

ARCHITECTURAL RECORD



The New Record Premiere Issue

Project Diary: Steven Holl's Triumph in Japan

Phoenix: The Next Los Angeles? by *Michael Sorkin*

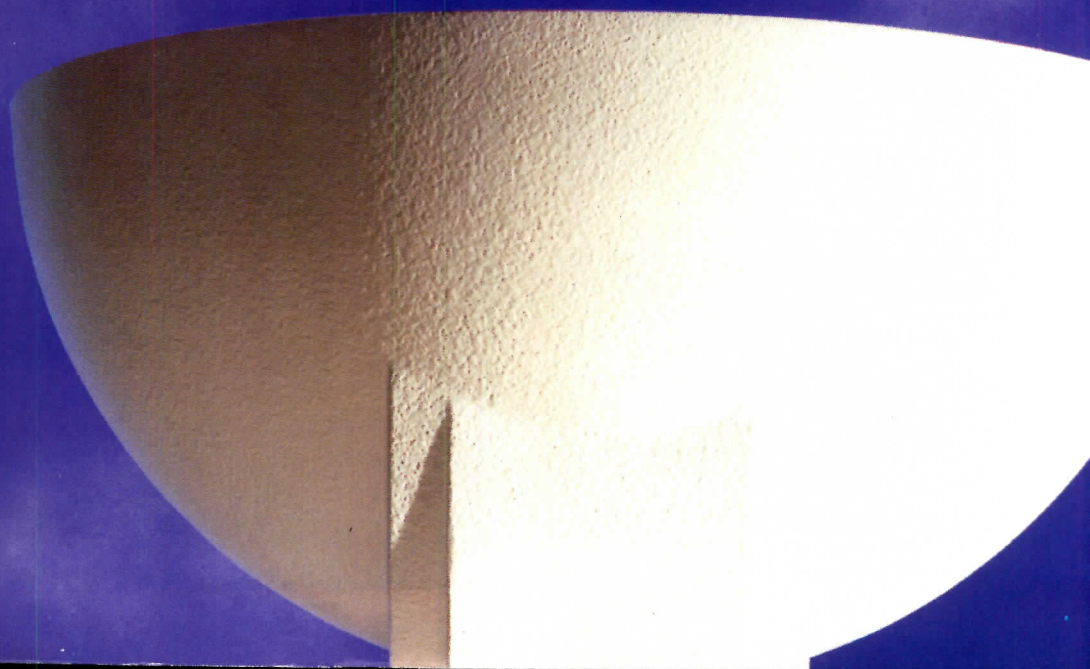
plus: The Phoenix Art Museum

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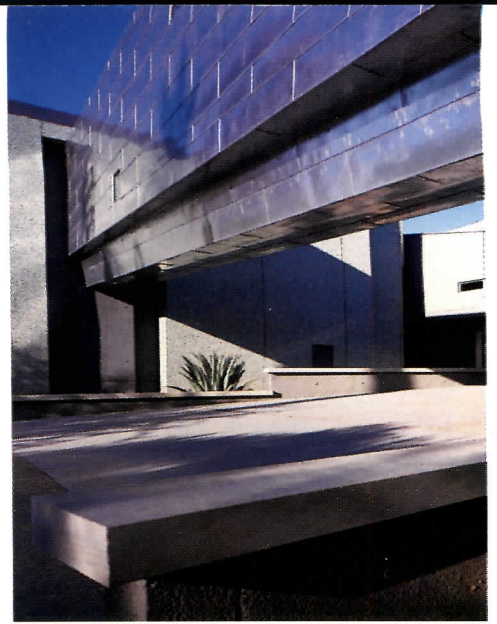
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Continuing Education: Three
AIA/ARCHITECTURAL RECORD continuing-education opportunities are offered this month: "Fundamentals of Metal Roofing" (page 161), and two stories from advertising supplements, "High Performance from Start to Finish" (page 147), and "Designing and Engineering the Future" (page 158).

Cover: Makuhari Housing Complex
Chiba, Japan, Steven Holl Architects
photo: © Paul Warchol
background: Steven Holl's notes
Above: A metal bridge connects two new wings of the Phoenix Art Museum
by Tod Williams, Billie Tsien and Associates.
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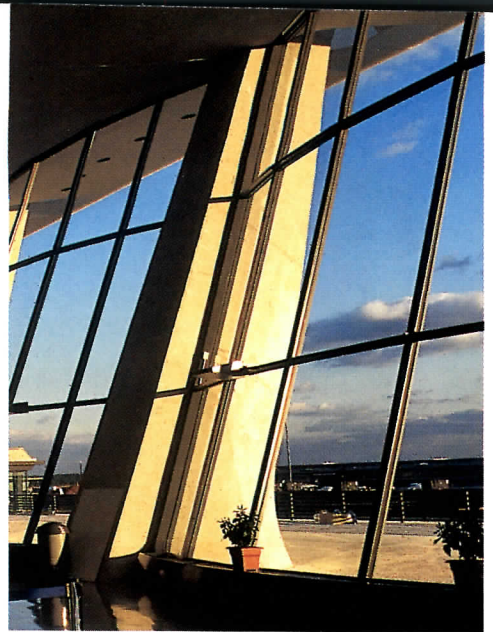
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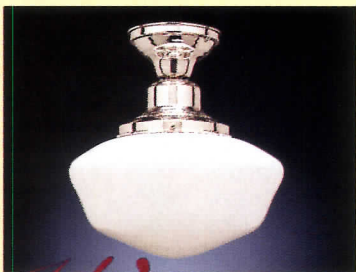
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Mockbee/Coker Architects.
Photo: © Timothy Hursley. Cover Design: Carbone Smolan Associates.
Above: Canova Museum, Possagno, Italy; remodeled in the 1950’s by Carlo Scarpa.
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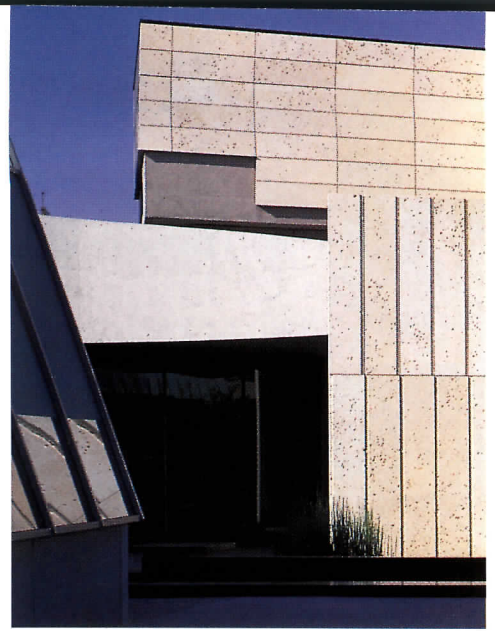


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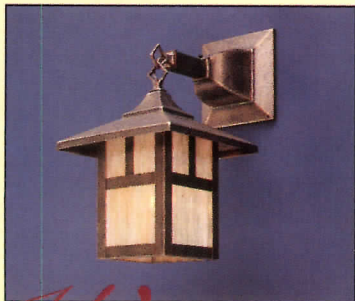
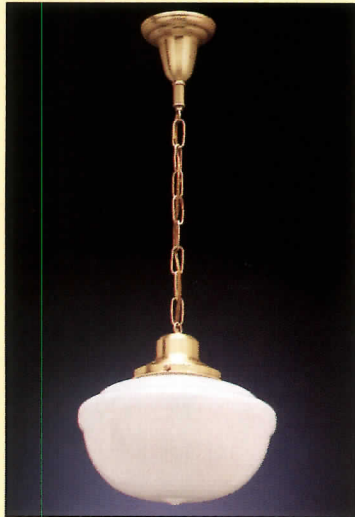
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Cover: Leeper Studio Complex, Atlantic Center for the Arts, New Smyrna Beach, Fla. Thompson and Rose Architects.
Photo: © TRA. Cover design: Carbone Smolan Associates.
Above: RWE AG Hochhaus, Essen, Germany. Ingenhoven, Overdiek, Kahlen & Partner, Architect.
Photo: © Holger Knaut.

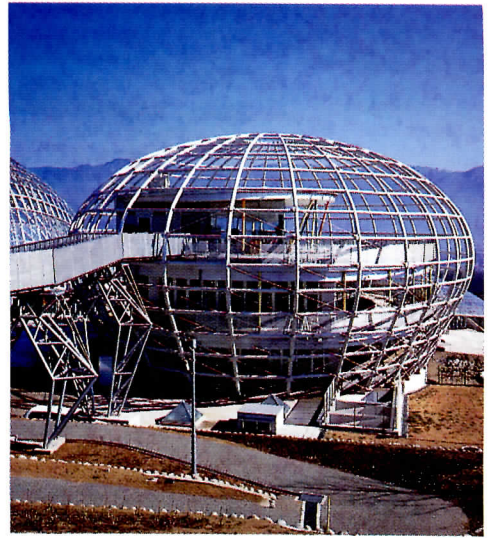
"Is that the company that made the boomerang laminate?"

Atlanta architect at Marlite Focus Group



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Cover: Chapel of St. Ignatius, Seattle, Wash. Steven Holl Architects. Photo: © Paul Warchol. **Above:** Yamanashi Fruit Museum. Itsuko Hasegawa. Photo: © John Edward Linden/Arcaid.

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Los Angeles Designer at Marlite Focus Group



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Cover: Chairs by designer Roy McMakin, along with excerpts from his sketchbooks. Photo: © Edmund Barr.
Above: Internal courtyard, Urban Interface Loft, New York City. Dean/Wolf Architects. Photo: © Peter Aaron/ESTO.

"Is that the company that made the boomerang laminate?"

Atlanta architect at Marlite Focus Group



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Cover: Guggenheim Museum Bilbao, Bilbao, Spain. Frank O. Gehry & Associates. Photo © Jeff Goldberg/ESTO.
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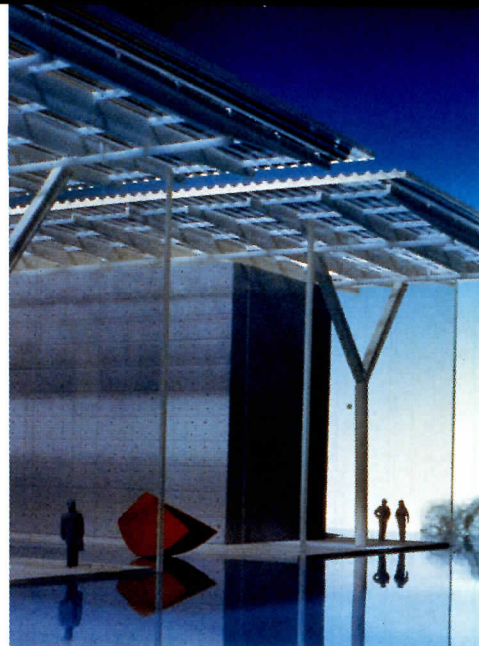


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Above: Tadao Ando's competition entry for the Modern Art Museum of Fort Worth (see page 63). Photo courtesy the Modern Art Museum of Fort Worth.

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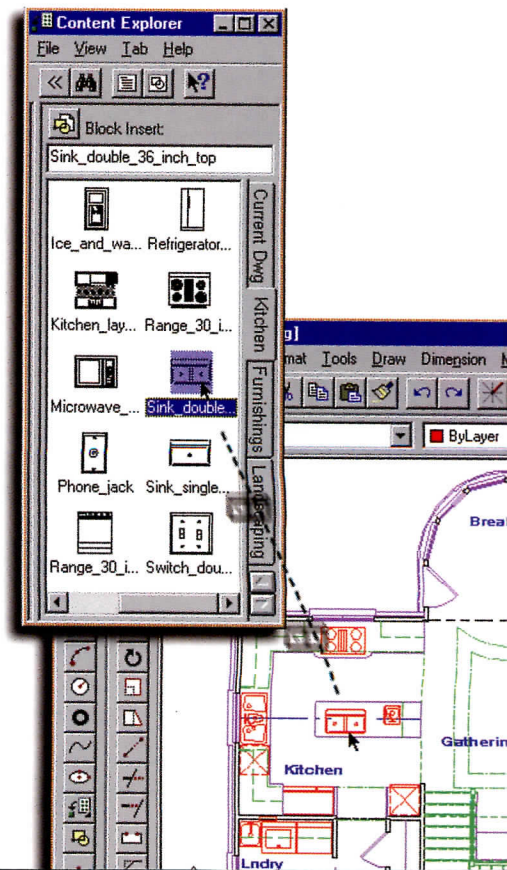
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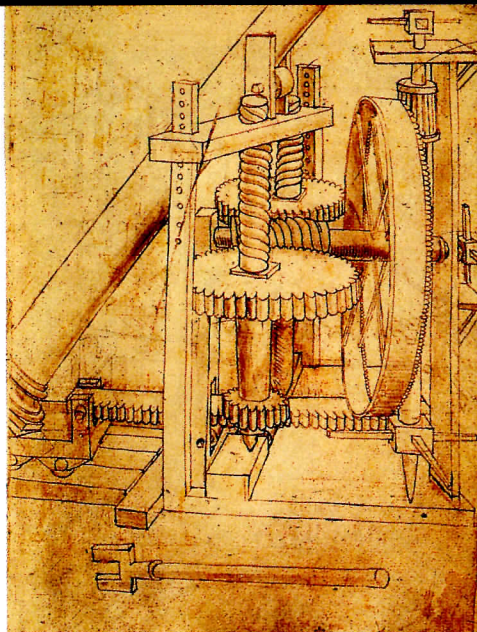
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Cover: Carmel Mountain Ranch Library, San Diego, California. M. W.

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Above: Column lifter designed by Francesco di Giorgio in the 15th century, from "Mechanical Marvels" (page 52). Photo courtesy Institute and Museum of the History of Science/Florence.

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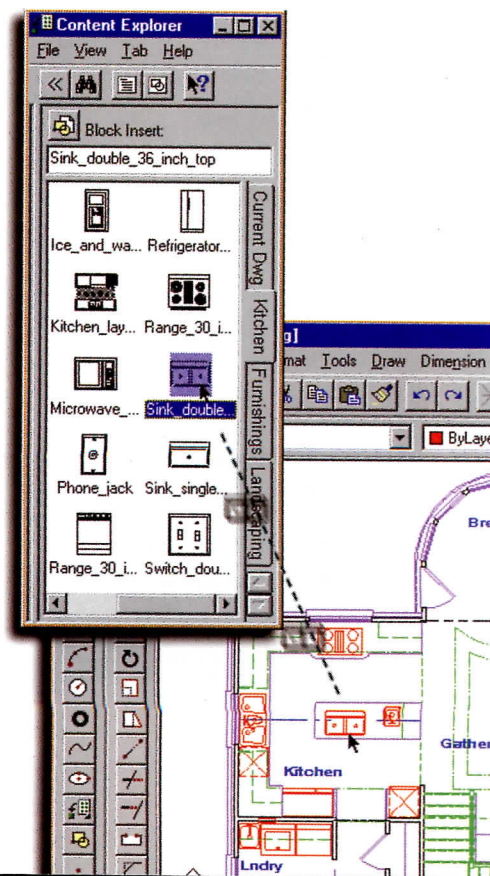
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EDITORIAL:

Poised for the Millennium

— ROBERT A. IVY, FAIA

This is a dynamic moment for architecture, a profession poised for the millennium—fueled by a robust economy, enriched by a plurality of styles, challenged by new ways of doing business, informed by increasing diversity of the workforce, and brimming with information and technological advancement. Such moments of change can be confusing times, demanding a voice, a guide through the maze of contemporary architectural practice. A good magazine can clarify the paths.

Yet how can we, a two-dimensional magazine, best present architecture, a multi-dimensional discipline? How can a single journal embrace the art and science, the pragmatic and esoteric aspects of the field? The cover of this magazine, a bold red sheet, announces our commitment to change. Both a real building and the ideas that led to the building share equal weight: a photograph of architect Steven Holl's Makuhari Housing Complex rests on a page from the architect's hand-written journal. The overlay implies that architecture is a composite discipline that consists of both active process and real projects, suggesting that RECORD will present the "how" and "why" of architecture as well as "what."

The proof of our intentions lies inside. We are devoting more pages to individual projects, offering more analytical drawings, more text, and more points of view. The stories, such as our newly instituted "Project Diary," present critical moments in the life of each project, whether in business or economics, construction, design trends, or post-occupancy.

The pages look different. Technology appears alongside social concerns; client and user voices offer counterpoint to interviews with architects. By juxtaposing information from numerous sources, busy readers can determine what to spend time with, how best to learn, and when to kick back and enjoy the ride. Real life presents such junctures, offering choices for learning or delight; so should our magazine.

We will not shrink from controversy, because the challenges facing society and the profession, from the plight of our urban centers to the chal-

lenges of the marketplace, demand leadership. You will hear writers' voices speaking with clarity and force from our pages. The best American critics, as well as international contributors, will analyze major works of architecture and take positions on substantive social issues to provoke thought and stimulate debate. Whether the writer is Robert Campbell tackling American architecture's vitality or Michael Sorkin writing about urban sprawl, ARCHITECTURAL RECORD will encourage conversation wherever architects converse—in face-to-face meetings, on-line, or in our pages. By raising important questions for the profession and the larger culture, the magazine will prove essential reading.

The number of you who read this magazine is growing. Our circulation now approaches 100,000 persons, including not only the majority of this nation's architects, but facility managers, clients, government officials, and other professionals. As of this month, all members of the American Institute of Architects will receive our magazine as a benefit of membership. We heartily welcome the 58,000 members of this distinguished professional society, though many are already regular subscribers. Their collective knowledge can inform our magazine, much as the information resources of our parent corporation, McGraw-Hill, give us access to a world of data. We are proud that the AIA chose to receive ARCHITECTURAL RECORD and pledge to all our readers, both AIA members and other subscribers, to uphold our 106-year history of editorial autonomy and integrity. The magazine's independent voice will persist as guide, mentor, and friend.

So welcome, all of you, to the new ARCHITECTURAL RECORD. In all our optimism, we offer one caveat. Other advances are in the wings. January is only the beginning of our renewal and a new, first step down the path. Join us on the journey.



Architectural Record's own journey

How did we arrive at the new RECORD? Our own path has been a deliberate journey across the nation. We held focus groups and roundtable discussions in a number of cities nation-wide, probing and listening to readers across the demographic spectrum. Your messages were clear and consistent: Speak with authority. Give us a voice. Offer more analysis. Continue to inspire us. Yet we knew that the magazine could not be all things to all people.

Once we knew what you wanted, we overlaid your desires with our own critical judgment. Our editorial vision includes key elements to appear regularly: a "dialogue" section that invites your responses and consists of letters, an interactive poll, a guest editorial ("Speak Out"), and a question-and-answer column ("AR Mentors"). Each issue will include either a project diary or critical analysis; a major article considers professional or social issues. Our signatory Building Types Study will remain, augmented by industry statistics and an introductory essay. Technology will appear in two guises—both integrated into articles about specific architectural projects and

York firm of Carbone Smolan Associates. We admired their process, which parallels an architectural firm's own design methods. After months of consultation and late nights, we thank them, particularly Ken Carbone, Leslie Smolan (pictured below), and their project designer Jennifer Domer, with Carla Miller and Lesleigh Feldman, for breathing life into our refreshed editorial product.

They were led through this effort by the magazine's interim editor, Malcolm Abrams. Malcolm came to ARCHITECTURAL RECORD as a consultant and brought experience, a steady hand, and an optimistic spirit as the staff moved into unfamiliar waters. Much of what you see here, the initial articles and the infectious spirit, is a product of Malcolm's hard work.

An editorial advisory board of industry leaders, both from the AIA and from the McGraw-Hill Companies, offered sound advice. Advisory



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as free-standing offerings. News and continuing education expand in scale and scope. Our final page looks into the future, searching out developments that may change the way we live and work.

Some of our standard offerings were sacrosanct. Devotees of the RECORD LIGHTING supplement will find it bound into the magazine quarterly, starting in February, 1997. The magazine will expand two of our most popular issues, RECORD HOUSES (April) and RECORD INTERIORS (September), in ambition and content. Our second computer delineation award, which proved to be a popular competition, will be announced later in the year. Likewise we will include supplementary pages on international practice in Asia and Latin America. Our calendar is filling up.


Where could we obtain the accessible graphic structure, the framework for our ideas? Our goals were clear: more words, more drawings, more illustrations—all interrelated in a way that you might segue from article to graphic image to illustration. Descriptive headlines should introduce stories; the cover should allow room to announce the exciting things inside, all bound within a graphic format that was very much of our time.

After interviewing a score of graphic designers, we chose the New

board member Malcolm Frouman, the art director of Business Week magazine, deserves singular praise for guiding our graphic progress with an eagle eye. Our editorial staff met every challenge, including a radically new way of making a magazine. Check out our masthead and read their names. This hard-working, talented group pushed their limits of time and energy to ensure the quality of the magazine. They were backed up by our publisher, Elaine Shusterman, who has remained steadfastly committed to transforming ARCHITECTURAL RECORD. And our advertisers have proved staunch allies, overflowing with support for our efforts.

Today, we continue to plan for change. Our Web site (<http://www.architecturalrecord.com>) will become operational by February 1, offering timely news, a chance to publish more information and research, and, ultimately, places to chat with each other. And we are planning a major new competition that should increase the visibility of architects and architecture within the business community in a significant way.

In addition to everything we have told you about the new ARCHITECTURAL RECORD, we make one further pledge: We will surprise you too. See you in February. ■



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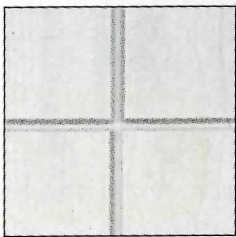
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CIRCLE 16 ON INQUIRY CARD

LETTERS



Raj Barr-Kumar, FAIA, RIBA
President, The American Institute
of Architects

Architecture begins in optimism

Architects translate client needs and community aspirations into built reality. We balance costs, codes, and constructibility to create places of beauty that elevate the soul and uplift the spirit. But it is social responsibility that validates design excellence. Today's building challenges include sustainable development in harmony with nature; improving the quality of community life; providing affordable housing; and restoring economic and social vitality to our cities.

Coupled with service to community is architecture's service to the client. Today's clients seek increased design accountability and a wider array of architectural services. The architect's unique talent—the ability to define the problem, to envision the solution, to manage the creation of a quality environment—in fact today adds beauty to the client's bottom line.

The AIA is helping the architect serve client and community with renewed vigor, advocating the assertive practice of architecture: tweaking the risk/reward ratio, redefining the profession, expanding practice opportunities, and developing new contract documents and practice tools. For example, new owner-architect agreements and the general conditions of construction (B141 and A201) incorporating this stance are under development and slated for introduction in 1997.

The renewed AIA is responding to community needs with action. For example, the Legacy Project in New Orleans, a 500-person "green" shelter for the homeless conceived as pavilions in a park, is being designed and built under the leadership of AIA architects in time for dedication at the national convention.

So it is with optimism that we celebrate a significant first anniversary with this issue of ARCHITECTURAL RECORD, and the beginning of a new information partner for AIA members.

Welcome to the new ARCHITECTURAL RECORD.

One year ago, The McGraw-Hill Companies and the American Institute of Architects signed a partnership agreement, effective this month, intended to strengthen the architectural profession—and support AIA members' drive to more assertive professional practice.

As architects, and AIA members in particular, broaden their services and sphere of influence in the community, the need for design, business, and practice information and continuing education grows. As architects move into more diverse work settings, becoming clients in government and corporations, specialized management information becomes more important. As the world of architecture turns global, international practice information becomes vital to U.S. architects working abroad. And as students of architecture graduate into a world of alternatives to traditional practice, they need better career management information.

With this new AIA/McGraw-Hill alliance comes access to McGraw-Hill's rich array of professional and market-data information services, plus continuing-education programs to help AIA members prosper and fulfill their obligations to create more wholesome communities wherever they work. And, starting with this issue of ARCHITECTURAL RECORD, AIA members and other architects will have a revitalized professional journal that not only serves them, but begins to expand the public percep-

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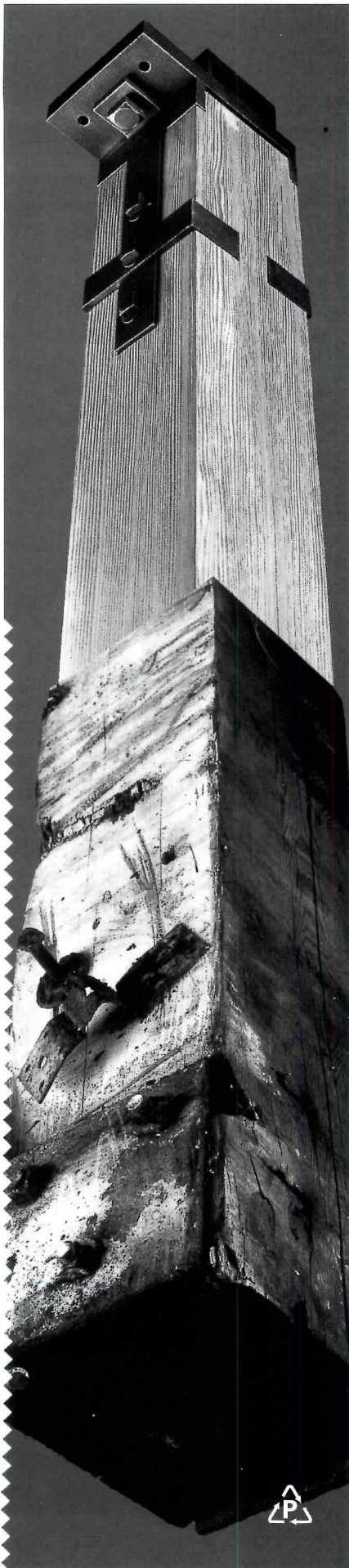
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tion about what architects do.

For more than 140 years, the AIA has served architects and the American public by actively promoting the value of architecture as vital to the quality of life in our communities. For much of that time, there has been a natural affinity between The McGraw-Hill Companies and ARCHITECTURAL RECORD and the AIA. This affinity is based in a shared vision of service to architects and society.

The AIA Board of Directors is confident that the RECORD tradition of editorial integrity and journalistic quality will continue to merit the commendation of the American Business Press, Columbia University School of Journalism, and other standard setters in the field of journalism for many more years, as it has in the past.

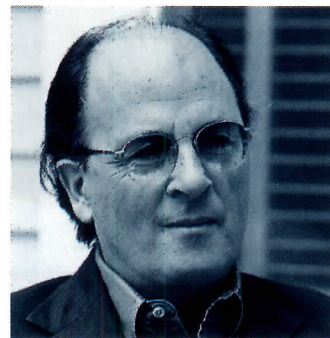
So, it is with optimism that we look to our future with ARCHITECTURAL RECORD. Enjoy it.

—Raj Barr-Kumar, FAIA, RIBA
President

The American Institute of Architects

More on the Boldness Gap

Editor's Note: RECORD received a score of letters in response to contributing editor Robert Campbell's article, "The Boldness Gap: Why America Is Falling Behind Other Countries [November, 1996, pages 76-79]. Several were published in December. Here are more.



Robert Campbell

I thought Robert Campbell's opinion piece was one of the most accurate summaries of the problems with architecture in the U.S. today. It was refreshing to read some of my own

unfocused musings expressed in a clear, concise, and seemingly well-researched essay. The most critical point made was the quote by an architectural school dean: "Our high-school students are lazy and ill-prepared." That comment reflects on both the students entering the field and on the public who is supposed to support and debate architecture.

One question I have is whether U.S. architects are doing bold, inventive work abroad and just not here in the States. As a recent grad, well under 30, I have to agree with criticism of a system that rewards "old, safe, established firms." As vice president of AIA Students, I advocate for the younger generation.

RECORD senior editor Charles Linn once told one of our gatherings that no one under 30 produces work worthy of publication. I see a lot of very bold, inventive work going on at U.S. schools, and not just those on the East Coast. It is even easier to find informed, caring, and responsible work at Auburn, Mississippi State, Iowa State, and Minnesota, to name a few. I hope that RECORD pursues the issues Mr. Campbell raises.

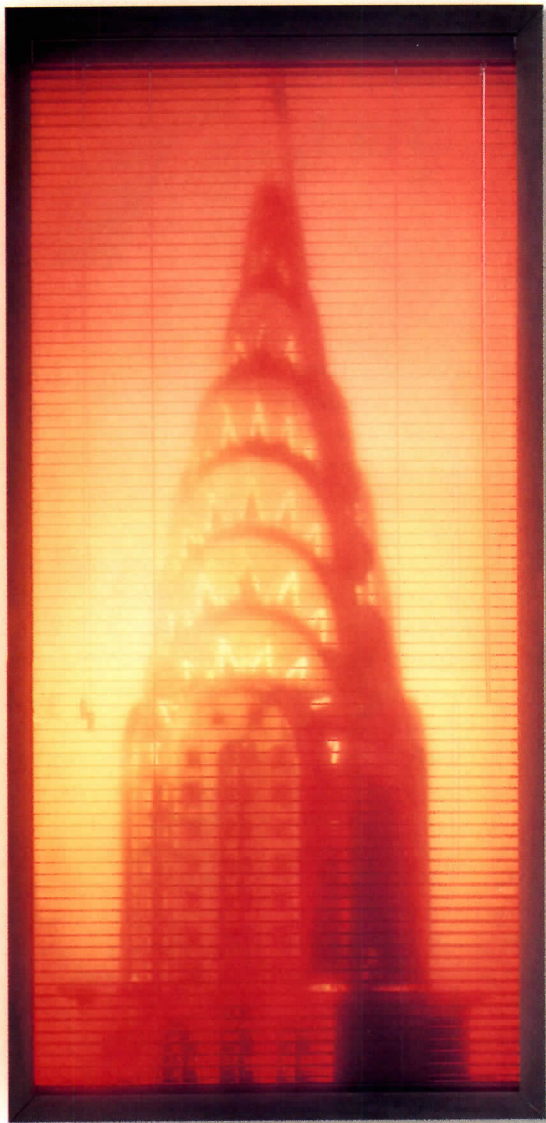
—Casius Pealer
Vice president, AIAS

Charles Linn comments: The intent of what I said was that unfortunately few architects get a chance at producing buildings to publish before a certain age. We'd love to see more.

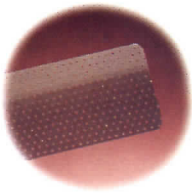
Intriguing article, "The Boldness Gap." Mr. Campbell raises some tough questions that can be debated forever. "Bold" to one may be "contrived" to another. Maybe the need to say "look at me" is an expression of cultural insecurity? Maybe American architecture is a little tired of the noise. But, then again, when was the last time a great American building really got the public's attention?

—M. Raymond, Architect
Provo, Utah

(continued on page 210)



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SPEAK OUT: “We need a different type of internship; one that is more proactive and relevant.”

— BY BOB DILLON



Bob Dillon is a writer and intern in Minneapolis. He has worked as an advocate for architecture students and interns in his capacity as the recent editor in chief of CRIT, The Journal of The American Institute of Architecture Students. He is a former member of the Board of Directors of the AIAS, and an associate member of the American Institute of Architects.

Being an intern is like being on a treadmill moving at uncomfortable and uncontrollable speeds, alternately too slow or too fast. I feel I have so many skills that are underutilized and, at the same time, so much more to learn that I'm usually frustrated by both situations.

Friends of mine have responsibilities and knowledge that I do not have, and I wonder how I got to a point where I'm lagging behind them in terms of professional development. Some other interns I know feel the same way. It seems to me we need a different type of internship; one that is more proactive and relevant. An internship redefined to include stronger mentorship.

A sense of “placelessness”

Architectural internships have been marginalized because many professionals fail to fully recognize their role in the partnership that is the Intern Development Program (IDP). Experienced architects have the ability to positively affect the future of the profession by committing time and resources to the development of interns. Part of the problem is that interns currently develop in a place that is considered neither fully academic nor fully professional; a sort of limbo where we shoulder the responsibility of implementing our own training within the guidelines of IDP, often without the help of a committed mentor. This sense of “placelessness” is perplexing; we are essentially professionals in training, limited by what we know but driven by what we know we can become. Our education and goals are no different than professional

architects; we are just at an earlier point in our careers. To recognize this simple fact is to understand the connection to the future of the profession that interns and architects share.

If it's important to you that we become better equipped to handle the responsibilities inherent within the profession, we're going to need your help. There are many examples of design firms successfully developing in-house work/training programs which allow interns to realize the full potential of the IDP experience. By creating this type of academic and professional partnership, the interns, the firm, and the profession as a whole benefit. Competent interns, imbued with a sense of empowerment over their development, will only strengthen the profession by learning to work as a team. Future generations of interns, who are as committed to an employer as the employer is to them, will benefit from a profession that has learned to advocate strong mentoring and relevant internships.

Hold intern meetings

The first step toward realizing this goal is to start a dialogue with the interns in your office. Listen to their concerns and help guide them through the maze of IDP and licensing requirements. Find out where they are in the process of IDP and work with them to determine what requirements they still need to fulfill. Advise them of the opportunities available in the office and in the community that will help them realize their goals. If there are a

number of interns in your office, bring them together to discuss their mutual concerns and frustrations. You'll learn what they need from you, and they will, in turn, learn from each other. This type of mentorship will go a long way toward realizing the full potential of both your professional and our IDP experiences.

The fruits of your efforts may not be seen right away, since any changes will be subtle and cumulative. Yet your commitment will ultimately mean that interns become better practitioners, more competent and knowledgeable, and with greater business savvy. In the meantime, you'll alleviate the frustration and confusion of young professionals trying to find their way in the complex world of architecture. And that, I guarantee you, will pay dividends.

Contributions: *If you would like to express your opinion in this column, send submissions: by mail (with a disk, if possible) to Speak Out, Architectural Record, 1221 Avenue of the Americas, New York, N.Y. 10020; fax 212/512-4256; or e-mail: rivy@mcgraw-hill.com. Essays must not exceed 700 words. The editors reserve the right to edit for space and clarity. Where substantial editing occurs, the author will receive final text approval.*



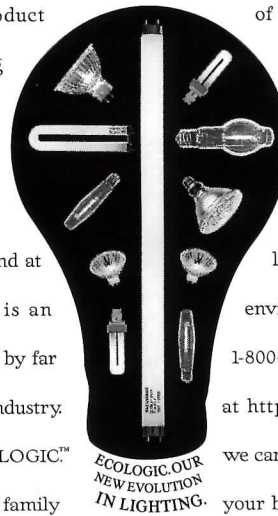
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CIRCLE 19 ON INQUIRY CARD

MENTORS: Tales of two architects—one stuck doing CAD work; the other's former employer refuses to release his work.

Kate Schwensen, AIA, Associate Chair for Research and Extension, Department of Architecture, College of Design, Iowa State University

Samuel A. (Pete) Anderson, III, FAIA Architect for the University of Virginia, member AIA's National Ethics Council



After working hard for one architect for nearly a decade, I left because it was clear I would never be offered a full partnership. That was a year and a half ago. I work for a good firm now in my hometown. I'm still not a partner, but I was promoted to senior project manager with potential partner status. My concern is that my former employer refuses to share copies of drawings that I participated in creating. He refuses to even let me have copies of photographs which I took. Do you think I should take legal action?
— *unsigned*

Samuel A. (Pete) Anderson responds: Unfortunately, your problem is far too common. Employers sometimes refuse to grant proper attribution to team members who actually perform the work. If your employer is a member of a professional association, he is bound by its ethical code of conduct. The AIA code of ethics would grant you proper attribution as well as access to copies of your work. If your employer is not a member of a professional association, you are left to the vagaries of the laws in your home state.

I am an architectural intern with two years experience. Since I graduated from architecture school with strong computer skills, I have spent all my time glued to a monitor doing CAD work. I know that I need to learn about construction and business, but my employer says that

I am a valuable employee to the company. How can I improve my practical education?
— *An intern in New York*

Kate Schwensen responds: Recently, I have visited a number of offices and witnessed this newest version of the internship problem. Computer literate recent graduates are sitting behind their monitors on one side of the room, earphones on, interacting only with their screens.

Meanwhile, principals and project managers are on the other side of the room, doing business in much the same way that they have always done it. They are talking on the phone to a contractor, talking to each other over a set of drawings, writing correspondence to a client, and checking shop drawings.

While historically interns have spent the majority of their time on construction documentation, (because it is the most labor-intensive phase of their traditional services), computer documentation has increased the separation between drafters and decision-makers. Your valuable skills often isolate you from other forms of decisionmaking. If your employer is not CAD literate, you are further isolated because the employer does not understand your "language" any more than you understand his or hers.

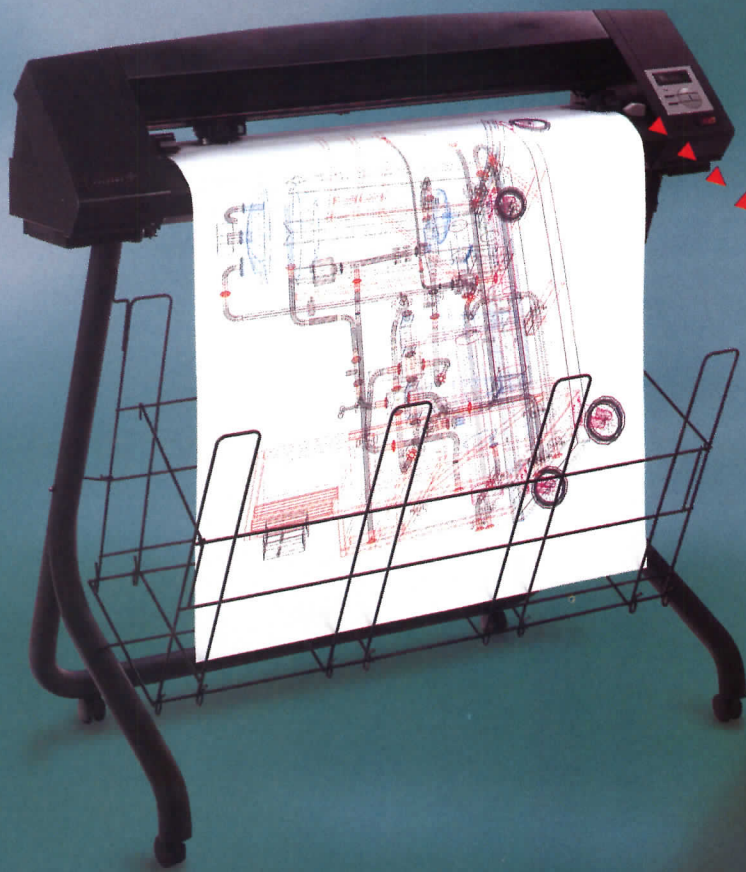
There are two paths you should take simultaneously. The first requires only your own initiative. If you are wearing earphones and listening to music: TAKE THEM OFF. You can learn an amazing amount by simply overhearing the conversations of project managers and others. Also,

make yourself available. Volunteer for odd assignments. Let your superiors know that you are ready, willing, and able. Ask questions. Organize a group of interns in your office and other local offices to discuss common concerns. If there are common shortcomings to your internships, such as a lack of construction observation experience, ask a local architect to organize a construction visit for the entire group of interns.

The second path requires the cooperation of your employer. Speak to your employer about your desire to learn and do more. Use the Intern Development Program guidelines as a means of illustrating the minimum breadth of experience that you need. Together with your employer, devise a plan by which you can participate in management, client contact, construction observation, and contract administration. You and I and your employer all know that you need to be given the opportunity to gain new knowledge if you are to be a valuable long-term employee.

Questions: *If you have a question about your career, professional ethics, the law, or any other facet of architecture, design and construction, send submissions: by mail to Mentors, Architectural Record, 1221 Avenue of the Americas, New York, N.Y. 10020; fax 212/512-4256; or e-mail: rivy@mcgraw-hill.com. Submissions may be edited for space and clarity.*

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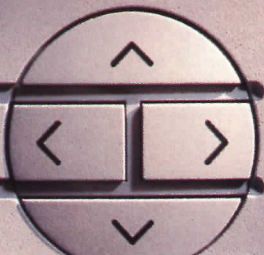
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CIRCLE 20 ON INQUIRY CARD

PULSE: Record readers were asked: Would you risk profits on a user satisfaction survey?

NO: 67%

YES: 33%

No: "We've kicked this idea around in our office and talked to a few colleagues about it, and it sounds like a good idea. But our niche is mainly resorts and country clubs. We've found that people tend to expect perfection whether you're putting your fee on the line or not. If an architect offered this sort of arrangement, no one would refuse to take it. A lot of architects would do that as sort of a marketing strategy to get a leg up and say, 'This is how much I stand behind my design.'

"But the problem we've run into is that design is so subjective, that unless you have a blatantly bad design, a lot of the satisfaction-quotient is a personal thing. We think that's a huge risk for an architect to take. This forces design into being a commodity. You don't have the quality-control in building that you have, say, with manufacturing a

computer. With the computer, you have a 90-day warranty.

"It's supposed to do certain things, and if it doesn't you send it back to be fixed. With architecture you have the client's program, environmental constraints, and fee constraints, and a lot of times there are really excellent reasons that a building isn't perfect. But the users really don't care or appreciate the architect's position. They just know if the building isn't perfect.

"There may be certain building types where basing the fee on a user survey would work. But when you have a complicated program, a tough budget, and several governmental agencies to deal with, I think it would be tough to get your money."

—William Kortsch, AIA
Ron Gregory and Associates,
San Diego, California

Yes: "I'd take the risk provided we had a high enough fee. I mean, if we'd cut our fee to the bone just to get the job in the first place, then I wouldn't want to take the risk. But yes, if I could cover my overhead and expenses, I would risk part of my profit to get the job."
—Thomas Walgamuth, architect,
Lafayette, Indiana

Yes: "Not only should architects be willing to risk up to a third of their profits, they should even be willing to put up 50 percent. Satisfying the end-user is the reason they were hired in the first place, as well as to use their talents to render a service and get something constructed. Granted, clients can be a pain in the neck, but the proof is in the pudding: in this case, it's how happy people are with the building. If we're only judging our work ourselves,

then it's easy to say we look good.

"In both the government and the private sector, there isn't enough involvement with the community, whether it's the community of the campus or the community of the town. That's what makes me cranky—that architects don't take the community into consideration. Maybe if we put our profit on the line we would pay more attention."

—Jeffrey O'Connor,
Building designer, A/E Services,
Oklahoma State University,
Stillwater, Oklahoma

This month's question:

Can New Urbanist planning and design principles be applied successfully to inner-city public housing?

The first wave of New Urbanist developments, such as Seaside, Florida, were built on "greenfield" sites beyond the central city. A second generation of New Urbanists (and some first generation ones, as well) are now trying to apply New Urbanist principles to inner-city public housing. [See "The New Urbanists: The Second Generation" in this month's Building Types Study, pages 132–145].

Do you think New Urbanist Principles will work on public housing? Yes No

Let us know your opinion:

May an editor contact you for further comments? Yes No

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CIRCLE 22 ON INQUIRY CARD

SHARKS IN THE DESERT AT SOUTHWEST'S FIRST AQUARIUM

The Southwest's first aquarium, a \$12.7 million addition to Albuquerque Biological Park, simulates the path of a single drop of water from the headwaters of the Rio Grande River in southern Colorado down through New Mexico, finally emptying into the Gulf of Mexico. The 50,000-sq-ft aquarium, which opened Dec. 5, 1996, contains 3,000 water creatures, including 16 Sand Tiger, Brown, and Nurse Sharks.

In total, the aquarium, designed by the Albuquerque-based architect Van Gilbert of Van H. Gilbert

The Albuquerque Aquarium, the newest addition to the Albuquerque Biological Park (right). Walking through the 45-ft Eel Tunnel, visitors are surrounded by marine life (below).



Architect, P.C., contains six large exhibits that replicate the 1,885-mile river journey from freshwater to saltwater. Along the way, visitors can see 167 species of vertebrates and 28 species of invertebrates.

The main viewing area of the shark exhibit boasts the largest piece of curved glazing in North America. According to Gilbert, "the concave shape allows you to be totally engulfed within the exhibit. It goes from floor to ceiling so it's as though you are walking on the floor of the ocean." The 20,000-pound acrylic piece, manufactured by Reynolds Polymer Tech of Grand

Junction, Colo., is 40 ft long, 10 ft high, and 8 in. thick.

The 500,000 gallons of salt water required for the entire aquarium is charcoal-filtered city water that is directed through salt-water reservoirs located beneath the aquarium and recirculated with a sand filtration system. According to Pat Westbrook, the assistant director of the biological park, ozone is also used to disinfect and polish the recirculated water.

The shark enclosure itself is a 285,000 gallon, 5,000 psi silica-fume concrete tank treated with a Vandex waterproofing compound. The compound spreads throughout the capillary system of the concrete, filling microscopic air channels to ensure the tank doesn't leak. In

addition, vinyl water stops were used at all construction joints.

Diners in the aquarium's San Esteban Restaurant can view the shark tank through two large windows extending along one wall. The rear wall of the tank is painted a deep blue with Sta-Crete, a heavy epoxy-based paint used to smooth and seal concrete inside the tank.

Another of the exhibits, the 45-ft-long Eel Tunnel contains 130 moray eels inside a 5 1/2-in.-thick polymer acrylic dome. A visitor passing through the tunnel is surrounded by water on three sides, providing a view of the eels, and 128



eel apartments made of concrete-based artificial rock and coral.

The \$12.7 million required to build the aquarium was funded

through a 1987, quarter-cent "quality of life" sales tax imposed for 10 years. More than 550,000 visitors are expected to tour the facility each year. The aquarium is one of several new additions to the 170-acre Albuquerque Biological Park, located downtown at Central and New York Avenues.

"Many of the people in New Mexico have never seen an ocean, and to see the ecological and environmental aspects of it is an incredible education tool," commented Gilbert, who served as project manager and architect for the park. *Danielle Beaugureau*

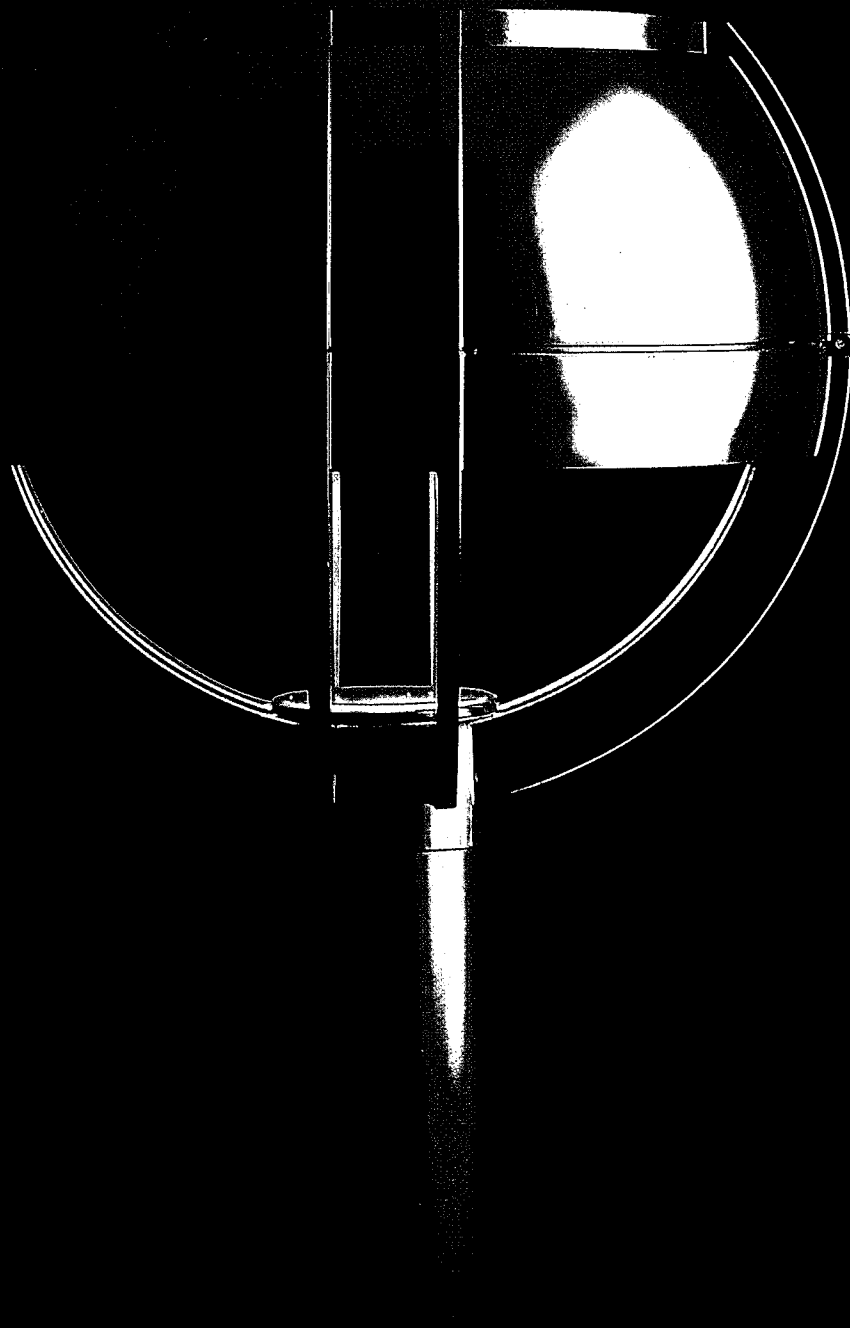
LOEWS BUILDING FIRST NEW MIAMI BEACH HOTEL IN 30 YEARS Ground has been broken on an oceanfront complex to be built by Loews that will include the first new hotel erected in Miami Beach, Fla., in 30 years.

Loews won the contract on the \$135-million project, which also includes the complete restoration of the adjacent Art Deco, 110-room St. Moritz Hotel, by beating out six competitors, including Ross Perot, Hyatt, and Peabody Hotels. According to William Cary, historic preservation coordinator for the City of Miami Beach, Loews's plans "paid the most respect to the historic district and retained more of the original St. Moritz than any of the other projects proposed."

The Loews architects, Nichols, Brosch, Sandoval & Associates, working with Bernard Zyscovich, a historic preservation architect, have already removed the hotel's exterior facades and ornamentals added in the 1960s, and preserved the original front desk, terrazzo floors, and wrought-iron staircase.

The new 16-story tower will include 650 rooms, four restaurants and lounges, a 4,500-sq-ft fitness center and 90,000-sq-ft of meeting space. The complex, about three blocks from the Miami Beach Convention Center, will add luxury room inventory to a popular convention destination that hasn't been able to accommodate large groups within walking distance of the convention facility.





KIM LIGHTING

28 FIRMS WIN 1997 AIA HONOR AWARDS

The American Institute of Architects selected 28 projects from among 500 submissions to be recipients of its 1997 Honor Awards.

Commenting on the winners, the jury chair for architecture Malcolm Holzman, FAIA, a principal with the firm of Hardy Holzman Pfeiffer, said, "The selected projects take many forms which interpret and test the requirements of locale, budget, and owners needs. The wide variety of submissions proves there is nothing absolute in architecture today."

The 28, by category, follow:

Interior Awards

Root Residence, Armband Beach, Fla., *Pasonella + Klein, Stolzman + Berg Architects, P.C., New York City*

Bow Truss Studios/Game Show Network, Culver City, Calif., *Steven Ehrlich Architects, Santa Monica, Calif.*

Bottega Veneta, Boston, *François de Menil, New York City*

Tokyo International Forum, Tokyo *Rafael Viñoly Architects, P.C., New York City*

The Henri Beaufour Institute, USA, Washington, D.C., *Williams & Dynerman Architects, Washington, D.C.*

New Victory Theater, New York City, *Hardy Holzman Pfeiffer Associates, New York City*

Dillingham Hall at the Punahou School, Honolulu, *Hardy Holzman Pfeiffer Associates, New York City*

Meyocks and Priebe Advertising, West Des Moines, Iowa, *Herbert Lewis Kruse Blunck Architecture, Des Moines, Iowa*

Praxair Distribution, Ankeny, Iowa, *Herbert Lewis Kruse Blunck Architecture, Des Moines, Iowa*

Delano Hotel, Miami Beach, Fla., *PMG Architects, New York City*



Architecture

Memorial Hall, Harvard University, Cambridge, Mass. *Venturi, Scott Brown and Associates, Inc., Philadelphia, Pa.*

Manville Hall, Berkeley, Calif. *David Baker Associates Architects, San Francisco, Calif.*



Schulman Residence, Brentwood, Calif., *Steven Ehrlich Architects, Santa Monica, Calif.*

The Neurosciences Institute, San Diego, Calif., *Tod Williams Billie Tsien Associates, New York City*

Lasater Residence, San Antonio, Tex., *Lake/Flato Architects, San Antonio, Tex.*

Laureola Oaks, San Carlos, Calif., *Seidel/Holzman, San Francisco, Calif.*

Delta & Pinelands Company Guesthouse, Scott, Miss., *Walter Chatham, New York City*

Bellevue Regional Library, Bellevue, Wash., *Zimmer Gunsul Frasca Partnership, Seattle, Wash.*

Bass Center for Molecular & Structural Biology, Yale University, New Haven, Conn. *Kallman McKinnell & Wood Architects, Inc., Boston, Mass.*

Tribeca Bridge by Skidmore, Owings & Merrill LP (above). Delano Hotel by PMG Architects (left). Neurosciences Institute by Tod Williams Billie Tsien Associates (below).

Arlington National Cemetery Facility Maintenance, Arlington, Va., *Kress Cox Associates, P.C., Washington, D.C.*

Boyd Lighting Headquarters, San Francisco, Calif., *Brayton & Hughes, Design Studio, San Francisco, Calif.*

Guest House, Medina, Wash., *Bohlin Cywinski Jackson/James Cutler Architects, Bainbridge Island, Wash.*

Paul Cummins Library, Crossroads School, Santa Monica, Calif., *Steven Ehrlich Architects, Santa Monica, Calif.*

Urban Design

Layfayette Courts, Baltimore, MD, *CHK Architects & Planners, Silver Spring, Md.*

Tribeca Bridge, New York City, *Skidmore, Owings & Merrill LLP, New York City*

Parco San Giuliano, Venice, Italy, *Comunitas, Inc., Boston, Mass.*

Kakaako Makai Area Development Strategy, Honolulu, *ELS/Elbasani & Logan Architects, Berkeley, Calif.*

Saigon South Master Plan, Ho Chi Minh City, Vietnam, *Skidmore Owings & Merrill LLP, San Francisco, Calif.* →



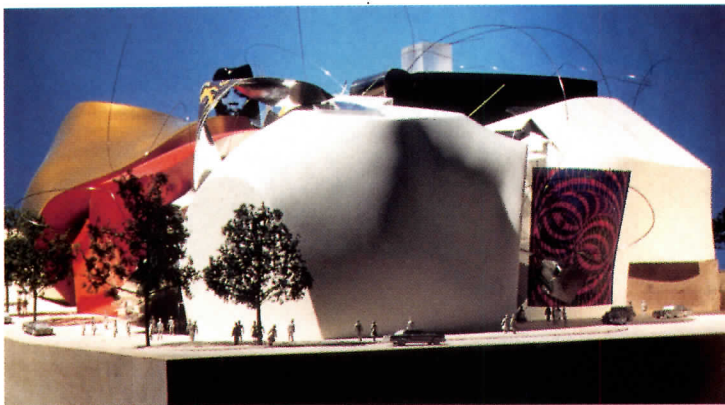
GEHRY DESIGNS "FAR OUT" INTERACTIVE MUSIC MUSEUM

Seattle, birthplace of Jimi Hendrix, The Kingsmen, and grunge, will soon have its own interactive music and performing arts museum. The Experience Music Project (EMP), founded by local billionaire Paul Allen and designed by Frank Gehry, is scheduled to break ground in May for a 1999 opening. The \$60 million complex "will use music to engage people in an entirely new way," Gehry said. "The exhibits and the building treat music as a living and evolving art form. I wanted the building design to evoke the energy of music."

The design is evocative—though critics disagree on exactly in what way. Some say the building resembles a Picasso painting. A reporter for the *Seattle Times* wrote that it looks like "a space-ship

building elements, including colored stainless steel, terrazzo, and glazed tile. The spirit of Hendrix appears in the form of a transparent overhead mural, and in psychedelic images anchoring some of the walls.

Museum designers intend to combine the interpretive aspects of a traditional museum, the educational role of a school, the research facilities of a specialized library, and the audience-drawing qualities of a performance hall, according to Jody Patton, executive director. The facilities will include a 35,000-sq-ft exhibit space, a 150-seat auditorium, 5,000 sq-ft of public gathering space, cafe, museum shop, classrooms, an interactive sound lab, and the Electric Library, a multimedia archive. The permanent collection includes examples of



that fell from the sky and got a little roughed up on landing."

"To those who say it looks like broken crockery," Gehry responded, "it took 30 models to get here. I didn't have a nightmare and do it."

The three-story, 110,000-sq-ft complex is formed by an arrangement of six building components, whose exterior surfaces and colors (bright orange, blue, and gold) are meant to recall pieces of broken Stratocasters (these being the instrument of choice for Hendrix, Kurt Cobain, and not coincidentally, Paul Allen) right down to the looping overhead cables that look like busted guitar strings. The building will also use unconventional

A building not unlike strings and pieces of a guitar.

musical instruments and equipment, photographs, films, artists' personal effects including costumes, jewelry, handwritten lyrics and other memorabilia, and extensive recorded-sound archives. Programs and exhibits will explore American popular music and culture with an emphasis on Northwest musicians and rock'n'roll.

The EMP is part of Seattle Center, adjacent to the Space Needle, various sports and performing arts facilities, and an amusement park. Museum officials project the first-year attendance will be 500,000.

BOAT OR BUILDING? The Whampoa Building in Hong Kong, a fantasy come to life for billionaire Li Ka-Shing, is filled with shops, restaurants, a health club, and other mall stuff. Tacky? You be the judge.



VENTURI, SCOTT BROWN QUITS FERRY PROJECT

With its most recent design for Manhattan's Whitehall Ferry Terminal scrapped by New York City officials, Venturi, Scott Brown and Associates (VSBA) has decided to withdraw from the project.

The Philadelphia-based architecture firm had won the competition for the project in 1992 with a controversial design featuring a three-story waterfront clock facade. The firm's latest design replaced the clock with a programmable electronic message board [RECORD, February 1996, page 11]. But the city has decided to go with a plain metal-and-glass facade instead. VSBA had worked on two major designs and dealt with a \$30-million budget reduction before deciding to step away from the project.

A spokesperson for the city's Economic Development Corp. said the firm's exit will not hamper the terminal's construction schedule, maintaining that the \$82-million facility will begin construction in 1998 and be finished by late 2001.

VSBA's second design was met with opposition by Staten Island Borough President Guy Molinari, who claims that Staten Island residents were concerned that the electronic message board would be too glitzy. "I thought the clock was offensive and the second proposal, the electronic 'zipper,' was equally

offensive," said Molinari. "It's not compatible with its surroundings... We've got a great view of lower Manhattan [from Staten Island] and we don't want to lose it," he added.

City officials were worried that community opposition would further delay the project, which is already three years behind schedule.

Others, however, felt that the review process had been undermined. "Venturi, Scott Brown were not treated very well in this process," said Tamara Coombs, chairwoman of the Ferry Riders Committee, a civic group. "Their second design was never properly presented to the public and a public forum of discussion with the architects has never taken place... A photo of their second proposal was published in a local paper and Staten Island residents were asked to call up a polling number and express whether they liked or didn't like the design!" VSBA declined to comment since the terms of its withdrawal are still being negotiated.

Anderson/Schwartz Associates of Manhattan, associate architect on the project, will continue to work on the revised design, which includes a two-story ferry terminal, outdoor walkways, shops, restaurants, a public plaza, an outdoor promenade, and direct access to subways and buses. *Katherine Kai-sun Chia* →

C/S Expansion Joints at



Architects: Pei Cobb Freed & Partners, Executive Architect: Leidenfrust/Hornowitz & Associates

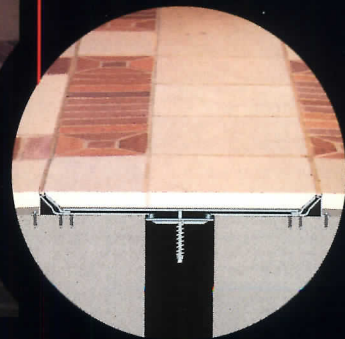
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HARD-WON RENOVATION OF SARASOTA'S RINGLING MANSION IS UNDERWAY



In the early 1920's, when architect Dwight James Baum was first approached by circus doyens John and Mabel Ringling to build Ca'd'Zan, a Venetian-Gothic Renaissance palace with features of [old] Madison Square Garden, he was said to have visibly paled. More recently, the State of Florida, faced with renovating the deteriorating Ca'd'Zan, that the Ringlings bequeathed to it, paled too—at the bill. But after several years of intense lobbying, the state senate approved \$3.5 million of appropriations, with private contributions expected to make up the difference in a \$7-million restoration of the Sarasota landmark.

Years of neglect and “non-malicious but nevertheless effective self-destruction” has seen the 70-year-old, 30-bedroom, 14-bathroom palazzo literally crumble, according to Jan Abell, AIA, the Tampa-based architect who's working with primary architects Ann Beha Associates of Boston on the restoration. “The marble boat dock has disappeared—either to the bottom of Sarasota Bay or in people's bathrooms,” Abell said. The multicolored terra cotta, which was a principal material used on the exterior and interior, was anchored by steel, “and years of exposure to sea air has led to corrosion and devastation.” The enormous stained-glass windows in the Great Hall, made of hand-rolled Venetian

glass in hues of amber, amethyst, ruby, emerald, and sapphire, were battered by tropical storms.

Where weather wasn't a culprit, humans were; a quick and careless installation of air conditioners in the 1950s placed vents near 15th century Flemish tapestries; and there was never an attempt to seal out humid exterior air from rushing in whenever a visitor opened the door. The interior decorations, much of it purchased in the 1920s from the estates of Vincent Astor and Jay Gould, were moved to the adjacent Ringling Museum for safekeeping. (Another testament to the Ringling ego, the museum, also owned by the state, is considered one of the finest Baroque collections in the world.)

The 14-month restoration project, now under way, will repair the exterior, upgrade the fire safety system to code, replace outdated air conditioning, plumbing and electrical systems, and create a new visitor entrance. Further appropriations will allow for continued restoration of the interior.

The Ringlings, who had little apparent inclination toward subtlety, still had an appreciation for quality and whimsy. The tubs were hewn out of solid marble, the ceil-

Ca'd'Zan: a palace built for two (top). The multi-colored terra cotta was corroded by years of exposure to sea air (right).

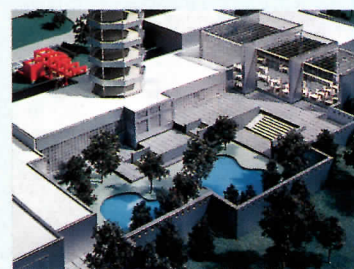
LARGEST GIFT EVER TO SUNY GOES FOR ASIAN AMERICAN CENTER Twenty-five million dollars, the largest single gift ever received by the New York public university system, will be used to construct and operate an Asian American Center at the State University of New York (SUNY) Stonybrook, Long Island. The gift comes from Charles B. Wang, CEO of Computer Associates International. The center will be named for him.

The 25,000-sq-ft facility has been designed by architect P.H. Tuan, principal of P.H. Tuan and Associates of New York City. According to a spokesperson for Tuan, the design concept emphasizes a flexible free-form plan that can be adapted and added to based on the changing needs of the center over time.

Upon entering the center through a series of abstracted gates, the visitor will be able to look up and see the inside of the “light” tower that rises from the middle of the complex. Composed of glass and metal, the tower will reflect and refract light throughout the day and night. A large landscaped garden and pond along the north side of the center, and open-air landscaped courtyards within the complex, provide views as the visitor moves from room to room inside.

The design includes a large multi-purpose common area with food kiosks serving a variety of Asian foods; a 200-seat theater; art gallery; audio-visual library with an Asian-American oral history archive; computer laboratory; conference, reading, and lecture rooms.

The center will serve the growing Asian and Asian-American population at the Stonybrook campus, which now accounts for approximately 4,600 of the 17,000 total student body. Ground breaking for the Charles B. Wang Asian American Center is scheduled for spring of this year.



ings of the ballroom and game room (rumored to be a party room during Prohibition) were painted by the Ziegfeld Follies set designer Willy Pogany, who painted Venetian Carnival scenes starring the Ringlings in costume. One of the mansion's most interesting quirks, Jan Abell discovered, was the “exquisite terra cotta work, a

combination of mythical and astrological characters” at the top of the six-story tower, which originally flashed a brilliant red light when the Ringlings were in town.

“The quality of the work is phenomenal,” she said, “and to put the effort and energy that only two people would ever see is really remarkable.” *Julie Moline* →



HEALTH CLINIC FOR PEOPLE SENSITIVE TO BUILDING MATERIALS

Architects working on the Fall River Environmental Health Centre in Fall River, Nova Scotia, had an interesting challenge: how to create a treatment clinic that didn't make already sick people sicker.

Patients treated at the health center suffer from hypersensitivity to substances normally found in buildings—in paint, cleaning supplies, certain metals, glue, industrial lubricants, and synthetic fibers in carpets and fabrics. To avoid exacerbating patient symptoms, the architect, William Nycum & Associates Ltd., put interior components for the 8,000-sq-ft facility through a rigorous three-step vetting process, one of which involved testing interior components on people with a variety of chemical sensitivities to see whether any part of the clinic would trigger reactions.

All of the building's steel components, including metal studs,

structural steel, roof deck, catwalks, and even screws for mounting dry-wall, were prewashed offsite to remove oils. Load-bearing structural glazed ceramic fire brick, which can be washed with clear water, was used for the interior and exterior finish on the walls, and radiant-

heated flooring with a ceramic tile surface replaced carpeting. Oversized overhead conduits allowed workmen to position electrical wires without the aid of a lubricant. Highly filtered air and low-emission materials produce minimal background odor, which triggers reactions in some highly sensitive patients.

To keep the air inside clean, a dual mechanical system allows 100

percent fresh filtered air to enter, and 70 percent of the interior air to recirculate. This minimizes exposure to environmental emissions like woodsmoke, according to architect William Nycum.

Occupancy is slated for January 15, when the clinic, part of Dalhousie Medical School, will begin to serve the first 1,000 people currently on a waiting list. *Andrew Safer*

PREDOCK BUILDS DANCE STUDIO IN FOREST OF EUCALYPTUS TREES

Adjacent to his 1991 Mandell-Weiss Forum at the University of California, San Diego, Antoine Predock Architect has designed a 14,523-sq-ft dance studio facility scheduled to open in Fall 1997. In contrast to the forum which occupies a clearing in a grove, the new facility is inserted into a forest of eucalyptus trees.

Three dance studios are grouped around a courtyard and organized by a curving wall which links the studios to the main campus and the forum. By weaving the facility into the trees, Predock creates exterior spaces for casual gatherings and impromptu performances. Glazing in the courtyard is intended to reflect the rhythms of the surrounding trees, and apertures in the arcing wall allow ventilation and light into the facility.

Support spaces include locker rooms, office space, and storage for equipment. The design is "a dance on the site, an impulse toward movement," explained Predock, adding that the dynamic tension between the building and its site echoes the choreographic relationship between dancers. *Katherine Kai-sun Chia*



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DUANY AND PLATER-ZYBERK DESIGN CANADA'S LARGEST NEO-TRADITIONAL COMMUNITY

A 1,275-acre site in Markham, Ontario, once earmarked for a new international airport, will instead become Canada's largest neo-traditional community, Cornell.

The plan, which won over 14 other proposals, was developed by city planners and architects Andres Duany and Elizabeth Plater-Zyberk of Miami. Duany described it as his firm's "absolutely flawless, best, flagship project."

Over the next 20 years, Toronto-based Law Development Group will build 11 distinct neighborhoods, "each with parks, open spaces and services," according to architect/developer Larry Law.

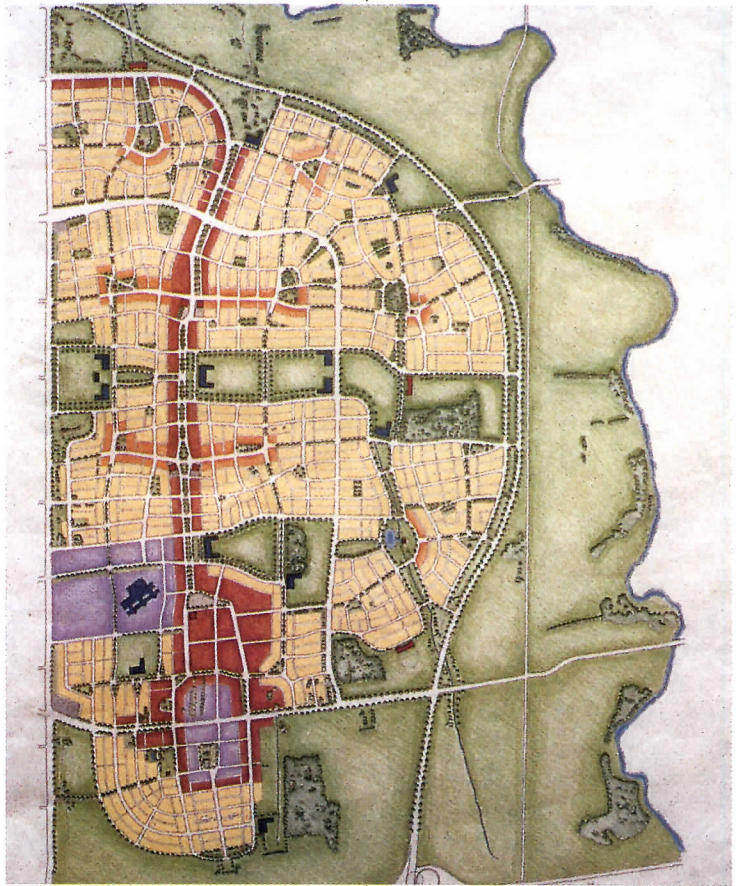
When it is finished, Cornell will contain 10,000 homes, 1.8 million sq-ft of office space, and 300,000 sq-ft of main street retail space and apartments. Developers will also restore 22 pioneer-era

farms and other heritage structures.

The \$73 million site, in a Toronto suburb of 160,000 residents northeast of the city, adjoins 15,000-acre Rouge Park, North America's largest urban park. The first neighborhood of 700 homes will be marketed this spring.

According to Duany, the manual his firm developed for Cornell, concerning the rules governing the way it will be built, is becoming a model for the firm's projects internationally. "We've been able to make the whole system of coding that guarantees urbanity and all the things that were promised much more efficient."

Cornell's master plan was endorsed by Markham planners and local government in 1994 after presentations and consultations with area residents, usually presided over by Duany. *Albert Warson* →



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NEWS BRIEFS

Minority architect awards announced

The National Organization of Minority Architects (NOMA) has awarded five 1996 Design Excellence Awards for Outstanding Achievement in Architectural Design. Moody/Nolan Ltd., Inc., a Columbus, Ohio architectural and engineering firm, received three of the awards for a library and classroom building at the Ohio State University/Marion campus, the Dublin Community Recreation Center in Dublin, Ohio, and the Highbanks Nature Center in Delaware, Ohio. Peter L. Wong Architects, Charlotte, N.C., won for the House for 1713 Tippah Avenue in Charlotte, and Stanley, Love-Stanley, P.C., Atlanta, Ga., received the award for the Youth Arts Connection Gallery for The United Way of Metropolitan Atlanta.

AIA/New York chapter gets HUD grant

The New York Foundation for



Architecture, a non-profit subsidiary of the AIA/New York Chapter, has received a \$100,000 University Partnership grant from the U.S. Department of Housing and Urban Development. Titled "From Istanbul to Harlem: Bringing Habitat II Home," the grant was initiated by chapter president Robert Geddes, FAIA, who participated in the housing conference Habitat II in Istanbul last year. "Our intention is to follow through on

U. of Maryland's new library

the United Nations Declaration on Human Settlements and the Habitat II Agenda, working with communities, working as architects," Geddes explained. The City College of New York School of Architecture and Environmental Studies will work with the New York chapter focusing on Harlem and the Upper Manhattan Empowerment Zone.

U. of Maryland's new high-tech library

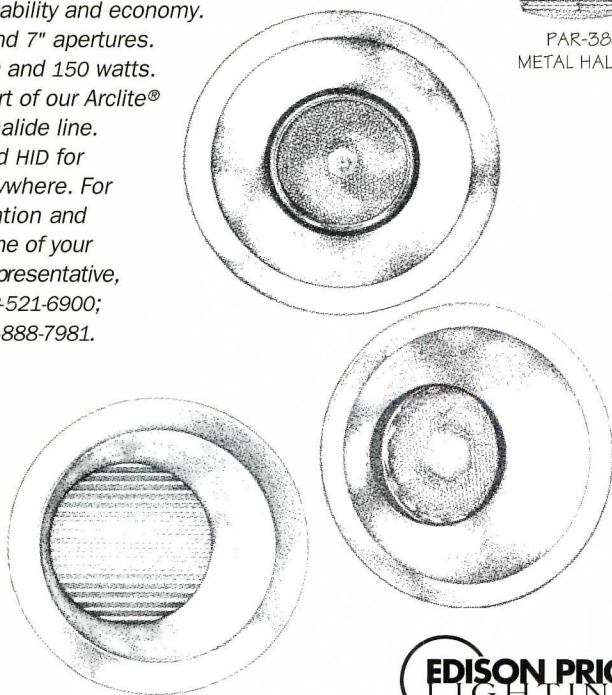
Boston-based Perry Dean Rogers & Partners, Architects, has teamed with Design Collective, Inc. of Baltimore to design the \$23-million Health Sciences Library and Information Sciences Building at the University of Maryland. Currently under construction and expected to open in Spring 1998, the six-story, 180,000-sq-ft building will centralize the university's library and computing resources, creating a specialized training facility for physicians, dentists, pharmacists, lawyers, and nurses. The program elements, linked to advanced computer technology, are designed to encourage collaboration in the creation, assembly, storage, retrieval, and transmission of information.

Tschumi awarded Grand Prix

Bernard Tschumi, architect and dean of the Columbia University School of Architecture, was awarded the 1996 Grand Prix National d'Architecture by the French

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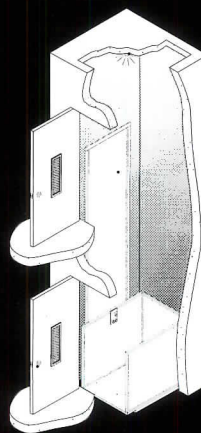
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Ministry of Culture. Previous recipients include Jean Nouvel and Christian de Portzamparc.

Alan Y. Taniguchi wins social activist award The AIA has awarded its 1997 Whitney M. Young, Jr. Citation to architect Alan Y. Taniguchi, FAIA, dean of the school of architecture at the University of Texas. The award honors the late civil rights and urban leader who in 1968 challenged America's architects to play a more active role in social issues. Taniguchi's career spans five decades in architectural education, private practice, and involvement in a variety of professional and civic offices.

Jane Thompson receives industrial design award Master planner and urban designer Jane Thompson was awarded the Industrial Design Society of America 1996 Personal Recognition Award for lifetime contribution to the field of design. Thompson, who prac-

ticed with her husband Benjamin Thompson, FAIA, from 1966 to 1993, was founder and editor in chief of ID (*Industrial Design* magazine) in 1954, and an active leader of the International Design Conference in Aspen (1971-1996).

Historic preservation grants apportioned The U.S. Department of the Interior has apportioned \$33 million for historic preservation grants to the 50 states, the District of Columbia, the U.S. Territories, the Federated States of Micronesia, the Republic of the Marshall Islands, the Republic of Palau, and the National Trust for Historic Preservation. Grants, available through September 30, 1998, may be used for a broad range of activities such as historic property inventories, resource protection planning, monitoring compliance with federal historic preservation requirements, technical assistance to private interests seeking to preserve historic resources, assist-

ing local government preservation programs, and acquisition or development of historic properties. The National Parks Services will administer these funds as part of the Historic Preservation Fund.

Art museum goes to Predock The commission for the \$6 million, 30,000-sq-ft Skidmore College Teaching Gallery and Art Museum, Saratoga Springs, N.Y., was awarded to Antoine Predock Architect of New Mexico. Others considered for the project include Frank O. Gehry & Associates, and Venturi, Scott Brown with Einhorn Yaffee & Prescott.

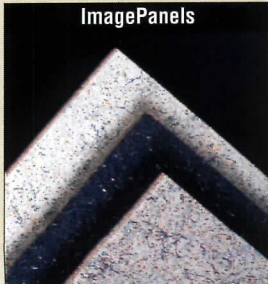
Aga Khan honored The World Monuments Fund honored His Highness the Aga Khan, spiritual leader of the Ismaili Muslims, with its Hadrian Award for his efforts to preserve and revitalize historic cities in Islamic countries. Previous recipients include the Prince of Wales, David Rockefeller, and Dominique de Menil.

New campus center for U. of Colorado Centerbrook, Architects and Planners of Essex, Conn. and the Davis Partnership of Denver, Colo., have just completed the design for a new Campus Center for the University of Colorado Health Sciences Center in Denver. The \$40.8 million center will include 225,400-sq-ft of new and renovated construction surrounding a new central quadrangle.

Gae Aulenti to design San Francisco museum Milan-based architect Gae Aulenti and the joint venture of Hellmuth, Obata & Kassabaum, LDA Architects, and Robert Wong Architect have been selected to design the new Asian Art Museum in San Francisco's Civic Center. The new museum will occupy the Old Main Library, built in 1917 as a key component of the Beaux Arts Civic Center Plan. The Musée d'Orsay in Paris and the Palazzo Grassi in Venice are two of her best known projects. ■

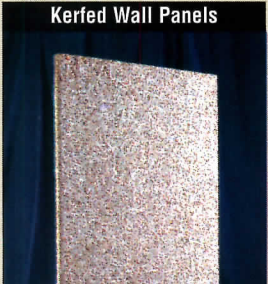
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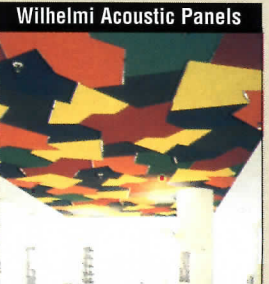
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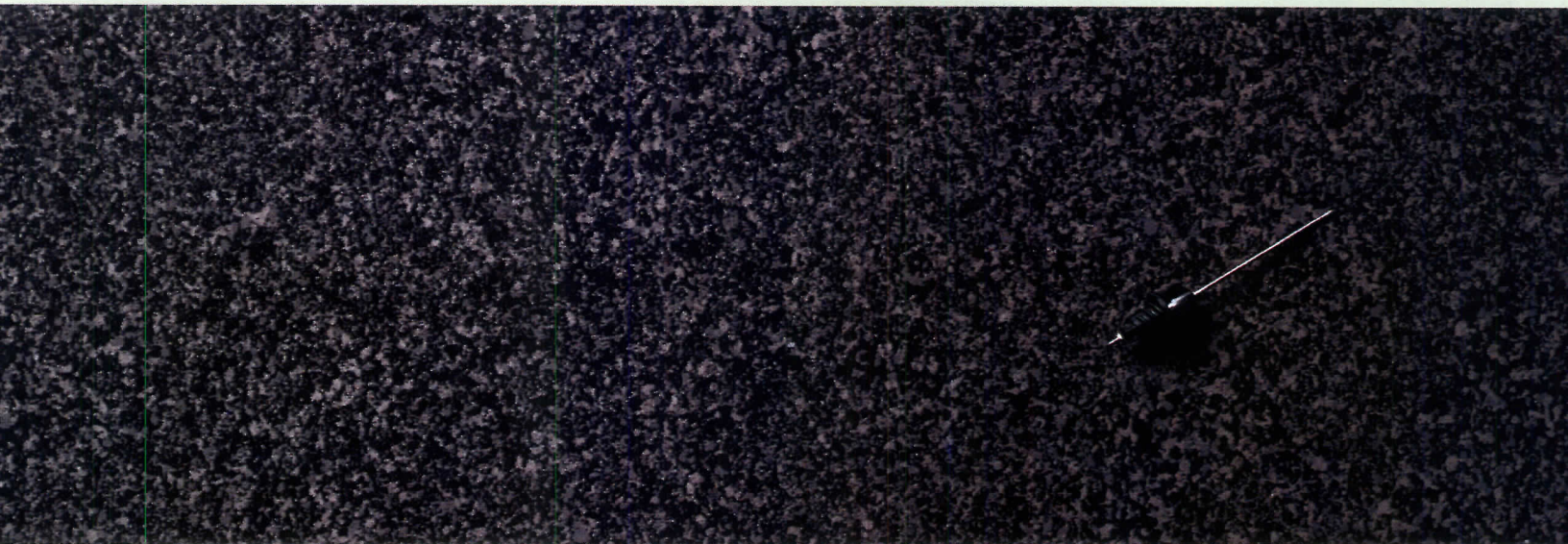
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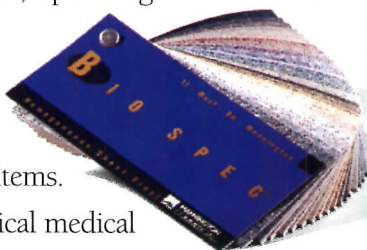


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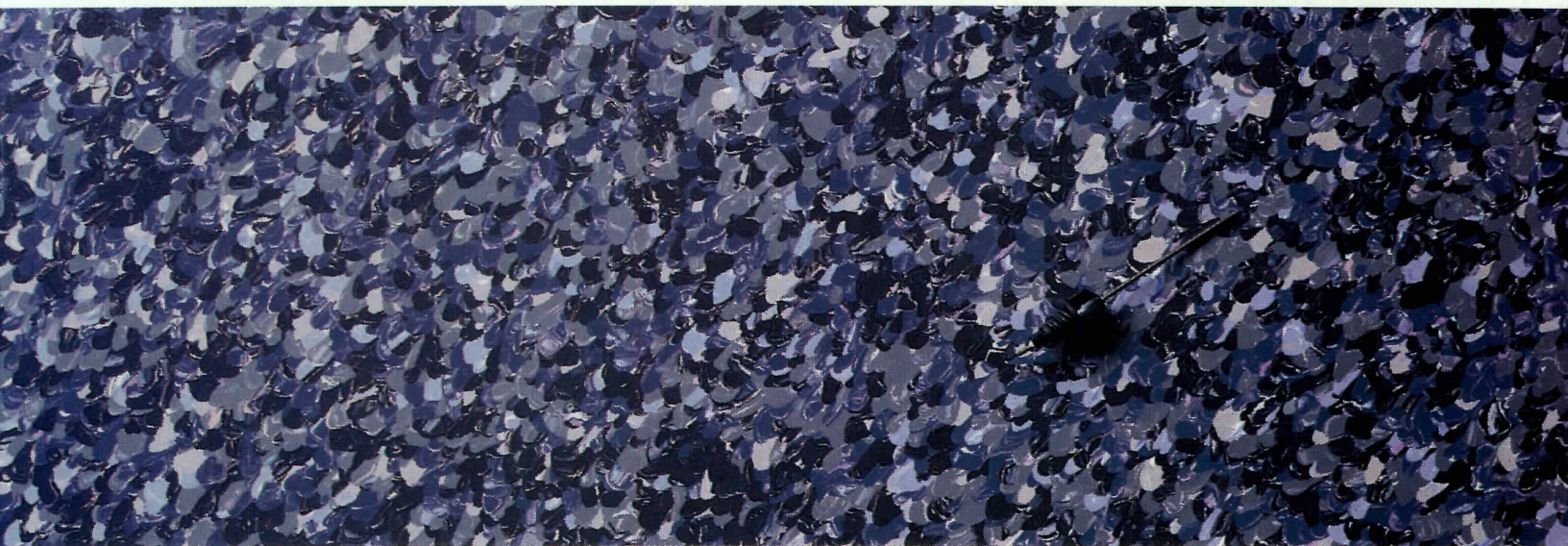


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PROJECT DIARY: Steven Holl's MAKUHARI HOUSING COMPLEX

is his biggest project, and biggest
struggle as an architect, to date.



First impressions. At the site, from left: Steven Holl, Tomoaki Tanaka of Holl's office, town planner Koichi Sone. Opposite: Holl's sketch book.

In the late 1980s, getting a job in Japan was, for an American architect, a major coup—a sign of international acclaim and the chance to benefit from foreign economic prowess. Not only did it mean that the architect was most likely working at a scale larger than sagging market conditions permitted at home, but also that the treatment by the client—in keeping with Japanese traditions of business etiquette and respecting artistic endeavors—was better. This was certainly the case for Steven Holl, AIA, when he designed a 28-unit housing block in the southern port city of Fukuoka as part of an all-star group of architects who were selected for the project by its “art director” Arata Isozaki. Isozaki also acted as a buffer between client and architect. Things would be different in Makuhari.

AUGUST 1992 Steven Holl was first invited to Makuhari, located in Japan's Chiba prefecture on the outskirts of Tokyo, in August, 1992, based on the strength of his Fukuoka design. The developer, Mitsui Fudosan Group, the largest builder of housing in Japan, had never worked with a “design” architect before, much less an American one. In Makuhari, however, town-planning codes and finances—specifically, the strong yen versus the dollar—made both appropriate.

Makuhari is a new town, and like other such communities outside of overdeveloped Tokyo, it's built on landfill—a dredged parcel at the rim of Tokyo Bay to the southeast of the city's downtown. The urban planners of the residential portion of the town were dissatisfied with existing models of “social housing” and sought to create something distinct in Makuhari. The planning group, which includes on its board Koichi Sone of Environmental Design Associates, studied pedestrian-scale European and American models ranging from the International Building Exhibition, known as IBA, in Berlin, to the Olympic Village in Barcelona, and Battery Park City in Manhattan.

by Karen Stein

Based on these precedents, the Makuhari planners established rules for building heights and setbacks, mandated tree-lined streets, ordered a mix of commercial and residential use, and required that each city block—the unit of development—be designed by three or four different architects in order to guarantee variety. The idea was to “add an international image” to the existing business center of the town, which includes a massive exhibition hall designed by Fumihiko Maki, according to Sone. Maki's Makuhari Messe is meant to compete with Rafael Viñoly's newly-completed and more lavish Tokyo Forum for international trade shows and conventions. Like the Forum competition organizers, the residential planning board agreed to look outside Japan for some of its architects. “[The board] chose a non-Japanese prototype for the town. It was better to invite those familiar with the type,” explains Sone of the decision. While the board was worldly in its outlook, the developers competing for parcels to build on had their own goals, the primary one being financial. Says Junichi Kogo, deputy branch manager of Mitsui Fudosan: “We always start from profit.”

Enter Holl. After he and his Japanese associate Tomoaki Tanaka made their first site visit in August, 1992, Holl began noting his impressions in his sketch book, along with scenarios for accommodating the required 180 housing units, roughly half of which would be subsidized rentals, with the rest selling at market rates. While Holl agreed with the

Project: Makuhari Housing
Chiba, Japan

Client: Mitsui Fudosan Group

Architect: Steven Holl Architects—
Steven Holl, principal-in-charge;
Tomoaki Tanaka, project architect;
Mario Godden, Thomas Jenkinson,
Janet Cross, Terry Surjan, project
team/master plan phase; Anderson Lee,
Sumito Takashina, Sebastian Schulze,
Gundo Sohn, Justin Korhammer,
Bradford Kelly, Lisina Fingerhuth,
Anna Müller, Jan Kinsbergen, Hideaki
Ariizumi, project team/design develop-
ment, construction document phase

Associate Architects: Kajima

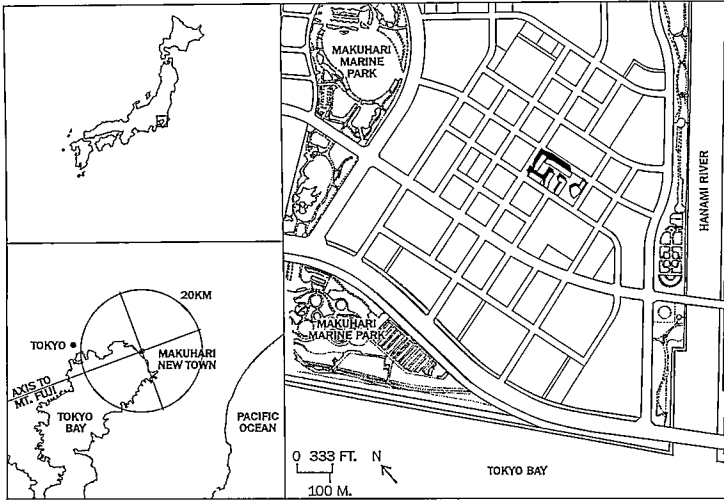
*Design—Toshio Enomoto, Masahiro
Shimazaki, Kazuhiko Funo, Akihito
Morino, and Yasushi Ninomiya, project
team; K. SONE + Environmental
Design Associates—Kouichi Sone, prin-
cipal-in-charge; Tomoko Watanabe,
project architect; Yoshihiro Kanamaru,
Hisakazu Ishijima, project team*

Engineer: Kajima Design

Consultants: Kouichi Sone (block
design coordinator); Toshio
Enomoto/Kajima Design (block archi-
tect); JUKA Garden and Architecture
(landscape); L'Observatoire (lighting)

General Contractor:

Kajima+Kaisei+Mitsui JV



basic premise of the planning board, he disagreed with its strategy of how to achieve planned variety. "If each face of a four-sided block was done by a different architect, the interior court would be chaos," he argued.

Instead, over a several month design period, he developed another approach that called for a mix of "silent, heavyweight" and "active, lightweight" structures. The "silent" buildings, made from concrete load-bearing walls, form the perimeter of the block, and within their bracket-like forms are the "active" structures, which include gatehouses, a free-standing public meeting room, an observation deck, and a communal "house" overlooking a reflecting pool, all clad in metal. As his journals show, Holl was inspired by his reading of a 17th-century Japanese classic, Bashō Matsuo's *The Narrow Road to the Deep North and Other Travel Sketches*, a travel log in haiku form about the author's journeys, both physical and metaphorical. "The notion of an inner journey gave human dimension to the project," says Holl. He choreographed a flow of movement from inside to outside: exterior corridors to private patios and balconies, to communal bamboo gardens, to a swathe of lawn, passing by the courtyard pavilions. Explains Holl: "In moving through inner gardens, smaller building elements reframe your perspective [so] the massive building elements are much more palatable."

In order to comply with the requirement for three or more architects, the interiors of the residential block, the "silent" buildings, were designed by Sone, a member of the planning board of the entire residential district and the "block coordinator" for Holl's parcel, and Toshio Enomoto of Kajima Design; Kajima also served as the associate architect and engineer of the entire project. A joint venture led by Kajima was designated as the contractor. It was all in the family, Kajima-style.

Sectional massing studies (top row) and concept diagrams (bottom row).

DECEMBER 1992

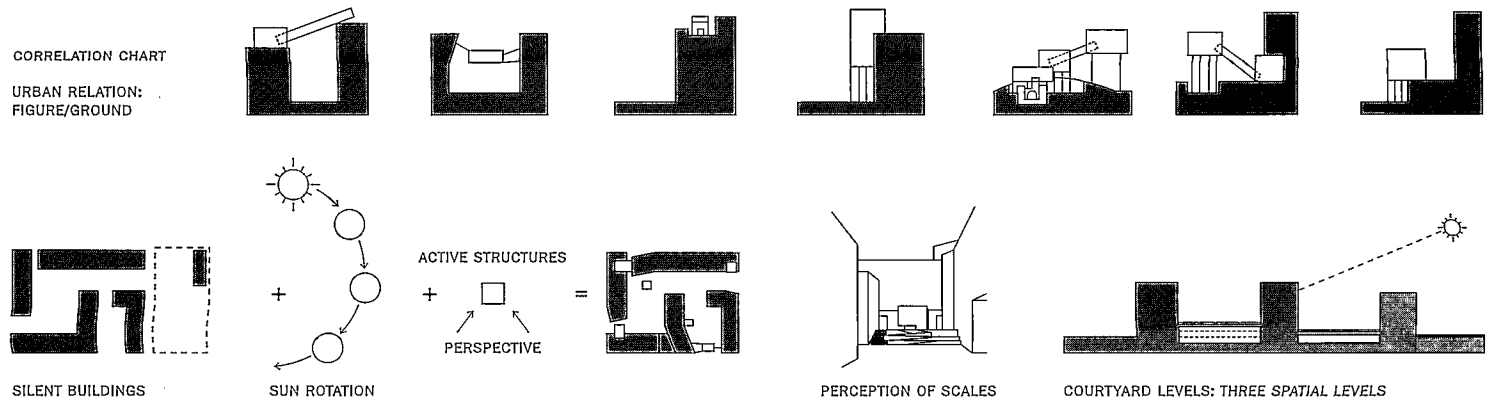
Clearly Holl had done some creative interpretation of the regulations, much less the Japanese notion of housing. Absent a project art director like Isozaki to give artistic prestige to the entire enterprise and run interference with the client, Holl was in the unfamiliar terrain of a corporate behemoth client. When he presented the scheme in December, 1992, to some 35 people in the Japanese client group, he was met with total silence. Holl recalls: "After a long pause, one bureaucrat said we did too much." The silence only deepened after he submitted his finalized proposal package of model and drawings in February, 1993.

Over a year passed. During that time, Holl's professional fortunes took a drastic turn for the worse. Rumor had it that a Japanese architect was now working on the Makuhari commission and no new jobs were coming in to Holl's New York City office to replace it. While he continued to teach at Columbia University, where he has tenure, he contemplated closing his studio—a shocking state of affairs for an acknowledged leader of his generation who had by his mid-40's received many of the top accolades of his profession, including an exhibition at New York City's Museum of Modern Art in 1989. "I almost went bankrupt," recalls Holl.

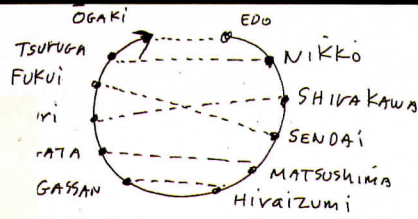
By year's end, the pendulum swung back in equally dramatic fashion. In short order, Holl won the competition for the new Museum of Contemporary Art in Helsinki over some 500 other entries, and in March, 1994, he heard from his Makuhari client after 13 months: his project lived again, for the most unlikely reason for this high-style "design" architect. The client liked Holl's parking garage.

Unbeknownst to Holl, developer Mitsui Fudosan had promised the Chiba prefectural government that the project would be done by the end of fiscal 1995, which occurred in March, 1996, so construction had to begin. "The parking in the alternate scheme didn't work as well as our parking," is Holl's recollection of how the decision was made. "They ran out of time. It was the efficiency of our parking that forced them to choose our scheme."

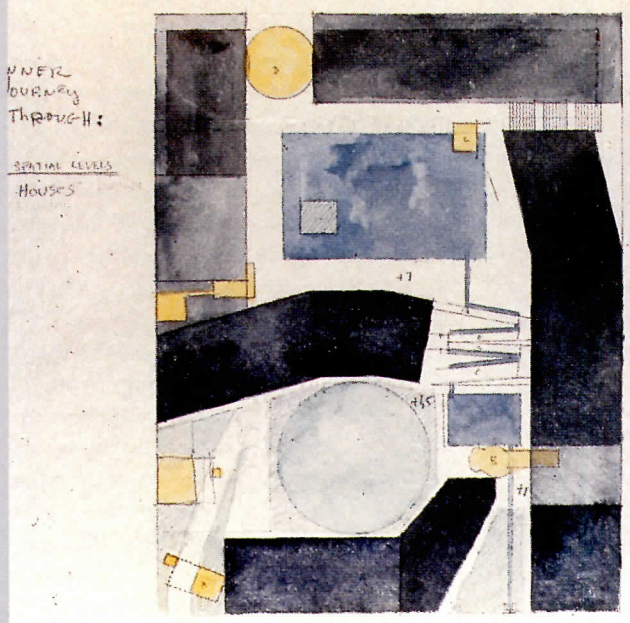
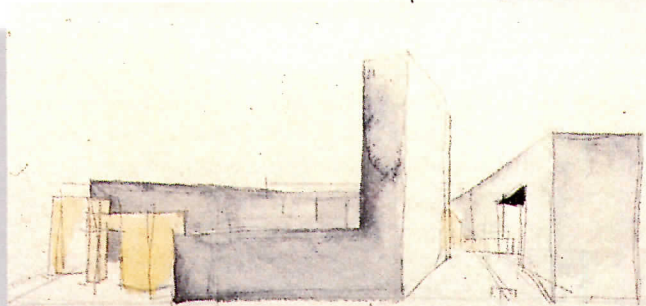
While Holl had recaptured the commission by spring, 1994, it was not given as a carte-blanche acceptance of his unorthodox housing solution. But his use of a straightforward structural system—concrete bearing walls pushed to the perimeter, allowing for windows and balcony openings, and floor slabs that virtually span wall to wall—gained him a crucial ally in contractor Kajima Construction. Holl's approach permitted construction to begin while the other architects involved in the project (Sone and Enomoto) were still refining the interior layouts of the apartments. "It's not the best way to proceed," admits Enomoto.



Colon
Forum



Disciples:
 Vision-inhabited House = Gejvan
 House of ANONYMITY = MUMYOAN
 House of Fallen Persimmons = RAKUSHISHA



UNFOLD
 JOURNEY
 THROUGH:
 SPATIAL LEVELS
 HOUSES

This is a 3 yr old abandoned child:
 looked to me as fragile as the
 bush-clover that scatters at the
 2 of the autumn wind, and it
 that I gave him what little food
 the ancient poet
 who pitied monkeys for their cries
 what would he say, if he saw
 This child crying in the autumn wind?
 indeed that this child has been reduced
 other misery? Is it because of his
 red him, or because of his father
 him? Alas it seems to me that
 for undeserved suffering has been
 something far greater and more

Steven Holl's sketch books are a mixture of writing and drawing. After visiting the Makuhari site (plan opposite page), Holl continued to study 17th-century Japanese writer Bashō Matsuo's *The Narrow Road to the Deep North and Other Travel Sketches*, written in haiku form, charting out the author's journey (left). Watercolors show massing studies for the combination of "silent, heavyweight" buildings and "active, lightweight" structures.

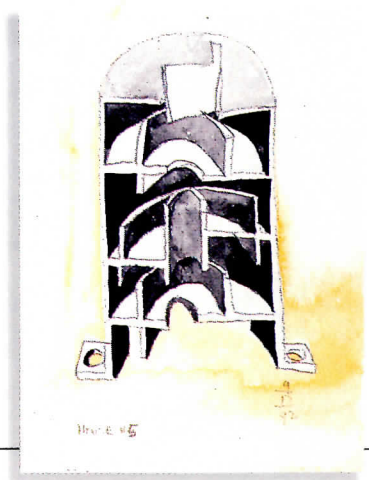
Because Holl's scheme responded to Kajima Construction's need for an efficient, schedule-driven project, the contractor, in an unlikely turn of events, became a strong voice for design excellence. "I think Steven Holl really understands *what* a house is. Other younger architects have built something closer to a hotel," is the verdict on the overall scheme by Junichi Ogawa, project manager for the contractor. Holl favored the construction system because it reinforced the image of solid, "silent" facades, giving coherence to the various elements comprising the block. Kajima liked the solution for other reasons: it relied on a rational structural grid; with the foundations in place (600 piles driven 60 feet into the landfill), they could get the walls up quickly.

Kogo, the client, was becoming increasingly skeptical of the entire enterprise. Expedience and sellability of the units remained his prime focus and Holl's main thesis was to build something unlike anything currently available on the market—a strategy Kogo perceived as risky, particularly in light of a recent economic downturn in Japan. But, at this point, he had no choice.

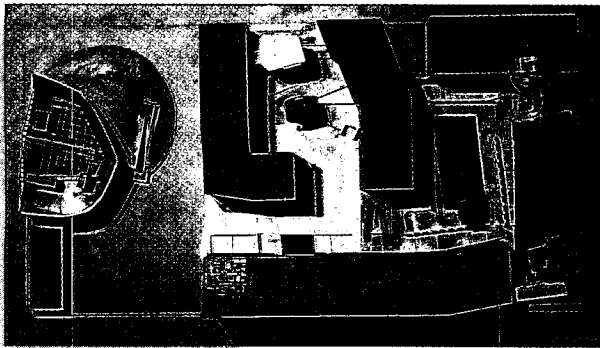
DECEMBER 1994 Construction began December 21, and the demands of the construction schedule drove the project. Because of the 13-hour time difference between New York City and Tokyo, work was ongoing 24 hours a day. Questions that arose on the job site were faxed to Holl's office and were resolved by the architect and his team while the

construction workers slept. Answers awaited them on their arrival at the site the following morning. Tanaka, Holl's project architect, proved essential in this phase too, because of his command of Japanese.

As time pressure mounted, so did the tensions between design intent and construction expedience. For Holl, the difficulties were constantly measured against the perceived opportunity: a small office of some 11 people working on its largest project to date—over \$50 million of construction on an entire city block—halfway around the world. But, says Holl, "it was war for every inch." He says he threatened to quit the project



A watercolor done by Holl on September 15, 1992 is a study of light and shadow.

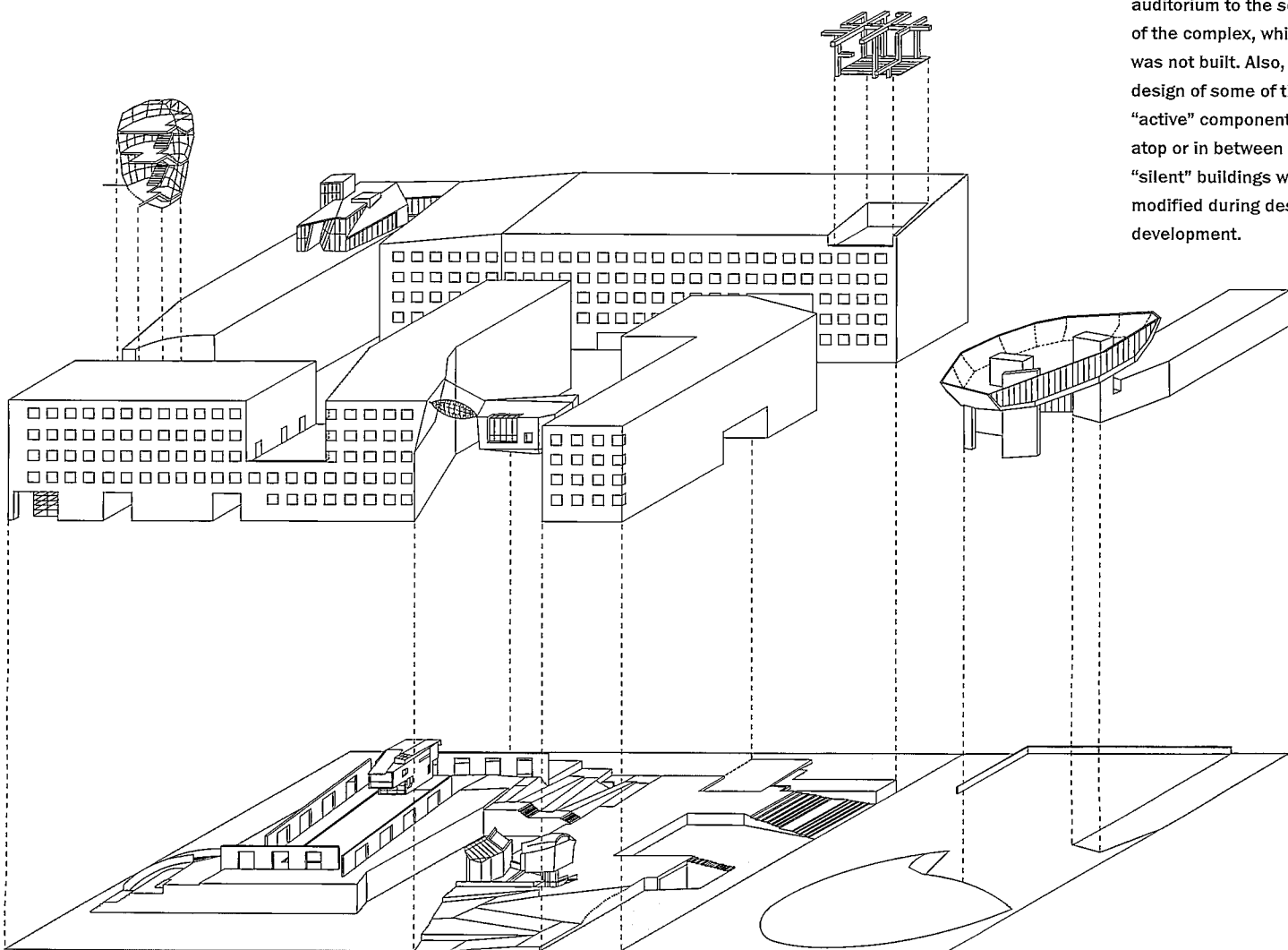


three times during construction over choices of materials and differences in detailing techniques.

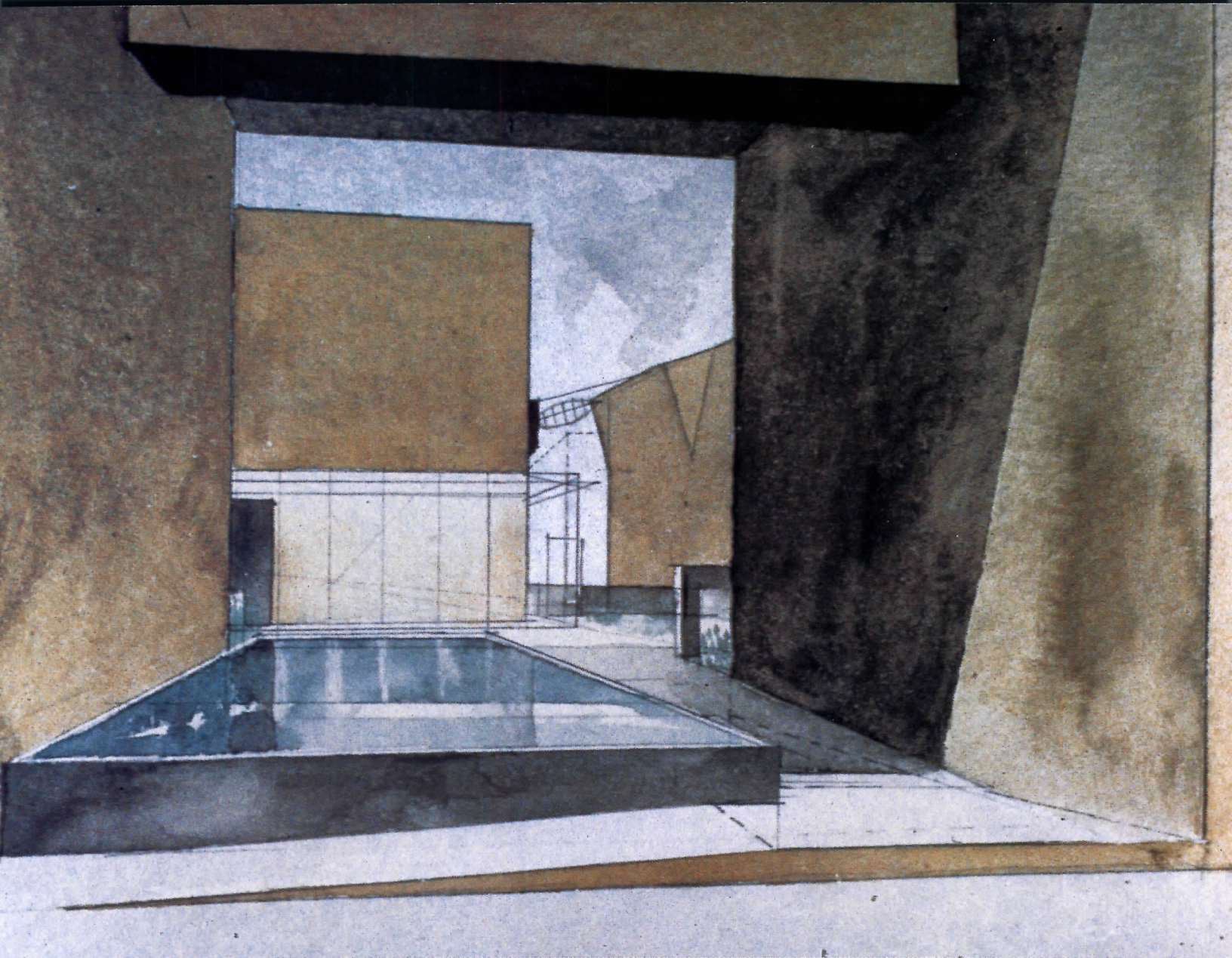
The biggest controversy came over the exterior corridors between apartments, which are within the building envelope. According to the Chiba city planning department, which grants building permits, the floor area of the corridors had to be included in the floor area of the apartments, reducing the overall amount of livable space and forcing an

unacceptable price per square foot from the client's point of view. Holl had not interpreted the code to say so, and, in fact, the code only implied this requirement. But in similar projects by Japanese architects the implication had become *de facto* law. Holl pointed out that the corridor was actually meant to satisfy fire-department egress requirements. The fire department refused to approve it on such grounds and bounced the decision back to the city planning department, where Enomoto of Kajima Design argued Holl's case over a two-month period. Eventually Enomoto was able to gain approval from the officials by making a large-scale sectional model of the passageway that convincingly demonstrated the degree of openness of the corridors.

Enomoto jokingly calls this difference of opinion between Holl and Japanese city planning officials "the invisible trade barrier," an epithet that goes to the heart of the cultural differences at work. How much of a suggested guideline is accepted and how much is questioned and upon whose authority? For an outsider, the answer is different. It also hints at a larger issue. While trade restrictions between Japan and the U.S. are the subject of on-going debate among politicians (*text continues on page 77*)



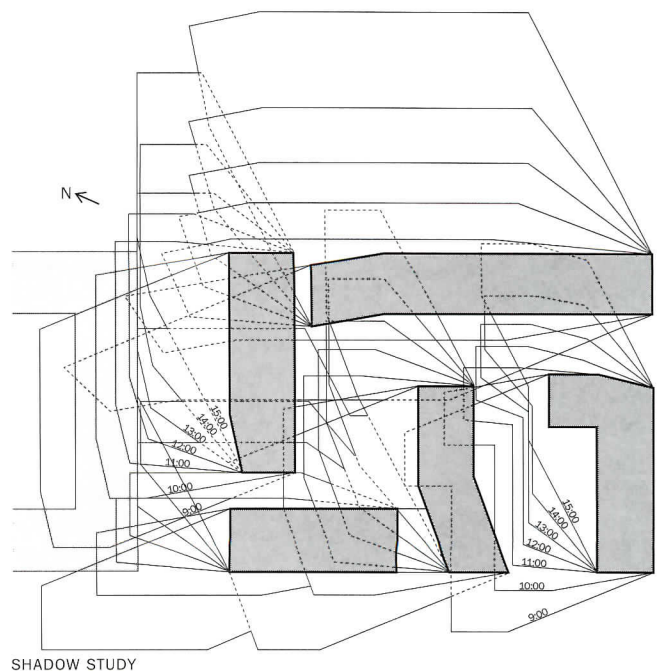
The presentation model (above) and an early axonometric of the complex include an auditorium to the south of the complex, which was not built. Also, the design of some of the "active" components atop or in between the "silent" buildings were modified during design development.



Japanese code requires that each apartment in the complex have a minimum of four hours of sunlight each day. What Holl calls the “faceting and folding” of the exterior facades was done in response to a study of sun angles in the region (see shadow study drawing right). The east gatehouse,

called the “Sunlight Reflecting House” by the architect, acts not only as a ceremonial entry piece to the complex, but also as a giant reflector, thanks to its shiny, metal skin. “It reflects the sun coming from the south down into the crevice between two [housing] blocks,” explains Holl. “As the sun rises and

hits midday, the light is ricocheting down this slot.” A watercolor view of a passageway toward the south court house (above) shows Holl’s vision of perspectival space. By funneling visitors into increasingly larger spaces, the architect hoped to soften the effect of the block-size scale of the complex.



SHADOW STUDY



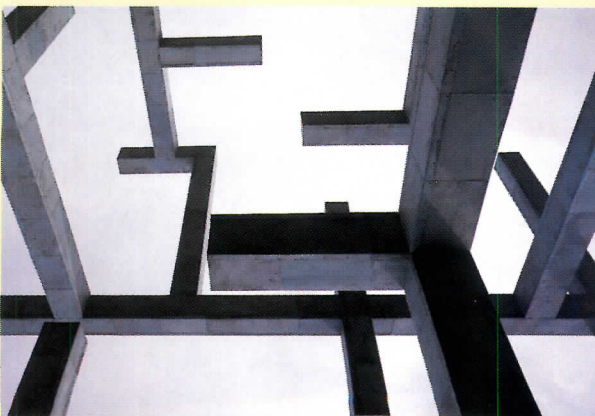
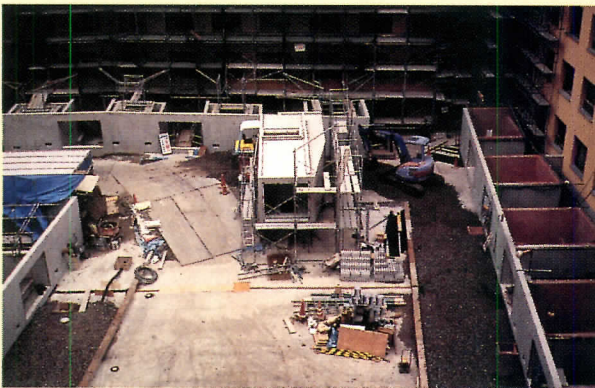
Steven Holl in April, 1995, during one of many construction site visits.

CONSTRUCTION

Once the decision was made to proceed with the project, construction moved at a fast-pace: 13 months for 280,000 square feet. Not only was the construction schedule fast-tracked, but since the project had been on hold for too long, it went virtually from schematics to construction drawings, basically eliminating design development. As a result, certain design issues had to be resolved quickly, on site. As Holl explained to RECORD, some battles between design intent and construction expediency were resolved in his favor—for unlikely reasons.

He said: "Every time they [the client] tried to change something, they couldn't because they didn't have time. For example, 'The House

of Nothing' [The south gate house]. They didn't want to build it—this weird thing sticking up. It's a kanji [Japanese writing] character for the word nothing. It's an observation deck. They faxed us that they didn't want to build it because the copper will make toxic acid, because lightning is going to hit it and ruin something, because it's going to send vibrations down into the apartments. We faxed them back that the copper is, in fact, not toxic, that [the structure] is already wired for electrical storms so that it's actually a lightning rod, and that our detail for the rubber mounts won't allow the vibration to travel. So, there wasn't enough time for them to come up with other reasons not to do it."



"The House of Nothing"



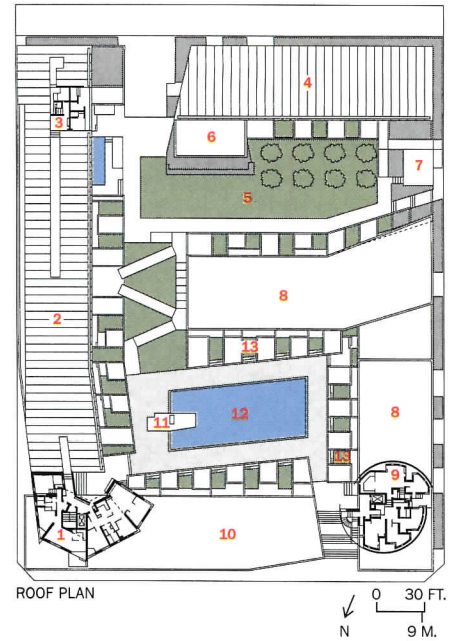
At night, there is a different solid/void reading of the exterior skin: stairwell openings, sized the same as window openings, take

on added depth. On top of the block is the north gate house, "Color Reflecting House"; an ovoid pent-house apartment.

The north gate house (“Water Reflecting House”—opposite top and opposite bottom right) cantilevers over a pool of water. The space, which includes a small tea room, can be used by residents of the complex. The tower-like west gate house, the “Fallen Persimmon House,” is a duplex apartment clad in preweathered zinc (opposite bottom left). Holl layered brightly painted walls with panels of per-

forated metal for the north gate house (“The Color Reflecting House”—opposite bottom left). Oxidized brass gives the exterior of the south court house, named “House of the Blue Shadow” for its interior, a ruddy glow (below).

1. East gate house “Sunlight Reflecting House”
2. East building with pitched roof
3. South gate house “House of Nothing”
5. South courtyard
6. South court house “House of Blue Shadow”
7. West gate house “Fallen Persimmon House”
8. West building with flat roof
9. North gate house “Color Reflecting House”
10. North building with flat roof
11. North court house “Water Reflecting House”
12. Reflecting pool
13. Bamboo garden







CLIENT PERSPECTIVE

Junichi Kogo, Mitsui Fudosan:

“There were many difficult problems. The biggest problem was the exterior corridor [in between apartments]. It was not regarded as exterior by city officials, so we would have to include it inside the floor

area of the apartments. In order to exaggerate the “silence” of the facade, Steven Holl tried to reduce openness of the facade. It took two months to resolve [in Holl’s favor].

Also, another big problem was the [issue of] exterior joints [in the synthetic stucco finish]. Mr. Holl hates joints. Our service people insisted that we have joints to avoid cracks after two to three years. First, we promised [Holl] to conceal the joints. Then we changed our minds, [because] according to our service people, cracks will come out over time. It’s [an issue of] market

acceptability. If there is no joint, it’s much better from a design or esthetic point of view. But housing is an industry of complaints. If it wasn’t a housing project, we would have favored the design issues.”

From left: Junichi Kogo, deputy branch manager of Mitsui Fudosan, client; Tomoaki Tanaka of Holl’s office, and Steven Holl.



A view from inside the “Water Reflecting House” (opposite). It cantilevers over a pool (below left).



The long yellow bar of the housing block turns at the top corner to catch the sun (below right).

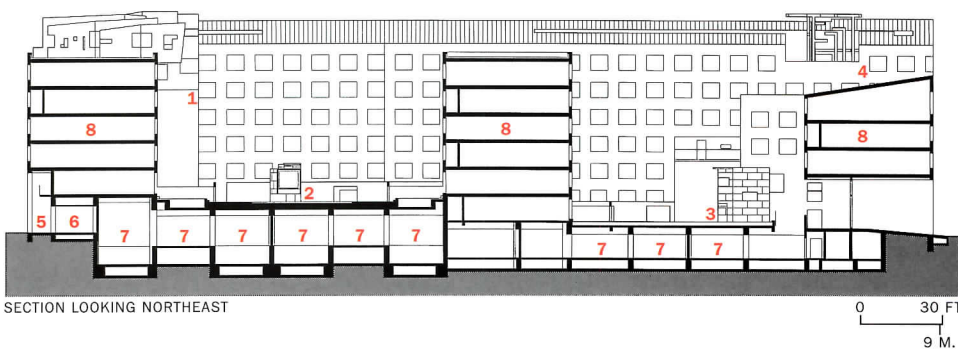


PHOTOGRAPHY: (OPPOSITE + BOTTOM LEFT) © PAUL WARCHOL, (BOTTOM RIGHT + TOP RIGHT) © N. KUROZUMI, (TOP LEFT) © STEVEN HOLL ARCHITECTS



Inside the "House of Blue Shadow" is a meeting room that can be used by residents or rented for public functions.

Apartment interiors have giant pivoting doors and custom light fixtures of cast glass that were made in Brooklyn, New York (opposite).



- 1. East gate house
"Sunlight Reflecting House"
- 2. North court house
"Water Reflecting House"
- 3. South court house
"House of Blue Shadow"
- 4. South gate house
"House of Nothing"
- 5. Pedestrian arcade
- 6. Retail
- 7. Parking
- 8. Apartments

on both sides, giving American architects jobs in Japan are token offerings that are relatively inexpensive at current exchange rates.

As construction proceeded throughout 1995 and into early 1996, fights continued over materials and methods. Holl went to Japan four times, and Tanaka twice as often. Holl wanted to use integrally-colored concrete as exterior cladding of the "silent" buildings. The coloring process was unusual to the client; the choice was overruled. Instead, a synthetic stucco called Fukko was applied, over Holl's vehement objection. Holl did have some small victories, though, including Kajima agreeing to pay for interior light fixtures of cast glass to be made in Brooklyn—a surprisingly "custom" touch for a large-scale, fast-track development.

MARCH 1996 Holl returned to Makuhari for the dedication ceremony when construction was completed in March, 1996. Many speeches were made including one by client Kogo, acknowledging how much he liked the project. No one was more surprised than Holl. Kogo's admission amounted to a public apology. For Holl, it was a vindication, not just of the project,

but of his overall approach to architecture. Everyone Holl worked with in Japan—from Kajima to the client—offers the same appraisal of the architect's vision. "Holl is stubborn," is what Kogo, Ogawa, and Enomoto all say; but with the project complete, and on each of their terms a success, they now all say it with a smile and a touch of admiration. For his part, Holl remains steadfast in his vision: "I knew it would work at an urban level, that's what kept me from quitting." By the end of 1996, almost all of 191 units that were ultimately built (11 more than were originally requested) have been either rented or sold. ■

Manufacturers' Sources

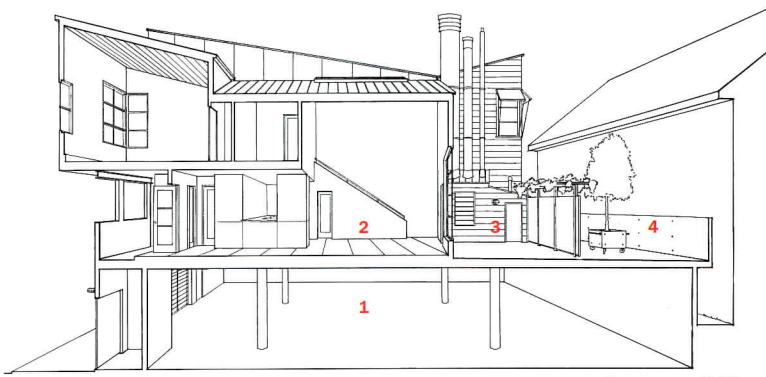
- Exterior aluminum panels:** Yamaki Co.
- Composite panels:** Rheinzink
- Acrylic stucco:** Magic Coat/Fukko
- Garden wall stain, paints:** Kansai Paint Co.
- Aluminum roofing:** Yamaki Co.
- Painted steel windows:** Tetsuya Co.

- Aluminum windows:** Tostem
- Skylights:** Yamaki Co.
- Painted/vinyl-coated steel doors:** Nihon Funen Co.
- Security grilles:** Testuya Co./Sainwa Co.
- Locksets/hinges:** Miwa
- Lighting:** Panasonic/Yamagiwa

Responding to different contexts, solar orientations, and uses, the Tipping Building presents a variety of faces—from the two-story apartment (this page and section opposite page) to the office block (photo opposite).



The **TIPPING BUILDING** in Berkeley, Calif. is Fernau & Hartman's modern interpretation of living above the store.



Just three-stories tall, the Steven Tipping Building is the kind of small-scale, mixed-use, pedestrian-friendly, and neighborhood-focused development that planners these days are trying to encourage in urban-infill situations. “We need to go back to living over the store if we want cities to work,” says Richard Fernau, whose firm Fernau & Hartman Architects designed the building.

A hybrid at the edge of downtown Berkeley, Calif., the Tipping Building combines street-level parking and a cafe with a two-story professional office space and a duplex apartment. Most of today’s important urban activities are accommodated in its 9,800 square feet: living, working, parking, and cappuccino drinking. Completed just a year ago, the corner building already has helped repair a once-frayed urban seam.

One person who is particularly delighted with the new building is Linda Powell, president of the Henry Hearst Neighborhood Association, who started out as a vocal foe of the project. “I’m a Victorian kind of person and I didn’t like the Modern vocabulary,” says Powell. “I was very concerned about the bulk. But the building gives a sense of openness, depth, space, and clarity.”

The sense of living in a village

For Powell, the lessons of the Tipping Building extend from architectural ones of scale, bulk, and materials to urban ones. “We brought a business back into the neighborhood, where people use the copy shop and the restaurants without getting into cars. We made the neighborhood more lively. We brought back a good dwelling unit where someone lives. We got a public space that is accessible. It has helped enhance the sense of living in a village,” she says.

Referring to “New Urbanist” or “neo-traditional” town-planning ideas that are much in vogue these days, Fernau explains, “We took

Aaron Betsky is curator of architecture and design at the San Francisco Museum of Modern Art and writes for many magazines. He is the author of several books on architecture and design, including the forthcoming Icons: Magnets of Meaning and Queer Space: The Spaces of Same-Sex Desire.

by Aaron Betsky

1. Parking
2. Apartment
3. Apartment garden
4. Office garden

Postmodern urban principles, but not the way they are usually expressed.” Instead, the architects let each of a variety of forces—from the demand for a housing unit to the orientation towards the corner, and from the open base to the gestural top—have its own material, shape, and geometry.

“We improvised idiosyncratically on the chaotic urban context,” says Fernau. Yet the result is so rigorous that the building almost disappears. “I don’t even notice the bulk anymore,” says Powell. “I just notice the shade it gives, the light it lets in.”

Berkeley, which has the reputation for making development difficult, worked with Fernau to make the building acceptable under its



Project: Steven Tipping Building, Berkeley, California
Owner: Steven Tipping
Architect: Fernau & Hartman Architects—Richard Fernau, Laura Hartman, partners-in-charge; Mark Macy, project architect; Scott Donahue, Geoff Holton, David Kau, Turk Kauffman, Tom Powers, Susan Stoltz, project team; Cecilia Hernandez,

Susi Stadler, Jessica Rothchild, Michelle Huber, Erica Vonder Hayden, Alexis Masnik, Don Najita, presentation team
Engineers: Steven Tipping Associates (structural); O’Mahony and Myer Electrical and Lighting Design (electrical and lighting design); William Mah Engineers (mechanical)
Landscape: Ron Lutsko Jr. and Associates



urban-design guidelines. The site is in a rather confused part of town, between taller institutional buildings, a mixed bag of commercial structures, and a residential neighborhood. Pat McGowan, the City of Berkeley planner who shepherded the project through the city's approvals process, says, "The Design Review Committee wanted to see a building that contributed to making a gateway here on the edge of downtown. They wanted transparency on the ground floor, a parking entry that was not dominant, a height and bulk that was not overwhelming, and scale-giving

house at auction, move it to another site, then incorporate a new unit as part of his mixed-use building.

Nearly trapped by all of the rules

Having appeased the city, Tipping got a variance from setback requirements and bulk restrictions. He then had to find room to park two cars for every thousand square feet of office space, provide a commercial use on the ground floor, and house his office. It was not an easy task, he explains: "I was

THE TIPPING BUILDING IS A COLLAGE THAT DRAWS TOGETHER COMPLEX URBAN FORCES INTO A COHERENT, SIMPLE, AND POWERFUL FORM.

elements." They did not, she states emphatically, demand a certain style. "In the downtown, we like to see background buildings but here we looked for the strength of the composition and how it contributed to the context."

"This building is about how construction works in the 1990s," says Fernau. "It's about how architecture is a compromise between the need to deal with all the agencies, real-estate formulas, client desires, ADA requirements, and all of the other inevitable realities. It is up to us to absorb those realities and draw out the issues that created them in the first place. It is an ad-hoc process, and it gives the building an improvisational quality."

By design, the Tipping Building is a collage that manages to draw together complex urban forces into a coherent, simple, and powerful form. Such a collage costs \$950,000 to build or \$97 a square foot.

"In some ways it is a miracle that this thing got built at all," says the owner, structural engineer Steven Tipping. After searching for months for a new home for his office, located in an industrial area south of Berkeley, Tipping found some property at the edge of the commercial core. Unfortunately, there was a house on the lot. "Nobody had been able to build here, because of that house," explains Berkeley's McGowan. "Landmarks [commission] didn't want it torn down, and the code said you had to replace the dwelling unit." Tipping's solution was to sell the

trapped on both ends. I had to provide the parking and the retail, but the bank would only give me a loan if I occupied two-thirds of the building." The overall volume of the building arose out of these numbers.

As if all of these demands—and California's strict earthquake and energy-consumption codes—were not enough, Fernau & Hartman also had a client who wanted "a building that was me, that you would recognize. I wanted it to be subtly about engineering. I wanted a big volume, lots of open space and light, and clearly defined spaces. I drew them a box."

To Fernau, all of these demands brought clarity to his task. He says, "We saw it like a classic school problem—a cafe, an engineer's office, a dwelling unit, tight square footages, a complicated site. We treated the city's demands in the same way. It's all the things we learn about as students. It meant that this building was about first principles. How do you put these different pieces together, how do you express them?"

Their answer was to make a straightforward composition. A poured-in-place, post-tensioned concrete base contains the corner cafe and parking, which you enter off the side street. Above this, a double-height, wood-frame box contains the main drafting room for Tipping's firm, which opens up towards the north "in the tradition of all art and architecture schools." It is clad in cement fiberboard that is meant to pick



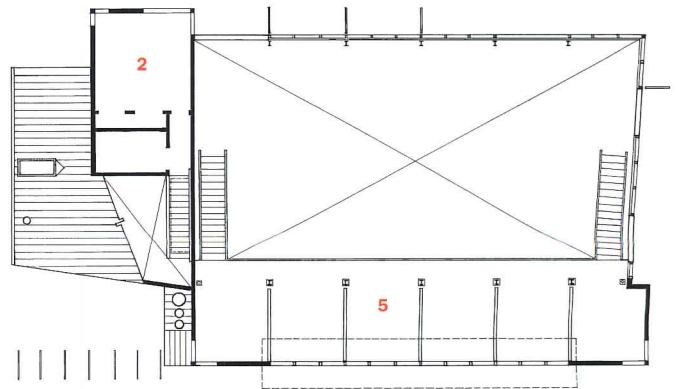
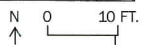
Fernau & Hartman selected materials for the Tipping Building that would allude to neighboring buildings. For example, the cement-board facade of the main office structure (opposite) picks up on the institutional nature of a government office building across the street, while the dwelling unit mimics the wood cladding of many nearby bungalows.

Metal sunscreens, canopies, and gates along the south elevation (right and above) bring a pedestrian scale to the building and help connect it to the street.





SECOND FLOOR



THIRD FLOOR

- 1. Office
- 2. Apartment
- 3. Apartment garden
- 4. Office garden
- 5. Office mezzanine

up on, but scale down, the palette of the nearby institutional buildings.

The single dwelling unit sits on a side street, and looks like a child's drawing of a house. Its green wood cladding is mirrored by the two-story row of private offices that anchors the drafting room to the south. This row of offices provides thermal mass and breaks down the bulk of the office block. Two outdoor spaces on the southern side of the second level give some relief to the density of this composition.

A rational engineer's esthetic

Once they had set the basic form, Fernau & Hartman worked to "go back to first principles in the way we expressed how the building comes together." From the pour holes in the base to the rain gutters that run right through the drafting room, almost every piece that makes up this building is exposed. Off-centered king trusses soar over the drafting room, metal decking becomes siding in the garden, and screws become decoration. To sum it all up, Fernau designed a conference table with a plywood top that has a pane of glass in the middle, so you can see the painter's scaffolding that holds it up.

All of this clarity of composition and detailing is a direct result of both the client's and the architect's desire to build with what Fernau calls a "rational, engineer's esthetic." For McGowan, it also "breaks down the scale of the building, gives you elements you can read."

The emphasis on parts and detailing has done more than just domesticate the Tipping Building. It has diffused the Modernist appearance inherent in the materials and forms of the building's architectural vocabulary. All of the parts and pieces made it acceptable, "so that people look at how it works," as Fernau says. This certainly is the case from Linda Powell's perspective: "It has become a kind of destination in the neighborhood at the beginning or end of the day. It's the kind of place where you can sit for a few hours with a book. The reveals give some depth. It has a very Mediterranean feel, maybe not in the look, but in how it functions, with a set of outdoor rooms." ■

Manufacturers' Sources

Shiplap siding: redwood

Fiber-cement-panel siding: E-Flex by Eternit

5-Vee crimp galvanized steel roofing:

Western Metal Building Products

1.5-inch aluminum windows:

U.S. Alumir

Green-tinted glass: Solex

Locksets: Schlage

Hinges: Hager

Closers: Norton

Perforated corrugated aluminum

acoustical ceilings: Reynolds

Cabinetwork and woodwork: custom by Fernau & Hartman

Paint: Cabots

Radiator: Runtal

Interior ambient lighting:

Holophane, Well-Made, LSI, Lightolier

Downlights: Reggiani

Exterior lights: Stonco

Steven Tipping's engineering firm occupies 4,010 sq ft of space on two levels (opposite). Operable windows and fans, as well as large, north-facing windows and low-energy lighting, allow the building to operate without air conditioning. Exposed off-set King

trusses and steel columns help convey an engineering esthetic, something the client specifically requested.

Corner windows in the 830-sq-ft apartment (right) help expand the unit visually, while a small garden (below) is a treasured urban amenity.



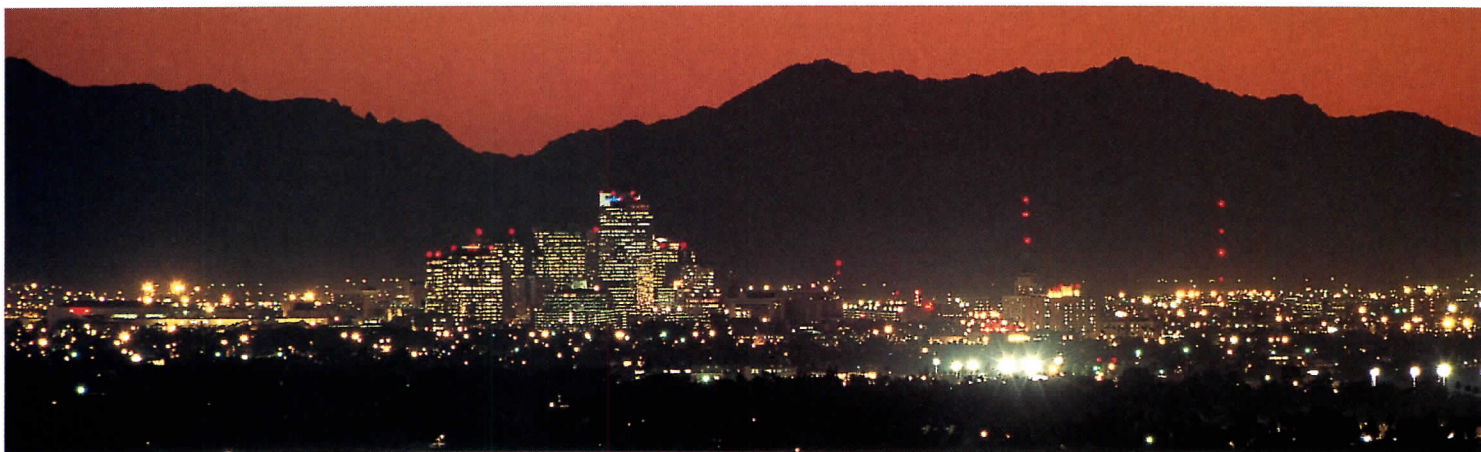


Gray-green precast panels and silver-gray terne-metal cladding on the new buildings of the Phoenix Art Museum pick up the subtle, dusty colorations of desert shrubs like Palo Brea.

Night-time view of Phoenix, from Camelback Mountain looking southwest (opposite).

CRITICISM: Can Williams and Tsien's PHOENIX ART MUSEUM help this sprawling desert city find its edge?

by Michael Sorkin



Night flying into Phoenix—inky emptiness abuts the grid of lights, the desert lapping at the edges of town. As the plane circles and drops to land, the glimmer of energy seems to spread to infinity and a paradox becomes visible: growth kills the resource that makes the city great. Climate and landscape are sunk in a miasma of development, sprawl without end. Sufferers fleeing their allergies find them again as the city urbanizes itself out of health.

The growth of Phoenix has been rapid, its settled area attenuating even more rapidly than its increasing population, the very formula for sprawl. Between 1950—when the town had a scant 100,000 people—and 1980—when it hit its first million—the area of Phoenix grew from 117 square miles to 450, almost three times the rate of population growth. Today, the inhabitants of Maricopa County—Phoenix and a brace of contiguous municipalities including Mesa, Tempe, Scottsdale, Chandler, Peoria, and Sun City—now number near 2.5 million, over 60 percent of the state's people. Arizona is incredibly urbanized: Phoenix is now among the 10 largest American cities.

There is a certain perverse environmental logic to such concentrations. The desert has a low bearing capacity for human settlement: its eco-systems are fragile. Concentration could be considered conservation by a simple math: the less of the desert covered, the more of it is

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preserved. For all their sci-fi scale, this was the message of Paolo Soleri's daft "Arcologies." This, too, is the message of the spare pattern of the site's original inhabitants.

Because of the construction of the Salt River Project at the beginning of the century and the Central Arizona Project in the 1980's, and because of enlightened restrictions on the use of groundwater, Phoenix is well provided with water. Since there is little anxiety about future supply, water is not a major regulator of growth. Indeed, the region has a history of irrigation—back to the canals of the Hohokam Indians. Phoenix's early modern character was also agricultural, dominated by a water-intensive cotton and citrus economy. Ironically, the replacement of

Project: Phoenix Art Museum
Phoenix, Arizona

Architect: Tod Williams, Billie Tsien and Associates—Tod Williams, Billie Tsien, principals-in-charge; Marwan Al-Sayed, project architect; Vivian Wang, Martin Finio, Betty Chen, Matt Baird, Peter Burns, design team; Peter Arnold, David van Handel, Erika Hinrichs, Yoshiko Sato, assistants

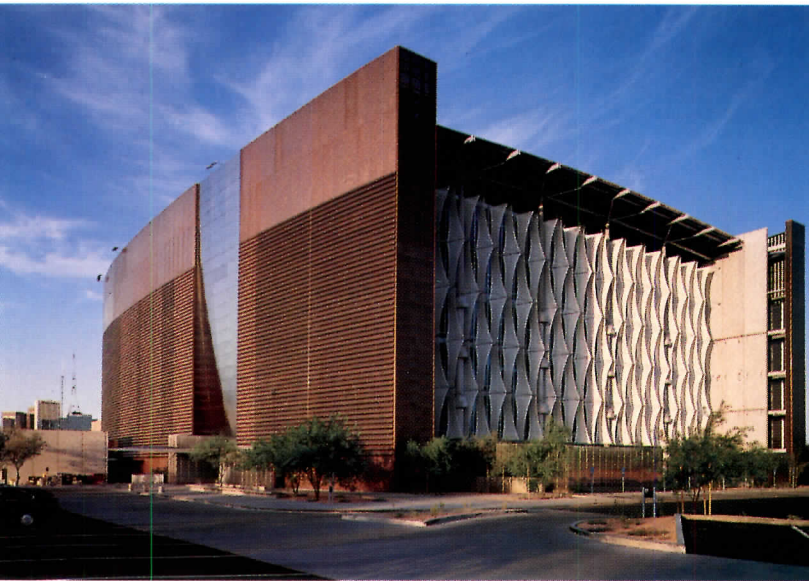
Associate Architect: Lescher and Mahoney/DLR Group—Bryce Pearsall, principal-in-charge; George Rice,

project manager; Bob Watkins, landscape

Engineers: Robin E. Parke Associates (structural); Ambrosino, DePinto & Schneider (M/E/P)

Consultants: Lescher and Mahoney/DLR Group, Debra Burnette Landscape Design (landscape); Fisher Marantz Renfro Stone (lighting); McKay Conant Brook (acoustic); Chapman Ducibella Associates (security); Thinking Caps (graphics); 3/D International (project management)

General Contractor: Johnson Carlier



The Phoenix Central Library by Will Bruder opened in 1995 (above).

The 1993 Arizona State University law library by Scogin, Elam and Bray, of Atlanta (below).

Antoine Predock's 1989 Arizona State University's Fine Arts Center (opposite).

agricultural uses by urbanization has resulted in a net decrease in demand for water. The requirements of even luxurious lawns do not rival the thirst of cotton. Phoenix has too much water: the sense of abundance induces a failure of limits.

Economy is also character. In Phoenix, growth is centered in a healthy high-tech and service sector and around those qualities of climate and culture that continue to attract waves of retirees, vacationers, and “snowbirds”—the large migratory population that arrives in the winter, swelling the city by 30 percent. The distortions of a population that is constantly increasing has economic consequences beyond growth. In their first year, new arrivals spend sums equivalent to six years spending by a standing resident. The culture of immigration adds a permanent fizz to the economy that a more stable population would not, another link in the chain-letter economics of endless growth. No coincidence that savings and loan manipulator Charles Keating made his killing in Phoenix.

This economy of growth has shaped both the city's self-image and official planning practice for years. Outside of several affluent areas, there are few curbs on either the character or the pattern of growth, and the city has expanded almost exponentially and in remarkably consistent form. Although impeded by a few natural barriers and by several large Indian reservations (which have yet to get hip to their own profitable possibilities in development), the desert is wide open for encroachment and the city gives every indication of being ready to encroach.

Although the official planning philosophy has changed from a simple growth formula to a strategy of “urban villages,” the effects on the ground are negligible. The experience of Phoenix is of a continuous field of low-density development with few internal edges. Phoenix is filled with gaps that are often the product of developer “leapfrogging” to avoid the run-up on land adjacent to existing developments. The differences among these towns are largely notional—physical fiction. Phoenix has become the dreaded polycentric automotive metropolis.

While planning styles may change, the structure seems forever: the grid, the house, the car. These are the basis of the city's urban culture. On a drive north of Phoenix, perhaps 30 miles out of town, heading for a

hamlet called Carefree, the otherwise undeveloped landscape is marked with optimism, signposts hailing the “future site of 19th Avenue, future site of 20th Avenue, future site of 21st Avenue...”

This vision of emptiness awaiting order fixes a historic tension. Arizona mixes opposites. The state's schizoid politics reflect the old conflict between wilderness and development, between styles of order, yielding John McCain; Bruce Babbitt; and Barry Goldwater, former department store magnate, Air Force General, founding father of American neo-conservatism, and defender of Gay rights—a liberal in the old-fashioned way. Arizona is also the first American state to have female chain gangs.

Arizona's historic immigration was comprised of people seeking not just freedom and opportunity—the standard-issue myths of the frontier—but also of those seeking health and physical invigoration. If the Arizona economy grew on the fabled 3C's—cotton, citrus, and copper—it was soon overtaken by a stream of health-seekers and quickly evolved a vigorous spa economy. An informal survey suggests that the service most frequently advertised on the billboards of Phoenix is chiropractic: the alleviation of psychic and physical aches and pains is the promise of the Southwest. The fantasy of paradise is everywhere. “Paradise Valley” is the city's self-designated soubriquet. And the welcome-signs at the city's edges are emblazoned with the slogan: “Best Run City in America.” Phoenix is a dream of order.

The grid is the physical expression of America's historic fantasy of paradise as order. It is also the primal scene for our partisan wars between density and extent. The grid represents the idea of democracy as pure extent. Thomas Jefferson's vision was not simply of a mathematical equality achieved through the continuous subdivision of an endless territory, but of a citizenship guaranteed by private invisibility. After all, if the grid was large enough, each citizen could possess a private horizon, his neighbors out of sight, her own territory effectively boundless.

Reaching the coast (and building Los Angeles) compromised this vision and the big re-migration from California back to places like Arizona is an effort to reclaim the dream of non-interference. A sense of utopia—however devoluted—continues to shape Phoenix's take on place. The fantasy of self-realization hangs like dust in the Arizona air, often taking form as architecture. Even the rocks seem to be buildings in the state of becoming. And, we all know Arizona's historic affinity for utopians at the high-end—architectural experiments from Frank Lloyd Wright's





Taliesin to Soleri's Arcosanti to the Biosphere to Sedona. Not simply laboratories for new architecture, these have all been elective communities. Arizona is a state occupied by choice.

Of course, one person's utopia is another's forbidden, gated community (or "armored cocoon" in the appalling words of "futurist" Faith Popcorn). The most extraordinary of such intentional community projects in Phoenix is developer Del Webb's Sun City, the famously successful retirement town at the city's northwest corner, its radial plan straight out of the 18th century. Sun City embodies the fundamental conundrum of democratic space by being both elective and restrictive, limited to older people (membership in the American Association of Retired People is 100 percent), forbidden to children. Sun City is also a remarkable reduction of the spatial structure of Phoenix itself. Pared of the distorting demands of employment (it's a retirement community, after all), Sun City is limited to residence, recreation, and consumption. The transit system is golf carts.

This is an important clue to the fate of utopia and to the current default mode of contemporary American urbanism. The leading post-democratic utopia is the city of segmented consumption. Phoenix is spatially organized like an inverted piece of market research. Each consumer sits in a single house on a piece of turf (there aren't even any dingbat apartments in Phoenix!): malleable monads, test audience for the new age. The analytic tool that unravels this organization is the advertiser's, and Phoenix, with its unconfused demographics, is a nearly ideal field of operation for contemporary consumption. Sun City has reabsorbed this mode by utilizing consumer research into the preferences of its residences as a main mode of planning. Why vote?

Further ironies. If the Phoenix model is of a grid of homes focused on a series of malls, this suggests that the "urban village" may be more relevant than first blush reveals. The pattern of such local centers is clear within Phoenix, more so for the city's remarkable underdevelopment in freeways (or any other form of transportation save cars in the grid). Once more, too, the city has produced the seeds for a rational and delightful maturity. After all, the agora was also a point of purchase and a golf course can be as green and trodden as Central Park.

How to build in such a paradise? Is it possible to look beyond instrumental views of the city to a more popular sense of a *genius loci*?

Is it possible to exceed the kind of creative geography in which the "Club Tribeca" is to be found in a shopping mall out of Georgia O'Keeffe or to eschew the hedonistic strategies of "climate control" that yield rose gardens and top-down driving with the air-conditioning blasting?

The answer is surely a provisional "yes."

The choices are nowhere clearer than in Scottsdale where I stopped one morning for souvenirs. For all its raw suburbanism, Phoenix

remains in love with the "look" of the Southwest. Scottsdale, with its streets of Native American *tschokerias* and its galleries of Western Art, is a point of dissemination for the sensibility, source for the decor of 10 million bleached-out living rooms. And people are into it: one sees remarkably few of the mock-Tudor or mock-Loire *haciendas* one would expect in Los Angeles or Orange County. However tacky the expression, there's terrific consensus and literacy about this version of the city's visual roots.

Negotiating with such an entrenched sensibility requires astute navigation between nature and culture. As we continue in recovery from the mimetic regionalism of the Disney cadre, the search for a healthy architecture resumes. Which brings us back to the desert.

The best desert architecture—from the Anasazi to those obsessive geometers, the Navajo and Frank Lloyd Wright—treats the desert as a cause, not a trope. The BTU-addicted ranchero with the three car garage and the xeriscaped front yard is the Benetton version of desert building.

SUDDENLY, PHOENIX HAS BECOME A SHOWCASE FOR MEDIUM-SCALE MODERN ARCHITECTURE.

And yet, it is *some* version, trapped in a contradiction but game nonetheless. A meaningful desert architecture has many tough choices to make in the middle of a city of two million.

Suddenly Phoenix has become a showcase for medium-scale Modern architecture, spurred by the confident expenditures of a culturally underdeveloped city enjoying its fortunes, ornamenting itself with libraries and university buildings, museums, malls, concert halls, festive marketplaces, skyscrapers, and ball parks. The ambition can be raw—the TV ads for the local opera feature a Julia Roberts lookalike in a "Pretty Woman" fantasy. Phoenix's luck is in the timing and in its liberal and remarkably consistent patronage of architects of real quality. And, most of the resulting architecture takes the investigation of place very seriously.

The recent spate of publicity notwithstanding, I was unprepared for Will Bruder's superb public library. It's a confident and disciplined piece of work, imposing without being overbearing, lightly constructed with no sacrifice to solidity. After a dark blue passage to the center, space rises through a bright, generous shaft, decompressing towards the top, blossoming into a vaulted reading room, glazed at either end, its roof supported by a graceful, ingenious, and droll system of posts and cables. The view south frames the skyline of the Phoenix downtown—or invents one, is more like it. While the downtown has a certain presence as a navigational icon (like its natural analogue, Camelback Mountain), it is simply ragged as a tectonic. The near vista from the library, though, gives this collection of generally mediocre buildings a presence and stature of civic



dimension. This ocular contribution to the city's collection of views of itself—the foregrounded hall, the middle distant center—is as remarkable as it is crucial to the sense of the metropole.

From outside, the building is a big lump of corrugated copper, almost geology, formless as a lode. It has the proportions of a vertically exaggerated suburban department store, initially a little graceless, soon more challenging, and finally very satisfying. And the library does have something of the atmosphere of a hushed and hip emporium: great signage, well-lit displays, glass elevators, atrium, good access to the freeway. It's a great scale—the scale of concert halls and retail, the scale of both

The building, entered via a descent underground, is about thickness and darkness, exclusion of the sun in its grotto-like interior and in the modulations of shade that returns the building's outer surfaces to use.

Down Central Avenue—the Wilshire Boulevard of Phoenix—from Bruder's Library is the Phoenix Museum of Art, just expanded by Tod Williams and Billie Tsien. The comparison to Wilshire, classy boulevard of towers, is not gratuitous: The new museum is a smaller, flattened version of the Los Angeles County Museum of Art (LACMA) expansion. Like the Los Angeles project, the Phoenix Museum conceals a bland (though not dysfunctional) original, and reorganizes entry and circula-

THE EXPANSION OF THE PHOENIX ART MUSEUM IS A SUBTLE EVOCATION OF SOUTHWEST MOTIFS, ABSTRACTED TO THE BORDER OF SIGNIFICATION.


urban and suburban monuments, dignified and big, but accessible. Bruder's library does it with no spurious clarity or denatured heft.

Another library, Scogin, Elam and Bray's fine law school building on a highly trafficked site at the edge of the Arizona State University campus [RECORD, January 1994, pages 78-85], also reflects on but does not pander to the desert, working within a narrow palette—extremely elegant. There's a seismic riff in the form of a fissure down the building's middle and the color is sandy and pale Dryvit, the adobe of post-modernity. The building responds to the sun both optically and thermally. Its geometry, irregular but comfortable, is a fine catcher for shadows. North-drawn light floats gently into the reading rooms. Spaces are high, airy, cool-looking, though not dark. My favorite region in the building is its fish-shaped service area. From an arching roof supported by graceful composite trusses, ducts and lights are hung on a plethora of cables that streak through the low-lit room like sun rays piercing clouds.

Across the campus, Antoine Predock's art museum has an architecture at once more local and more thermally histrionic. In massing, the building evokes traditional desert tectonics at a remove comparable to that between Le Corbusier's villas and the prismatic Mediterraneanity of their origins, and recalling modernity's capacity for happiness in the heat.

tion through a dramatic portal. Williams and Tsien have rehabilitated the Museum's public face and introduced another, grander one, with a range and scale of spaces. Like the Bruce Goff-designed addition at LACMA, there's even to be a curvilinear excursus, an enormous conoid fiberglass baldachino for sculpture (that awaits funding), cooled by mists in summer, a lateral displacement of a centralizing dome. *(text continues on page 97)*





The western facade, with the two large wings sloping in towards the entry court between them (opposite top).

The Central Avenue entrance at night beckons to car passengers and the few pedestrians found in Phoenix (opposite bottom); most museum goers will enter the building from the courtyard side, closer to parking.

Spears of green glass—translucent vigas—admit western light into the Museum's Great Hall on the sparsely windowed Central Avenue facade.

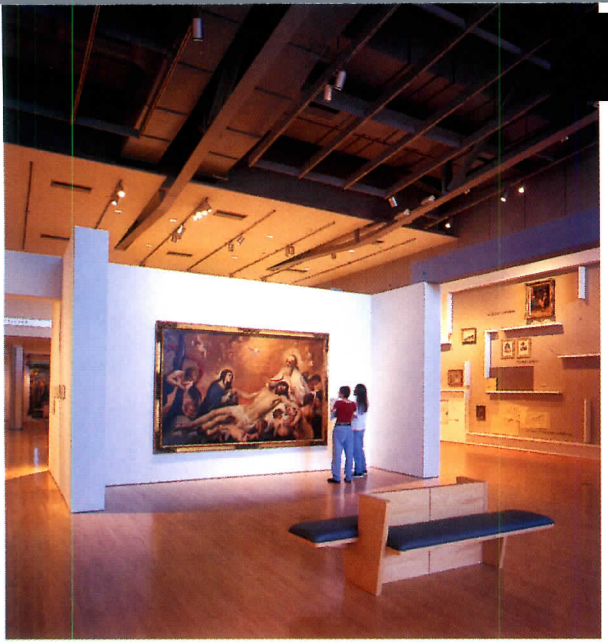




Looking past a corner of the entrance lobby with Frank Lloyd Wright-like mitered-glass windows towards the courtyard kiosk. The huge precast panels that seem to root the building in the soil are faced with Glacier-green quartzite aggregate that comes from Utah (above).

Looking out through one of the dozens of unexpected vignette-framing windows from the new gallery to the courtyard (right).

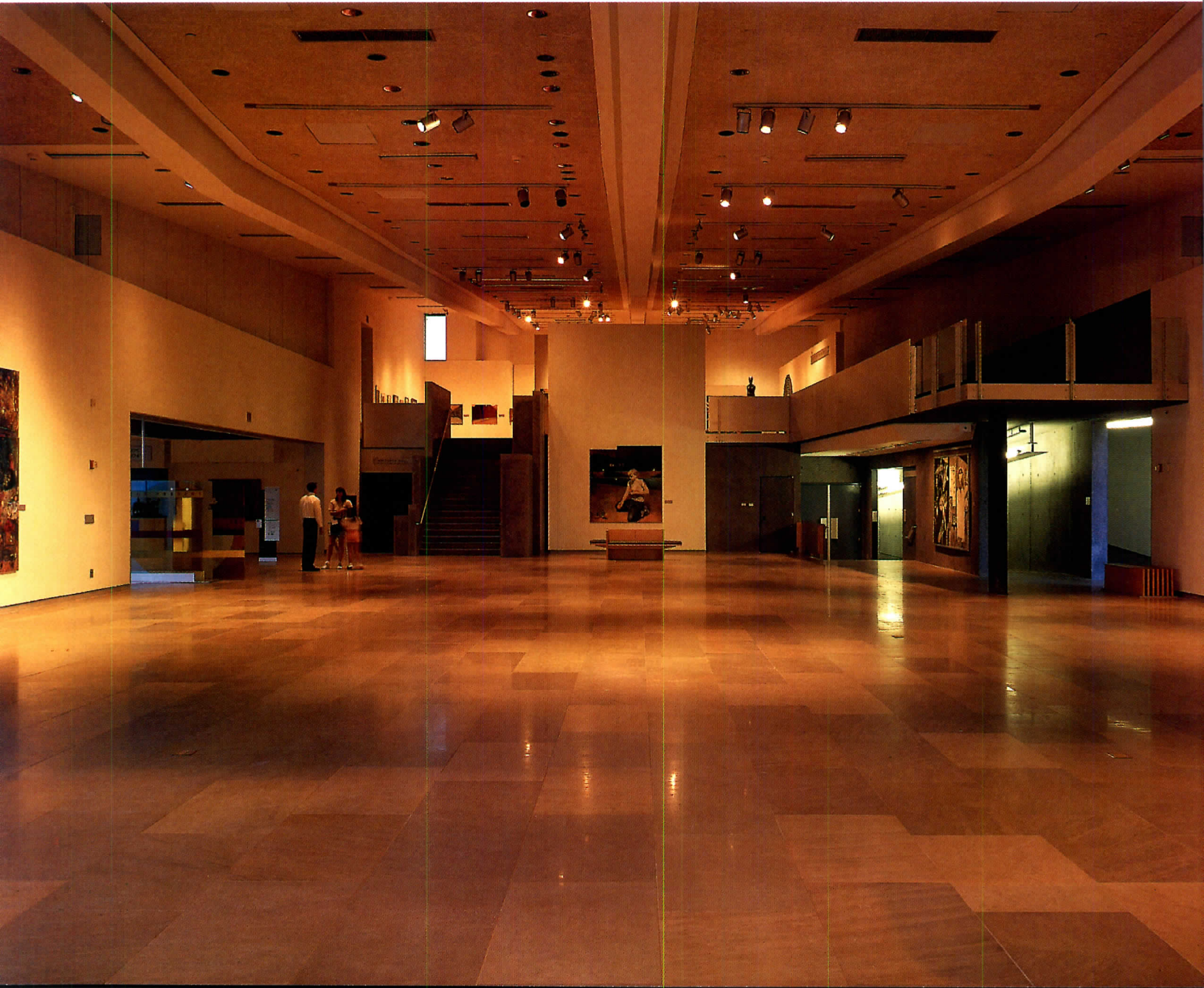


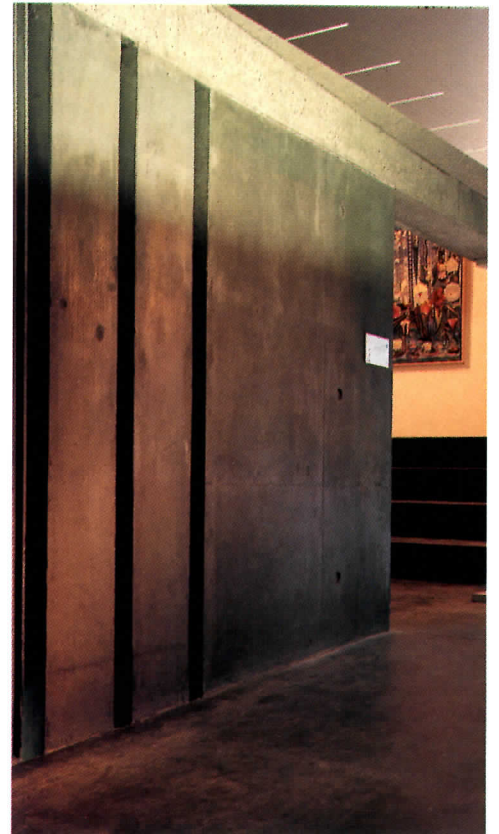
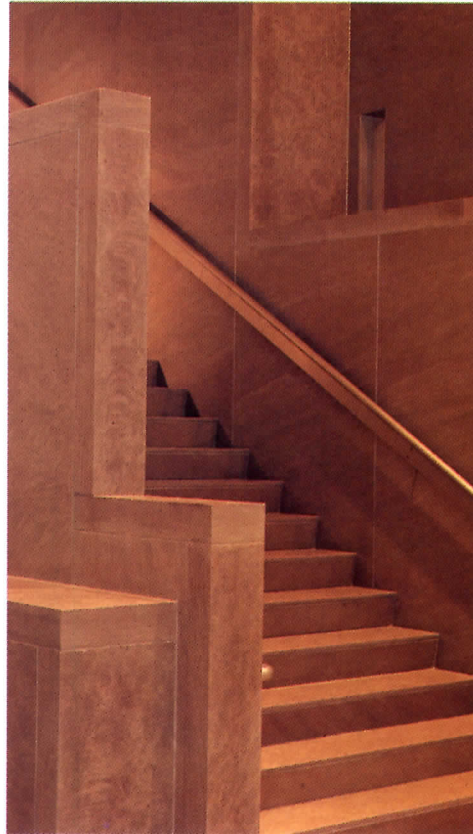


A Spanish Colonial gallery with one of the maple-veneer plywood benches designed by Tod Williams, Billie Tsien and Associates. The double-sided bench, named "Twisto," has a storage pocket within the seat back to hold exhibit brochures and catalogues (left).

Intended to be a grand public space for fundraising events and civic galas as well as a permanent exhibit space, the Great Hall has luxurious materials not found in the rest of the Museum. The floor is Yukon Silver Limestone from New Mexico (below).

The pedestrian experience: The poured-in-place gray cement ramp wends from the ground-level Great Hall up to the Modern galleries and down to the partially below-grade lecture hall. The stairs lead up to the Art of Our Time exhibit (opposite).





- existing/
renovation
- new
- future

1. Entry
2. Changing exhibits gallery
3. Great Hall
4. Auditorium
5. 20th century gallery
6. Sculpture pavilion/court
7. Museum store
8. Asian art
9. Community theater
10. Administration/education

The site plan shows the total extent of the Phoenix Art Museum complex—renovation, new construction, and yet-to-be. The Sculpture Pavilion, as yet unbuilt, nestles in the “L” formed by the old library, renovated to a new research facility and museum offices, and the experimental Little Theater.

FIRST FLOOR PLAN

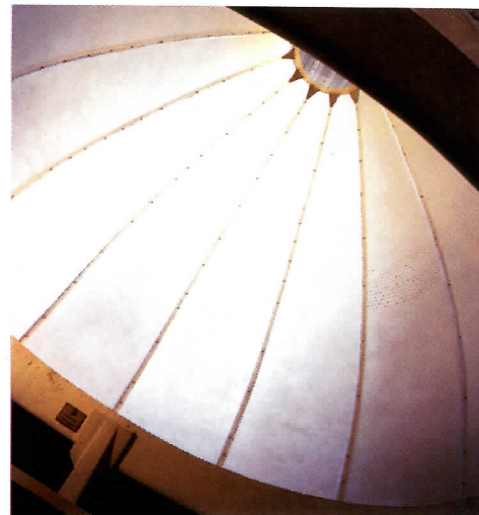
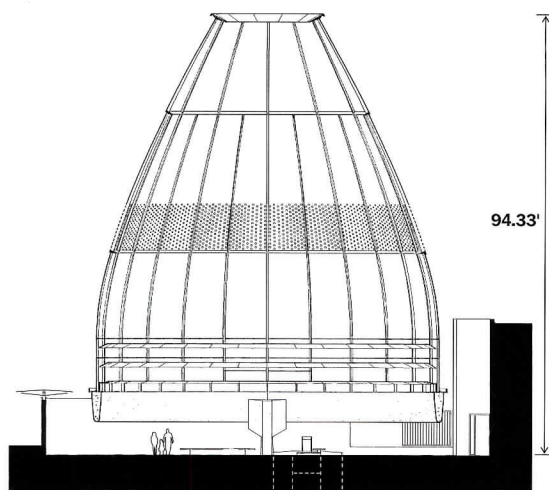
Central Avenue

0 60 FT.
N ← 18 M.



Ascending a stair of dark-gray integrally-colored concrete, visitors catch a glimpse through the slotted wall. Punched-edge baffles at the ceiling shield fluorescent tubes.

The translucent fiber-glass Sculpture Pavilion, unbuilt but shown here in model, is designed as a giant floating lantern that will become the preeminent symbol of Phoenix. Perforations in the cast-resin panels draw the warm desert air upwards, to be cooled by a water mist and fall back down to earth.



The expansion of the Phoenix Art Museum is a subtle yet unmistakable evocation of motifs of the region, abstracted to the border of signification. The building is almost Spanish. Massive, pre-cast walls are battered in the load-bearing profile of adobe and topped with a metal cornice. Like roof beams through a mud wall, slabs of green glass penetrate the upper portion of the panels, transmitting not load but light: day in, night out. A frieze of circular indentations along the wall re-evokes the shape of the beams. A courtyard will come.

The parti is Classical: symmetrical wings on either side of an entry court. Unfenestrated elevations have a long, pueblo proportion. The precast panels, though, eschew the usual buff, and are colored instead with a local aggregate in a lovely green, somewhere between celadon and lime. Both Bruder's copper and William's and Tsien's aggregate are logical expansions of the local envelope of tonality without losing the color of the place. The gap between the two wings forms the museum entrance. It's overflowed by a galvanized metal bridge that descends from left to right above the axis of entry, suggesting a less-Classical pattern of circulation. That metal-clad ramp is part of a narrow gallery that begins in the small, second-level space of the left-hand wing and gently descends across the entry, passing out and into a small interior terrace overlooking the gallery to the right.

The right-hand wing, which contains a beautiful new auditorium as well as gallery space, also has a more complicated set of ramping galleries that combine necessary circulation with more room, producing a composite, level-bending, space "within the walls." Williams and Tsien have a very refined sense of incident. Their ability to produce such complex movement within a project of relatively modest scale is by use of a canny, elegant plan and by beautifully developed events en route—landing sites and overlooks, changes in color and materiality, flashes of light through apertures ranging from windows to glazed form-tie holes.

Again, contrary to the expectations set up by the semiotics of the exterior, the two new halls of the addition are spanned the long way by three deep trusses that frame two graceful sections which in turn have produced two elegant ceilings covering two rooms of very different character—with the most delicate inflections of material and detail. The big room on the left is a loft: a little provisional feeling, sheet-rocked and New York Cityish, the setting for changing shows. It has a techy, movable mechanical ceiling which adds to the raw, downtown feeling of the space as does the industrial-strength length-wise span. The floor is wood and finishes are plain and responsive to the cycle of sheet-rock partitionings and demolitions that will accommodate changing exhibitions.

The room on the right is the museum's ceremonial great hall—the site of openings. Here, the palette is richer, warmer, more local in tones. The detail is also more elaborated. The floor is stone and the folded ceiling is superb: roughed plaster, wood, paint, and a celestial spray of lights and HVAC registers. The proportion of the room is unusual—slightly wide—a space which has stayed with me. Eventually, this room will connect to a new set of galleries and open onto the new courtyard.

Phoenix abounds with architectures which make their peace with the desert. But this again evokes the conundrum of the town: Addition is subtraction. An answer, though, is suggested by the siting and agendas of these recent projects. Rather than colonizing new territory, each elaborates existing densities—the campus, downtown. And surely such considered densification is both the social and environmental key.

What will become of Phoenix? The worst fear is that it will coalesce into an endless substrate of urban nothingness somewhere between L.A. and Orange Country on the devolutionary family tree of the "Western Town," solving the riddle of density and extent via totally liberated sprawl. Or, perhaps, there will be a drawing back from the fantasy of no limits and in its wake the growth of a more genuinely loving relation to a place that is now at the point of passing the limits of its own sustainability. Perhaps this will allow Phoenix to find its edge. ■

Manufacturers' Sources

Terne-coated stainless steel panels:

Follansbee Steel

Custom precast concrete panels:

Coreslab Structures

Integrally-colored poured-in-place concrete:

Johnson Carlier

Single-ply EPDM roof:

Firestone

Glass bead-blasted stainless-steel clad aluminum mullions:

B+B Glass

Acoustic plaster:

Pyrok

Acoustic panels:

Tectum

Wall paints:

Sherwin-Williams

Bridge interior wall panels:

sanded Homasote

Sisal acoustic wall coverings:

Mayatex

Cleaned, waxed concrete finish:

Ora Hopper and Sons

Sandblasted concrete finish:

Johnson Carlier

Changing exhibits/gallery maple strip flooring:

Southwest Sports Floors

Limestone lobby, Great Hall floor:

supplied by New Mexico Travertine

Gallery carpet:

Bentley

Lecture hall seating/upholstery:

Hussey Seating/Unika Vaev

Custom benches leather:

Your Favorite Upholster

Track lighting:

LSI

Incandescent and fluorescent downlights:

Lightolier, Kurt Versen

Exterior uplights:

Hydrel

Zoned lighting controls:

Microlite System, Lutron Dimmers

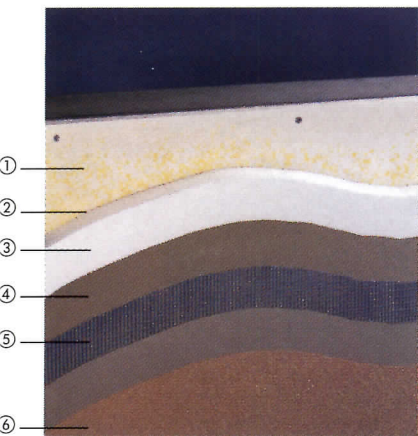
Lecture hall silver-leaf stage surround:

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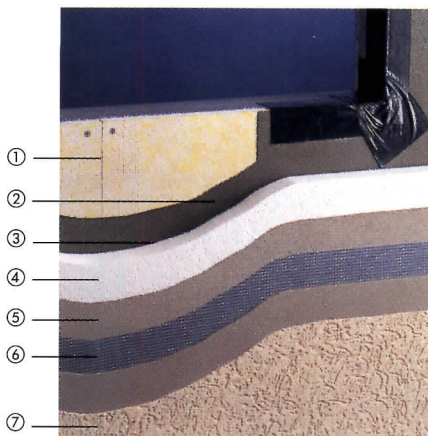
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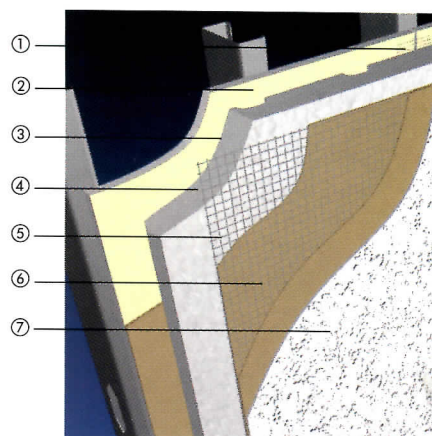
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- ⑥ Base Coat
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Lessons from America's Best-Managed Firms

LOOKING TO IMPROVE YOUR PRACTICE? OR LOOKING FOR A BETTER PLACE TO WORK? YOU MAY FIND SOME ANSWERS HERE.

by Charles D. Linn, AIA, and Clifford A. Pearson

Who says nice guys finish last? The truth is that in the 1990s the firms with the best numbers are often the ones that pay their associates well, offer generous benefits packages, and give to their communities. Not surprisingly, these are also some of the most attractive places to work.

In a profession where stories of cavalier management practices, low pay, and grueling hours are part of the lore, and where marketing was once a dirty word, a growing number of firms are now making good management an essential part of their mission. In the process, they are creating important jobs for architects with skills in marketing, business development, and project delivery. Design is no longer the whole story. To attract the best clients and employees, architectural firms are sharpening their business skills.

None of this is rocket science. All of the methods and practices described in this article are currently in use by well-managed small, medium, and large firms around the country.

Talking to architects and management consultants, one hears a lot of buzzwords: entrepreneurial, client-driven, empowering, collaborative, benchmarking, total quality management. Beyond the talk, innovative practices are indeed changing the profession.

To find out what the best-managed firms are doing, RECORD examined the practices of 30 top firms from around the country. These firms were selected based on nominations from management consultants, business authors, academics, and RECORD editors and correspondents. Each firm responded to a detailed questionnaire that examined practices in six key areas: vision/direction, marketing, project delivery, human resources, financial performance, and ability to change (see Methodology, page 115). Almost all of the firms offered data on compensation, benefits, billings, and profits. Since much of this was shared on a confidential basis, we used it as a data pool to create averages for what well-managed firms around the country are making and what they're paying.

Vision/Direction

Like politicians running for office, architects are grappling with "the vision thing." Mission and vision statements are all the rage and can be found mounted on waiting-room walls and stenciled on coffee mugs. Some firms, though, confuse image with vision—mistaking who they are (image) for where they want to be in the future (vision). The firms that successfully deal with vision and direction usually involve everyone—

from interns to associates to partners—in creating a shared view of where the firm is headed.

According to management consultant Paul Wesley Nakazawa, AIA, a strong vision is the foundation on which success is built. "It all starts with a view of where you want to go," says Nakazawa, an architect by training and a principal of the consulting firm Pearson Egan Nakazawa. "If a firm's leadership has vision, then management follows." A clear vision provides the direction needed for "the creative orchestration of markets, strategy, process, and organization that is the hallmark of accomplished firm leaders," he explains.

To make everyone aware of their direction, many firms are sharing information that they once kept close to their vests. "We run an open-book firm," says Wilson Pollock, FAIA, president of ADD Inc., a 75-person firm in Cambridge, Mass., that celebrated its 25th anniversary in 1996. "Everyone knows the financials of the projects they're working on, and to a large extent, the financials of the firm as a whole." In addition to striving to bring "extraordinary design and value to clients" and recognizing responsibilities to the environment and society, ADD Inc.'s vision includes empowering employees and encouraging them to take risks. The only way to ensure employees will take the initiative is to give them the information they need, says Pollock.

ADD Inc., which was the first architectural firm to be named Small Business of the Year by the Greater Boston Chamber of Commerce in 1995, takes the idea of employee buy-in literally. In 1989, the firm established an employee stock-ownership plan, which has transferred 80 percent of the ownership to the people who work there. By 2000, all of the firm will be employee-owned. There's nothing like owning a piece of the action to make employees feel responsible. (See Compensation section for more information on this topic.)

Promoting the value of architecture to corporate managers is a key element in the vision of Design Management Corp., an eight-person firm in Natick, Mass., a suburb of Boston. From the firm's name to its dealings with clients, Design Management Corp. emphasizes the total management orientation of its services. "Our goal is to help our customers become more profitable by being their best resource for facility planning," states principal Janis Reiters.

Reiters remembers a very different approach being taught at architecture school in the early 1970s. "In school, if a cantilever looked good but cost twice as much as a simpler alternative, who cared?" After

graduating, Reuters learned that most people in his profession saw clients as just “stages for architects to stand on.” When the last recession hit in the second half of the ’80s, many of the traditional sources of architectural work dried up and architects had a difficult time convincing struggling businesses they could provide services of real value.

In 1992, when the Boston area was still reeling from the collapse of the “Massachusetts Miracle,” Reuters and his partner Kristin Hill started their firm. “I got rid of my tweed jackets and bought some business suits and wing tips,” recalls Reuters. He started looking at architecture from the viewpoint of the client. “When a client walks through a facility, he isn’t looking for great design opportunities. He’s looking for ways to get three more workers in the department over here and four more over there.”

Instead of selling architectural services on a project-by-project basis, Reuters positions his firm as a source of expertise that clients can use over and over, as their needs change. Just as a good investment counseling firm “takes your money and farms the hell out of it,” Reuters sees his firm’s job as taking a “client’s facilities and farming the hell out of them.”

BOORA Architects in Portland, Ore., has followed a different path to success. Having designed a number of performing arts centers in the Pacific Northwest, BOORA maintains strong roots in the local arts community by providing free space in its offices for two nonprofit arts groups: Portland Arts and Lectures, and the Portland Institute for Contemporary Art. Clearly, the connection with the arts is both charitable and professional. The payoff for BOORA includes strengthened relationships in the arts community and good public relations, says Pat Harrington, one of the firm’s nine principals. But the most important benefit is something less tangible. The arts groups, says Harrington, help “set loose a creative virus in the office.”

Marketing

There are nearly as many successful marketing strategies as there are successful firms. The one common element in the marketing practices of the firms covered in our survey is the emphasis on service. “Architectural practice is undergoing a fundamental redefinition,” states Richard Hobbs, vice president of the American Institute of Architects and the person heading AIA’s “practice and prosperity initiative.” “Firms are moving from a product- or project-based model to a service-based

model,” says Hobbs. The goal of such a strategy is to increase repeat business, which is more profitable and steadier than new business.

Some of the firms responding to our survey provide a broad range of services targeted at narrowly defined markets. For example, BSW International, a 405-person firm known for its work for Wal-Mart stores, focuses on one key market: customers with “volume-building programs.” Targeting only corporations that build many facilities, BSW has developed a database of approximately 1,500 prospects that it tracks on an ongoing basis. The strategy has allowed Tulsa, Okla.-based BSW to follow its clients around the country and into Canada and Latin America.

Although Hammel Green & Abrahamson, Inc., in Minneapolis, has a more traditional mix of four key building types—corporate facilities, cultural and religious buildings, schools, and healthcare facilities—it too focuses on the big-fish customer. Realizing that it isn’t economical to chase every client, the firm identifies those with long-range building programs and maximizes its repeat business.

An innovative way of identifying potential repeat customers is to find fast-growing companies that keep needing bigger and more facilities. Design Management Corp., which specializes in corporate fit-up work and office-space planning, has developed a database of 3,000 prospects using a standard software package called MarketPlace. The software crunches data from Dunn & Bradstreet and can call out prospects based on geography, the number of employees, and increase in employees.

Another way to expand is by providing a broader range of services than just architectural design. Askev Nixon Ferguson Architects, a 37-person

firm in Memphis, Tenn., has set up two stand-alone companies—one called OnLine for facilities management and the other called CMPlus for construction management. Having separate entities providing these services allows the firm to project the image of being specialists in these fields, not just dabblers in nontraditional architectural spheres.

Kwan Henmi, a 30-person firm in San Francisco, has expanded its business by studying demographic, economic, and lifestyle trends to identify new markets. This process led the firm into designing senior housing and single-room-occupancy (SRO) hotels when these markets were just beginning to heat up. “It’s part serendipity, part being in touch with what’s going on,” explains principal Sylvia Kwan, AIA.

For example, the firm was involved in changing ordinances in San Francisco to allow new SROs and it then used this experience to design the first legal SRO in decades—a 257-unit project completed at the end of 1996. Getting a jump on the competition has allowed the firm to





PROFILE

Large firm: BOORA Architects, Portland, Ore. When BOORA Architects built a beach house on the Oregon coast for all of its employees to use on a rotating basis, profit wasn't even a consideration. The idea was to provide a memorable perk that everyone in the firm could share. But like so many other innovations at BOORA, building the beach house turned out

to boost the firm's bottom line, as well as its employees' morale. The land and house cost \$450,000. Just one year later, the property has a market value of about \$550,000, says Pat Harrington, a principal. By doing good, BOORA has found itself doing quite well.

Started in 1958 in a trailer in suburban Portland, the firm remains true to its unconventional roots

even as it has grown to be the second-largest architecture firm in town with 84 employees.

"Coming from Oregon, we've always had to look for work beyond our home base," explains Robert "Bud" Oringdulph, FAIA, the last of BOORA's three founding partners still on the job. "As a result, we've always had to be competitive." Today, the firm has nine principals—two of whom are not architects. (Harrington, who handles marketing, came from an old client, the Portland Center for the Performing Arts, and Mary Van Domelen, the c.f.o. has an accounting background.) "Having non-architects in decision-making roles has changed the firm in a profound way," says Oringdulph. "It's given us a better awareness of the needs of clients and the public, and a greater sense of pragmatism."

Although it now attracts employees from around the country, the firm remains true to its original design ethos of concern for context, climate, scale, and planning, says principal John Meadows, AIA. "We're

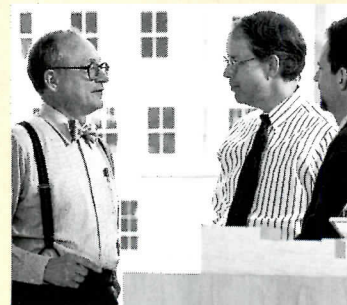
still a regional firm with some building types such as schools and healthcare, but national with others such as performing arts centers and retail," says principal Dennis O'Toole, AIA. High-flying clients such as Nike, Intel, and Portland Trailblazers-owner and Microsoft executive Paul Allen are starting to take BOORA around the country. One client, Aetna Life Insurance, is giving the firm work in China.

"The decision-making process here is more open than any other place I've ever worked at," says Michael Tingley, an associate. Leslie Kuhl, an associate principal, says "Some new people here are amazed when they're asked what projects they'd like to work on. They're not used to being involved in such decisions."

Since certain projects are inevitably more desirable than others, some jockeying goes on for plum assignments. "It's competitive here," states associate Ellen Fortin. "There are a lot of really sharp people." But at the same time, the firm emphasizes "working smarter not harder," and doesn't expect employees to work 80 hours a week.

Profit-sharing and a host of committees that involve employees in decision making give associates at BOORA a sense of empowerment. "We're all involved and we can see where we're headed," says Fortin. And that looks up.

Snapshots from Portland, clockwise from top: three BOORA associates confer at a workstation; principals Bud Oringdulph (left) and Tom Pene (center) talk as associate Michael Tingley listens; an informal meeting; principal John Meadows.



develop a local track record in certain building types, which it uses to expand into regional, national, and international markets.

OWP&P in Deerfield, Ill., is leveraging its strengths in the health-care and life-care markets to expand into nontraditional services. Last year, the 203-person firm established The Continuum Group, headed by a former hospital administrator, to provide elder-care strategic planning and management consulting for its existing life-care and health-care clients. In evaluating new services to offer, OWP&P uses several criteria, says OWP&P president Len Peterson, AIA: profitability, continuity of client relationships, and the firm's ability to provide value-added, as opposed to commodity, service.

Perkins & Will (P&W), headquartered in Chicago, has been pursuing an aggressive strategy of growth by acquisition over the past two years. Since the firm's board of directors approved a plan in November 1994, P&W has expanded, going from 240 employees in two offices to 416 employees in seven locations. By acquiring firms and opening new offices, P&W has added locations in Atlanta, Charlotte, N.C., Miami, Los Angeles, and Minneapolis to go along with long-time offices in Chicago and New York. "We followed a simple premise," explains James Stevenson, AIA, P&W's president, "that one plus one equals three."

By expanding into parts of the country where it had no permanent presence—specifically the South and West—P&W hopes to reinforce its vision of itself as "a global network of world-class professionals offering a broad array of multidisciplinary services centered on a core design practice." The goal is greater diversity—in terms of geography, markets, and services, says Stevenson.

Before setting out on its buying binge, P&W developed a profile of the kind of firms it was interested in: medium-size operations of between 60 and 75 employees, with solid foundations in at least two markets, strong financial statements, and a culture of quality design. "There are two different approaches you can take in acquiring other firms," notes Stevenson. "You can go bottom-fishing or you can go for profitable firms. We decided at the very beginning of the process that we were only interested in strong firms."

With building booms transforming parts of the developing world and large-scale projects being scarce in the U.S., a number of American firms are keeping busy by working overseas. For example, Baltimore-based RTKL Associates has been aggressively planting its flag in foreign lands. The firm has offices in Hong Kong, Tokyo, and London, in addition to its offices in Baltimore, Washington, Dallas, and Los Angeles. The firm seeks to "open offices in those parts of the world that offer a strategic advantage," states RTKL chairman Harold L. Adams, FAIA. The firm's goal is to "grow these offices organically—in other words as local studios staffed with RTKL-trained nationals who ultimately form the leadership of that office." While this approach takes longer to pay off, it is more effective than sending American architects to run offices in foreign countries, says Adams.

A growing number of firms are teaming up with other architects both abroad and at home to pursue opportunities. In 1990, St. Louis-based Hellmuth, Obata & Kassabaum, Inc., formed a strategic alliance with Kajima Corp., the giant Japanese design-build firm, to jointly pursue international work. The two firms have also started a new joint entity HOK/K to provide industrial facilities design and environmental engineering services.

About a year ago, OWP&P joined the Star Alliance, a group of 13 architectural and engineering firms from around the U.S. whose members share ideas on strategy and operations, and sometimes team up to pursue jobs. The alliance was formed four years ago by Lou Marines, a

San Francisco-based architect and consultant who founded the Advanced Management Institute, which provides continuing education for architects.

Although a large firm, OWP&P has traditionally stayed close to home—the Chicago metropolitan area. With help from its fellow Star Alliance members, the firm hopes to spread out both nationally and internationally. "Our goal is to position ourselves to attract large multi-state clients," says OWP&P president Peterson. Membership in the alliance has already paid off, with the firm joining Charlotte, N.C.-based Odell Associates to land a big healthcare job. Recently, OWP&P heard about a project in Brazil and was able to investigate it further, thanks to another Star Alliance firm's contacts there. "It's been an exciting process," remarks Peterson.

No matter what their marketing strategy, well-managed firms are emphasizing the bottom-line value of their services to their clients. "The real sign of a successful firm," states Frank Stasiowski, chief executive officer of PSMJ/Resources, a management consulting firm in Newton, Mass., "is that it helps its clients succeed at their business."

Project Delivery

Management hierarchies and complex chains of command are relics of a previous era. Today, successful architectural firms are going horizontal, eliminating layers of management and giving their project teams more responsibility. Not only does this reduce the number of places where delays can happen, but it brings project teams in more direct contact with the client. From small practices to multi-office firms, the trend is to give teams the job of taking projects from the early stages of pre-planning all the way through construction. This usually means that principals have to play active roles in the teams, and team members must be well informed about everything from the client's budget to the contractor's responsibilities.

When asked how it coordinates firm-wide management and project-delivery management, a spokesperson for Hammel Green & Abrahamson, Inc., a 275-person firm based in Minneapolis, replies "They are one and the same." Partners are responsible for getting work and then for delivering it in the form of completed projects. "We believe in a hands-on organization."

Leaner management structures tend to empower team members to look at the big picture. Marketing, client relations, research, design, and project delivery are viewed together, not separately. At

MEDIAN SALARIES OF SURVEYED FIRMS

	PRINCIPALS (HIGH TO LOW RANGE)		SENIOR ASSOCIATES	ASSOCIATES
Large Firms (50+ employees)				
salaries as per AR survey ¹	\$148,680	\$102,431	\$65,702	\$51,138
US median salaries ²	\$149,000	\$100,000	\$64,000	\$60,900
Small Firms (0-49 employees)				
salaries as per AR survey ¹	\$100,400	\$73,735	\$63,250	\$48,992
US median salaries ²	\$99,999	\$75,000	\$57,000	\$52,000

¹ Does not include bonuses or stock options ² Based on 1996 AIA salary survey

INNOVATIVE MARKETING STRATEGIES



Einhorn Yaffee Prescott, a 356-person firm with offices in Albany; White Plains, N.Y.; Washington, D.C.; and Boston, "project profitability is the responsibility of the entire project team," notes a firm spokesperson. This requires that financial information for each project be shared with and tracked by all team members.

Retaining the direct involvement and agility of small firms is one of the key concerns of large offices. The Hillier Group, which has 350 employees in seven offices in the U.S. and Australia, has responded to this issue by developing a system of studios, which function much like small firms. "Guerrilla forces move faster than large armies," states J. Robert (Bob) Hillier, FAIA, president of the Princeton, N.J.-based firm. "Our studio system assures speedier delivery and a higher degree of ownership on the part of all architects who come in contact with the project in that studio," explains Hillier. The firm's main office in Princeton has six studios, while each of the other offices acts as an independent studio.

To keep the bottom line within view of everyone, each project at Hillier begins with a documentation process that "in essence, forces development of a 'mini business plan.'"

Gensler, a 953-person design firm with offices in the U.S., Europe, and Asia, also relies on studios to bring a small-firm atmosphere to a large operation. "The studio is the professional building block and basic unit of client service," states a spokesperson. "Each studio operates as an independent unit within the regional office, responsible for business development, staff growth, and quality assurance." To inject fresh blood into studios and give individuals a feeling for how the firm as a whole works, Gensler frequently shifts people from one studio to another and even from one office to another—a practice that only a big firm can do.

Connecting the various studios and offices together has become easier with electronic technology. A wide-area network and e-mail link computers at Gensler allow efficient sharing of documents. In many cases, Gensler is networked to customers and consultants to expedite the transfer of information. The firm is also experimenting with interactive data conferencing to run long-distance design charrettes without having anyone travel further than down the hall.

Zimmer Gunsul Frasca Partnership, which employs 220 people in four offices around the country, uses the latest Internet technology to establish private World-Wide-Web sites where project information and drawings can be shared among project-team members, outside consultants, contractors, and the client.

While firms are encouraging creativity by giving project teams more responsibility, they are also standardizing procedures to pass along experience from one generation to another. HKS, Inc., a 334-person firm based in Dallas, has pulled together teaching documents, standardized details, and standardized methodologies into a veritable encyclopedia it calls HKS Guidelines. The documents also double as "defacto pricing packages" for a variety of building systems. BOORA in Portland, Ore., has developed something similar: a process booklet that provides "a uniform approach to all areas of our work efforts, while allowing for modification to meet the unique requirements of each project," says partner Harrington.

Computer technology is also helping some firms track projects as work progresses. BOORA has developed software programs that link management data to its accounting department. The link can give immediate status reports on fee budgets for the firm's staff and for consulting engineers.

Providing quality control during all phases of a project's development is a growing concern of architects. The Orcutt/Winslow Partnership, a 64-person firm in Phoenix, uses an unusual two-team approach to project management. For each project, a primary team takes

6. Tailored each marketing brochure to the needs of the prospect; never used a standard brochure (Mithun Partners, a 75-person firm in Seattle with expertise in three general building types)

7. Studied demographic, economic, and lifestyle trends to identify new markets before they get hot (Kwan Henmi)

8. Joined a design/build consortium to provide a specialized type of facility on a turnkey basis (Tsoi/Kobus, an 87-person firm in Cambridge, Mass.)

9. Established a "maintenance marketing" program that keeps contact with clients who don't have active projects with the firm (Orcutt/Winslow Partnership, a 64-person firm in Phoenix)

10. Wrote a book and held a national symposium on innovative healthcare architecture (Watkins Carter Hamilton Architects, a 73-person firm in Bellaire, Tex., specializing in the healthcare market)

1. Established strategic alliance with giant foreign design-build company to pursue international work (HOK)

2. Hired an experienced healthcare and laboratory planner as a principal, to bring the customer's perspective into the firm (SRG Partnership, a 46-person firm in Portland, Ore. that specializes in education, healthcare, and research facilities)

3. Developed database of 1,500 prospects and tracked them on an on-going basis (BSW International)

4. Developed database of fast-growing companies likely to need space-planning and design services (Design Management Corp.)

5. Joined alliance with other architectural and engineering firms (OWP&P)

lead responsibility for all aspects of the process and an assist team provides quality control and can be used for back-up staffing. A more typical arrangement is the peer-review system that Zimmer Gunsul Frasca employs, in which the firm's most technically knowledgeable senior staff members review projects to ensure consistency and quality of detailing and documentation.

A few firms are considering going through the lengthy ISO 9000 certification process, which involves an independent quality review of every aspect of a firm's operations. More common in Europe, ISO 9000 certification is used by a growing number of industries to recognize service and product-manufacturing companies that meet very high international standards.

OWP&P is one firm exploring the ISO 9000 route. Having started a total-quality-management process several years ago, OWP&P has already adopted many of the continual-improvement practices that would be required under ISO 9000. "It's a lifelong endeavor, not just something you do once," notes OWP&P's Peterson. Some international

corporations such as the major automobile companies use ISO 9000 certification as a way of identifying product and service suppliers with whom they want to do business. "I wouldn't be surprised to see the healthcare industry start requiring ISO 9000 certification sometime in the future," says Peterson. "I'd rather be ahead of the curve."

Compensation

If the late Abraham Maslow, a psychologist who studied work and its relationship to mental health, was right, individuals who toil at creative jobs and function at high levels have the greatest potential for achieving happiness and well-being in their lives. This should come as a great consolation to the many creative architects who are not well-paid. It seems that almost all architects, if not all, have said at some time that they are architects because they love the work, not for its financial rewards.

The earnings of principals, senior associates, and associates in the firms we surveyed are on a par with the national average according to a recent AIA study (see chart page 109). On the surface, this might indicate that a firm can pay average wages and still be considered well-managed. However, most of the firms listed base salaries only, and bonuses were not included in the salary figures. Where bonus figures were included, we subtracted them from base-salaries before averaging them with the other base salaries. Bonuses can increase a person's income by 30 to 100 percent and over, depending on their position in the firm, their responsibilities, and the amount of profit.

The American Institute of Architect's chief economist Kermit Baker says that while salaries for recent graduates and newly registered architects have increased only slightly over the past few years, they are increasing more rapidly for senior architects. "There seems to be an emerging shortage of experienced people, who know how to manage a project. If you don't keep up with what the guys across town are paying, you may wind up losing people to them."

Senior associate Dave McHenry of Hillier's Philadelphia Office believes that money alone will not attract and keep employees: "What really makes a difference is paying well, but also having a corporate culture that rewards people in less-tangible ways. We try to make our office a fun place to work, and we don't hold anybody back."

Hillier's Philadelphia design director Scott Erdy says, "Here, you get to step up to the plate and you're given all you can handle. It isn't like other firms where I've worked that have a strict hierarchy, and you're forever working for whoever has been there longer than you have."

There are other benefits for firms whose culture rewards initiative and long-term employment: these firms also maintain continuity in what might be regarded as "human databases" of information about the firm's work and business practices. McHenry notes that one of the reasons that the Hillier Group has been able to expand from a single office to seven in the last seven years is that, "Our people become thoroughly familiar with how we do business, how we relate to clients, and how we treat our people. When it has been time to open a new office, someone was ready to manage it."

Insurance. With dramatic increases in the cost of medical care, insurance has become a benefit that employees scrutinize almost as closely as wage structure. The cost of treating a catastrophic illness or accident can easily exceed an employee's annual salary, so employees may feel that health insurance benefits are really an indicator of how much an employer values both health and financial well-being.

All of the firms we surveyed provide health insurance but the extent of these benefits varies greatly from firm to firm partly because of differences in cost from region to region. Almost all of the firms are now

using some type of managed care with prescription plans, and some subsidize family coverage. Dental care may also be covered or optional. Life insurance benefits ranged from \$15,000 up to twice the base salary of the employee. Disability coverage varies from firm to firm, but is available at the discretion of employees at additional cost almost everywhere.

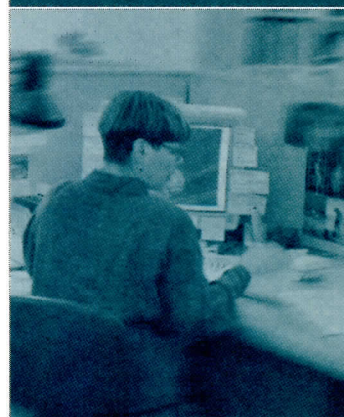
"These benefits have always been viewed as part of the wage structure at the Hillier Group," says Michael Kessler, Hillier's director of human resources. What we are trying to do is maintain that competitiveness with a total program, for two reasons. One is to attract the best talent we can find, and the second is to retain them. It becomes increasingly important to look at each piece of that compensation package beyond salary. Today when I am talking to a potential employee, the discussion isn't just over salary but also the benefits and career growth and development."

The difficulty of managing insurance benefits is compounded when branch offices are involved. When Einhorn Yaffee Prescott Architecture and Engineering, of Albany, and Washington, D.C., acquired its White Plains, N.Y., office, it became clear that maintaining three different benefits packages with different levels of coverage was cumbersome to administer and not fair to EYP's employees. "We surveyed our employees to determine what they wanted in terms of coverage, and even looked at what other firms in these areas were offering their employees," says human resources director Harriet Rifkin, "and the partners put together a budget."

"At that point we selected an insurance broker to help us find companies that would cover us, but it was frustrating. We couldn't find any company that could offer everything we needed." As the process evolved, a committee of employees helped review proposals and communicate to their colleagues the progress of the search for the ideal package of medical, dental, disability, and life benefits, until the right group of insurers was found. "There was a cheer when it was announced," says Rifkin. "The main thing was clear communication throughout the process, and making sure that everyone in all of the offices was treated alike."

401(k)s, bonuses, profit-sharing plans, and ESOPs. Almost all of the firms we surveyed contribute to employees' 401(k) plans. In addition,

BEYOND DESIGN: WHAT FIRMS ARE OFFERING



1. Computer consulting, digital graphics, facilities management software, asset-management software (ADD Inc.)
2. Facilities management, construction management (Askew Nixon Ferguson)
3. Facilities-management software, way-finding graphic systems for large cities, and products developed in-house, such as a wireless electric light switch (Hillier Group)
4. Elder-care strategic planning and management, and facility database management (OWP&P)
5. Value-engineering, helping clients with fund-raising events and graphics (BOORA)

other forms of compensation are provided to motivate employees to contribute to the good fortunes of their firms, and their rewards are directly related to their efforts. The dilemma comes in defining the best way to reward different contributions by different individuals. Of all the firms we surveyed, the Hillier Group seems to have tackled this problem the most ambitiously. Besides the firm's 401(k) plan, each year approximately 5 percent of each employee's salary is set aside to purchase stock in the company. If the employee leaves, the stock is sold back to the firm. If the employee remains with the firm to retirement age, the stock serves as the employee's retirement fund.

Profit distribution is handled through the Hillier Group's "Salary Enhancement Plan." Once the firm has met an earning's target, the profits of all the studios are pooled. This fund is broken down into smaller pools, each sized according to employee rank, from principal down to support staff. All employees are automatically awarded 50 percent of the average bonus in their particular rank. The remaining 50 percent is distributed according to the ranking of each employee within their pool. The top fifth splits 40 percent of the pool; the next fifth splits 30 percent; the third fifth divides 20 percent, the fourth fifth splits 10 percent and the bottom fifth receives nothing.

According to Bob Hillier, principal of the Hillier Group, this represents a change from a previous arrangement where work was divided between different studios in the office, and profits were distributed among studio members according to how much profit each studio

made. "When a new job came into the office," he says, "each of the studios fought over it. Things would get ugly and peoples' feelings got hurt. Dedicating different studios to different building types and pooling the profits changed everything. Now everyone pulls together, but people are still rewarded for their individual efforts." The system rewards advancement, because there is more money split between fewer people at higher levels. And, under the system, an excellent employee need not be penalized because he or she is working for a manager who is not doing an exceptional job.

In addition to the five percent of salary put away into stock, a stock-option plan rewards senior employees most dedicated to the development of the firm. The number of options is determined by the growth from the previous year, multiplied by its level of profit percentage. The firm's executive committee determines which members of the firm receive these stock options.

Other methods for rewarding initiative have evolved at the Hillier Group. They maintain a spot-bonus plan. Principals can award bonuses of up to \$1000 "on the spot" for a particularly exceptional effort on the part of an employee. Stock and cash are awarded to employees as they are promoted to associate, senior associate, and so on. The firm's suggestion program rewards an employee by matching 25 percent of the money saved the first year after a money-saving suggestion is adopted. Entrepreneurial spirit also is rewarded as promising ideas for profit-making enterprises are financially backed by the firm. Facilities-planning software, and an prepackaged enzyme product that can be added to lakes and ponds to control algae growth have both been successful.

Most of the firms surveyed share profits only in the form of annual bonuses. Einhorn Yaffee Prescott has departed from this strategy for the first time this year by offering bonuses on a quarterly basis. Steve Einhorn, AIA, says, "a year is just too long to wait to reward employees for their hard work," especially when profit from a good quarter can be diminished by a subsequent bad quarter.

Employee stock-option plans are in use at about a third of the firms we surveyed as a way of getting their employees to "buy in" to the business, not only in a literal, ownership sense, but also in the sense that owners do a better job of serving their clients. Most firms offer stock options only to senior employees, using ESOPs to gradually transfer firm ownership to individuals who one day may become partners. However, a few, such as Hillier and OWP&P offer stock to employees at all levels, the number of shares based on employees' salaries.

NBBJ, a 615-person firm based in Seattle, offers some of the better career development opportunities. One program, called "Oregano," sends a group of staff members abroad to learn about the culture and architecture of other countries. A mentoring program assigns a senior staff member to every new employee, to acquaint them with firm procedures, and to be an advocate for that employee's professional growth.

Besides the brown-bag educational programs common at many firms, NBBJ gives each of its design studios its own budget for educational purposes. This allows each group the ability to customize educational programs for its own needs. As well, each studio holds critique sessions at least three times per month. These are open to all members of the staff and provide an opportunity for people to interact and exchange ideas at all levels of project design.

One of the better indicators of the enhancements that make a firm a good place to work might simply be regarded as the extras: small details that bring the firm together and show that management cares. Design Management, an eight-person firm in Natick, Mass., sponsors a ski weekend every winter.

INNOVATIVE PROJECT DELIVERY STRATEGIES



1. **Created SWAT teams** for projects when schedules are tight and fast action is required (Tsoi/Kobus)
2. **Established benchmarks** and continually measured and improved performance (BSW International)
3. **Clustered project teams** for easy communication and work flow (BOORA)
4. **Developed software** to link management data to accounting department to supply immediate status reports on fee budgets (BOORA)
5. **Developed in-house encyclopedia** of implementation and construction methodologies (HKS)
6. **Established special-projects group** to work on small projects that otherwise wouldn't be large enough for firm to deliver (HKS)
7. **Used a two-team approach** in which a primary team takes lead responsibility and an assist team provides quality control and back-up staffing (Orcutt/ Winslow Partnership)
8. **Developed a process booklet** that provides a uniform approach to process, management, and implementation (BOORA)
9. **Used digital technology** and Internet to connect employees, consultants, and clients (Gensler and Zimmer Gunsul Frasca)

Small firm: Design Management Corp., Natick, Mass.

A few years ago, Janus Reiters and Kristen Hill, employees of a moderately sized, conservative architectural firm, took time out to look ahead at their professional lives. What they saw were career opportunities they wanted to pursue in "total project management." What they also saw was that it wasn't going to happen if they stayed where they were. "We were constantly being pushed back to doing the traditional types of things that the firm was used to doing," says Reiters. "One day we decided that leaving made more sense than staying. We had offers to buy in, but financially that didn't make sense either. After all the years of buying into the firm, who knew if we were going to have the power to do what we wanted to do?"

What Reiters and Hill wanted to do was offer what might be called "extra-architectural services" to clients: space planning, furniture and communications design, even coordination of movers. "There are real estate companies, furniture companies, movers," says Hill, "all of whom have a vested interest in picking up this work."

Hill believes that architects are trained to coordinate projects, and that they know all the bits and pieces. "And we can serve our clients impartially because we have no vested interests. We've found that there's a whole realm of clients



out there who have this space, but they haven't got a clue what to do with it. It isn't just the planning of the space, it's the infrastructure, the cabling, the phone systems. If they are renovating, or moving, you have a CEO or managing partner in charge, and they have jobs they need to do beyond managing space. They need help. They don't realize you need to look into your phone system at a certain point and coordinate it throughout the entire project. It's not like you go to Staples and buy a phone system. They don't understand the research that goes

into that. We do, and we bring that to the table."

Reiters adds, "The scope of services we provide attracts a different sort of clientele. It's well-suited to the corporate sector, because we provide total project management. Even in-house we have different capabilities. We have developed alliances with other consultants and vendors, although we don't have vested interests in any of these people, and we will bid one against another. We are a one-stop source for a lot of our clients, and many of them avail themselves

Janus Reiters and Kristen Hill tap the 'extra services' market.

of those services." But Design Management hasn't abandoned traditional architectural services either. "We have about a 60-to-40 percent split between architectural services and project management. We've done projects where we did none of the design and all of the project management. We even had one client ask if we knew anyone who could design a new entrance for their building—they had forgotten we are architects too."

At the Hillier Group, company unity is engendered when branch offices compete against one another in an annual T-shirt-design competition. The winning design is worn by members of all the offices when they attend their annual meeting as a symbol of unity. Hillier also awards travel certificates and an extra week's vacation to those who celebrate their 10th, 15th, 20th, and 25th anniversaries with the firm.

Some firms are practical, offering seminars, flexible scheduling to help employees care for their children, tuition, and even free flu shots.

Finances

The purpose of this survey was to learn about the best-managed firms, knowing that they might not necessarily be the most profitable. However, all 30 firms are financially healthy, even if not wealthy. Most of the firms shared confidential information concerning their 1995 billings, net service revenues, chargeability, and multipliers.

Seven of the 30 firms responding to our survey had increases in billings that topped 20 percent. One firm with 20 employees increased its billings by a whopping 61 percent. AIA economist Baker says that considering the amount of activity in the economy, "increases in total billings between 1994 and 1995 that range from 10 to 12 percent are fairly typical." He considers increases in the range of 20 percent to be quite high.

Still, these increases in billings can be misleading. Over the same period, increases in Net Service Revenues (the amount of money left, including profit and overhead, after fees for consultants, subcontractors, and reimbursables are subtracted) are much more modest than increases in total billings. This would indicate that a good deal of the extra money earned by these firms during 1995 was "pass-through" money, paid to consultants or suppliers outside the firms.

Two additional numbers help factor out some of the variables of firm size and their net billings. The first is chargeability. This is the annual



P R O F I L E

Medium firm: The Hillier Group, Princeton, N.J.

When an employee of Hillier Philadelphia was asked where the corporate culture of the Hillier Group comes from, he replied without hesitation, "It comes from Bob Hillier." Only Bob Hillier, FAIA, might disagree. Although the Hillier Group's aggressive growth from one office to eight in the last seven years is surely a reflection of Hillier's entrepreneurial spirit, still, he steers the credit for the firm's success away from himself, placing an extraordinary value on employees' loyalty and longevity. "One of the reasons we've grown," he says,

Above: Bob Hillier. Middle: Hillier's Computer Training Lab. Below: The annual T-shirt design contest.

"is I feel we have a commitment to give the people here a career. It's very anti-1990s, with all this corporate shake-up stuff, but I think you owe people a career if they want it."

Hillier's studio organization is one of the keys to successfully managing this far-flung architectural empire, which includes an office in Sydney, Australia. All of the offices except Sydney are connected through a wide-area computer network, facilitating the exchange of E-mail, drawings and construction documents, time sheets and other documents. Managers and business development people from all of the studios hold frequent teleconferences. Each of the satellite offices operates as a separate studio, and is responsible for getting its own

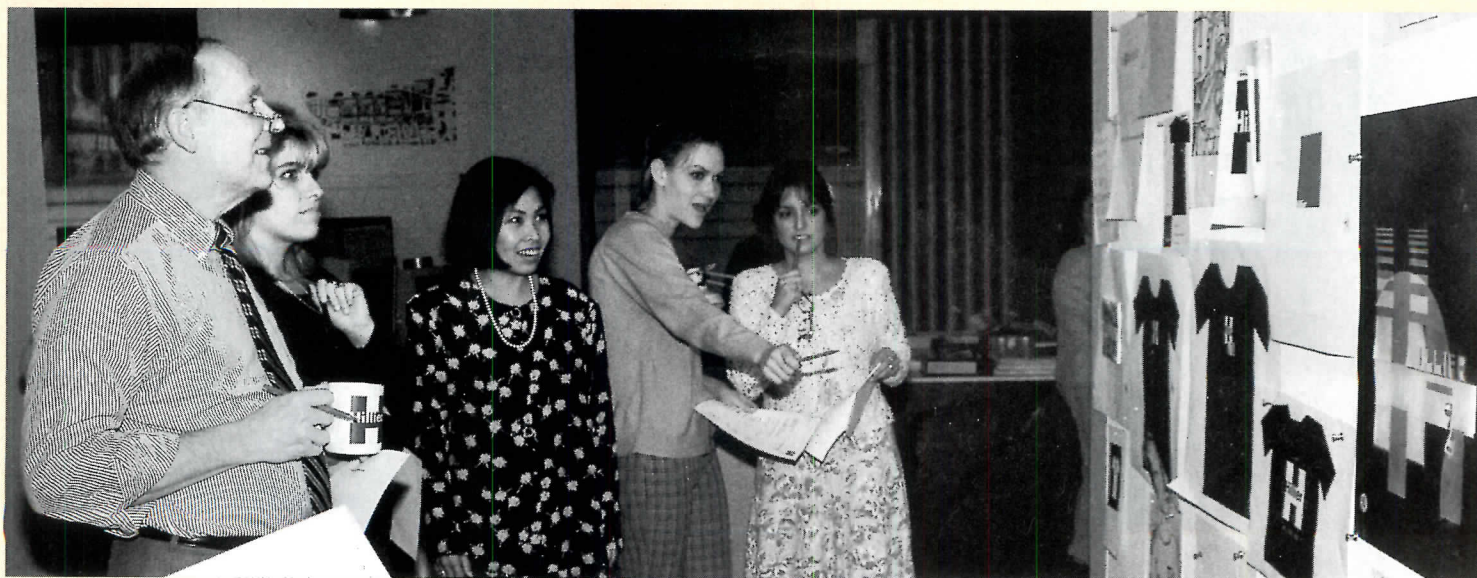
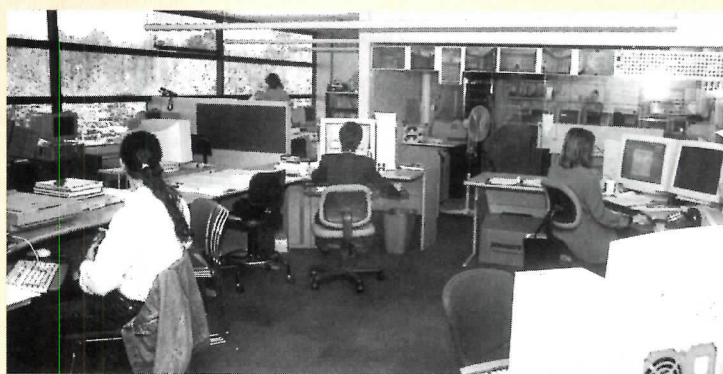
jobs, developing a "mini-business plan" for executing them. Project managers and studio group leaders are responsible for assuring that they are profitable.

People are one part of the Hillier Group's recipe for success. Another is riding building markets while they are developing, abandoning them when they are mature, and making transitions into markets that may not necessarily be new but currently have a high demand, like research-and-development laboratories and big-box retail buildings. The group also jumps at the chance to take on emerging building types, like computer-telephone operations centers and casinos. The casino group evolved out of Hillier's hospitality group and now seems to be evolving again, this time into an entertainment group. Currently, retirement communities and shopping malls are beginning to appear on the firm's CADD screens. Working on a number of building types at the same time within the

firm eases the transition from one building type to another.

In addition, the Hillier Group is taking an active role in pursuing the sort of non-traditional services and project delivery systems that architects are warned that they must pursue for success in the coming years. These include design-build, strategic facilities planning, construction management, and facilities management (complete with an innovative software product developed by the Hillier Group that is sold to clients).

When questioned about who might succeed him at the helm of the Hillier Group when he retires in a few years, Bob Hillier avoids the question somewhat. "If asked to vote, most people around here would probably elect someone who is really good at design. That's not what a firm needs. You need a COO and a CFO. And, you'd better put together two five-year plans for succession. Just in case the first one doesn't work."



value of all billable hours (anything that can be put on timesheets and charged to jobs) divided by the firm's total annual wages and salaries (including marketing, business development and other non-billable wages). For example, if a firm's billable wages and salaries were \$1,000,000 and the total wages and salaries paid out were \$1,400,000, their chargeability would be about 71 percent.

In our study, these numbers varied between 60 and 70 percent. Of course, if all of the work done by a firm were billable, chargeability would be 100 percent. This might not necessarily be good however. Staff training, marketing and, perhaps some kinds of research, are not usually billable, but may very well pave the way to a firm's future success.

The second number is the multiplier. This is the net-service revenue (as above, a firm's net billings minus the cost of consultants and reimbursables) divided by the firm's annual wages and salaries. The larger the multiplier, the less a firm is paying out in wages, with respect to the overall revenue coming in. A high number such as 3.5, may reflect that a firm is doing a good job of estimating the costs of doing work, and that it is negotiating its contracts to more than adequately cover the cost of doing business. The average multiplier for the firms we surveyed with 50 or more employees was 3.1. The average for firms with less than 50 employees was 3.5.

We also asked the firms how many of their clients were repeats. Here there was a tremendous variation. Some firms had as much as 90 percent repeat business, others only about 30 percent. It is comforting to have steady clients, and when as much as 90 percent of one's business is repeat, it probably indicates clients have a high level of satisfaction with the firm's work. But architectural markets are also constantly shifting. When the rate of repeat clients is too high, it may indicate that a firm is not developing new markets, and should market more aggressively.

Change

If there was one common theme that ran through most of the replies, it was that the only constant in the business of architecture is change. Many who commented specifically on innovation said that they are changing the way their offices are organized, from centralized departments that handle all of the projects that come into a firm into studios. Studios are smaller work groups that specialize in one or several building types and handle all aspects of each job, from design development through construction documents. This gives the firms greater flexibility to deal with changing market conditions, and helps break down the resistance some clients have to working with extremely large firms.

While HKS, Inc. of Dallas has not converted to the studio system, it has developed "project clusters," interdisciplinary teams of staff organized to work on multiple projects. These staff are "cross-trained," in other words, they have spent time in both the production and design departments and understand the nuances of both of these areas. A special projects group delivers all of HKS' projects that have budgets of less than \$5 million. HKS has also made a commitment to Total Quality Management, which they have retitled "Continuous Process Improvement." Every service provided by the staff is reviewed in terms of quality, cost, and delivery to clients, with the firm emphasizing innovation to meet or exceed the client's expectations. Employees at all levels are empowered to change the firm's work process if the change's effectiveness can be statistically supported.

One of the most important signs of change is the growing presence of women and minorities in these firms. Out of 5,298 employees counted by the survey, 23 percent qualify as minorities, and 51 percent are women. However these figures do not separate professional women

and minorities from those on support staff. A sampling of firms surveyed showed that 15 percent of professionals are minorities, and 18 percent are female. These numbers are about 3 percent better than the national average for architects [see RECORD, November 1994, page 25].

Sylvia Kwan of Kwan Henmi Architecture Planning, San Francisco, notes that, "firms can create volumes of material about their affirmative action plans and do nothing. Or they can write very little and just do it. You have to really be committed and you really have to seek the people. I have a women-and-minority- (text continues on page 204)

THE WELL-MANAGED FIRMS SURVEYED

FIRM	CITY	NUMBER OF EMPLOYEES	NUMBER OF ARCHITECTS	NUMBER OF PARTNERS
ADD INC.	BOSTON	75	40	8
ASKEW NIXON FERGUSON ARCHITECTS	MEMPHIS	40	16	4
BSW INTERNATIONAL	TULSA, OKLA.	405	105	3
BOORA ARCHITECTS	PORTLAND, ORE.	84	36	9
DESIGN MANAGEMENT CORP.	NATICK, MASS.	8	3	2
EINHORN YAFFEE PRESCOTT ARCHITECTURE	ALBANY, N.Y.	356	126	25
ELS/ELBASANI LOGAN ARCHITECTS	BERKELEY, CALIF.	46	26	5
ESKEW FILSON ARCHITECTS	NEW ORLEANS	20	13	2
GENSLER	NEW YORK	953	300	68
THE HILLIER GROUP	PRINCETON, N.J.	350	125	8
HKS ARCHITECTS/ENGINEERS/PLANNERS	DALLAS	334	115	25
HLW INTERNATIONAL	NEW YORK	242	64	15
HOK, INC.	ST. LOUIS	1601	242	46
KLIMENT & HALSBAND	NEW YORK	25	15	5
KOHN PEDERSEN FOX	NEW YORK	218	95	7
KWAN HENMI	SAN FRANCISCO	30	13	2
LOONEY RICKS KISS	MEMPHIS	90	24	4
MITHUN PARTNERS	SEATTLE	75	38	8
NBBJ	SEATTLE	615	283	9
ORCUTT/WINSLOW PARTNERSHIP	PHOENIX	64	29	4
OWP&P	CHICAGO	203	113	23
PERKINS & WILL	CHICAGO	381	179	31
RTKL ASSOCIATES	BALTIMORE	605	378	39
SHEPLEY BULFINCH RICHARDSON AND ABBOTT	BOSTON	186	79	15
SRG PARTNERSHIP	PORTLAND, ORE.	46	17	5
TSOI/KOBUS & ASSOCIATES	CAMBRIDGE, MASS.	87	50	2
VALERIO DEWALT TRAIN ARCHITECTURE	CHICAGO	39	15	5
WATKINS CARTER HAMILTON ARCHITECTS	BELLAIRE, TEXAS	73	32	4
ZIMMER GUNSUL FRASCA PARTNERSHIP	SEATTLE	220	109	7

A Regular House Remodeled For a Special Way of Living

**HOW AN INGENUOUS CLIENT AND HIS ARCHITECTS
CREATED SOLUTIONS—LARGE AND SMALL—
TO MAKE A RESIDENCE MORE THAN IT SEEMS.**

by Charles D. Linn, AIA



The client's parents lived in a house built on a golf course in Palm Springs that gave him the idea to suggest the use of a narrow overhead door to allow access for his special bicycles (left and opposite). "They're very handy. Everybody who lived on the course had them for their golf carts," he said.

is, 'Here are some clever things you can do when people are handicapped.' But what I hope could be presented here, is, 'Here is the overall challenge of designing a home. That includes all these other things, and, by the way, one of these things is accessibility.'"

The architects have been clever. There is not, for example, a single stainless-steel grab bar anywhere. And no ramp leading to the front door. The innovative work is surprising because when the client first hired them his concerns were only to increase the square footage, and to get more light inside.

The addition to the house is complex. "This also expresses the complexity of the client," says Anmahian. "He was dissatisfied with what he termed 'the details' of the building. We translated his ideas into a more formally defined addition, rather than adding more Neoclassical brick and trim. That's what he was looking for. And when we would develop drawings that would show complex parts and pieces, that's when he would begin to get excited." Winton adds, "He wasn't interested in replicating the language of this house, which made it easy for us because we weren't either."

The addition has the appearance of having been carved from a solid block of pure material. In this case, the material is mahogany, stained to a light color, that has been custom-milled and installed with a precision that is normally found only on handmade, interior casework. The house uses solid and permanent materials: lead-coated copper, slate, and bluestone, and on the interior, solid maple and ash casework and trim, and granite and terra-cotta countertops. In its use of wood inside and out, the addition bears a certain resemblance to Anmahian Winton's Minneapolis Pathways project [RECORD, July, 1994, page 78]: it is boxy and its detailing is not in the least fussy.

"The handicap issues are no more important than any that come up in the design of a house," says Anmahian. "These happen to be unique to this client in the same way a lot of issues are unique to other clients. His handicap was never a part of our discussions. It was always there, but it wasn't what drove the project." After a short period of time the client's handicap just became invisible, the architects claim. "He'd say, 'I need this for access, or I need this a certain way.' I actually think solving the technical problems would have been relatively easy, but satisfying ourselves as architects, and providing for his need for incredible, fascinating moments—like when he comes out of his study into this beautifully daylit, three-story stairwell with its skylight and clerestories—these were

Nestled on a corner lot in a friendly Cambridge neighborhood is a classic 1930s Georgian Revival house that recently underwent an extensive remodeling. The work on the reconstructed brick street-side facades is so faithful to the original that only the neighbors who watched the demolition of all but a few hundred square feet of the original notice the difference. Boston architects Nick Winton and Alex Anmahian were inspired by their client, a dynamic, inventive software developer.

If a house is a machine for living, the success of this collaboration might well be judged on how thoroughly the structure's mechanical parts have been submerged—for behind the casework and plaster walls in this house, there are many machines, cabling for computers, and extensive wiring to control other electrical systems. Yet with only a few exceptions, the architects avoided making an overt expression out of these devices.

This would not necessarily be an exceptional path for a pair of architects to take. But Anmahian and Winton's client depends upon either crutches or a wheelchair for mobility most of the time. Homes and institutions that have been designed with too much reliance on accessibility manuals and institutional-hardware catalogs have a tendency to resemble the technical and sterile medical spaces that people who have been through physical rehabilitation would rather forget.

Anmahian and Winton's client reiterates this point of view. "The way this stuff is typically presented," he says, "is 'Here are things you have to do when people are handicapped.' The more advanced way of thinking





The drawbridge: An innovation in accessibility.

One of the client's most creative ideas was suggesting a way to access either the main floor from the garage or the basement, using only one ramp. "Our client asked, 'Why not a bridge that moves?'" says Anmahian. "You wouldn't necessarily suggest to a residential client, 'let's make this 2,000-pound thing that moves,' but he did make it happen. He made a lot of things happen."

Anmahian and Winton designed what the ramp would look like and its overall dimensions, developed performance specifica-

tions, and worked with Gillespie Corp., a speciality engineer and fabricator of elevators in western Massachusetts. The bridge uses a hybrid of ancient technologies, counterweights, and a more recent one, the hydraulic drive; "all of the components are stock, except for the structural frame," says Anmahian. The prefabricated structural frame that supports the floor of the bridge and the handrails were assembled between two parallel supporting walls from sections. When the bridge is in the up position, (seen through a window in the garage wall above and left photo below) a permanent ramp that allows access from the garage into the basement is revealed. When down, (below right) the ramp to the basement is covered and the drawbridge itself allows access from the garage onto the main floor.

The actual mechanics of the bridge are more complicated than meets the eye. The weight of the bridge is balanced by counter-

weights: lead bricks which are strung on a cable, and concealed in the side walls, which are actually steel trusses to counteract the moment loading of the bridge. (The slots where the counterweight cables attach to the drawbridge are seen on the left and right sides of the walls in the foreground below.) A key activates a pair of push-pull, short-stroke hydraulic jacks at the shortend of the ramp, and these move the bridge. Push-pull jacks are different than other types of jacks because they pull the ramp down, rather than simply allowing hydraulic fluid to disperse under the weight of the ramp, which would allow the ramp to drop without being controlled.

An electrical solenoid is always controlling the flow of the hydraulic fluid. If power fails, the valves open and the counterweights return the drawbridge to its up position, so that no one can be trapped in the basement, a requirement for emergency egress. An automatic door at the

bottom of the ramp opens any time the drawbridge is in the up position.

For safety's sake the drawbridge had to conform with any of the normal egress requirements, and according to Anmahian, it needed to work in such a way that any person could operate it intuitively.

One of the advantages of designing a structure constructed of stock components is that both the first cost is lower, as well as the cost of maintaining it. Any hydraulic elevator repair person can do maintenance. In fact, the hydraulic pumps are located remotely, in the mechanical room for the elevator.

Leaving no opportunity to add wood and light untouched, the architects added maple panels to the sides of the drawbridge and the ceiling. Generous windows on the walls that parallel the structure allow any "dark-corridor" feeling. Low-voltage downlights with decorative glass rings installed on the underside of the drawbridge light the ramp below.





The original intent of remodeling the house had little to do with accessibility issues: the client wanted more daylight, and more space. One of the solutions (above) was the baffled lightwell installed over the stairs. Elsewhere new dormers and glazed wooden doors add additional light.

Anmahian and Winton's client demanded a "solid, enduring house." The architects responded by specifying the best materials (right): custom-milled mahogany siding, bluestone, slate roofing, and lead-coated copper flashing.



the keys. Technical solutions should always become opportunities for architectural solutions."

Many of the solutions to the client's needs are remarkable in their simplicity, but they illustrate what is possible if architects are willing to go beyond catalogs to find solutions and think through, hour by hour, almost every thing disabled people must do to function in their daily lives: how they bathe, how they dress, get their meals and groceries, the movements they must make.

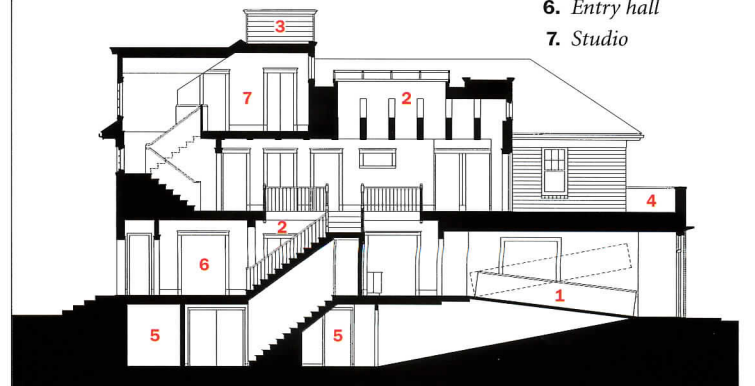
In fact, Anmahian and Winton's house may in some ways be more comfortable than normal for people who have no disabilities. The client's wife suggested a cabinet on the wall shared by the garage and kitchen. It opens to reveal a 4-in.-deep drawer. Groceries or packages (photo, page 121) can be loaded into the drawer, and slid into a space under the kitchen counter, where they can be unloaded. In the dressing room, closet rods inside the wardrobes are hung lower than normal, so that clothing is within reach, and drawers are at the base of the cabinets where the client can reach them easily (photo, page 121).

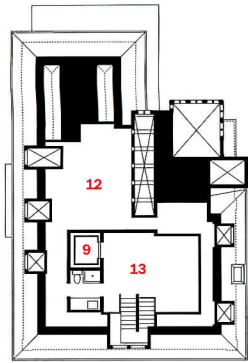
Because the allowable footprint of the building was too small to accommodate both a ramp from the garage into the house and a ramp from the garage into the basement, a hydraulic-operated drawbridge was fabricated to accommodate both (sidebar, opposite). In the master bath, the chore of getting in and out of the bathtub/shower has been eased by a special hanging door system (detail, page 120). Automatic door bottoms on all of the exterior doors of the house eliminate clunky door thresholds, and allow a tight seal against water and drafts. In the garage, a narrow overhead door allows access for the client's hybrid hand-powered tricycles (photo, page 116) and his wife's regular bike so that the double garage doors don't have to be opened every time the bikes are used.

Anmahian and Winton's client wanted to live in a "normal house," but changing levels without ramps in a building that would start out as a three-story house (but would end up as a four-story house) was impossible without the use of an elevator. This was one of the sole institutional concessions, yet the elevator is still disguised as much as possible. The door frames were detailed to receive wood trim, and there are no floor markers or up/down indicators. Just a single call-button. Trimmed out, the elevator doors look like closets.

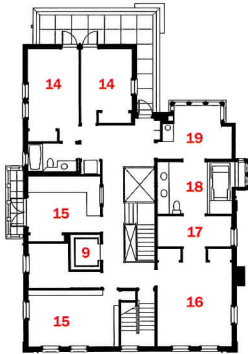
Among the more complex structural maneuvers was the underpinning of the existing footings and foundation walls so that new footings and foundations could be installed for a recirculating lap pool. To accommodate the depth and loads required for the pool, pumps and

- 1. Drawbridge
- 2. Stairwell (skylights over)
- 3. Elevator penthouse
- 4. Balcony
- 5. Basement
- 6. Entry hall
- 7. Studio

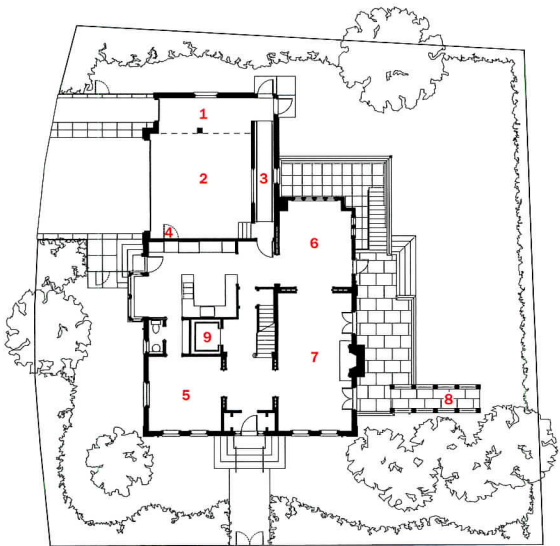




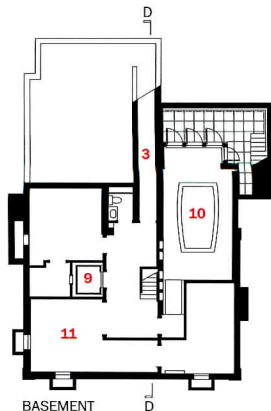
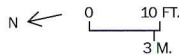
ATTIC



SECOND FLOOR



FIRST FLOOR



BASEMENT

1. Bicycle garage
2. Garage
3. Drawbridge
4. Pass-through between garage and kitchen
5. Dining room
6. Living room
7. Family room
8. Pergola/ramp to yard
9. Elevator
10. Pool room
11. Workshop
12. Mechanical room
13. Studio
14. Bedroom
15. Study
16. Master bedroom
17. Dressing room
18. Master bath
19. Sitting room



The shower: Very clean details.

In the master bath suite, the solution to getting in and out of the combination shower and bathtub without having to slide over sharp shower-door tracks was to have the 200-pound hanging glass doors drain into a flat, polished stainless-steel plate (right) that has continuous slots cut into it. (The weight of the doors keeps them from swinging from

the force of the 60-gallon-per-minute waterfall that cascades from the long horizontal slot in the headwall, and a micro-switch keeps the water from running unless the doors are closed.) The water simply drains into the channels, down through passages to holes in the side of the tub. The client says sitting under the waterfall is the perfect antidote for a stiff neck.

machinery, the new foundations were some 17 feet below grade. “The pool was also an idea that wasn’t in the original program,” says Winton. “But it turned out quite nicely, despite the fact that we had to excavate almost every square foot of the site to put it in.” Glazed wooden doors allow access to a small patio outside the pool room.

Not every person can afford all of the accessibility features contained in this house. But disabled clients should engage the architect’s ability to be creative in designing environments that not only make living easier, but give them space that is enjoyable to live in as well. As the owner himself suggests, “I think there are a couple of lessons that come out of the house that are kind of useful to play back to people.

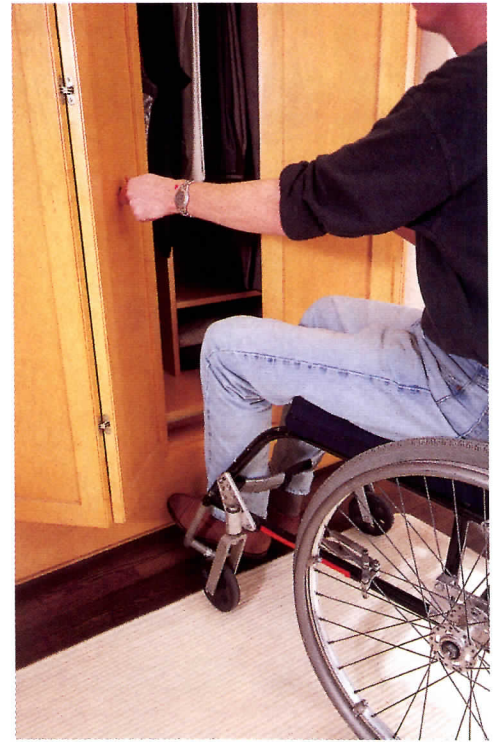
“One is the collaboration between the client and the architects. I think that there’s lots of talk about that, and I’m not sure that it really happens as easily as it did on this project. With a house, it’s your life unfolding. And you end up having a very personal relationship with your architect. It’s very important for the architect to take your input and turn it into things that do the job, and that they understand the things that need to be done. The one thing that my architects didn’t do according to the spec that I gave them was that the quality level was dramatically higher than I asked for. It cost more than what I wanted, but to some extent, I’m finding myself appreciating things that I didn’t appreciate to begin with.”

But the client also says the house stands on its own as good architecture, even without considering the special features that make life easier for him. “The house has 16 rooms, but more like 25 experiences to have; places to be with all the decks and so forth. The accessibility items and how we incorporated them are one aspect of the house. But all the other elements of the house really had nothing to do with any kind of



Wardrobe drawers (above) are located near the floor, and door pulls and clothing are positioned within easy reach. Accessibility design involves thinking out every movement the client would make through the day.

The brainchild of the client's wife, a pass-through (right) connects the garage to the kitchen, to ease the unloading of groceries and other items from the kitchen to the car, and vice-versa.



physical handicap. I think it's really important that the spirit of the house play an important role when we discuss it, as opposed to, 'Here's a really cool house with all kinds of accessibility stuff.'

"The issue we started out with was light," he reiterates. "How are we going to increase and make sense of daylight in the house? And to me the incorporation of the skylights and the way that the architects did it, gives it this gentle, warm glow of light all throughout the house and with the dormers. But because of all the baffles, it isn't what people would consider a skylight at all—it's more like a lightwell.

"And so the house has five dormers and two skylights, and lots of glazed doors and outdoor patios. And that desire for light really drove the entire design. That's where it all started, with the addition and putting the lightwell over the stairs. It's one of those things that is so subtle that you don't notice it after awhile. But it works and it's something that I enjoy very much."

Some elements of the design simply offer tactile pleasures. "The waterfall in the bathroom has nothing to do with my handicap. It's just something to enjoy. Both my wife and I work with computers all day long, and our necks get stiff. And, guess what, when people come over they say, 'I've just gotta try it,' because everybody's neck gets stiff.

"People inadvertently wind up focusing on the accessibility things done in a space. To me the best accessibility things are done in a way so that I don't have to see them. I don't want to feel there are barriers so, frankly, I can just enjoy my home. We tore down half of the house in part because it was a foot and a half different in height. It had a ramp when we bought it, and a foot and a half doesn't sound like much but if you have to go up and down it many times during the day with a baby on your lap, it's a huge deal. There are some things whose goal is to be transparent, and other things whose goal is to be the life of the house." ■

Project: Cambridge Residence
Cambridge, Massachusetts
Owner: withheld
Architect: Anmahian Winton
Architects—Alex Anmahian, Nick
Winton, partners-in-charge;
Scott Brown, Katarina Edlund, staff
Interior Designer: Repertoire—Celeste
Cooper; Classic Restoration—Peter Labau

Consultants: Gregorian Engineers
(structural); Atlantic Heating and Air
Conditioning (hvac); Gillespie
Corp.—John Linsley (hydraulic lifting
ramp); Ripman Lighting
Consultants—Chris Ripman (light-
ing); Chimera Designed
Lighting—Michael Eberle
General contractor: M.F. Reynolds

Manufacturer's Sources:

Elastomeric roofing: Firestone
Casement windows: Duratherm
Double-hung windows: Pella
Hydraulic elevator: Beckwith Elevator
Hydraulic ramp: Gillespie Corp.
Skylights: Wasco
Window-door combination:
Duratherm

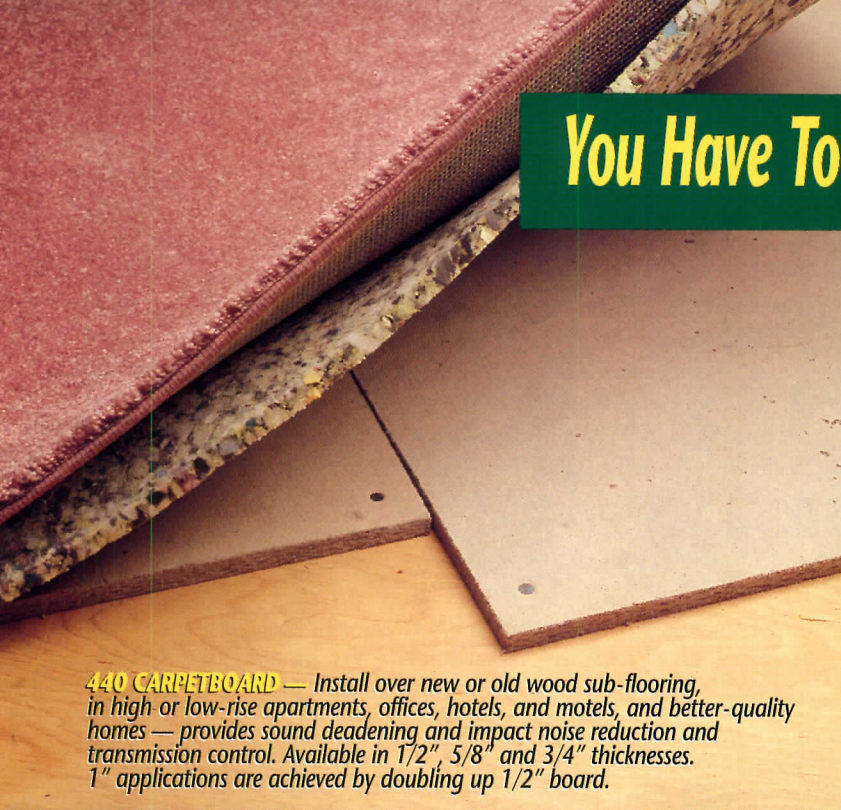
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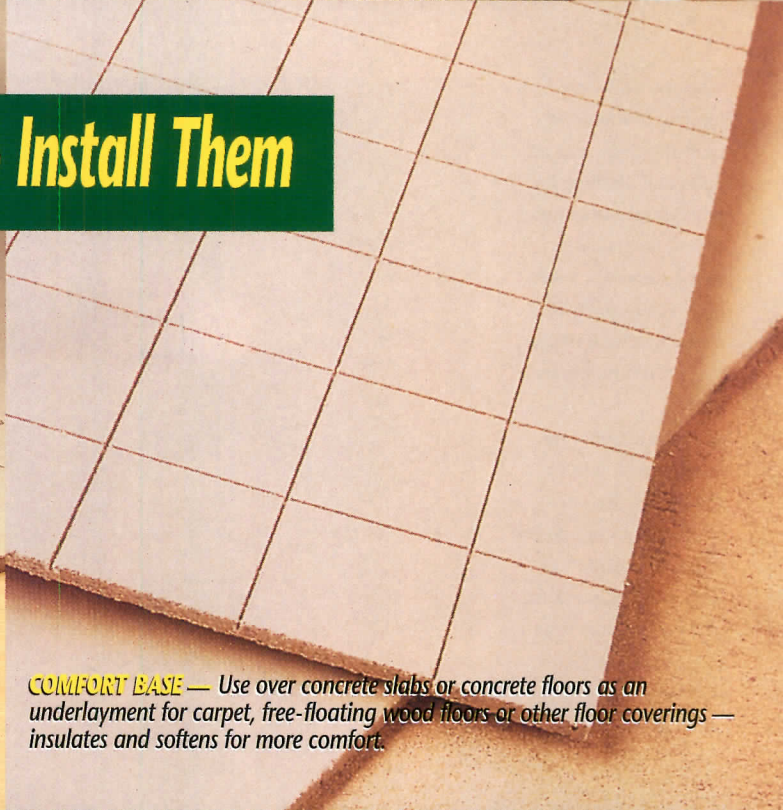


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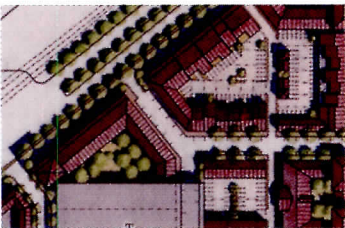
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THE NEW URBANISTS

The Second Generation

TACKLING PROJECTS IN THE INNER CITY AND THIRD-WORLD COUNTRIES, THESE LATTER-DAY PLANNERS ARE TAKING THE MOVEMENT IN NEW DIRECTIONS.

by Beth Dunlop



1

Miami

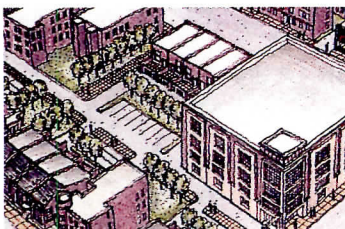
The Hometown Plan by Dover, Kohl & Partners aims to transform a deteriorating South Miami area into vibrant mixed-use neighborhoods.



2

Ecuador

Using canals as water-retention devices, Correa Valle Valle of Miami have planned a new community near the port city of Guayaquil.



3

Detroit

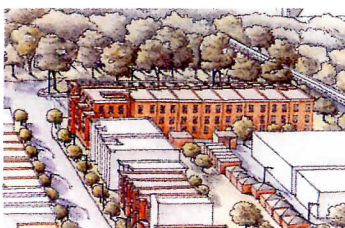
In the Weber Block, the firm Archive D.S. is upgrading existing housing and adding new live-work lofts to a tough part of town.



4

Mercer Island

Just outside Seattle, Lennertz Coyle & Associates is bringing some urban values to a place known for its suburban strip development.



5

Chicago

Farr Associates is reviving the Parkside neighborhood by playing on its strengths: access to mass transit and a location next to Garfield Park.

For a decade or so, the New Urbanism was the province of just a handful of practitioners—most notably Andres Duany and Elizabeth Plater-Zyberk in Florida and Peter Calthorpe in California. From the start, their projects—among them Seaside (in the Florida panhandle), Kentlands (outside of Washington, D.C.), and Laguna West (near Sacramento, Calif.)—were the focus of one of the most intense debates in the planning profession. Some critics hailed these new “traditional towns” as the next great places to live, while others dismissed them as artificial communities dressed up in historicist architecture. Many in the profession saw them as a passing phase, assuming the New Urbanism would go the way of Deconstructionism. It did not. Instead, the ranks of traditional town planners continue to grow.

A new generation of New Urbanists is coming of age. No less fervent or idealistic than their mentors, these latter-day New Urbanists carry the movement’s banner but are unafraid to diverge a bit. Responding in part to criticism that the first wave of New Urbanist projects were mostly middle-class, suburban developments comfortably buffered from the hard realities of urban America, the second generation of New Urbanists (as well as many of the first generation) are now applying the principles of traditional town planning to a wider range of projects—including ones in the inner city and third-world countries.

And as public policies shift and governmental entities ranging from small towns to state planning departments to the U.S. Department of Housing and Urban Development start to question post-war Modernist planning principles—these younger New Urbanists are helping to set the agenda for the next century. Their clients range from federal agencies to what architect Victor Dover of Miami calls “the regular, just-walking-around folks.”

Although the New Urbanists are anything but a homogenous group, they share a common set of ideas that they agreed on in a 1991 document known as “the Ahwahnee Principles.” Named for the historic lodge in Yosemite National Park where the planners met, the principles state that planning “should be in the form of complete and integrated communities containing housing, shops, work places, schools, parks, and civic facilities,” and that these activities should be “within easy walking

Beth Dunlop, RECORD’s Miami correspondent, has written four books on architecture. Her most recent titles are Building A Dream: The Art of Disney Architecture and Miami: Trends and Traditions.

distance of each other” and “of transit stops.” The document goes on to say “a community should contain a diversity of housing types to enable citizens from a wide range of economic levels and age groups to live within its boundaries” and “should contain an ample supply of specialized open space in the form of squares, greens, and parks.” In addition, the principles call for networks of streets and paths that encourage pedestrian and bicycle activity and for the use of greenbelts and wildlife corridors to define the edges of communities and protect them from development.

Latest projects address key complaints

The new wave of New Urbanists is just beginning to move from drawings to construction. But many of the latest projects address complaints made by critics of the movement’s early work: that all too often plans were made for “greenfield” sites beyond existing urban cores, that low-income groups were given only lip service, and that practitioners dealt mostly with private developers and only rarely with public housing.

Consider these examples of work from second-generation New Urbanists. The five-year-old Portland firm of Lennertz Coyle & Associates recently worked on the 1995 revision of the Oregon Transportation Planning Code, setting forth principles to determine which streets should have strong retail and commercial orientation and which should be parkways. Dover, Kohl & Partners of Miami has done an urban-infill plan for what Victor Dover calls “the hardscrabble-poor” downtown Orlando neighborhood of Parramore. Rick Williams of Van Meter Williams Pollack in San Francisco is using the tenets of the New Urbanism to grapple with ways to rework tough public housing projects (in such places as South-Central Los Angeles), and he is taking a similar approach on the “campuses” of some of California’s big biotech companies; in both cases, he is bringing things down to a more human scale and creating a clearer definition of public and private space.

Portland architect William Lennertz, who as a former project manager for Duany and Plater-Zyberk (DPZ) shepherded such communities as Seaside and Kentlands from sketches to construction, says he sees fewer “greenfields” planning projects in the future and a greater emphasis



Two by Dover, Kohl: Okeechobee, Fla. (above) and Rustville & Fort Negley (below) in Chattanooga, Tenn.

on work in central cities (as is going on in cities ranging from Providence, R.I. to Cleveland to Los Angeles). “What I have learned,” says Lennertz, “is that Oregon is now confronting problems that the rest of the country will soon have to confront. The battles we have to fight are set out before us in our existing urban fabric, in our suburbs, in towns with main streets that have become state highways, in big-lot residential areas that will have to diversify to survive. I know that there’s a tremendous appetite and need for communities, real communities, out there among the populace.”

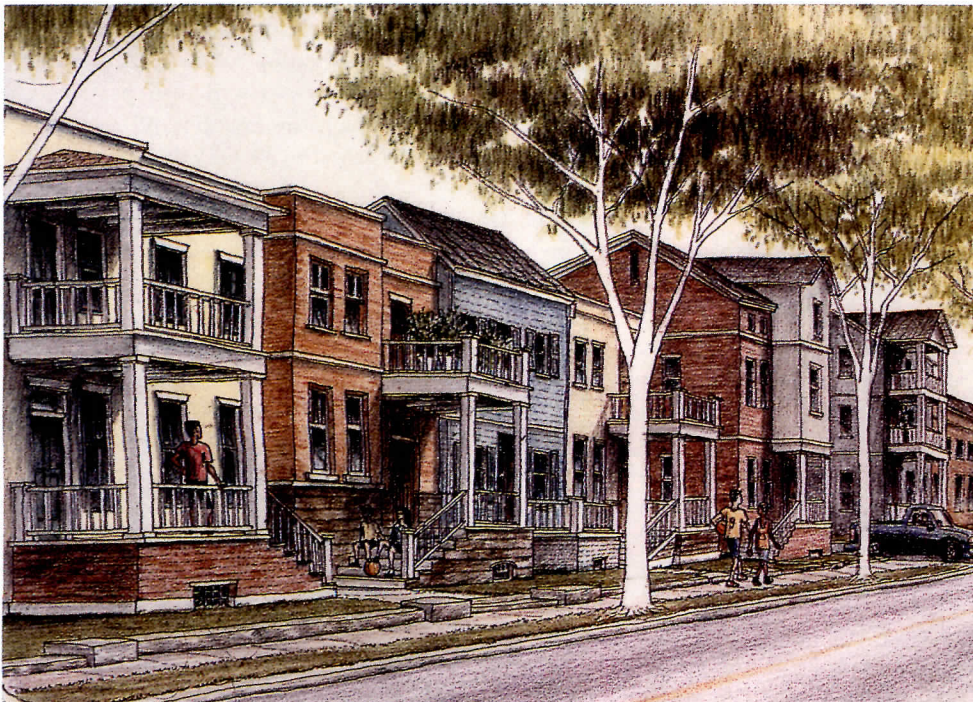
Having preached the need for new planning and zoning codes that allow apartments to be built above stores, granny flats to be included in single-family homes, streets to be narrowed, and other such “neo-traditional” devices, the New Urbanists won over a growing number of city and state officials during the 1980s and early 1990s.

Now they are starting to win important friends on the federal level as well. At the U.S. Department of Housing and Urban Development (HUD), for example, several programs have now adopted the tenets of the New Urbanism. “As we move forward on public housing, demolishing high rises, reducing densities, and creating mixed-income environments and really livable communities, we are embracing New Urbanism,” states

Marc Weiss, special assistant to HUD Secretary Henry Cisneros. “It’s not just a style,” says Weiss. “What the New Urbanism is really about is community planning and urban design, and it is a really good approach not just for transforming public housing but for rebuilding cities in general.”

When HUD began to explore New Urbanist principles, looking into new ways to replace or revamp public housing projects and renew dangerous, derelict neighborhoods, it was “first generation” architects such as Ray Gindroz, AIA, of UDA Architects in Pittsburgh who took up the challenge. But as the work in transforming public housing and rebuilding inner-city neighborhoods filters out, it will often go to the younger firms. “Certainly we have planted a lot of seeds at the local level,” says Weiss.

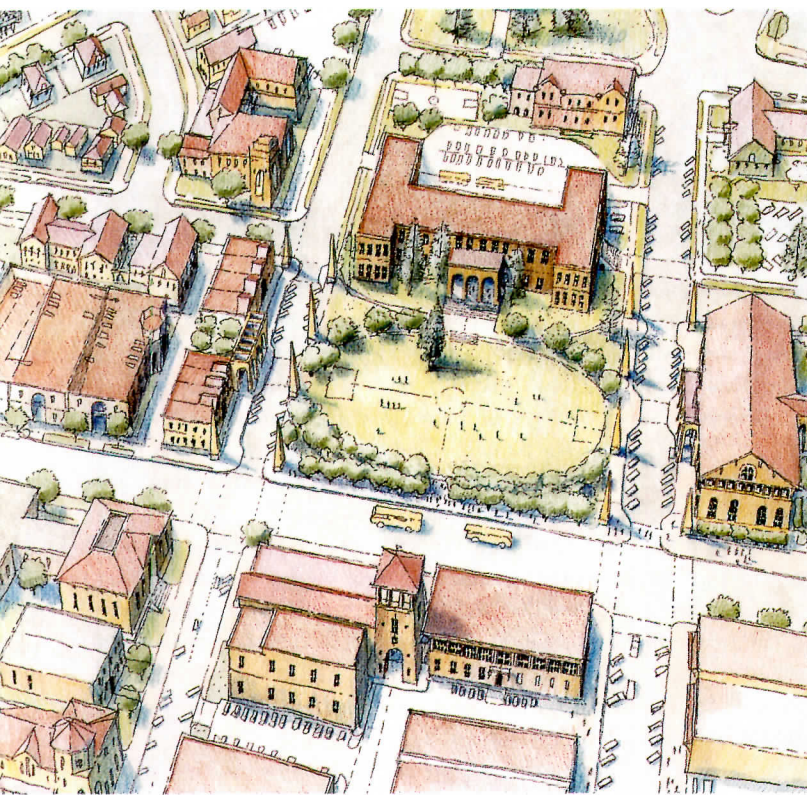
To date, the second generation of New Urbanists has worked with far less fanfare than the first; often, the jobs they take have been less glamorous than say, Seaside, and on a smaller scale—fixing up a main street in such decidedly



Lennertz Coyle & Associates' plan for Bend, Ore., turns a parking lot into a new civic square (below).

Van Meter Williams Pollack redesigned outdoor spaces at Genentech's campus in South San Francisco

(opposite top). Looney Ricks Kiss designed rowhouses at Harbor Town in Memphis (opposite bottom).



unsexy places as Fort Pierce, Fla., a current project of Dover, Kohl, or the Weber Block in Detroit, a small urban infill housing project that Archive D.S. has under way.

More projects are downtown

Indeed, much more of the work now being done in the name of traditional town planning (another moniker for the New Urbanism) is in inner-city areas. Much of what is being done, too, is fixing places that went wrong, imbuing them with the movement's idealism, rather than creating new idealistic towns from scratch.

"It's fundamental," says Richard Bernhardt, planning director for the city of Orlando, Fla., where the codes include traditional city design standards and where Dover, Kohl's plan for revitalizing the downtown neighborhood of Parramore paved the way for two additional in-city traditional town planning projects being done by other firms. "It's building a community, not just a development project," asserts Bernhardt. "It is mending the community, putting it back together." Often it is work that, as Victor Dover says, requires "surgical skills" such as filling in parking lots rather than demolishing the existing urban fabric.

Says J. Carson Looney, AIA, of Looney Ricks Kiss of Memphis: "We do some land planning, but the majority of what we do is take an existing land plan and fix it and then do the architecture."

If the earliest New Urbanists were fairly orthodox about its terminology and methodology, they have also had to be the standard-bearers. "They are more formal and focused on the recipe," says Jaime Correa of Miami. "We can afford to be less rigid, less reflective and more pragmatic." His firm, Correa Valle Valle, has created a model code for the

environmentally precarious Florida Keys that stretches the New Urbanist planning lexicon to include such offbeat (but useful) terms as "hamlet" as a zoning type.

In their work in South and Central America, Correa Valle Valle have found themselves working with new governments and having to persuade entrenched military establishments to embrace their plans. Williams, working with public housing tenants, has to summon all his persuasive powers as well. "We do enjoy working on complex projects," says Williams, "but they can't always be as pure. In some ways we can't be as philosophical about it. We're trying to work on projects that have a lot of issues—social issues, philosophical ones, financial issues—and you can't solve them all with design."

Among this "second generation" of New Urbanists there is a growing understanding of the nuts and bolts of the development process. For example, Looney Ricks Kiss uses Jim Constantine, a market research expert from New Jersey, as a "front man," to determine what will be acceptable to potential buyers. For example, Constantine did market-preference surveys for a new town near Austin, Tex., that Looney's firm is designing. The surveys helped determine which types of houses and what elements of the town would be built first. Says Looney, "We've got to make sure we look at the reality. You've got to take what is good philosophically and make it apply. But if you don't get it built it's just a book."

Stylistically, this generation is a divergent group consisting of some diehard Modernists and some entrenched Classicists—with most falling into a historicist category somewhere in between. All of them, with no exceptions, express a debt to their mentors—particularly Duany and Plater-Zyberk and Calthorpe.

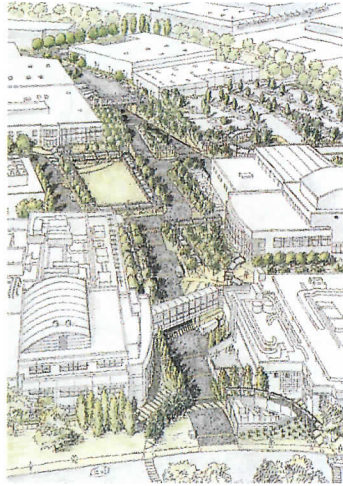
Though the call for traditional town planning expertise comes from all five continents, the younger New Urbanists also find work in their own backyards. Dover, Kohl, for example, has done a massive two-part "Hometown" plan for the town of South Miami, which includes a strategy for the incremental replacement of old-style public housing with a variety of lower-income dwellings, public and private. In true practice-what-you-preach fashion, the firm's office is over a shop on the town's main street. Similarly, Archive D.S. is at work on a series of new urban housing projects near the firm's office, a 1909 Daniel Burnham building in downtown Detroit.

Having laid out the precepts of traditional town planning with some specificity in the Ahwahnee Principles, the movement has taken on the ways of a formal organization with the founding in 1993 of the Congress for the New Urbanism, chaired by Plater-Zyberk and run by designer/author Peter Katz.

For sake of definition, one might group as "first generation" New Urbanists such architects as Stephanos Polyzoides and Elizabeth Moule of Los Angeles, Dan Solomon of Berkeley, Ray Gindroz of UDA Architects, Robert A.M. Stern, FAIA, of New York City, and Jaquelin Robertson, FAIA, of New York City, almost all of whom have been involved in one or more aspects of traditional planning since the mid 1980s.

Working with, rather than against, each other

A mark of the movement, however, is its collegiality. "We constantly work with each other. This whole thing is a big soup," says Duany. And indeed it is. DPZ, for example, worked on the initial planning phases of Celebration, the Walt Disney Co.'s new town near Orlando that was eventually planned by Stern and Robertson. Gindroz, however, wrote Celebration's Pattern Book, which offers the town's architectural code, and Looney is designing dozens of houses for Celebration using the Stern/Robertson plan and the Gindroz pattern book. Dover, Kohl and



Correa Valle from Miami worked with Mark Schimmenti and town planner R. Geoffrey Ferrell, both DPZ alumni, to do a plan for Riviera Beach in Palm Beach County, Fla.

It is a missionary movement, in many ways. The list of believers includes such mayors as Joseph Reilly of Charleston, S.C., Jon Norquist of Minneapolis, and Dennis Archer of Detroit, and countless zoning and planning officials from all over the country, most of whom avidly spread the word at conferences, in lectures, and even on the Internet. One such example is Demetri Baches of Belmont, N.C., who has put his town's entire zoning code (a Traditional Neighborhood Development code) onto the Internet (<http://www.sips.state.nc.us/Belmont/planning.htm>) to be downloaded free by anyone who has Microsoft Word for Windows and enough computer capacity. A number of municipalities also have Websites from which town plans can be downloaded or printed out: two such places are the new town of Fairview Village in Portland, Ore., (<http://www.fairviewvillage.com>) and the existing community of Mercer Island near Seattle (<http://www.halcyon.com/mmatt//mihome.htm>), both designed by Lennertz Coyle.

"People who have problems with the whole New Urbanist movement have the feeling that it's incredibly one-dimensional, and when you look at the pictures, they can seem one-dimensional and suburban," says Williams. "People will say the problem is that it hasn't been inclusive enough, that it doesn't include, for example, low-income housing. But in fact, it does. We just have to enrich the vocabulary."

The "second generation," if you will, includes architects who may have been at work in the 1980s but usually for other architects, learning at the side of Calthorpe or Duany and Plater-Zyberk. Indeed, charting the growth of even this young a movement (Seaside was born in the late 1970s, but the term New Urbanism wasn't coined for another decade) takes the skills of a genealogist.

Victor Dover and Joe Kohl, for example, came to the University of Miami in 1985, then founded a firm that does graphic imaging on computers ("We thought if we could get people to visualize, they'd stop making such bad decisions," said Kohl). Eventually, they went back

to the University of Miami and were among the first graduates of the school's Suburb and Town Planning Program (founded by Plater-Zyberk and Duany), then opened their own firm.

That firm was initially a four-way partnership with Jaime Correa and Erick Valle who now, along with Estela Valle, have their own firm. Correa had come to Miami in 1979 as a young architecture graduate seeking work with Arquitectonica; but when he got there with a portfolio full of urban design work, he was dispatched to the newly founded DPZ (Duany and Plater-Zyberk had just split off from Arquitectonica) where he was put to work on a project called Seaside.

Erick Valle, who was born in Costa Rica, is a University of Miami graduate with degrees in architecture and suburb and town planning. Estela Valle is a Cuban refugee who came to Miami in the Mariel boatlift; she worked for DPZ for eight years before joining her husband and Correa.

Lennertz of Lennertz Coyle of Portland, had Duany as his Harvard thesis advisor then eventually went to work for DPZ. Ultimately, he moved to Portland, where he linked up with Steve Coyle.

Rick Williams, whose firm is Van Meter Williams Pollack in San Francisco, took a course taught by Calthorpe at the University of California at Berkeley, and then went on to work for him.

But if many of the new New Urbanist firms have not fallen very far from the family tree, others came into it all on their own. The partners in Archive D.S.—Mark Nickita, Dorian Moore, and Kevin Borsay—and Carson Looney in Memphis, for example, looked at cities and places they loved, figured out what made them great, and incorporated those ideas into their own designs. Only later did they discover there were planners and architects around the country working the same vein.

At a time when many architects are still struggling to get work, most of the New Urbanists—of both generations—are quite busy. With government agencies from local planning offices to HUD increasingly receptive to New Urbanist principles and clients in foreign countries as far away as India and Japan, demand remains strong for the services of New Urbanist planners—perhaps strong enough to launch a third generation. ■



Hometown Plan South Miami, Florida

DOVER, KOHL'S PLAN FOR AN INNER-CITY AREA CALLS FOR MIXED-USE DEVELOPMENT AND PEDESTRIAN ACTIVITY.

Project: *Hometown Plan, South Miami, Florida*

Clients: *South Miami Hometown, Inc. (nonprofit); City of South Miami; State of Florida Energy Office*

Planner/architect: *Dover, Kohl & Partners (Phases I and II)—Scott Boe, Marice Chael, Victor Dover, Jason Dunham, R. Geoffrey Ferrell, Douglas Frost, Robert Gray, Steve Hafer, Ross Halle, Mimi Kelly, Joseph Kohl, Barbara Lamb-Ortega, Cristina Lopez, Miriam Tropp, Kevin Young, project team*

Consultants: *Holland & Knight (legal, Phases I and II); Barton Aschman Associates (transportation, Phases I and II); Judson & Partners (neighborhood liaison, Phase II)*

Financing: *Upfront costs raised by South Miami Hometown, Inc., mostly from commercial property owners, matched by the City of South Miami and the State of Florida Energy Office. Street improvements are being made incrementally by the City of South Miami, funded in part by a special gas tax. Sunset Drive improvements are being paid for by developers in exchange for exceptions to regulations.*

Projects written by Clifford A. Pearson.

Project area

55 acres (28 city blocks) for Phase I; 350 acres (86 blocks) for Phase II.

Major components, Phase I

Retail development (504,000 sq ft), restaurants (21,400 sq ft), offices (377,500 sq ft), cinemas (20,000 sq ft), civic buildings (28,225 sq ft), hotel (75 rooms), apartments (568 units), single-family houses (39 units).

Existing conditions

A public-private collaboration, the Hometown project calls for the redevelopment of an aging, mostly African-American district in South Miami. Although scarred by dilapidated buildings and oversized parking lots, the area has a Metrorail station, a good street grid, some historic buildings, a close-in location, and an intact sense of community. The South Dixie Highway cuts through the area, separating Phase I to the south from Phase II to the north.

Major tasks, Phase II

Narrow car lanes, widen sidewalks, and plant trees on median and sidewalks on Sunset Drive; encourage development of larger, mixed-use buildings on Sunset Drive; encourage development of infill projects; encourage development of a greater mix of housing types; reconfigure existing public housing complex over time, replacing "campus-style"

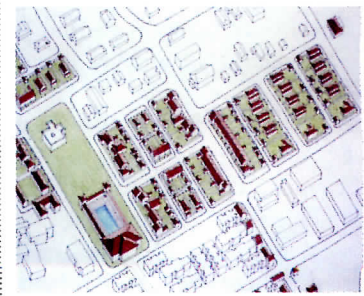
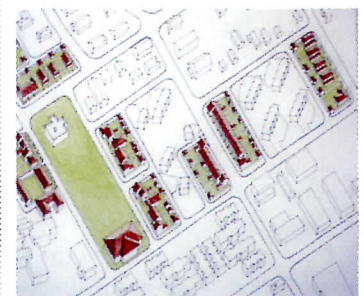
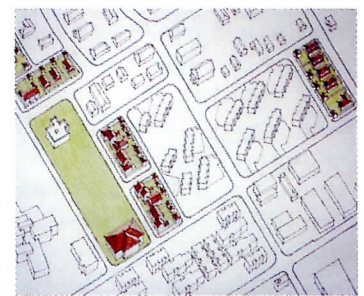
buildings with more traditional buildings that have individual street addresses and defensible outdoor spaces (drawings, right).

Design/planning approach

The planners set out to reinforce the sense of distinct neighborhoods—one south of South Dixie Highway and two north of it. The project calls for redeveloping the main shopping street, Sunset Drive, to create a more pedestrian-oriented experience. To do this, sidewalks will be widened, car lanes reduced, and mixed-use buildings erected. In an important break with Modernist planning, the project replaces land-use zoning with design conventions. This change allows greater flexibility in the uses of buildings, but stipulates the placement of buildings on their sites (pushing them to their main street fronts), location of parking (usually behind buildings), minimum building heights (to create a uniform street wall), and use of arcades and porches.

Project status

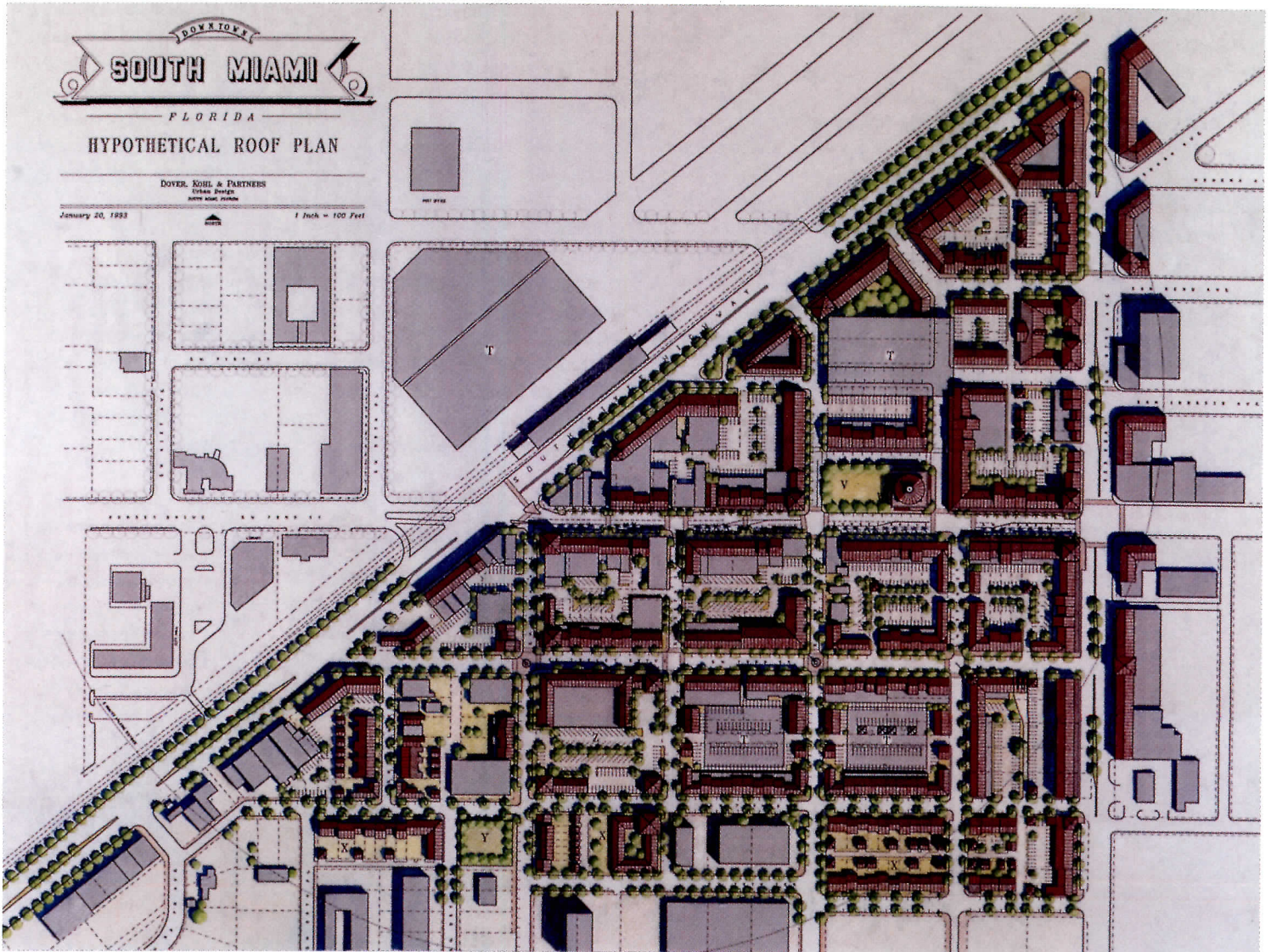
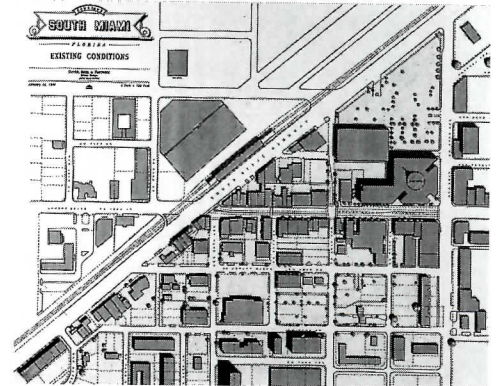
Public charrettes were held in 1992 and 1994, and the Hometown District Overlay Ordinance was adopted in 1993. Street improvements are going ahead, while the city is working on a model block and developers are starting projects, the largest being a \$200-million retail center.





Computerized image (left) shows planned improvements for a demonstration block,

including wider sidewalks, new trees, and larger buildings fronting the street.



Site plan (top right) shows existing conditions in Phase I,

and large plan (above) shows hypothetical build-out of Phase I.

Incae Neighborhood Plan Guayaquil, Ecuador

A NEW TOWN BY CORREA VALLE VALLE WILL OCCUPY A SERIES OF ISLANDS SURROUNDED BY CANALS.

Project: *Incae Neighborhood Plan, Guayaquil, Ecuador*
Planner: *Correa Valle Valle, Inc.—Jaime Correa, Erick Valle, Estela Valle, Eduardo Chamorro, Manuel Fernandez-Noval, Charles Barrett, project team*
Architect-of-record: *Eduardo Chamorro, Architect*

Project area

125 acres of development on a 180-acre site.

Major components

The masterplan covers the design of a new community 10 miles from downtown Guayaquil and includes six development areas with a variety of uses, such as residential, sports, educational, and commercial. Most of the areas are on islands surrounded by littoral canals and waterways.

Design/planning approach

A 30 percent water-retention-coverage requirement was a driving factor in the design of this self-sufficient community outside of the port city of Guayaquil. Turning the requirement into a major feature of their design, the planners surrounded various neighborhoods with canals, lakes, and waterways. Six areas of development are included in the town: two residential neighborhoods on individual islands, a community meeting hall and sports complex on another island, a university campus on a fourth island, a retail/office/residential area along an adjacent highway, and a park bordering the town.

Historic precedents

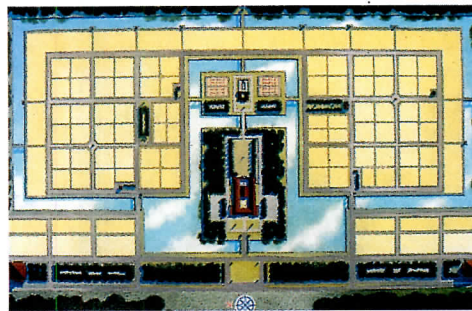
The design of the community is based on the ancient Laws of Indies. Square blocks of 100 meters (330 ft)

in each direction define a network of smaller blocks and streets where paved plazas and *plazoletas* are interwoven to provide a variety of public outdoor spaces and offer views of civic buildings. The design of the university building emulates the courtyard organization of traditional monasteries found in Guayaquil and has a rear loggia offering views of the mountains. In residential areas, only one building type—the courtyard house—is used, as is customary in this part of South America. This kind of house, though, has long proved to be flexible, allowing production of large,

medium, and small houses next to each other. The masterplan also follows the local tradition of land subdivision, which prohibits the joining of adjacent lots, while encouraging their subdivision into smaller pieces. The rule accommodates growing and extended families.

Project status

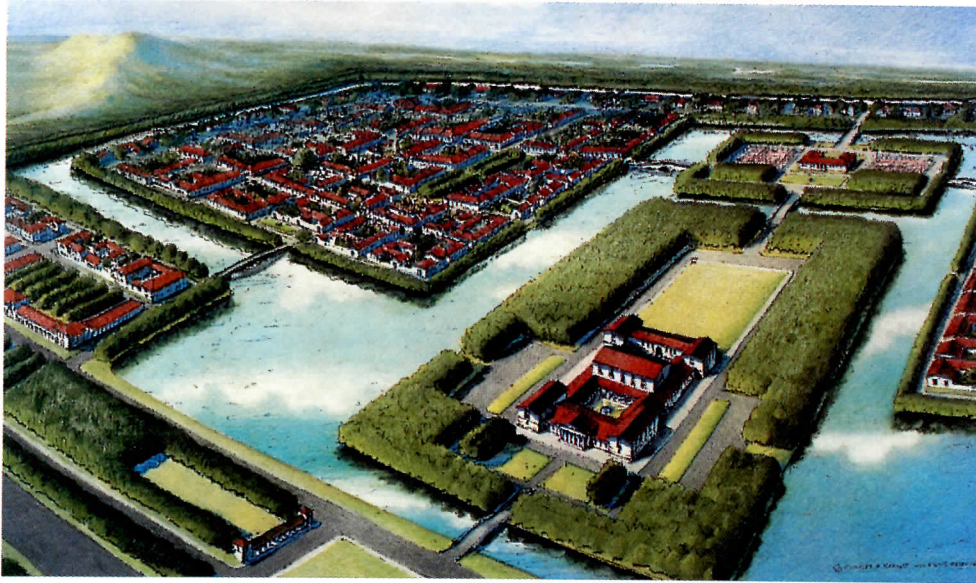
Ground-breaking is scheduled to start in December 1997 and construction will continue for about 10 years. A “town architect” will be named by the Incae soon and will be in charge of implementing the masterplan.



The centerpiece of the new community is an academic island with a university campus (in center of plan, left). The \$2.5-million school will be 80-percent subsidized by the Ecuadorian Family Trust Fund.



The first building at the university (opposite bottom) will have a courtyard organization like those at monasteries in Guayaquil. A loggia on the rear of the building (left bottom) will provide a covered space for students.



Directly behind the university is an island with a meeting hall and sports fields (drawing left). On either side of the school are square islands with residential neighborhoods. Funding for these neighborhoods will be provided by private developers and property owners. Each neighborhood is organized into blocks

measuring 100 meters by 100 meters (330 ft by 330 ft) and has just one building type, the courtyard house, which can be built in a variety of sizes.



3

The Weber Block Detroit, Michigan

**IN A TOUGH NEIGHBORHOOD, ARCHIVE D.S. IS INTRODUCING
LIVE/WORK LOFTS TO ADD DIVERSITY.**

Project: *The Weber Block, Detroit, Michigan*
Client: *Midtown Development Group, Inc.—Robert Slattery, president*
Planner/architect: *Archive D.S.—Mark Nickita, Dorian Moore, design principals; Kevin Borsay, principal; Marcus Colonna, design assistant*

Project area
15.4 acres (four city blocks).

Major components
Renovation and new construction including: 80 infill rowhouse dwelling units, 30 live-work lofts, 50 apartments, and 13,000 sq ft of commercial space.

Existing conditions
Located in the Willis/Seldon Historical Resources District in the Cass Corridor, this project is in one of Detroit's most decayed and economically depressed areas. Although characterized by urban blight, the area—like many other inner-city neighborhoods—is equipped with the utilities, parks, clearly defined commercial districts, and other infrastructure that are integral parts of New Urbanist planning. Most of the existing structures are brick apartment buildings and wood-frame residences. "The challenge comes from weaving in the new with the existing to create a seamless whole," says architect Mark Nickita, an Archive D.S. principal.

Design/planning approach
Because security is a key concern in this economically depressed part of town, the project is designed as a series of what the planners call "hardened blocks" with solid lines of buildings fronting directly on the street. By providing a limited number

of access points to its internal organization, the hardened block allows residents to take control of their environment. Cutting through the center of the block is an "internal street" that is a pedestrian-scaled spine providing access to parking and landscaped areas in which residents can gather. At certain locations along the perimeter of the blocks, suspended-metal panels act as screens for parking lots and can be sold as billboards to provide an extra revenue source.

Building types
An important aspect of the project is its use of three kinds of residential/office/loft buildings. The idea is that these mixed-use buildings will bring a diversity of activities and residents to the area. The largest of these buildings is a multi-unit structure (model photo, this page and item 5 on site plan, opposite) with retail or cafe space and internal parking on the ground floor, single-height living spaces on the second floor, and double-height units with sleeping lofts above. All of the units in the building can be used for living or working. Single-family rowhouses will also allow live/work situations in loft spaces, while townhouses will offer duplexes above flats.

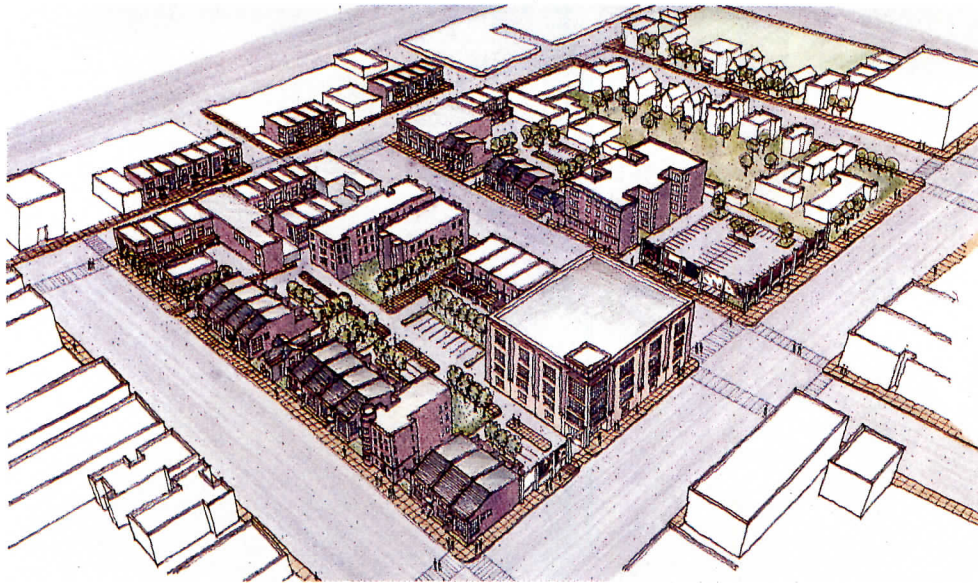
Project status
Urban design began in 1996 and is being followed with architectural



design development this year. Construction is scheduled to start in early 1998 with low-rise buildings to be completed by the end of 1998 and the multi-story loft building to be finished by September 1999.

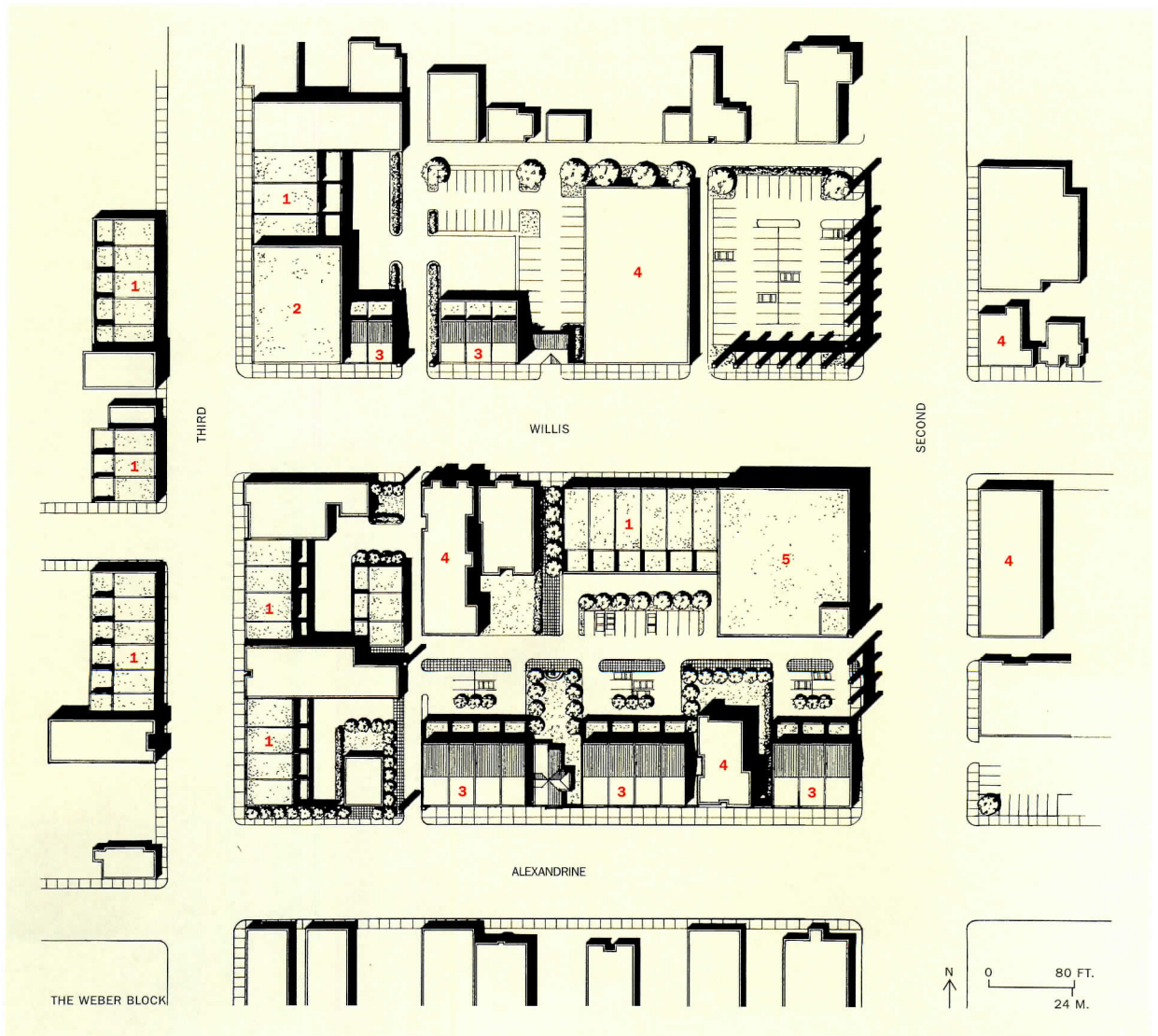
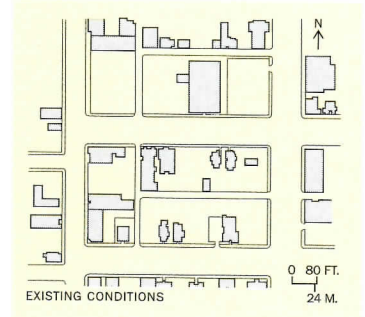
Funding
About 70 percent of the money will be loaned by a local banking institution, while 25 percent will be public funds from the City of Detroit and the U.S. Department of Housing and Urban Development (HUD). About 5 percent of the money will come from nonprofit community groups.

Construction systems
Steel-frame for multi-story buildings; pre-engineered rigid steel-frame for low-rise buildings.



Drawing (left) and plan (bottom) show what the Weber Block would be like after new and renovated construction is completed. Plan

(below) and photograph (opposite below) show existing conditions. Model (opposite top) is of multistory residential/office/loft building.



- 1. Townhouse
- 2. Commercial
- 3. Rowhouse
- 4. Apartments (renovated)
- 5. Multistory lofts

4

Mercer Island Town Center Mercer Island, Washington

ENHANCED MASS TRANSIT AND PEDESTRIAN-FRIENDLY SHOPPING ARE KEYS TO LENNERTZ COYLE'S PLAN.

Project: Mercer Island Town Center Redevelopment, Mercer Island, Washington (just east of Seattle)
Clients: City of Mercer Island and Regional Transportation Authority of the State of Washington
Planner/architect: Lennertz Coyle & Associates—William Lennertz, principal-in-charge; Steve Coyle, principal; William Dennis, project designer; Laurence Qamar, designer
Charrette team: William Lennertz, Steve Coyle, William Dennis, Laurence Qamar, Randall Imai, Marcy McInelly, John Borofski
Consultants: Mark Hinshaw, Bill Williams, Gary Schaefer, Michael Steffen, C.R. Douglas (architecture and planning); Greg Easton, Norman Peterson (financial)

Project area
60 acres (15 city blocks).

Major components
Redevelopment of a suburban commercial strip into a mixed-use avenue with pedestrian activity; two new public plazas—a Station Square and a Civic Square; new cross streets to reduce size of some blocks and facilitate traffic flow; new housing with a mix of apartments and townhouses; mixed-use infill buildings with retail on ground floor and offices or housing above.

Design/planning approach
A goal of this project is to convert a place known for sprawl into a more pedestrian-oriented, mixed-use downtown. Anchoring the north and south ends of the core area will be two new outdoor spaces. Taking a cue from the transit-oriented plans of first-generation New Urbanist Peter Calthorpe, this project originally proposed a new light-rail line that would run alongside an existing highway. The light-rail won't be built, but funding for a new trunk bus line was recently approved by the city. Retail and daycare at the Station Square, along with a cinema complex, new shops, and a hotel will turn the station into a hub of activity.

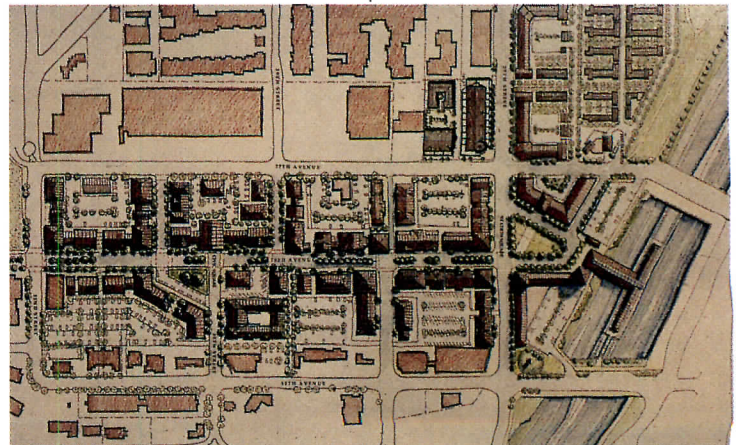
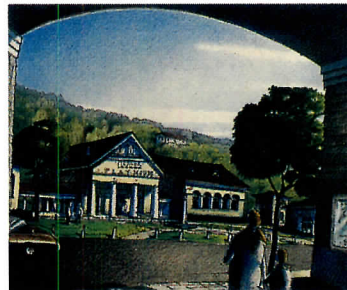
Pedestrian orientation
The plan also calls for transforming 78th Avenue—now a commercial

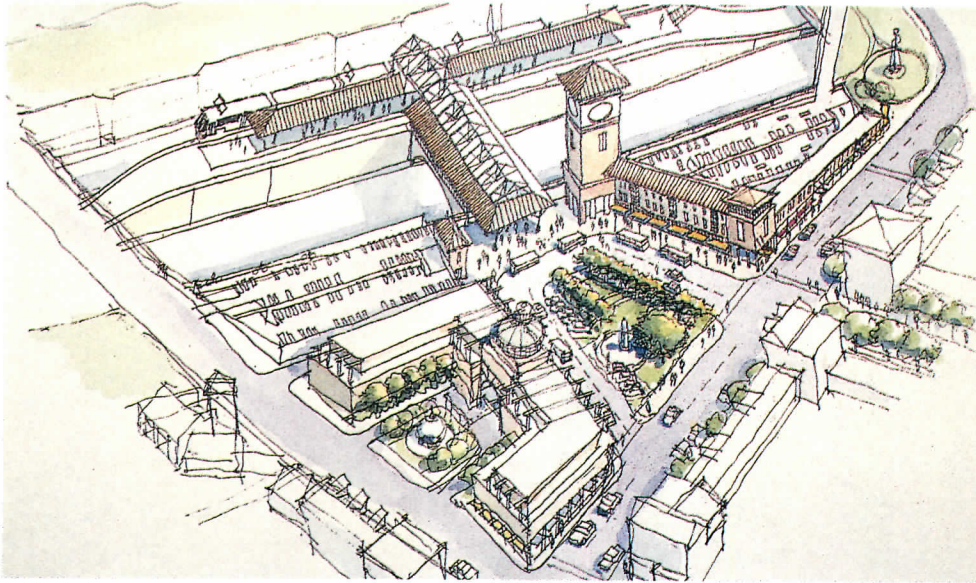
strip of isolated stores and parking—into a tree-lined, pedestrian-oriented shopping street. New codes now require buildings on 78th Avenue to form a streetwall three- to five-stories high with ground-floor retail. Another important element is requiring parking to be placed behind the buildings on 78th Avenue, instead of in front.

Process
Begun in late 1992, the project brought together government offi-

cial, planners, architects, landowners, developers, economic and market analysts, and citizens-at-large. The first step was a series of discussions of planning, research, and education issues culminating with a five-day design charrette in May, 1993. This led to the drafting of a comprehensive plan, which was completed in November, 1994, and includes strategies for future growth, and the rewriting of the city's zoning code.

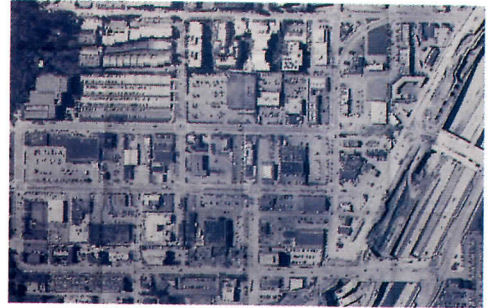
Project status
Street improvements have been made to 78th Avenue and developers are beginning to work on new buildings here. The city has adopted the new urban code and recently passed a rail and bus measure that will fund a new trunk bus line and the construction of a new station and parking structure.





New public spaces include Station Square (left) with retail, offices, and a hotel, and Civic Square (opposite top) which has a theater and post

office. Photo (below) shows existing conditions; plan (opposite) shows new development. Plans call for 78th Avenue (bottom) to be a shopping street.



Parkside Chicago, Illinois

**FARR ASSOCIATES HAS DESIGNED A SAFE
COMMUNITY LINKED TO A REVIVED ELEVATED RAIL LINE.**

Project: Parkside, Chicago, Illinois
Client: Bethel New Life, Inc. (nonprofit developer)
Planner/architect: Farr Associates—
 Douglas Farr, Patrick Thornton, George Koukourakis

Project size
 11 acres (two city blocks).

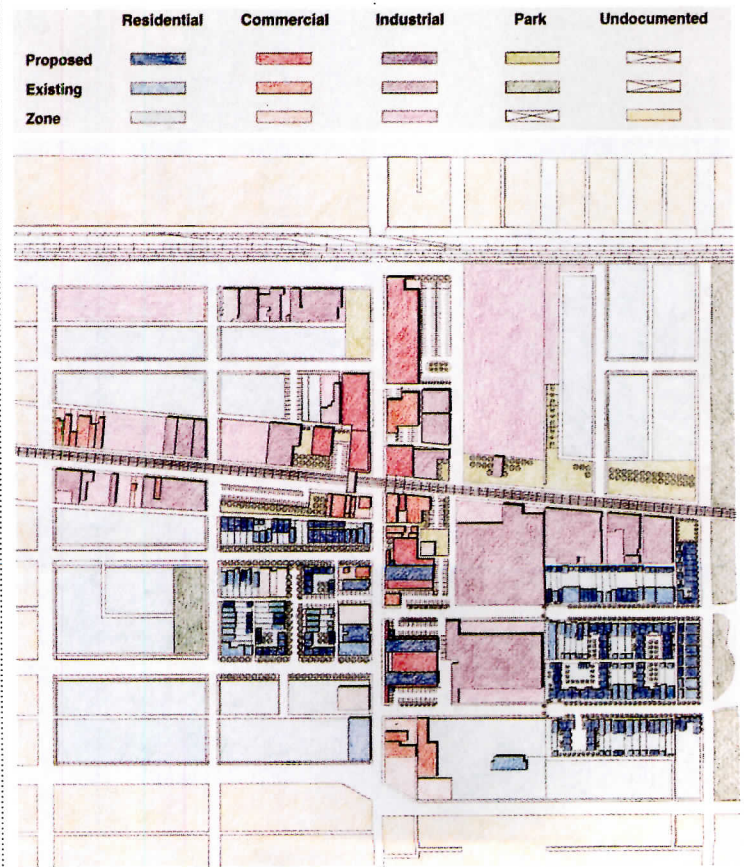
Major components
 Redevelopment of an inner-city neighborhood with 89 new residential buildings and 35 renovated residential buildings.

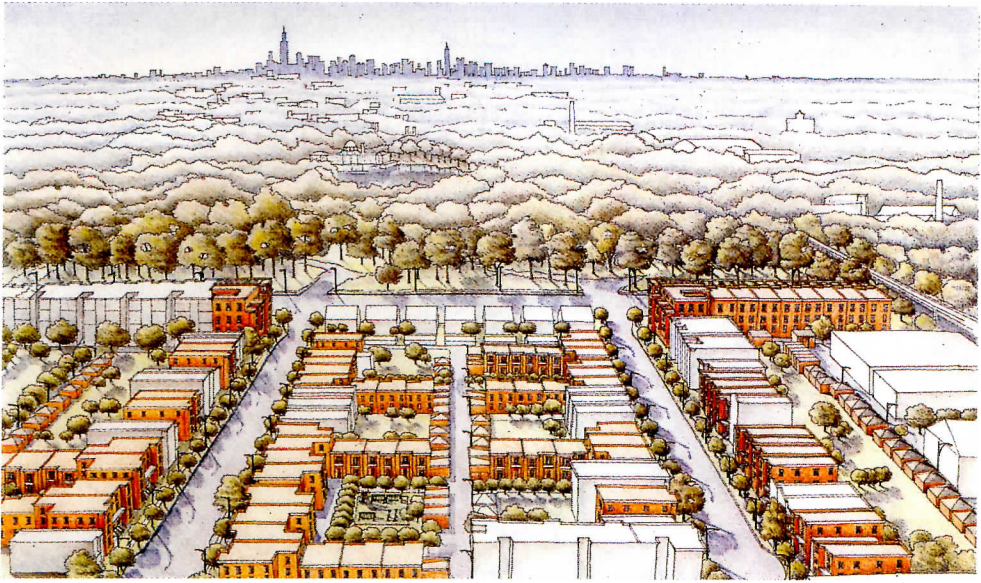
Existing conditions
 A high-crime neighborhood in the West Side of Chicago, Parkside has some important assets, including: being next to Garfield Park and along the city's Greenline elevated rail. In 1993, the city agreed to renovate the Greenline and help turn the Lake-Pulaski area (of which Parkside is a part) into a mixed-use transit-oriented development [RECORD, June 1994, page 86].

Design/planning approach
 Using a participatory design process that involved local residents, Farr Associates devised plans for what it calls a "focused community redevelopment" that includes owner-occupied housing for a variety of income groups and defensible space throughout. New infill housing is sympathetic in scale and materials to existing housing stock in the area and is clustered around shared green space and secure on-site parking. The largest and most expensive homes face Garfield Park, while moderately priced homes are on the avenues, and the least

expensive ones face the private green spaces. Two streets in the project are being turned into cul-de-sacs to reduce traffic conflicts with adjacent transit maintenance facilities and eliminate drive-through traffic, much of which had been drug-related. The masterplan is broken down into 10 separate sites so it can be built in phases. Each phase has hard costs of \$1.35 million.

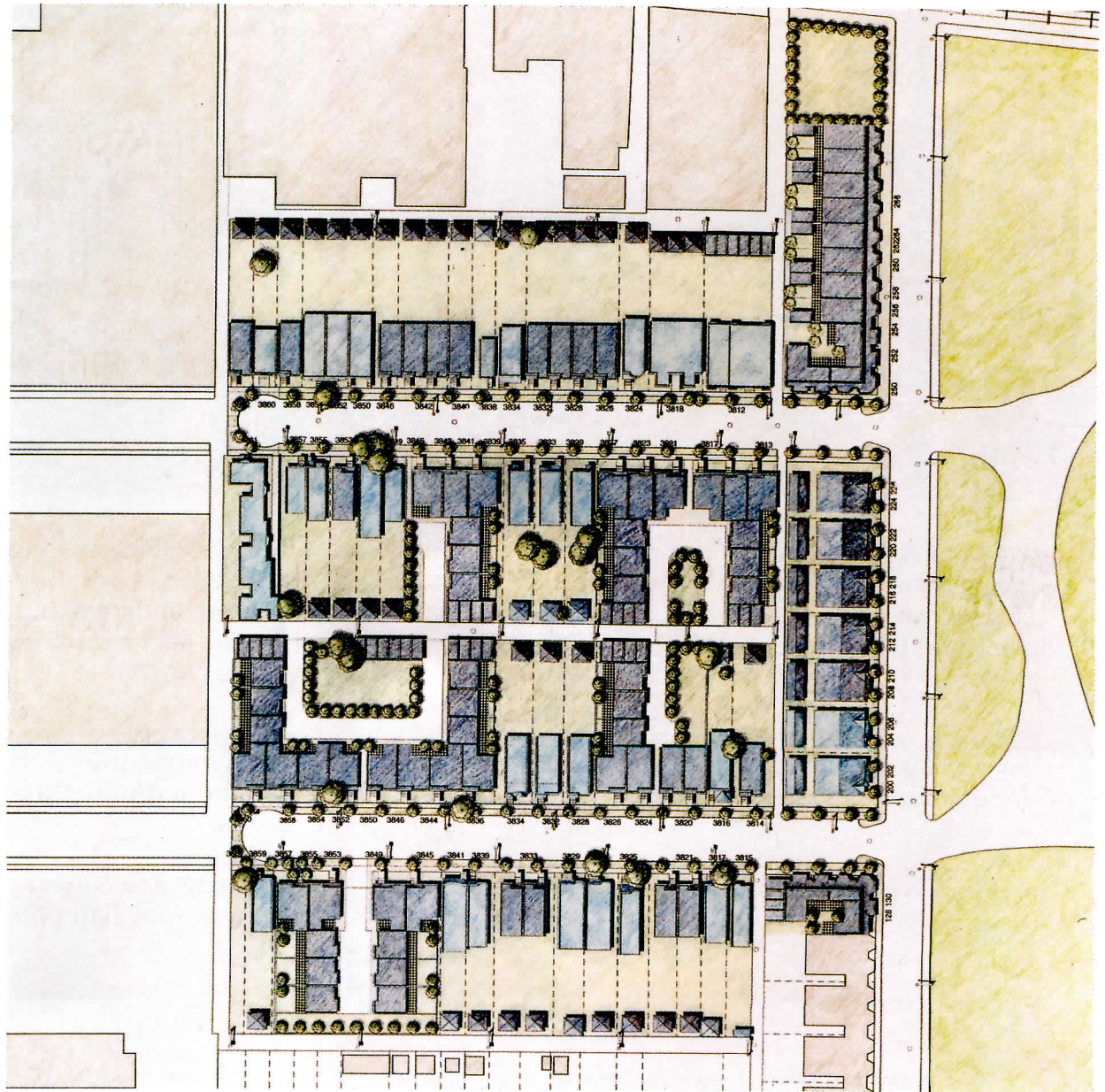
Project status:
 Community organizing and participatory planning sessions were held in 1995 and construction of the \$15.3-million project is set to proceed from 1998 to 2002. Financial assistance to homeowners is coming from the City of Chicago, low-interest loans from local banks, and downpayment help from various grant pools.





After helping to convince the Chicago Transit Authority to renovate and not tear down the elevated Greenline and then working on plans for the Lake-Pulaski district along the line

(site plan, opposite), Farr Associates developed plans for the Parkside neighborhood (left and below). Owner-occupied buildings wrap around defensible common spaces at Parkside.





In Association With AIA/Architectural Record Continuing Education
Marvin Windows & Doors Presents . . .

HIGH PERFORMANCE FROM START TO FINISH

An Evaluation of Clad Finishes on Windows and Doors



A leading manufacturer of architectural windows and doors, Marvin uses high performance coatings on all its extruded aluminum clad products. This finish, made with fluoropolymer resin, is highly resistant to scratches and abrasion as well as color fading and chalking. In fact, it was developed to meet or exceed the most stringent performance tests set forward by the American Architectural Manufacturers Association (AAMA).

Marvin uses the highest performing clad and coating system available to provide a finish that lasts. Architects rely on industry standards to substantiate a manufacturer's claims. With an independent set of standards, architects can feel confident that the product they choose will meet or exceed their specifications.

Marvin offers the proof here in a detailed explanation that strives to educate architects and others in the intricacies of paint finishes offered on aluminum clad products.



You can earn two AIA continuing education learning credits by reading this section, examining the learning objectives, and completing the questions on page 150. Then just fill out and return the self report form on page 230.

HIGH PERFORMANCE FROM START TO FINISH

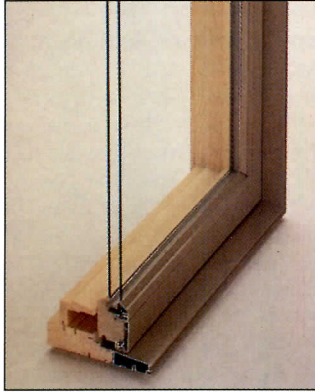
An Evaluation of Clad Finishes on Windows and Doors

Learning Objectives

After reading *High Performance From Start to Finish: An Evaluation of Clad Finishes on Windows and Doors* and completing the exercise, you will be able to:

- Cite three factors to consider when evaluating the coating systems of extruded aluminum clad win-

Aluminum-clad window systems for residential and light commercial buildings have increased in popularity over the past decade. This trend is not surprising, considering the constant search for durable products that require low maintenance. As demand has risen, manufacturers have met the challenge by offering new and better systems, with particular emphasis on improving the finishes that coat the aluminum. Now, the specifier of clad window systems has a wide array of choice. Today, therefore, the most difficult question is how to judge the differences in coatings and their effectiveness on aluminum clad window systems.

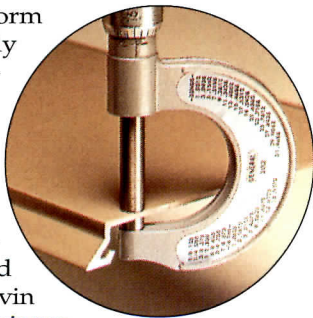


Three factors are seen as paramount:

- The quality of — or the type of — aluminum substrate that the exterior sash, frame, and muntins are made of;
- The quality of coating applied to the aluminum substrate; and
- The process by which the coating is applied.

Type of Aluminum Used

First, the aluminum substrate. Aluminum put through an extrusion process usually ranges in thickness from .050 inch to .065 inch, compared to roll-form aluminum that typically is only .030 inch in thickness. The additional thickness means significantly increased resistance to abrasion and unwelcome impact. Some products incorporate both extruded and roll-form aluminum. Marvin uses only extruded aluminum on its clad products, which significantly enhances performance, color uniformity, weatherability and durability.



Types of Coatings

Second, the quality of coating. Typically, coatings for aluminum building products consist of pigment for color, resin to bind the pigment to the substrate surface, and solvent to allow liquid consistency in application. This coating is sprayed onto the surface and then the substrate is baked. In the process, the solvent is released, or burned off, and the resin's molecules surround the pigment molecules and bind it to the substrate.

dows and doors.

- Compare two major standards for sprayed finishes on extruded aluminum clad windows and doors.
- Explain at least three performance enhancing processes or tests and their application to this specific product.

Pigment. If the pigment fails, the finish will fade. Basically, fading is caused when substances in the environment attack the pigment portion of the paint and cause the color to change. Typically, color fade is a lightening of color, but some pigments may actually darken over time.

Complex metal oxide pigments — or ceramic pigments — have been used for hundreds of years to color porcelain and ceramic products. Basically, minerals are mixed together, baked at a very high temperature, then ground down to form a pigment. Ceramic pigments are unaffected by the presence of most oxidizing and reducing agents and are resistant to attacks from acids and alkalis. This translates into colorfastness — colors resistant to change even when exposed to hostile environments for extended periods. Experts consider the resistance to color change unparalleled.

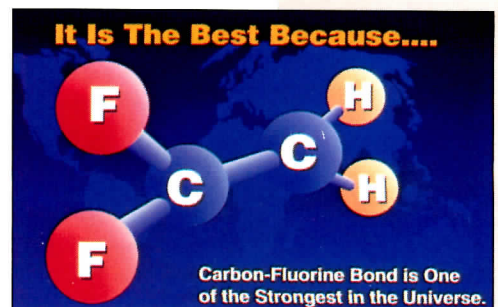
Resin. If the resin fails, the finish will chalk. Contributing to the breakdown of the resin are acid rain and pollution, salt spray and abrasion by airborne particles. Basically, when the resin particles at the surface lose adhesion, the surface takes on a white appearance, which is called chalk. This chalk, however, is difficult to wash or buff away. In addition, as the resin at the surface of the finish degrades and loosens up, the pigment particles that are imbedded in the resin detach and become debris on the surface — and contribute to an even more noticeable degree of paint failure.

For residential and light commercial windows and doors, commonly used paint resins are acrylics, polyesters, urethanes, TGIC powders, and siliconized polyesters. A radically different type of resin material is fluoropolymer (polyvinylidene fluoride). A distant cousin of Teflon®, fluoropolymer has an exceedingly strong molecular bond, which translates into its being a highly impermeable coating system. Fluoropolymer is considered a "Space Age" finish, for its use on building materials was preceded by use of similar materials in the space industry.

Fluoropolymer resin. Two different classes of fluoropolymer coatings are available in the U.S. market — PVDF (fluoropolymer) resin coatings using 70 percent fluoropolymer resin (by weight) in the coating system, and paints using 50 percent fluoropolymer resin in the total system. Marvin uses fluoropolymer resin brand named Kynar® and Hylar™. The additional resin in both is acrylic. Finishes



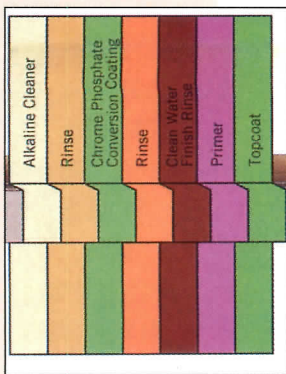
THE MOST DIFFICULT QUESTION IS HOW TO JUDGE THE DIFFERENCES IN COATINGS AND THEIR EFFECTIVENESS ON ALUMINUM CLAD WINDOW SYSTEMS.



HIGH PERFORMANCE FROM START TO FINISH

An Evaluation of Clad Finishes on Windows and Doors

NO MANDATORY STANDARDS FOR PERFORMANCE EXIST FOR ANY PRODUCTS IN THE BUILDING INDUSTRY. HOWEVER, MANY VOLUNTARY STANDARDS HAVE BEEN ESTABLISHED.



with 70 percent PVDF have long been used by the industry to coat aluminum curtain walls for skyscrapers, because of the high resistance to color fading and chalking. Yet, 70 percent fluoropolymer lacks maximum abrasion resistance, which is not a significant concern with skyscrapers that are not commonly prone to scratches or hard abrasive hits. A high degree of scratch and abrasion resistance is crucial, however, for residential and light commercial buildings, the surfaces of which are physically impacted more often. Therefore, the 50 percent fluoropolymer resin was developed. It retains high resistance to chalking and fading, but is more resilient to scratching. Marvin uses Kynar®, a 50 percent fluoropolymer resin system as a standard coating on all its products.

Coating Application

The process by which the coating is applied is extremely important in the overall success of its endurance qualities in that proper coating techniques increase the corrosion resistance, film adhesion, and surface durability of the soon-to-be-added film.

Pretreatment. Marvin subjects all window and door extrusions to five stages of pretreatment:

- Stage one: Clean and desmut. A high pressure, high temperature alkaline solution cleans, etches and desmuts the aluminum.
- Stage two: Rinse. Clean rinse water is circulated at 300 gallons per minute over aluminum parts.
- Stage three: Conversion coating. The aluminum surface is converted to an adherent, amorphous, iridescent, mixed metallic oxide coating. To this an amorphous chromium phosphate coat is applied to increase the corrosion resistance, adherence, and durability of any applied film.
- Stage four: Rinse. As in stage two, clean rinse water is circulated at 300 gallons per minute over the aluminum parts.
- Stage five: Final rinse of neutralizing clean water consisting of 200 gallons per minute circulating water.

After pretreatment, the aluminum is racked and all water is blown off the aluminum parts. Then, the primer and top coats are applied as the aluminum window extrusion is passed through four enclosed areas. Booths are paired so that both sides of the extrusion can receive the necessary layer of paint without the product ever being touched. The process is entirely computer controlled.

Marvin extruded clad windows and doors receive a two-coat finish. For two-coat applications involving a primer, the top coat should be 1.0 mil minimum with a primer of 0.3 +/- 0.1 mil. (A mil equals one-thousandth inch.) A clear topcoat is required on paints that may react with the environment and discolor — those with metallic flake or unstable organic pigments such as bright colors.

Application. The finish is applied as follows:

- Step one: Application of primer coat using a high voltage charge applied at atomization to coat materials. This charge allows a highly efficient, uniform



application of coating material to the front, edges, sides, and back of the product allowing for application to a variety of surface configurations.

- Step two: Flash area, where the newly applied primer is allowed to flash off — the solvent evaporates before the next coating is applied.
- Step three: Application of color coat, applied with a bell-shaped atomizer that rotates at 10,000 to 60,000 rpms. Centrifugal force spreads the coating to the edge of the bell and spins it off in finely atomized, electrostatically charged particles.
- Step four: Flash area, where the newly applied coating is allowed to flash off — the solvent evaporates before baking.
- Step five: Baking at 450 degrees Fahrenheit for at least five minutes.

Meeting Industry Performance Standards

No mandatory standards for performance exist for any products in the building industry. However, many voluntary standards have been established. For finishes on extruded aluminum clad products the most widely referenced standards were developed by the American Architectural Manufacturers Association:

- AAMA 603.8-92. Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- AAMA 605.2-92. Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels.

A trade association of firms engaged in the manufacture and sale of architectural building components and related products, AAMA sets voluntary standards for components of windows, doors, skylights, curtain walls, and storefronts and entrances. To meet these standards, products must comply with stringent specifications and be subjected to a battery of performance tests that address a product's durability, strength, resistance to environmental degradation, and longevity. For the consumer, these can be used as litmus tests for product comparisons.

AAMA 605.2 is the more stringent of the two coating standards. What are the main differences between the two? Basically, a product that meets AAMA 605.2 versus 603.8 should show higher performance as concerns weatherability and durability. In other words, a product covered with a coating meeting the AAMA 605.2 standard should retain its original color, be more scratch resistant, and less vulnerable to other environmental pollution. There

HIGH PERFORMANCE FROM START TO FINISH

An Evaluation of Clad Finishes on Windows and Doors

should also be less likelihood of film loss, chipping or cracking.

A brief comparison of AAMA 605.2 and AAMA 603.8 follows as concerns specific test results.

Coating Thickness. Differences in coating thickness can affect appearance and are particularly helpful in maintenance of a consistent film coverage. For example, a thicker coat protects the adhesion of the film over sharp corners and recesses.

For both standards, coatings must be "visibly free from flow lines, streaks, blisters, or other surface imperfections in the dry-film state on exposed surfaces when observed at a distance of 10 feet from the metal surface and inspected at an angle of 90 degrees to the surface." Total dry-film thickness, however, differs. AAMA 605.2 calls for a minimum of 1.2 mil on 80 percent of significant exposed surfaces. No single measurement can be below 1.0 mil or 85 percent of thickness specified. AAMA 603.8 calls for 0.8 mil thickness on 80 percent of exposed surfaces. Measurements cannot be below .68 mil.

Dry Film Hardness. Dry film hardness can actually be a misleading term. For instance, think of glass. Glass is a hard surface, but it shatters easily. Rubber is a softer material, but is more impact resistance. For paint finishes, the ideal is a product that is scratch resistant but also allows for some formability without cracking.

Under both AAMA standards, dry film hardness is tested with an Eagle Turquoise Pencil, by pressing the exposed lead at 45 degrees to the film surface and pushing forward about 1/4-inch using as much downward pressure as can be applied without breaking the lead. To meet the particular specifications of 70 percent fluoropolymer resins, the grade F minimum hardness of AAMA 605.2 is actually less rigorous than the pencil test of H for AAMA 603.8. To meet either standard, there should be no rupture of the film to the substrate.

Through years of testing and development, Marvin found that a coating of 50 percent fluoropolymer resin meets similar high performance color fade and chalk resistance characteristics of the 70 percent solution, but provides an enhanced durability against scratching. In the dry film hardness test, Marvin's system measures a minimum of 2H, a hardness that provides better protection than either of the specifications against finish damage during fabrication, transportation, erection, and general daily use.

Film Adhesion. A consistent adhesion of the film to the surface avoids paint chipping and cracks in the paint. Under both standards the coating is subjected to rigorous dry and wet adhesion testing. The dry adhesion test involves cross hatching the film and then covering that cross-hatch with tape. For the wet adhesion test, the sample is immersed in distilled or deionized water. In both cases, when the tape is removed, no film should



pull off and there should be no blistering anywhere on the sample. AAMA 605.2 requires an additional adhesion test in which the sample is immersed in boiling distilled or deionized water (210 to 212 degrees Fahrenheit) for 20 minutes, a faster test for film adhesion.

Abrasion resistance. This is a highly specialized test to study the effect of sand constantly hitting the window or door surface. Testing for abrasion resistance is only required under AAMA 605.2 — the falling sand test method, during which the window and door systems are subjected to a showering of sand for a constant period of time, involves an calculating an abrasion coefficient according to the formula:

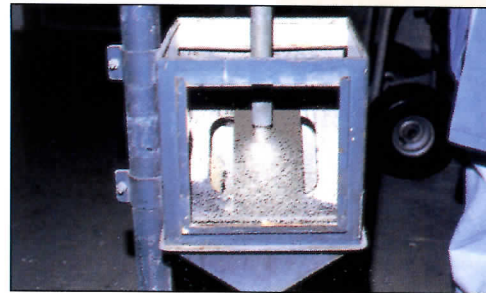
ABRASION COEFFICIENT 0 LITERS PER MIL = V/T , where v equals the volume of sand used in liters and t equals the coating in mils (0.001-inch).

Under this test, the abrasion coefficient value of the coating shall be 40 minimum.

Nitric Acid Resistance. This test was added to AAMA 605.2 to analyze the effects of acid rain on window and door products; in other words to address environmental pollution. The test for nitric acid resistance allows not more than 5 Δ E Units (Hunter) of color changes on panels treated with nitric acid. The test procedure calls for placing a sample over the mouth of an eight-ounce bottle half filled with nitric acid for 30 minutes. After the sample is rinsed with tap water and dried, there could be no color change after a one-hour recovery period.

Corrosion Resistance. Resistance to humidity is desired in all climates, but particularly in coastal areas. AAMA 605.2 calls for exposing a sample in a controlled heat-and-humidity cabinet for 3,000 hours at 100 degrees Fahrenheit and 95 to 98 percent relative humidity, compared to 1,500 hours under AAMA 603.8.

Weathering. Weathering tests for resistance to UV light but also for other atmospheric attacks, such as salt. The weathering test is the heart of the AAMA 605.2 document, as test requirements for weathering were extended under AAMA 605.2 to five years compared to one year under AAMA 603.8. All weathering tests are to take place in a Florida exposure South of latitude 27 degrees North at a 45 degree angle facing South, one of the two areas in the U.S. considered the most extreme for such testing, the other being Arizona. AAMA 605.2 requires more stringent and specific paint performance for color retention, chalk resistance, gloss



DIFFERENCES IN COATING THICKNESS CAN AFFECT APPEARANCE AND ARE PARTICULARLY HELPFUL IN MAINTENANCE OF CONSISTENT FILM COVERAGE.



HIGH PERFORMANCE FROM START TO FINISH

An Evaluation of Clad Finishes on Windows and Doors



**PREPARATION AND
PRETREATMENT
OF ALUMINUM IS
PARAMOUNT TO
THE CREATION
OF QUALITY
ALUMINUM
CLAD WINDOW
AND DOOR
SYSTEMS.**

retention, and resistance to erosion.

Preparation and Pretreatment. AAMA 605.2 prescribes strict procedures for the preparation and pretreatment of the material to be coated. AAMA 603.8 has no such prescription. Marvin believes that the preparation and pretreatment of the aluminum is paramount to the creation of quality aluminum clad window and door systems and follows elaborate procedures.

Color Uniformity. A test designed to make sure color is uniform throughout a product. Random samples are viewed under a uniform light source, such as a MacBeth daylight lamp or the North daylight sky.

Specular Gloss. Gloss or sheen of finish is tested for aesthetic purposes. Loss of gloss is a failure of the paint system. Samples must meet standard gloss values:

Gloss colors	Specular Gloss Value
High	80-Over
Medium	20-79
Low	19 or less.

Impact Resistance. This tests the adhesion of film to the substrate after impact. For the exercise, an

5/8-inch diameter round-nosed impact tester is applied directly to the coated surface in sufficient force to deform the sample a minimum of 0.10 inch. Tape is applied, and as with film adhesion tests, when pulled off there should be no loss of film.



Chemical Resistance. Muriatic acid and mortar used in construction and detergents used in cleaning have harmful ingredients that are likely to come in contact with the coating on extruded clad windows and doors. Tests should result in no visible change in film color or no loss of film adhesion. For muriatic acid resistance, a 10 percent solution of the acid in water is applied to the panel for 15 minutes. For mortar, a soft paste of mortar hardened on the surface for 24 hours should be easily dislodged with a damp cloth. A 3 percent solution of detergent and distilled water is applied for 72 hours.

AAMA has recently adopted four new paint specifications: AAMA 613 and AAMA 615 for paint on vinyl or plastic windows and AAMA 620 and AAMA 621, standards for high performance coil clad window systems.



AIA/Architectural Record Continuing Education

Continuing Education

The preceding section *High Performance From Start to Finish: An Evaluation of Clad Finishes on Windows and Doors*, sponsored by Marvin Windows & Doors, is part of the AIA/ARCHITECTURAL RECORD Continuing Education Series. You can receive continuing-education credits by reading the section, studying the learning objectives and answering the questions below. Check your answers against those provided on the next page and return the self-report form as indicated.

QUESTIONS

1. What factors should one consider when evaluating different coatings and their effectiveness for aluminum clad window and door products?

Answer 1. _____

2. Why is AAMA 605.2-92 considered a higher performance standard for sprayed paint finishes on extruded clad systems than AAMA 603.8-92?

Answer 2. _____

3. How does the use of ceramic pigment affect color consistency?

Answer 3. _____

Learning Objectives

After reading *High Performance From Start to Finish: An Evaluation of Clad Finishes on Windows and Doors* and completing the exercise, you will be able to:

- Cite three factors to consider when evaluating the coating systems of extruded aluminum clad windows and doors.
- Compare two major standards for sprayed finishes on extruded aluminum clad windows and doors.
- Explain at least three performance enhancing processes or tests and their application to this specific product.

4. What situations are best suited for coatings of 50 percent fluoropolymer resin versus 70 percent fluoropolymer resin?

Answer 4. _____

5. How does the intricate pretreatment process dictated by the AAMA 605.2 standard affect the overall performance?

Answer 5. _____

6. Describe the three-part test criterion for chemical resistance to ensure color consistency and performance against environmental factors such as acid rain.

Answer 6. _____

For answers turn to page 151.

For self-report form, turn to page 230.



AIA/Architectural Record Continuing Education

Questions on page 150

ANSWERS

4. Generally, a 50 percent fluoropolymer resin coating is used on windows and doors for residential and light commercial buildings; a 70 percent fluoropolymer resin coating for high-rise buildings. Coatings with a 50 percent fluoropolymer resin content are more scratch resistant than those with a 70 percent fluoropolymer resin content and, therefore, offer better finish protection during fabrication, transportation, erection, and general use, while retaining strong color consistency.
5. This process increases corrosion resistance, film adhesion, and surface durability of the soon-to-be-applied film.
6. The measure for chemical resistance test looks for 1) resistance to visual change after applying a 10 percent muriatic/water solution to a sample; 2) mortar paste set for 24 hours should be easily dislodged with a damp cloth; 3) there should be no loss of film adhesion to the metal after a three percent solution of detergent and distilled water is applied.

1. Consider the aluminum substrate that the exterior sash, frame and muntins are made of and look for resistance to abrasion and impact. Examine the quality of coating applied to the substrate and determine which extruded aluminum coating standard the product meets. Finally, look at the process by which the coating is applied.
2. Basically, a product that meets AAMA 605.2 versus AAMA 603.8 should show higher performance as concerns weatherability and durability. In other words, a product covered with a coating meeting the AAMA 605.2 standard should better retain its original color, be more scratch resistant, and less vulnerable to other environmental pollution. There should also be less likelihood of film loss, chipping or cracking.
3. Complex metal oxide pigments — or ceramic pigments — are unaffected by the presence of most oxidizing and reducing agents and are resistant to attacks from acids and alkalis.

For self-report form, turn to page 230.



MARVIN'S EXTRUDED CLAD WINDOWS AND DOORS

High Performance and a Wide Choice of Colors

Marvin offers a wide choice of colors for its extruded clad windows and doors. It's five standard extruded aluminum finish colors include white, bahama brown, pebble gray, medium bronze, and evergreen. For larger projects, several select colors are available — spruce, stone, ebony, french vanilla, desert beige, cape cod blue, and wineberry. In addition, Marvin offers custom color matching.

To see Marvin's product line, we invite you to visit our website at: www.Marvin.com.
Or, for more information please call 1-800-346-5128.



Please circle #58 on inquiry card

ENGINEERED WOOD PRODUCTS

DESIGNING AND ENGINEERING THE FUTURE

Market studies show that the use of engineered wood products in all forms of residential and nonresidential construction will double by the year 2000. The definition includes those products manufactured by bonding together wood strands, veneers, lumber or other wood fibers to produce a larger composite structural unit. They are "engineered" to form a stronger, more efficient building material by using less wood fiber to make more wood products.

In addition to being engineered with respect to their manufacturing processes, structural engineered wood products are also "engineered" by virtue of assigning design properties for use in construction applications.

Plywood, oriented strand board (OSB), glulam and wood I-joists, for example, are considered structural wood products, those used in construction applications governed by building codes.

APA-The Engineered Wood Association, divides structural glued engineered wood products into four general categories: (1) structural wood panels, including plywood, oriented strand board (OSB) and composite panels; (2) glued laminated timber (glulam); (3) structural composite lumber (SCL) consisting primarily of laminated veneer lumber (LVL) and parallel strand lumber (PSL) and (4) pre-fabricated wood I-joists.

How to specify structural wood panels

Structural wood panels are the most widely used of the structural glued engineered wood products. They are also arguably the most versatile, being used in scores of construction and industrial applications. The original structural wood panel, plywood, consists of veneers arranged in perpendicular layers. The layers may consist of a single veneer ply or two or more plies laminated with the grain running in the same direction. There is always an odd number of layers, with the grain of the face layers typically oriented parallel to the long dimension of the panel. It is the cross-laminated layup of layers of veneer that gives plywood its excellent strength, stiffness and dimensional stability. In addition to a variety of sheathing, siding, sanded and concrete form grades, many manufacturers can produce custom layups for specialized applications.

Oriented Strand Board (OSB) consists of wood strands bonded with adhesives to form a mat



Like the veneer in plywood, these mats are layered and oriented for maximum strength, stiffness and stability. The individual strands are typically three to four inches long. OSB is widely used as construction sheathing, web material for wood I-joists, structural membranes of structural insulated panels (SIPs) and in a growing number of other applications.

Structural composite panels (the APA trademark is COM-PLY) consist of veneer faces bonded to a wood-base core material, such as OSB. COM-PLY panels are manufactured in three- or five-layer arrangements. A three-layer panel has a veneer face and back, while a five-layer panel also has a veneer crossband in the center. Typical composite panel applications include sheathing, siding and industrial applications.

In order to properly specify a structural panel product, the architect must be familiar with the standards under which these products are manufactured and the associated trademarks which identify these products.

Plywood can be produced in accordance with U.S. Product Standard PS1-83 for Construction & Industrial Plywood or under the provisions of Voluntary Product Standard PS2-93, Performance Based Standard for Wood-Based Structural-Use Panels. In addition to plywood, OSB and composite panels can also be produced for use as construction sheathing and single-floor applications under PS2-93. APA also publishes PRP-108, Performance Standards and Policies for Structural-Use Panels, which defines the performance requirements for sheathing products, STURD-I-FLOOR and sidings, regardless of whether the

panel is manufactured using all veneers, composites or non-veneer materials.

Each of these standards requires the panel products to meet a wide variety of physical and mechanical tests in order to assure compliance. A proper construction specification should reference one of these standards.

Design values published by APA are based on extensive testing of APA trademarked panels and are only applicable to panels bearing the APA trademark. Thus, it is important that the design architect specify APA trademarked panels as this mark provides them with the assurance that the product conforms to the standard specified.

panel is manufactured using all veneers, composites or non-veneer materials.

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Design values published by APA are based on extensive testing of APA trademarked panels and are only applicable to panels bearing the APA trademark. Thus, it is important that the design architect specify APA trademarked panels as this mark provides them with the assurance that the product conforms to the standard specified.



In addition to specifying the APA trademark, an architectural specification for a construction application should contain the following minimum information: panel thickness; panel grade; span rating and exposure durability classification.

Panel grade refers to the grade name of the panel. Grades are generally identified in terms of veneer grade used on the face and back (A-B, B-C, etc.) or by a name suggesting the panel's intended end use as APA Rated Sheathing.

Span rating denotes the maximum recommended center-to-center spacing, in inches, of supports over which the panel should be placed in construction applications. For example, a

You can get two AIA continuing education learning credits by reading this APA article. Examine the learning objectives and complete the questions on page 158. Then just fill out and return the self report form on page 230.



span rating of 32/16 indicates the panel can be used in a roof sheathing application with the joists spaced up to 32 inches on center or in floor framing with the joists spaced 16 inches on center.

Exposure durability classification relates to glue bond durability. APA trademarked panels may be produced in four exposure durability classifications— Exterior, Exposure 1, Exposure 2 and Interior with most construction grade panels being produced as an Exposure 1 classification.

Glued laminated timber (GLULAM) explained

Glued laminated timber, or glulam, is an engineered stress-rated product created by bonding together individual pieces of lumber having a thickness of two inches (50 mm) or less. Individual pieces of lumber are end-joined together to create long lengths, referred to as laminations, which are then face-bonded together to create the finished glulam timber.

Glulam is also a highly versatile engineered wood product. It can be shaped into forms ranging from straight beams to complex curved members and is used in a wide variety of residential and nonresidential building construction applications.

Glulam is manufactured in accordance with the provisions of ANSI Standard A190.1-93, Structural Glued Laminated Timber which is referenced by virtually every building code in the U.S. APA's related corporation, Engineered Wood Systems (EWS) is a third party quality control agency that provides trademarking for glulam. Approximately 65% of all glulam manufactured in North America by EWS member plants in the United States, Canada and Mexico bears the APA EWS trademark. It is important that all architectural specifications require that glulam be manufactured in accordance with ANSIA190.1.



Since glulam is manufactured from kiln-dried lumber, shrinkage and warping are minimized



APA trademarked engineered wood products are used in residential construction on floors, walls and roofs.

and dimensional stability is assured. In addition, the use of dry lumber permits higher design strengths to be achieved than would be possible from green timbers. Because they are dry, glulam also has excellent fastener-holding capability. In floor beam applications, this translates into a firm subfloor with minimal nail popping or squeaks.

Specify the right product for the right application

To specify the right member for the right application requires a basic understanding of the inherent characteristics of glulam. Some of the design considerations unique to this product include selecting the appropriate structural grade, specifying member size and appearance characteristics, and determining the appropriate camber.

Glulam is available in a variety of sizes, species and appearances - each of which has a unique look and application. The most commonly used species for glulam are Douglas Fir, Southern Pine and Spruce-Pine Fir. Glulam design values are also published for Hem-Fir, Alaska Cedar and other softwood and hardwood species.

When used in applications which expose glulam to the elements, it is important that the architectural specifications require them to be pressure impregnated with preservative treatment chemicals in accordance with applicable industry standards. Detailed information on pressure treatment of glulam is available from EWS.

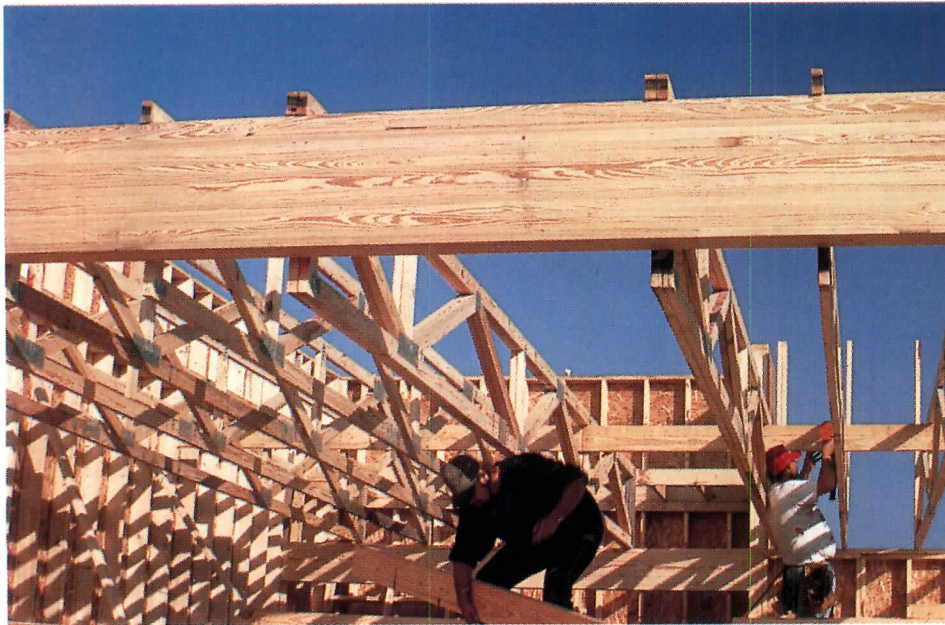
ASTM Standard D-3737-93, Test Method for Establishing Stresses for Structural Glued Laminated Timber, sets forth the methodology for assigning stresses to glulam. Design stresses are published in such references as the National Design Specification for Wood Construction (NDS), the Uniform Building Code and Engineered Wood Systems National Evaluation Report No. 486 (NER 486).

Each of these documents tabulates various lay-up combination symbols and associated design stresses. A typical specification might make reference to a specific lay-up combination such as a Western species 24F-V4 combination which denotes a bending member produced using visually graded lumber with an allowable bending stress of 2400 psi. As an alternative to specifying a specific lay-up combination, the specifier may indicate the allowable design properties required in the specification documents and rely on the supplier to provide a glulam which will satisfy these design criteria.

For members such as columns or trusses which are subjected primarily to axial loads, glulam members having all the same grade of laminations throughout the depth are most efficient. All one grade lay-ups are typically specified by a number designation such as a No.1, No.2, etc. These designations are also tabulated in NER-486 and the NDS.

Glulam beams are available in both custom and stock sizes. Stock beams are manufactured in commonly used dimensions and inventoried at distribution centers throughout North America in long lengths. These members can

ENGINEERED WOOD PRODUCTS



then be cut to length when the beam is ordered by the contractor. Stock beams meet the requirements for many typical residential and light industrial construction applications where a simple span bending member is required for headers, floor beams and roof beams.

Stock beam widths that are typically inventoried are 3-1/8" and 5-1/8". In addition, many stocking dealers also inventory "full width" 3-1/2" and 5-1/2" members.

Custom beams are commonly ordered for a specific building application. For glulam manufactured using Western species of lumber these members are readily available in widths of 3-1/8", 5-1/8", 6-3/4" or 8-3/4". For glulam manufactured from Southern Pine Lumber, the traditional widths are 3", 5", 6-3/4" or 8-1/2". Wider widths or other custom widths are also available for any species but availability needs to be verified before specifying.

Glulam beams produced using Western species lumber are manufactured in depth multiples of 1-1/2" whereas Southern Pine glulam is typically supplied in depth intervals of 1-3/8". Regardless of the species or end use requirements, custom beams are available in *virtually any size* or configuration that may be required to meet design conditions.

Premium, Architectural, Industrial and Framing describe the four appearance classifi-

cations traditionally specified for glulam. Premium or Architectural beams are recommended when the glulam will be exposed and finished appearance is of prime importance.

Industrial appearance members are typically surfaced on the two wide faces with eased edges on the soffit face but with little or no additional filling or patching of voids. These are typically specified for light commercial and industrial construction where appearance is not of primary importance or for concealed applications such as a residential header.

The Framing appearance is intended only for concealed applications such as when glulam members are being framed into traditional 2x4 and 2x6 wall construction and a full width (3-1/2" or 5-1/2") member is desirable. Full-width refers to the fact that these members are only surfaced to a "hit and miss" designation to produce the final required net width.

It is important to note that the finishing of a glulam member has no influence on the members structural capacity. In other words, an industrial or premium appearance beam manufactured to meet the same structural grade will have identical structural performance characteristics. This is often misunderstood by specifiers and a Premium appearance may be specified assuming it will provide a higher degree of structural performance than a member with an Industrial appearance.

APA EWS trademarked glulam is an engineered, stress-rated product used in a wide variety of residential and nonresidential and building applications. Shown is a commercial header.

The grade and placement of individual laminations affects the overall strength of the beam and determines whether the beam is "balanced" or "unbalanced". In order to more efficiently use the available lumber resource, laminations of highest strength are placed in zones of the member that will be subjected to the highest stresses in service. Balanced timbers are symmetrical in lumber quality and are used in applications such as cantilevers or continuous spans where either the top or bottom of the beam may be stressed in tension.

In unbalanced beams, the quality of lumber used on the tension side of the beam is higher than the lumber used on the corresponding compression side. This limits their use to simple span applications or short cantilever applications where high tension stresses will not be developed on the top of the beam.

A unique quality of glulam is the ability to pre-camber the members to offset in-service deflections. Camber can be specified in "inches of camber" such as 3/4" or as a camber "radius" such as 2000 ft. The question of how much camber is needed is often asked when architects specify glulam beams. For most short span framing applications, such as headers and floor beams in residential framing, stock beams are supplied with a camber radius of 3500 ft. or flatter with zero camber being an acceptable option.

For longer span roof beam applications, the glulam industry recommends beams be cambered for 1-1/2 times the calculated dead load deflection. For floor beams or shorter spans, the recommended camber is 1.0 times the calculated dead load deflection.

Structural composite lumber examined

Laminated veneer lumber (LVL) is the most widely used of the structural composite lumber products. It is produced by bonding thin wood veneers together in a large billet so that the grain of all veneers is parallel to the long direction. The LVL billet is then sawn to desired dimensions depending on the construction application. Some of the product's many uses are as headers and beams, hip and valley

rafters, scaffold planking, and as the flange material for prefabricated wood I-joists.

Parallel strand lumber (PSL) is created by adhesively bonding together relatively long strands of wood fiber. The strands are oriented in a parallel configuration with the long axis of the member. PSL members having cross sections up to 11 inches by 19 inches can be produced, although the most common sizes are those comparable to dimension lumber. PSL members are typically used as beams, headers and columns.

Since all SCL products are produced as proprietary wood products, each manufacturer must obtain their own code acceptance. This is typically accomplished by obtaining a National Evaluation Service Report (NER) for the product. These NER reports establish the various strength properties for the SCL product, the conditions of use for these products and define the quality assurance testing program that is required to assure that these stress levels are maintained. Since there are no standard design values or conditions of use for these products, the architect must be familiar with these various NER reports or rely on proprietary product literature to specify them.

A single standard for prefabricated wood I-Joists

Prefabricated wood I-joists, also referred to as I-beams, are structural, load-carrying products and are among the fastest growing of the glued engineered wood products. Their "I" configuration provides high bending strength and stiffness characteristics with a very low weight. I-joists are typically available in long lengths and because they are very lightweight can be easily handled at the jobsite without the need for heavy handling equipment. The flange material for I-joists is either dimension lumber or LVL whereas the web material is either OSB or plywood.

I-joists are used in both residential and nonresidential floor and roof construction in much the same manner as sawn lumber joists with the largest use being in residential floor construction. In general, nominal 10" and 12"



APA EWS trademarked engineered wood I-joists allow you to use longer spans and wider spacings than standard lumber joists

depth I-joists can be substituted on an equal or greater load/span basis for most grades and species of 2x10 and 2x12 sawn lumber. Since I-joists can be supplied in long lengths, they are often used in multiple span applications and therefore interior bearing reactions become a design control that is normally not applicable to sawn lumber. Also, special design verifications need to be made for I-joists supporting concentrated loads or cantilevered over supports.

As with SCL products, wood I-joist products are produced as proprietary products with each individual manufacturer obtaining their own NER reports for building code acceptances. Thus, as with SCL, the specifier must be familiar with either the NER report or the manufacturers literature for each of these proprietary products in order to develop appropriate construction specifications. In an effort to simplify I-joists, APA has developed a performance standard for I-joists when used in residential floor applications. It is anticipated that this standard will be accepted by the model building codes in early 1997.

Why specify the APA trademark

Glued engineered wood products represent an exciting future for the wood products industry. These products allow high end structural products to be produced in a manner that makes efficient use of the available wood fiber. Standards have been developed which estab-

lish the test protocol for determining design properties for the various glued engineered wood products described in this article. Such standards, when properly referenced in project specifications, help assure the end user of a structural product which will perform its end use function.

In order to properly specify these products in the wide range of construction applications for which wood framing is applicable, it is imperative that architects responsible for product specifications have a thorough understanding of the design properties and end use characteristics of these products.

APA-AIA Interactive Correspondence Course. 10 credits

Working in conjunction with the American Institute of Architects, APA has developed an interactive multi-media CD-ROM correspondence course to educate AIA members and other design professionals on the proper use and specification of engineered wood products in commercial and residential projects. The course is accredited with the AIA Continuing Education System (AIA/CES). It provides up-to-date information on understanding engineered wood, specifying the right product for the right application and using these products in high wind and seismic regions. AIA members will receive 10 CES learning units for successfully completing the self study exam.

In addition to the five, one-hour modules, the CD-ROM contains an interactive glossary of engineered wood terminology and various industry world wide web site connections. The CD-ROM utilizes the latest technology including animation, video and audio, and a powerful search engine that takes you directly to the information you need. It allows fast, easy access to the product specifications and design tables that architects have used for years.

Please contact APA - The Engineered Wood Association at P.O. Box 11700, Tacoma, WA 98411-0700, or by calling (206) 565-6600. Internet address: <http://www.apawood.org>

CIRCLE 59 ON INQUIRY CARD

A P A

The Engineered Wood Association

DESIGNING AND ENGINEERING THE FUTURE: AIA CONTINUING EDUCATION Q & A



LEARNING OBJECTIVES

After reading Designing and Engineering the Future and completing the exercises you will be able to:

- Identify the main characteristics and at least two design applications for at least three of the engineered wood products examined in the article.
- List at least 10 key elements to consider in engineered wood product specification.
- Cite at least two standards for engineered wood products.

QUESTIONS

1. Differentiate between oriented strand board (OSB), plywood, structural composite panels, glued laminated (glulam) timber and identify the most common applications for each.
2. List five important elements to include when specifying structural wood panel products.
3. What are some design considerations specific to glulam?
4. How much camber is commonly needed when specifying glulam beams for short and long span framing?
5. Since there are no standard design values or conditions of use for structural composite lumber products, where can architects find useful information beyond the proprietary product literature when researching and specifying?
6. Why are wood I-joists the fastest growing of the engineered wood products?

ANSWERS

- 1 (a) OSB is made by bonding three or four inch long wood strands with adhesives in a layered mat and is most often used for sheathing, web material for wood I-joists and as the structural membrane for structural insulated panels.
- (b) Plywood consists of veneers arranged in perpendicular and odd-numbers of layers with the grain of the face layers typically oriented parallel to the long dimension of the panel. Plywood is most often used as sheathing products, STURD-I-FLOOR and sidings.
- (c) Structural composite panels consist of veneer faces bonded to a wood-base core material. APA's COM-PLY is manufactured in three- and five-layer arrangements. Prime applications include sheathing and siding.
- (d) Glulam is manufactured by endjoining together pieces of wood that are 50mm in thickness or less. These laminations are then face-bonded together. Since it can be shaped, uses range from residential to commercial headers, floor beams to roof beams, as well as columns and highly complex commercial applications.
2. An architectural specification should include: manufacturing standard to which the product conforms, panel thickness, panel grade, span rating and exposure durability.
3. Consider the appropriate structural grade, wood species, specifying member size and appearance, whether balanced or unbalanced layouts are in use and determine the suitable camber.
4. For short spans, stock beams come with a camber radius of 3500 feet or flatter with zero camber acceptable for most residential uses. The glulam industry recommends beams be cambered for 1.5-times the calculated dead load deflection for roof and 1.0 times the calculated dead load deflection for floor beams.
5. National Evaluation Service Reports establishing the product's strength properties are available from the building code jurisdiction.
6. These structural load carrying products provide high strength and stiffness with a very low weight that makes for ease in handling and use in long lengths for multiple span applications.

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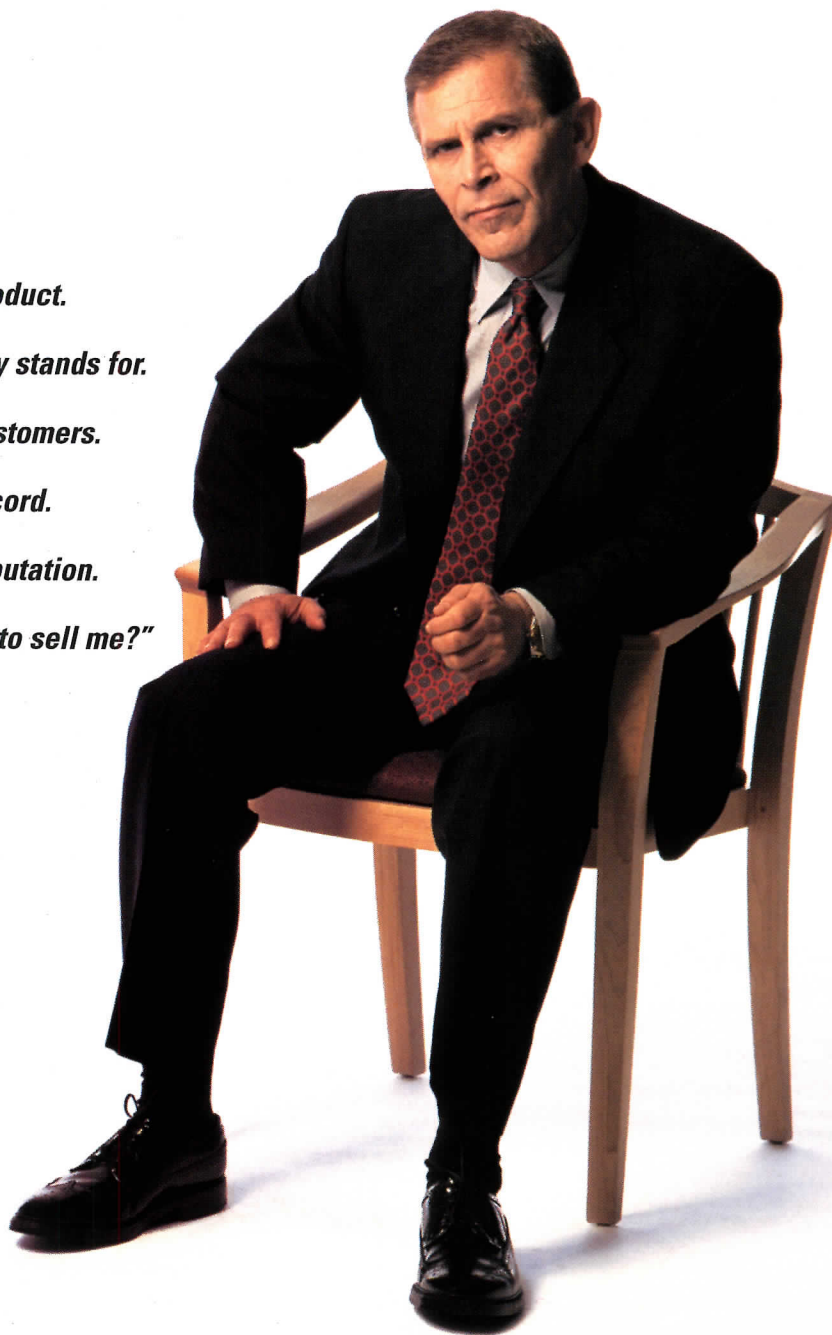
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Metal Roofing Fundamentals

DESIGNERS NEED TO GO BEYOND STANDARD DETAILS AND DATA, ESPECIALLY IN DESIGNING FOR WIND AND SNOW.

by Steve Hardy and Michael J. Crosbie

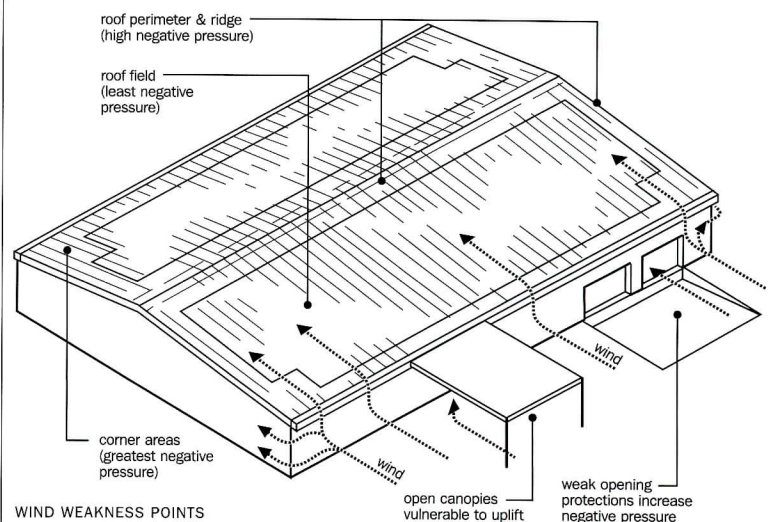
Metal roofs, a highly visible element of both low and high-end architecture for centuries, maintain a significant place in U.S. construction today due to esthetics, economy, and durability. Corrugated tin covers the most humble of agriculture sheds, while copper and lead have capped the most treasured cathedrals and institutions of Western culture.

While copper, lead-coated copper, stainless steel, terne-coated stainless, and galvanized aluminum all have their place in the market, the most popular type of metal roof today is factory-formed, paint-coated steel, and this story will focus primarily on this type. These first became popular for industrial and warehouse use, and metal-building manufacturers integrated support purlins and batt insulation into a total system. These metal-roof types have since migrated into wider commercial and institutional use.

Among the reasons for the new popularity of metal roofs is dissatisfaction with traditional membrane roofs. Built-up roofs and newer modified-bitumens or single-ply require significant maintenance and repair to achieve even a 15- to 25-year life. With proper design and installation, a metal roof system can—with reasonable maintenance—remain leak-free for 40 years or more.

Although the design and construction of coated-steel roof systems is apparently straightforward, few accepted standard details currently exist within the metal-roofing industry. Designers should start with reliable manufacturers' details and specifications, but this primer focuses on areas that are too specific for coverage by standard details and technical data. Architects also need to be aware of the changing consensus on wind uplift and snow loading.

Metal roof systems were traditionally divided into two broad categories. One type is known as *architectural*, and consists of metal roof panels supported by a deck. The other common type is referred to as *structural* because the panels support their own weight, and no underlying deck is needed. However, as hybrid systems have come to be more



Roof failures often occur when designers don't recognize the varying wind forces on a roof.

commonly used, a new distinction has developed: steep slope versus low slope. Usually supported by a deck, *steep-slope* roofs are defined as those with a minimum pitch of 3:12. The lapped, standing seams connecting the panels are designed to shed water, rather than create a watertight seal. These systems are sometimes referred to as hydrokinetic. With the wide use of metal roofs on large commercial and institutional projects, *low-slope* (minimum 1/4:12) types have developed. Because they are nearly flat and water can accumulate on these roofs, the seams and laps connecting low-slope metal roof panels must be designed to be watertight (hydrostatic) and to withstand water pressure.

These types usually are not supported by a deck. While typical spans for structural panels are five feet on-center, the span is affected by the thickness of the metal and the configuration of the panel. The more ribs and seams, and the higher they are, the larger the possible span. However, some architects find the rib and seam pattern esthetically too pronounced, and should consider different kinds of panels or spans.

Wind uplift is the focus of new attention

Roof failures in recent hurricanes, especially Florida's Hurricane Andrew of 1992, have forced a reassessment of some roof-design criteria. High-

Steve Hardy is a roofing consultant in Nederland, Texas. Michael J. Crosbie is a senior architect with Steven Winter Associates, a building systems research and consulting firm in Norwalk, Conn. Portions of this article are adapted from a forthcoming book on metal roofing, to be published by The McGraw-Hill Companies.

Continuing Education This month's installment of the ARCHITECTURAL RECORD/AIA continuing-education series covers metal roofing. Use the learning objectives below to focus your study. After reading this article, complete the questions on page 228 and check your answers, page 230. AIA members may fill out the self-report form and send it in for two AIA learning units. —Mark Scher, Director, AIA Continuing Education Programs and Products.

Learning Objectives After reading this story and completing the exercises, you will be able to:

1. Identify at least three wind-load standards;
2. List two or more design solutions for problems related to condensation, thermal movement, and water leakage at flashings and penetrations;
3. Cite seven approaches for minimizing and controlling damage from heavy snow.

speed winds cause negative-pressure areas on roofs. What's called "blow-off" is really the roof being drawn off by negative pressure. The pressures vary at different parts of the roof and are affected by configuration and slope (drawing previous page). In recent hurricanes, many failures occurred at the corners and edges, where negative pressure is greatest, and much of the remaining roof covering was then sucked off. A great deal of damage was also done when wind entered buildings through blown-out windows and doors, creating positive pressure on the insides of roofs, which magnified the outside suction force.

Designing and specifying a metal-panel roof system to resist wind blow-off is comparable to wind-resistance design for other types of roof systems. Additional load factors should be considered for steeply sloped metal-roof systems because the shape affects how air flows over it.

A number of design standards have been upgraded in recent years to reflect a better understanding of wind uplift. If the building is insured by Factory Mutual Systems (FM), wind-resistance design must be

in accordance with the recently released "Factory Mutual Approval Standard For Class 1 Panel Roofs, Class #4471," unless FM grants a variance. (Contact information is listed at the end of the story.) The standard recognizes that wind resistance must be designed into the entire roof and support system. FM's approved assemblies reference and include the structural purlins supporting the roof, the fasteners that attach the roof panel to the purlins, the insulation, and the roof covering itself. Simply indicating that the roof is to be attached "per FM requirements" is not enough. The architect must spell out requirements in drawings and specifications.

A similar specification some architects use is to require the metal roof system to be listed per wind classification UL-30, UL-60, or UL-90. These ratings are derived by Underwriters' Laboratory using their UL-580 test procedure. The test subjects samples to both positive pressure on the underside and negative pressure on the top side, thereby providing classification for nominal gross-uplift pressures levels of 30, 60 and 90 lb.

OF DRAG LOADS, ICE DAMS, AND OTHER SNOW-LOAD MALADIES

The damage done by heavy snows in much of the country last winter revealed weaknesses in the way many metal roofs are designed. Actual collapses from excess snow are relatively rare, but snow can considerably damage roofs. And falling snow masses can do injury.

In heavy snow regions, live loads from snow can exceed 200 psf, while in most northern areas of the U.S. snow loads are calculated at 35 to 50 psf. Snow falling from upper-level roofs onto lower ones can cause impact loads much higher than static ones. While a roof can be designed for these loads, it is better to avoid the condition. Also, deep overhangs and suitable roof slopes should divert falling snow and icicles so that they don't injure persons at entrances and on adjacent streets and walks.

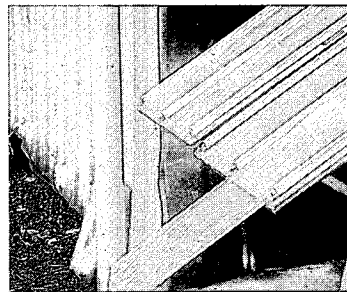
Drag loads

On steep-slope roofs, the drag load is the tension the weight of the snow exerts on the roof panel: in effect the snow tries to pull the panel off as it slides down. The steeper the roof and the longer the panel length, the higher the drag load is. For example, a snow load of 100 psf on a roof with a 50-ft-long panel at a 6:12 slope will have a drag load of 1,120 pounds per lineal

foot (plf) at the ridge. The same roof with a 12:12 slope will have a drag load of 1,770 plf. The drag load is resisted by the fasteners used to pin the panel to the roof deck and building structure. The designer will need to give drag-load guidance to the manufacturer, who should be able to demonstrate that fastener-load capacity and shear resistance of the panel thickness can resist the loads.

Roof configuration

Metal roofing panels are slick, and will shed snow readily, sometimes in huge, damaging masses. Staggered patterns of snow guards or tiny snow fences are sometimes used to retain snow until it can melt. There is controversy over how effective these devices are. Sometimes they hold too much snow on the roof,



causing overloading; other times the snow pulls them out, damaging the roof or causing leaks. And they don't guarantee that a dangerously large mass of snow won't fall off the roof. George Mueller, president of Specified Roofing, a roofing consultancy in Richton Park, Ill., says that one system he has looked at that features 3/8-in.-high embossments in the panel itself appears to offer a good performance compromise.

Where heavy snow is anticipated, valleys should be made from flat metal stock and widen as they go down the roof. They should be wide enough to eliminate ribs or standing seams where snow can accumulate. Sliding snow can bend rib seams, sometimes tearing apart the metal panels (photo left).

Vents and other penetrations

Wide, tapered saddle crickets should be used to divert sliding snow around chimneys and other large roof penetrations. A sliding snow and ice mass can displace or rip out a vent stack or chimney.

Vents or stacks located at the ridge will be out of harm's way. They should also extend high enough so they won't be covered by accumulated snow.

Ice damming

This is the most common roof problem in snowy climates. Snow melting next to the roof surface under a thick snow pack runs down to the cold eave, where it freezes. A dam of ice is created, behind which more water piles up and freezes. Water backs up into the roof covering behind the dam, causing leaks.

Heavy roof insulation may equalize the temperature between eave and attic, but experts are now urging the consideration of venting eaves to attics so that they are sufficiently warmed to limit freezing melt-water on the roof. Severe snow conditions may warrant exhausting some air from the interior to the attic and eave. Freezing can be slowed and a combination of soffit vents and ridge vents can condensation from forming. A water-barrier, rather than water-shedding roof system should be considered where ice damming is likely. If the sealants within the panel system fail to keep the backed-up water from penetrating, a waterproofing underlayment membrane at all eave, valley, and cricket locations offers an additional line of defense.

per square foot. The weakness of the UL procedure, however, is that the test specimen does not include edge and roof details, and these have proven to be vulnerable in severe wind storms.

The American Society of Civil Engineers ASCE 7-95, "Minimum Design Loads For Buildings And Other Structures," can help designers determine realistic wind-uplift pressures, so that proper attachments can be designed. ASCE 7-95 contains design uplift-pressure formulas for

field-formed architectural standing-seam types rather than the factory-formed systems most commonly used.

Eave, rake, ridge, and gutter flashings are usually supplied by each metal-roof manufacturer as part of its system. However, manufacturers' standard flashing details may not take into account unique building configurations. For example, the designer will have to modify a rake flashing that the manufacturer shows as fixed to both the roof panel

HEAVY SNOW DAMAGE IN MUCH OF THE COUNTRY LAST WINTER REVEALED WEAKNESSES IN THE WAY MANY METAL ROOFS ARE DESIGNED.

cladding and components and takes into account differing conditions at corners, perimeter, and the field of the roof system.

Designers sometimes use values obtained from model building codes, such as the Standard Building Code, which applies in much of hurricane country. However, code requirements are minimums and have not always been adequate for the kinds of wind pressures buildings actually experience, especially high-rises. Some local jurisdictions, most notably Florida's Dade County, have stricter requirements.

A long awaited standard, relatively new to the metal-roofing design community, may find its way into the codes. It is ASTM E 1592-94: "Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure," and experts see it as more accurately reflecting real wind effects. The test evaluates the strength of the connection of the metal-roof system to the building structure. The designer specifies the force that the roof system must be capable of resisting—for example, 90 psf of negative pressure uplift in accordance with ASTM 1592-94.

Researchers investigating wind damage have found plenty of design errors, but they have concluded that most wind-related roof losses are a direct result of improper attachment of the roof system to the building structure. This is too often the result of poor site supervision of unskilled mechanics. While the architect may not control field quality, he or she can influence it in impressing upon the client the importance of using experienced and qualified subcontractors. The architect can also review quality standards in pre-construction conferences and carefully observe the work.

Flashings—the most vulnerable details

The design and application of flashings to a metal roof is less forgiving of error than roof types with more redundancy, like multi-layer built-up roofs. To keep the roofs watertight, metal roof flashings—ideally made from the same stock material as the roof panels themselves—rely on a single layer of tape sealant or caulk in water-barrier panel systems, or on the gravity flow of water in water-shedding applications.

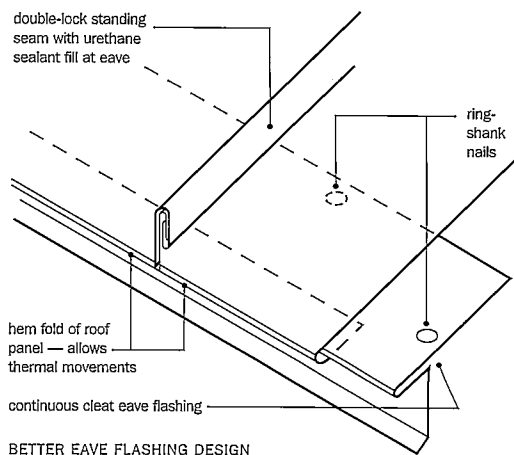
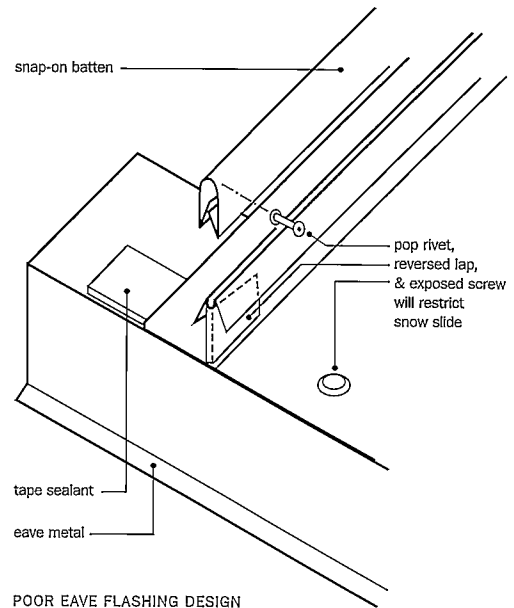
General waterproofing principles common to the roof industry apply to metal roof flashing systems. The sealing adhesive, or caulk, between the flashing and the metal-roof membrane must be continuous to create a waterproof seal. The architect, not the manufacturer, must size the flashing, assuring the coverage of base flashings under extreme thermal conditions and making sure flashings extend up walls, curbs, and parapets a height sufficient to keep wet snow and wind-driven rain from driving moisture into the building. If there are movement joints in the building, flashings must be able to accommodate the desired dimensional change.

The SMACNA manual offers some guidance and is non-proprietary, but is mainly oriented to flashings for low-sloped membrane roofs and

Low-slope roofs need more than one line of defense to keep water out.

and to the building wall when some movement between the two elements must be accommodated.

A common source of failure is flashings that are lapped, butted, or wrapped in a way that depends primarily on sealant to keep water out. If movement between flashing sheets isn't needed, soldering the joint is best. However the shop or field painting done after soldering is never as durable as the baked-on coating applied to the sheet stock. When soldering is required, it is best to use a kind of metal that can be soldered but does not need painting, such as stainless or galvanized steel. To match the



roof color, the soldered flashing can be covered with a piece of metal that matches the roof-field color. If this covering is riveted into place, though, the steel mandrels (the anchoring part of the rivet) may rust, causing unsightly streaks. Admittedly, this is an imperfect and more complex solution than manufacturers recommend, but the number of failures at poorly fabricated curbs and corners demands the designer's attention.

Details at roof penetrations

Manufacturers' standard details may also overlook the support of flashings at openings. Additional framing must be provided around the opening to be sure that both the roof field and the flashing are properly supported. Especially check framing shown in structural drawings to be sure that it is sized and located to accommodate needed flashing systems and the shims or blocking that supports them.

Ideally, architects should avoid penetrations through metal-panel roof systems. Instead, consider installing vents or fans through a building side wall or manifold vent pipes together to minimize the number of roof penetrations.

Controlling condensation

Condensation occurs when the surface of a material reaches dew-point temperature. Because metal reacts quickly to changes in temperature, condensation on the underside of the panel requires more attention from the designer than is needed for other kinds of roofs. On cold winter days, for example, warm, moist air that escapes the interior of a building will condense on the cold underside of metal roof panels. Accumulated water can leak back into the interior. The condensate may also be trapped between the metal roof panel and the purlin supports or roof deck, caus-

ing the panel to rust through from the bottom (an occurrence not covered by manufacturers' warranties). Among the solutions:

Ventilation: The entire underside of roof panels must have a continuous flow of air, which can often be accomplished by proper ventilation of the attic or plenum space. The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) *Handbook of Fundamentals* or the Federal Housing Administration (FHA) "Minimum Property Standards" are the documents referenced by building codes for ventilation and humidity control of an attic cavity. But research is ongoing, and the FHA standards appear to be out of date. In general, the recommended air-exchange rate for residential structures today is a minimum of three times per hour in the attic or plenum space, which can

TRAPPED CONDENSATION CAN CAUSE A ROOF PANEL TO RUST THROUGH FROM THE BOTTOM

usually be provided through the use of continuous eave and ridge vents. In increasingly popular metal-roof retrofits over existing built-up roofs, adequate ventilation is all too often not provided in the space between the old and new roof. Many roofing experts strongly advocate a minimum of five air changes per hour to compensate for the exceptional humidity that can develop in these spaces.

Vapor retarders: In addition to adequate air-exchange rates, the ASHRAE Fundamentals handbook recommends the use of vapor retarders to keep moist air away from the underside of the roof. Structural-panel roof systems are often designed with a vapor-retarder sheet that supports batt insulation and stretches between purlins or



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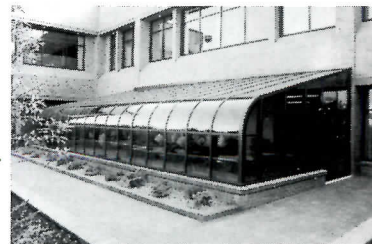
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rafters and is usually taped and sealed. This does not create a perfect barrier, but the amount of moist air that reaches the roof panel is usually acceptable. In some commercial and most industrial applications, the sheet becomes the visible ceiling of the building interior.

Where there is an attic or plenum above the ceiling, it is best to place the vapor retarder nearest the warm space, since the vapor drive is from warm to cool. Ideally, the vapor retarder is placed above the finished ceiling. Above that is insulation, then the attic or plenum under the roof. Ventilation under the roof is still needed, but the vapor barrier stops the greatest source of condensation. The membrane must be sealed around any penetrations and at terminations, especially when the interior space is particularly humid, as in a kitchen or shower area.

Thermal movement

Metal moves more under the influence of temperature change than any other roof material. When properly executed, standard details, such as the concealed clips that attach adjacent panels of structural-type roofs, take movement into account. Floating clips, which incorporate tiny hinges, may be called for. At roof terminations, especially for very large roofs, architects will have to calculate and allow for actual panel movement, using the coefficient of thermal expansion suited to the metal chosen.

Even when movement is taken into account, roofs built with long, continuous metal panels may make loud popping noises from metal rubbing together as the outdoor temperature swings. Sometimes the panel clips bind as the panel lengthens or shrinks, and the popping occurs when the pressure is enough to force the panel through the clip. This binding can be harmful. If clips are improperly installed—either out-of-line with the panel side laps or driven too far into an insulated roof

deck, the panel cannot move enough, and dents form (“oilcanning”). When binding is extreme, the metal panel can tear or can pull the clip out of the deck.

While some metal roofing issues can seem daunting, the architect that goes beyond manufacturers’ standard details and data will help ensure a reliable installation. Indeed, the perception that metal roofs are more reliable and require less maintenance is key to the impressive growth of of this type—especially in retrofits. ■

Further Information

- *American Society of Civil Engineers, 800/548-2723*
- *Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractors’ National Association, 708/803-2980*
- *James Carlson, “Detailing for Standing-Seam Metal Roof Systems,” Professional Roofing, June, 1994.*
- *Copper in Architecture Handbook, Copper Development Association, 212/251-7200*
- *Factory Mutual, 1151 Boston-Providence Turnpike, Norwood, MA 02062; 617/762-4300*
- *James Holland, “Drag Loads: Snow and Other Heavy Loads on*

Metal Roofs,” Western Roofing, January/February 1995.

- *James Holland, “Sealing Tight: The Use of Sealants with Metal Roofs,” Western Roofing, September/October 1995.*
- *Chuck Howard, “The Nuts and Bolts of Metal Retrofit Roofing Systems,” Contractors Guide, October 1994.*
- *Metal Roofing Systems Association, 1300 Sumner Avenue, Cleveland, OH 44115; 216/241-7333.*
- *Wayne Tobiasson, “Some Thoughts on Snow Loads,” The Roofing Industry Educational Institute Information Letter, Winter 1995. REII, 14 Inverness Drive East, Building H, Suite 110, Inglewood, CO 80112; 303/799-7200.*

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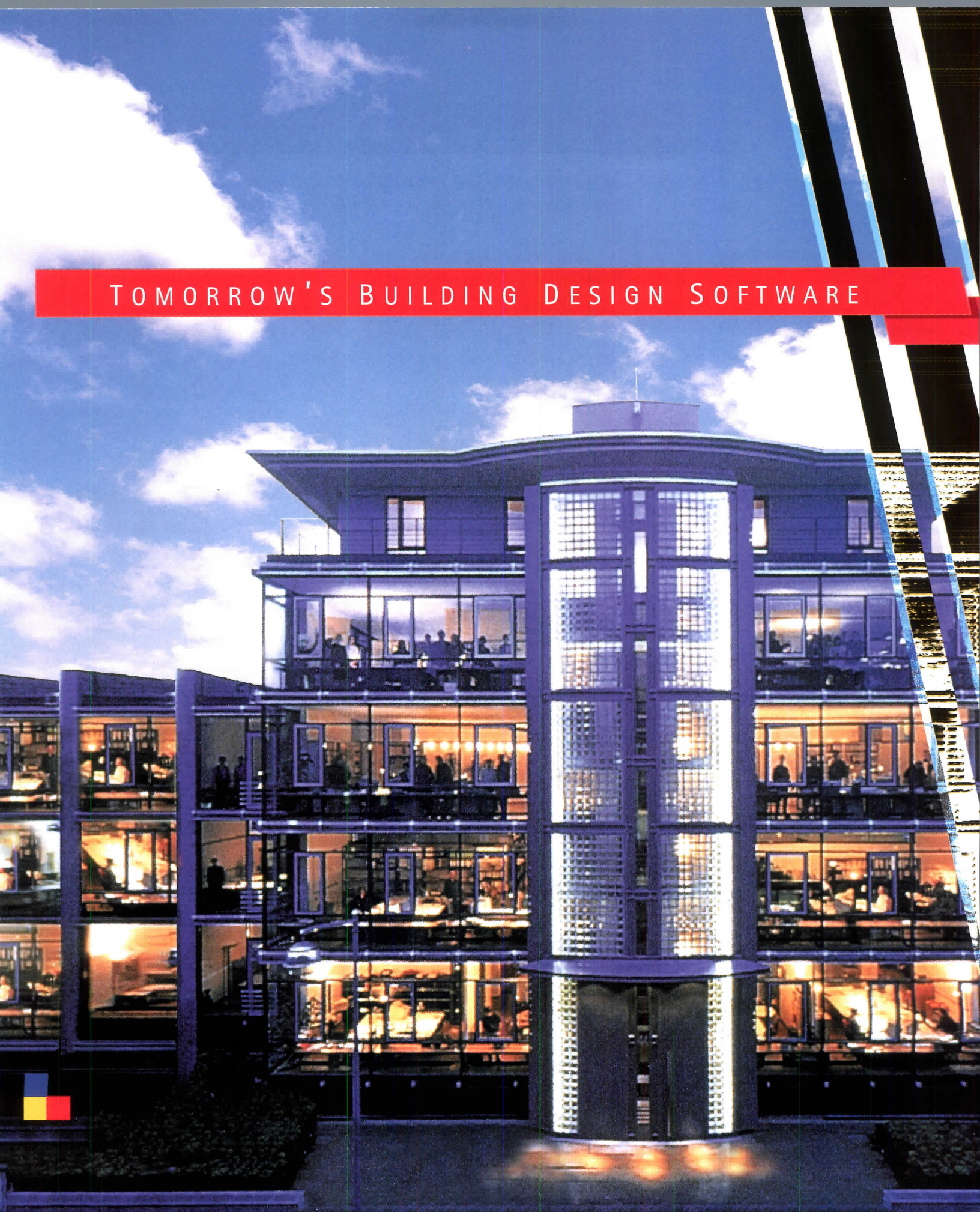
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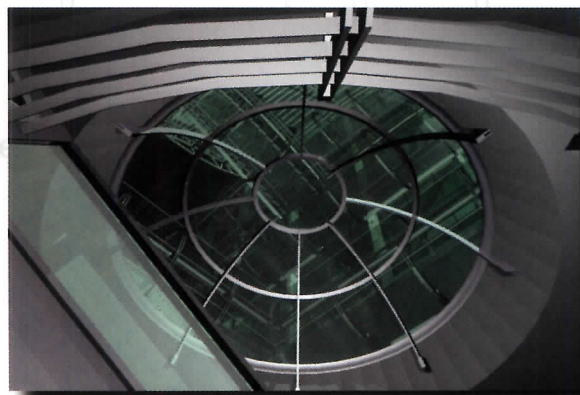
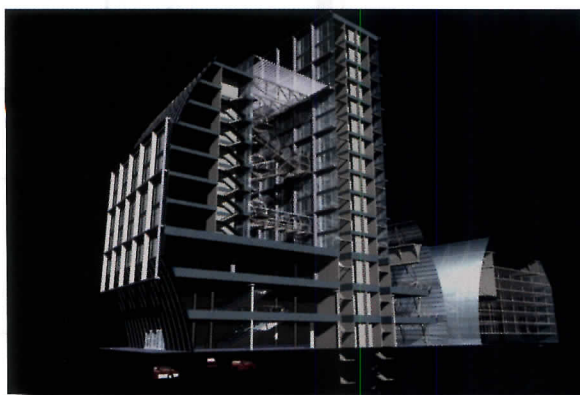
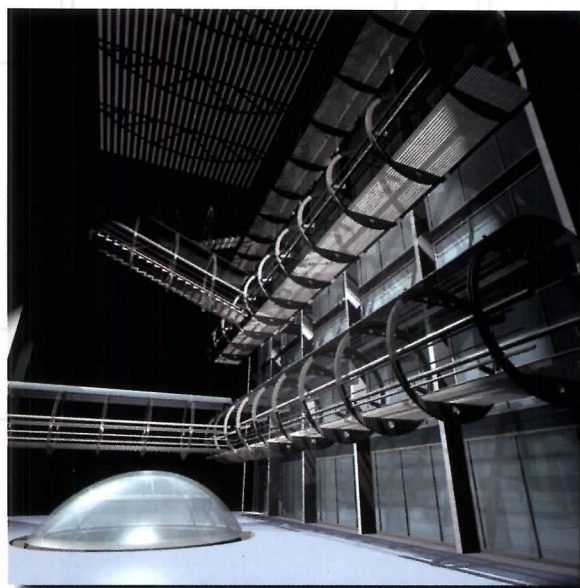
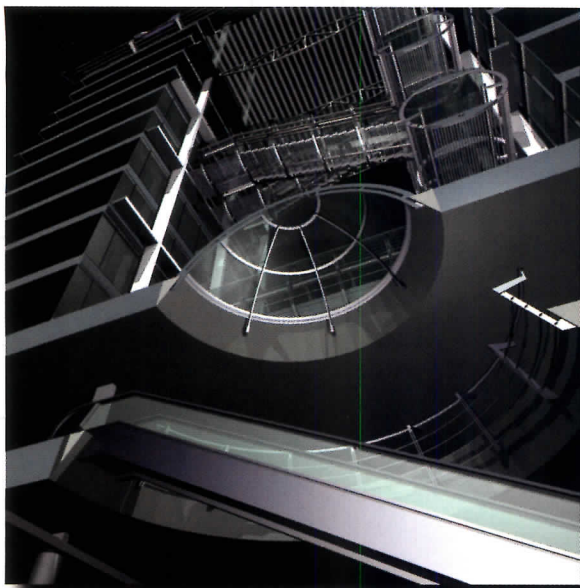
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Who's Who in the CAD Landscape

A GUIDE TO ADD-ON VENDORS, "VIRTUAL CORPORATIONS," AND THE CONFUSING AND EVER-CHANGING DYNAMICS OF THE CAD BUSINESS

by Steven S. Ross

Buying a CAD system used to be so much easier. One company sold you its computer with its proprietary software. It was an entire system solution from a single source. Easy, but expensive. That era of "closed" systems, in which all enhancements had to come from the original vendor, is long since over. Some of those vendors and like Intergraph, remain, but you no longer must accept the single-vendor solution. Today you can mix and match hardware and software. What you get is vastly more powerful and much less expensive, but it is offered by a bewildering array of vendors, and sold through a confusing array of dealers who have a variety of capabilities. And this world is ever-changing. As this story went to press, one of the biggest players, Autodesk, acquired one of the largest developers, Softdesk.

How is the poor buyer to sort this out? And where do you turn for upgrades, maintenance, training, and support? To successfully use and manage today's computer systems, you have to understand the business landscape in which hardware and software suppliers operate. This includes the nature of the relationship that major CAD vendors have with their third-party developer teams and the relationship of vendors and developers with local dealers—if you're lucky enough to have one.

Some definitions

The CAD engine: The largest CAD suppliers build basic CAD applications like Autodesk's AutoCAD and Bentley's Microstation. They have many basic drawing and design tools, but they are generic, highly adaptable to a wide range of end uses. This adaptability eases cross-discipline compatibility: the architect's floor plan, the structural engineer's framing plan, and the mechanical engineer's duct layouts are done with similar tools. These form a core around which a huge variety of products can be developed. All full-featured CAD systems offer a "description" or "macro" language that allows users to automate routine or difficult tasks. Those tasks might include drawing a wall with one mouse movement, or designing a dormer or staircase.

Add-ons: Still, there are limitations to what makers of even full-featured CAD engines care to offer. That's why almost all CAD engines provide "hooks" that allow third parties to attach complete applications to the engine. The strongest hooks are called APIs (applications programming interfaces). Third-party developers are thus enabled to make a huge range of add-on software that customizes the engine to make it work efficiently for anything from generalized architectural design to laying out ductwork, testing stadium sight lines, or calculating the cheapest cut-and-fill excavation for a hillside lot.

Stand-alone programs: Although programs like Nemetschek's Allplan and Graphisoft's ArchiCAD share some characteristics with the

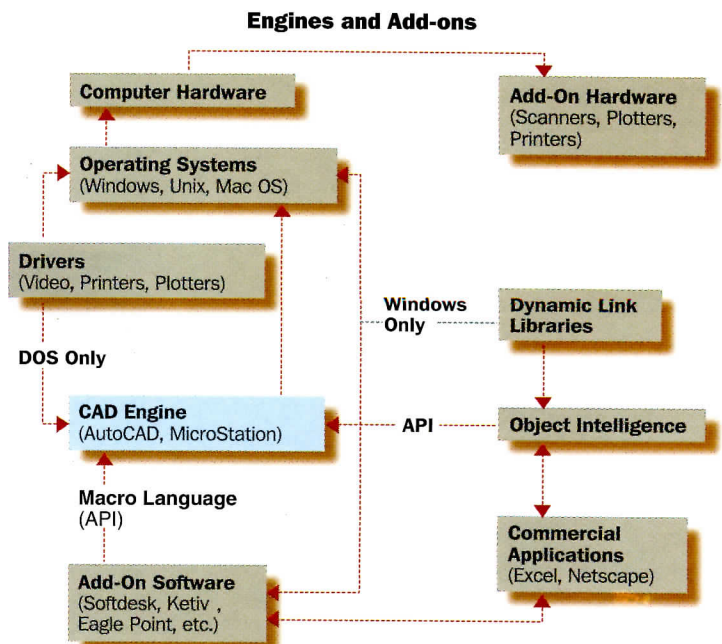
A CAD system that appears seamless may actually be made up of several applications blended together by developers.

engine-and-add-on scheme used by Autodesk and Bentley, these are more suitably thought of as complete all-in-one solutions. Minicad by Diehl-Graphsoft, Architrion, FastCAD, and SoftCAD are other stand-alone programs. If they have the right features, cost, and ease-of-use, these programs come closest to the simplicity that single-vendor solutions used to offer. Stand-alone products may also accept add-ons, but their main marketing thrust is to provide turnkey products.

Understanding add-ons

Perhaps the most complex aspect of the way CAD software is sold today is the way add-ons and CAD engines combine to make useful integrated applications. Autodesk alone has 2,000 separate developers who have produced more than 5,000 add-on programs that work with AutoCAD. Autodesk's chief, Carol Bartz, has been calling this network of developers Autodesk's "virtual corporation." At Bentley Systems, Autodesk's chief competitor, president Greg Bentley calls its "team" an "interpreneurial" organization (the idea is that the various vendors "interoperate"). Bentley says more than 500 independent vendors are writing software for MicroStation.

While such organizations are convenient for developers, architects have every right to be suspicious. Virtual coffee never was as good as



the real thing. What's more, the Europeans—no less computerized than we—have tended up to now to prefer all-in-one solutions from a single CAD developer, even if the final price is higher. Thus, if you buy AllPlan or ArchiCAD in Europe, you tend to get the equivalent of a range of common add-on enhancements in a single package from the same vendor that developed the core CAD software. As David Marlatt, Graphisoft's president, points out, the buyer must compare ArchiCAD's price not just to AutoCAD alone, but to the engine and add-on suite needed to make the products similar in functionality. Another difference with stand-

improved it greatly. Primavera Systems, the project-management specialist, is the newest Bentley strategic affiliate. It offers WorkPlace Systems, an assemblage of add-ons for facilities-asset management. One of the key advantages of these application suites is that add-on incompatibilities should be fewer. While AutoCAD does not have an equivalent to strategic affiliates, its vendors have been absorbing each other to create strategic-affiliate equivalents. These AutoCAD mega-developers—Ketiv and Eagle Point—offer a broad product line, everything from drafting aids to visualization tools. Autodesk's acquisition of Softdesk, its

WHILE STAND-ALONE PROGRAMS OFFER SINGLE-SOURCE SIMPLICITY, ADD-ONS ALLOW UNIQUE, CUSTOMIZED SOLUTIONS.

alones is that the buyer purchases the software direct from the developer's sales force or through a specialized dealer.

It should be noted that there are many free-standing third-party programs that add functionality to major CAD software but are not, strictly speaking, add-ons. Perhaps the most common types are file translators or printer/plotter controls. Unfortunately, they cannot be run from within CAD programs. Unless you still use the DOS operating system, the translation software is far more likely to be an API that runs seamlessly within a full-featured CAD package.

Even though CAD developers like Bentley and Graphisoft have been adding more functionality to their core products, there are compelling reasons that you and your dealer may still be cobbling together a system developed by many diverse vendors. In this complex world, technology enables developers to create ever-more specific tools, whether it be for parking-lot paint striping or residential kitchen design. But the cost equation at the giant CAD developers tends to preclude the economical development of tools for small niche markets.

Even firms with very specific needs, however, can find packages that offer a one-stop solution. Some third-party developers license a bare-bones CAD engine and build a seamless combination package around it. Softdesk, for example, bundles special versions of AutoCAD Release 13 with Softdesk add-ons, selling this "CD Plus Special Edition" line only to larger firms and certain government agencies. A key advantage of the Autodesk acquisition of Softdesk is that Autodesk will now be able to offer a seamless package of this type, says Christine Tsingos, vice president and treasurer. (Third parties will still be able to make add-ons for this combination.) Eagle Point Software ships a free-standing visualization product that uses the Autodesk engine. These combination packages are easier to put on your system than installing a CAD engine, then installing the add-ons. And with a sole-source vendor, they should be easier to upgrade as well.

Mega-developers and "strategic affiliates"

As noted above, Autodesk has more independent developers of add-on software than anyone else. Historically Autodesk has left the mixing and matching of add-on products to independent dealers, but has developed its own packages to supplement or supplant those produced by third-parties. Bentley is somewhat more likely to add its own brand name and support personnel to products developed by third parties.

Bentley groups its add-on developers into what it calls "strategic affiliates," each concentrating in a specific area. Each of these, in turn, offers add-on software under its own name, and software from other, smaller add-on vendors. One strategic affiliate, BRICS N.V. of Belgium, developed the add-on that became TriForma, for 3D modeling within MicroStation. Before selling it under the Microstation name, Bentley

largest developer, muddies the waters. "Our developers are very important to us," Tsingos says, but she was not specific about how relationships between it and its megadevelopers will change.

"Object" oriented software changes the rules

A programming innovation that should make CAD programs faster, more powerful, and more versatile is also changing the rules about what CAD systems you buy. CAD vendors are struggling to bring "object intelligence" to drawings. A software object is a collection of information that can be readily manipulated by commands. Thus, a door object is more than a collection of lines that looks like a door. It can have information associated with it, such as its weight; its fire rating; a description of its frame, hinges, and adjacent wall framing—even a standard position for a light switch set into the adjacent wall. But beware! Software-engineering gurus call any set of lines and associated data "objects." The objects that will be most useful to architects, however, can be edited, moved, duplicated, and attached to other items without erasing and redrawing. And they will be recognizable by other members of the building team, who might find themselves manipulating these objects as they add wiring or place ductwork. Jacobus, for instance, has been selling add-on software for MicroStation that makes drawings of plant equipment behave somewhat like an object. A piece of equipment is even able to project the clearances it needs within the building structure.

Among the most hyped AutoCAD API these days—and with good reason—is ARX. It stands for AutoCAD Runtime eXtension, and is the key to writing object-based add-ons for AutoCAD. The initial ARX release did nothing special for end-users. But the version in AutoCAD R 13c4, which appeared in 1996, allowed add-on developers to offer improved functionality, such as the door example above. Bentley says it will release its competing approach, Objective MicroStation, in 1997. It has been calling the object technology itself ProActiveM.

For now the added convenience of some object technology comes at a price, a kind of software "brittleness," in which developer fixes or upgrades to one software element force costly upgrades of all the software it works with. Third-party developers, for example, are incorporating into add-ons such commercial applications as the Microsoft Excel spreadsheet and Access database. The software components often exchange information through Microsoft's clunky OLE (object linking and embedding). This means that Microsoft Office 1997, which contains new versions of Excel and Access, will force upgrades in the linked CAD software. Also, plotters don't work with imported OLE objects.

This approach to object programming superseded an older add-on strategy in which the vendor bought a utility (such as Btrieve for databases) and integrated it into the add-on package. By moving to OLE, the vendor avoids extra programming time and licensing fees.

AutoCAD's description language and APIs offer the greatest variety of CAD for third parties to add features to CAD engines. But Autodesk stumbled with Release 13, because bugs in the program held up products by third-party developers and kept users from making the most of the upgrade. After more than two years on the market, the most serious bugs seem to have been wrung out of the latest release. But this has meant users are only just beginning to see a tangible benefit from ARX, although add-on vendors have been working with Autodesk-supplied ARX development tools for two years. These tools will allow software to take advantage of new standards developed by the Industry Alliance for Interoperability (IAI). Under these standards, which other developers are adopting, a door and its associated data are defined as an Industry Foundation Class item. As more doors are added to the project, the software needs only to know how each one varies from the Foundation item. The added door is called a "daughter" object. What's important about this is that it takes less effort to input information, quality assurance is better, and files are much smaller, so screen redraws, plotting, and so on are quicker.

Softdesk released its first ARX-based product, a new version of CAD Overlay, only in early 1996. Its ARX-based version of Auto-Architect, which adds many architectural drawing features to AutoCAD, was due to be released at press time. Bentley Systems' description-language approach allows third-party products to work together in more seamless and user-friendly ways. But, overall, Bentley's system lags behind Autodesk in raw power for creating intelligent objects within drawings.

Both Autodesk and Bentley have invested in Internet tools. Since every piece of data that might come onto the desktop from the Internet is an object, this is an obvious extension of the object approach. Currently, nearly all CAD packages can cleanly exchange and translate files as DXF or DWG formats. IAI standards notwithstanding, easy and complete translation may, at least in the short term, fall victim to the growth of object technology. Softdesk, for example, says objects drawn with its ARX-based tools will always be readable by competing software applications as blocks and entities, but they may lose their "object data intelligence."

The withering of non-Windows platforms

This brings us to another trend that is potentially disturbing: Major CAD vendors are moving to support only Windows 95 and Windows NT operating systems. Autodesk says it will develop only for Windows in the future, although it has said that before and backed down. Bentley develops for Windows first, but has also released MicroStation for various kinds of Unix and for the Macintosh.

Former all-Mac vendors such as Graphisoft and Diehl-Graphisoft (the developer of MiniCAD) have embraced Windows as well. Even IBM, which developed its A&E software family to run under AIX (the IBM flavor of Unix) has announced a Windows version.

Part of the reason for AutoCAD's push to Windows is that its ARX object system derives its power from Dynamic Link Libraries (DLLs), which essentially are satellite programs, and these run only under

WHAT TO WATCH FOR WHEN SELECTING A DEALER AND A SOFTWARE FAMILY

Understand who you are dealing with. There are different levels of dealers. Some are mainly developers (they write software but may sell it as well). Some are value-added resellers, with capability to write small sections of an overall software solution for you. Some are contracted sales forces for a developer. Some are highly focused experts in a specific field (Softdesk calls them Registered Consultants). Check the major developers' web sites for details, names, and addresses of dealers.

Compatibility: Look for add-on software that works with a range of products you are likely to use. You won't have the added expense of buying new software and converting existing data to it. Harper and Shuman, for example, sells facilities-

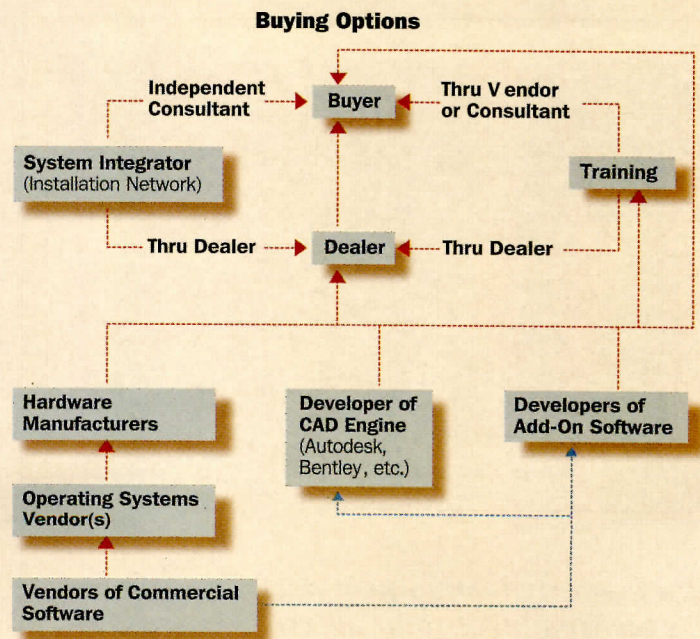
management software that can work with the Oracle database engine or with Microsoft Access or Microsoft's SQL Server.

Out of business: If your software company fails, are you out of luck? Investigate the original source of software your dealer or add-on vendor might sell and ask them how you would be protected.

Because Atlanta-based IdeaGraphix, for instance, had trouble in 1996 distributing speedikon, an architectural add-on developed in Germany, IEZ agreed to escrow the speedikon source code in Atlanta and to give IdeaGraphix full access to the technical details of the speedikon Building Data Model format.

Developers assume their dealers will handle the bulk of upgrading and after-market services. But reliable ones are the servicer of last resort, and users should call on developers in cases where dealers are not handling customer needs.

Buying a CAD system means buying into a dealer or consultant relationship for training and maintenance (diagram).



Look to the future. Your dealer should make sure the add-on products you want are compatible with each other. But only the most technically savvy dealers will be able to reliably predict whether future upgrades to the add-ons will

be compatible. Having the dealer call add-on developers to discern their upgrade plans can help allay fears because upgrades may not be coordinated. "We don't do much certification of third-party applications," admits Barron at Autodesk.

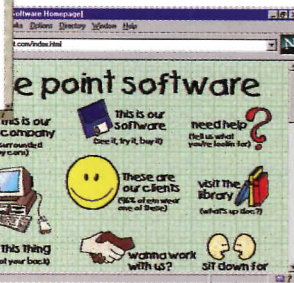
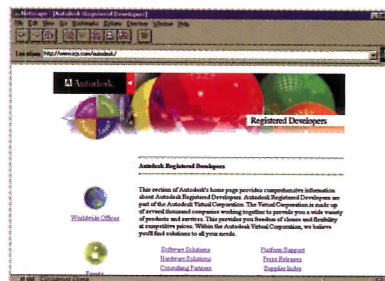
Windows. The DLLs are critical to the "foundation" class and "daughter" object methodology. Most add-on developers lack the financial resources to develop DLL equivalents for other operating systems. Bentley claims that eventually Objective MicroStation will be able to add object intelligence without using DLLs, and so can stay ahead in non-Windows platforms. Unix and Mac platforms may be given new life by Web-based programming languages, such as Java, which in theory will permit writing one DLL equivalent that works on all platforms.

What the Web will mean

The World Wide Web has opened amazing new opportunities for multi-firm collaboration and interactive on-line product catalogs [RECORD, October 1996, pages 46-51]. Vendors can also distribute product information, technical data, software updates, and bug fixes on the Web.

The way that CAD programs support the Web may become an important element in the buying decision. Autodesk, for example, has released an entire Web-publishing solution, which uses Netscape Navigator inside AutoCAD. But everyone else is jumping on the bandwagon, too. Bentley has announced its Engineering Back Office, which allows users to store all their drawings and data in one large database, and "publish" it as needed on private or public Web sites. One big advantage of these Web databases is that they make it easy to track updates—whether done by architect, mechanical engineer, or pursuant to construction-phase change order—because all the data are in one place.

Bentley and Autodesk are sniping over which drawing format is best. DWF is very compact and allows the addition of hypertext links to a drawing. It is on the way to becoming an Internet standard, but it is 2D only. Bentley notes that it supports Virtual Reality Modeling Language



The World Wide Web offers new CAD-development frontiers.

(VRML), a fast-growing 3D Web technology. Autodesk responds that VRML is still in flux and often 2D is what is desired. Both Bentley and Autodesk are using Netscape's web server tools.

The dealer connection

How or whether you use a dealer may be a key element of your buying decision. Some CAD add-on vendors sell direct to consumers (Eagle Point started that way), but almost all of them, Eagle Point included, also sell through dealers. Much add-on software is simply too difficult to



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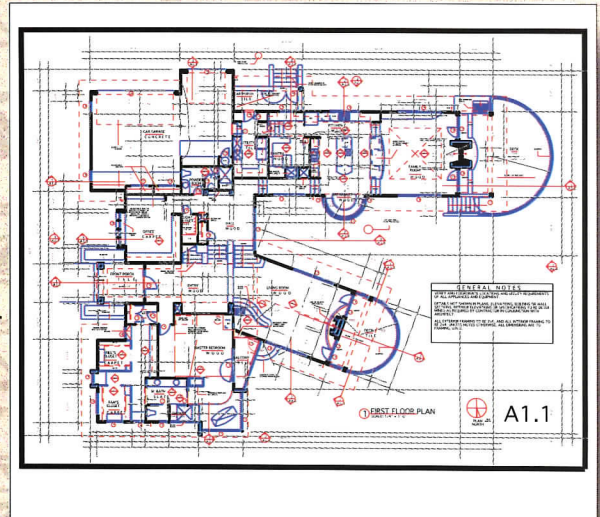
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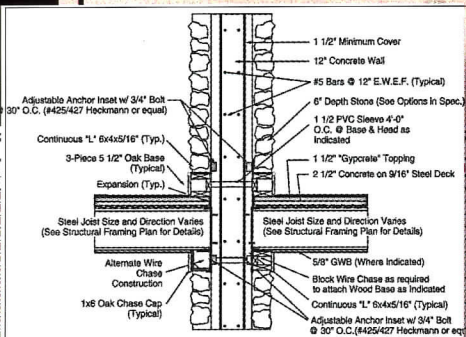
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*Image 1



*Images 2

#	Room	Material / Finish	Trim
101		1x6 wd	1x4 wd
102		1x6 wd	1x4 wd
103		1x6 wd	1x4 wd
104		1x6 wd	1x4 wd
105		1x6 wd	1x4 wd
106		1x6 wd	1x4 wd
107		1x6 wd	1x4 wd
108		1x6 wd	1x4 wd
109		1x6 wd	1x4 wd
110		1x6 wd	1x4 wd
111		1x6 wd	1x4 wd
112		1x6 wd	1x4 wd
113	Change room	12x12 Ceramic	Gwb
114	Kitchen	12x12 Ceramic	Shrb Gwb and oppse Gwb
115	Breakfast Nook	12x12 Ceramic	Gwb
116	Rear Vestibule	12x12 Ceramic	Gwb/Gwb/Gwb/Gwb
117	Spa Room	12x12 Ceramic	Gwb Var. Gwb T&G Wtl & Gwb
118	Bath w/ Shower	12x12 Ceramic	Gwb/Gwb/Gwb/Gwb
119	Side Foyer	12x12 Ceramic	Gwb Var. Gwb/Gwb/Slipped
120	Laundry	Sheet Vinyl	Gwb/Gwb/Gwb/Gwb
121	Mud Room	Par'd Concrete	Gwb/Gwb/Gwb/Gwb
122	Tool Room	Par'd Concrete	Gwb/Gwb/Gwb/Gwb
123	Garage	Par'd Concrete	Gwb/Gwb/Gwb/Gwb
			Open

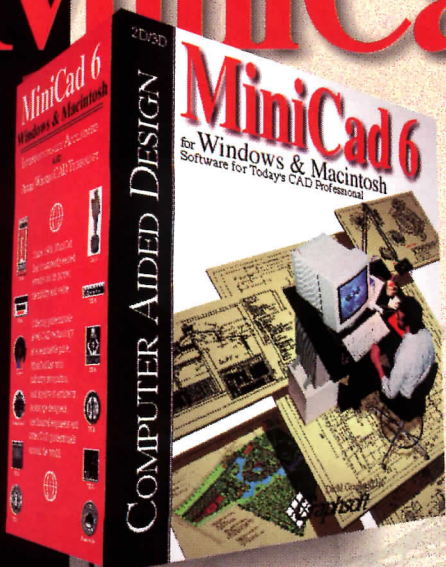
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*Image 3

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*Image 1 - Courtesy of Francois Levy, Dick Clark Architects, Austin, TX **CIRCLE 66 ON INQUIRY CARD**
*Image 2 - Courtesy of Cameron Lacy, DCL Architects, Wayne, PA
*Image 3 - Courtesy of David Brunke, Herring & Trowbridge Architects, Herndon, VA

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MACINTOSH WINDOWS

service any other way. [See story page 173 for tips on dealing with dealers.] There are single-person dealers who service Fortune 500 companies, says Chris Barron, in charge of A/E/C marketing at Autodesk. But most large dealers have developed expertise in multiple professional specialties. These days, the most successful dealers often "do it all." They offer turnkey solutions that might include hardware, installation, networking, CAD software, add-ons for the CAD software, and non-CAD commercial software for accounting and word processing.

The biggest dealer margins these days are often in training. The smallest margins are in hardware, with the exception of super-high-end graphics adapters and super-large (20-in. and up) monitors. The result is that dealers are evolving—offering more training, even sponsoring seminars and user groups. But they are arranging with large local computer stores to provide hardware and installation. Training costs are an important factor in the buying decision. Hardware and software for a high-end CAD seat (including engine and add-ons) will run to around \$10,000. But training can run \$3,000 to \$10,000 or more per person, depending on the number and complexity of add-ons (rendering and other visualization tools having an especially high learning curve), and the degree of interaction with contractors or owners using the software. And training never stops; there's always a new add-on to master, it seems.

Dealers who get all or most of their software from one developer have the most flexibility on pricing. That's because the developer has done the work necessary to make sure all the add-on software fits together cleanly. And the software interfaces that smooth the transition between add-ons, and between add-ons and the CAD engine, are likely to be smoother, which cuts training costs. Finally, the dealer is more likely to get better discounts from a developer.

With margins so thin, and hardware or software changes coming so fast, repair and servicing channels for hardware and commercial software are convoluted, at best. Expect long waits for telephone technical support, repairs, and replacements. You may also experience a reluctance to make good on warranties.

The clouded crystal ball

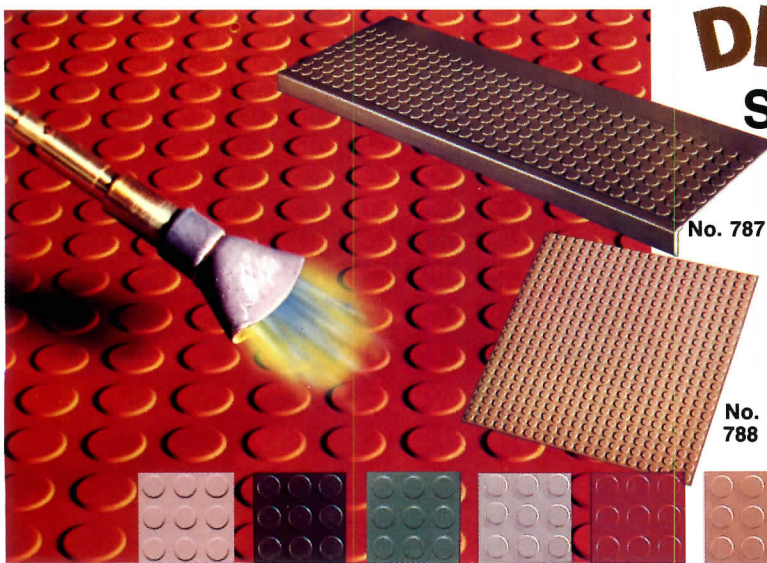
Among the frustrations for CAD users is that changes come so thick and fast users are perpetually faced with mastering new technologies, desirable though they may be. CAD-on-the Web, for example, is not only new, it is also coming in waves with new announcements every few weeks. The Web may allow the unleashing of Internet-based mega-dealers, but it also gives easy access for low-capitalization startups. Among CAD vendors, there is not yet an emerging web "winner."

Obviously the combination of Autodesk and Softdesk creates a new juggernaut. (Autodesk has an estimated 40 percent of its claimed 800,000 seats in the A/E/C fields, versus Microstation's 140,000. Softdesk claims about 225,000 for its various products, but almost all of them attach to AutoCAD.) But that doesn't mean you should strike from consideration any software application that appears to meet your needs. Autodesk's acquisition of Softdesk was driven in part, says Tsingos, by customers' desire to have a single vendor to turn to, suggesting that the argument the stand-alone vendors have been making is a compelling one. Autodesk is now in a position to set the pace in new technology, such as for objects. But its competitors are large and feisty enough (keeping Autodesk from increasing market share over the last two years, for instance) that compatibility across applications and platforms is, if not assured, highly likely. ■

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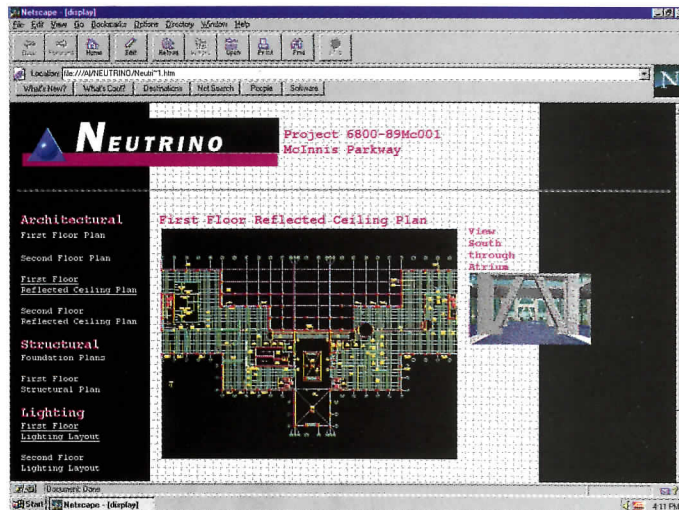
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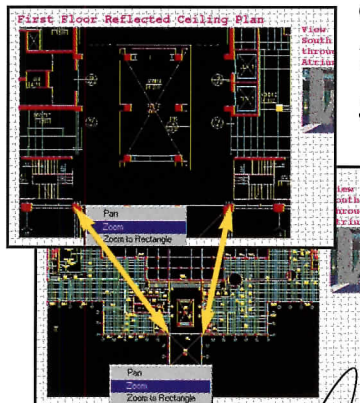


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Prizes: Three winners will be selected from each division and receive one choice from the following prizes offered by this year's sponsors: Autodesk's AEC Professional Suite, a \$4,095 set of CAD tools, including AutoCAD R13c4a, AutoVision and Architectural Symbols • Bentley Systems' Microstation TriForma, a 3D modeling and 2D documentation program, value \$5,350 • A 3-application software package from Graphisoft: ArchiCAD (object-oriented 2D/3D CAD software), PlotMaker, and Artlantis Render • Lightscape's Lightscape Visualization System, a realistic rendering and lighting

package, a \$2,995 value • Nemetschek's Allplan FT, fully integrated, object-oriented building-design software. Winning entries will be published in the June 1997 issue of ARCHITECTURAL RECORD and on the magazine's World-Wide Web site, and exhibited at the A/E/C Systems '97 computer exposition.

Rules: Projects delineated can be real, potential, or speculative, but must not have been previously published in a design or computer journal as either editorial or advertising. Images prepared solely for promotional use by manufacturers are also ineligible. An entry may be created on any platform, using any hardware or software. Submit hard-copy (maximum size 11 in. by 17 in.), 35mm slides, or VHS cassette (the latter only for animations). Submit single images, except where a suite of images is essential to describe the concept. Entries must be received by Wednesday, February 26, 1997. They remain property of owner, but may be republished in print and electronically. Entries must truly represent role of collaborators, firms, and clients. Include a stamped, self-addressed envelope for return of entry. Queries: 212/512-4256 (fax); jarussel@mcgraw-hill.com (e-mail).

Sponsors: ♦ Autodesk, Inc. ♦ Bentley Systems Inc. ♦ Graphisoft ♦ Lightscape ♦ Nemetschek

To be judged, enclose \$15 entry fee, and provide information requested below.

Entrant's Name	Project Name	Client		
Company	Street	City	State	Zip
Phone Number	Fax Number	Name of any firms providing imaging or output services		
<i>Please tell us the hardware, software, and output devices you used. List by company and brand name (i.e., Autodesk AutoCAD 12, Apple Power Macintosh 6100)</i>		Names of collaborators (firms or individuals) who should be credited		
software 1	software 2	software 3	software 4	
hardware 1	hardware 2	hardware 3	hardware 4	
output 1	output 2	output 3	output 4	

Submissions should be mailed to:

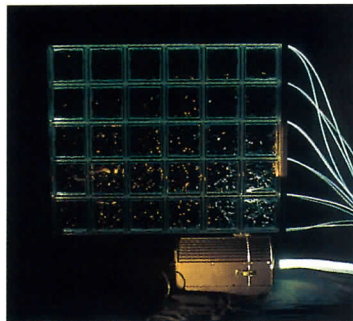
James S. Russell **COMPUTER DELINEATION AWARD** ARCHITECTURAL RECORD, 1221 Avenue of the Americas, New York, NY 10020

NEW PRODUCTS

EASY TO ILLUMINATE GLASS BLOCK INSTALLATION SYSTEM

The popularity of glass block has promoted the development of several proprietary systems intended to make block walls and partitions easier to install. Traditional mortar lay-up calls for a good degree of skill, and the needed mortar setting time slows construction. Also, while light-refracting glass blocks are a natural for fiber-optic illumination, it's not easy to insert cable into the wall without having mortar obscuring the light-emitting cables.

The Swift-Track system, designed by a building contractor familiar with the difficulties of mortared installations, is intended to simplify both assembly and lighting.

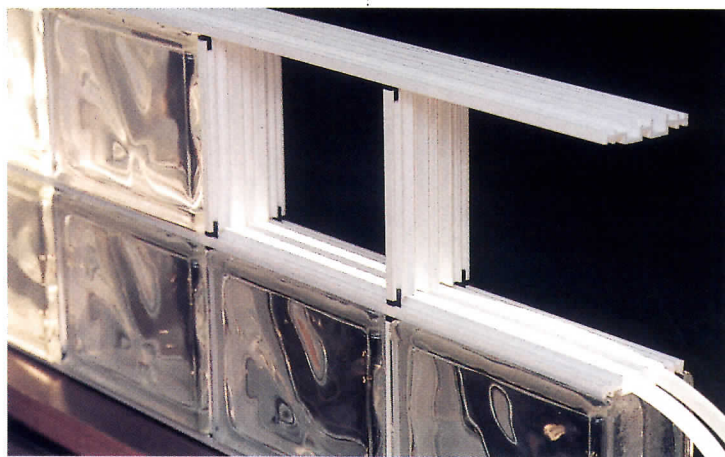


The new system (photo, right, and exploded view, bottom right) positions individual blocks within a rigid, extruded-PVC spacing grid, with the weight of the block taken by the outside edges of the extrusion.

The grid is recessed a bit from the outer edge of the block to allow for unobtrusive application of silicone caulk along the joints. Two rounded channels, about 1/2-in. wide, can hold solid-core or bundled fiber-optic cable. Horizontal and vertical connections are made using an interlocking clip that allows the cable to be placed, without interference, on both sides along the center line of the block. Mechanics can use the same space to install reinforcing rods to meet seismic loading as required. (A Swift-Track assembly will be tested to Dade County's demanding high-wind missile-impact standard this spring.) The illuminated glass-block counter (below) is an example of the kind of lighting effects possible.

Because the grid and connectors create an uninterrupted channel,

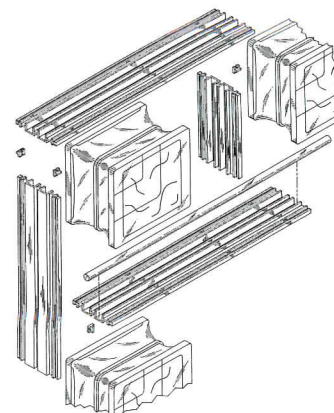
New Products has a new look this month, but continues to feature the new building materials, decorative options, specification-driven products, and technical literature that we, the editors, feel will be most useful to architects, interior designers, and other design professionals—RECORD readers. Products are selected for coverage based on our view of their newsworthiness and value, and we'd appreciate hearing from any manufacturers with products of interest to the design marketplace. Product specifiers, please let us know how this section can help you better, and keep us posted on innovations you come across that might deserve publication.—Joan Blatterman, *New Products Editor*



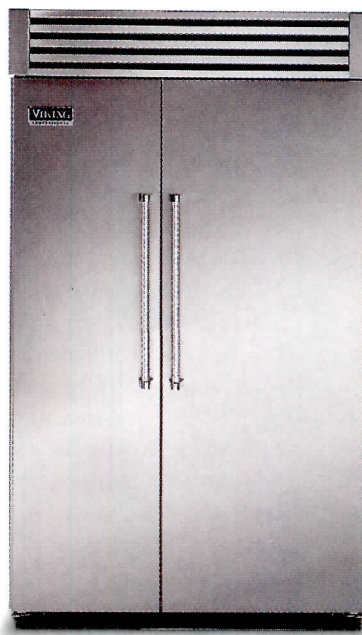
fiber-optic cable can be inserted after the wall is finished. The channel can also be used for thin, low-voltage lighting strips or to distribute voice and data wiring.

The connecting device holds horizontal to vertical wherever they meet, and lets the designer use

different sizes of glass block within a wall—a course of 8-in. block on top of 4-in. block, for example—as long as the final, overall measurements coincide. Since the grid is essentially cut to fit on site, any make of glass-block unit can be accommodated. Holes can be punched in the PVC grid if vertical cable runs are wanted. Shown here in white, the grid can be specified in clear PVC as well; other colors can be ordered for large projects. 201/440-5116. Coleman Enterprises, Little Ferry, N.J. **CIRCLE 201**



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which refrigerator goes best
with a Viking range.



At long last, the appliance which makes the Viking kitchen complete. The new Viking built-in refrigerator/freezer.

It has the professional-style design you'd expect, along with enough food storage space to entertain a small army. Or a few hungry teenagers.

For the ultimate Viking kitchen, you can even add our new wine cooler or undercounter ice machine.

The result is much like a fine meal. All elements in complete harmony and uncompromised in presentation.

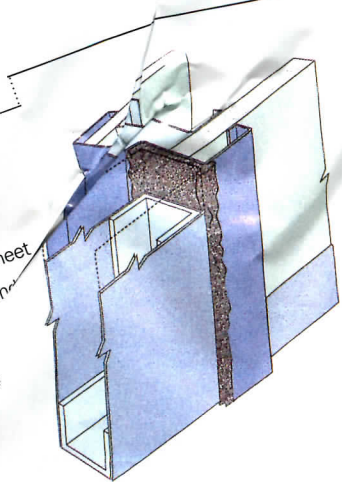
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PRODUCT BRIEFS

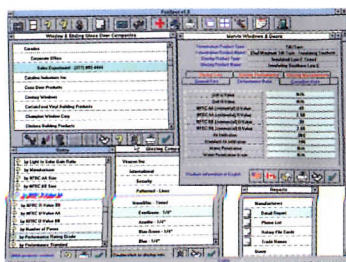
▶ **Hot smoke gasket**

An intumescent-graphite strip lets rated door and frame assemblies meet new positive-pressure fire tests, and can be used with the S88 door blocks passage of gases at high temperatures. The 140 Mfg. backed strips fit the frame over



▲ **Foster Hardware**

Designed by British architect Sir Norman Foster, Fusital levers subtly change in appearance with the material selected: metal, plastic, wood, black rubber, or leather. Collection includes pulls and other fittings. 800/423-7161. Valli & Valli (USA), Inc., Duarte, Calif. **CIRCLE 203**

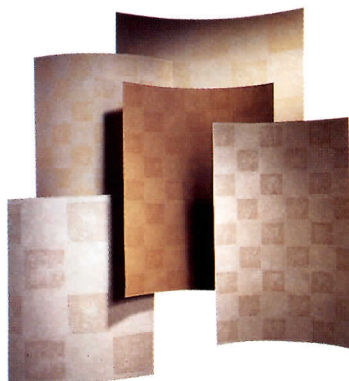
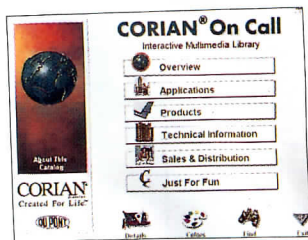


▲ **Window-option CAD**

FenSpec selects for an architect's own criteria from a database of over 3,000 window and glazing possibilities. Queries can sort for glass tint, shading coefficient, frame construction, acoustic performance, location of vendor—any combination of features—and output selections to a printer. Windows version: \$89. To try: eneraction.com/~skapp (Web page); 800/786-4FEN. EnerAction, Inc., La Mesa, Calif. **CIRCLE 204**

▼ **Interactive manual**

Corian On Call, DuPont's free CD-ROM, is an architectural walk-through of design, technical, and application information about Corian solid-surface material. Includes video clips of actual installations, and lets the user manipulate 51 colors and all style options within a virtual environment. 800/426-7426. DuPont Co., Wilmington, Del. **CIRCLE 205**



▲ **Egyptian air**

Michael and Cecilia Kirkpatrick designed the Nile chair with the subtle arcs and canted back seen, perhaps, in Middle Kingdom frescos. Made of cherry and sleekly upholstered, chair is suitable for corporate or dining use. 800/438-4830. Charles McMurray Designs, Charlotte, N.C. **CIRCLE 208**

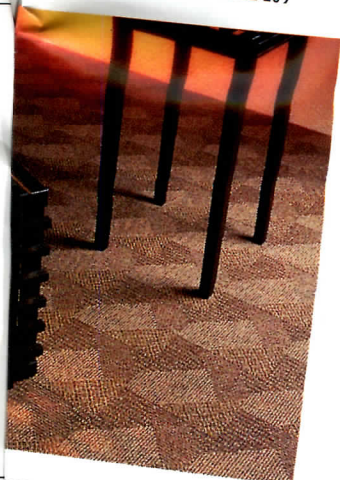


▲ **Metal-shade sconce**

Colonnade fixture meets ADA projection guidelines; shade is perforated stainless steel or aluminum with a removable mylar backing. Offers brushed-, polished- or "cycloned"-finish options in 14- and 18-in.-high versions. 414/757-1088. Advent Lighting, Greenville, Wis. **CIRCLE 206**

▼ **Carpet-on-the-spot**

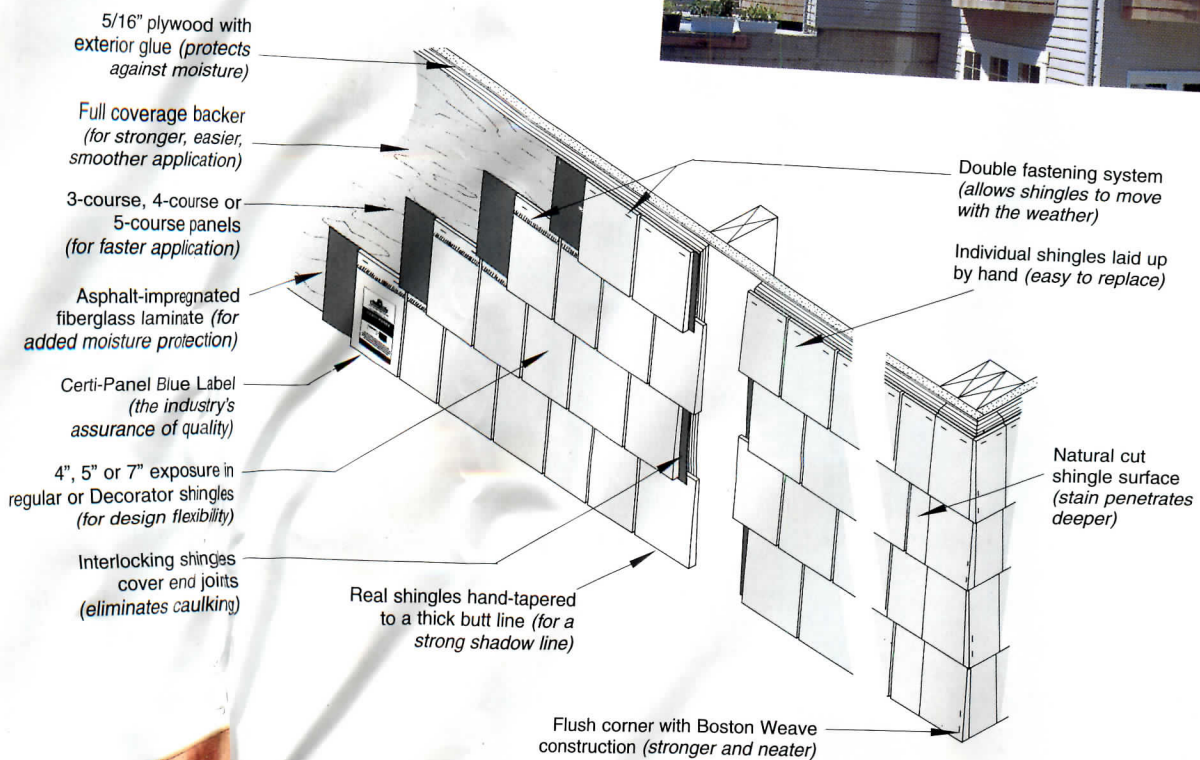
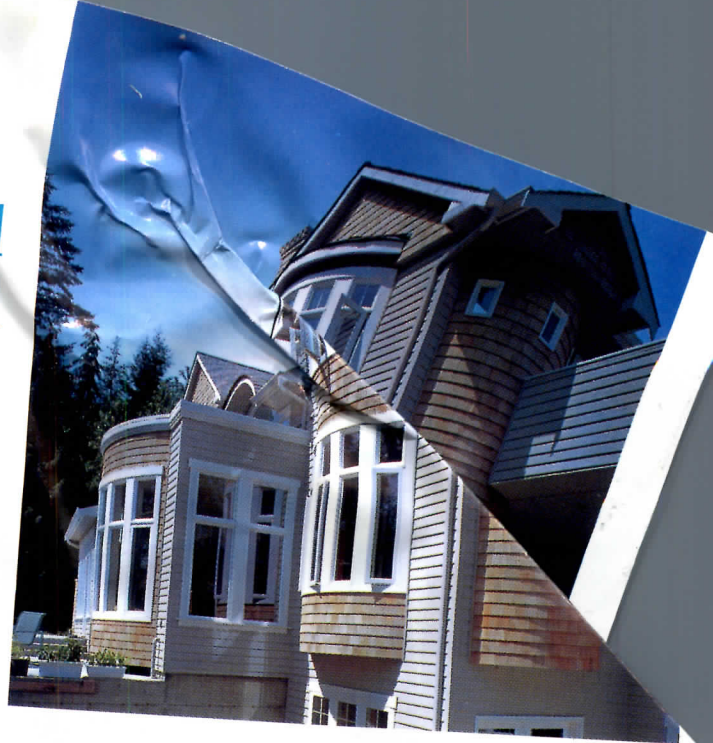
Part of this mill's new Sisal Style line, Savanna is a 36-in., modular commercial carpet available on a 21-day lead-time Pattern Express program. Large square carpet units are said to combine seamless esthetics with modular convenience. Samples offered. 800/241-4826. Milliken, LaGrange, Ga. **CIRCLE 209**



◀ **"Plaster" wall coverings**

Encausto Type II vinyls are now made in varying scale patterns and 15 colorways. Collected in the Encausto Series Big Book, patterns are said to have an appearance of hand-rubbed plaster and wax. Custom colorations are a specialty. 212/807-7300. Innovations In Wallcoverings, Inc., New York City. **CIRCLE 207**

If you want a siding panel system with real tapered shingles, you'll have to take these other exclusive features along with it.



The only way you can get even **one** of these features is to specify Cedar Valley. Then you get all of them. (Or, conversely, if you don't specify Cedar Valley, you won't get any of them.) Only Cedar Valley uses individual, tapered Western Red Cedar shingles in a panelized siding system. The other features give you greater design flexibility, confidence you'll achieve the real shingle effect intended with a wide range of proper application and long-lasting, maintenance-free performance.



**RESIDENTIAL SIDINGS:
VINYL AND OTHERS**

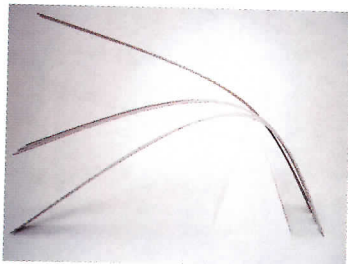
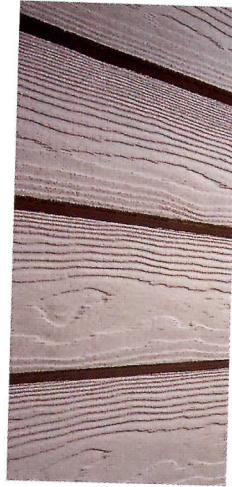
The "gold standard" of traditional-style clapboard sidings is clear cedar, a natural material that weathers gracefully over time. But cedar, once painted, does need to be refinished on an ongoing basis, as thermal- and moisture-driven movement within the wood itself gradually cracks through coatings.

Vinyl, originally a recovering product homeowners viewed as a lower-cost, lower-maintenance alternative to wood, has improved to become the exterior choice for many residential architects. The pronounced "grain" patterning of earlier vinyls is more subdued, even gone entirely; UV-inhibitors extend long-term color performance and permit the use of deeper shades. The gloss characteristics of vinyl and other smooth (non-cedar) sidings is addressed by ASTM D 3679; the vinyl-siding industry has not yet agreed on a description that permits a real comparison of gloss-appearance levels among manufacturers. The main in-use problem with vinyls continues to be over-nailing by the installer, where fasteners crimp the material and cause it to buckle from thermal movement.

The Society of the Plastics Industry offers designers a kit with vinyl siding application instructions and video. Call 202/974-5326.

► **Stainable siding**

Eternit Siding is made of autoclaved, fiber-reinforced cement, a non-combustible material capable of resisting extremes of humidity and corrosive environments like salt air. Its design intent is to come as close as it can to natural cedar; 12-ft-long planks are offered in Traditional Smooth, Traditional "Cedar" (photos, right), Country Smooth, and Country Rough sawn textures. Siding needs to be painted or stained upon installation. Said to cut easily with diamond-tip saw blades. 800/233-3155. Eternit, Inc., Blandon, Pa. **CIRCLE 210**

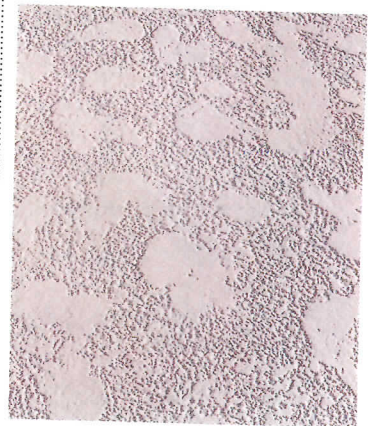


▲ **Reinforced vinyl siding**

Charter Oak panels, the plank above the fulcrum point in the sag-test photo above, are made with an integral PVC reinforcement said to provide superior rigidity, making individual sections easier to handle during installation and insuring straight and even coverage even over bowed and uneven substrates. Panels can be cut with standard tools; texture is a subdued oak grain, available in 12 low-gloss colors. Sample program offered to architects. 800/922-6009. Alside, Inc., Akron, Ohio. **CIRCLE 211**

▼ **Chameleon-like exteriors**

Described as "replica siding," Nailite polypropylene panels come in interlocking sections 18-in. deep by 3 1/2-ft long. The injection-molded polymer and baked-on finish used are said to capture both the texture and natural-appearing colorations of hand-split shakes (pictured), brick, stone, and cedar shingles. Suitable as siding or an architectural accent on building elevations up to 40-ft high. 305/620-6200. Nailite International, Miami. **CIRCLE 212**



▲ **Stucco-pattern panel**

A new vertical siding has a non-directional, "knocked-down" texture. A blend of Portland cement, sand, cellulose fiber, additives, and water, panels are said to install with ordinary carpentry tools. They come 4-ft wide by 8-, 9-, and 10-ft high. 714/348-1800. James Hardie Building Products, Mission Viejo, Calif. **CIRCLE 214**

◀ **Composite clapboard**

Resembling sawn lumber with a 5/8-in.-thick, square edge, Classic Select lap siding, in nominal 6- and 8-in. widths, comes in a 16-ft length that reduces the number of butt joints on a given exposure. Boards are factory-primed on the face and all four edges, ready for a final on-site painting; will not warp or swell. The consistent density of the engineered wood-fiber siding is said to make it easier to paint, and to let the paint itself perform up to twice as long as on dimensional lumber. 800/BUILDGP. Georgia-Pacific Corp., Atlanta. **CIRCLE 213**



▲ **Shingle accent**

A polymer decorative shingle, half-round panels are one of the exterior accents available in Cedar Impressions sidings. Edges interlock for a seamless appearance. 800/233-8990. CertainTeed Corp. Valley Forge, Pa. **CIRCLE 215** (continued on page 190)



PRODUCT BRIEFS

▼ Window style options

Decorative muntins are available as a retrofit or original-purchase option, providing a custom appearance without otherwise changing the window unit. A removable wood perimeter grille designed to snap into frames with a concealed pin, Fashion Grilles come in five wood finishes and seven styles, including diamond-shaped Silhouette, pictured. 800/553-4157. Weather Shield Mfg., Inc., Medford, Wis. **CIRCLE 216**

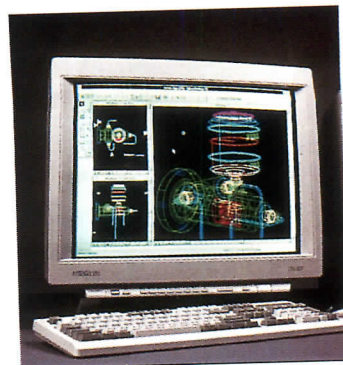


▲ Watercolor-pattern rugs

Artists Brad Davis and Janis Provisor of Fort Street Studio have rendered their free-flowing, blurred-edge watercolor technique in plush area rugs hand-knotted by independent artisans in Hangzhou Province, China. A computer scan of the artists' original work color-codes the yarns needed to translate subtle, bleed-edge designs into a pile texture made of wild Dandong silk, worked into a cotton backing. 212/752-9000. Stark Carpet Corp., New York City. **CIRCLE 217**

► Startup 3D

A new line described as offering high-powered 3D graphics options, as well as multimedia applications such as Web authoring, at an entry-level price, TD PCs and Personal Workstations start at \$1,495. Products include Pentium Pro processor and Windows NT preloaded. intergraph.com/ics (Web page); 800/763-0242. Intergraph Computer Systems, Huntsville, Ala. **CIRCLE 220**



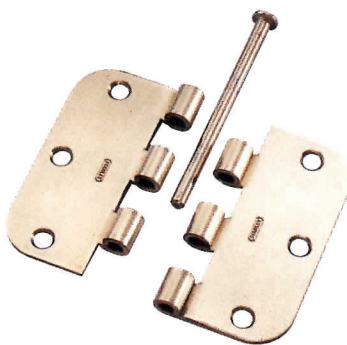
▲ On (to) the table

Tables represent a new venture for this manufacturer of casegoods and seating for the contract market. Shown here: Sagebrush, the first table collection. Oxidized-metal tops with a soft patina convey a Southwestern feeling; wood or

metal bases can be selected. A "Designer Participation" program allows for a project-specific combination of size, height, top material and shape, base, and finish. 800/444-8812. Geiger Brickel, Atlanta. **CIRCLE 221**

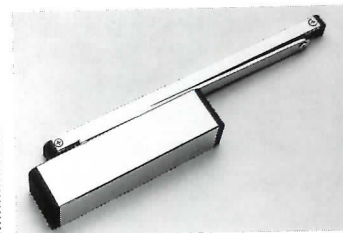
► Universal door hinge

The six-knuckle RD756 is described as a time saver for residential builders. Both leaves are exactly the same, so hinges can be installed in advance on frames and pre-hung doors. Hinge is steel with US4 satin-brass finish; 5/8-in. radius. Also new: three-knuckle Grade I architectural hinges, the CB1900 Series. Specification guide: 800/337-4393. Stanley Commercial Hardware, New Britain, Conn. **CIRCLE 218**



▼ Architectural carvings

Over 500 interior elements—door panels, corbels, mantels, railings, moldings, linenfold paneling—are produced from hard maple and red oak. Economies of scale and CAD-M routing techniques used are said to keep prices "affordable." 310/532-1400. Raymond Enkeboll Designs, Carson, Calif. **CIRCLE 222**



▲ Cam-and-roller closer

Part of a line of accessibility related door operators and fire/life safety closer-holder-release devices, the TS 93 closer is a new track-style device with a cam and roller mechanism said to ensure smooth opening and secure closing more efficiently than typical rack-and-pinion closers. Unit can be specified to firmly close pocket doors opened up to a full 180 deg. 800/523-8483. The Dorma Group, Reamstown, Pa. **CIRCLE 223**

Continued on page 188

► Dakota Mahogany flooring

This South Dakota quarry now offers six different granite colors in large, 12- and 18-in. tiles suitable for heavy-traffic commercial applications such as retail malls and airports. Finish options: polished, honed, sandblasted, and thermal (flamed). A free promotional kit includes a videotape describing production and fabrication capabilities, tile- and dimensional-stone literature, and technical data. 800/843-3333. Dakota Granite, Milbank, S.D. **CIRCLE 219**



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CIRCLE 75 ON INQUIRY CARD

PRODUCT BRIEFS

► Customized entry

The Chandelle-pattern door pictured is one of this maker's Advent Collection doors, which can now be ordered with vision lights in decorative glazings. Intended to offer a degree of custom-design potential in a mid-price entrance, the series are stile-and-rail doors with routed patterns in board inserts. Doors can be ordered for indoor and outdoor use, and are shipped primed and ready for on-site painting. 800/952-4057. Simpson Door Co., McCleary, Wash.

CIRCLE 224



▲ Microcassette recorder

The Voice Write 42 recorder can "take dictation" on building sites or record client meetings. Voice-activated unit works in single-user and conference modes. 800/708-7088. Lanier Worldwide, Inc., Atlanta. CIRCLE 225

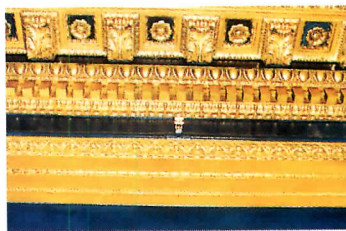


▲ Tilt-turn window

Solid-wood windows work European style: sash can turn in like a casement, or tilt at the top for secure, draft-free ventilation. Custom shapes and monumental sizes can be ordered with any energy-efficient glazing option needed. 800/227-3957. Case Window and Door, Schenectady, N.Y. CIRCLE 226

▼ Rolling service doors

This manufacturer of rolling fire and service doors, rolling grilles, counter shutters, and related safety devices was able to supply a customized door installation that met the appearance criteria required for the renovation of Chicago's Navy Pier, a land-marked property. Service doors can be specified to meet severe wind- and impact-loading tests, including Dade County, Florida's, missile-impact tests. 800/959-9559. Atlas Door, a Clopay Building Products Co., Orlando, Fla. CIRCLE 227



▲ Copper blends in

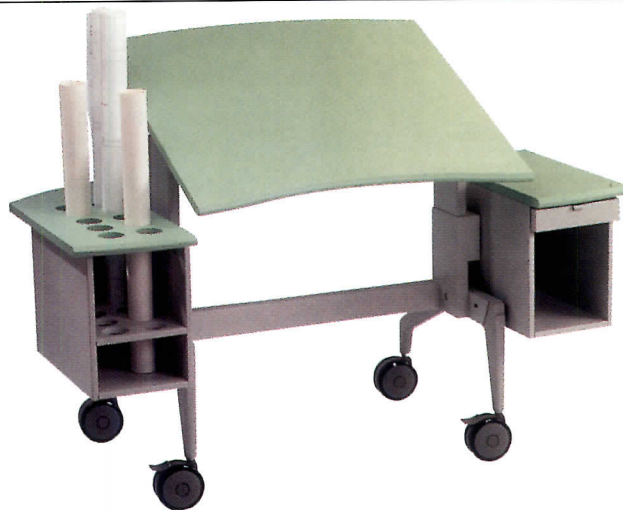
Paintable, small-diameter pipe lets new fire sprinklers fit into the historic fabric of Pennsylvania's Capitol. (www.piping.copper.org). Copper Development Assn., New York City CIRCLE 228

► Structural hardwood

Now offered in decking, Iron Woods—sustainably grown lpe, Jarrah, and Bangkirai—will perform for decades without maintenance, sealers, or preservatives. Clear-grade lumber has a Class A fire rating. 414/445-8989. Timber Holdings, Ltd., Milwaukee. CIRCLE 229

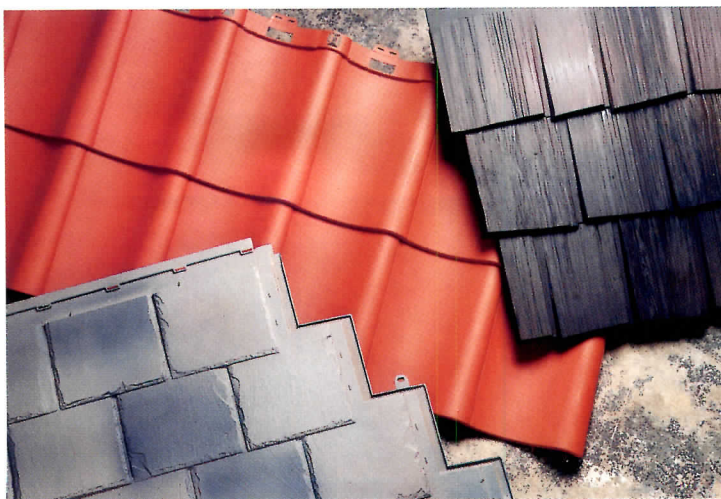
▲ Mobile drafting furniture

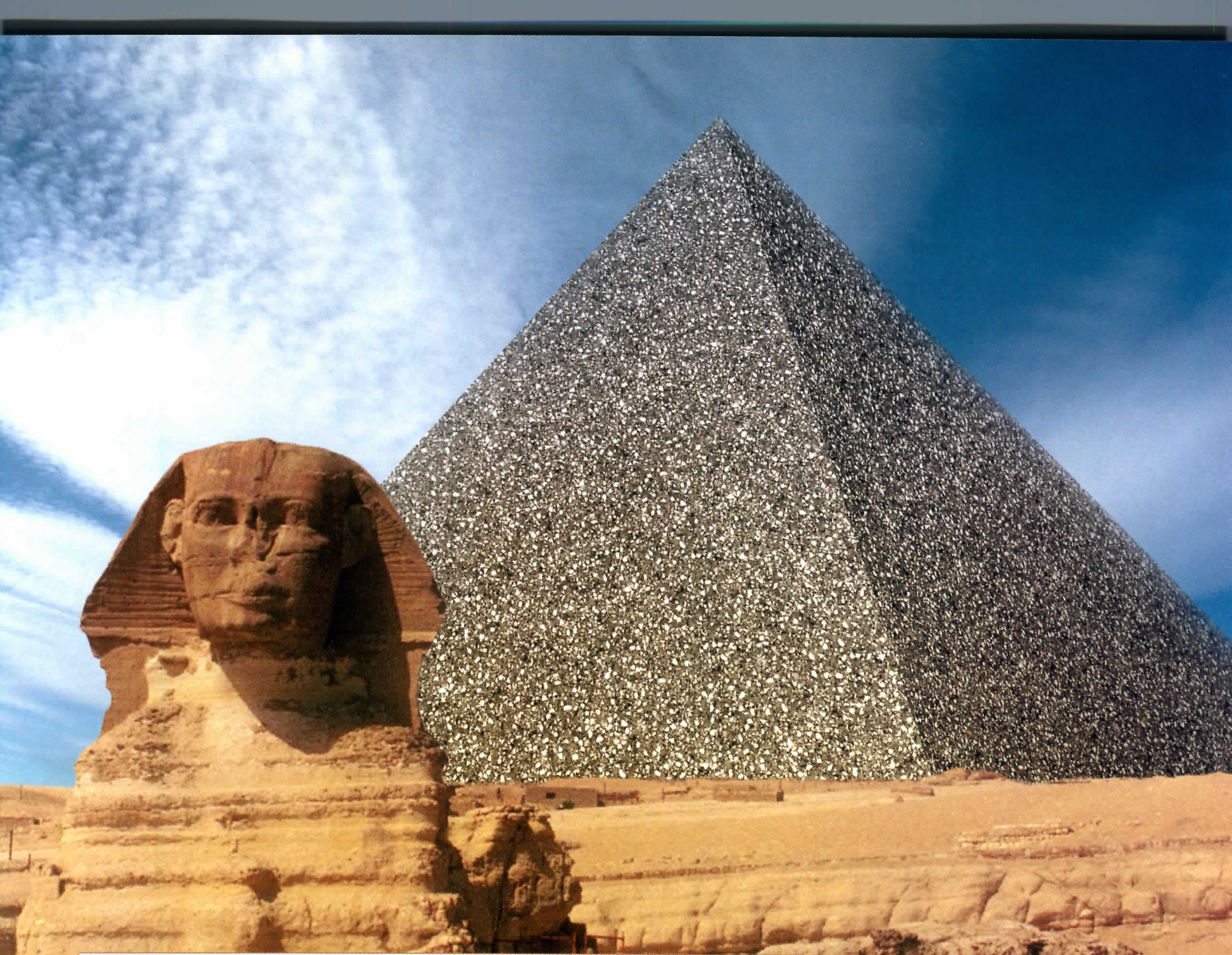
Freestanding units designed for "non-territorial spaces," Mobile Task Furnishings allow for easy reconfiguration. Pieces support a variety of computer needs, with cabling chases, height-adjustable worksurfaces, and keyboard trays. Shown: an angled drafting surface, with attached saddlebags that hold drawings. 905/851-2826. Egan Visual, Inc., Woodbridge, Ont. CIRCLE 230



▼ Resin roofing

GE supplies Noryl PPO resin to several different manufacturers for use in light-commercial roofing panels that replicate the detail, texture, and colorations of natural cedar shakes, slate, and clay barrel tile. The material is said to offer very good moldability, light weight, weatherability, and fire resistance. Noryl roofing is currently used on McDonald's, Pizza Hut, and several Disney installations. Panels interlock, and average only 65 to 90 lbs per square. 800/845-0600. GE Plastics, Pittsfield, Mass. CIRCLE 231





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AVONITE
CIRCLE 76 ON INQUIRY CARD

(continued from page 185)

▼ **Stay-smooth siding**

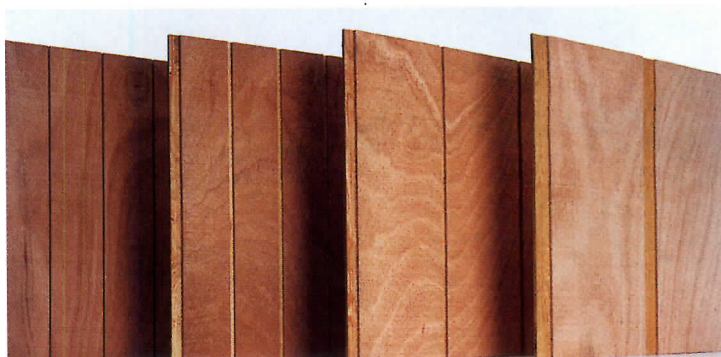
A reinforcing feature on Wolverine's Benchmark siding, fiberglass rods act to stiffen panels against any tendency to conform to wavy substrates. The extra rigidity makes individual lengths of siding easier to handle and install. The rods also let the installer lock adjoining panels together by pushing rods, overlapping edges and holding them straight for a tighter fit all along the course, minimizing edge-to-edge gaps. 888/838-8100. Wolverine Vinyl Siding, Livonia, Mich.

CIRCLE 233



▲ **Realistic wood look**

Like other sidings from Alcoa, Lake Forest Premier offers a range of coordinating decorative exterior trim elements such as 4-in. corner posts, soffits, shutters, and door surrounds. Suggested for abuse-prone multihousing exteriors, its multiple-tone wood grain pattern is protected from UV degradation and weathering by a top layer of clear Kynar 500 resin. Siding comes in eight colors, including Walnut, Sierra Clay, and Wheat. 800/962-6973. Alcoa Building Products, Sidney, Ohio. CIRCLE 234



▼ **Stained-cedar appearance**

Said to have the random-grain texture and attractive variegated colors of natural, stained cedar, Timberland vinyl resists scratches such as those from adjacent shrubbery. Siding comes in double-4 and double-4 1/2-in. Dutch lap profiles. 800/251-3300. Rollex Corp., Elk Grove Village, Ill. CIRCLE 235



▲ **Clear-face plywood siding**

Breckenridge is described as a "premium grade" plywood siding made with select, clear face veneers that have specific grain characteristics. Offered in three- and five-ply configurations, Breckenridge can be ordered in different grooved or ungrooved patterns. For use over sheathing such as plywood or composition board, siding can also be applied directly to studs. A solid-color acrylic finish, semi-transparent or opaque stain, or exterior house paint should be applied after installation. 541/679-3311. Roseburg Forest Products, Roseburg, Ore. CIRCLE 236 ■

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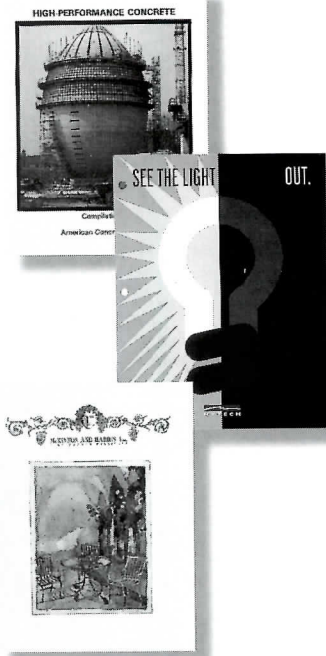
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PRODUCT LITERATURE

High-strength concrete

A 104-page bulletin contains articles published in *Concrete International Magazine* and other professional journals, compiled to provide technical and design information to readers who would find it useful in practical applications. Papers define high-performance concrete—what it is, how to insure getting it, and the ratio of cost to load capacity—with many graphs and some photography. (Cover photo shows a sludge digester.) 313/532-2600. American Concrete Institute, Detroit. **CIRCLE 237**



Occupancy-sensor guide

A new catalog includes a primer on "sensor basics," typical installations for infrared and ultrasonic types, and creating networks of controlled lighting and hvac equipment. Calls out products for each specific use. 512/450-1100. Mytech Corp., Austin, Tex. **CIRCLE 238**

Wrought-metal benches

A McKinnon and Harris catalog illustrates landscape furnishings—benches, chairs, and tables—of contemporary design, fabricated in wrought iron and aluminum. Styles incorporate American motifs, simply made without extraneous details. All pieces are shipped with

a powder-coat finish; many benches have hidden bolt holes that permit unobtrusive anchoring for security in public spaces. 804/358-2385. McKinnon and Harris, Inc., Richmond, Va. **CIRCLE 239**

Commercial ceilings

All of this maker's ceiling styles, including Acoustone, Auratone, Eclipse, and Orion, are shown in an architectural catalog that samples standard-color options, rates acoustical performance, and gives fire-test data. Request publication SA-905. 800/950-3839. USG Interiors, Inc., Chicago. **CIRCLE 240**

Paints from Holland

A 50-page brochure describes the long-term esthetic and performance benefits attributable to better-quality paints. Made by the Hermann A. Schreuder Co. (HASCO), these paints, while expensive, are said to offer excellent depth of color, bright and durable enamels, suede-like mattes, and a significantly longer anticipated useful life. Specific paint formulations and thinners are suggested for all interior and exterior surfaces; application instructions are given for each. 800/332-1556. Fine Paints of Europe, Woodstock, Vt. **CIRCLE 241**

Stamped-metal ceilings

Traditions panels have the nostalgic appeal of 19th century metal ceilings, but are available as lay-in ceiling panels for suspended grids. Finish options include bare steel, any color of baked enamel, reflective metal, and anodized aluminum. Nail-up panels are also available, along with accessories such as cone-head nails and matching cornice. 800/560-5758. Interfinish Division, Chicago Metallic Corp., Bridgeview, Ill. **CIRCLE 242**

Good wood

A short brochure offers facts about the various uses of wood in building construction today, discussing reforestation, efficient use of natural resources, and recycling potential of timber products. It mentions the structural and esthetic advantages of different solid-sawn and engineered wood products. Fax 503/224-3934. Wood Works, Portland, Ore. **CIRCLE 243**

Hardware guide

A comprehensive catalog covers "Total Openings Solutions" from Essex Industries, which now integrates product from Curries, Graham, McKinney, and Sargent. Includes hardware, door systems, and security fittings for healthcare facilities, school and university applications, and commercial office buildings. Dimensions, ratings, and finish options given. 800/ESSEX4U. Essex Industries, Inc., New Haven, Conn. **CIRCLE 244**

Structural-wood design

Correct use of APA-rated panels is covered in a design/construction manual. A reference for users and specifiers, it has current information on panel grades; floor-, wall-, and roof-systems; fire-rated panel systems; diaphragms and shear walls; and finishing methods. Single copies are \$4. More data at apawood.org (Web page); 206/565-6600 (phone). APA—The Engineered Wood Assn., Tacoma, Wash. **CIRCLE 245**

Home-design trends

A quarterly, written for the homeowner to encourage expression of a personal style in residential spaces and materials, *Envision* presents ideas about mixes of colors, patterns, and textures. Illustrations demonstrate the ability of Formica laminates and solid surfaces to work with natural materials such as granite and hardwood. 800/FORMICA. Formica Corp., Cincinnati. **CIRCLE 246**

Architectural glass

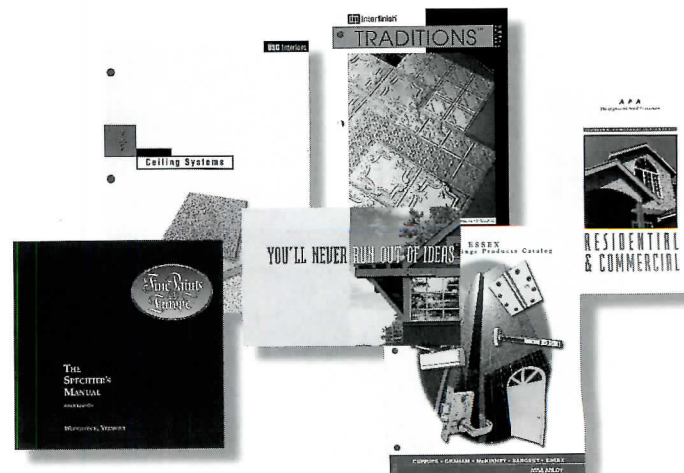
A design and technical guide explains the



performance characteristics of Azurlite glass, with comments from architects who have specified the glass. Combining a high visible-light transmittance (71 percent) with a low shading coefficient (0.60), Azurlite yields a Lighting and Cooling Selectivity (LCS) index of 1.18. Call 800/377-5267. PPG Industries, Glass, Pittsburgh. **CIRCLE 247**

Masonry design

Prepared for concrete masonry and precast concrete applications, a *Lintel Design Manual* contains chapters on material properties, loading conditions, and design methods. Lintel-design tables list moment- and shear-capacities. Publication TR 91A is \$12 per copy. 703/713-1900. National Concrete Masonry Assn., Herndon, Va. **CIRCLE 248** →



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Introducing Bilco's Type FR fire rated floor door - this innovative product will now enable you to specify convenient access through a 2-Hour floor without jeopardizing fire code compliance. Tested at UL Laboratories in accordance with ASTM E119, (the same demanding test standard as the floor/ceiling assembly), this unique door contains flames and limits heat transmission to the floors above. A specially designed self-closing system insures that the door automatically closes when a fire occurs.

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Photo B...Composite cover design with fire proof coating.

Photo C...Cover recess accepts custom floor covering.



A



B



C

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Excerpt from Mission Statement

In response to the April 19, 1995 bombing of the Alfred P. Murrah
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to sponsor the

Oklahoma City Memorial: An International Design Competition

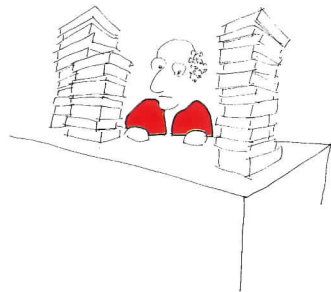
Participation in this two-stage design competition is open to all individuals and
teams. To register, please send a written letter requesting the competition
materials and a \$ 25.00 non-refundable registration fee.

Make the check or money order to: Oklahoma City Memorial Foundation.
Mail to: International Design Competition, Oklahoma City Memorial
Foundation, 420 North Robinson Avenue, Oklahoma City, Oklahoma 73102.

Competition materials mailed to registrants include: regulations, mission
statement, selection process, schedule, site description and other pertinent
information. Registration is open through February 10, 1997.

For more registration information, please phone 1. 800. 491. 3822
Oklahoma City area residents phone 405. 748. 0515

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PRODUCT LITERATURE

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800/556-7752. Dryvit Systems, Inc.,
West Warwick, R.I. **CIRCLE 249**

Roof-spec software

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as a 3.5 PC disk, free GAFWare Version 3.0
provides performance and appearance
data, detail drawings, and CSI-format
specs for all GAF commercial and
residential roofing products. Drawings
and text can be exported directly into
CAD systems. 800/ROOF-411. GAF
Materials Corp. Wayne, N.J. **CIRCLE 250**

Web-server updates

The most recent issue of InterVue maga-
zine discusses the benefits of Web
technology to engineering and design
firms. Subscriptions to this quarterly on
multi-platform computing are free:
800/345-4856; intergraph.com (Web
page). Intergraph Corp., Huntsville, Ala.
CIRCLE 251

Fabric structures

A color portfolio illustrates the flexibility
and variety of scale possible with
tensioned-membrane and air-supported
structures. Projects range from
bandshells to amphitheatres to airports;
step-by-step photos show erection
methods. www.birdair.com (Web page);
800/622-2246. Birdair, Inc., Amherst, N.Y.
CIRCLE 252

Stone-look finishes

Color-selector fan deck gives the look
and feel of Aurora Stone, a new Senergy
finish for use on EIFS, cementitious
stucco, or other masonry surfaces,
indoors as well as out. Spray-applied,
textured Aurora replicates the appearance
of granite and marble in 12 blended
colorways. Fax requests: 401/941-7480.
Senergy Div., Cranston, R.I. **CIRCLE 253**

Exterior wood products

Cabot's newest brochure describes the
appeal of wood as an exterior material,
and illustrates the different effects
of clear, semi-transparent, semi-solid,
and solid stain on the appearance and
grain of different wood species. Other
products covered include bleaching oil
that speeds up and evens out nature's
own weathering process, and O.V.T.
acrylic coatings that cover and color
like paint. 800/US-STAIN. Samuel Cabot,
Inc., Newburyport, Mass. **CIRCLE 254**

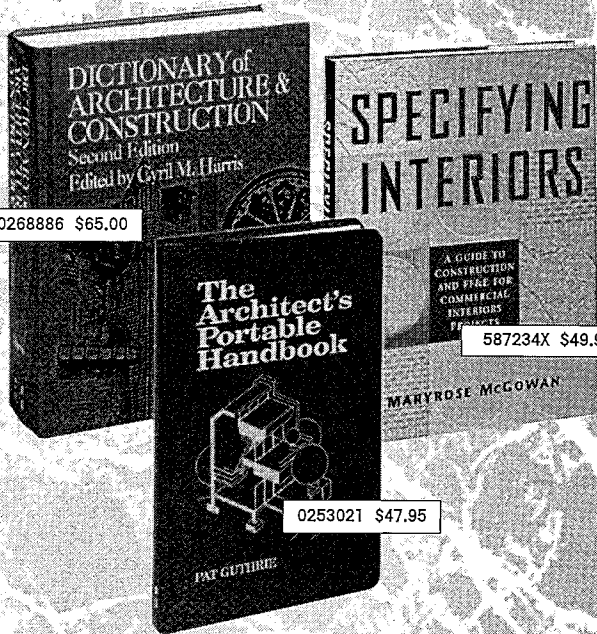


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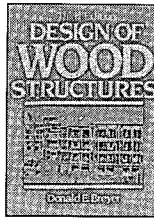
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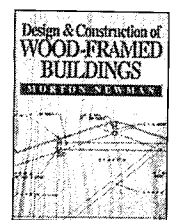
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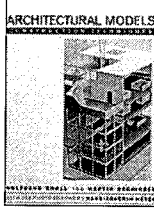
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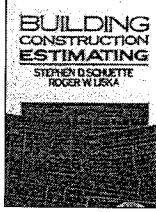
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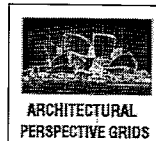
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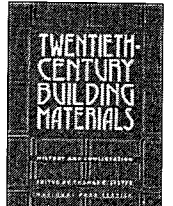
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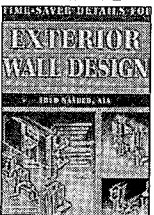
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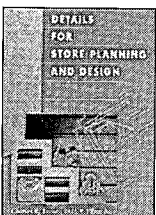
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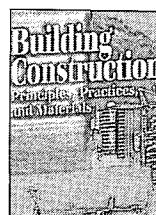
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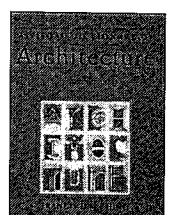
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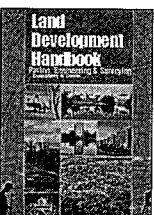
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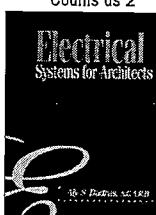
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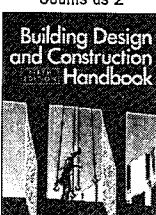
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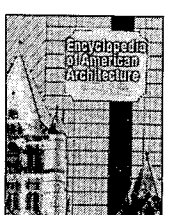
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CIRCLE 100 ON INQUIRY CARD

(continued from page 115) owned firm, and the candidates who come through my door are not typically women or minorities. In order for me to increase the number of people in my firm who are diverse, I really have to go out and seek them.”

One of the ways that Kwan Henmi has increased the number of women and minorities in the firm is to bring them in at the intern level. Others have their own methods. BOORA sponsors a scholarship for minority students at

that. You look for the best talent, but you have to aggressively seek the talent that represents diversity or you're not going to get it. Everybody brings something to the table whether they're black or white or Asian. And the more that you have different viewpoints and backgrounds, the richer the environment is at the office.”

Over and over, these firms say that they look for leadership and managerial skills even in entry-level job candidates, with the thought

potential successors as many as ten years before any significant amount of stock changes hands.

OWP&P began planning for these transitions in 1986. “We did some benchmarking,” says Len Peterson, “and found that few firms do leadership and ownership transition well. They start too late, and the stock is often too expensive to buy.” In 1986, OWP&P recapitalized its firm, and in 1989 an ESOP was introduced. These steps established a method for transferring ownership of the firm, and made the stock more affordable. At the same time, steps for transferring leadership were established. Senior principals for design and development were identified, and, entered a mentorship program under partners who planned to retire eventually. A junior partner was sent to Northwestern University's Graduate School of Business to prepare him to assume the position of chief financial officer of the firm. He then headed a task force to establish a timeline for the retirement of the older partners, who will reduce their holdings by 50 percent initially, then by another 25 percent, with a concurrent reduction in responsibility. Principals who wish to continue to keep working with the firm can retain as little as one percent of their stock, and still be involved on a limited basis. ■

FEW FIRMS DO LEADERSHIP AND OWNERSHIP TRANSITION WELL. THEY START TOO LATE.

the University of Oregon. Len Peterson of OWP&P serves on the board of the Newhouse Foundation, which supports minority youth who aspire to architectural careers. Peterson actively seeks employment opportunities for these youth. The Hillier Group maintains very close ties to Howard University, thereby attracting African Americans to the firm.

It is notable that many of the firms stated that their objective is to find and hire the most talented people possible, regardless of sex or race. Kwan says, “That may be true. But you have to throw your commitment in on top of

that these very people may well lead their firms in the future. As more female and minority students enter the work force, these numbers are sure to improve if firm managers are truly committed to making their firms diverse and cultivating this young talent.

Leadership Transition. There were just a few firms among respondents to the survey which said they are not planning any kind of leadership transition. Those which are looking ahead draw a great distinction between leadership transition and ownership transition. Principals begin identifying and training their

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pieces of structural steel



Len Peterson notes that transition of ownership and management is always on-going, and that as one generation retires and is succeeded by a new one, planning for the next transition must begin. "For each principal's position, you should always start with six or seven people you could nurture into your position. And these are gradually narrowed down to two people, and finally one." When younger partners have joined OWP&P's board, it is the custom for the partners who are close to retirement to abstain from voting on decisions that will have a long-term influence on the firm. "We believe it is very important for these partners to have complete control over the decisions they're going to have to live by in the future," says Peterson.

This article has only scratched the surface as far as innovative management practices are concerned, and there was no way all of the good ideas that were submitted to us could be shared. Obviously there are changes and transitions ahead for all architects, and we invite our readers to share with us and other readers the management methods they are using to make their practices more successful and more enjoyable. Write Associate Editor Cliff Pearson, fax, 212/512-4256, or E-mail, pearsonc@mcgraw-hill.com ■

METHODOLOGY



List of management consultants who helped with this story:

Robert Gutman (Princeton University, Princeton, N.J.)

Richard Hobbs (American Institute of Architects, Washington, D.C.)

Louis Marines (Advanced Management Institute for Architecture and Engineering, San Francisco)

Paul Nakazawa (Pearson Egan Nakazawa, Wellesley Hills, Mass. and New York City)

Peter Piven (Coxe Group, Philadelphia)

Stuart Rose (Professional Development Resources, Inc., Washington, D.C.)

Frank Stasiowski (Professional Services Management Journal, Newton, Mass.)

Mark Zweig (Zweig White & Associates, Natick, Mass.)

To select firms to be included in this story, we:

1. **Spoke with top management consultants** and asked what criteria they use to evaluate firms.
2. **Collected nominations of well-managed firms** from management consultants, authors, academics, and RECORD editors and correspondents.
3. **Developed a detailed questionnaire** and sent it to a select group of firms.
4. **Interviewed some firms** by telephone.
5. **Visited other firms** and spent at least a day in the offices of each one.

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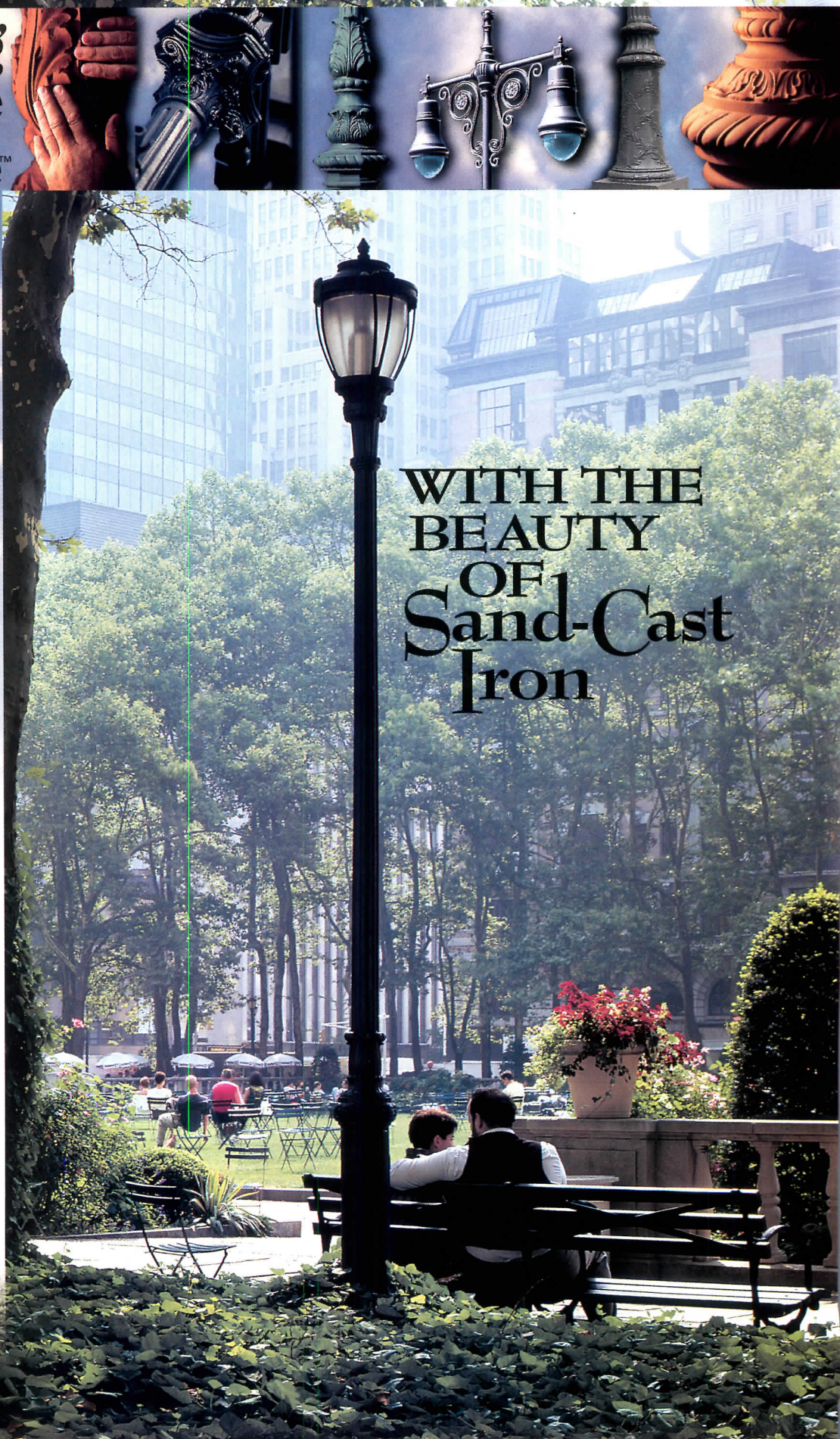
The quality of historically-styled outdoor lighting can vary greatly. Was the piece hastily mass-produced in a run of thousands of identical die-cast units, with their bland, vacant surfaces and harsh, abrupt edges? Or was the iron shaped by genuine sand-casting, whose characteristically rich surface texture and beautifully softened angles convey the metal's full evocative beauty?

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Through January 12

Milwaukee Art Museum

"The Architecture of Santiago Calatrava" at the Milwaukee Art Museum (MAM) includes models, drawings, and photos of the Spanish-born architect and engineer's major works. Calatrava's first completed project in the U.S., scheduled to open in 2000, is an expansion of MAM. Call 414/224-3240.

Through January 19

National Building Museum, Washington, D.C.

"Three Buildings by Frank Lloyd Wright: American Spirit Alive in Japan" traces the history of the only three non-U.S. buildings Wright designed and built: the Imperial Hotel, Yamamura House, and Jiyu Gakuen Myonichikan School. Call 202/272-2448 or fax 202/272-2564.

Through January 20

Michael C. Carlos Museum, Atlanta

"Steven Brooke: Views of Rome," 200 images that follow in the footsteps of traditional painters who recorded the city in earlier times. Call 404/727-2251.

January 21-24

Las Vegas Convention Center

The Concrete Construction convention will show the latest techniques and developments in the trade. Call 708/543-0870 or fax 708/543-3112.

January 22-26

Houston Convention Center

The National Association of Home Builders Convention will include an AIA Housing Professional Interest Area (PIA) slide presentation of the top 25 architect-designed and developer-built residential units, and three sessions of plan-review workshops targeted to help builders work with architects. Call 800/368-5242 for registration and information.

Through February 16

Metropolitan Museum of Art, New York City

The career of Charles Rennie Mackintosh, with 250 works that include photos and drawings of his buildings, furniture, textiles, and the reassembled Ladies' Luncheon Room from Miss Cranston's Ingram Street Tea Rooms. Call 212/535-7710.

Through February 23

National Building Museum, Washington, D.C.

"An American Embassy in Berlin" examines the recent competition for the American Embassy in the German capital. Models and drawings by all semi-finalists as well as the winner, Moore Ruble Yudell and Gruen Associates. Call 202/272-2448 or fax 202/272-2564.

March 6-8

Westin Tabor Center, Denver

Six PIAs (Professional Interest Areas) and the AIA risk-management committee are cosponsoring a conference, "The Client Connection." It is endorsed by the AIA Denver, AIA Colorado, and the AIA Denver Design-build Committee. The conference will focus on ways architects can better serve their clients with over 30 seminars, workshops, and programs on design-build, construction and risk management, alternative futures in the profession, and information technology and communications. For information, call 202/626-7482.

March 19-21

Los Angeles Design Center

WestWeek 97 will celebrate European furniture and interior design with major sponsors and keynote speakers from Italy, France, and Spain. Call Ann Videriksen at 310/657-0800 or fax 310/652-8576 for information.

Competitions

Registration to design the **Oklahoma City Memorial** is due by February 10. The new structure will stand on the site of the worst terrorist attack on U.S. soil—the bombing of the Alfred P. Murrah Federal Building on April 19, 1995. Also included are a visitor center, which may be housed in an adjacent existing building. To register, send a letter requesting competition materials and a check for \$25 to International Design Competition, Oklahoma City Memorial Foundation, 420 North Robinson Avenue, Oklahoma City, Oklahoma 73102. For information call 405/748-748-0515 or 800/491-3822.

Entries for the **1997 DuPont Benedictus Awards** for Innovation in Architectural Laminated Glass are due March 3. The competition is sponsored by DuPont, the AIA, and the Association of Collegiate Schools of Architecture, and is supported by the International

Union of Architects. This year's jury is comprised of Hugh Newell Jacobson, FAIA; Patricia Patkau, RAIC; and Christian de Portzamparc. Winners from around the world who demonstrate "significant" uses of laminated glass will be announced at the AIA Convention in New Orleans, May 16-18. For information, write Joanna Hanes-Lahr, 1100 New York Avenue, N.W., Washington, D.C. 20005; call 202/393-5247; or E-mail to haneslahr@mcimail.com.

The Village of Plainfield, Illinois together with Plainfield Partners Commercial, Ltd., and the township Park District are holding a one-stage competition for the design of a 300-acre **Plainfield Town Center** to be located directly across the Du Page River from the historic downtown. Registration costs \$90 and closes March 30. Entries are due May 1. Prizes are \$10,000, first, \$5,000, second, and \$2,500, third. To register, send check or money order to Plainfield Design Competition, Village of Plainfield, 32145 West Lincoln Highway, Plainfield, Illinois 60544. For information, call 815/436-7093.

Entries are due on April 1 in the one-stage International Design Competition for the **Development of David's Island** located in Long Island Sound. The sponsor is the College of New Rochelle. Registration before January 15 costs \$35, and \$50 thereafter. Jurors include Diana Agrest, Diana Balmori, Deborah Dietsch, Laurie Hawkinson, Michael Manfredi, and Bradford Perkins. Prizes totaling \$5,000 will be distributed among the winners, whose entries will be exhibited at the New Rochelle Castle Gallery. For a brief, call 914/654-5423.

Reviews

Buckyworks: Buckminster Fuller's Ideas for Today by J. Baldwin. New York: Wiley, 1996, 243 pages, \$30.

Frank Lloyd Wright: Designs for an American Landscape 1922-1932 edited by David G. De Long. New York: Harry N. Abrams, 1996, 207 pages, \$45.

Josef Frank, Architect and Designer, An Alternative Vision of the Modern Home edited by Nina Stritzler-Levine. New Haven: Yale University Press, 1996, 311 pages, \$65.

Reviews by Wendy Moonan

Why is it that, as we approach the year 2000, three of the most interesting new books are on

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visionary thinkers born in the last century? Of the three, the least academic and most original is Buckyworks by J. Baldwin, an inventor and teacher who worked with Fuller for 31 years. Baldwin includes his own personal anecdotes and 200 historic photos and drawings in his description of Fuller's inventions and key projects, from the "4D," a 10-deck residential tower of 1928 to the three-wheeler Dymaxion car (which looks strangely like our minivan) to synergetic geometry and the geodesic dome.

Fuller's ideas were more practical than he knew. Baldwin cites many examples, including the amazing North Face geodesic tent, a 9-pound, 48-sq-ft tent used on expeditions to remote places with brutal weather. Neither biography nor scholarly treatise, this book is valuable because it describes both Fuller's original building techniques and innovative use of such materials as aluminum, Mylar, fiberglass, tin, and waterproof cardboard.

A new book on five of Frank Lloyd Wright's unrealized projects from the 1920s is equally revealing. It was commissioned for an exhibition at the Canadian Centre for Architecture (CCA) in Montreal this summer (it opens at the Library of Congress on November 14). When Wright returned to the United States in 1922 after years in Europe and Japan, he confronted a newly mobile society. Realizing the car would provide access to America's wilderness areas, he went looking for the patrons who would build there. In one scheme, for the desert outside of Phoenix, Wright designed a luxury resort over a ravine with 120 different types of ornamental textile block (for walls, ceiling, and floors), some of which reappear in later projects.

Another project in the book is a house for A.M. Johnson on the edge of Death Valley, which utilized corbelled concrete-block walls 1,000 feet long—an idea Wright later adapted for Taliesin West. One also sees here Wright's first spiral structure, the Gordon Strong Automobile Objective, a Guggenheim-like viewing platform for drivers to ascend Sugarloaf Mountain, near Washington, D.C., to take advantage of the spectacular views.

Wright, who had never been to these remote parts of America before, discovered the car in 1922, explains CCA curator Nicholas Olsberg in his Introduction to the book. Wright had inventive ideas about how to place buildings in the landscape rather than let them intrude on it. For the first time, landscape was about planning and geometrics, not plants. The book's strength is to trace the architect's ideas about siting and materials.

Josef Frank, an Austrian architect born in 1885, made his mark designing furniture, textiles, and interiors in Sweden before and after World War II. Nina Stritzler-Levine's book on Frank was prepared as the catalog for an exhibit earlier this year at New York's Bard Graduate Center for Studies in the Decorative Arts, where Stritzler-Levine is director of exhibitions. Before World War I, Frank designed several spare Modernist houses not unlike those of his countryman Adolf Loos. By 1927, he had attained a prominent position in the Viennese design community and was known throughout Europe as a leading representative of the Modern movement, says Stritzler-Levine.

But Frank turned away from the Modernist esthetic. He designed housing projects for the poor and eclectic interiors for the middle class. He had a vision of the modern home that included comfort—a vision attacked by Josef Hoffmann, among others. In 1933, Frank, alarmed by the rise of Nazism, accepted an offer to work as chief designer for an interior design shop in Stockholm. He largely gave up architecture, though he did design several innovative (but unbuilt) Modern houses in the 1950s, which are included in this book. In Sweden, he created some 2,000 pieces of furniture, hundreds of textiles and decorative objects. This book, said to be the first complete examination of Frank's work in English, shows how he helped pave the way for postwar Swedish Modernism. His designs for Modern furniture, in particular, are as fresh as those of Gio Ponti, his contemporary in Italy, and will certainly be rediscovered by collectors of 1950s design as a result of this book.

Richard Horden: Light Tech: Towards a Light Architecture edited by Werner Blaser.
Basel: Birkhauser, 1995, 192 pages, \$75

One of England's up-and-coming architects, Richard Horden studied at London's Architectural Association and worked with Nicholas Grimshaw and Norman Foster before going out on his own. An experienced sailor with a fascination for airplanes, Horden is taken with the idea of creating an architecture without weight. His projects usually involve the construction techniques of yacht building and spaceflight, taking advantage of the most advanced technology and materials. He has devised easily assembled lifesaving platforms with aluminum and acrylic canvas for the beach and canopies for garden parties for Buckingham Palace. Best of all is the mobile alpine ski hut for two that is transported by heli- (continued on page 223)

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(*Letters, continued from page 26*)
 As a recently graduated architecture student with a deep interest in urban design, I was repelled by my school's inability to generate productive ideas on urban problems. To offset my overly ideological education on design theory, I opted to work in a planning department of a major U.S. city. The attitude toward planning there is numbingly bureaucratic, concerned more with procedure and politics than with anything remotely related to urban design.

Part of this stems from the balkanization of our graduate-school curriculum into planners and architects. In my school, architects took no classes with planners, had no professors in common, and received little credit for taking [planning] courses. And planning graduates are better equipped to collect data and produce tables of information devoid of visual content. The net result? A city where no urban design on the level Mr. Campbell discusses has been produced in 20 years.

As government retrenches even further, I can only think that the gap between planning and architecture is bound to grow even wider. As someone who is trying to bridge the gap, I have found little support. I'm ready to throw in the towel and retreat back into academia to study the bolder efforts occurring elsewhere. Before we address our inability to design urban projects, we must address our inability to produce urban designers and governments unwilling to accept design as a responsibility.
 —Name withheld by request

In response to "The Boldness Gap," I have to ask "Have we lost interest? Perhaps we have, but I contend that the problem facing architecture in this country is whether or not we, as Americans, are truly capable of appreciating the built environment.

We need to examine the behavioral sciences and interpret examples such as Abraham Maslow's hierarchical model of basic human needs. The model is based

on the thought that lower needs such as survival and safety must be met before human motivation can shift toward the higher esthetic needs.

As a relatively young society, America is still struggling with homelessness and welfare issues (basic survival and safety) thereby restricting our ability to reach these upper-level needs. On a recent trip to Europe, a colleague's wife commented that the older established European societies are "concerned with filling their lives with artful things." America is not able to focus on beauty or order without first worrying about issues like job security or adequate education.

I am not using this model as a reason to submit to "The Boldness Gap," but as a challenge to designers to aid America in understanding "that architecture is important to people," as Campbell says.

—Scott Hedglin
 Architecture student
 North Dakota State University
 Fargo, North Dakota

After practicing architecture in Germany, England, and the U.S. for 21 years, I agree with Robert Campbell's observations on architectural design in the U.S. Furthermore, the lack of boldness can be traced to other design areas such as cars, appliances, and, most notably, furniture. The absence of progressive, strong, and bold design in so many areas (notwithstanding the exceptions) must have some deeper causes. I think that the article should have used some background research. I'm afraid each society gets the architecture and design it deserves and, in fact, needs. Let me try a few explanations of why European or Asian design might often seem bolder:

Public poverty. In our current tax-cutting, anti-government mode, there is simply no money for grand public projects. Thus, public buildings lack civic pride and look cheap and dismal. As long as our economic emphasis is on private consumption, this is unlikely

to change despite some laudable efforts by the AIA to promote quality-based architect selection over fee-based competition for public projects.

Anonymous architecture. Most houses, but also retail centers and office spaces, are built by speculators. Lacking input from the actual users with their specific interests and needs, these projects tend to cater to the smallest common denominator.

Lifestyle. Families are more pressed for time than ever, often containing two breadwinners who have long commutes and drive their children to many activities and 24-hour shopping. They watch 24-hour television and use the Internet. Project-design phases get shorter for architects too. There is no time for careful deliberation. Our mobility is at an all-time high. We move from community to community. In the process, we become more disjointed while our older cities disintegrate. All this doesn't foster good design, nor appreciation, nor even interest. There is not only a lack of debate on design, there is general apathy. Less than 50-percent voter turnout in a national election is a particular American record; European turnouts are usually in the 80 percent range.

Unfortunately, I don't think we can learn from Europe or Japan. Their social development is simply lagging behind ours (for better or worse), but generally shows trends similar to ours: more private consumption, more individual isolation, less homogeneity, and less interest in public affairs.

I believe it is our task to look forward rather than back. We have to demonstrate that the public realm is as important as the individual and that design can also flourish in a multicultural society—not by power of presidential fiat (as in France), but by virtue of the rationale that good architecture and design actually serve people better.

Design and architecture understood as a social function will not bring back the days of the architect

as benevolent design dictator (the Howard Roark syndrome) nor will it support architecture for art's sake. We might, however, rediscover that architecture understood as a service and approached as a holistic and comprehensive craft will make our society richer and more sustainable, and result in solutions less timid than the ones Robert Campbell is deploring.
 —Klaus Philipsen, AIA
 Baltimore

I just don't get it. Dallas wants to project an image of civic pride as a global center of business and culture—a world leader in entrepreneurial opportunity and quality of life. But wait a minute. Doesn't architecture express corporate and civic leaders' dreams of our city? Aren't concrete expressions of abstract goals a message to the world about who we are?

Rising like a phoenix, a dozen or so building cranes (thought to be extinct) have been spotted near LBJ and Central as a bundle of new Texas Instruments structures emerges. And what is the building style of Dallas's global leader in the high-tech electronics business? If you're expecting state-of-the-art design, or award-winning architecture, don't hold your breath.

Unfortunately, with the simple addition of a chain-link fence and some rolls of barbed wire, the new campus could double as a penitentiary. With increasing attention to our environment, it's disappointing to see a community leader add visual pollution to the place we live. If Dallas truly wants to compete with Singapore or Hong Kong or San Jose, we need to improve the quality of our architectural investments.

—Charles D. Cliff
 Dallas

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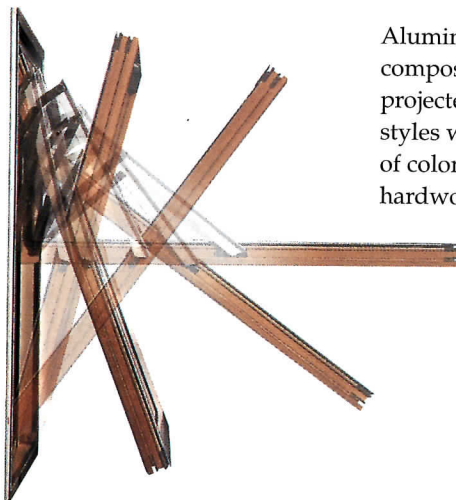
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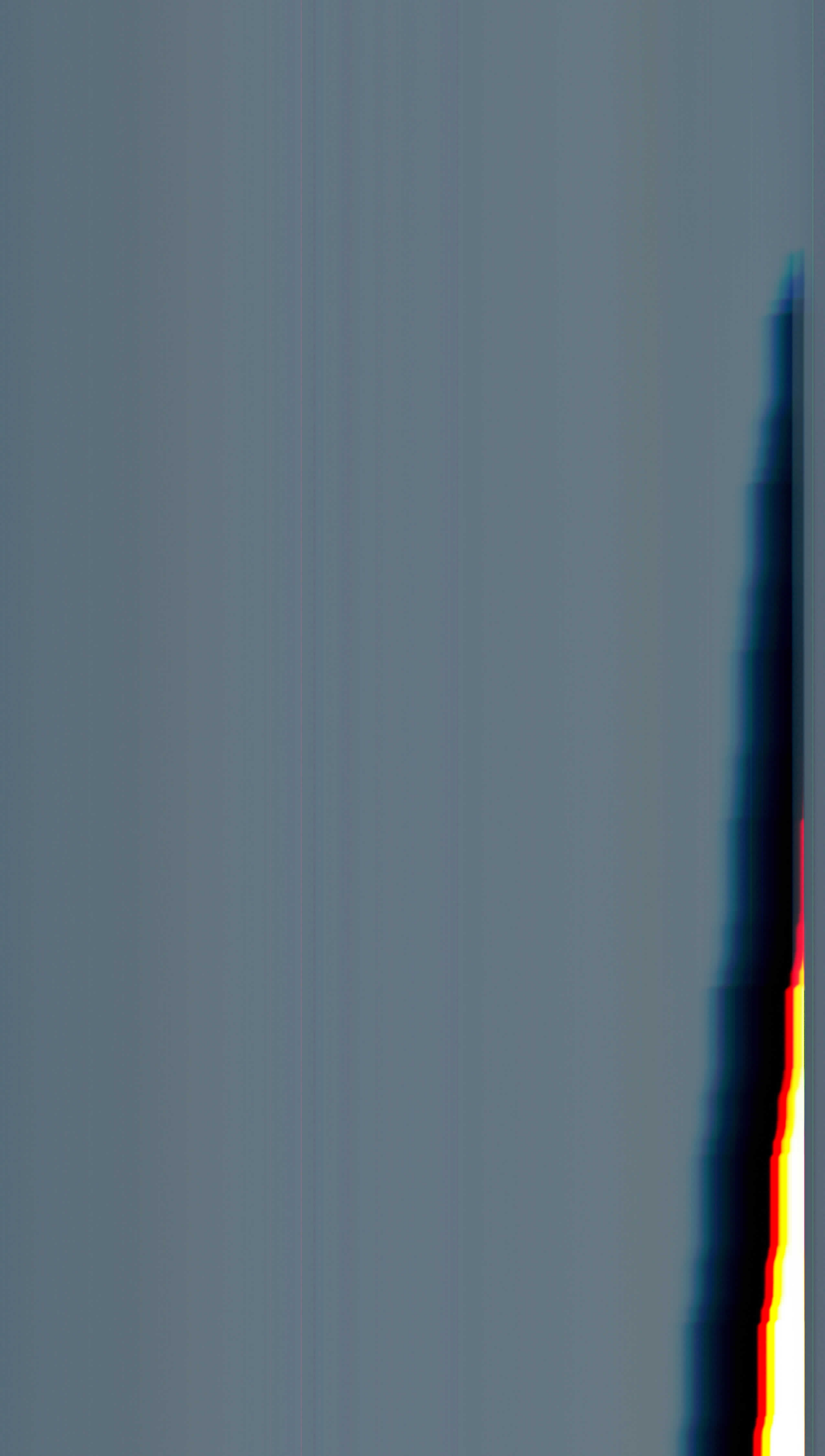
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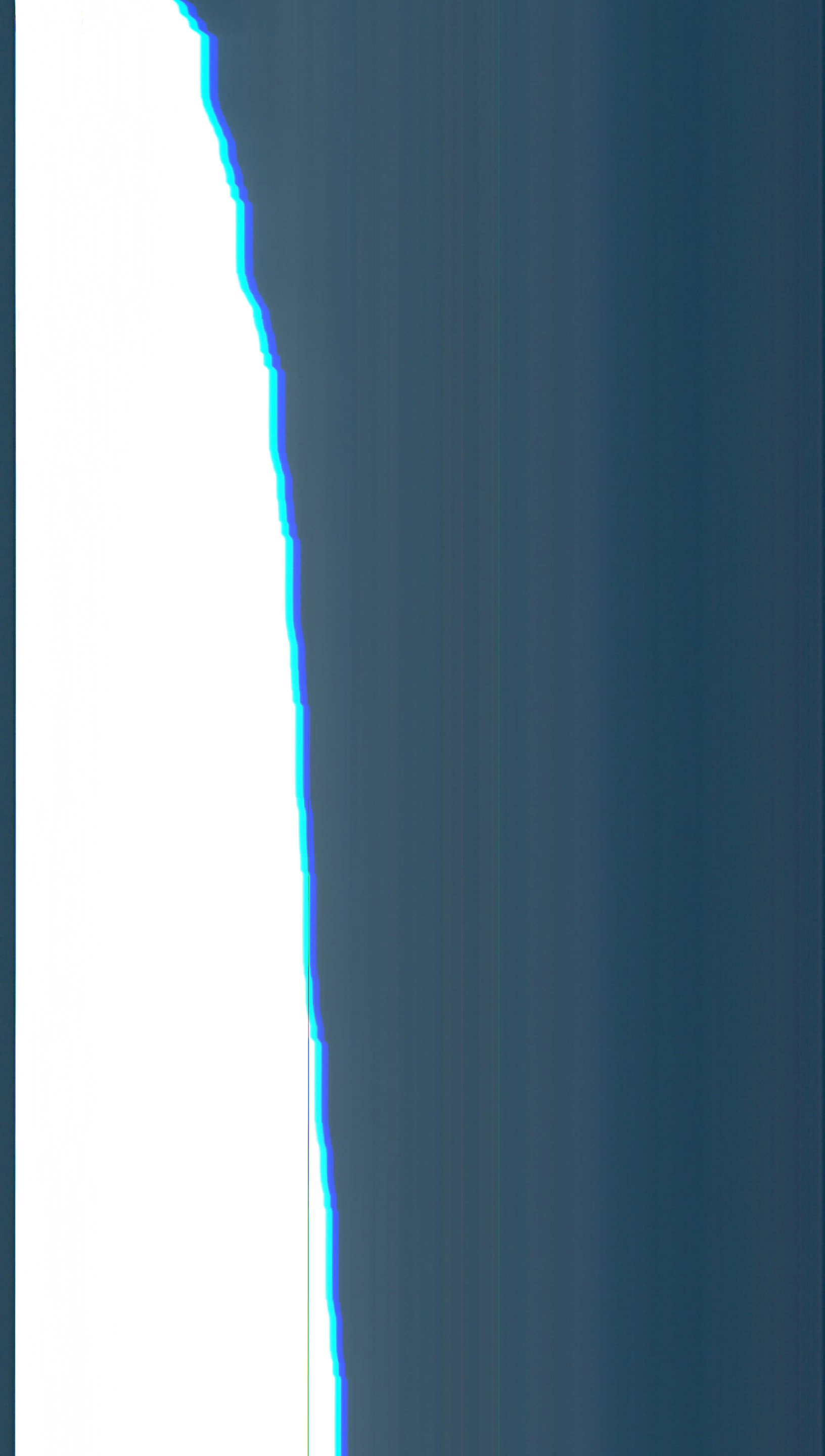
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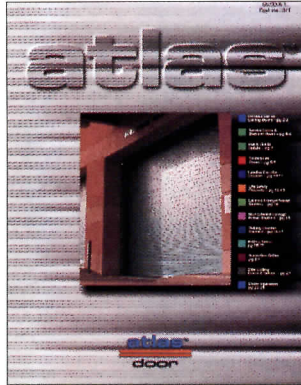


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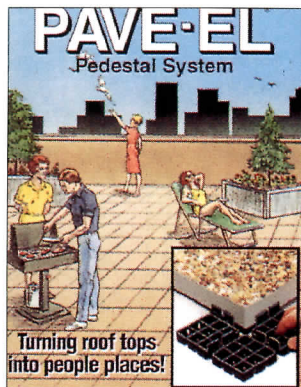


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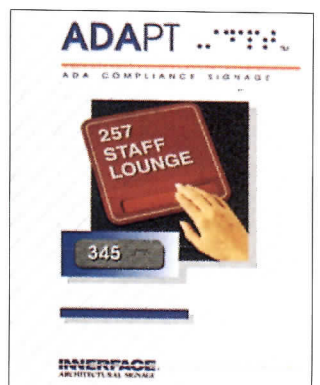


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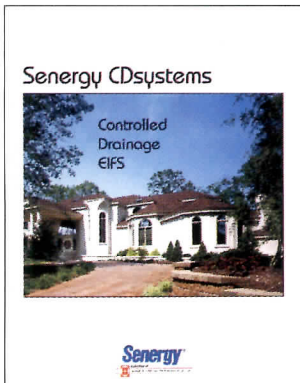


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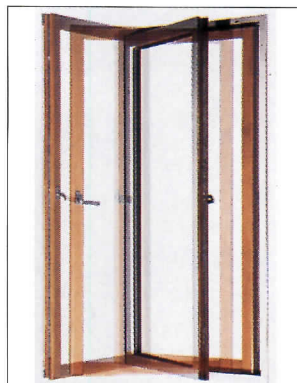


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H-Window

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Jacuzzi Whirlpool Bath

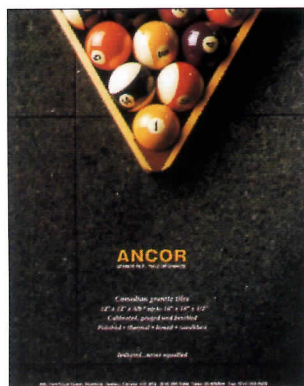


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Jacuzzi

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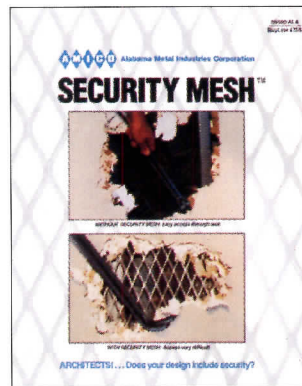


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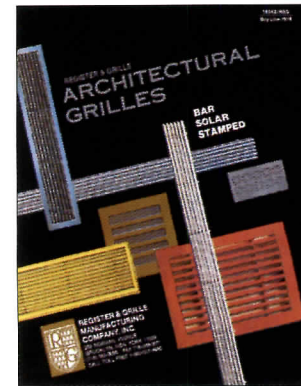


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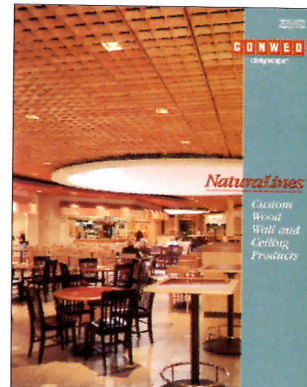


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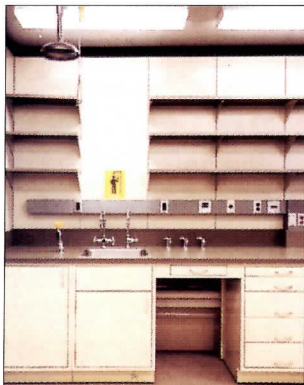


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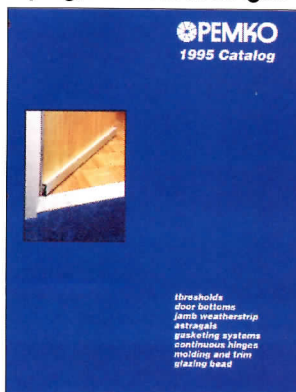


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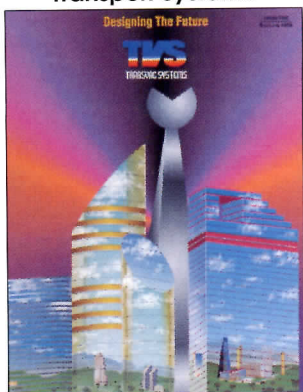
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Buckingham-VA Slate

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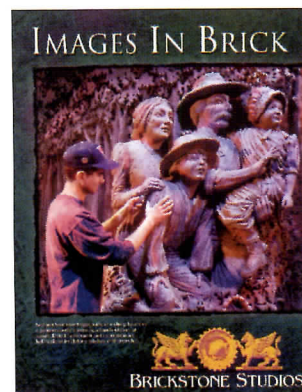


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CIRCLE 150 ON INQUIRY CARD

(continued from page 209) copter to a mountaintop, much like a lunar landing module. The red aluminum structure, well insulated and able to generate its own solar energy, has already been tested in the Swiss alps and would be an ideal weekend getaway for super-hikers.

10 Houses, series edited by Oscar Riera Ojeda. Rockport, Mass. Rockport Publishers, 1996, 1995, about 100 pages each, \$20 (paper).

Aimed at a general audience, this series of books—each with the same title, but focusing on a different architect—features beautiful large photographs and short concise texts. Architects covered in the last two years include: Gwathmey Siegel & Associates, Peter Forbes, and Peter Gluck.

Wendy Moonan is an editor of House & Garden.

Factory Mutual Approval Guide, Factory Mutual Research Corporation. Norwood, Mass.: 1996, \$100 (CD-ROM)

Factory Mutual, a leader in property-loss prevention engineering, has issued its 1997 Approval Guide in CD-ROM format. In addition to Fire Protection, Electrical Equipment, and Building Materials information, previously published in three separate volumes, the disk holds the 1997 Property Loss Prevention Resources catalog. 617/255-4681.

Omissions & Corrections

The correct name of the design-resource product [RECORD, August 1996, page 56] is DesignBlocks, from Autodesk Data Publishing. McGraw-Hill's Sweets' Group is a contributor.

Credits for the Science, Industry and Business Library [RECORD, September 1996, page 90] should have included telecommunications consultants DVI Communications, Inc.

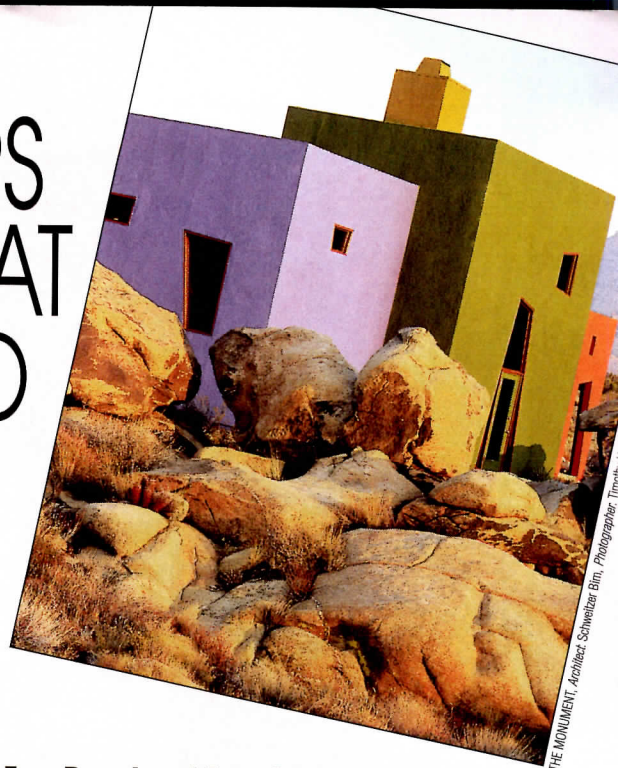
The names of the third-place winners in the Bucharest 2000 competition [RECORD, November 1996, page 50] should have been spelled Adam Drisin and James Saywell. They are, respectively, American and Canadian nationals.

The last line of the address on the AIA/CES Self-Report Form [RECORD, November 1996, page 134] should have been Norman, OK, 73072-6400; Fax, (405) 325-6995.

The Product Report item "Snow/ice dam" [RECORD, December, 1996, page 89] should have listed the manufacturer, Thybar Corporation, IL; 800/666-CURB.

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DEPARTMENT OF CITY AND REGIONAL PLANNING

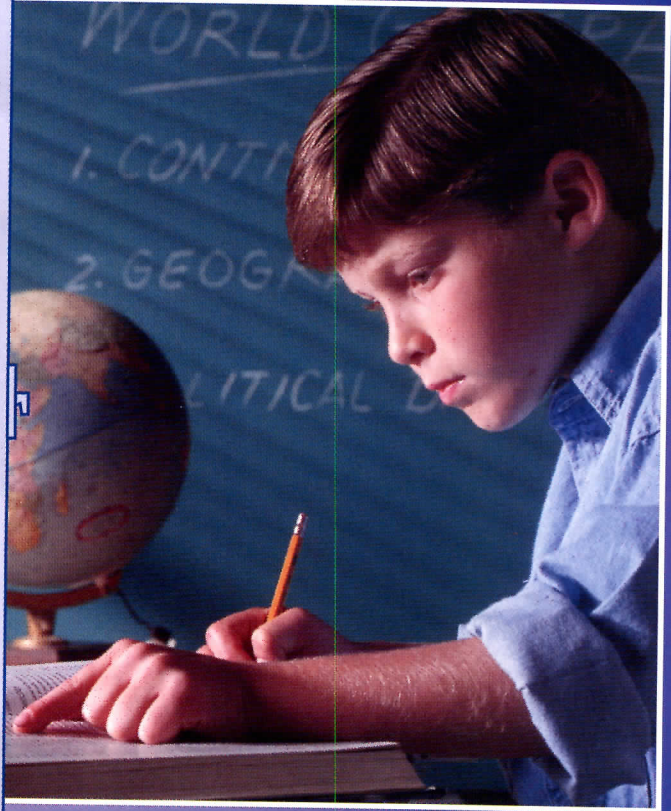
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**Professor John C. Keene,
Chair of the Search Committee
for Senior Professors in
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Department of City and Regional Planning
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Questions on page 228

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- "Fundamentals of Metal Roofing"
- "High Performance From Start to Finish" (Marvin Windows section, page 146)
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CIRCLE 95 ON INQUIRY CARD

THE FUTURE: Architects have a new role to play in America's love affair with the automobile.

— BY JOAN BLATTERMAN

This month, our Future column looks at the architectural potential inherent in the technology of the electric car. With minimal equipment requirements and versatile placement options, it will be possible to design battery-charging stations into office and factory complexes, retail malls, hotels—places you couldn't possibly put a gasoline pump. Can recharging modules be integrated into existing facilities? Will Electric Vehicle (EV) service become a margin-boosting bonus for the enterprising restaurateur or theater owner? Will wide use of all-electric cars mean a unique way of dealing with personal transport?

Architecture has always played a prominent role in America's love affair with the automobile. Once a rudimentary network of paved roads was built, architects began creating the infrastructure that gave the auto its setting, and provided reassurance that fuel would be available wherever needed. The minutiae of gasoline-station design became an architectural sub-specie, with courses, exhibits, and books. By the thirties, the gasoline service center was an icon, with sleek,

streamlined shapes that gave a style to the era.

Now, with the introduction of General Motors' EV 1, the first American electric car intended for general use, there's a new design paradigm. Toughened clean-air standards should boost use of zero-pollution electric vehicles for the short-haul, stop-and-start commuting trips that foul the air in metropolitan areas. Electric vehicles can operate at speeds over 65 mph solely on the current stored in batteries and discharged on demand to accelerate transmission-free motors. While speed and mileage range is a function of the vehicle's weight and the storage capacity of the batteries, sooner or later a recharge is needed. What architects need to know to meet the technical requirements of a recharge facility aren't complicated—but the human-factor component is vital.

The design of the car-to-power source connection attempts to overcome any reluctance about hooking up to high voltage. Right now, the fledgling industry has two competing technologies that plug in the car. One, championed by GM, is *inductive*—electricity crosses an air-space gap from charging unit

to a paddle-like receptor. The other approach, adopted by other American and Japanese car makers—is *conductive*—a direct connection between car battery and power source. Now in development, a single-source, "pig-tail" recharge connector will permit different types of EVs to use the same plug.

The charging technologies currently available, in whatever form, are extremely safe to use. Ads by the Edison Electric Power Institute (EEPI) show a car being charged under water. Users "plugging in" their cars are okay even standing in a rain puddle. Conductive charging systems are fail safe: there is no power at all in the "plug" fitting until a correctly completed connection embeds a "safety pin" and lets current flow through the cable.

What's required for a recharging station?

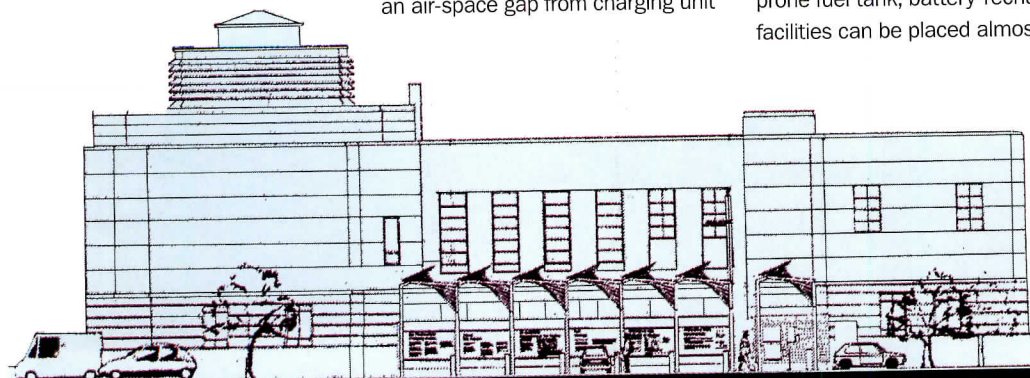
A big plus for EVs is that the high-current power sources quick-charging batteries will require are widely available—most industrial, commercial, and retail facilities have three-tier power (330V) in place. And because EVs don't need a potentially explosive and pollution-prone fuel tank, battery-recharging facilities can be placed almost

anywhere a car can drive. Design consultant Anthony Loui, with architect Amy Alper and engineers Pugh+Scarpa won an AIA photovoltaic-design award for a charging station (pictured) that doesn't need any utility power at all. (For home garages or parking spots where cars will be left overnight, a 120-volt curbside module is sufficient.) The higher-current charging stations can be freestanding kiosks, designed to be unattended and credit-card activated. Stations need lighting and perhaps a weather or security enclosure (rain doesn't affect the equipment or the charging process, though). An attention-getting canopy can be backlit and carry ads or graphics. Landscaping and site amenities need to be considered. Most importantly, the facility must be able to quickly convey its purpose and how to use it.

Recharging-time requirements are part of the program. Today, EVs take several hours to charge, but next-generation vehicles will fill up in about 20 minutes, says EEPI. McDonald's has already approached GM about placing EV charging stations at their restaurants—offering an extra inducement to "take a break today." And stations would be a natural at shopping malls—charge while you charge. Use of electric-powered vehicles depends on the public's perception of a supportive infrastructure. But building that infrastructure is contingent on consumer demand. Who's going first?



Photovoltaic recharge station (left and above) in front of Santa Monica, California's, City Hall.





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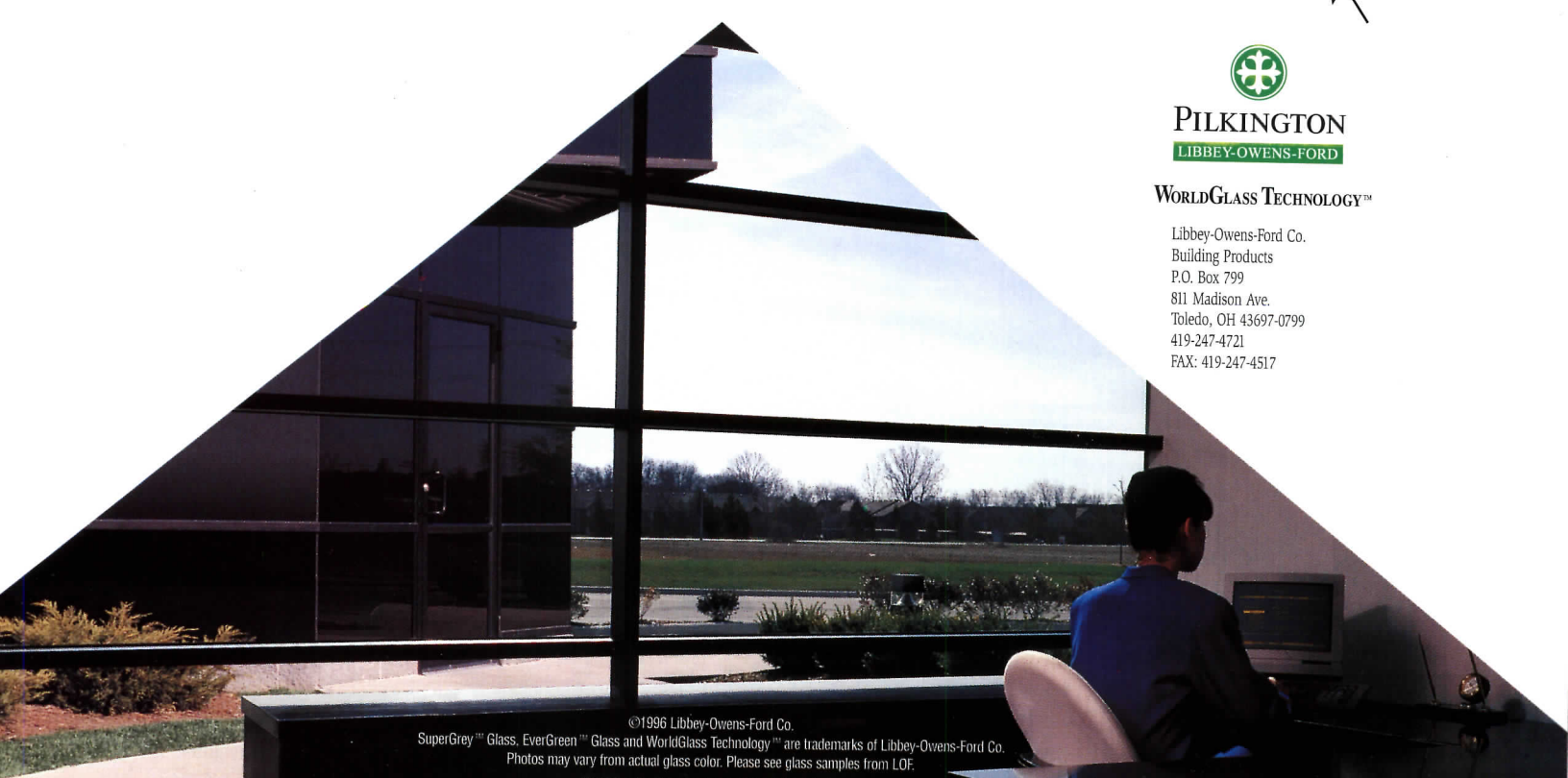
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