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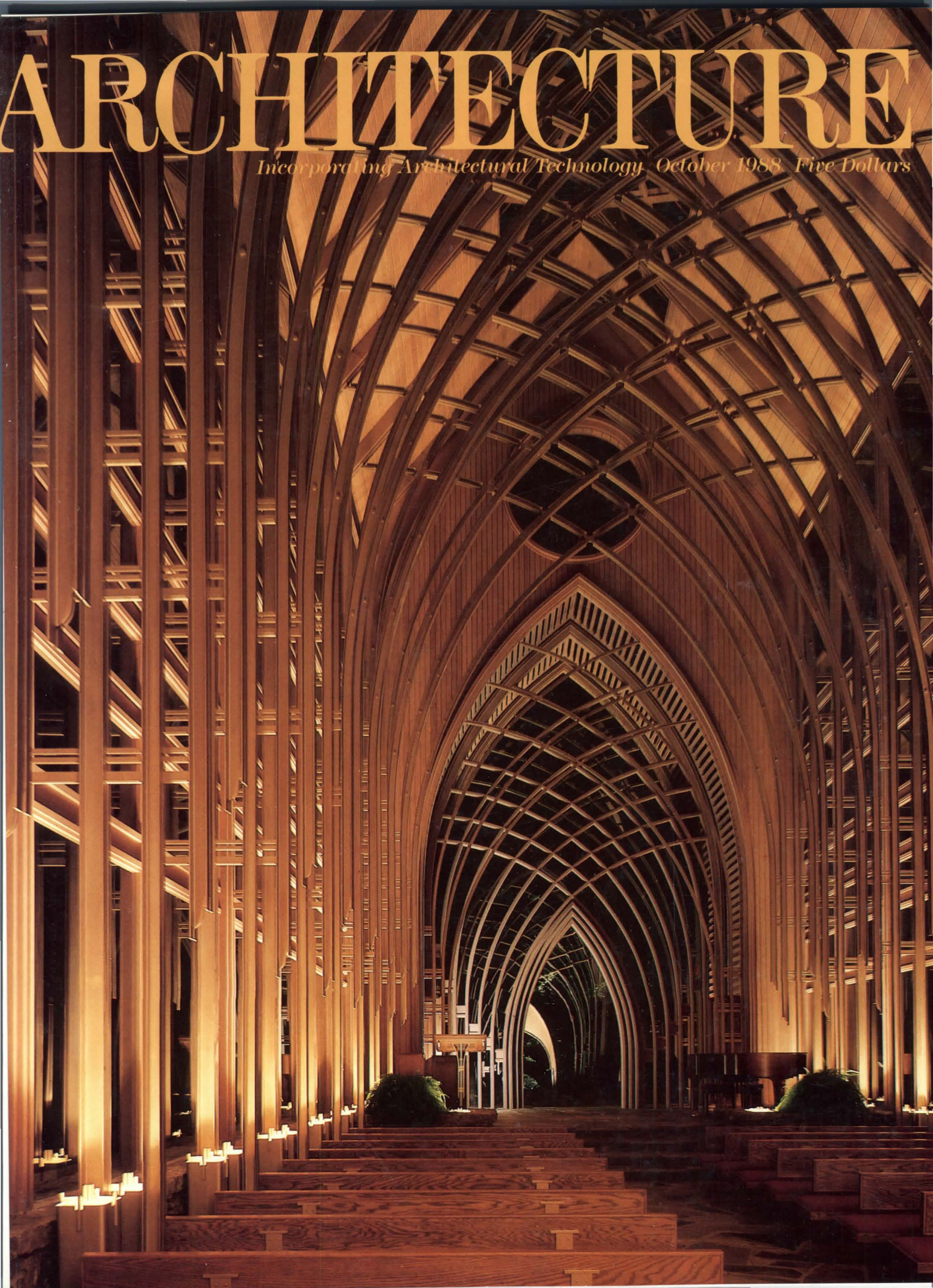

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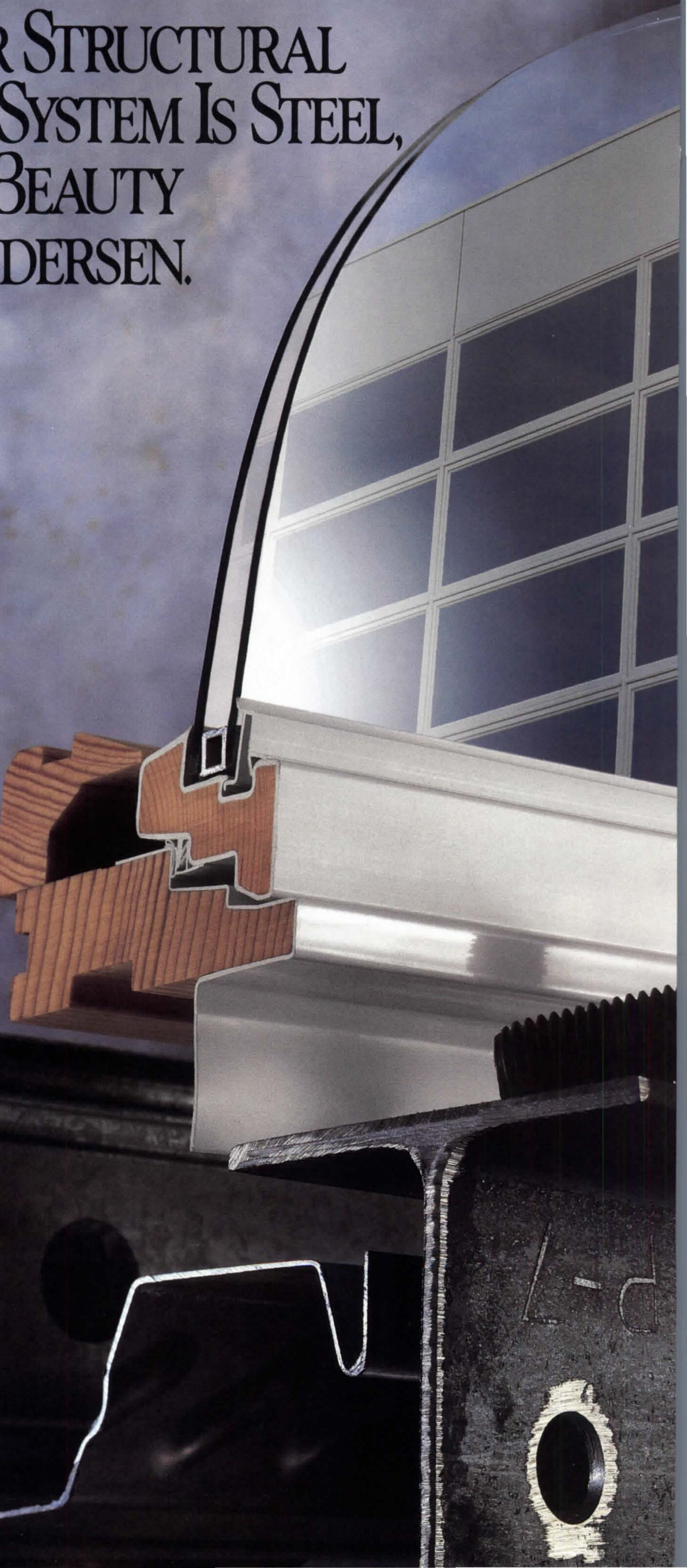

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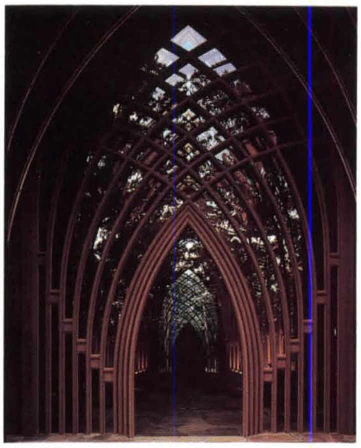

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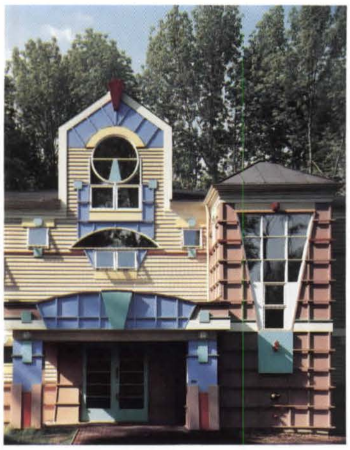

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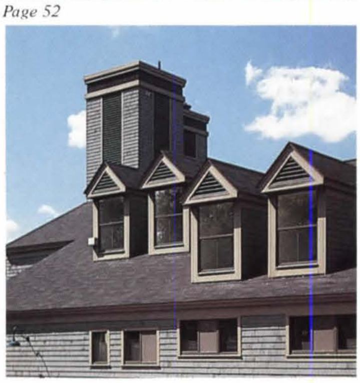

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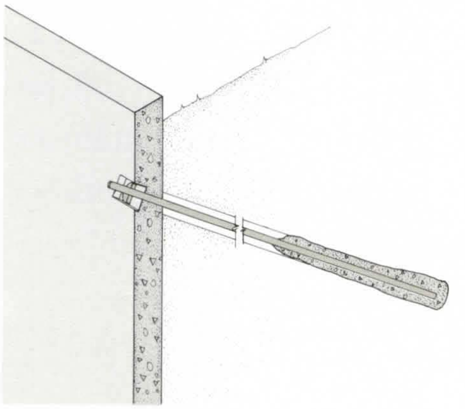

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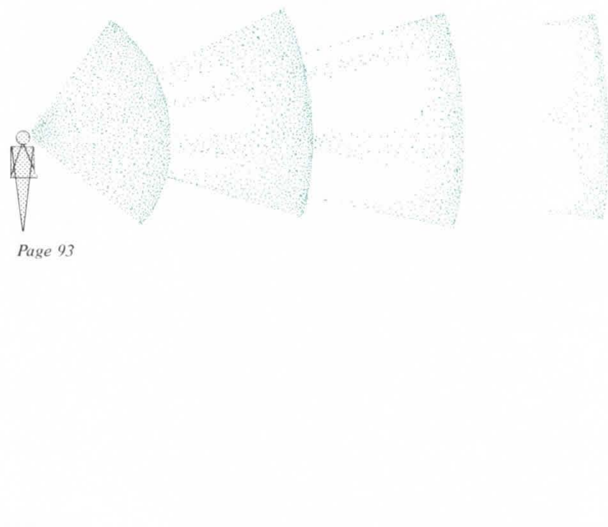
Cooper Memorial Chapel, Bella Vista, Ark., by Fay Jones & Maurice Jennings Architects (see page 52). Photograph by Timothy Hursley/The Arkansas Office.

News

Technology & Practice



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Back in 1984, Dean Witter decided to centralize their New York headquarters at Two World Trade Center. They've been ripping out floors and building them back ever since.

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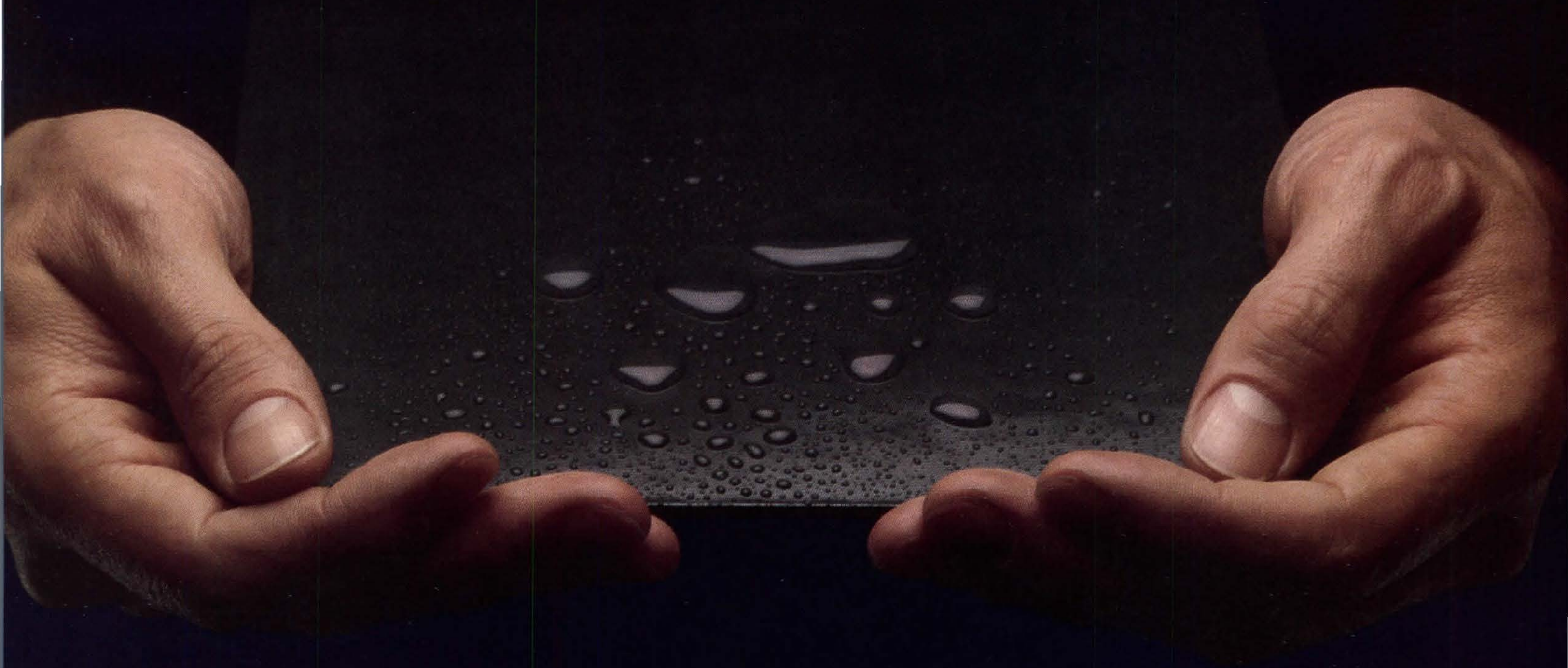

EVENTS

Oct. 30-Nov. 4: American Concrete Institute Convention, Houston. Contact: Robert M. Abramson, ACI, Box 19150, 22400 West Seven Mile Rd., Detroit, Mich. 48219.
Oct. 31-Nov. 1: Workshop on Effective CADD Management, Chicago. Contact: Pat Wright, Computer Aided Design Report, 841 Turquoise St., Suite D, San Diego, Calif. 92109.
Nov. 1-4: Course on Protection of Industrial and Commercial Electric Power Distribution Systems, Madison, Wis. Contact: E.K. Greenwald, P.E., Dept. of Engineering Professional Development, University of Wisconsin-Madison, 432 North Lake St., Madison, Wis. 53706
Nov. 2-5: Urban Land Institute Fall Meeting, San Francisco. Contact: Barbara Prender, ULI, 1090 Vermont Ave. N.W., Washington, D.C. 20005.
Nov. 3-4: Conference on Exterior Wall Insulation, Paris, France. Contact: French Technology Press Office, 401 North Michigan Ave., Suite 601, Chicago, Ill. 60611.
Nov. 4-6: AIA Committee on Design Conference on 20th-Century American Architecture, Los Angeles. Contact: Joanna Bache at Institute headquarters, (202) 626-7361.
Nov. 9-11: International Disaster Congress and Exposition, Chicago. Contact: Sandi Eberhard, Kotch & Poliak, 708 Third Ave., New York, N.Y. 10017.
Nov. 9-12: Industrial Fabrics Association International Convention, Chicago. Contact: Melanie J. Anderson, IFAI, 345 Cedar St., Suite 450, St. Paul, Minn. 55101.
Nov. 13-17: Steel Structures Painting Council Convention and Exposition, Baltimore. Contact: Rose Mary Surgent, SSPC, 4400 Fifth Ave., Pittsburgh, Pa. 15213.
Nov. 14-18: Course on the Application of Infrared Scanners to Detect Building Energy Loss, St. Louis. Contact: Paul Grover, Infraspection Institute, 33 Juniper Ridge, Shelburne, Vt. 05482.
Nov. 15: "The Landmarks of New York," slide-illustrated lecture, Washington, D.C. Contact: Joan Cole, Smithsonian Resident Associate Program, Washington, D.C. 20560.
Nov. 16-18: National Institute of Building Sciences Annual Conference, Washington, D.C. Contact: Dean Phelus, NIBS, 1015 15th St. N.W., Suite 700, Washington, D.C. 20005.
Nov. 16-18: Seminar on "Reflectors and Computerized Optical Design," Scottsdale, Ariz. Contact: L.S. Advertising, 7830 East Evans Rd., Scottsdale, Ariz. 85260.
Nov. 27-Dec. 2: American Society of Mechanical Engineers Winter Meeting, Chicago. Contact: A'ndrea Elyse Messer, ASME, 345 East 47th St., New York, N.Y. 10017.
Nov. 29-30: Course on Inspection Techniques for Elevators and Escalators, Philadelphia. Contact: Adrienne Roberson, ASME 345 East 47th St., New York, N.Y. 10017.
Nov. 29-Dec. 3: Symposium, "Design Needs for Special Population Groups," Orlando. Contact: National Symposium for Health Care Interior Design, 4550 Alhambra Way, Martinez, Calif. 94553.
Nov. 30-Dec. 3: Vermont Granite Symposium, Barre, Vt. Contact: Philip C. Marshall, Barre Granite Association, 19 Marble Ave., Burlington, Vt. 05401.

LETTERS

The Prince and 'Beauty': Is beauty in the eye of the beholder? Allow me a few words about Prince Charles's critique of contemporary architecture in Europe and the United States. [See Jan., page 22, and May, page 33.]

New trends in art provoke negative reactions. If we apply George Bernard Shaw's statement that "all great truth starts as blasphemy," substitute "art" for "truth," and look into history, we will find that the French impressionists had difficulties being accepted. Molière took consolation from the fact that common people liked his plays. Euripides was not liked by the establishment but was loved by lower classes. Gothic architecture, which I admire for its economic use of materials, structural logic, and resulting impression of weightlessness, was also not accepted instantly. The architects who rebuilt Germany after World War II had a problem of how to design good architecture without spending money on the "unessential." One of my teachers called the emerging German style "cultural Bolshevism"—this in the period of Stalin's demands for wedding cake architecture. Is everything new always good? Art nouveau did not accomplish very much.

Beautiful or not, cities consist of buildings. People are born in them, grow up, love, suffer, and die in them. The architecture gets interwoven in their lives. To be Parisian means Notre Dame, the Eiffel Tower, the Place de la Concord, the Bridge of Alexander, and other landmarks. I revisited Paris after 50 years of absence and found the city unchanged, the same as it was in my youth. In wars, Europeans often surrender their cities in order to save them. They look at their cities as precious antiques. They ban, most of the time, the high-rise construction to the outskirts in order not to dwarf the past. The Acropolis is still the highest point above the old Athens. The Poles rebuilt the city of Gdansk/Danzig after World War II with all its faults of the past, thus preserving it as a museum city like Williamsburg, Va.

As cities grow in the flow of the centuries, economic conditions and technical progress necessitate new styles that do not blend with the "classics." The advent of new building materials like steel, concrete, panel walls, and increased use of glass calls for development of new styles that often clash with traditional architecture. However, the new styles should not be allowed to dwarf, overpower, or brutalize our architectural heritage. We may love Leonardo da Vinci and Picasso but would never display both in one frame.

The above observations may still apply to most European cities. For the United States it is not too late. We have entered the era of the high-rise megalopolis. Thanks to the invention of the elevator and to steel, we can go higher and higher. Here or there we still may have a museum, a college campus, a cultural center, or churches, but the "vertical city" is on the move. God and art were the main concerns of the medieval builders; the economy drives our architecture.

Sometimes we may have difficulties defining "beauty," but our lives are totally beauty oriented. We strive for beautiful architecture, gardens, textiles, ceramics, fashions, furniture, sculptures, music, etc. We love beautiful humans. Beauty is part of our lives, and it is the striving for it that we share with Prince Charles while worrying about the architecture of our cities.

Stephen H. Gabrielson
Suffern, N.Y.

'Slave Labor' Sympathies: I can't resist offering my sympathies to Mr. Bujold, whose exposure to "slave labor" moved him enough to write such a long letter [July, page 14]. He may be relieved to know that, in New York State, it is illegal to employ anyone without compensation. Some years ago at one of the chapter meetings, one of our members who taught at a local college pleaded with us to hire students. "They need the experience," he implored. "They don't want any pay; they'll work for nothing." I had to tell him about the law.

It is, of course, unconscionable to have someone work for you without compensation. The practice is not unheard of and is not confined to architects. Commercial artists resort to the same tactics because beginners are so anxious to get started. It is historic in apprenticeship programs.

Governments plead with employers to hire students for the summer without measuring the cost to the employer. Students should, however, know that they will not get the same pay scale as experienced drafters. At times they are "fill-in," subjected to tasks such as "cutting cardboard models." I have hired summer help without any real need for an extra employee. On the other hand, I have also found them a valuable asset. Hiring them is a balance between need and community responsibility.

Leon Rosenthal, AIA
Babylon, N.Y.

Clarification: Three master plans were drawn by three architecture firms involved in Liberty Place, a Philadelphia complex discussed in our May article, "A Tale of Four New Towers and What They Tell of Trends," page 124. The firms are Wallace Roberts & Todd, Murphy/Jahn, and Zeidler Roberts Partnership. Each was engaged successively by the developer, Rouse & Associates.

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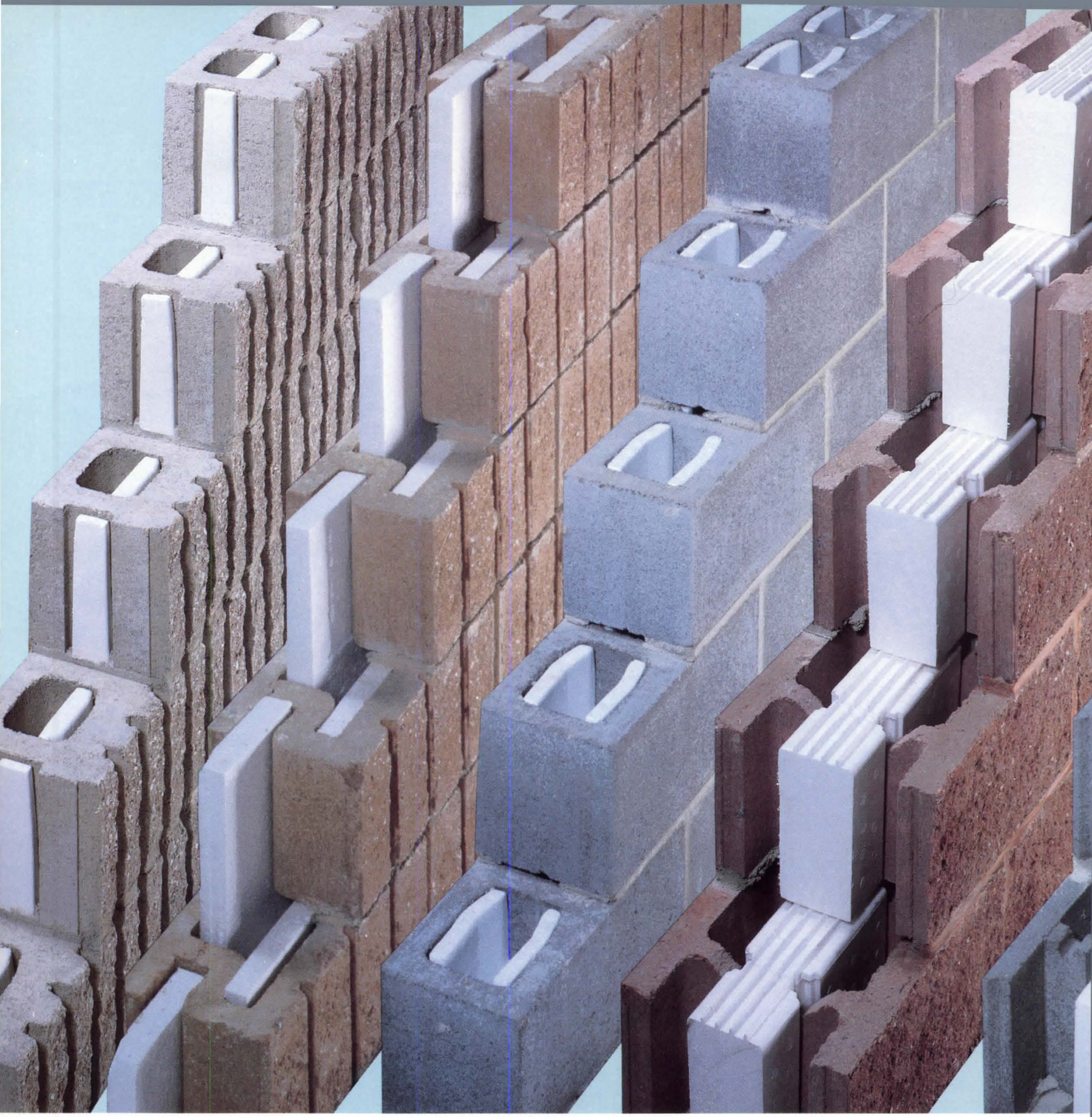

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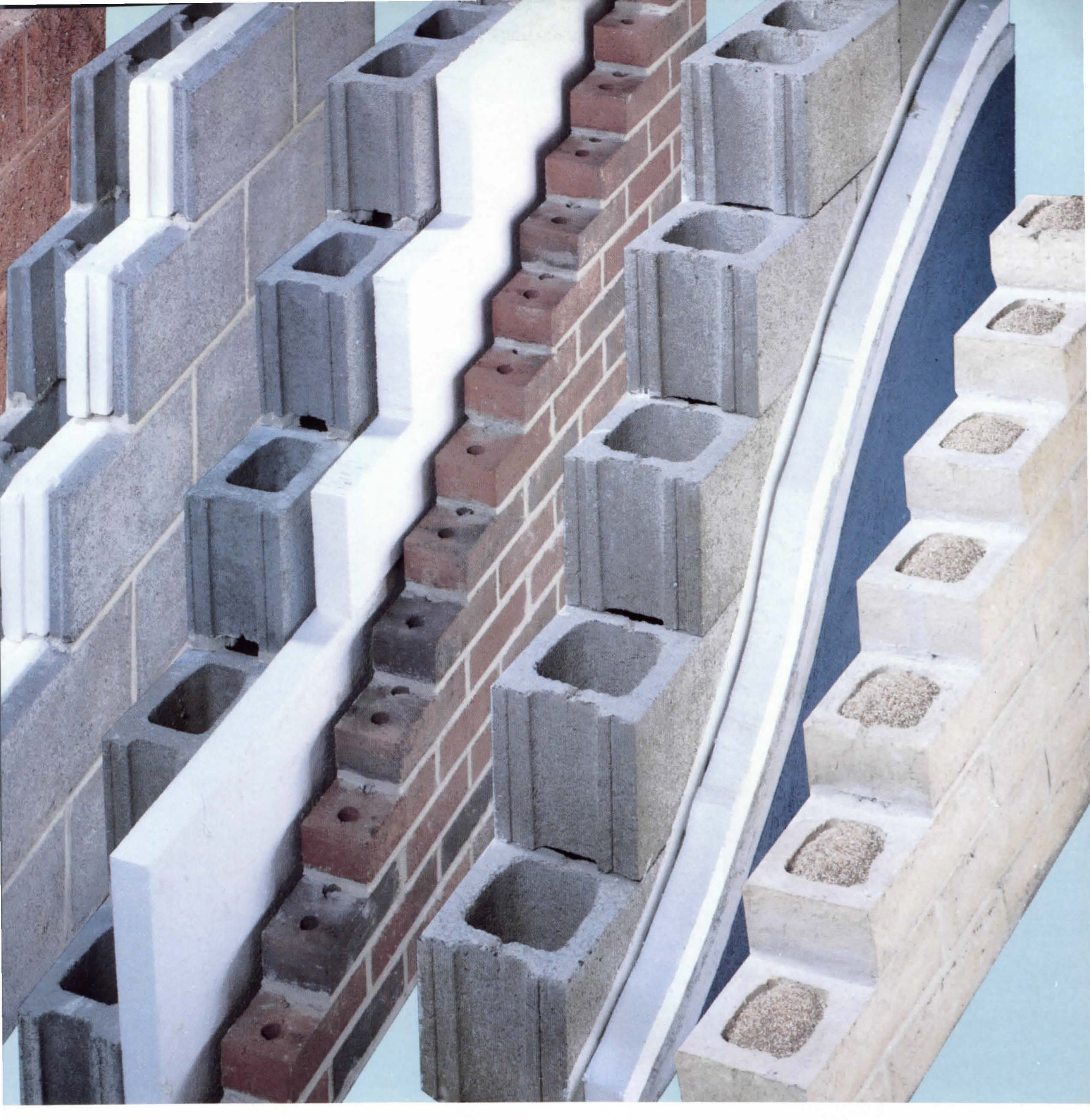


NEWS

Government

Bush and Dukakis Express Views on Housing, Cities, Related Issues

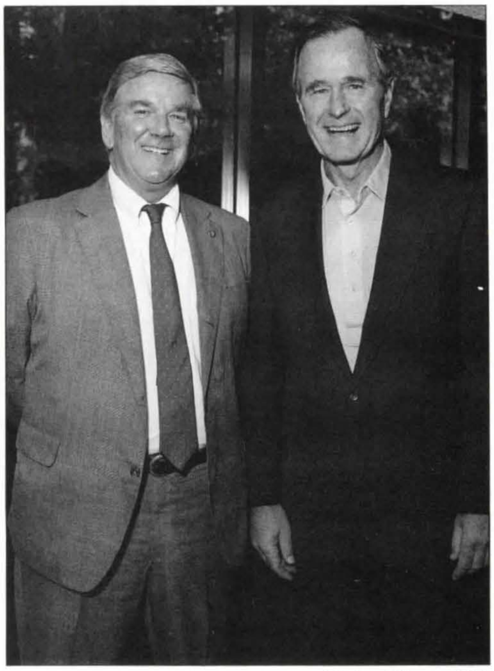
The following is a summary of the Republican and Democratic Presidential candidates' views on issues of particular concern to the architectural profession, in answer to questions framed by this magazine and AIA's government affairs department.

Vice President George Bush was interviewed Aug. 25 in Houston by AIA's first vice president, Benjamin E. Brewer Jr., FAIA; Massachusetts Gov. Michael Dukakis met with AIA President Ted P. Pappas, FAIA, on Sept. 13 in Washington, D.C. The summary also draws from position papers provided by the two campaign staffs. It is presented here in the format of a debate.

First, the candidates were asked what role the federal government should play to aid Americans in securing and maintaining decent, affordable housing, and how the federal government can encourage the strength of state and local governments and the private sector to address the diversity of housing needs. "It's the American dream to own a house," Bush said. Dukakis echoed, "The opportunity to live in decent and affordable housing is an integral part of the American dream." From here on their views diverged.

The Presidential candidates: below left, Michael Dukakis with Ted Pappas; right, George Bush with Benjamin Brewer.

Lisa Cohen



Richard Payne, AIA

"The last time we had a Democratic President," Bush charged, "the dream almost died. Inflation was rampant; interest rates were at record highs; and taxes took a much bigger bite out of the income of families trying to pay rent or to save for their first house. When the last Democrat left office, a typical $60,000 mortgage cost about $300 more a month than it does today."

It is the "sound" Republican policies of the 1980s, Bush maintained, that have "helped more families than ever realize the dream of homeownership. Housing starts were 25 percent higher in 1987 than in 1980 and 53 percent higher than in 1982. The federal government subsidizes more homes for low-income families than ever before, and it spends more money to maintain public housing than ever before," he added.

Dukakis disagreed with this scenario. "The disgrace of homelessness is a tragic sign of our inability to ensure decent housing for all," he said. "The need for affordable housing is greater than at any time in the last four decades. We must act now if we are to make the dream of homeownership a reality for the next generation. . . . Young families are finding it increasingly difficult to own their own homes. In 1949, the monthly cost of owning a house with a mortgage was 14 percent of the average 30-year-old's income; today it costs 44 percent. There had been a steady rise in the homeownership rate from 1940 through 1980. Since 1980, the share of young families buying their own home has steadily declined."

Dukakis attributed this to the fact that "we simply aren't producing enough decent and affordable housing. Back in the 1970s, with federal assistance, under both Presidents Ford and Carter, we were building or rehabilitating approximately 200,000 units of housing for low- and moderate-income families every year. Under the current Administration, that number has dropped to 25,000 units. At the same time, budget authority for the Department of Housing and Urban Development has dropped from 7.4 percent of the total federal budget in fiscal 1978 to less than 1 percent in the budget proposed for fiscal 1988. For the last half-century, at least until 1980, the commitment to decent affordable housing has been a bipartisan commitment.

"That consensus broke down in 1981. What we have seen during the past seven years," Dukakis continued, "is a steady, consistent withdrawal by the federal government from the field of housing. At a time when our need for affordable housing is greater than at any time since World War II, the federal government's role has declined to its lowest point since the 1930s."

As President, Dukakis would propose the creation of a "national partnership for affordable housing—an active involvement

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of developers and building trades unions and bankers and the clergy and realtors and housing advocates and community action agencies and government at all levels working together" toward four common goals:

• supporting local efforts to build low- and moderate-income rental housing, through federal housing incentive grants, the encouragement of mixed-income housing production, and rental assistance programs;

• broadening opportunities for home-ownership through better and more creative uses of federal credit and savings mechanisms;

• preserving our existing low- and moderate-income housing stock where it is threatened by disinvestment, use restrictions that are expiring, and other forms of neglect;

• providing flexibility to meet differences in state and local housing needs.

Overall, federal incentives would be used to encourage "state and local housing partnerships that can build and rehabilitate housing tailored to the needs of a particular state or community," Dukakis said. "Despite the importance of getting housing back on the federal agenda, we do not want to return to the old days of deep subsidies for programs crafted in Washington."

Bush did acknowledge that "as good as things are, they could be better. Homelessness cries out for solutions, and I compliment AIA for its creative Search for Shelter initiative. Additionally, low-income families need help paying the rent, young families need help taking the first step toward the American dream, and the right of Americans of all races to live where they want—and to be left alone—needs to be protected. I plan to help. I am going to help without raising taxes," he said.

The centerpiece of Bush's housing policy would be vouchers—public rent assistance given directly to families and individuals rather than the federal government contracting with developers to create new low-cost housing. Bush sees vouchers as a way for the federal government to help more people in need of housing assistance. "We can help two to three times as many people for the same amount of money we would spend on building new homes," he said.

"For most of the country, vouchers are the answer," Bush maintained. "Vouchers address the affordability problem directly by getting aid right into the hands of those who need it. Vouchers give aid recipients the ability to choose where they want to live, rather than corralling all the poor into the projects. Vouchers provide aid today—there is no construction lag time.

"Vouchers will not solve all of our housing problems, however," Bush admitted. In some areas of the country the supply of housing is "a real problem, and we will continue to support building programs in those regions," he said.

A Bush Administration would also "work with state and local housing officials to design the package of aid best suited to the needs in each area and [would] try to encourage localities to change regulations that restrict the supply of housing." Bush would also work to maintain the tax deduction for mortgage interest payments, which he said "the Democrats considered scrapping in their platform."

In the recent past much attention has been paid to the nation's infrastructure, a substantial portion of which is suffering from neglect or old age or is not keeping up with urban growth. What role should the federal government have in mitigating this growing national problem?

"The nation's infrastructure is the skeleton on which our booming economy is built," Bush said. Dukakis maintained that "we must invest in the nuts and bolts needed to make economic development happen: the highways, bridges, transit systems, clean air and water that are building blocks of our economic future."

Currently, under the Surface Transportation Act, Bush pointed out, "we are providing new funds for highway construction, repair, and rehabilitation—and providing new funding for mass transit. There has been extensive new construction and repair of airport facilities around the country under the Federal Airport and Airways Act. And we are pressing ahead with a massive overhaul of airport navigational and flight controller systems to make flying even more safe."

In addition, as President, Bush would "maintain the policy of nondiversion of assets from federal highway, transit, airport, and waterway trust funds, but would be sure that sufficient funds from those are plowed into renewing our infrastructure."

Addressing this problem Dukakis said, "There is no shortcut to rebuilding and expanding our public infrastructure. It costs money to do it right, and communities with the most serious economic problems are least able to foot the bill themselves." Besides supporting the Clean Water Act and the Surface Transportation Act, Dukakis as President would propose a "fund to rebuild America" with an annual budget of $500 million— "just one-seventh the cost of Star Wars." Through this program, public-private partnerships would be created to attract the crucial investment that makes "vibrant economic growth possible," Dukakis added.

Dukakis's "fund to rebuild America" would be one piece of a larger national urban policy. Other federal programs—the urban development action grants, the community development block grants, a "strong and better" job training program, and Dukakis's proposed affordable housing initiatives would round out a new "investment of public resources in the long-term health of cities and towns," he said.

To coordinate efforts among all levels of government, a Dukakis Administration would establish a local, state, and municipal government advisory board that, with the Administration, would examine whether "federal agencies were maintaining the kind of working partnerships with local governments that I expect in carrying out their programs," Dukakis said. The board would also examine "every major national initiative to a hard and probing discussion of its likely impact on American cities and towns," he added.

Dukakis's comments came in response to the question of how the federal government could—and would—ensure a set of complementary urban livability standards. It has been widely acknowledged among urban development professionals that many federal urban policies conflict with one another—policies concerning transportation, housing, economic development, environmental quality, and historic preservation.

Bush suggested that the problem of conflicting directives is "true throughout the federal government, not just in the urban policy arena." He called the federal government a "crazy-quilt of government bureaucracy, with typically a new patch added whenever there is a new problem . . . . We [the Reagan Administration] have tried to do something about this by using the Office of Management and Budget as a central command post for regulatory policy. This has been successful, but still some real bureaucratic reform is necessary. We simply don't need 15 offices to implement different bits and pieces of every policy.

"On this point my opponent and I differ," Bush added. "He is advocating building new bureaucracies to solve problems, but I believe we have to rationalize and integrate the bureaucracy that we are already stuck with—so that more of our tax dollars get spent on problems, not salaries."

An important urban component is the preservation of the nation's architectural heritage. Many urban development professionals believe the tax credit incentives approved by Congress in 1976 were an extremely successful tool encouraging preservation. Those incentives, however, were diluted by the Tax Reform Act of 1986, and as a result preservation activity has markedly decreased. It seems unlikely that the former tax incentives will be reinstated soon, since both Bush and Dukakis favor maintaining the 1986 tax code, with only a few changes.

"The 1986 Tax Reform Act was a good bill," Bush said. "It was imperfect, but after balancing the pros and cons I supported the final version. I have already called for some minor revisions of the tax code in my capital gains and child care proposals, but we should try to keep the tax code as simple as possible. There are other ways to promote the preservation of landmarks, such as zoning or local property tax adjustments."

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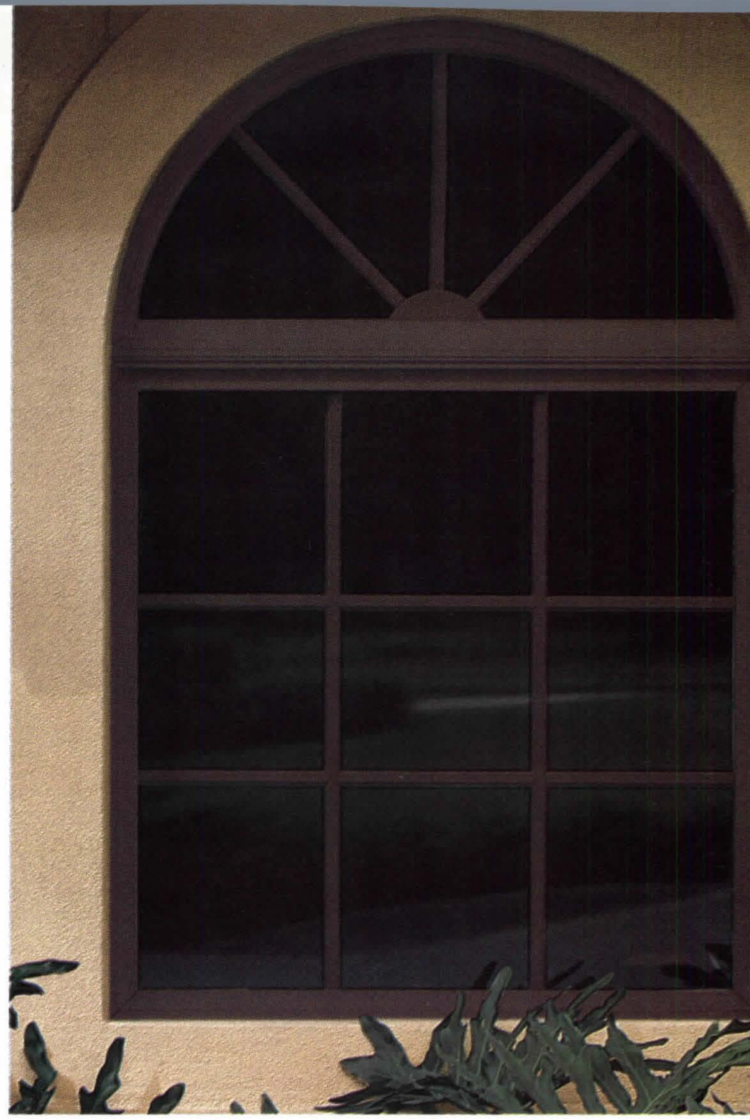

Government *from page 22*

Dukakis said that, although he might "eventually wish to change" some provisions of the 1986 act, "I believe we need a period of stability in our tax system. It is burdensome for everyone when we change our tax code every year, as we have done for the past decade."

A major source of assault and long-term damage to buildings is acid rain. Its effects on the built and natural environments have been well documented, yet still lawmakers argue about whether to continue studying this complex phenomenon or to take immediate action to mitigate future damage.

Dukakis pointed out that he was a leader in securing the enactment of a funding law in Massachusetts to clean up the environment. One provision of that law calls for reduction of toxic emissions that cause acid rain. As President, Dukakis said, he would work with Congress and the Environmental Protection Agency "to stop the acid rain pollution of North American skies and waters. I will establish national standards to reduce emissions of sulfur dioxide and nitrogen oxide—the two major components of acid rain.

"Acid rain," he continued, "is a national problem, which we must work together, as a nation, to correct. Any truly responsible national acid rain control program must consider and mitigate negative economic impacts through cost-sharing mechanisms [and] at the same time promote environmental benefits. . . . Even under the Clean Air Act regulations, proper regulation of tall stacks by EPA could cut sulfur dioxide emissions by nearly 5 million tons per year."

Bush ties his acid rain policy to those on energy and agriculture. "Acid rain cannot be viewed solely as an environmental problem to be solved only by imposing new smokestack and tailpipe controls," he said. "Rather, acid rain is also an energy issue because of the role cleaner fuels can play in reducing emissions, and an agricultural problem because of the need to avoid damage to crops and forests. Implementing an energy policy goal of diversification into cleaner alternative fuels such as natural gas, ethanol, and methanol will greatly expand the opportunities to reduce pollution and expand benefits to the farm sector at the same time. Therefore, I support [the Reagan Administration's] $5 billion program to develop new clean-coal technology and other pollution control incentives."

Bush also said the United States should "pursue the initiatives that have emerged from our dialogue with Canada. And if they do not produce results, we should establish specific emission reduction goals that promise steady progress toward cleaner air. . . . We must accelerate the elimination of regulatory and other barriers that diminish the ability of these cleaner energy sources and other innovations to compete in the marketplace."

Bush said the aim of his energy policy would be to "find more and conserve more, apply good old American know-how and technology to our energy problems, and protect the environment in the process. . . . This nation has struggled for almost 20 years to come to grips with thorny energy issues—with limited success," he said. "We need to bring some common sense to the table and face up to the looming challenge of our increasing reliance on unstable foreign sources of oil."

Research and development in conservation and renewable energy resources—geothermal, solar, and wind power—would be encouraged, as well as basic research in fusion, superconductivity, and particle acceleration. Alternative fuels "should not be ignored, either," Bush said.

Dukakis's energy policy "promotes our national security, the quality of our environment, and the future economic vitality of every region in our country," he said. "We must have dependable supplies at reasonable prices, healthy energy industries, and sound environmental practices. And we must pursue these goals in ways that bring us together, rather than pitting region against region, consumer against producer, industrialist against environmentalist."

Energy efficiency and conservation would be a priority, since they are "the most cost-effective and easily implemented energy supply options," Dukakis said. "One of the great tragedies of the current Administration's energy program has been its neglect of energy conservation. This era of neglect must end. Today energy efficiency and conservation are the most cost-effective and easily implemented energy supply options available. They are also the single best path in the near term toward energy security and reducing our nation's dependence on imported oil.

"I will increase federal support for improved energy efficiency," Dukakis continued, "not only in cars and trucks but also in electric motors, appliances, and buildings. I will also use federal government buildings as demonstration sites for energy-efficient technologies, such as cogeneration and efficient lighting."

A Dukakis Administration would also seek to increase the federal role in and funding of research and development of renewable energy technologies—active solar, alcohol fuels, biomass, cogeneration, passive solar, photovoltaics, solar thermal, wind, and wood energy. "As governor," he said, "I have worked to promote the use of renewable energy resources. . . . Our Alternative Energy Property program funds the design and construction of cost-effective renewable energy projects in several technologies for government facilities. We are demonstrating the feasibility of renewable energy technologies, while saving our taxpayers money. I know that the technologies of the future are within our reach."—NORA RICHTER GREER

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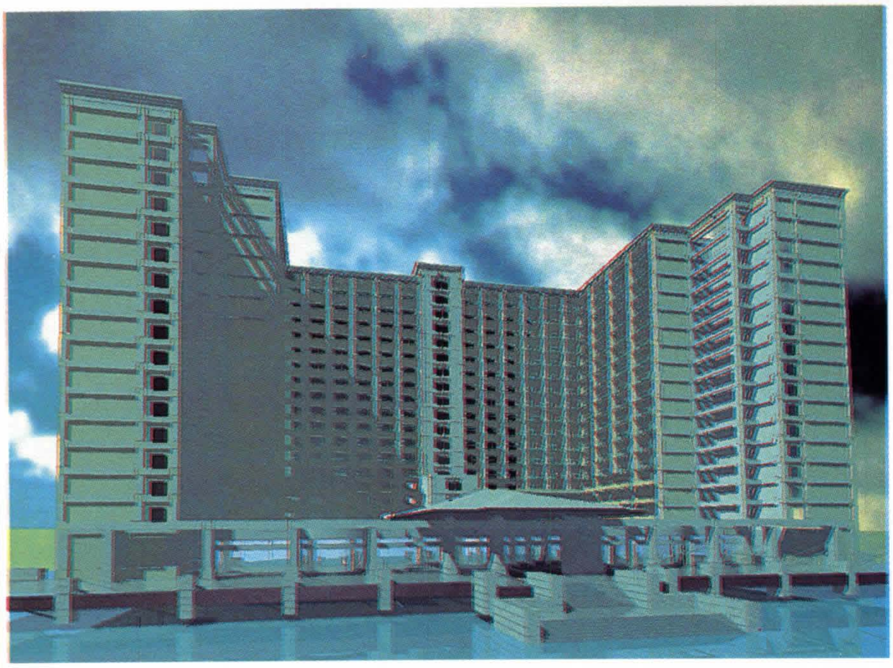

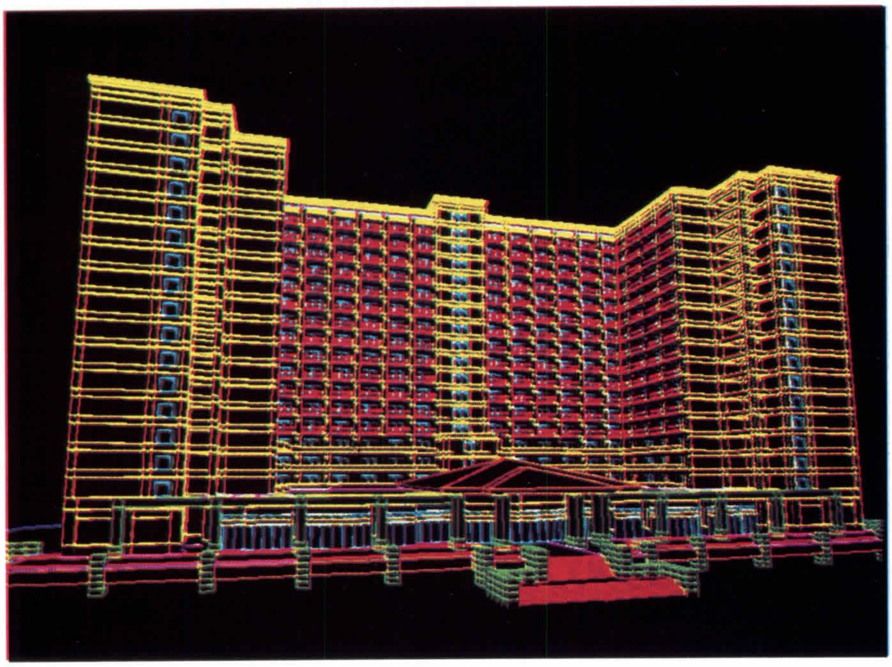

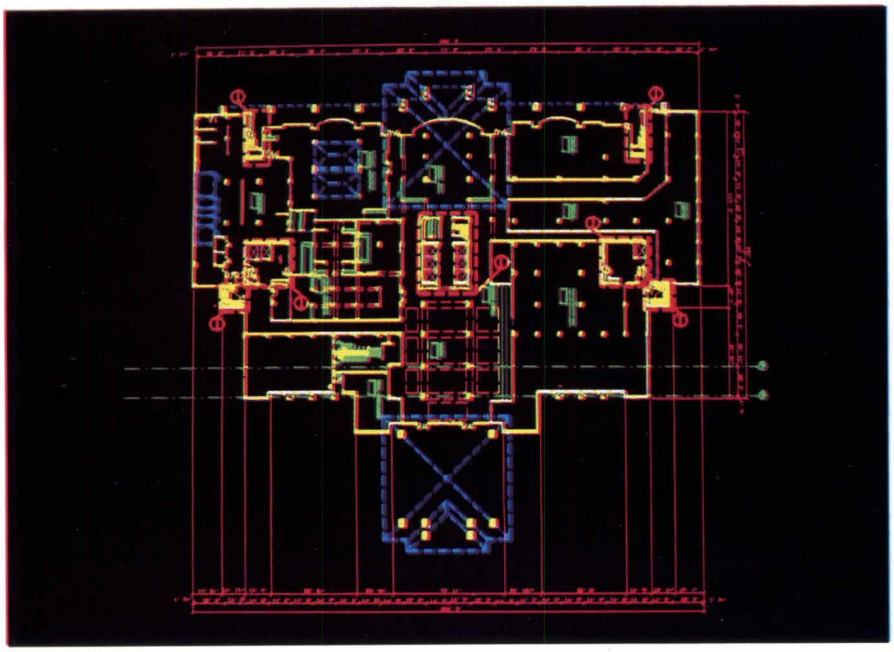

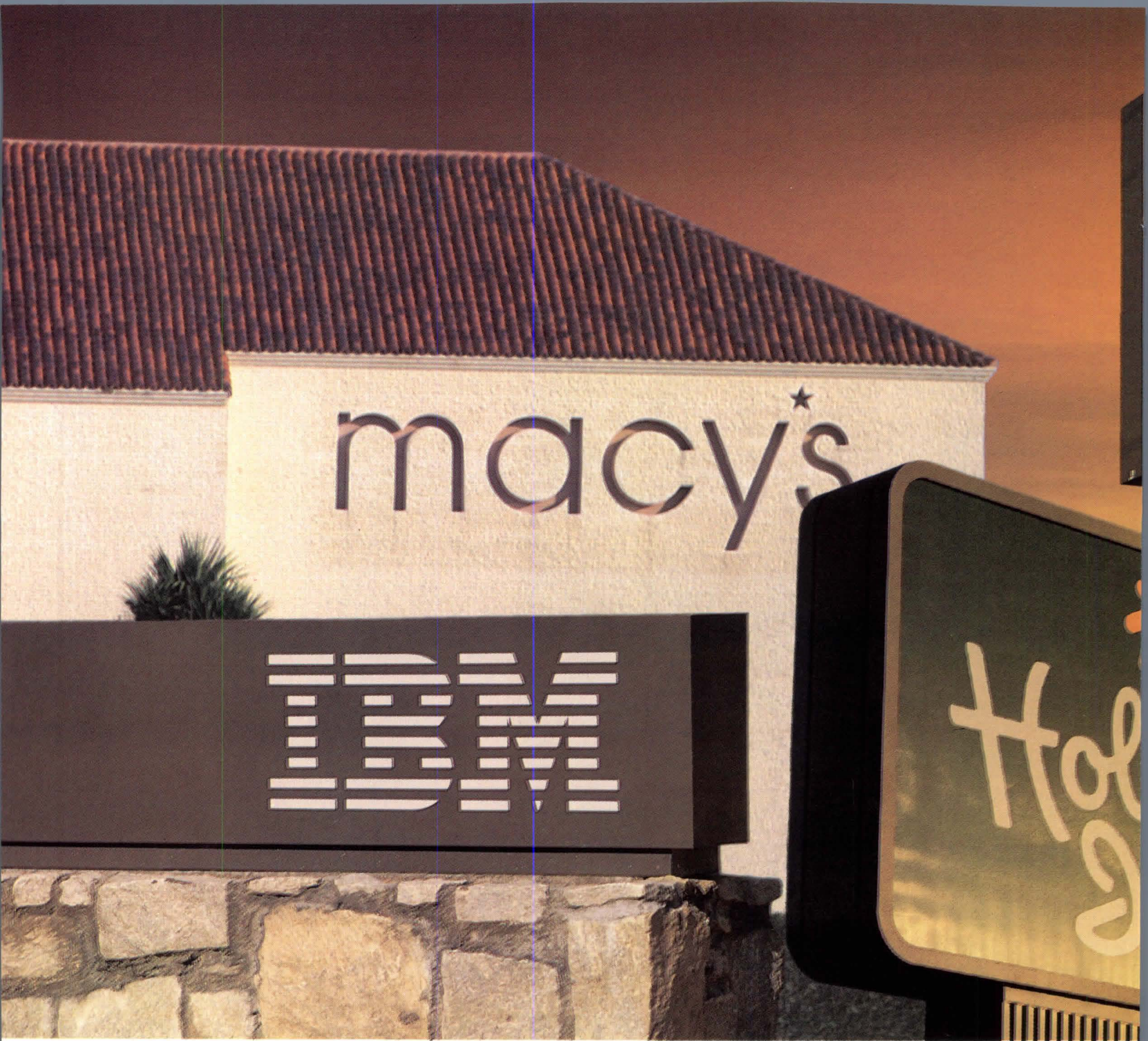

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Exhibitions and Conferences

Installation Contradicts Content In Chicago Architecture Exhibit

While the architectural world's curiosity was focused on the Museum of Modern Art's Deconstructivism show last summer (see Aug., page 28), a bigger and more elaborately planned Midwestern exhibition drew larger public audiences but less attention within the subculture. "Chicago Architecture 1872-1922: Birth of a Metropolis" was on display at the Art Institute of Chicago from July 16 to Sept. 5 after showings in Paris and Frankfurt.

It was the largest exhibition ever organized by the Art Institute's department of architecture and was augmented by a substantial slide show, films, lectures, building tours, and related exhibits elsewhere in the museum. Even without those many adjuncts, the exhibition and its oversized, 480-page catalogue constituted one of the most ambitious architectural shows ever attempted in this country.

"Chicago Architecture" was eight years in the making, and its nearly 300 items were set in a theatrically designed installation. Although its subject lay well in the past, this did not lead to a safe or predictable treatment. Going beyond the accepted notion of Chicago as the seedbed of a uniquely American architecture, curator John Zukowsky pursued the premise that the city was also molded by strong European influences. His secondary theme was that of the architectural hero. To make matters more interesting, architect Stanley Tigerman's installation had strong narrative and symbolic overtones that at times contradicted Zukowsky's historical reinterpretation.

This was an ironic situation, since 12 years ago Tigerman himself was an organizer of "Chicago Architects," a revisionistic show and book that expanded upon the then-canonic Miesian view of the city's architectural culture. Now, the former rebel was defending the faith against a further broadening of the definition of Chicago's architectural essence.

Whichever side one takes in this debate, it is unmistakable that Tigerman's vision was the more powerful within the confines of the Art Institute's Morton Gallery. Zukowsky's idea of strong European roots, whether intellectually valid or not, was not convincingly supported by the material he assembled. These 15-score artifacts were often interesting or impressive in their own right but did not advance the larger thesis effectively. It was rather like the proverbial Broadway musical that sends its audience home humming the sets: whatever organization and narrative existed came largely out of Tigerman's committed, high-risk approach to the installation design.

The result was a controlled sequence of spaces corresponding to the exhibit's periods and themes. The first, devoted to the historic context, was dominated by a model of 12 downtown blocks in ruin after the fire of 1871. The next, given over to French and German influences, was a latticed and trellised construction based on a Tuscan villa and accented in smoldering reds and blues. Tigerman's rationale was that Europe equals classicism and classicism equals the Tuscan style, but this was neither a credible syllogism nor the point that Zukowsky wished to make.

A temporary gift shop took up a large stair hall in the midst of the exhibit. (Apropos of this bit of commercialism, Tigerman wryly noted that "it's very Chicago.") There, classical aediculi labeled Sullivan, Wright, and Burnham were used to display books and other items for sale, many of them designed for the show by Tigerman. A fourth temporary pavilion in the form of a Miesian steel frame was empty and uninscribed.

The next section was devoted to "Major and Minor Masterpieces" and featured a floor painting of the plan of Graceland Cemetery sprinkled with fallen autumn leaves and accompanied by a recorded jazz band funeral dirge. This evocative set piece also seemed to have little bearing on the subject, other than to remind us that all the turn-of-the-century architects represented were dead, and perhaps to make a musical pun on "major and minor."

Louis Sullivan's architecture and ornament occupied an arcaded basilica oddly trimmed in electric shades of green. Sullivan often used the arch, but not in the constricted academic manner of this space. Urns of pale dried ferns were placed near examples of Sullivan's florid ornament, underscoring the natural sources of his decorative forms and setting a poignant tone in keeping with Tigerman's contention that "Chicago's architectural heroes have all been failures misunderstood by their contemporaries and their disciples." As beautiful objects and as communicative devices, these ghostly fronds may have been the crown of the installation.

The funerary ferns continued into Wright's section, which was dominated by an impressive dining table and chairs from the Robie house. This room was distinguished by warm-toned beams and banding that were fully in character with

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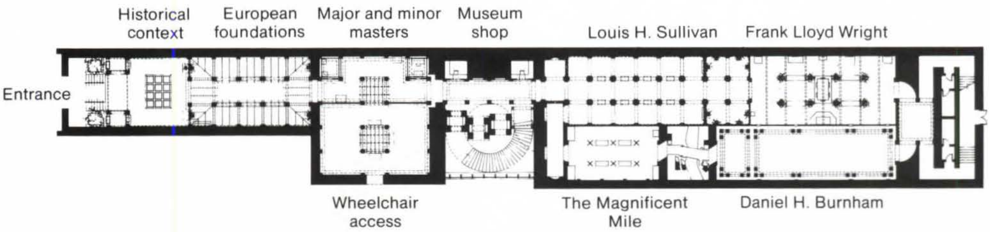

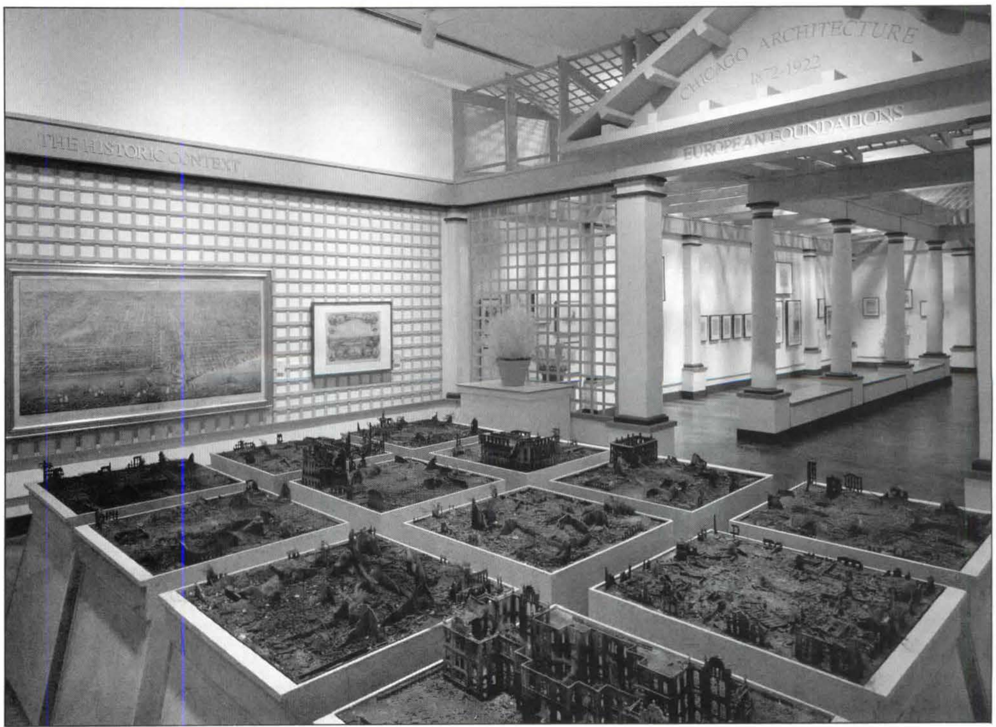

Model of Chicago after the 'Great Fire' in the section called 'The Historic Context' (see exhibition plan above).

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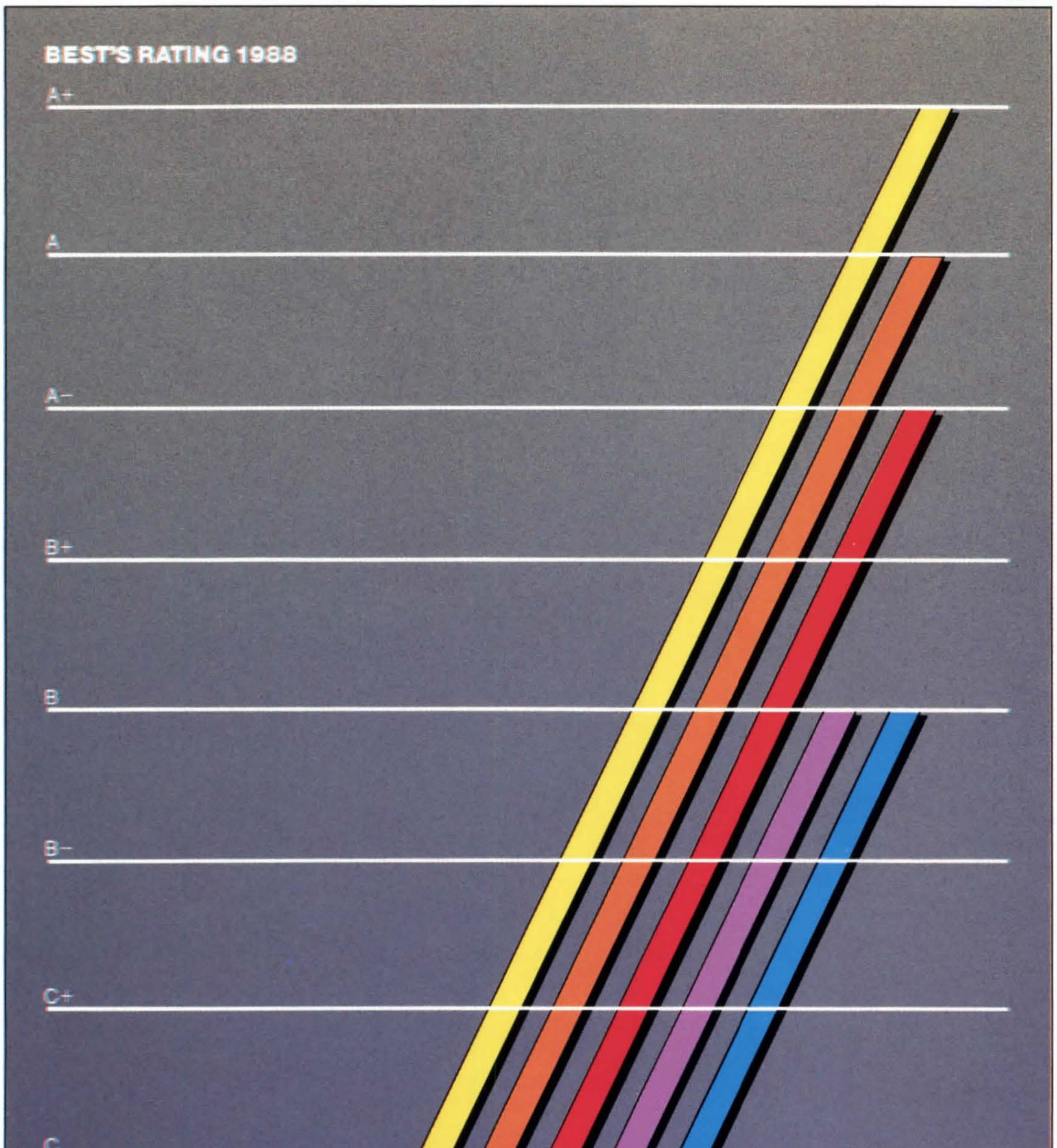

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Exhibitions and Conferences *from page 30*

Wright's work without diverting attention from the displays. Here Tigerman rose fully to the occasion, providing the best space for the exhibit's greatest figure.

A heroic-sized Wright portrait terminated the 300-foot enfilade that began at the exhibition's entrance. Mounted on a concave wall, it turned the museum-goers rightward into a darkened corridor where Daniel Burnham's oversized portrait gazed back at Wright's. Here again Tigerman was commenting upon—indeed, strongly disagreeing with—Zukowsky's curatorial intent, for after passing Burnham's image the spectators were turned right once again and were now proceeding back. This metaphor of regression may have arisen from the imperatives of circulation, but there is no doubt that the message was intentional. On the audio tour, Zukowsky declared that Burnham's spatial ability "makes [him] an equal to Wright." Tigerman retorted that Burnham "reduces invention to convention and transforms heroism into success." He compared Burnham's work to the emperor's new clothes. This exchange was the most enlightening part of the recorded tour, and was the tip of a large iceberg that will be discussed later.

Like Sullivan's, Burnham's space was arcaded in a not quite appropriate form and trimmed in bright colors. (Curiously, Sullivan's room would have suited Burnham far better). This section dealt with Burnham's urbanism, particularly his 1909 plan of Chicago. It was a pastiche of Baron Haussmann's boulevards, unexecuted Parisian designs and planning schemes, and Frederick Law Olmsted's large-scale park systems, and it denied the reality of the city's skyscrapers, many of which were the work of Burnham's own firm. Largely unimplemented, it is one of the great sacred cows of American city planning and merits re-examination rather than the honorific treatment it received here.

In another clever transition, Tigerman linked Burnham with the Tribune Tower competition via a floor map of the Michigan Avenue Bridge. In a darkened room rough models of four pre-Depression skyscrapers hovered eerily over their sites. The next room was also a reference to the outdoor space of North Michigan Avenue, with a *trompe l'oeil* frieze of a cloudy blue sky and rows of park benches and plywood lamppost silhouettes. It housed some of the Tribune Tower competition's better- and lesser-known entries, including those of Walter Gropius and winner Raymond Hood. Here, Zukowsky noted that Gropius's modernist submission was seen by the jury as old-fashioned because it made use of the classic Chicago window, while Gothic revival entries modeled after New York's Woolworth Building looked new.

The exhibition concluded in an alcove devoted primarily to runner-up Eliel Saarinen. His portrait faced one of Sullivan, which was barely visible through a narrow slot. Thus, a show that began with a long but open view of Wright ended with a constricted glimpse of his master.

For all the installation's symbolism and complexity, Tigerman also tried for wide accessibility, and his flamboyant approach proved very popular: more than 100,000 people attended the show during its rather short duration. [It opened at the San Francisco Museum of Modern Art Oct. 6 and closes Dec. 4.] At the same time, Tigerman's work carried a deeper message, with its solid-seeming painted plywood forms reflecting "the dissimulative nature of [European-derived] Chicago architecture." Speaking of its basic premise, he said that "the show is a slap in Chicago's face. The city doesn't believe in itself."

Perhaps more accurately, the exhibition seemed not to believe in Chicago. Both in architecture and literature this is a city where realism has been raised to an art, but here was a show celebrating Beaux-Arts escapism. It took as its basis an architectural footnote and inflated it to a greater size than the primary text. Its subject was not the Chicago of the nation's first coherent skyscraper school—the treatment of that movement, arguably the city's architectural zenith, was cursory and fragmented, and so major a figure as John Wellborn Root was relegated to a lecture rather than given a prominent space on the wall or in a catalogue essay. Neither was it the Chicago of the els and railroads (there wasn't a train station in the show), the stockyards, the local business districts, the bungalows and three-deckers where most people lived, or the neighborhood churches and synagogues where Europeans really did express their aspirations

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Temporary museum gift shop booths.

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through architecture. Here, under an all-inclusive title, was Chicago stripped of much of its architectural genius and almost all of its vernacular vitality. In this context, Tigerman's occasional failures of taste and judgment were nearly as welcome as his successes, since they embodied a creative impulse and passionate conviction that were missing in the show itself.

There was a certain paradox in his collaboration on an effort that he disagreed with so strongly. The critical consensus was that the installation was superior to the exhibition, or at least more worthy of analysis. The heavy attendance, both public and professional, must have been due mainly to the showmanship of the setting. Thus, Tigerman labored mightily to attract people to an event that he found insulting to his city. In a similar situation a dozen years ago, he joined with like-minded colleagues to produce an enlightening counter-exhibition. That may be the sort of thing that mere mortals can do only once in a career. Perhaps this Chicagoan is correct in his belief that heroism and success are not compatible in local architecture.

When "Chicago Architecture" opened, a more modest exhibit was winding down just three blocks away at the old public library. It was devoted to Nelson Algren, a neglected literary giant whose career suggested that it is not only architectural heroes who find success elusive in the Windy City. This show was fascinating and moving in its depiction not only of the writer but also of the place that he took as his source and home. A page of typescript in gruff praise of the city and photographs of the author in its streets and beaneries were enough to capture a significant part of Chicago's spirit.

"Chicago Architecture" wasn't able to attain that level of poetic truth, but it did suggest what was possible and what is needed. This city's architecture and urban form are of undeniable consequence and deserve a permanent venue for their display and interpretation from multiple viewpoints. The Art Institute's exhibition could be seen as either a grandiose disappointment or as part of a learning process in the communication of the city's architectural and urbanistic accomplishments. Providing a framework for further communication would be no small task, but it should be possible for an architectural community that appreciates its importance.

—John Pastier

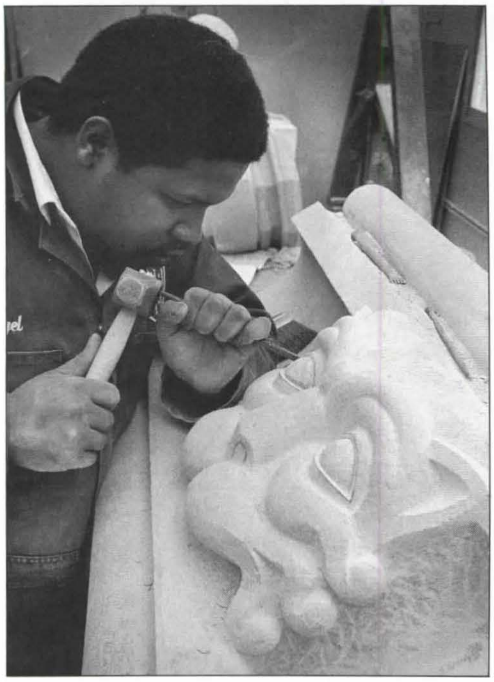
Learning to Carve Stone the Old-Fashioned Way at St. John

Do 20th-century crafters building a 12th-century cathedral in the middle of New York City have rocks in their heads?

How does stone technology of the Middle Ages compare with that of the present? These were the questions asked and answered at a symposium entitled "Craftsmanship and Technology of the Middle Ages and Today," held at the Episcopal Cathedral of St. John the Divine in New York City last July.

The symposium occurred at the midpoint of a summer program, sponsored by the cathedral's Stoneyard Institute, called "Build a Cathedral This Summer," in which architecture students, artists, and anyone else who can swing a hammer, likes high places, and otherwise qualifies comes to study stonecutting and cathedral building at St. John. The program, now two years old, is the most recent undertaking in the building of St. John—a two-century-long "cathedral crusade" that began a hundred years ago and will extend well into the 21st century.

At the symposium, architects, an artist, professors, and a landscape architect spoke of the significance of stone construction and of problems and solutions of the past and present. Students and symposium audience heard the cathedral dean, the Very Rev. James Parks Morton, explain why the church is building a Gothic cathedral in 20th-century New York. They heard professors Stephen Murray and James Addiss and this writer discuss cathedrals in spatial and social context, as image and building in stone and steel.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Above, student Angel Escabor carves a lion's head for a lower cornice.

During the lunch break the audience visited the top of the tower to watch carvers and stonecutters at work. They also viewed Manhattan from the highest point of land on the island, perched on scaffolding 200 feet above the street.

The afternoon session included a group presentation by sculptor Walter Diusenbery, architects Malcolm Holzman and Peter Walker, and landscape architect Gary Handel. Each presented his work and ideas; then the group and audience joined in discussing design solutions to a stone building problem.

Training at the Stoneyard Institute is based on the medieval guild system. All work is done under the supervision of English master masons who worked on the restoration of the cathedral at Wells, a small, medieval, town near Bristol, England. Students in the "Build a Cathedral This Summer" program work alongside the year-round cathedral building crew of apprentices and journeymen to master the skills of cutting, carving, and setting stone.

The first mason apprentices at the cathedral workshop, who are now journeymen carvers, were selected from the depressed areas in the surrounding neighborhood. The workshop is the heart of the cathedral building program and also the cornerstone of Morton's first U-HAB, a community rehabilitation program for multiple-family dwellings. U-HAB became a national demonstration model and received a $3 million HUD grant in 1978. It was aimed at the thousands of abandoned but sound,

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serviceable brick and stone buildings in American cities. Many of them are in Harlem.

"If we plan to rehabilitate instead of bulldoze, there is going to be a great deal of need for skilled labor to restore these buildings," Morton declared. "We are not training people for basket weaving—stonecutting is going to become a crucial trade."

Although the rebuilding of Harlem remains a primary goal, the emphasis appears to have shifted once again. We find ourselves in a new era of stone, according to Morton. Our society is enamored of stone construction; hence, St. John's summer program and symposium.

St. John, like a medieval cathedral, has been a long time building. Its site was chosen a century ago, in 1888, and the architecture firm of George Louis Heins (1860-1907) and Christopher LaFarge (1862-1938) was chosen from about 60 competitors for the design.

The cornerstone was laid on the Feast of St. John the Divine, Dec. 27, 1892, in probably the only event in the cathedral's building history to take place on time. After two years of digging and $500,000 more than budgeted, the diggers finally found bedrock in the huge excavation at 72 feet below the surface. By comparison, the foundations of some of the greatest French cathedrals are at 30 feet, the average depth of a Paris subway station. The relationship between the cathedral trustees and their architect was no firmer than their foundation estimates, and in 1907 the death of Heins released the trustees from their contract. They selected Ralph Adams Cram as the new architect. He changed the design from Romanesque to Gothic, and building proceeded slowly until Thomas Manning was appointed bishop in 1920. The construction of the great nave began four years later, and work on the north transept two years after that. The bishop was assisted in a massive fund-raising campaign by a young lawyer named Franklin Delano Roosevelt.

Work continued during the Great Depression amid foundation problems with the north transept. Nave and crossing were joined and a ceremony held to celebrate the triumph on Dec. 6, 1941. The Japanese attacked Pearl Harbor the next day, and Manning gave the iron and steel on the construction site to the war effort.

After the war, social issues took precedence over building at the cathedral, and various desultory plans were proposed for its completion. In the late 1960s, pent-up frustration exploded in New York and other cities. Harlem rioted, and in 1969 students barricaded Columbia University, next door to the cathedral. Bishop Horace William Baden Donegan stopped all building and sought funds to address social ills.

A decade after Donegan stopped the work, it began again. Morton, a former architecture student turned Episcopal priest, was appointed dean in 1973. He vowed to resume building and, in 1979, dedicated a new stoneyard.

The search for bedrock resulted in what has become perhaps the world's largest and most unorthodox crypt. It houses a children's day school, artists and dancers, and a senior citizens' outreach program. Shinto services are held, whirling dervishes whirl, new-age musicians perform, and public figures such as Jesse Jackson and Kurt Vonnegut have delivered sermons there.

"Any cathedral that is alive will never be finished," said Morton. "The needs of the city require its continued development and continual growth. Once a church says it is finished it has become a museum and no longer a church."—Forrest Wilson

Deaths

Arthur Odell: AIA President And Charlotte Architect

Arthur Gould Odell Jr., FAIA, an eighth-generation North Carolinian, in 1964 was elected the Institute's first president from a Southern state. "Gouldie" Odell brought to the office "a restless energy, a dry humor, and a steady record of plain, outspoken language," reported *Architectural & Engineering News* at the time. His Charlotte colleague S. Scott Ferebee Jr., FAIA, remembers him as "one of AIA's most colorful and forceful presidents."

Odell received his architectural degree from Cornell in 1934, did graduate study at the Ecole in Paris, apprenticed with Harrison & Fouilhoux in New York City, and worked briefly for industrial designer Raymond Loewy before opening a one-man architectural office in Charlotte in 1939. The firm that grew into Odell & Associates—now numbering more than 200 employees with branches in Richmond, Greenville, S.C., and Tampa, Fla.—is architect of the Burlington Industries headquarters in Greensboro, N.C., the Hampton Coliseum in Virginia, and the North Carolina Blue Cross and Blue Shield building in Chapel Hill, N.C. Odell, who retired from the firm in 1982 with the title chairman emeritus, died last April in Charlotte. He was 74.

Ray Eames: Designer, Artist

Ray Eames, with her late husband and partner, Charles Eames, strongly influenced furniture and industrial design for the last 40 years. The Eameses collaborated in hundreds of innovative designs for mass-produced chairs, tables, and other furniture that combined style with function and comfort.

Their most famous works are the molded plywood chair, a winning entry (with Eero Saarinen) in the Museum of Modern Art's 1940 competition for "organic design in home furnishings," and the leather lounge chair with ottoman, which appeared in 1956 and is still popular. In the late '40s the Eameses began a long association with the Herman Miller Co., which continues to produce some of their classic modern chairs.

A native of Sacramento, Calif., Ray Kaiser studied painting under Hans Hoffman in New York City for six years in the '30s. She met Charles Eames at Cranbrook Academy of Art in Bloomfield Hills, Mich., in 1936. Five years later they married and moved to California.

The Eameses' house in Pacific Palisades, Calif., completed in 1949, was designed and constructed to incorporate materials and techniques standard at that time for industrial architecture but not widely used in residences; their house was one in a series of case study houses sponsored by *Arts & Architecture* magazine. The delicate steel-framed house won the Institute's 25-year award in 1978. The judges called it a "merger of technology and art, transcending mere construction and avoiding sterility by combining elegance and utility."

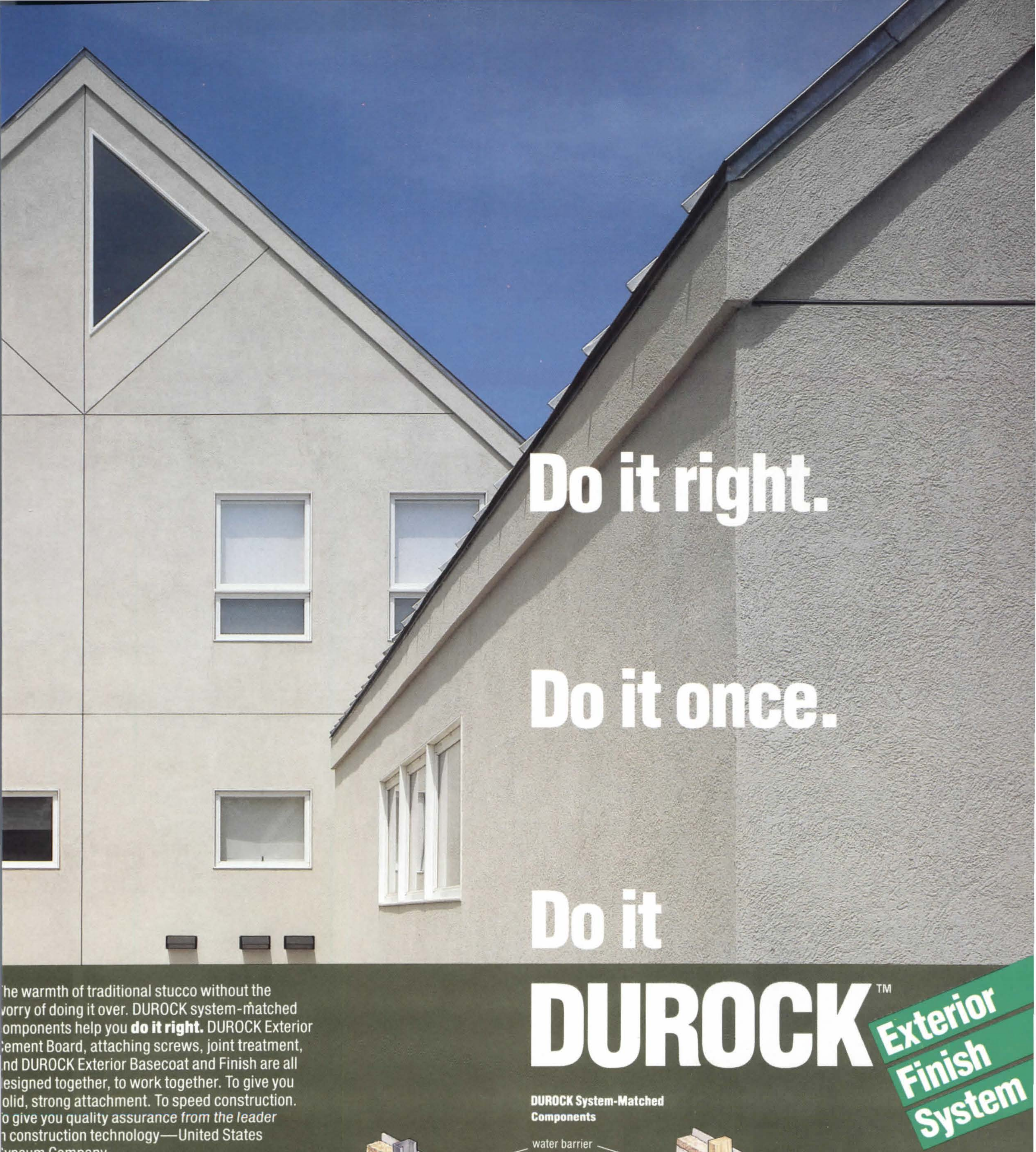
The couple also collaborated on designs of books, fabrics, museum exhibitions, and scientific and educational films.

Eames died in August in Los Angeles. She was 72.

Timothy Patrick Alcox, vice president of Sandy & Babcock Inc., Architects & Planners, San Francisco, died in July at the age of 54. Alcox studied under Bruce Goff at the University of Oklahoma and graduated with special distinction in 1957. He worked with the National Park Service, Anshen & Allen Architects, and Claude Oakland & Associates before joining Sandy & Babcock in 1972.

William A. Bernoudy, FAIA, of St. Louis, was known for his residential designs, furniture, and designs for stained glass windows and screens. His public buildings include an arched gate at the St. Louis Zoo, Beaumont Pavilion in Washington University's quadrangle, the United Missouri Bank of Ferguson, and Temple Emanuel in Creve Coeur, Mo. He was a Taliesin Fellow with Frank Lloyd Wright in the early 1930s. From 1947 to 1966 he practiced architecture with Edouard Jules Mutrux. He was in his mid-70s when he died last summer.

Neill Smith, San Francisco architect and environmentalist, died in August at the age of 60. He earned his architecture degree from Princeton. In 1961 he established an architecture firm, Neill Smith Associates, and in 1971 started Whole Systems, an environmental research and development firm in Mill Valley, Calif. His architecture firm won more than 50 national and international awards, including citations for the Capitol Mall in Sacramento, Calif., the International Science Center in Sunnyvale, Calif., and the Navajo Tribal Government Center in Window Rock, Ariz. □



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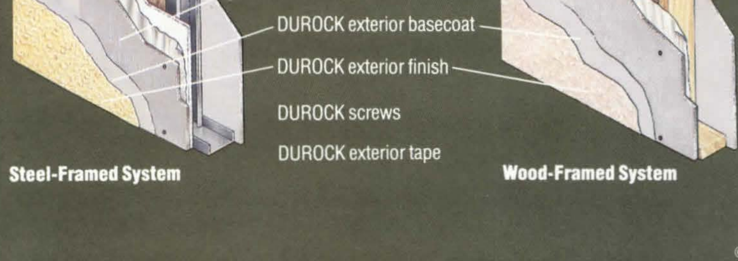

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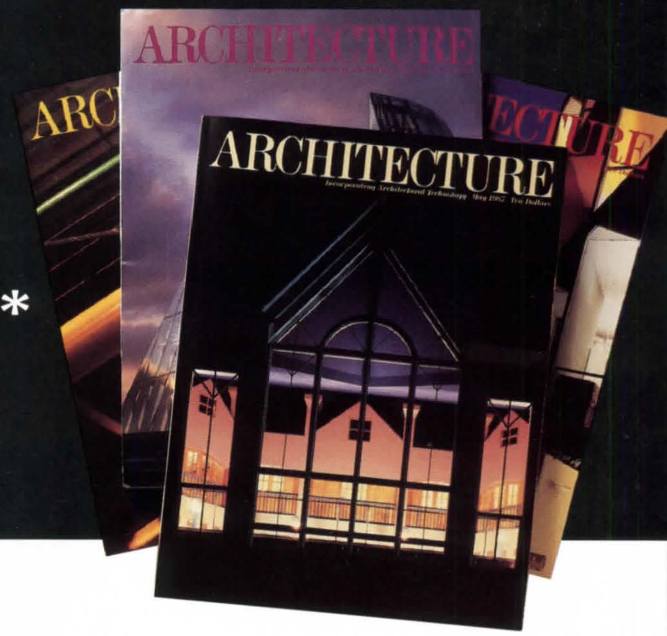

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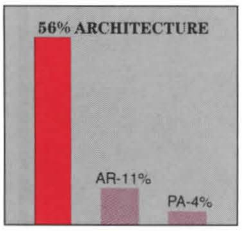

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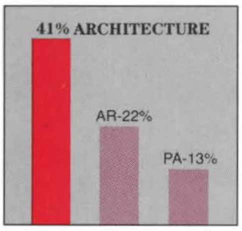

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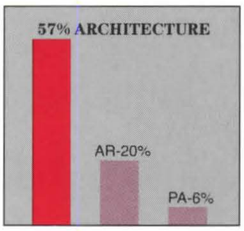

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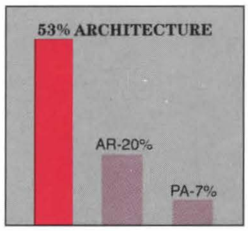

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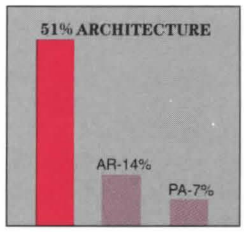

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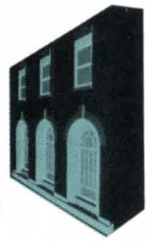

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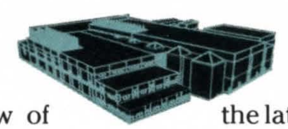

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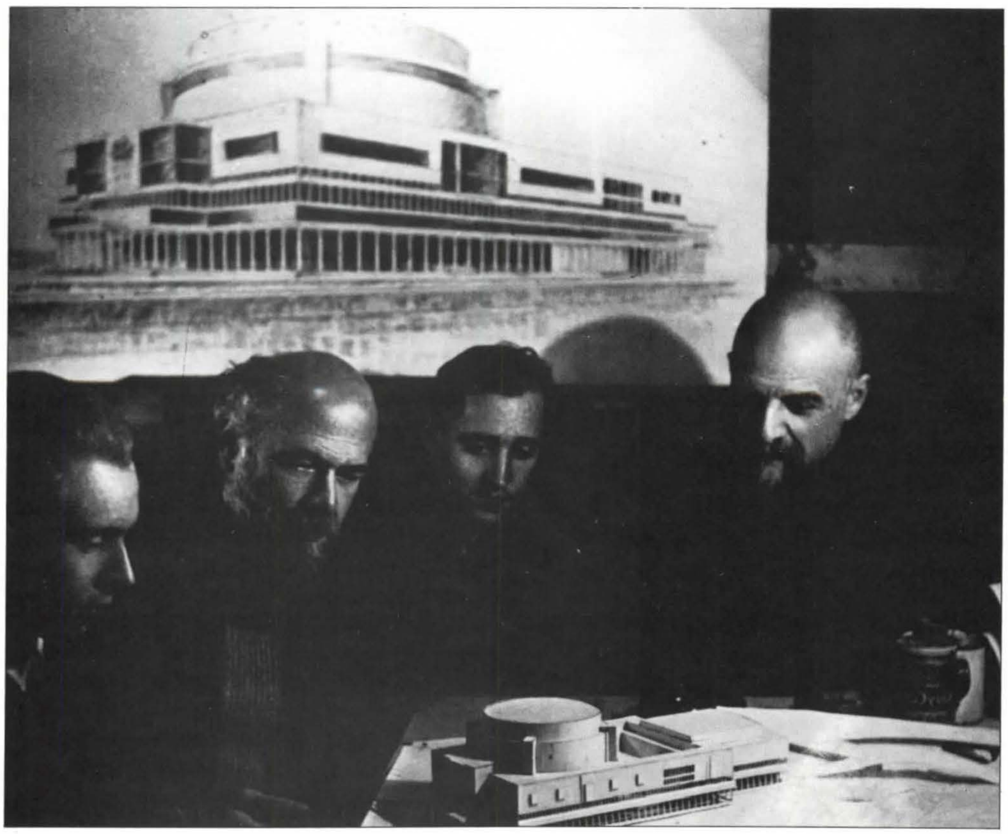
The Founding of Constructivism in Russia

Alexandr Vesnin and Russian Constructivism. Selim Omarovich Khan-Magomedov. (Rizzoli, $35.)

The Vesnin brothers have been generally recognized as the founders of constructivism in Russian avant-garde architecture. Their design of the third-place entry to the 1922-23 competition for the Palace of Labor in Moscow became an iconoclastic image of the style to follow. Further reinforced by ensuing competition entries, such as the Leningrad *Pravda* offices and the Arcos Co. headquarters in Moscow, both designed in 1924, and the Telegraph office building in Moscow, 1925 (none of which was built), this imagery stood synonymous with the Russian revolution and symbolized the new social and political order of the country. It was conceived to accommodate the new man who had outlived his past and now lived for a bright future.

The constructivist architectural language was manifested through a strong framework of exposed structural elements on a clear stereometric volume that gave forms a rhythmic order. Building entry, circulation, and major functions were articulated in the mass so that architecture communicated to observers its use and purpose. Furthermore, the visual paraphernalia connected to the vision of a modern city were organically integrated into a unique and unified artistic expression: signboards, clocks, antennas, searchlights, loudspeakers, projection screens, public announcements, advertising, shop windows, etc. In other words, a constructivist building was in motion: it was dynamic and animated and designed as a three-dimensional object to be observed at an oblique angle.

In this book, Selim Omarovich Khan-Magomedov reveals to us the specific role of Alexandr Vesnin in the movement. The youngest of three brothers, he was the moving force, the innovator, the form giver of their joint designs. His leadership was equally vigorous in the arena of design philosophy, theory, and criticism. He founded in 1925, along with Moisey Ginsburg, the first organization of constructivist architects—the Association of Contemporary Architects. Alexandr was recognized as the spokesman of the group, and his studio had become the training center for the young adherents of the new movement.



Right, Leningrad Pravda *competition scheme by Alexandr and Viktor Vesnin, 1924. Below, Leonid Vesnin (first on left) and Alexandr Vesnin (second from right) with Palace of Soviets model, 1933.*

A versatile and talented artist, Alexandr tested first the ideas of the new style in painting, graphic design, and stage design. He experimented with bold graphics and typography used in poster design and propaganda art, which was intended as the primary means of communication with the largely illiterate masses. The pictorial compositions integrated with revolutionary slogans emitted the society's thrust forward into the future.

However, it was Alexandr's contribution to the art of scenography that set him apart

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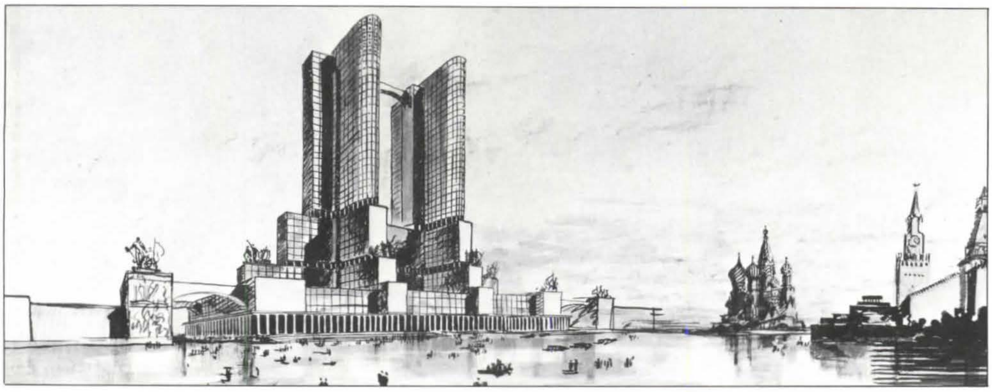


Books *from page 43*

from his fellow artists. He created a number of avant-garde stage designs that influenced theater productions worldwide. The realistic and representational approach to scenery imagery was replaced by scaffoldlike constructions made of rough wood and metal, exploding the actor's space in all directions. A state set consisted, in Vesnin designs, of architectural structural elements such as trusses, columns, and beams organized into compositions of towers, bridges, ramps, stairs, elevators, pulleys, etc. This high-tech imagery of the times was further intensified with the use of billboards, signage, neon lights, and other elements creating a picture of an exciting and dynamic future world. In fact, the constructivist form vocabulary had been defined in graphic and stage designs before its introduction into architecture.

Competition proposal for the People's Commissariat of Heavy Industry, 1934.

The author should have elaborated on the Vesnin brothers' contributions to urban design. In particular, the concept of the "ribbon city," first envisioned by Nikolai Miliution and applied by the Vesnins to plans of the cities Stalingrad and Kuznetsk in 1930, laid the foundations of Soviet town planning principles used since in hundreds of new towns throughout the Soviet Union.

Unfortunately, the translation and transliteration of many Russian names and terms in the book is inconsistent and incorrect.—PETER LIZON, AIA

Dr. Lizon, an architecture professor at the University of Tennessee, writes on Soviet and Eastern European architecture and urbanism.

Architectural Acoustics. M. David Egan (McGraw Hill Book Co.)

Mr. Egan has given the architectural profession another book. This one is an extension of his *Concepts in Architectural Acoustics*, one of his well known "concept" series that includes thermal comfort, building fire safety, and architectural lighting.

Most students and instructors of architecture are familiar with Egan's books and will welcome this addition. Egan has sought long and hard to make the dry subjects of environmental systems palatable to students and practicing architects. His device has been to write simply and illustrate profusely. As he says in the preface to *Architectural Acoustics*, the intention is "to present in a highly illustrated format the principles of design for good hearing and freedom from noise in and around buildings. The illustrations are the core of the coverage of the basic principles of sound and hearing, sound absorption, and noise reduction, sound isolation and criteria for noise, control of HVAC systems and noise and vibrations, auditorium acoustics design, and electronic sound systems."

Concepts of Architectural Acoustics was published in 1972, *Architectural Acoustics* this year. Egan's intention is to cut through to the basic core of information required for architectural acoustics. In his new book, he has added 16 years of experience of teaching and cognizance of the

continued on page 46

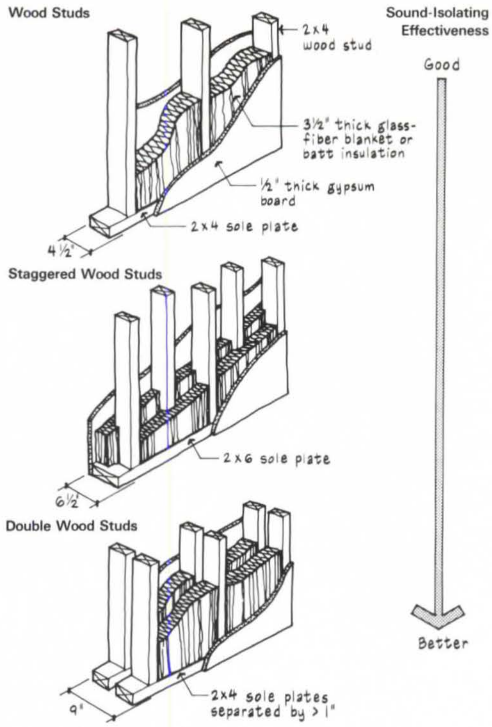
Books *from page 44*
changes in building and landscape design that have taken place during this period. *Concepts* was 200 pages including front matter and index; *Architectural Acoustics* contains 411 pages.

The new material includes coverage of such subjects as open and closed plans and offers details and solutions. The analysis sheets and work plans are particularly helpful. The book also mentions such new features as atriums, which have become so popular during the 16 years since *Concepts* was published.

The old material has been included and updated. Some of the old drawings are in the new book, and many of them have been redrawn. Egan provides a detailed table of contents in both books, but unfortunately the index does not appear as thorough in the new book as it was in the old.

Almost all present-day books on architectural technology now include sections or chapters on acoustics. This was not true of architecture books of the '50s and '60s. For example, Harry Parker's well known *Materials and Methods* did not include acoustics. It is probably fair to say that much of the present-day interest in acoustics is due to Egan's work.

Many books now separate acoustics into "noise control" and "sound control, or acoustics." Egan does not; instead he wisely considers noise and sound as part of the same design problem. This stance informs his treatment of mechanical systems and their sound transmission. Egan discusses speech privacy and the annoyance of noise but does not get involved in the behavioral implications of sound and noise.



The drawing above is one of the many sketches that, along with charts, diagrams, and photographs, illustrate Egan's new book, Architectural Acoustics. *It compares the relative sound-isolating effectiveness of single wood studs, staggered wood studs, and double wood studs for wall construction.*

The problem with Egan's book is not in the coverage—he does indeed cover all bases, including a few more than in *Concepts. Architectural Acoustics* is full of charts, diagrams, graphs, and graphics covering a wealth of material thoroughly—at least as thoroughly as is required for architecture students and most architects. The problem is that the graphics are simply ugly. Egan's book needs a little of the wonder and mystery of human behavior woven into the charts and diagrams.

I would not fault this book's fine coverage of acoustics, but rather the idea widely accepted among technical writers that technical subjects can be covered in isolation. The graphics in *Architectural Acoustics* could be much more imaginative to better reinforce the text, and acoustics can be explored as part of seeing and thermal comfort, which Egan has written about before. This might be the next step for the prolific and multifaceted author.

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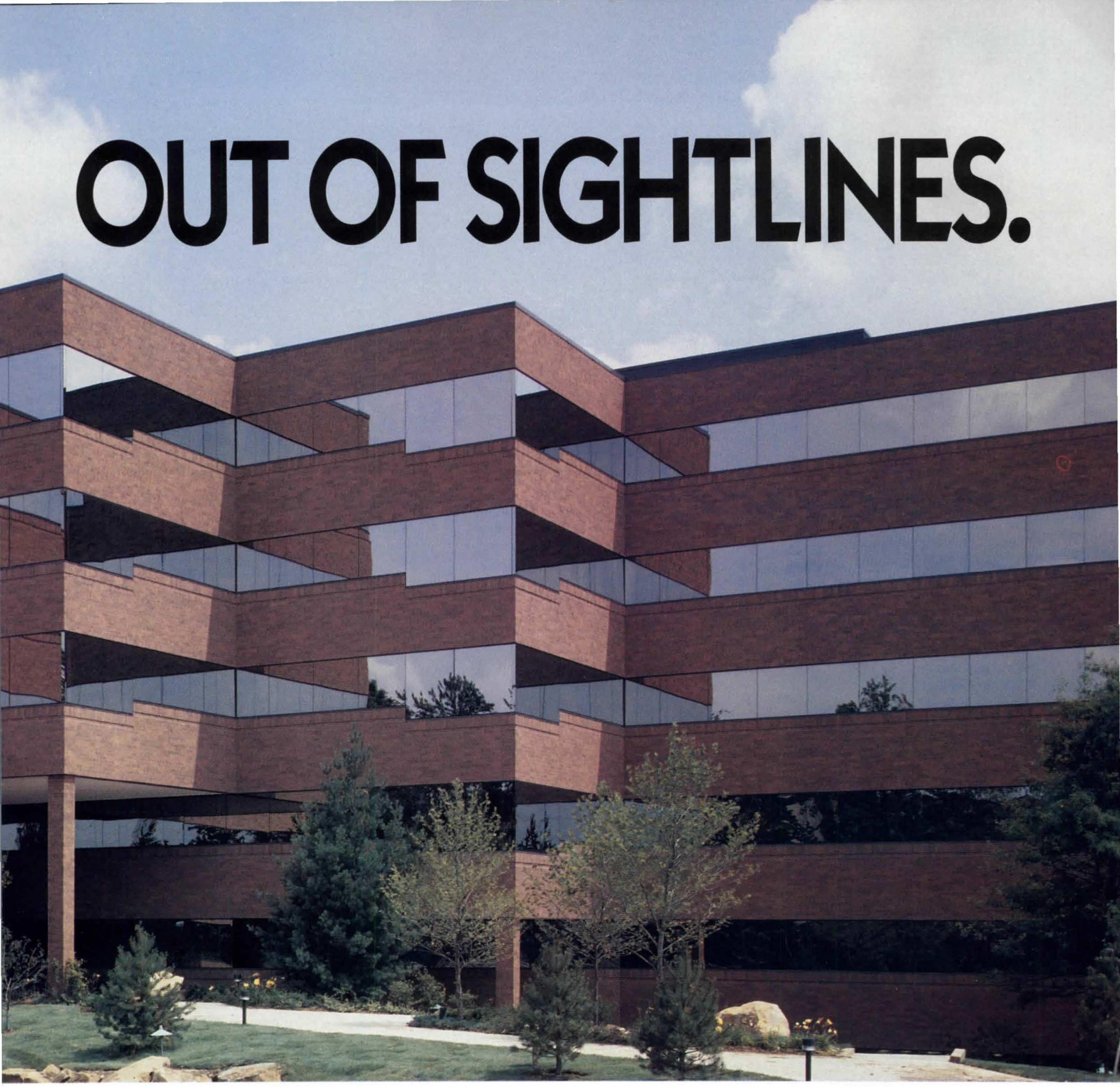

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ARCHITECTURE

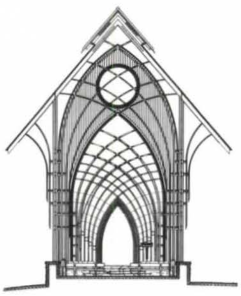
This issue deals with architecture at three different scales. First comes a collection of buildings from smaller communities, defined as those with less than 50,000 population, providing proof, if any were needed, that quality architecture is not solely to be sought in our cities. Then come two analyses of a new plan for one of our largest, and most planned-over, cities. And finally there is an examination of design directions in an entire region of the nation.

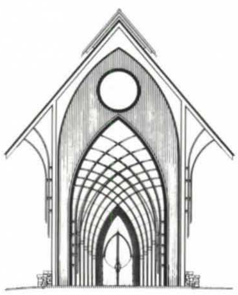
Preceding all that, in the news section, is a summary of the views of the two major Presidential candidates on issues that we and AIA's government affairs department felt were of particular interest to the architectural profession. They include housing, urban infrastructure and the general consideration of the cities, acid rain and environmental quality, and incentives for historic preservation.

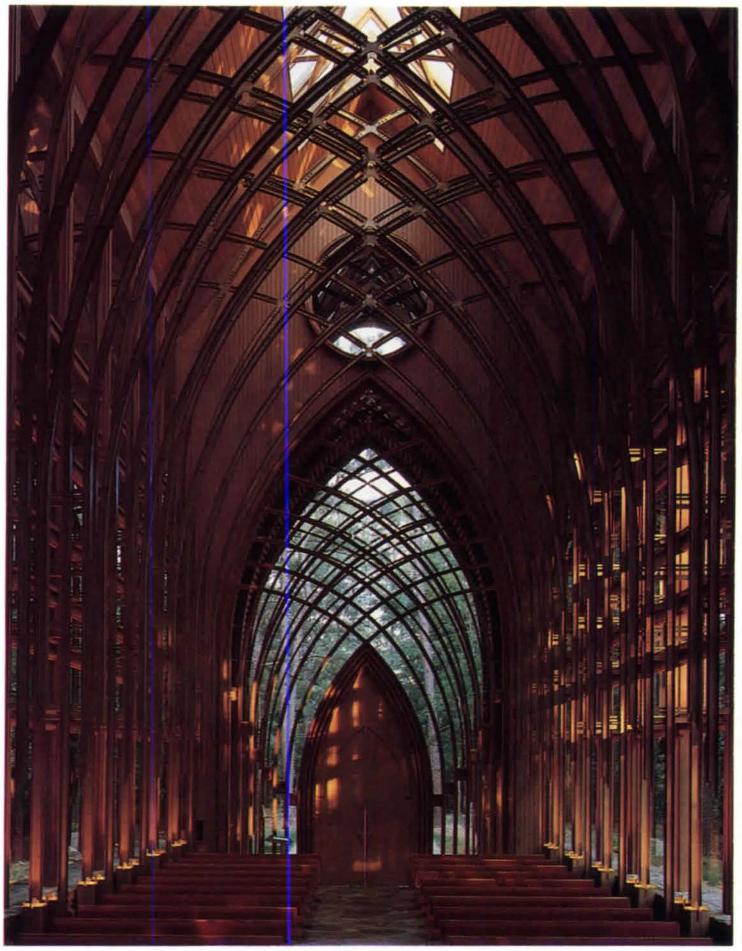
As this is written, just after Labor Day, it is striking how little these issues have figured in the campaign so far. Clearly there is work to be done to raise them higher on the nation's agenda, regardless of who wins the November election.—*D.C.*

Encore Delivered with Strength and Delicacy

Cooper Chapel, Arkansas, Fay Jones & Maurice Jennings.
By Karen Cordes







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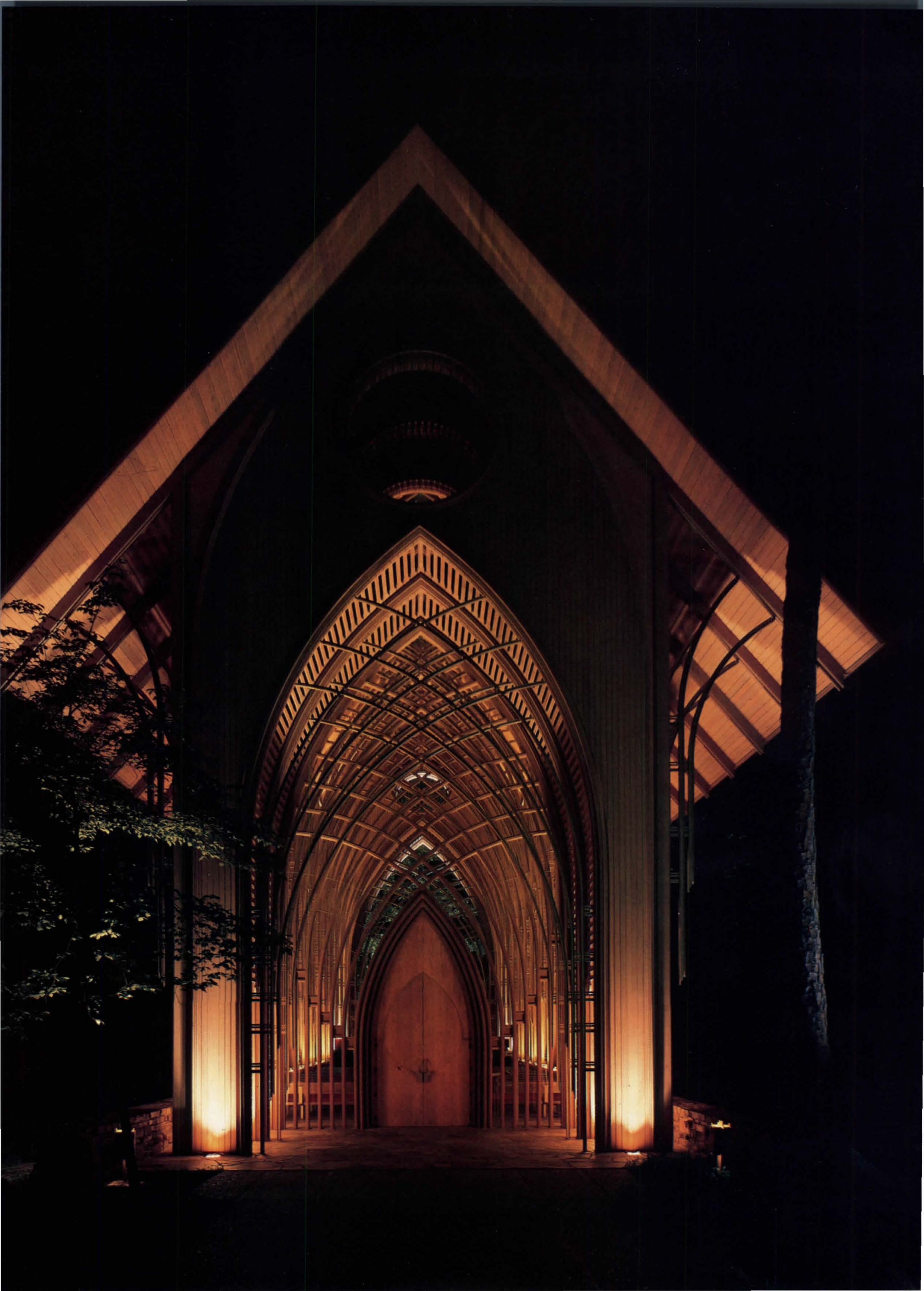
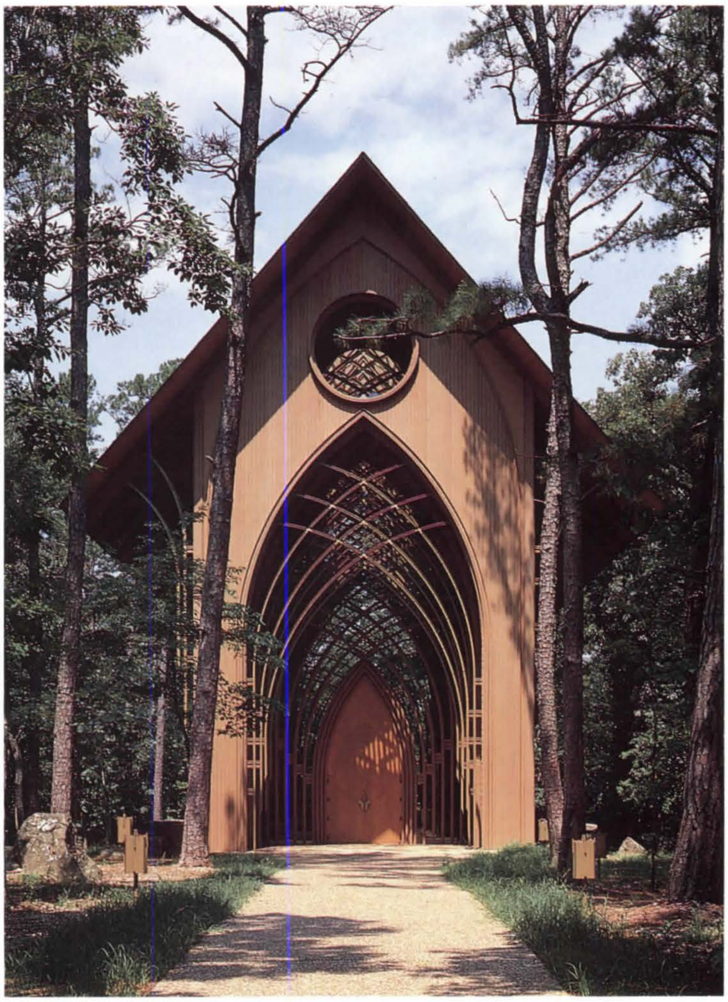
Left, front elevation. Right, lighting is from floor fixtures along perimeter.

In a variation on his Thorncrown theme, E. Fay Jones, FAIA, has touched the Ozarks once again, this time in the small retirement community of Bella Vista, Ark. Conceived by Bella Vista developer John Cooper Sr. in memory of his wife, the Mildred B. Cooper Memorial Chapel is a gift from her children to the 7,000 townspeople.

Cooper Chapel quietly commands a dignity and presence uncommon among buildings of our era. It is a harmonious celebration of strength and delicacy, owing much to its predecessor, Jones's celebrated Thorncrown Chapel in Eureka Springs, Ark. Both chapels have a power that stems from an expression of the nature of the materials, and their grace is found in a translation of Gothic architecture capturing the emotions of that age of faith. Like Thorncrown, Cooper Chapel employs what Jones and his partner, Maurice Jennings, AIA, refer to as Gothic's "operative opposite," which reverses the structural system to use members in tension rather than members in compression. This reversal is derived from the materials themselves, exchanging the medieval masses of stone for today's lighter materials. And it is here that Cooper Chapel departs from its predecessor.

Ms. Cordes is a 1987 graduate of the University of Arkansas school of architecture and is with the firm of Keyes Condon Florance in Washington, D.C.





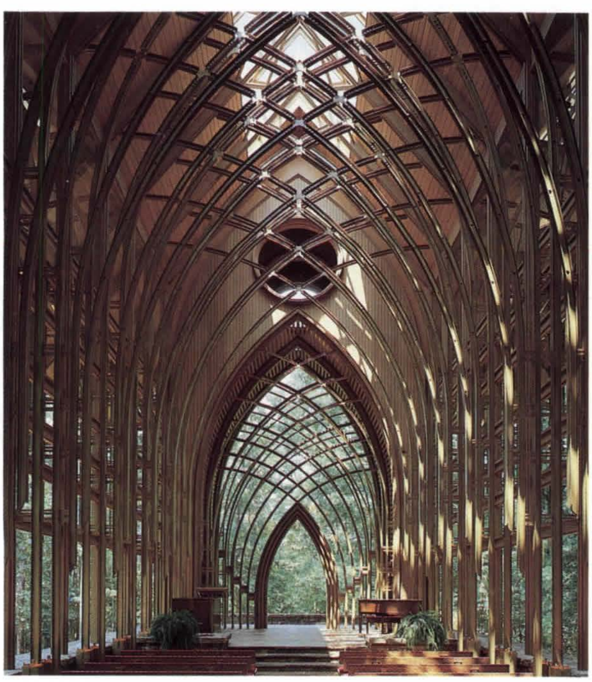
In Cooper Chapel wood and glass are combined with a third material—steel—allowing Jones to design with an expression natural to it: the curve. This simple form relays a gentle flow quite unlike the crispness in Thorncrown's straight wood members, strengthening the allusion to the Gothic. Says John G. Williams, FAIA, founder of the school of architecture at the University of Arkansas and a close friend of Jones: "People ask me which I like better, Thorncrown or Cooper. I ask them, 'Which is more beautiful, a straight line or a curved line?' Both are beautiful."

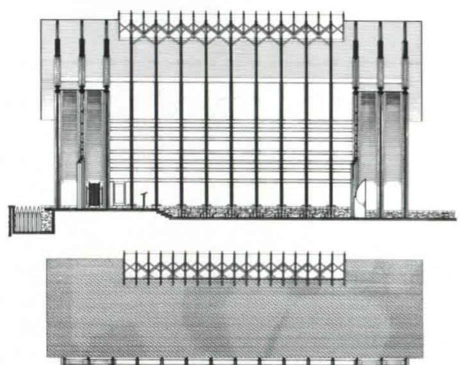
Left, lights border the approach path. Above right, front door is recessed two bays. Below right, view toward pulpit.

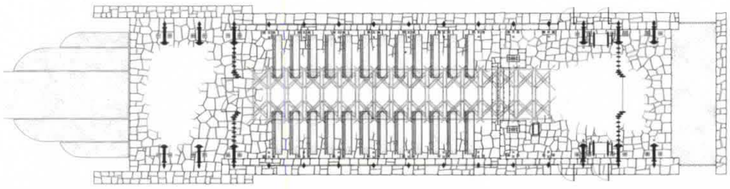
Protected by a wooded hill, Cooper Chapel is undetectable from the Interstate highway and shopping center only a few hundred yards away. The path to the chapel lies along the slope of the hill; the walk is dotted with intricate foot lamps that hint the building's presence. As you round a curve and the cars and noise fade, the chapel appears.

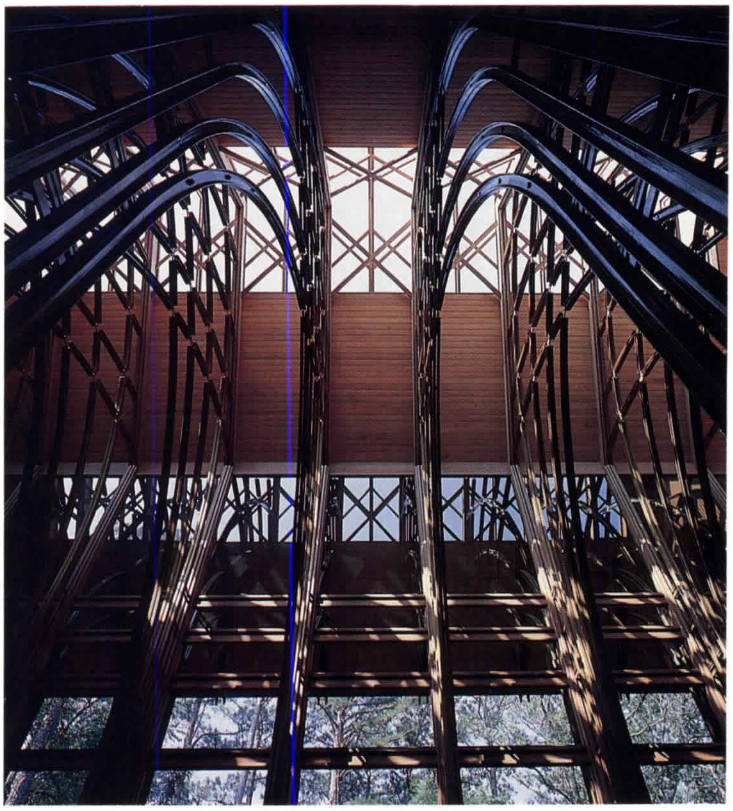
Its delicacy is striking. The wood frame is pierced by a large entry arch and a circular opening reminiscent of a rose window. Through these openings the curves of the steel structure appear against the wooded backdrop. The curves intersect one another high overhead, forming a lacework of members into a series of pointed arches. As each member extends toward the ground, only the outermost pieces reach the flagstone floor. The remaining are suspended in the air, ending with a curved slice. The entire structure supports a roof with a long central skylight and

Photographs © Timothy Hursley/The Arkansas Office









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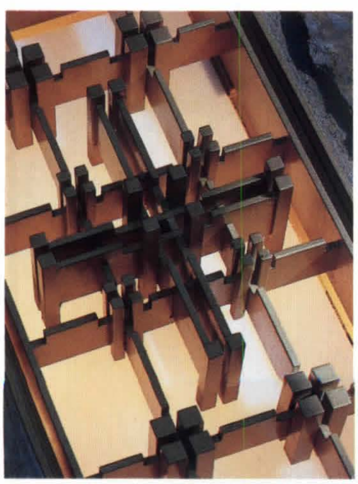


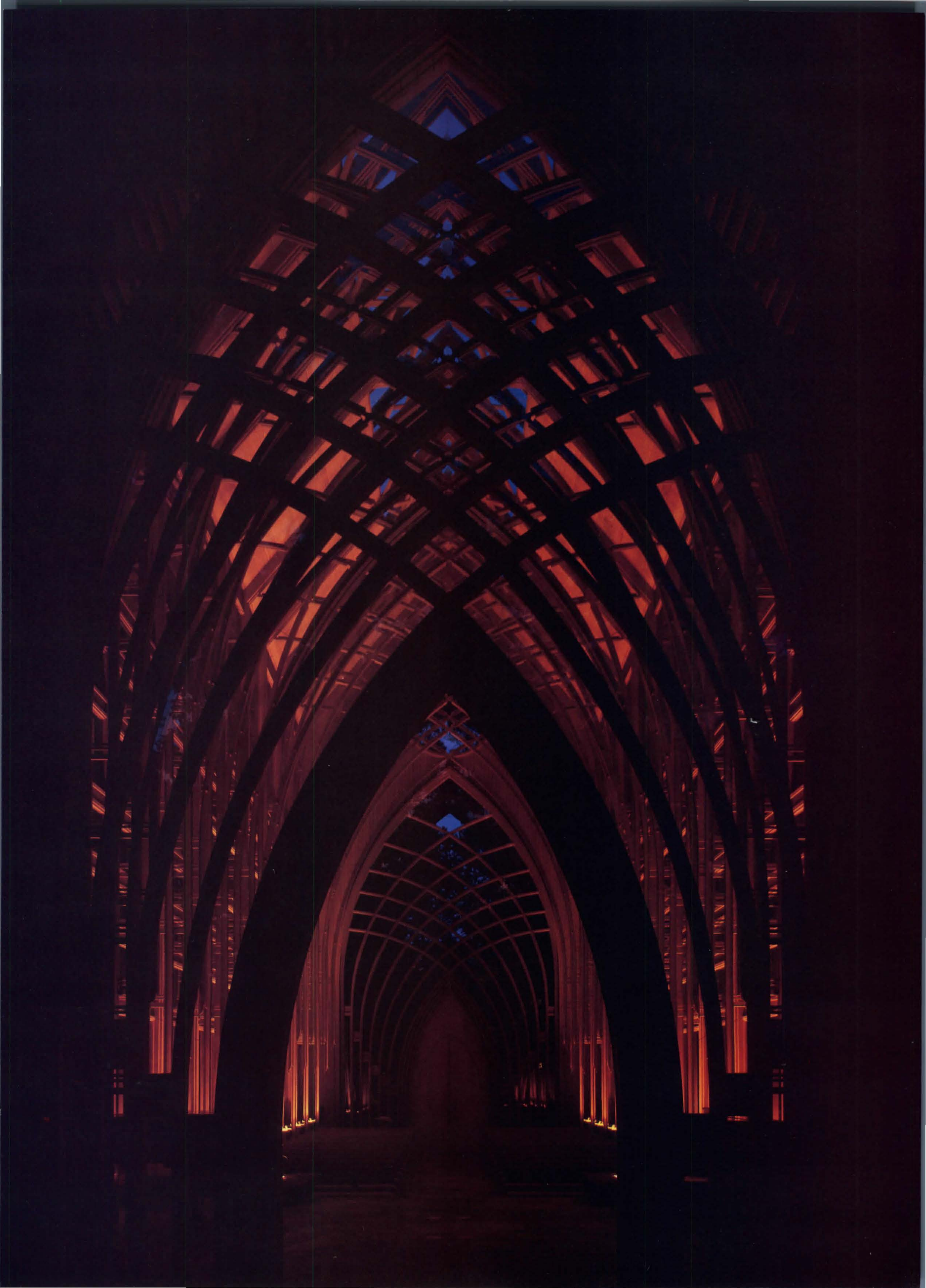
large overhangs, giving the steel network light and shadow to play in and against. The wood frame joins with the outermost steel members, resting on the low stone walls that border the flagstone floor. Wood members give form to the building; the steel structure supports it.

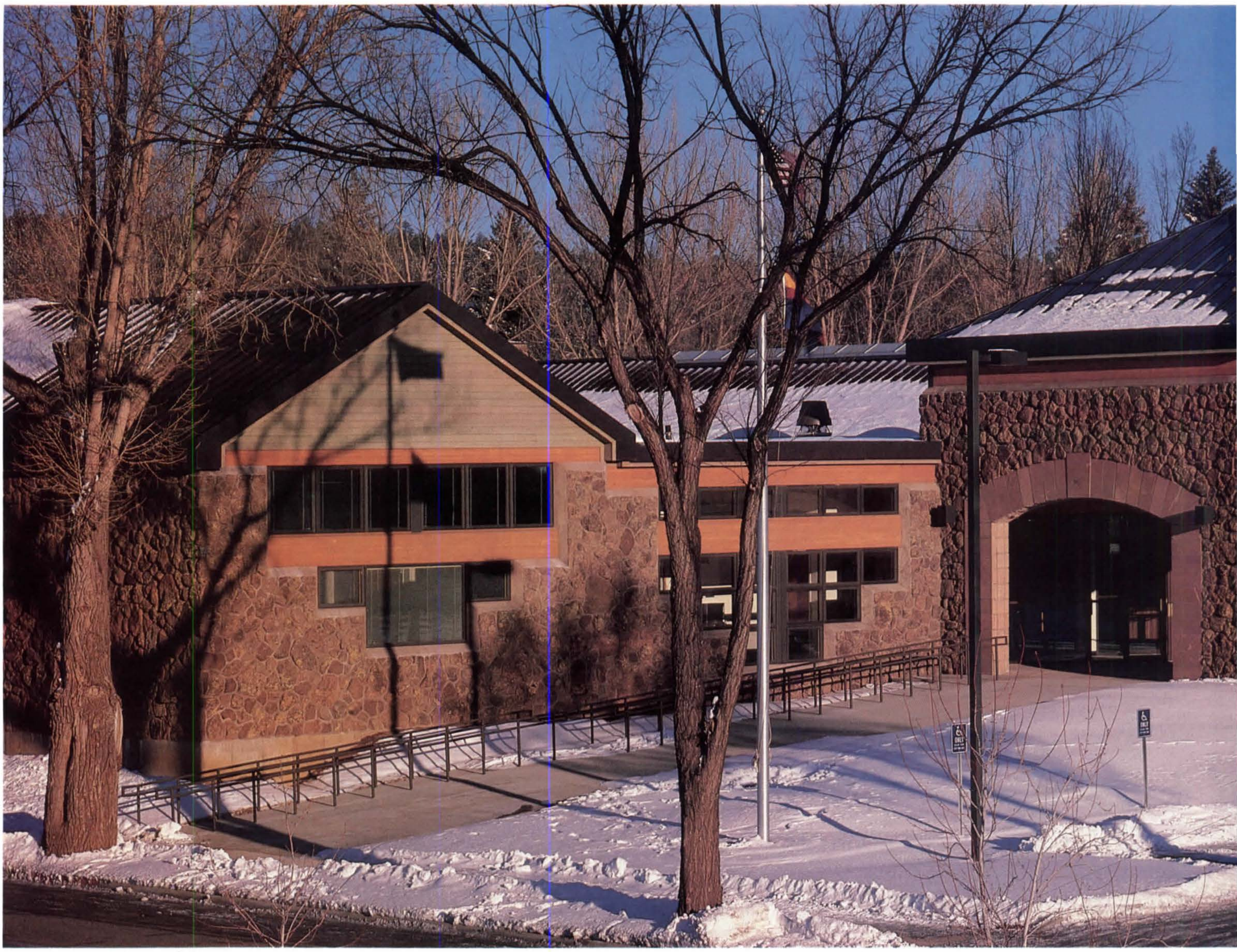
The chapel speaks simultaneously of enclosure and openness, bringing the outside in while at the same time making a place within the woods. Jones spaced the columns six feet apart, combining the wood and steel pieces to minimize their presence. This maximizes the meeting of the interior and exterior, making one an essential part of the other. The close relationship of chapel and nature becomes most apparent through time and season, as daylight continually changes the patterns made by the steel structure and the seasons create a range of enclosures.

The mechanical system consists of outside units with the ductwork enclosed in each of the two low walls running the length of the building. Vent openings are actually holes within the mortar, surrounded by the moss and lichen that still grow on the rocks. Pews, doors, and other wood trim are oak; structure is redwood. Oak and redwood are stained to blend with the bronze finish of the steel. The red pew cushions and the colors in the flagstone harmonize with the bronze, creating a warm tone for the chapel.

Set like a dark jewel in a deep setting, Cooper Chapel is a place of splendid solitude. □

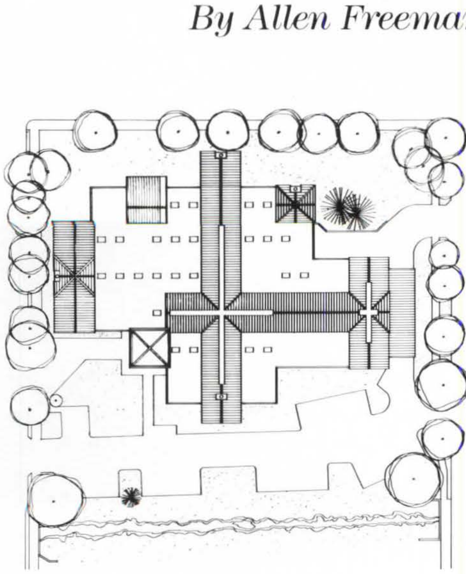
Above, note patterns in skylight; apparent second skylight is reflection in side wall glazing. Left, cross motif in perimeter lighting. Right, the effect of stained glass.





Low-Keyed And Full of Light

Flagstaff, Ariz., Library, Snowdon & Hopkins. By Allen Freeman



In a community that harbors few good buildings, the new public library in Flagstaff, Ariz., sets a softspoken high standard. Snowdon & Hopkins, a two-person firm in Vail, Colo., was challenged to find a local vernacular worthy of emulation.

Pamela Hopkins, AIA, and Craig Snowdon, AIA, got the Flagstaff commission in large part based on their compact, efficient, partially earth-sheltered Vail Public Library, which they tailored for a constricted, sloping site in Vail's center. At 34,500 square feet, the Flagstaff and Coconino County Public Library is twice the size of Vail's, and its site is ample and almost flat. (Flagstaff lies 7,000 feet above sea level near Arizona's highest peaks. Unlike Phoenix, 130 miles south in the low desert, this city of 40,000 has a mild summer climate and occasional heavy winter snowfalls.)

Sited at the western edge of downtown Flagstaff, the library has a mixed immediate context: unlandscaped parkland along its eastern front side, a recent, ungainly City Hall just southeast, and, on three sides, buildings of lesser scale—houses close to the street and a small church. Snowdon & Hopkins designed the one-story library on a 28-foot module, expressing the module in bays approximating residential scale, and roofed about half of the building area with peaks and ridges in standing seam metal. The rest of the roof is flat. Cladding is domestic as well: malipai—a rounded volcanic stone used on many Flagstaff houses; exposed glued, laminated beams; and painted wood siding. Glazing is ample. It pushes up into the fan-trussed gable ends and surrounds some bay ends, responding to interior uses.

The entrance is appropriately located on the southeast cor-

Above, skylight-peaked entry pavilion; also note skylights on gable ridge. Right, rear elevations with domestic chimneys.

Photographs © Timothy Hursley/The Arkansas Office

Allen Freeman

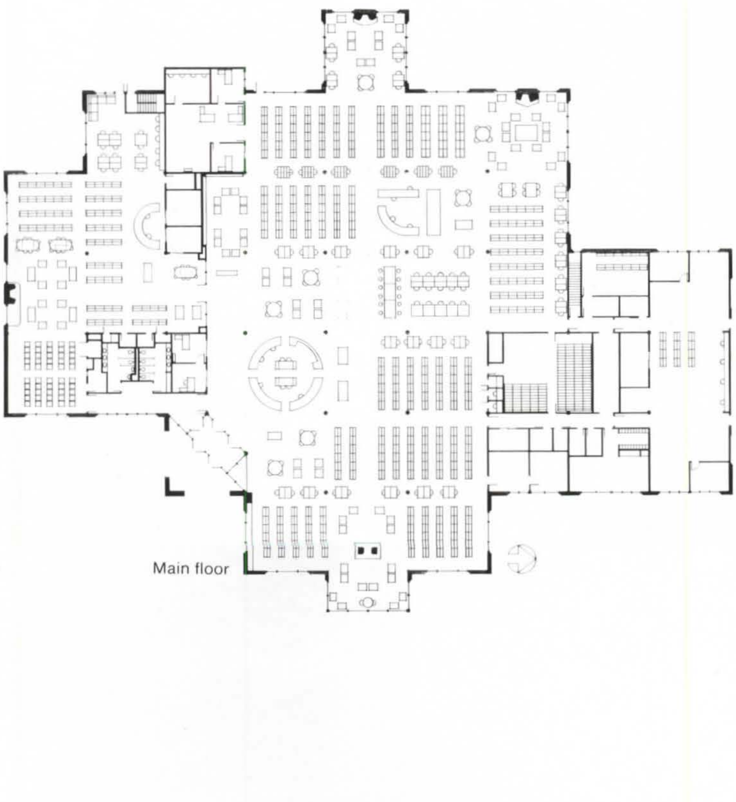
Left, a full view of the east side, with sandstone arch marking the entrance; the wooden footbridge crosses a stream. Interior views show concrete columns, three of the four fireplaces, and wooden beams and fan trusses. In photo at right, along east-west axis, linear skylight is detailed to ride over truss tips, and the rounded circulation desk is at far right.

ner, facing City Hall. A peaked pavilion with broad sandstone arches (derived from a school that occupied the site) marks the entrance. But the door itself is in a curtain wall oriented diagonally across the pavilion. As a result, the arches seem hollow, the entrance ambiguous.

Because fragmentation minimizes the building's considerable bulk, the interior spaciousness is all the more surprising and wonderful. A dominant axis runs east-west, the full depth of the building, under a row of exposed wood fan trusses; a cross axis intersects near the circulation desk. Simple, subtle linear skylights seem to float above the truss peaks, their daylight reflecting down off white ceiling surfaces. Structure and spaces seem light and airy. Four large fireplaces, around which are clustered upholstered chairs, terminate long views. But these areas are too evenly and brightly lighted and need a higher standard of furnishings (cut from the budget) to bring them to their potential of comfort. Skylights on the portions of the roof that are flat are well placed to illuminate the stacks; lights controlled by sophisticated sensors augment daylighting.

The library holds 100,000 volumes and can comfortably accommodate another 50,000. After that, additional 35-foot bays would selectively expand building capacity, theoretically without major interior redesign or disruptions to daily functions. Offices for the staff of 40 (including part-timers) are in three clusters around the building perimeter.

This building reflects the spirit and wishes of a practical and dedicated librarian, Ava Stone, whose own new office is sparsely furnished with cast-off pieces from the former library, which occupied a ramshackle house. Stone wanted a building that could be run with a minimum of staff, would be well lighted, and would offer maximum square footage, say the architects. And she and her staff wanted a cozy building, suggesting ski lodges as models. Snowdon & Hopkins satisfied pragmatic clients while synthesizing a Flagstaff architecture. □



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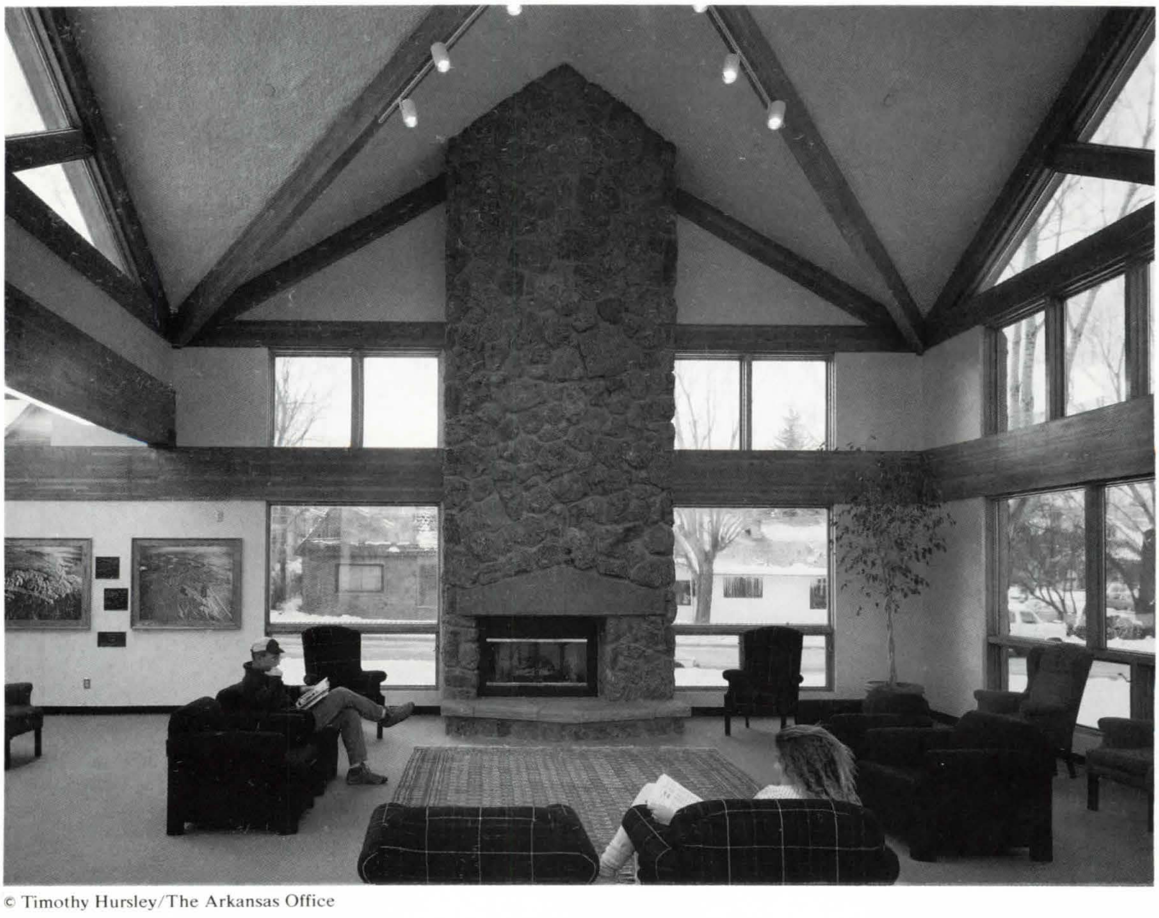

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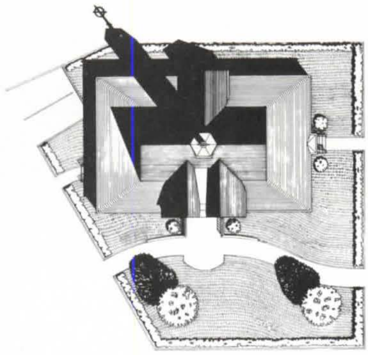
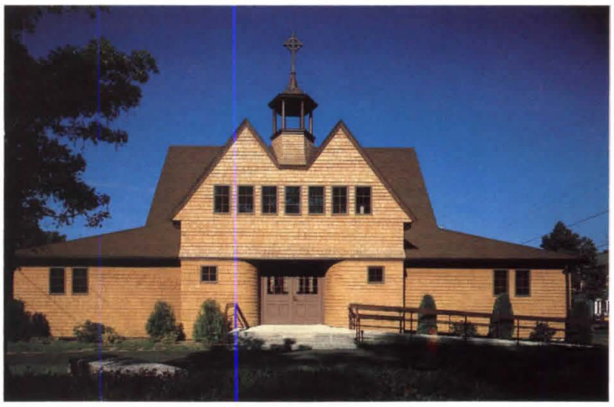


Crisp, Simple Forms Wrapped in a Shingle Skin

Church in Rockport, Mass., Hilgenhurst Associates. By Robert Campbell, AIA



Of all building types, the church is perhaps the one that least often, in our time, produces distinguished architecture. Unless they're run by Christian religious broadcasters, churches typically don't have much money. And the loss of faith in architectural traditions has left wide open the question of how to design for an institution that, by its very nature, is usually dedicated to maintaining a tradition. Golf resorts probably have produced a larger number of esthetically successful buildings—certainly more expensive ones. There are, of course, at least two ways to spend a Sunday morning.

Rockport is a one-time fishing village on the North Shore of Boston. Some decades ago, its picturesque harbor began to attract artists, and in recent years it has been best known as a lowbrow art colony. Its most famous landmark is a barn-red, gabled fishing shack out at the end of a dock, so often painted that it is universally known as Motif No. 1. When Motif No. 1 collapsed in a storm a few years ago, it was carefully rebuilt to serve the painters of the future. A recent scandal has been the revelation that "original" oil paintings of New England seascapes are now being churned out in factories in East Asia by persons who have never seen the Atlantic Ocean. Indistinguishable from the native product, these fraudulent canvases are said to be on sale at Rockport galleries.

That was the town—visually self-aware, a little stagy, but not big-city sophisticated—in which the Boston firm of Hilgenhurst Associates was commissioned to create a church. The new United Methodist, replacing an older church lost to fire, had a tight budget, a small and unremarkable site in a historic district, and, like most churches today, a program that included many activities besides worship. If designing a good church is hard anywhere it must have been harder here. And yet the architect created an almost completely satisfying building.

The first decision was to work in the shingle style. In the 1880s heyday of the style, Rockport wasn't building many wealthy vacation cottages. But up and down the coast they were plentiful. Hilgenhurst chose a style that immediately says "North Shore," a style associated in people's minds with high quality and, to some extent, with seaside art. And shingles are still a cheap way to enclose and express a large interior volume. They also respond to the nature of the place, for what makes the shingle style seem so appropriate to the weather-beaten coast of New England, even today, is the way the skin of cedar shingles seems to be pulled tight around the building like a shawl around shoulders. The smooth, continuous shingle skin is visibly water-repellent yet looks shaggy and warm. It speaks of the climate. So do the steep roofs and small windows.

Making the most of the church's small budget, the designers wisely chose to collect much of the architecture where it would count most—at the main entrance. Here the skin of shingles curves sharply inward on both sides of the double door, while the gable above splits in two to mark the point of entry. A simple pattern of windows, just slightly smaller than you expect, completes a sensitive elevation.

The big, simple shapes of the church, crisply defined, give it a monumentality remarkable for its small size. Though not unlike a barn or house in most of its details, it achieves a clear expression of churchliness through simple devices: the round window, the aspiring gables, and the delicate hexagonal bell tower, which was saved from the former church and brought to the new one as one might bring a torch from an old house to light the fire in a new one, thus symbolizing continuity.

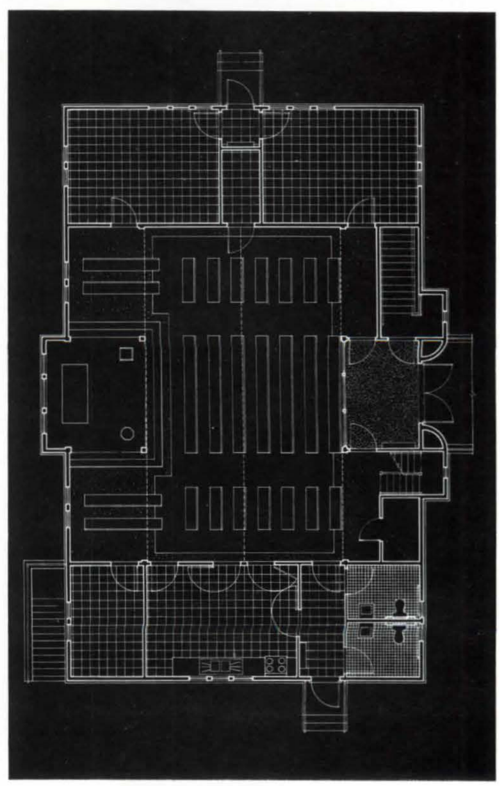
Inside, the church is spacious and has just enough detail, in the form of dark wood beams and trim, to provide a sense of craft. Much detail was omitted for reasons of cost—this was a very inexpensive building—but the architecture makes a virtue of necessity by seeming to speak of the virtues of simplicity, without ever seeming thin or bare. Indoors as well as out, the shingle style, with its recollections of spacious, relaxed, seaside vacation homes, strikes just the right note—traditional, informal, and generous.

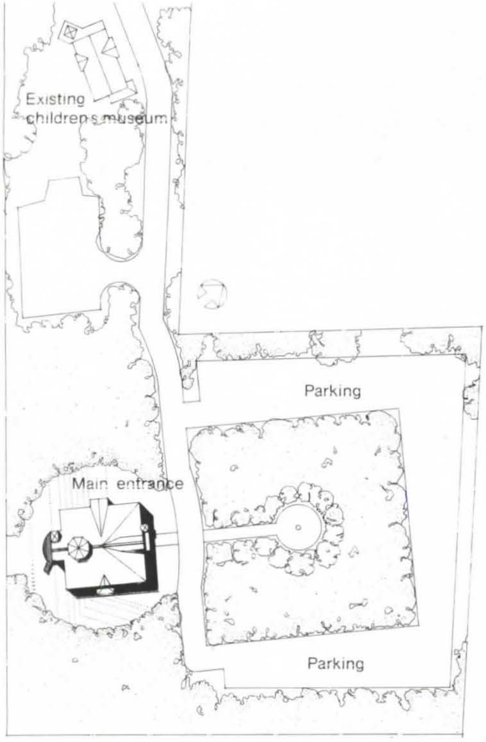
The only blot on this fine small church is a hideous, poorly crafted concrete ramp, providing access for the handicapped, that has been installed across the entrance front. Regardless of who is to blame (a subject on which there is debate), the ramp should be got rid of as soon as an alternative is affordable. Much simpler, much more dignified solutions to the access problem can easily be imagined.

This United Methodist church is the work of architects who want to be good neighbors (the Hilgenhurst partner in charge is a Rockport resident). They've used a historic style of architecture not as a trivia game but as a means of communication. The shingle style quickly and clearly conveys useful, conventional messages about the kind of building this is. And as pure form it's been handled with real skill. □

Interior, like exterior, is straightforward, informal, simple.

Photographs © Paul Gobeil





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'Nutty, Delightful' Children's Museum

Science Discovery Museum, Acton, Mass., E. Verner Johnson & Associates. By Robert Campbell, AIA

An ideal marriage of architectural style and programmatic substance is what we find in this little museum in a bedroom suburb of Boston. All the gripes about postmodernism's antic ways vanish, at least for the moment, as we contemplate this gem.

Postmodernism is just a game you play with colored cutouts from architectural history books? You just paste them together and call it a building? It's childlike? It isn't really serious? It's full of puzzlement and ambiguity? It will melt in the rain?

Oops. That last one just may turn out to be a problem when a few New England winters have had their way with the Science Discovery Museum in Acton, Mass. But even if the carpenters and painters have to come back now and then, it will have been worth it.

Looking at the nutty, delightful, multicolored entrance facade, architectural buffs will immediately recognize motifs cribbed from such high postmodern icons as Robert Venturi (his mother's house) and Michael Graves (numerous works of the late 1970s). Inside, there's a lot of Charles Moore, especially in the cutout holes in the walls and in the big stair that rises toward a skylight. Since all those sources are now a decade or more old, I suppose we must call the Acton museum postmodern revival.

As for those benighted persons who couldn't care less about architectural history (a group that presumably includes the kids visiting the museum), they will see in this architecture something else: a wondrous array of faces, robots, clocks, triumphal arches, fanlights, towers, arches, keystones, crow's nests, bowers, and trellises. This is storybook architecture. It's architecture made out of pictures of architecture.

None of those pictures is quite literal. All are slightly abstract. The round "clock," for instance, in the gable high above the entry, is really only a window with a green wedge in it. It takes imagination to see the window as a clock. Imagination is what

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the Science Discovery Museum is all about. And of course the clock isn't just a clock. Its abstraction allows us to imagine it in many ways. Like all clocks it's also a face, and the blue gable above it becomes its hat. Or it's an eye, with the gable its brow.

There is another and more general metaphor at work, too, one deeply rooted in Western children's culture. The museum is a magic house, a house discovered in a clearing in a forest like the houses of Hansel and Gretel and Little Red Riding Hood. Surrounded by a dark woods that gives it no social context, it is like the dream of a house, placeless and surreal, more vivid than life.

The architect of this remarkable museum is E. Verner Johnson & Associates of Boston, a firm that specializes in museums. The client was the museum's founder and director, Donald Verger. Both were influenced by another museum that already existed on the same piece of land, the Children's Discovery Museum, which Verger also founded and which he still runs for younger children. The earlier museum occupies a Queen Anne house that, like all Queen Annes, exhibits an amazing variety of shapes and of shingled and clapboarded exterior surfaces. Verger liked the old house's shaggy, exuberant exterior with its oddly Victorian quality of being a sort of sampler of architectural surface treatments. He insisted that new Science Discovery Museum also be an enthusiastic exploration of all the things you can do with wood.

Verger also liked the "houseness" of the earlier museum because it doesn't intimidate children. Its mazelike floor provides nooks and crannies where kids can be by themselves in small places. In the new Science Museum, Verger wanted to replicate that sense of a complicated house in which every room comes as a new and private discovery. But he also wanted bigger spaces for bigger kids.

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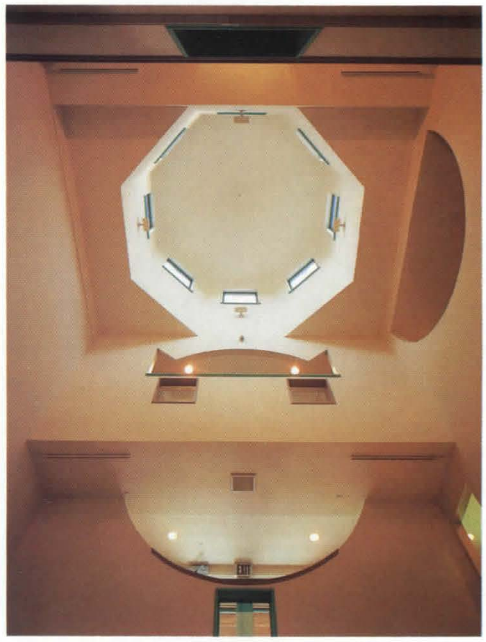
Facing page: below, main entrance with abstract round 'clock' in the gable; above, the secondary entrance and balcony on the building's opposite side. This page, clockwise from bottom: the second floor looking toward the 'clock,' across the atrium, and up into the atrium.



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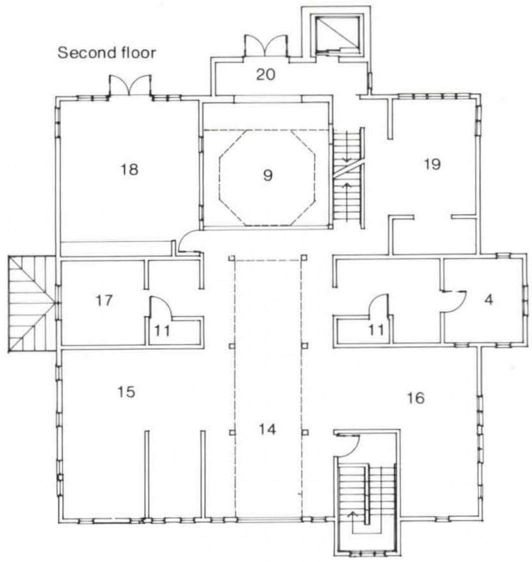
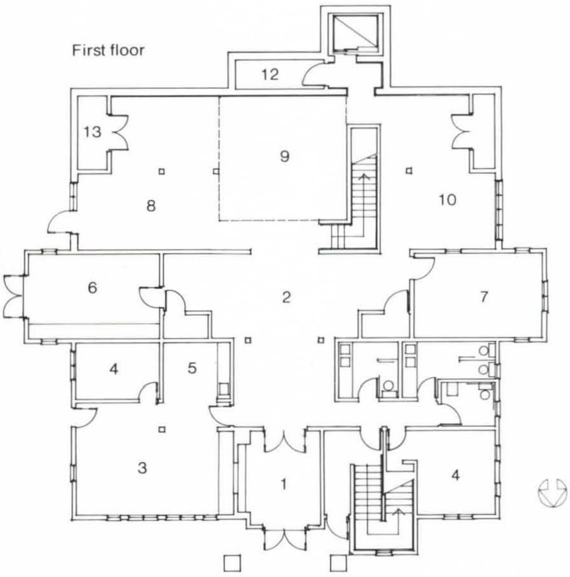
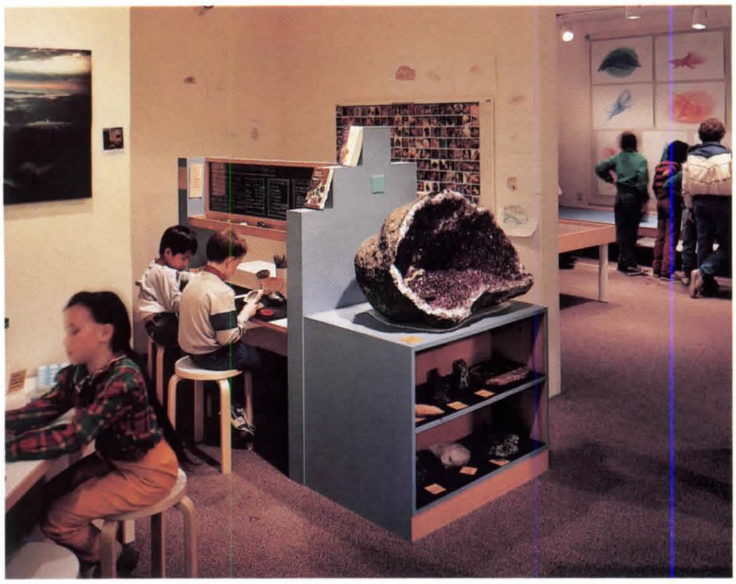




1 Entry
2 Earth science
3 General office
4 Office
5 Work area
6 Workshop
7 Director
8 Flight exhibit
9 Atrium
10 Inventors workshop
11 Storage
12 Elevator room
13 Mechanical
14 Physics circus
15 Computers
16 Water room
17 Math exhibit
18 Multipurpose room
19 Light and color
20 Balcony

The interior celebrates architecture as well as science. Below, smaller spaces for study give way to larger communal areas (bottom and facing page). Wall cutouts create views into and across the atrium.



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The architect responded by creating a 60x60-foot, three-story building ordered by a 12-foot grid, with small spaces around the perimeter and an atrium near the middle. Outside, clapboard and trellises and pitched roofs recall the local farmhouses, but there is a curious quality in the architecture that locates it, even to a child, firmly in the contemporary world. This quality is its resemblance to toys like Lego sets or Transformers. You get the sense of a kit of parts that could be rearranged in some other way. But since the clapboard is there too, it's as if in some preservationist horror film a familiar family farmhouse has been invaded by aliens from Lego-land who are gradually transforming the house into one of their own.

Indoors, the atrium rises the whole three stories to an octagonal tower. Things grow brighter the higher you climb. Exhibits can be tucked into the nooks around the edges or placed in the more open spaces that overlook the atrium. Cutouts in the walls, in geometric shapes that often suggest architecture (e.g., a Palladian window), establish vistas through layered space. Staff offices are scattered and visible through glass.

The exhibits, not done by the architect, are as delightful as the architecture. None is operated by push button. They are exhibits to be played with, not canned and pretentious "learning experiences." All involve things you can pick up and mess around with. It is doubtful whether the museum has ever had a visitor, child or adult, who resisted the urge to play with them. Scientific principles are always involved, often ingeniously so, but the principles are for you to discover to your own delight—although there are helpful staff wandering around who make unobtrusive suggestions.

The Science Discovery Museum is part of a master plan that eventually is to include other small museum buildings and a nature

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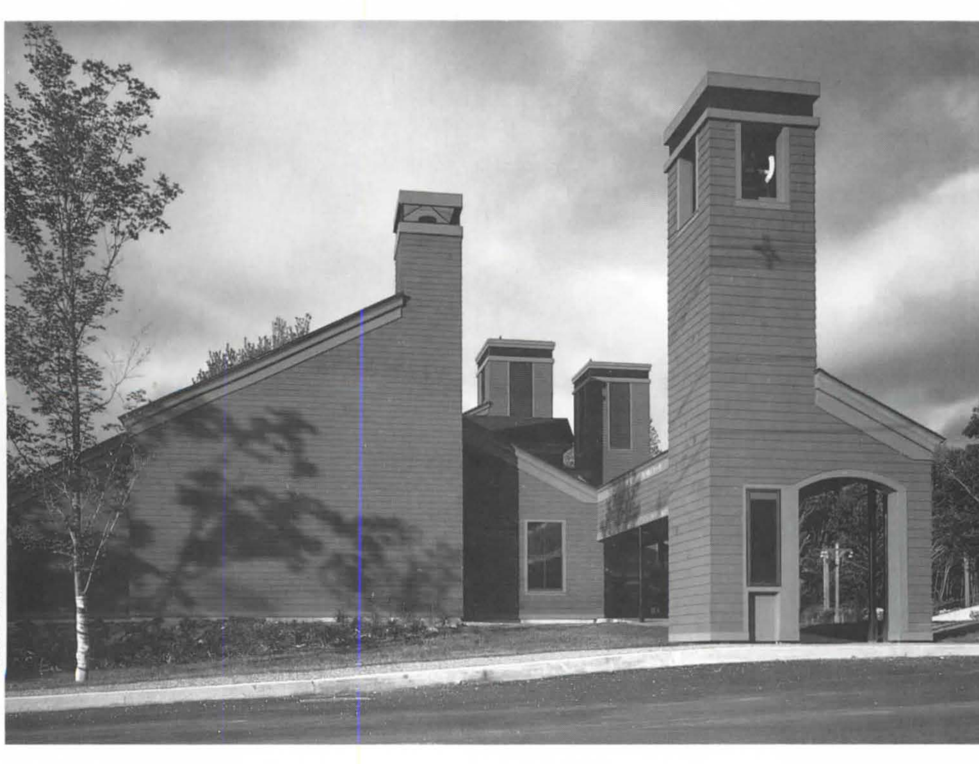
'Essay in Folk Architecture' With Serendipity Inside

Community Center, East Hampton, Conn., Centerbrook Architects.
By Allen Freeman



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This big, fat, friendly barn of a building is a new community center in East Hampton, a middle Connecticut town of 10,500. Its shingled, dormered demeanor seems to reflect the taste of the town, and the staggered facade and towers signal a multiple program. But the interiors relate not at all to external forms and come as a pleasant surprise.

The idea of sheltering under one roof a public library, day-care center, and senior center wasn't the architect's, Mark Simon, AIA, of Centerbrook Architects, although he thinks they make a good combination—at least in theory. He has found, however, that elders who frequent senior centers tend to be clannish and somewhat aloof, and there is less mixing with children than he hoped for.

During the conceptual phase, Simon enlisted 35 residents—blue- and white-collar, men and women, children and seniors—to advise on program, siting, and architectural character. He therefore sees the community center as a kind of essay in folk architecture. (East Hampton is fairly typical of smallish New England communities. Its history includes shipbuilding, bell manufacturing, and summering on a lake named Pocotopaug. Although now something of a bedroom community for Hartford, it retains a mill town flavor.)

In workshops in 1980, after which construction was delayed, the architect noted the residents' reactions to slides of buildings and then asked them to draw pictures of how a community center should look. "We got a sense of what was important to them—their images, their symbols, the elements of a building that they understood and appreciated, and used that as the material for a design," Simon says. Project architect was Stephen L. Lloyd, AIA.

The building, its longer axis perpendicular to the street, occupies the base of a tight, L-shaped site fronting one of the main streets; 47 of the 60 attending parking spaces are hidden from the street along the top of the L. The footprint is a pair of modified, touching rectangles—surprisingly simple considering the community center's complex massing. Senior and day-care quarters occupy the smaller segment in front; the library fills the larger one behind.

It was perhaps inevitable that the roof would be a dominant part of the design, given that residents wanted it to slope, economies dictated a one-floor building, and the program involved some 16,000 square feet. Roof planes are long, punctuated by deep-set dormers and a pair of towers that sprout at the junction of the building segments. The towers are somewhat ungainly. They seem just fine above the roofline, providing appropriate identity to a public edifice. But a roof climbs awkwardly alongside one of them, and the shafts meld unsatisfyingly into facades. Too, an arched row of five windows bends 90 degrees under the towers and seems more schematic than inevitable. More convincing is a covered walkway anchored at roadside by a slender third tower and extending back to the building where it skirts the staggered facade as a loggia, its edge rising like eyebrows over the three entrances.

Inside, two main rooms—one in the senior center and the other in the library—have rounded ends and tentlike ceilings, unexpectedly serendipitous spaces in this dark, rather brooding, rectilinear building. Thoughtful interior designs include a window just inside the library door to orient young people and perhaps pull them past the circulation desk and back into their own spaces; three Simon-designed, graduated bears' chairs (Pappa, Mama, and Baby) in the children's library; an especially beautiful palette that employs some saturated colors and dark accents; and tiny bells stenciled in patterns on windows and walls as reminders of community roots.

Minor exceptions in an otherwise beautifully functioning building: there is a long walk along an uninteresting side wall from the end of the parking lot to the library entrance; noisy mechanical equipment, intended for the towers, ended up next to a day-care playground on the back side; and the large library space is more acoustically alive than one would want (although Simon says there have been no complaints). The community seems to have embraced the building enthusiastically.

Above, covered walkway starts at the small tower at far left and skirts the two main facades of the building. Left, the four towers become a cluster in view from the northwest.

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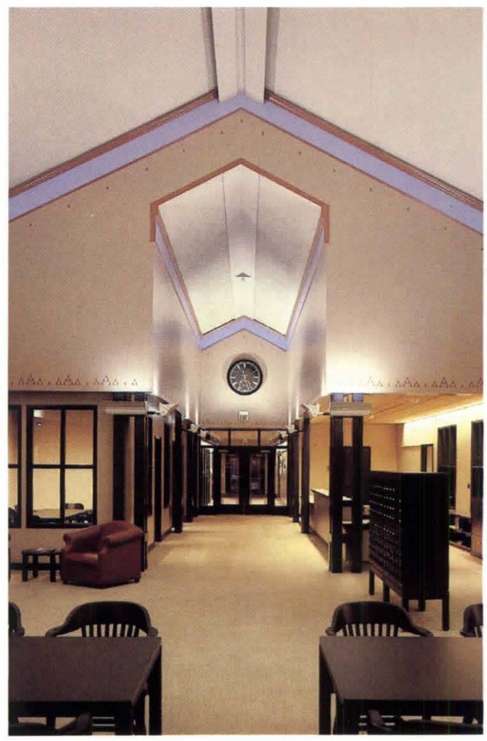
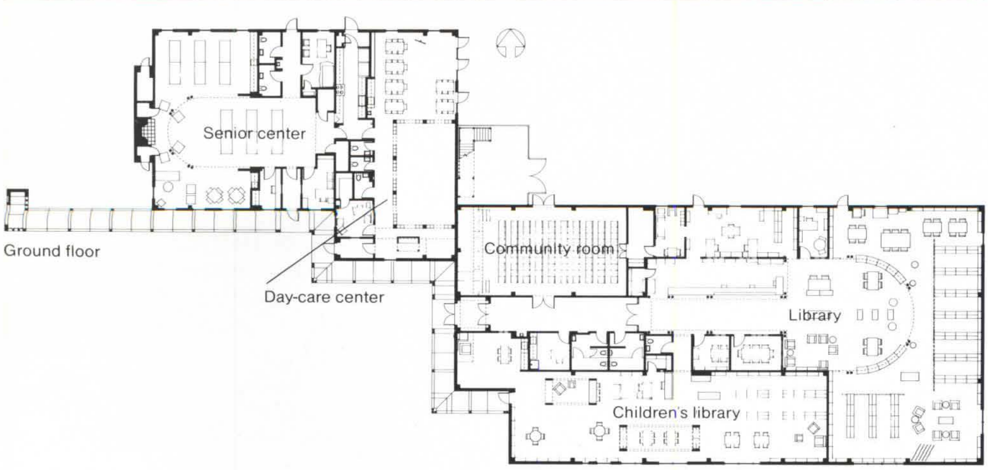


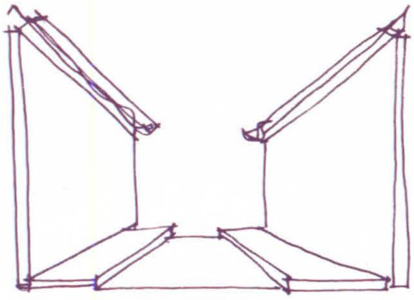


Top left, the senior center focuses on fireplace; partitions move on overhead tracks. Above, two opposing axial views of the library; note bells, symbol of local manufacturing concerns, stenciled on walls. Right, the three bears' chairs in the children's library. □


World Wildlife

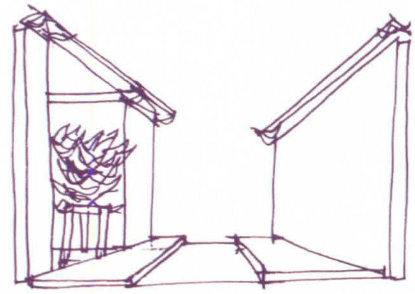
A Third Philadelphia Plan: The Theoritical Base

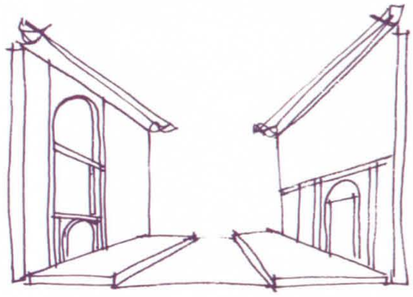
By Robert L. Geddes, FAIA



Respect for the Urban Fabric

Guidelines and regulations must be adopted to ensure that new buildings respect the continuity of existing buildings. Street walls should be preserved. Open spaces should be designed, not merely result from leftover land. When appropriate, retail uses should be at the ground level. Building entrances should be legible and well defined.





pal-imp-sest *n.* a written document, typically on vellum or parchment, that has been written upon several times, often with remnants of earlier . . . writing still visible, remnants of this kind being a major source for the recovery of lost literary works of classical antiquity [from Greek *palimpsestos,* rubbed again]—*The American Heritage Dictionary of the English Language,* 1981

Historians, critics, planners, and architects often have chosen metaphors to understand cities. There have been religious, social, organic, mechanical, and compositional analogies. Colin Rowe sees the city as a collage, while Christopher Alexander insists that the city is not a tree.

A particularly useful image is that of a palimpsest. Consider a city as a writing surface, a tablet on which various texts have been written over the centuries. Earlier words and lines have been erased, but their vestiges remain, shaping the present document. Additions either enrich the past or try to obliterate it.

The palimpsest analogy applies to individual buildings within a city, to streets and neighborhoods, and to the city as a whole. In Oxford, England, for example, in 1637, a new porch was grafted onto the side of a medieval church. The baroque style of the porch—John Summerson calls it Anglo-Flemish mannerism—polemically contrasted with the medieval, but its spatial position was determined by the original structure. Today's emphasis on rehabilitating old buildings has yielded many such architectural palimpsests, buildings in which the past is not so much preserved as amended to serve contemporary life. Past and present join together to create a new whole. The contemporary incarnation is enriched by its association with history, while the old structure is given renewed life and purpose.

But not all palimpsests can be read coherently. An old, altered, and much-erased document can be a muddle. Lining the main streets of most American cities are fine old brick and stone, turn-of-the-century commercial buildings, their facades hidden behind glass and metal masks, inappropriate storefronts tacked on to make the structures look modern. The result is often incoherent, and better possibilities are lost.

On a larger scale, the palimpsest analogy offers a way to judge a city's plans for development with respect to its history. One city that attempted to obliterate the past was Boston, in the 1950s. Downtown Boston, essentially a medieval city, had grown organically. As the city expanded, streets and common spaces fit themselves into the topography of the peninsula with its hills and watery inlets. The North End, one of Boston's oldest neighborhoods, had twisting, narrow streets and dense housing. When postwar urban renewal sought to clear the clutter away, what had been a vital neighborhood became a dead zone. Attempts to erase the past failed; images of the old North End haunted the new.

Fortunately, the cultural traditions and historic fabric of the North End were strong enough that, after the clearance was halted, the area's form and vitality began to reassert itself. Today the North End is again one of the vibrant areas of downtown.

Any city plan that tries to ignore the past, rather than reinforce and build upon earlier layers of the palimpsest, is in danger of creating an incoherent whole. Most urban districts, left to their own devices, resist large-scale erasure. Neighborhoods will intuitively stick to the original text, making modifications that build upon the urban structure and fabric.

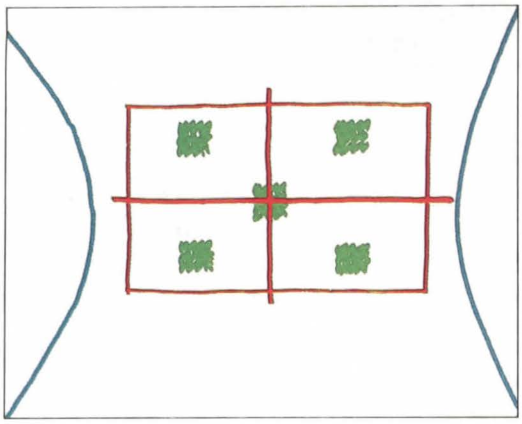
Even cities with seemingly unpredictable and disorderly patterns of growth can be understood more clearly when viewed as palimpsests. Dallas, an archetypal boomtown, has actually been shaped by overlaid sets of urban designs. In 1846 John Neely Bryan planned a 580-acre land grant in a gridiron pattern with blocks 200 feet square. As it grew, the Bryan tract met other plots of land, laid out at slightly different angles. The grid systems merged, forming an odd but pic uresque mosaic pattern that still exists in downtown Dallas.

This was overlaid in 1910 by a comprehensive city plan that attempted to give form to the city's rampant growth. The plan, by George Kessler, considered the city's weaknesses and strengths, amending the former (for example, recommending levees be built

Mr. Geddes, a design principal of Geddes Brecher Qualls Cunningham and Princeton's Kenan professor of architecture, was urban design consultant for the third Philadelphia plan. He was aided in preparing this article by Robert Brown and Ann de Forest

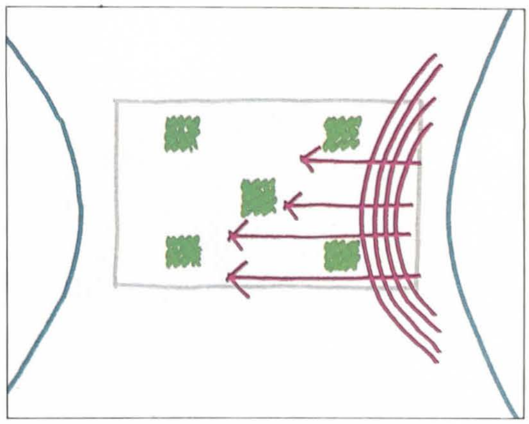
The Grid

William Penn's practical plan for a "greene countrie towne."



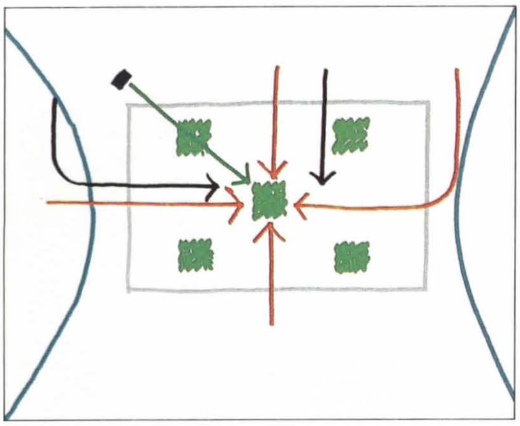
Early Settlement

With an early economy based on trade and the port, the city grew outward from the Delaware riverfront.



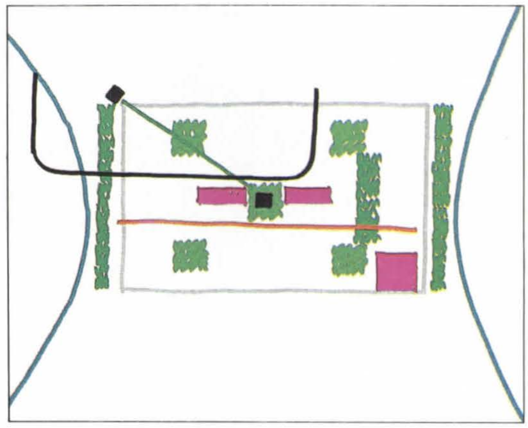
Reinforcing the Center

By the late 19th century, development began to concentrate near Center Square and was reinforced by subway lines intersecting at City Hall. The Parkway, the one fundamental departure from Penn's plan, extended Fairmount Park to the center of the grid.



The 1963 Plan for Center City Philadelphia

The 1963 plan focused on improving access to Center City and on the redevelopment of downtown areas including Market Street East and Society Hill, and the "great marginal elements"—the Delaware and Schuylkill riverfronts.



Text and illustrations above and on the following page were reproduced directly from the plan document.

on the flood-prone Trinity River) and reinforcing the latter (adding plazas to mark the city's key entry points). While the Kessler plan did not organize all the growth that followed, its structural order, like that of the Bryan plan, still informs the dynamic city.

Center City Philadelphia, with a clear spatial structure that dates back to the city's beginnings, is a positive example of an urban palimpsest. In Philadelphia, growth and change have tended to acknowledge and reinforce the past. Whereas in Dallas one may have to consciously search for the lines of history, in Philadelphia one can easily peel back the layers of the palimpsest to discover the original city. This is more than just an interesting historical exercise. The structure of the past provides guidance for future growth.

Last May, the City of Philadelphia released the new plan for Center City, the third in its 300-year history. The goal is to stimulate growth without sacrificing the qualities of livability that give Philadelphia its special character. The new plan sets out to define and reinforce Philadelphia's character by considering both its structure—grid pattern, cross axes, and open spaces established by the 1683 William Penn plan—and its fabric—the intricate texture of buildings, streets and sidewalks, squares and plazas.

To extend Center City's existing structure, the new plan proposes to reinforce the commercial core along the historic cross axes while protecting the residential neighborhoods. To establish a buffer zone between the commercial core and residential areas, the plan proposes a transition corridor, promoting mixed-use development while preserving the streets' pedestrian scale. Improving the links between the various activity centers is a key strategy. Moreover, the plan identifies five major development districts within Center City, each with its own plan appropriate to its charcter, within the overall structure of the urban palimpsest.

The Center City plan seeks to ensure that new development preserves the continuity of Philadelphia's urban fabric. While the urban structure establishes the framework for the city and its growth, the city's fabric—the sidewalks, the tree-lined streets, the parks and plazas, the scale of buildings and their entrances—embraces the details of everyday life in the city. A large part of the plan focuses on those diverse details, identifying the particular features that distinguish, say, Society Hill, with its Georgian brick row houses, from Old City, with its cast-iron factory buildings and mixture of commercial and residential life.

Mindful of the city's existing structure and fabric, the plan designates certain areas for growth and others that should be carefully preserved. For example, the plan stipulates exactly the "high spine" zone where tall buildings should be built and other zones where their construction would be inappropriate to the city's scale and skyline. Center City's two "frontiers," along the Delaware River on the east and over the rail yards along the Schuylkill River on the west, have been identified as underdeveloped areas that, when their potential is reached, will not only contribute to Philadelphia's vitality as an urban center but also eliminate development pressure on the areas of Center City where the intimate scale and residential character should be preserved.

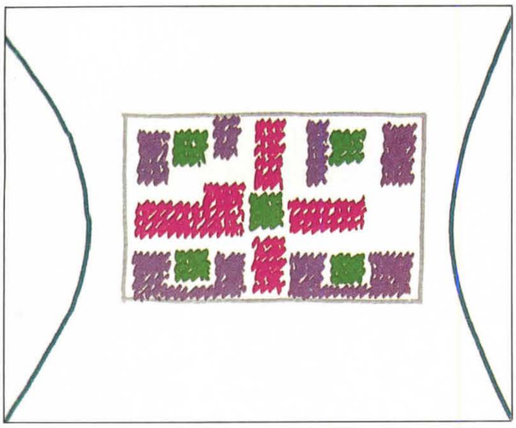
Because great streets make great cities, the plan proposes four principles for the fabric of Center City: "street walls" formed of facades along a uniform building line; intentional, defined open spaces, not merely residual spaces left over by buildings; building entrances that address the street and vividly inform people on the sidewalks; vitality at the ground level, whether social, commercial, or architectural.

The new Philadelphia plan is the latest addition to a very old document. Rather than distinguishing or blurring the visions for the city that preceded it, the 1988 plan underlines and clarifies its precedents and makes past strengths accessible to a new generation. Clearly visible just beneath the new lines of text is the last earlier layer of the palimpsest: Philadelphia's second plan, the Bacon plan of 1963.

In its time, the Bacon plan also built upon Philadelphia's spatial tradition and concentrated on urban structure. Its strength was in physically articulating and reaffirming connections between what had become disparate parts of the city. Its strategy focused on rehabilitating Society Hill, a district with spectacular, if rundown, examples of colonial architecture; and, through a system

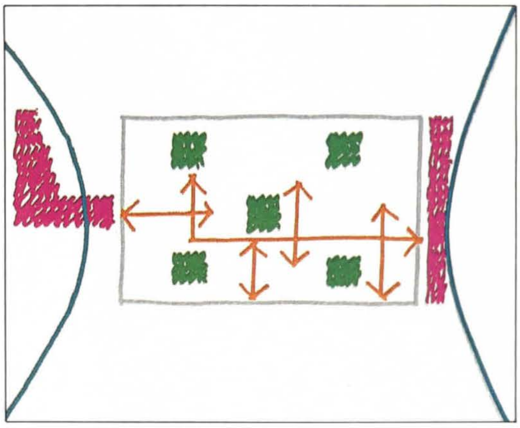
A Framework for Physical Development

The framework for the development of Center City is based on two fundamental concepts: development must be directed to appropriate areas and limited in areas that have a distinctive character that could be threatened by inappropriate development.



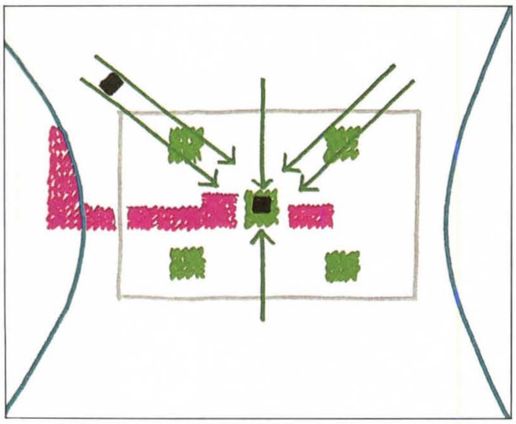
Linkages

A key strategy of this plan is to strengthen the links and improve circulation between downtown activity centers. As the new frontiers of the riverfront and 30th Street Station grow, the importance of circulation within Center City grows.



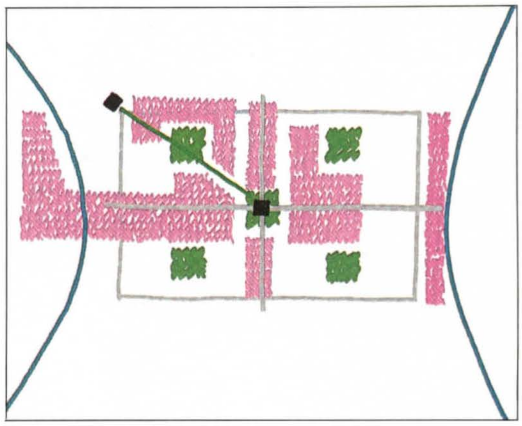
City Hall and Tall Buildings

Protecting the views of City Hall and the statue of William Penn can be achieved while permitting the development of tall buildings. Tall buildings should be directed to those areas of greatest transit accessibility.



Development Districts

Five development districts in Center City have the greatest potential for growth and change: Market West, Center City East, Broad Street, Parkway North, and the Delaware riverfront.



of pedestrian greenways, physically linking the residential area with the green expanses of the city's historic places.

Also, rather than encouraging development to head only westward along one of the original axes—Market Street—the 1963 plan proposed to balance the growth, to stimulate development along the eastern side of the corridor as well. The 1988 plan, which considers Center City East and Market West as prime areas for continued commercial development, builds upon this earlier concept of balance and introduces another balance along the north-south axis, Broad Street. And, because the 1963 plan pointed to the Delaware and Schuylkill riverfronts as untapped areas ripe for development, today's "new frontier" areas build upon some of the groundworks that were laid 25 years ago.

With William Penn's vision as his model, Edmund Bacon had taken the idea of a "Center City" literally. His plan made downtown the central focus of the metropolitan area. Through expressways, mass transit networks, and pedestrian walkways, it got people into the center city and moved them through the urban structure. Embellishing and modifying Penn's spatial concept, Bacon sought to draw out the rich physical delights inherent in Penn's original framework.

Between the first and second plan lay several centuries of urban development. Perhaps the most intriguing mark on the urban palimpsest was made early in this century. On maps of Center City, one line seems to contradict the geometric order of the grid—the diagonal line of the Benjamin Franklin Parkway. Although it is a fundamental departure from Penn's original plan, the parkway does not muddle the clarity of Center City's layout. Rather, as a direct link with the romantic landscape of Fairmount Park, it introduces a tree-lined boulevard into the city fabric; at the same time it reinforces the existing center at the intersection of the two axes.

In other ways, the subway and railroad lines, introduced after *the turn of the century*, reinforced the urban structure by following the Broad Street and Market Street cross axes. Later, this confluence of transportation paths would influence Bacon's decision to redevelop Market Street east and west. While their placement may seem strikingly logical today, one can imagine how incoherent the core of the city could have been if the mass transit links had followed a pattern independent of the historic structure.

The original layer of text, the structure underlying the entire Center City Philadelphia palimpsest, is William Penn's plan of 1683. Unlike Boston, a city of medieval character that developed organically and adjusted to the shape of the land as it grew, Philadelphia was laid out according to Renaissance principles of clarity and order. Penn had a vision for his plot of wilderness, and he articulated his vision with a practical plan larger than London or Paris at that time. He mapped out a grid-patterned "greene countrie towne" on the neck between the Delaware and Schuylkill rivers. Two wide streets would meet at the center, the intersection marked by a public square.

Today, Center City Philadelphia closely resembles Penn's original vision. The gridiron, the two major cross axes, the four green squares, and the central square continue to be the essence of the city's structure. One has to look at the urban fabric—the small 18th-century residences, emblematic civic and religious buildings, and grand town houses on the west—to realize that Penn's ideal symmetrical form actually grew asymmetrically. He envisioned the city growing from a Front Street along each riverbank eventually meeting in the middle. But since the early economy was based on trade and the port, the city grew first south to north, and then westward, from the banks of the Delaware. The practical, economic dynamics at work determined Philadelphia's fabric, but those unpredictable forces were always guided by the ideal of Penn's clearly articulated grid and cross-axial structure.

All cities have a palimpsest, a text that has been rewritten over the years. Philadelphia's, built on a tradition of two prior plans, has a clearly laid out classical spatial structure for guidance. Even in cities as diverse as Dallas and Boston, one can be informed by peeling back the layers. By trying to discern the palimpsest, one comes to understand the essence of the city. As Philadelphia's third Center City plan demonstrates, such understanding not only connects one with the past but also leads to a more potent vision for the future, a vision of growth and change that builds upon a city's historic structure. □

A Third Philadelphia Plan: A Critical View

By Robert Campbell, AIA

The Philadelphia Planning Commission's new Center City plan—especially the urban design section, written in consultation with Robert Geddes, FAIA—is at first glance a paradox. "Big Is Beautiful," trumpets the plan in some of its parts. It calls for vast new development, taller buildings, and a major, city-shaping urban design gesture. But "Small Is Beautiful," the plan purrs elsewhere, arguing the importance of doors and awnings, of mixed uses and small lots, and of streets conceived as humanly scaled outdoor rooms. It is as if Daniel Burnham and Jane Jacobs had collaborated. Geddes recognizes the two tracks of his plan and calls them the "Structural Plan" and the "Fabric Plan."

The Structural Plan: Big Is Beautiful. Most recent American city plans have been attempts to control and channel growth. Boston and San Francisco, the cities most often compared with Philadelphia, are good examples. But both these cities are coming off recent downtown booms, while Philadelphia is looking to catch up. And where Boston and San Francisco—as well as New York and other cities—are now trying to decentralize growth or spread it around, Philadelphia is trying to concentrate it.

"The plan is unabashedly pro-growth," comments Edward J. Logue, a Philadelphia native who became chief planner for New Haven, Conn., Boston, and the State of New York. "Big growth. I think that makes sense. The plan sends a clear signal to developers: here's where you may go, here's where you stay away—don't talk assemblages on Walnut Street, but if you go where we say, you can go big."

The place where you can go big, according to the plan, is a narrow corridor along Market Street, the city's east-west main drag. The plan calls for major office development here, and the new high-rise spine is the plan's one big-brush effort at creating urban form. It's envisioned as an enormous, spikey dorsal fin of office towers running almost the full length of the Market Street corridor, from the railroad yards near the University of Pennsylvania, west of the Schuylkill River, all the way eastward to Independence Mall.

The new towers will be big. As-of-right floor area ratios will be as great as 20, or up to 24 with bonuses; these densities now would be unthinkable in central Boston or San Francisco. And the towers will be high. Heights in Philadelphia were long governed by a so-called gentlemen's agreement that held all buildings to 491 feet, the height of the city's first skyscraper, the PSFS tower—well below the 548-foot-high top of the hat on the statue of William Penn on City Hall. But the gentlemen's agreement, never enacted into law, was broken when developer Willard Rouse built a 700-foot-plus tower, One Liberty Place, completed this year (see May, page 130).

Many opposed Rouse's skyscraper, most notably Edmund Bacon, Philadelphia's famed city planner of the 1940s through 1970s. But others, including Thomas Hine, architecture critic of the Philadelphia *Inquirer,* saw Helmut Jahn's rocket-shaped tower as a visible bursting-out of energy in a city that had lagged during the national office boom of the 1980s.

Geddes's Center City plan will make the Rouse tower the norm. Now a lonely giant that throws the rest of downtown out of scale, it will take a more modest place as only one of many towers that together will read as a single megabuilding at metropolitan scale. This is the kind of big, formal idea one associates with the generation of Burnham in Chicago—and of Ed Bacon in Philadelphia.

In fact, as many have noted, Geddes's plan is a logical extension of Bacon's. "It accepts the principles of the 1963 Bacon plan," says Hine. "Bacon attempted to shrink the perception of the city to that of an east-west, river-to-river city, with a moat of highways around its center. Luckily the highway along the southern edge never got built. The Geddes plan does go beyond Bacon in thinking more about the north-south streets."

Philadelphia architect Denise Scott Brown concurs. "The overall strategy, the great spine, is probably correct," she says. "And it sees the areas north and south as more cultural. It fits well with what we in our firm think we should be doing."

Says Ed Logue, "This is very much in the Ed Bacon spirit but at a size and scale that was not practical to think about when he was planning director." Logue points out, too, that the plan covers precisely the same area as the first Philadelphia plan, the "greene countrie towne" of William Penn.

The only person who seems to think the plan isn't Baconian is Ed Bacon himself. A vociferous critic of the new plan and longtime supporter of the gentlemen's agreement, he claims the new plan lacks a large vision and permits too much growth.

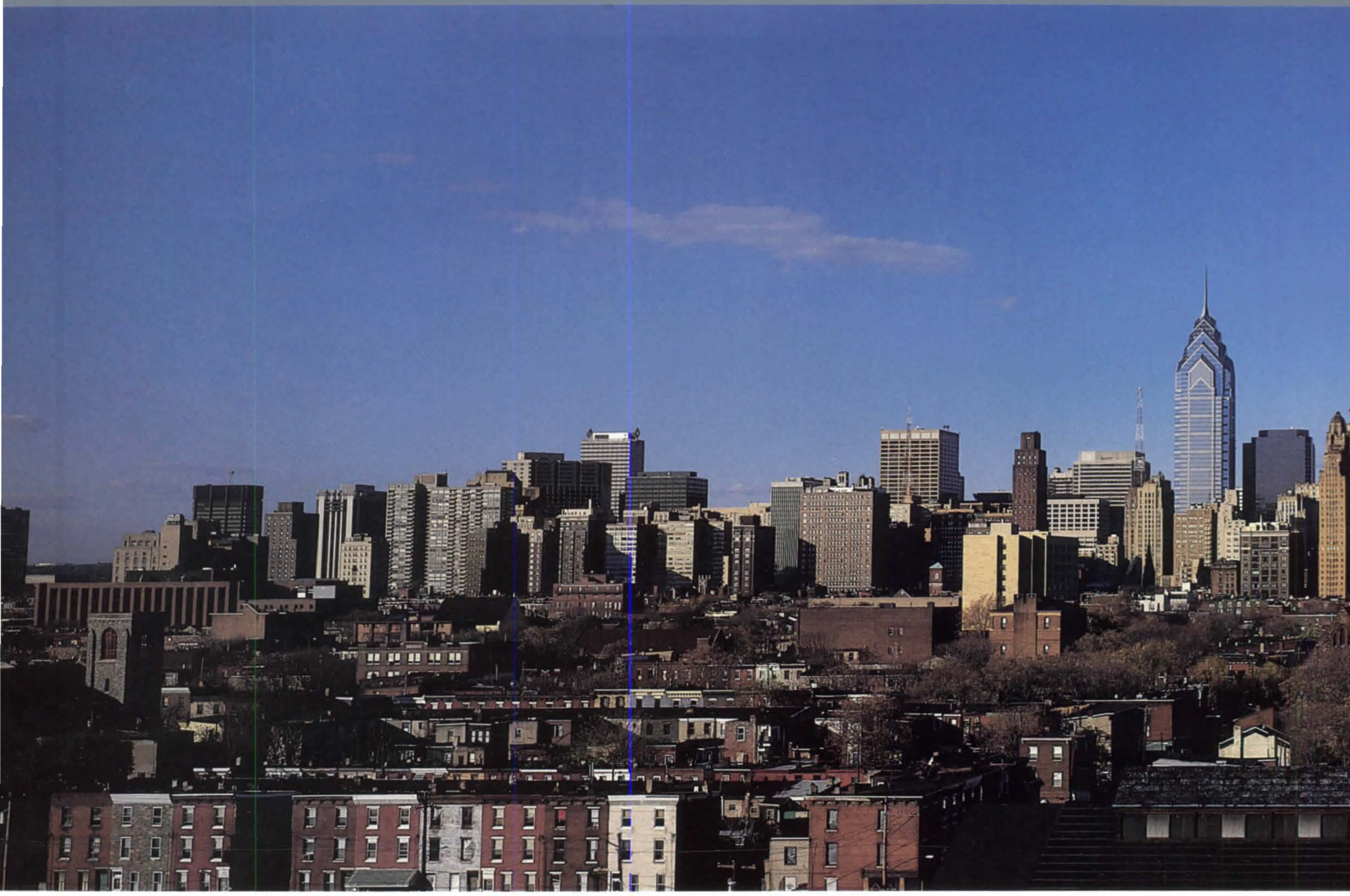
In published comments Bacon has written: "The plan for Center City is . . . nothing more than a grab-bag of miscellaneous items, selected at random, with no connection with each other nor with any coherent body of ideas or overall vision of the future. . . . [It] simply hands over to the owners and developers in one stroke the right to build 1.6 million more square feet of office space per city block than they may build now."

Bacon's comments are illustrated with grotesquely unfair photomontages of what he says the future Philadelphia will look like, thanks to the plan. But he's right about the plan's grab-baggery—more on that later—and his warnings about density deserve a response. The plan does say there will be no net increase in density because current bonuses allow just as much. But such an argument isn't the same thing as a reasoned, fresh analysis of just what density is ideal for Philadelphia.

The high spine probably makes sense for Phildelphia now. The fin of towers will give the city and its underlying order—the order of the original William Penn plan—the kind of three-dimensional definition it lacks. And concentrating growth along the spine, where it is served by mass transit, will relieve nearby residential neighborhoods from development pressure. As Hine comments, "The plan's analysis shows that there is room for growth within present zoning envelopes. That surprised many people in the development community. It put to rest the argument about preservation versus growth."

Also appealing is Geddes's notion of a *transitional* band, just south of Market Street along Chestnut and Locust streets. Here the present engaging mix of new and old, tall and short buildings will be preserved as a buffer between the new spine and the residential neighborhoods to the south. And the plan—despite voiding the gentlemen's agreement—preserves much of the skyline prominence of City Hall by creating diagonal viewing corridors from key points in the city.

As a footnote, it may be noted that the plan avoids calling attention to the city-shaping, city-expressing power of the high



spine idea. Geddes talks about it, but it exists in the plan only by implication. The omission is probably the result of a certain nervousness, in today's populist culture, about bold planning concepts.

The Fabric Plan: Small Is Beautiful. This is the Jane Jacobs part of Geddes's plan. It deals with what used to be known as "townscape," back in the era of Gordon Cullen. It is here that the Center City plan is most interesting, most persuasive, and most representative of our own moment in history.

Geddes's fabric plan, like the writings of Jacobs and Cullen, is obsessed with the idea that the essence of a good city is good streets. It asserts that streets must be shaped into outdoor rooms by continuous walls of interesting architecture. And it implies that streets must be regarded not merely as means (that is, routes from one place to another) but also as ends (places in themselves, places where we live an important part of our lives).

After 40 years of American street edges being eroded by widenings, by plazas, and by parking lots, to such a degree that they can no longer be perceived as rooms or corridors—and can't, therefore, be sensed as habitable—it's hard to argue with Geddes. His ideas aren't new to professionals, but they're crucially important. Geddes makes public the argument that the enclosed outdoor street or square, not the windy residual plaza with its sculpture or the manicured indoor atrium with its rubber tree and waterfall, is the true locus of public life.

Geddes encodes this perception in four simple, evocative, one-point perspective sketches (page 74), unfortunately misplaced and miscaptioned in the actual Center City plan. The sketches identify four qualities of good urban fabric: streets that are shaped by continuous walls of building along the property lines; open space that is intentional and well defined, not residual; active uses, especially retail, at ground level; and building entrances that are legible and inviting.

All four principles, of course, run exactly contrary to the principles of the era that most American cities are only now emerging from—the era when we awarded bonuses for useless plazas and arcades; edged the sidewalk with blank walls of glass or concrete; designed entrances conceived at best as cubist voids and at worst as mere panels in a curtain wall; and created fancy atriums that only drain life from the street. The most significant feature of the Philadelphia Center City plan, and the one likely to have the greatest influence nationally, is its explicit, vigorous defense of the streetspace as the heart of the city. Other cities, of course, have made the same case—Boston and San Francisco most notably—but none in so strong or general or didactic a manner.

Once it gets beyond these two general ideas about big and small, the Center City plan often wanders unconvincingly. Some of its ideas are good. It makes a sound case, for instance, for preserving older buildings without asking new ones to resemble them.

But much that is truly important is left to the future. "Because of the importance of the streetscape, the Planning Commission will prepare standards and a compre hensive design manual for streets in Center City," says the plan, copping out on what one would have thought was a major responsibility. Or again: "Driveways would also be restricted as to location and dimensions and would be prohibited on certain major streets." That's vague stuff, as the subjunctive verb form confesses. Or again: "The Planning Commission will prepare a design guide to aid architects in understanding and implementing the new zoning regulations. The guide should deal in detail with issues beyond the scope of zoning controls. . . . Building materials and the relationship between new buildings are two examples. A publication detailing specific design objectives is far more desirable than subjecting new development to ad hoc design review." Nobly said, but as yet undone.

It's in this area of follow-through that the plan draws its sharpest critics. "It has no teeth," says Laurie Olin, partner in the Philadelphia landscape design firm of Hanna-Olin and former chair of the department of landscape architecture at Harvard. "It has good intentions, but it's very disappointing in detail. There is no agenda for public works. It plays at urban design. There's a sense of gestures not connected. The government in Philadelphia is not really interested in the physical realm. The city is

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Above, in panorama from the south, Helmut Jahn's One Liberty Place (left of center) pierces Philadelphia's skyline. William Penn's statue atop City Hall is just right of center.

polycentrist politically, and the city council is gerrymandered. The only politics is small politics, the politics of swimming pools in the neighborhoods and garbage collection. You don't get real planning."

"It's a plan for a plan—I think a good one," says Ed Logue. "It lacks the final chapter, the one you entitle 'Implementation.' Now everything depends on who writes the zoning code and the handbook for architects. Also, Bacon's great 1963 plan was not followed up by detailed neighborhood plans, and there's the same problem here."

Adds Tom Hine, "The plan has not been disseminated very much, except by me. The zoning law has still to be drafted. The whole preservation ordinance, which the plan assumes, is currently under challenge. And the Planning Commission has no legal power at all—Bacon drafted the law and he only wanted advisory power. There is no instance in which it is the final reviewing agency; it advises the city council and the zoning board."

More supportive, Denise Scott Brown says, "The plan grows out of a whole series of studies that are not contained within it. It is a summary for the public of a stage of the inquiry. It's a document that has to be thin." She worries more about the fabric part of the plan. "He could have said more than he did. Geddes's four squiggle diagrams don't mean much."

The plan isn't quite the tough document it claims to be. It presents itself as a specific, prescriptive plan, like the plans of a generation ago—as opposed to the more recently fashionable kind of "planning" that really amounts only to design review. Barbara Kaplan, executive director of the Planning Commission, says, "We did not want to get ourselves in a position where we have to negotiate everything that is being built. We wanted to put everything down in a code so that a developer approaching the city knows what is acceptable."

That sounds a lot more explicit than the plan really is. The truth is that it will leave plenty of room for maneuvering and design review by the planners. More important, as already noted, far from being a "code," the plan is right now nothing but a set of recommendations for laws and guidelines that have yet to be written. Such revisions have not yet begun to happen. Until they do, if they ever do, the plan is precisely the soft document its authors—especially Geddes—tend to deride. It's a general guideline for design review—review to be conducted by an agency, the Planning Commission, that does not even possess a final right of approval.

I'd like to add one mild complaint that pertains not to the plan but rather to its presentation. This is a difficult document to read and understand, despite the fact that it's graphically handsome and written in plain, commendable English. The problem is that it has been conceived as a public relations tool and therefore has been chopped up, like too many PR handouts, into tiny "digestible" fragments. The theory, apparently, is that nobody's attention span is more than a paragraph long.

Everything gets said three or four or six or eight times. Within the booklet, the repetitions take the form of preambles, summaries, little boxes, captions, and outrigger blurbs in the margins. And the plan itself is only the beginning of the information overload. Like a great aircraft carrier, it comes to us surrounded by a protective flotilla of posters, clippings, and press releases that repeat the same points. As soon as you begin to understand any one issue, you are distracted by another. And throughout the plan are strewn, more or less at random, all sorts of pious hopes, like little buttercups, covering everything from getting rid of billboards to planting trees. Had the plan been written straight through in an organized way, it would have been much shorter and much clearer. Bacon is right about the "grab-bag."

The plan for Center City—as its form of presentation, perhaps, accurately expresses—is really the first draft of a very good plan. It's a scrapbook of ideas, visions, and concepts, most of which make a lot of sense but also need to be developed in greater detail. In years to come we'll see whether it will evolve into a real plan that can structure the evolution of its wonderful city.

But I leave the last word to Logue, who says, "I thought it was a damn good piece of work." □

The Search For Southern Expression

Strongly emerging regional voices.
By Robert A. Ivy Jr., AIA

Two Souths exist in 1988—rural and urban. Contemporary Southern architecture falls within two spheres of influence that are mirrored by the region's development. Until recently, most buildings by Southern architects have not been recognizably Southern: the goal has been to escape the confining grip of the past and move on. Today the Sunbelt glistens with glassy curtain walls; from the air, downtown Nashville could be Hartford.

Yet there has been a hunger for more. Critics have asked, "What is unique about the place? What caused early buildings to take the shape they took? Is there anything in vernacular building tradition that can be re-applied in this decade?" If so, the result would be richer buildings.

Recently Southern architects have begun to re-examine their inheritance, to reach for cultural and formal antecedents as inspiration for new work, and to revitalize existing buildings with fresh ideas. The vernacular building tradition was an individual response to place. In small towns and the countryside, Southerners built houses that answered needs of shelter, culture, and economy. By looking back at the influences on early buildings, it may be possible to forge a new architecture, one that belongs to the land it occupies, that embodies what writer Eudora Welty and others have termed a "sense of place." What factors have influenced Southern buildings in the past?

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The South is hot. That is one undeniable influence on all building in a large geographic area characterized by diversity of topography, race, and economy. The sun bears down on July days, mixes with moisture from the seas, and wraps people in a stifling bear hug until October. The Southern sun, with its high angle of incidence in the warmest months, is an inescapable fact of life. Rain falls hard and fast and splashes against the walls of buildings.

Both sun and rain must be kept out with large overhanging roofs, which traditionally have been hipped, gabled, or shed. In the past, thick brick or log walls provided cooling mass against the heat; shutters controlled light. Cupolas drew hot air up and out of buildings through encircling galleries and porches, whose task was to shelter walls from sun and rain. Separate kitchens isolated heat and provided some safety from fires. Today architects are using the traditional elements (higher ceilings, cupolas, and overhanging roofs) in airconditioned new buildings.

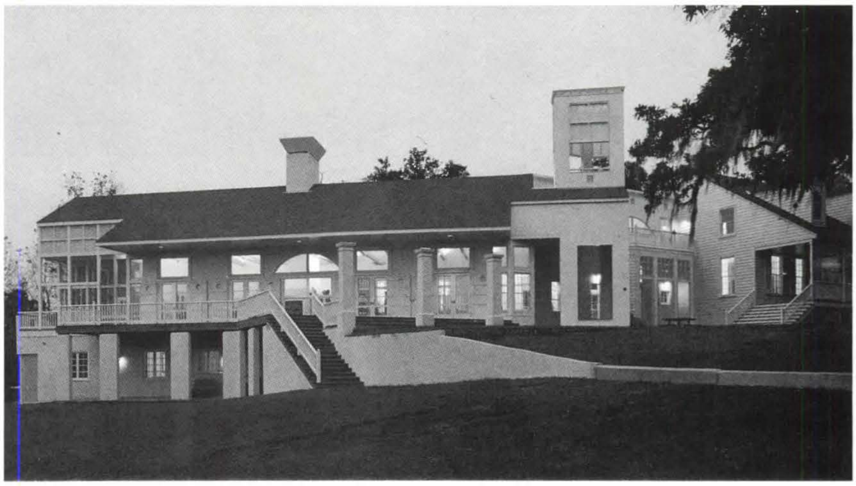
While larger, more ambitious older buildings frequently contrasted with the large-leafed woodlands, others blended with their site. Whether in water mills or in lodges perched on North Carolina crags, site can set a recognizably regional building apart. However, diversity of the Southern landscape produced variety in foundations and in the structures above them.

Above, today's urban South as exemplified by Riverfront Apartments on Nashville's industrial riverbank. *See page 86.*

Siting is perhaps less critical to identifying a regional building than size. Smaller buildings can be linked to local building traditions more easily than larger buildings, which have tended to reflect academic architectural ideas.

Some ideas were local. Variations such as Charleston's side galleries on the South Carolina coast were accepted within defined geographic areas. Today regional archetypes are influencing designers again, and the dogtrot, shotgun, and raised cottage are reappearing, frequently merely imitated but sometimes rethought.

Southerners have beeen reluctant to tap their cultural and spiritual heritage in new buildings, since the South's past carries the baggage of racism, of defeat, of economic loss, and of grief. Yet the region has overcome much of its pain, and the healing has been led largely by its writers. William Faulkner's words lie above the hills like smoke after battle, while Welty's chuckles have helped heal the wounds Richard Wright felt. Now the South celebrates its traditions—of strong family and strong church, of storytelling on Sunday afternoons after the gospel music and fried chicken, of Ma Rainey shouting the blues.



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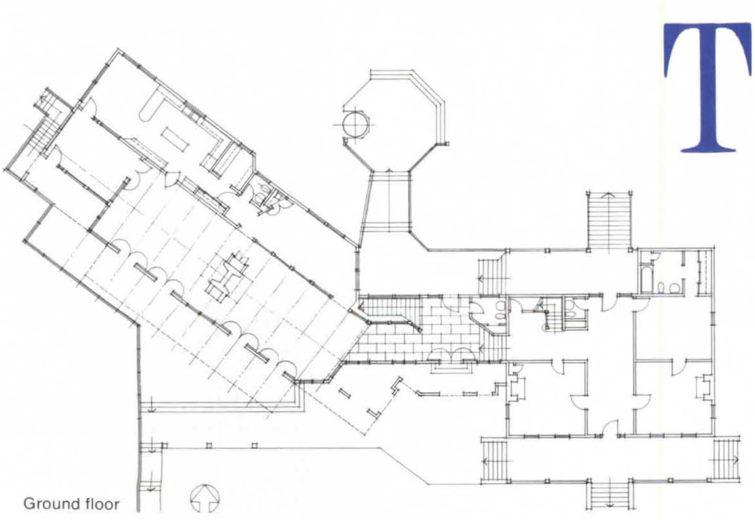


The new South meets the past above the salt marshes at a corporate retreat and family center at southern Louisiana's Avery Island. The points of view of each period are clearly complementary, though opposed, in the hybrid Marsh House (named for the builder), a restored 1820s raised cottage with a significant contemporary addition grafted onto the existing stock.

Two early settlers built the cottage on rising land that proved to be a rich salt dome whose oil and salt fueled enterprises as diverse as the original McIlhenny Tabasco Co., a wildlife refuge, and a tourist industry. The raised cottage was lowered and appended in 1926 and subsequently was acquired by the Avery Island Co. and used as a corporate retreat. When the 20th-century additions burned, Avery turned to Mac Ball, AIA, and his partner Lloyd Vogt, AIA, of the New Orleans firm Eskew Vogt Salvato & Filson to provide contemporary quarters sympathetic to the original building. The first task was restoration of the progenitors' house; the next was construction of a new addition over the 1926 addition's original foundation.

The new living spaces and kitchen are housed in a 1986 response to an Acadian building. Where the two buildings join, the architects added a tower, which anchors the complex to the hilltop and serves as a beacon to the lowlands and a light well

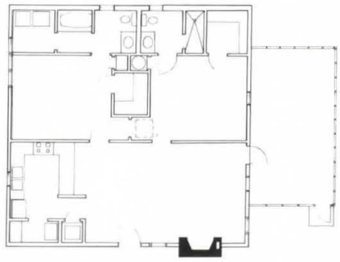
Below left, Marsh House, an 1820s cottage in Louisiana, and, to the left of it, the new addition by Eskew Vogt Salvato & Filson. Right, the entry hall at the knuckle of the plan mediates between cottage and addition levels. Below, screened porch at far end of the addition. Bottom, addition's living room; dining room lies beyond fireplace.

to the interior. Absent from the exterior are literal copies of formal elements—the columns, details, or fenestration evident in the older building. Sloped roofs overhang walls, however, responding to site, shading the summer sun, and providing exterior social spaces overlooking nearby Vermilion Bay. A screened porch invites family visits and offers some protection from the area's inevitable mosquitoes. Columns have been used in a new way, treated as sculptural artifacts defining the limits of an outdoor patio.

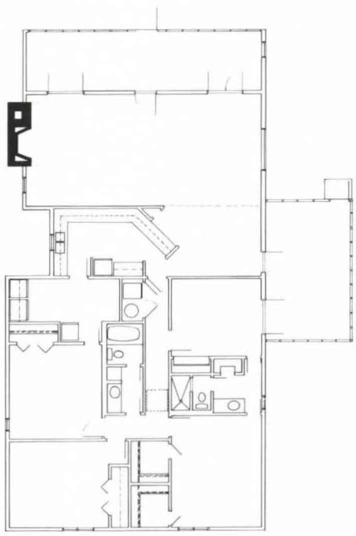
Nine bedrooms and large living, dining, and conference spaces are housed in forms reminiscent of the past, yet reinvigorated. Interiors are simple, enriched by new and old materials. New flooring in the living room is Brazilian cherry, a hardwood with full-bodied red color and warmth, its high finish similar to that of the heartwood floors common in the 19th century. A cypress mantel is an authentic remnant, taken from a burned sugar mill near Lafayette, La., and reworked into a contemporary fragment.

The Marsh House at Avery Island successfully juxtaposes the old and new South. In this unified composition, each era retains its own identity; each commands its own dignity. Together they make a positive statement about the continuity of family and place—respecting the future by building on the old foundations.

Breezeway under high metal roof separates twin wings of house in Mississippi by Mockbee, Coker, Howorth. Below, lake pavilion. Below right, the view through breezeway from one to the other.



Ground floor, smaller residence



Ground floor, three-bedroom residence

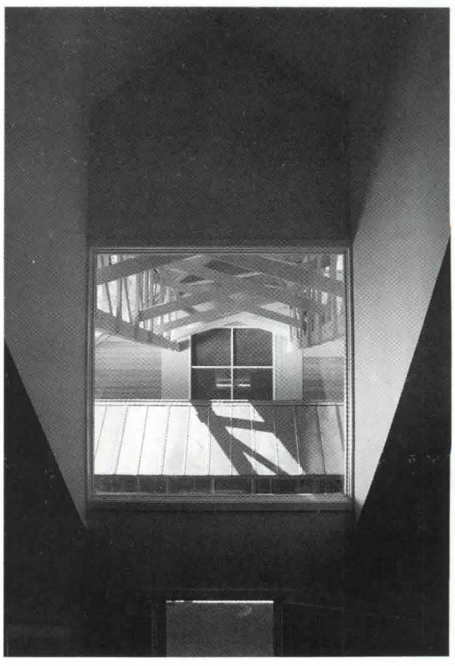
The family has always been a potent force in the South, giving rise to a tension between individual privacy and group cohesion. Sam Mockbee, AIA, of Mockbee, Coker, Howorth Architects, faced this tension and resolved it with an innovative solution. He confronted not two Souths, but two families at the Moore residence, set on six lakeside acres near Jackson, Miss. A local physician and his wife asked the architect to design a new house for themselves so that they could invite the wife's parents to live in an adjacent existing house. A Southern archetype, the dogtrot, solved the problem of keeping the two families close but independent. In this reinterpreted version of the early building type, which had twin wings separated by an open breezeway, the doctor and his wife occupy a three-bedroom house that is connected to the wife's parents' smaller residence by a covered walk. Mother-in-law now joins her children in the evenings but spends most days in her own house, independently.

The Moore house is a more complex solution than the simple dogtrot revisited, however. Other elements from the past have been reinterpreted here, from the building materials of wood siding and metal roof (V-crimped, galvanized metal) to the building forms, responsive to the clients' request for a structure reminiscent of the barn forms in the nearby countryside.

larger sheds, providing both shade and social spaces. Mimicking the dependencies of older buildings, outbuildings complete the composition and work for the family. A detached carport is connected by a long pergola to the living quarters. This covered walkway, laced with native trumpet vine and jasmine, forms an axis that terminates in a lake pavilion, used for sitting and reflecting or chatting.

Decorative elements are simple, drawn from cottage architecture or from structure. Trusses link the two buildings into one house form, working as they embellish. Windows are very large or small, reflecting their interior purposes. Trelliswork adds counterpoint while shading exterior walls. Interiors in both buildings are simple volumes with large, vaulted spaces for visiting, music, reading, or television; they are cooled by airconditioning and ceiling fans. Glazing is calculated to make the upper walls transparent in the living rooms, to bring the pines, the stars, and the sky within. Dining, kitchen, and sleeping rooms are modest.

In the Moore house, the architect drew from the past. The foundation of this very new building is the ephemeral world of pre-existing cultural forms. The result is a new building in a rural setting, a simple building type with a contemporary built-in tension. The architect reinterpreted a familiar building type for a specific family's needs; the result is a building true to its place.



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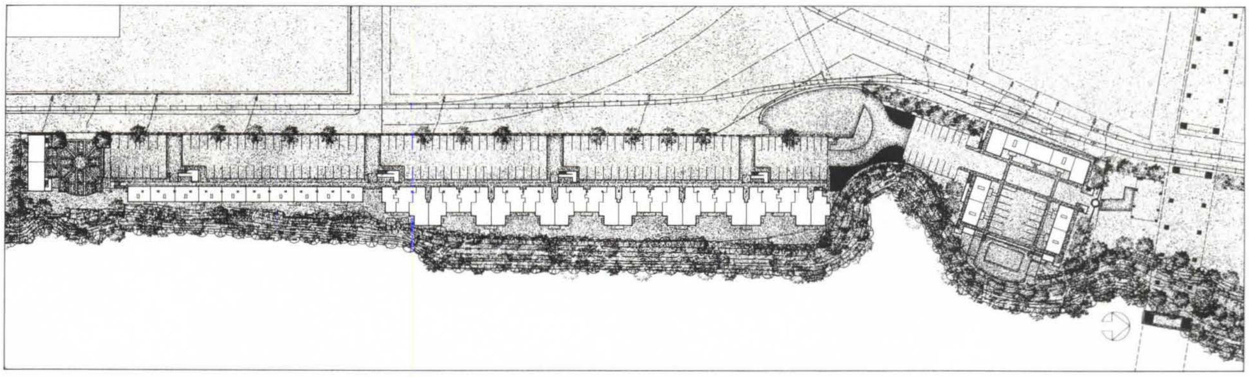

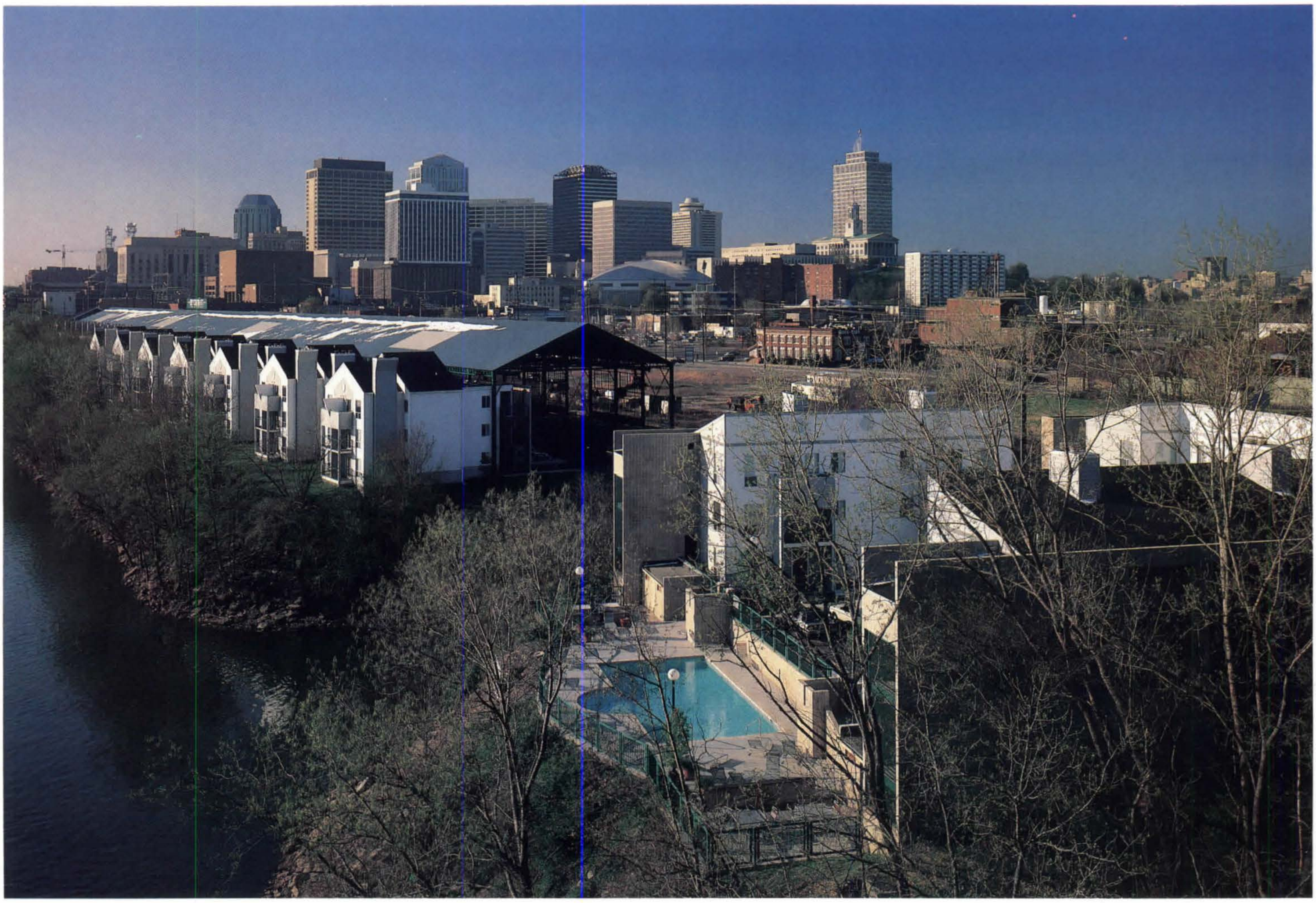

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Four hundred miles upland, in Nashville, the Cumberland River cuts through rock, not Mississippi mud, as it flows. Yet the sun shines as brightly. To walk into the main parking space of the Riverfront Apartments on a late afternoon in summer is to see the Southern atmosphere as well as feel it: the covered shed space captures warm afternoon light and glows.

The setting of the apartments, an industrial area several blocks from downtown Nashville, differs dramatically from the Mississippi woods. This deserted Nashville neighborhood had been abandoned. Warehouses were close around the narrow site, which stretches almost a quarter of a mile along the riverbank. Railroad tracks lay parallel to the main structure, a metal shed 900 feet long, the former home of the Kerrigan Iron Works. Terminating the property was an abandoned 180-foot incinerator; the Jefferson Street Bridge angled across behind the tower.

Brookside Properties hired Tuck Hinton Everton Architects of Nashville to design 145 apartment units for the difficult site, demanding that constraints become virtues, the artifacts become found art. Today a small new residential community has emerged within the larger city on the Riverfront grounds.

The complex proceeds from an entry court through the shed structure, which the architect left in place as a covered parking structure for the apartments, then through to new buildings

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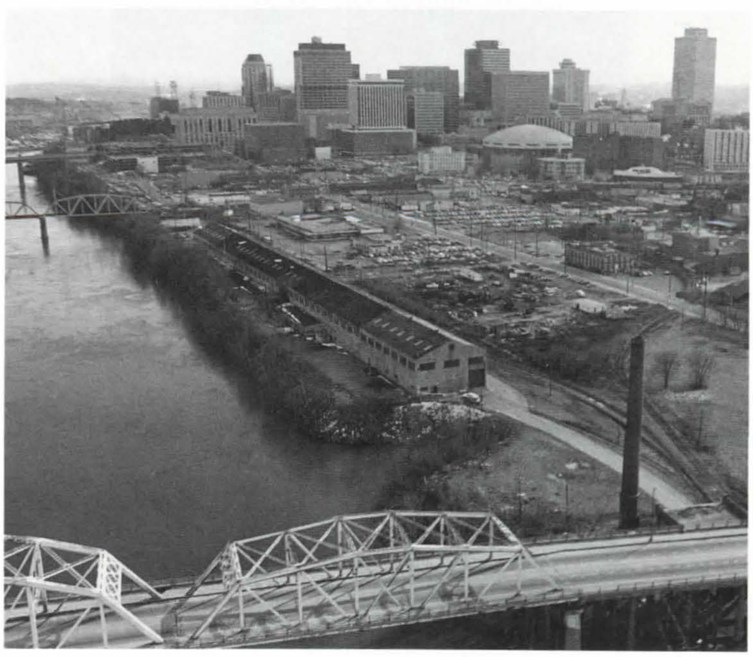
Industrial shed (in 'before' photo at right) became car-park spine (above and top left) for Tuck Hinton Everton's Riverfront Apartments in Nashville. Top right, abandoned incinerator stack (at lower right in 'before' photo) anchors one end.

grouped around the incinerator. The main three-story apartment building tucks up into the shed and out eastward toward the river. Repeated gable forms line the riverbank, marked by rhythmical chimneys and balconies.

Unlike most residential projects, this multifamily solution explores the industrial esthetic. Materials include metal siding, empty metal window frames, and new metal roofing. Industrial artifacts have become sculptural features of the building, from the large factory fans that revolve slowly in the heat, to large cast-iron transformers that stand like guardians of a Chinese temple, to the former factory's swinging catwalk. By retaining the shed, the project acquired a porch, tempering the air, shading the walls of the apartment building, and adding an unexpected boundless expanse.

Riverfront Apartments are contemporary—in dialogue with climate and site and in step with contemporary society. If the South has two faces, two directions, then Riverfront Apartments represents the urban South—but an urbanity with memory.



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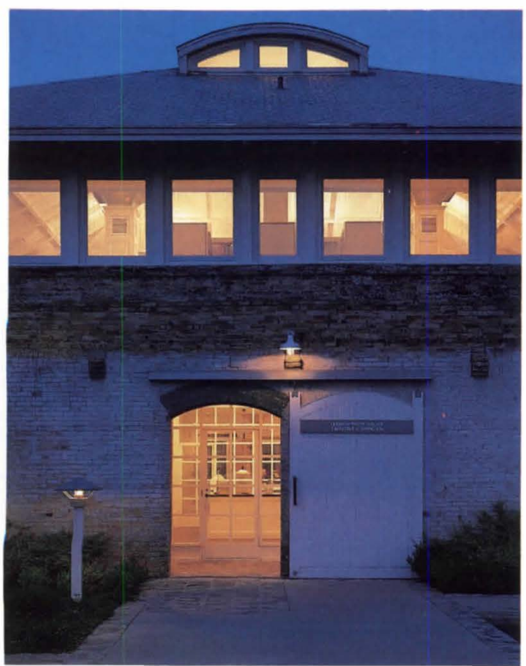
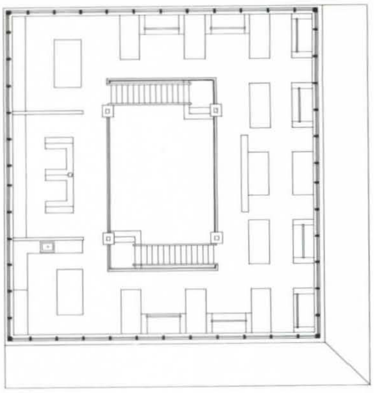


The scale and character of Pensacola, Fla., lie somewhere between the rural site of the Moore residence and the profoundly urban Nashville riverfront. Four blocks from downtown, in an area that had been known as the equivalent of the Pensacola Bowery, stood a brick shell.

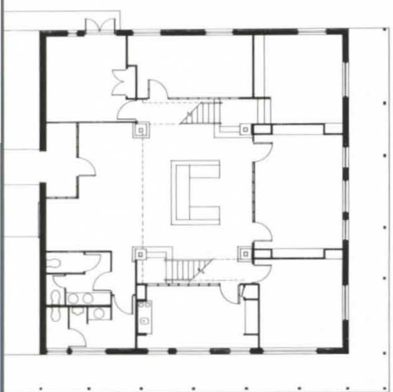
For Clemens Bruns Schaub & Associates, the relic was an opportunity. Schaub's chosen property for an office and studio, 400 West Romana St., had enjoyed several uses since its construction before the turn of this century; most recently it had been a grocery store. On one side of the one-story building stood a frame house; on another, a porch.

Although the renovation of the building had to correspond to guidelines from the Department of the Interior, little was salvageable of the original fabric: the roof was ruined, the interior partitions had rotted and had to be removed, and the adjacent house had come down. However, the brick walls, which had withstood hurricanes, rain, and Gulf Coast sunshine, were strong and texture-filled. Schaub left them as the framework for a new structure within.

Rising uninterrupted from the first floor to the roof are columns carrying airconditioning, light, and ornament throughout the two-story space. A mezzanine has been added as the main design studio, and clerestory windows surround the upper walls.



Second floor



First floor

This converted commercial building in Pensacola, Fla., is now the 10-person architectural office of Clemens Bruns Schaub & Associates. Columns (all four of which appear in upper photo on facing page) that define the reception area carry air as well as roof loads; they flair near their tops to conceal uplights. Ceiling and columns are faced in painted pine members and plywood panels. Mezzanine rail is tubular square section steel with steel rods as infill. Ceiling rises 34 feet at center.

Sitting lightly atop the construction is the roof, its exposed underside adding texture and life to the composition.

The metal-shingled roof is like a hat, or an old cupola resting on a strong brick shell. From outside, the roof's form recalls other commercial buildings nearby; inside, the volume surprises. Glass walls allow an uninterrupted flow of space. The new creature rises from the old.

Outside walls have been left exactly as found to share their age and to excite interest. The gallery around the building has been restored and now serves the neighborhood as a new bus stop. A wide opening is the major entrance to the building.

There is a deference to the existing surroundings in the Schaub office building—manners, if you will, that are characteristically Southern. The architect compares the neighborhood to a large Southern family, in which each member is accepted for his or her own contribution, and in which personality, even the eccentric, is cultivated. In his view, the architect's role in renovation is to add dialogue to a conversation that is already in progress, not necessarily to create an entirely new order in an older setting, nor to replicate the past.

Memory is key. Whether inspired by the actual brush strokes and brick of men and women who passed before, or by the spirit of the culture, some contemporary architects are building in a more responsive, nonacademic way.

New buildings can exhibit regional character, not, as Gropius disdained, "through sentimental or imitative approaches." The contemporary architect can gain strength from the past culture—either from explicit artifacts of site or surroundings that remain or from more intangible sources—archetype, literature, family characteristics, personality, or the spirit of the place.

Such buildings do not necessarily form a regional trend; the styles employed by the practitioners differ. All are modest in scale; larger versions of vernacular buildings would be problematic. What they share is a respect for a specific time and place and a confidence in their individual identities. By reflecting on the past, the architects are redirecting energy into new projects that could not be located anywhere else. □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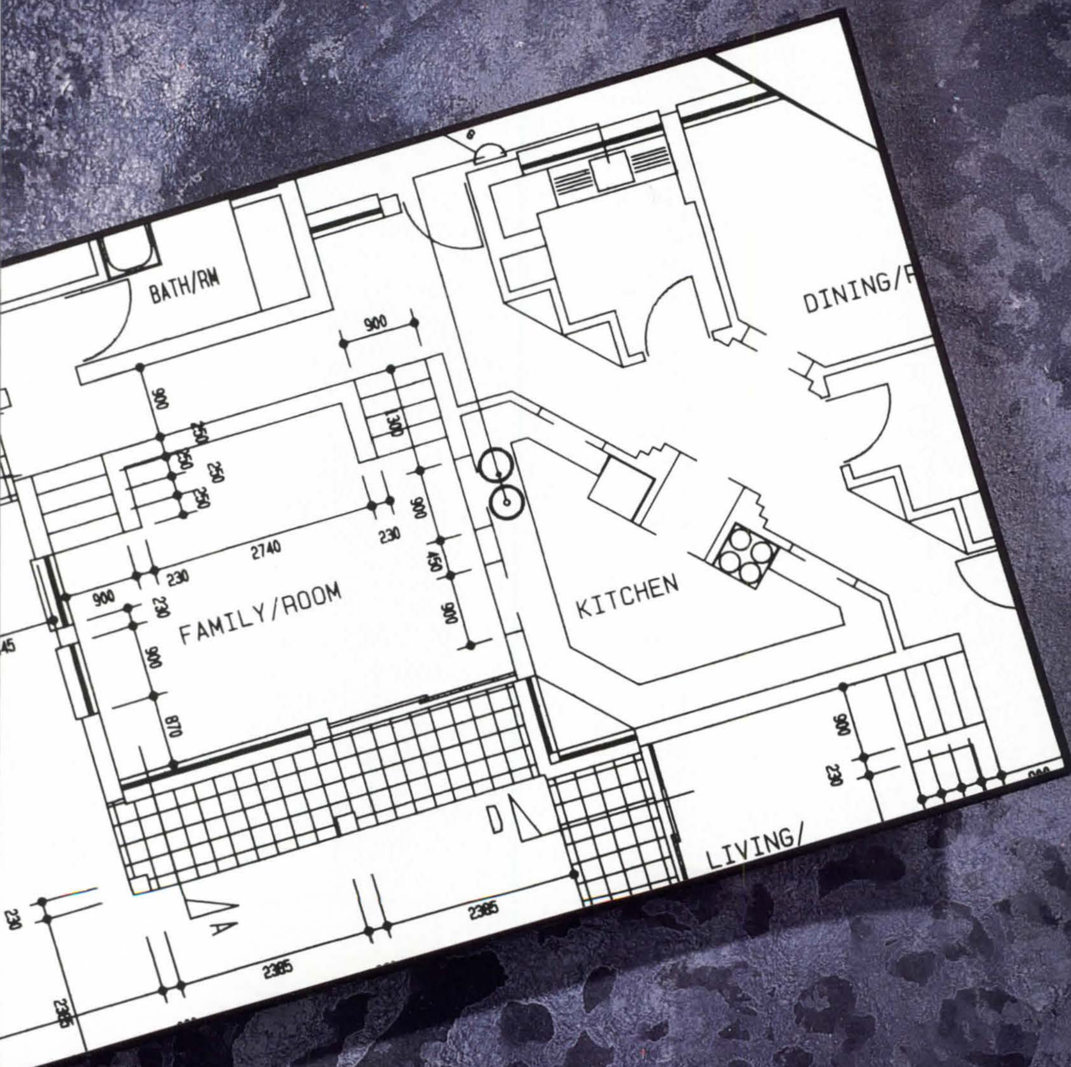

HEWLETT PACKARD

Sound Performance in Public Spaces

How it can be influenced and controlled.
By Carl J. Rosenberg, AIA

Three separate groups of kids are practicing basketball in the gym and the din is deafening—how is it that they seem to be making more noise than a Saturn rocket? There's a lose finish to the relay race at the swimming pool, but you an't distinguish the announcements because the noise is so garbled. The clatter in the bank lobby makes waiting in line uncomfortable, and you can't understand the teller when it finally is our turn. A finely presented, elegant (and expensive) meal is uined by the distracting noise in the restaurant.

These public spaces share similar acoustic problems: sound n the room is too loud; it is harsh and raucous; it appears to ome from all directions at once, adding to the sense of cacophny and disorientation; and intelligibility, articulation, or undertanding of speech is poor. These types of spaces do not require he finely tuned acoustics of a concert hall, but they can be esigned for acoustic comfort. It is possible to investigate the coustic performance of "nonperformance" public spaces, present a model for the way sound responds in such spaces, and hen apply treatments to control acoustics.

The model can be applied to similar spaces that share the ollowing attributes: they are not performance or presentation paces; intelligibility of live (unamplified) sound is not critical there is no orchestra or dramatic presentation); the sound sources re spread out or distributed throughout the space; and the dimenions of the room are relatively even, that is, the space is not nduly long, wide, or high. Given these attributes, sound (which ravels at 1,120 feet per second) will rapidly fill the space with diffuse, evenly distributed sound field. For example, in a room 0 feet long, the sound will bounce from one end to the other nd back 10 times each second. In a smaller room, the diffuion and buildup of sound occur even more quickly.

Outdoors, where there are no reflecting surfaces, sound radites and expands spherically, like the ripples on a pond or like balloon being blown up. Sound radiating outward can be diaramed as a series of arrows or rays projecting in all directions rom a source (Figure 1). Sound is measured on a logarithmic ecibel scale—with every doubling of the distance from the ource, the sound level decreases by six decibels. In the model f sound as a ray, the reflection of that ray off a hard surface ollows the simple rule that the angle of reflection equals the ngle of incidence. In other words, sound reflections behave like ight. Occasionally, when a signal comes back to us after at least ne-tenth of a second, we hear discrete reflections as echoes, ven though the sound has become quieter—by six decibels every ime the distance from the source is doubled (Figures 2 and 3).

Inside a room, the walls bounce the sound waves (or rays) ack and forth, creating the diffuse sound field noted above. However, we can still model this sound field as if it were com-

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Figure 1
Sound as a wave or a ray

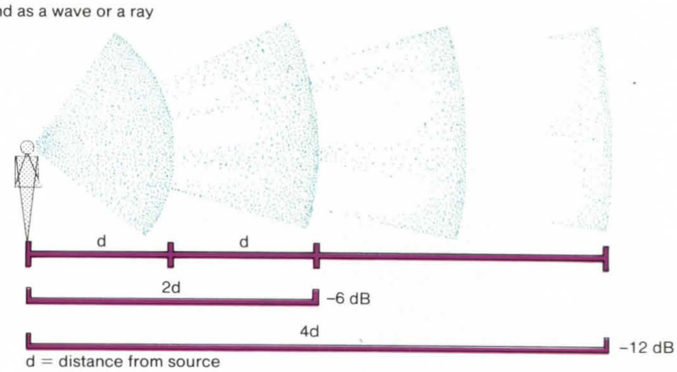


Figure 2

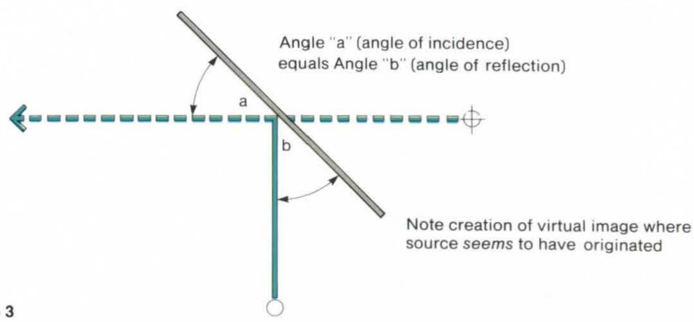


Figure 3

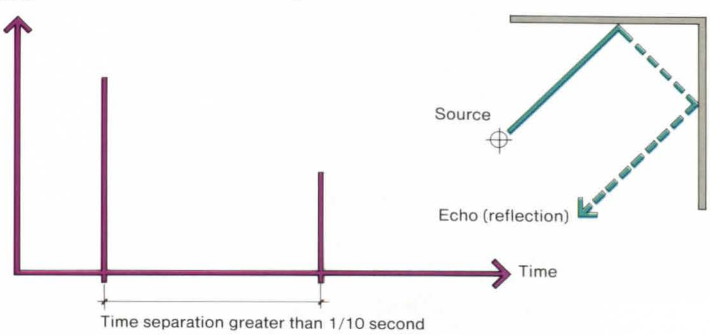
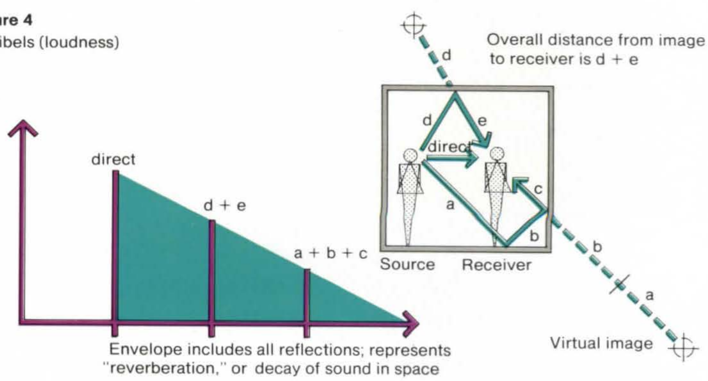


Figure 4
Decibels (loudness)



posed of discrete reflections or images. Each sound ray has an energy level that depends on how far it travels as it bounces around (that is, the distance from the receiver to the sound image) and on the absorptive properties of the surfaces the ray encounters. We hear multiple reflections as reverberation or the smooth decay of sound in a room, but, for purposes of this model, reverberation is made up of many individual reflections (Figure 4).

The designer can lower the level of built-up sound energy in a room by lengthening the distance a sound wave has to travel to reach a receiver's ears—that is, making the room larger—or by changing the physical characteristics of the surfaces that reflect the sound wave—that is, adding absorptive materials.

Understanding sound absorption is a key to using this simple model. As a sound ray hits the surface of any material—wall, floor, ceiling, table, or computer—that surface absorbs some sound. This is a basic property of physics caused by the interaction between a pressure wave (sound in air) and a boundary layer of a surface that has an impedance different from air. The efficiency with which a material absorbs sound is measured in a laboratory as a *coefficient of absorption,* designated α. The coefficent of absorption is expressed as a value between zero and one, representing the percentage of the sound absorbed.

The efficiency with which a material absorbs sound varies with the frequency of the sound. Frequency is what we associate with pitch, from low notes to high notes, and is measured in Hertz

Figure 5

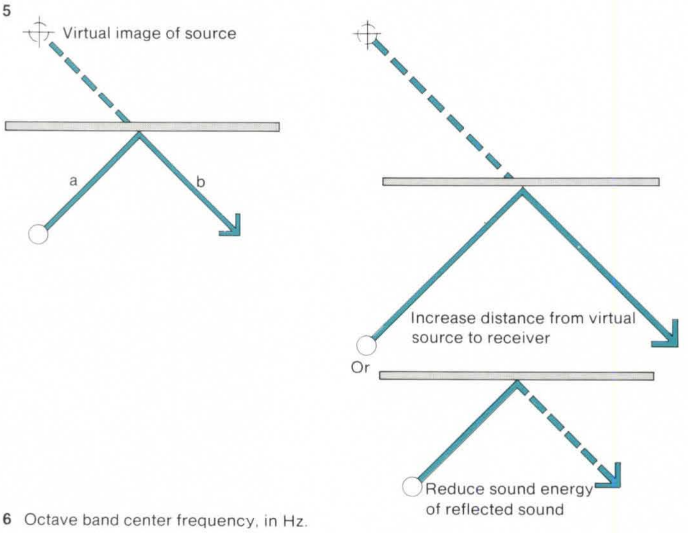
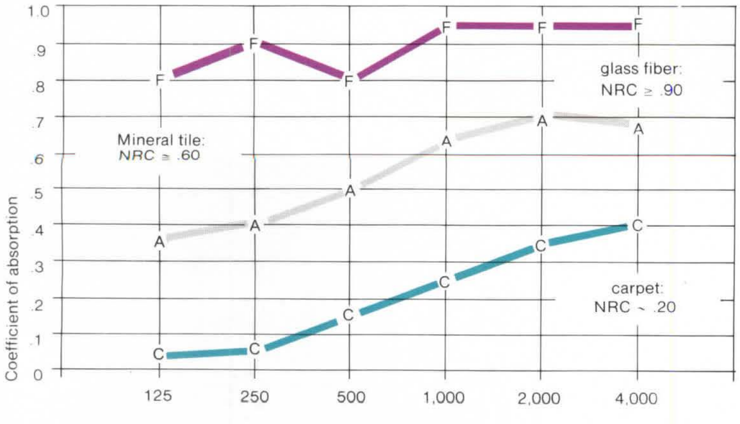


Figure 6 Octave band center frequency, in Hz.



$$\frac{\alpha\ 250 \quad \alpha\ 500 \quad \alpha\ 1{,}000 \quad \alpha\ 2{,}000}{4} = \text{NRC}$$

Noise reduction coefficient

(Hz), or cycles per second. For architectural acoustics, the frequency range of human hearing is from 31 Hz to 8,000 Hz, approximately equal to the range of a piano keyboard. Most materials are much better at absorbing sound at high frequencies than at low frequencies; this is related to the size of the sound waves and the thickness of absorptive materials (Figure 5).

For most architectural applications where human speech is the predominant source of noise, it is sufficient to design a space using an *average* value of coefficient of absorption. This is called the *Noise Reduction Coefficient* (NRC), and it is an average of the coefficients of absorption at 250 Hz, 500 Hz, 1,000 Hz, and 2,000 Hz. Because the NRC value is simply an average, it is rounded off to the nearest 0.05. NRC values are a useful tool to give the designer a rough idea of how well a material absorbs sound in the frequency range of speech (Figure 6).

Higher NRC values indicate better efficiency at absorbing sound. Materials with high NRC values usually are soft, porous, and fuzzy, because open pores allow the sound pressure fluctuations in the air to release their energy as friction to the material. Good choices are glass fiber, acoustic tile, shredded-wood-fiber formboard, spray-on cellulose, curtains, cloths, some carpets, and so forth. Because they tend to be rather delicate and expensive, good sound-absorptive materials often are premanufactured into components that also offer some protection against wear and tear.

At the other end of the spectrum, materials that are efficient at reflecting sound (and therefore have low NRC values) usually are hard and smooth, such as wood, gypsumboard, and glass.

For the model of a diffuse sound field in an enclosed space, we are concerned with the average NRC of all the surfaces together because, by definition, sound is diffusely reflected within the enclosure and hits all the surfaces quickly. Experience and extensive theoretical analysis have shown that the average NRC of typical architectural enclosures with all "hard" surfaces—such as wood, metal decks, gypsum walls, furniture, etc.—is about 0.1, meaning that 10 percent of the sound is absorbed by the boundary surfaces. (Some extremely reverberent, "live" spaces might have average NRCs for all surfaces that are less than this; for example, a ceramic tile bathhouse might have an average NRC for all surfaces that is only 0.05.)

Consider our noisy gym, with hypothetical dimensions 50 feet long by 80 feet wide and 22 feet high. The total area of all exposed surfaces is 13,720 square feet, calculated as follows: 4,000-square-foot floor (50x80); 4,000-square-foot ceiling (50x80); 5,720 square feet of wall surface (two walls of 50x22, two of 80x22).

Assume that the surface area has an average NRC of 0.1, which includes the wood floor, metal ceiling, bleachers, lights, and all other surfaces. To increase the average NRC to about 0.25, we could treat *all* the surfaces—floor, ceiling, walls, and bleachers—with a material of this value, such as carpet. Acoustics might be superior, but we would not have a workable gym.

We can get the same acoustic result by treating about one-third of the surface area with a moderately absorptive finish of NRC 0.7. Although the remaining surfaces still average NRC 0.1, all surfaces together would produce an average NRC as follows: one-third of the surface area, covered with material of NRC 0.7, would yield NRC 0.21; two-thirds of the area, the "hard" materials of NRC 0.1, would yield NRC 0.066; the total surface area would then average NRC 0.271.

A similar value results if we treat only one-quarter of the surface with a super-efficient material of NRC 0.99; again, the higher efficiency of the absorptive surface is averaged out over all the surfaces. The one-quarter covered with material of NRC 0.99 yields NRC 0.25; the remaining three-quarters, with NRC 0.1, yields NRC 0.075; the total area averages NRC 0.325.

The numbers work because the sound field is diffuse for this type of space. We are not concerned with a specific reverberation time, although this could be calculated and is related to the average NRC, nor are we concerned with a specific noise level, although this too could be calculated for a given noise source. Rather, we are using a model of a diffuse sound field to implement reasonable noise control. The goal is simply to obtain an average NRC for all surfaces equal to 0.25 or greater.

Because the sound field is diffuse and sound bounces off all surfaces everywhere so quickly that we can catch it anywhere, this model does not relate the absorption to any particular location. But common sense suggests either spreading the absorptive material around the room evenly, so that it captures some sound from all reflections, or placing it close to the source or receiver, so that it reduces energy mainly in the first or last reflection. In that light, the ceiling of a public space often is the best place for sound-absorptive material: it covers the whole room; it comprises usually about one-third of the total surface area; it is out of the way and relatively safe from abuse (important for expensive and fragile materials); and it will not be covered with tables and chairs or interrupted by windows and doors.

In *gymnasiums,* if adequate absorptive treatment is incorporated as part of the ceiling system early in the design process, lots of potential problems can be avoided. If the ceiling of the gym is also the roof, an acoustic metal deck is an excellent choice. Sound-absorptive glass fiber batts are placed between the webs of the deck, and the webs are perforated so that the insulation is exposed to sound. The NRC values of these systems are often above 0.8, so, if the ceiling is one-third the surface area, an overall average NRC of 0.24 is easily achieved.

Other options for gym ceilings include a suspended acoustic-tile ceiling (with hold-down clips so that bouncing balls do not dislodge the tiles), shredded-wood-fiber foamboard, or sound-absorptive baffles suspended vertically from the joists. In any case, such treatment of the ceiling often will be all that is needed to reduce the noise to reasonable levels, making the gym a suitable place for instruction and spectator viewing.

If the dimensions of the gym are such that the ceiling does not provide enough absorption area even when covered with a very efficient material, it may be desirable to add materials with high NRC values on the upper side walls. These might be glass fiber panels covered with a perforated vinyl, or regular building insulation protected by shredded-wood-fiber formboard. Durable materials that can withstand the abuse of volleyball impact are available for this use.

Swimming pool areas of necessity have floor and water surfaces that are very reflective of sound, and their lower wall areas also must be of solid materials such as ceramic tile. But here, too, an average NRC of 0.25 can be achieved if other surfaces, especially the ceiling, are treated with very efficient sound-absorptive materials, such as metal deck systems. Other suspended ceiling systems are specially designed for high humidity and corrosive environments or employ suspended elements such as perforated metal panels with glass fiber wrapped in thin plastic laid above the panels.

Television studios generally have dimensions that meet the criteria for a diffuse sound field. Typically, the studio space must be quite dead, with low reverberation, so the average NRC for all the surfaces must be at least 0.25. Floor surfaces may have to be vinyl to be smooth enough for cameras to be wheeled around without vibration. To achieve an average NRC of 0.25 or greater for all surfaces, the design must incorporate an absorptive ceiling. Curtains around the perimeter walls also will help raise the average NRC if they are bunched up (100 percent fullness, or two feet of curtain per foot of wall), spaced four to six inches away from the wall, and made of a heavy material, say, 18 to 25 ounces per square yard.

Some degree of noise control for a studio space can be achieved by increasing the volume of the space. As shown in the model, the distance that reflections would have to travel would be increased if the roof were raised and the walls placed farther apart; hence, the decibel level of each reflection would be lower, by six decibels if the distance of the sound-ray path is doubled. The main problem with this approach is the great expense of increasing volume just for acoustic results. Another problem is that increasing volume often multiplies the noise sources within the space. For example, during the 1987 World Series, the built-up noise levels in the enclosed Metrodome in Minneapolis were extremely high even though the volume of the space is huge, with the reflective surfaces (and virtual images) far apart, and the ceiling has a very efficient sound-absorptive design.

Atriums and lobbies also have high volumes but usually do not hold crowds cheering for a World Series team. The same acoustic model can be applied here for noise control. The high volumes help reduce noise buildup, even where there are many hard surfaces. Therefore, the average NRC can be reduced to 0.2 and still yield an acoustically comfortable space. Less absorptive material may be needed to give a quieter feel to such a space.

Restaurants and cafeterias are notorious for being noisy, but if the ceiling can be adequately covered with sound-absorptive material to hold the average NRC to 0.25 or so, most problems will disappear. Acoustic tile is one way to do this, although more elegant finishes may be desired, such as cloth-covered glass fiber panels floating at the ceiling. The walls will seldom provide enough area for absorption there to do any good; and even carpet on the floor will not be adequate. Additionally, the floor material is covered by tables, which, even with the most elegant tablecloths, do not have a high enough NRC to help.

Keep in mind that for nonperformance public spaces the sound-absorptive materials must be spread out over all the surfaces, and the average NRC of all the surfaces is what determines whether there is adequate noise control. This model, plus some common sense and some care in selecting materials and checking on their acoustic properties, can make for happy clients and successful projects. □

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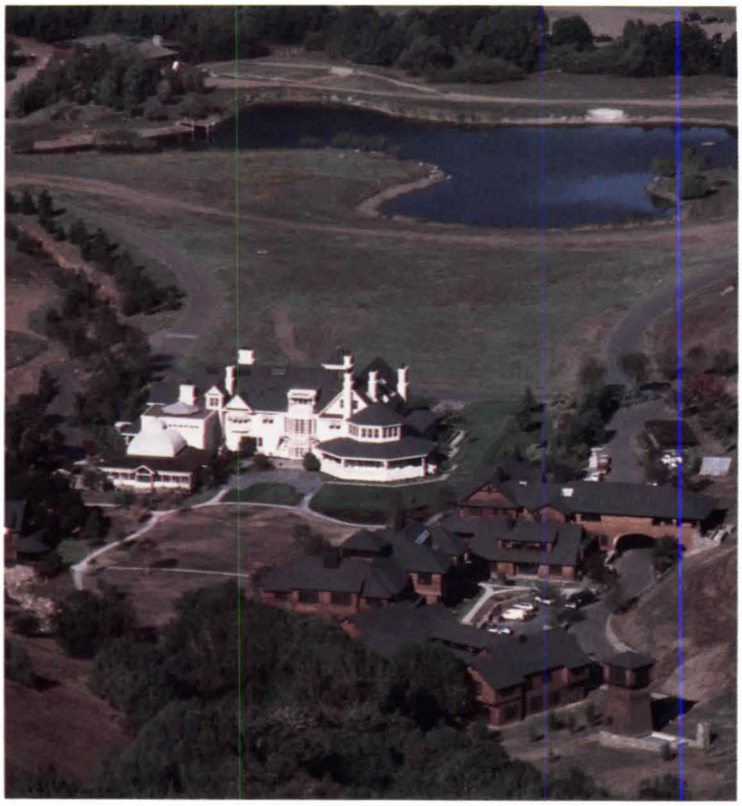
State of the Art Acoustics

At George Lucas's Skywalker Ranch. By Douglas Gordon and M. Stephanie Stubbs



Filmmaker George Lucas has a dream come true in the form of a comfortably scaled, totally state-of-the-art production facility, Skywalker Ranch, located on 2,000 acres in Marin County, Calif. (about a 45 minute drive north of San Francisco). At the heart of this multibuilding complex is a facility known as the "technical building," designed by Backen, Arrigoni & Ross Inc. (BAR), a San Francisco-based architecture and interior design firm. The technical building is a 140,000-square-foot postproduction sound recording and mixing facility that has sound stages and mixing rooms with some of the strictest sound-control criteria in the world.

To meet commitments to Lucasfilm Ltd., the building was constructed on a fast-track basis, requiring that the foundation and underground construction commence within eight months of initial studies. Necessary construction information was generated in advance of the critical building schedule and issued as separate bid packages, which allowed construction to proceed during the 15 additional months required to complete the final bid drawings. This design/construction sequence necessitated a close working relationship among the owner, architect, and all consultants, including the acoustic engineering firm, Charles M. Salter Associates.

The acoustic requirements for the recording spaces and the isolated site presented a series of challenges for BAR and Salter Associates. They worked together first to determine proximity and antiproximity relationships. At the outset, the building's spaces were categorized into three different types according to their acoustic requirements:

- A-type spaces are the most sound-sensitive and include all recording and dubbing rooms for musical scoring, solo recording, Foley recording (sound effects), voice dubbing, premixing, final mixing, and screening. The performance level for these spaces, measured as background noise criteria (NC—a measurement commonly used to classify noise production of mechanical equipment), ranges from NC 5 to NC 20.
- B-type spaces include sound transfer rooms and the control rooms associated with the recording and dubbing spaces and have background noise criteria between NC 20 and NC 30.
- C-type spaces include sound design and editing rooms, with background noise criteria of NC 30.

The acoustic engineers found NC ratings to be more applicable to this project than the more familiar Sound Transmission Class (STC) ratings, which typically are used to rate residential and office building partitions. STC ratings categorize a material's ability to attenuate sound propagating through it at the frequency range of human conversation. The problem is that, although STCs are useful for evaluating the isolation of speech, they are less so for evaluating the isolation of mechanical equipment or low-frequency generated noise. On this remote site,

Above, the heart of Skywalker Ranch is Lucas's house, surrounded by production facilities. Below, the new technical building low-frequency sounds of airplanes and helicopters (often less-than-welcome sightseers) are the most obtrusive exterior noises. So partitions are massive and thick to control low-frequency noise, even though this type of construction may not seem justified on the basis of the STC rating alone.

The formal NC rating system started in the late 1950s when acoustic engineer Leo Baranek conducted a series of informal tests from which he charted curves that related, in a general way, equal levels of background sound. The tests were based on human judgment of whether sounds were equally loud. The human ear is much less sensitive to low frequencies than high frequencies, and the contours of Baranek's curves reflect that. By the 1960s the rating system began to be adopted by the American Society of Heating, Refrigeration, and Airconditioning Engineers, although neither the American National Standard Institute, ASTM, ISO, nor any other official standards bodies have ever really sanctioned NC curves. Because ASHRAE published Baranek's NC curves in its "Handbook of Fundamentals" chapter on sound, and because acoustic consultants began to use them, they came into widespread use in this country. Mechanical equipment in the United States is NC rated.

The lowest NC curve that Baranek drew was NC 15, explained David Schwind, the Skywalker project representative for Salter Associates. "We had to go beyond Baranek's curves to measure both NC 10 and NC 5. We actually interpolated between the threshold of human hearing and NC 15, which is very quiet," Schwind said.

"The NC-5-rated spaces are among the quietest recording studios anywhere," said Guy Chambers, project architect for BAR. "Recording studios typically have a standard NC rating of 10. At these levels of background noise control, your major concerns are with the mechanical systems. The STC ratings of the enclosure are such that no noise is passing through the walls, ceiling, or floor. What you're left with is the noise of air movement and fans, and outside sound entering directly through the mechanical ducts. In this case, with the Foley stage, we have 65 feet of lined duct that has a number of sound-baffling bends and a final isolation assembly before the duct comes into the space. Getting air inside a room without it making noise is another problem. There are no diffuser grills acoustically rated below NC 20. So we didn't use air diffusers at all. Consequently, the design also had to eliminate the potential for cold and hot spots."

Background noise can play a part in lessening the effect of intrusive noise. Airconditioning systems create continuous noise of broadband spectral character, which masks to some degree intermittent and otherwise intrusive noise. Of course, there are well defined limits to the benefit of background noises.

Once the spaces planned for the building were categorized as A, B, or C, the design team located sensitive acoustical spaces remotely from other, noise-generating activities. In this case, all of the A spaces are in distant corners of the building. Additionally, the A spaces required specialized high-performance construction to eliminate low-frequency noise intrusion.

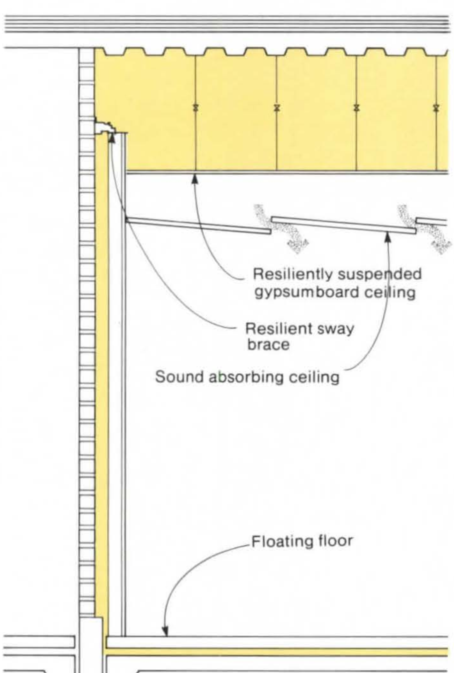
Building materials that are massive and good isolators of airborne sound, such as concrete and steel, are also relatively good transmitters of low-frequency, structure-borne sound. The typical approach to overcoming that problem in the A spaces is isolation from the structure. Concrete slab, walls, and roof form a rigid "outer box" consisting of various densities and multiple layers of construction to absorb both high- and low-frequency sound. The outer box surrounds a lighter but resiliently isolated "inner box," which is conventionally insulated, metal stud and gypsumboard walls that rest on a floating concrete slab. This inner assembly is laterally restrained with resilient isolators to meet strict seismic requirements. A load-bearing resilient material, similar to bridge-bearing neoprene, functions as a structural attachment and isolator. Conceptually, this results in a room within a room, with separation between the structure and the inner isolation envelope. Except for the scoring stage (which is primarily used for orchestral recording), all the A spaces rely on the "isolated box within a concrete box" construction assembly.

The idea to isolate rooms from the structure arose early in design development in response to the less-than-ideal adjacency between the final mixing room and the parking garage below. To block the sound that a noisy sports car would generate, a special concrete floating floor was conceived. Its construction above the garage consists of a four-inch reinforced concrete slab supported on plywood formwork, under which is placed a continuous layer of glass fiber, containing load-bearing resilient pads at 24 inches on center. This floor was also used to disconnect the inner wall structures from the building structure at large, to attenuate any structure-borne sound.

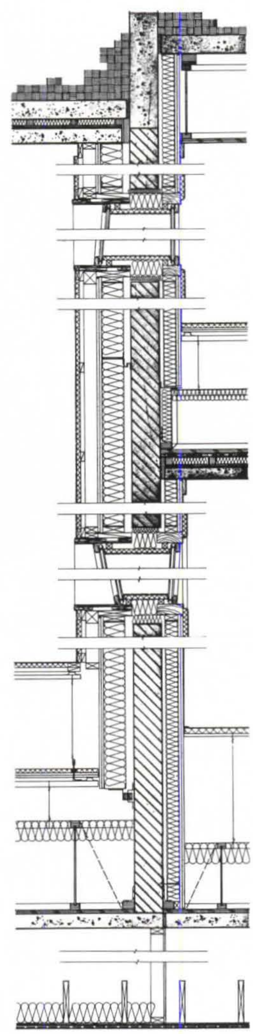
"Most of Lucas's input was esthetics-related," Chambers said. "He selected BAR, even though we didn't have extensive background in production facility design, because he wanted a firm that could produce work consistent with his vision. The technical genius was the chief technical engineer, Tomlinson Holman. His was one of the best technical programs I've ever seen, and it gave us a real head start. One place where his close involvement early in the project helped was working to isolate that one room from the garage noise. We ended up developing the isolation strategy that we used subsequently with all the editing rooms."

The scoring stage presented other challenges. Of all the A spaces, it had the most demanding sound criteria, requiring isolation from the noise of helicopters and other aircraft traveling approximately 500 feet above the building. The massive wall and ceiling constructions used to block the intrusive noise were designed also to reinforce the low-frequency reverberation compati-

Right, baffles in ducts control noise in mechanical system.



Acoustical isolation scheme


Foley stage Isolation detail

Section detail, left, shows construction of the sound isolation wall at the Foley recording stage. Rigid outer box is constructed of concrete; inner box is insulated metal stud and gypsumboard. Section, far left, presents the basic concept of the acoustically isolated rooms.

ble with specialized acoustic requirements for orchestras. For this reason, the design approach to sound isolation for the scoring stage was reversed; that is, the inner structure is the more massive with outer supporting structures resiliently isolated from it, the one notable exception being the ceiling.

Once the basic building layout and envelope were conceived, the details of connections between the walls, ceilings, and floors were examined. Adequate door and window assemblies had to be chosen to prevent these openings from becoming major acoustic leaks. For the doors, an additional requirement was specified early: they had to be easy enough for a child to operate, in keeping with Lucas's commitment to open access for all users of the facility, including child actors. This limited the complexity of the closure and latching systems and the weight of doors; the result was doors 1¾ inch thick with a maximum STC rating of 50. Solid-core doors were specified with full perimeter gasketing to create an airtight seal when closed. Where more sound isolation was required, particularly in the A spaces, sound-isolating vestibules were used extensively. A quality-assurance program was established to measure the installed isolation performance of each door to ensure that the door seals remain properly adjusted and perform as specified.

Because of the superior acoustic qualities of the spaces and doors, the windows for the projection port and the control room required better acoustic performance than is standard practice. In most instances, windows are a limiting factor in an acoustic assembly, particularly the window from the audio dubbing room to the outdoors. The acoustic engineers at Salter Associates reported that "research has revealed that double-glazed window assemblies provide superior low-frequency sound isolation performance to either single or triple glazing. The acoustical performance of the window assembly is governed by the weight of the glazing, the air space separating the two lights, and the air leakage rate at the perimeter gasketing. For instance, a window achieving better than STC 65 is required to adequately isolate the projector at Foley and achieve NC 5."

"When we talk about the acoustic performance of double glazing being better than triple glazing, we are talking about its ability to block low-frequency sound, which is the main thing you want to attenuate in this circumstance," Schwind said. "With less than two inches of air space, glass can couple acoustically. This means that panes of glass that are close together are actually worse than a single sheet of the same total weight in blocking low-frequency sound. I'm assuming in all these cases that we're talking about fixed glazing, and that the seals have a very good air infiltration rating. If you have leaky seals, then it becomes a nonlinear problem. With triple glazing, you're dividing the space between outside panes into smaller cavities. If those cavities were to become less than two inches, then, again, you would be in this problematic region where the glass would couple at low frequencies."

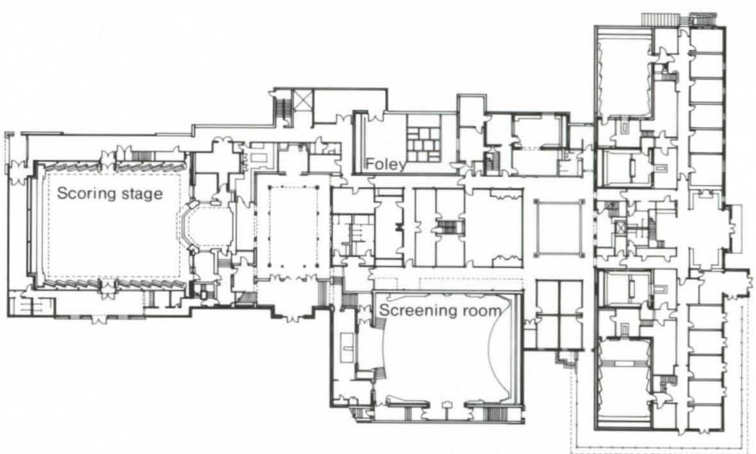
Keeping sound in

The primary focus for the interior spaces of Lucasfilm's technical building is how a given space sounds, including the effects of reverberation. Chief technical engineer Holman specified explicitly how the room acoustics for each type of space must perform. The program criteria defined the optimum reverberation time based on speech intelligibility. The Salter engineers then established new reverberation criteria for the design of all the Lucasfilm facilities. These new criteria are substantially less reverberant than the average standard practice; they are comparable to criteria used by the British Broadcasting Co. in designing television stages and by the Canadian Broadcasting Co. for screening rooms used to evaluate television programs. More recently, the reverberation criteria were adopted by Lucasfilm THX, a cinematic sound system, for use in evaluating sound in movie theaters.

In practice, ideal reverberation time is a very difficult design goal to achieve because the low-frequency absorption characteristics of most sound-absorptive materials are related to their thickness and the wavelength of the sound being absorbed. Logically, then, extremely deep sound absorbers would seem the ideal solution. But the Salter engineers' review of manufacturers' test reports on sound-absorptive materials, as well as their own prior experience, led them to conclude that simply placing glass fiber duct liners over a deep air cavity would provide adequate sound absorption at low frequencies.

Although most of the A spaces were designed primarily for intelligibility of dialogue, the scoring stage again posed unique

Right, above, adjustable, absorbent wall and ceiling panels in the orchestra scoring room allow a range of reverberation times from one-half second to three seconds. Right, below, plan of the technical building shows adjacencies and nonadjacencies of rooms with different sound requirements. Note corner placement of sound-sensitive rooms.



requirements. It required a longer reverberation time and a more sound-reflective environment to enable musicians to hear one another well and therefore to perform synchronously. To achieve the long reverberation, the massive masonry wall surfaces were used as an "interior" wall finish. To provide a variety of reverberation times (and therefore flexibility in the use of this voluminous space), the scoring stage design integrated a system of movable, absorbent wall and ceiling panels. These allow a range of reverberation time from about three seconds (with the various reflective surfaces exposed) to a half-second (with the absorptive panels fully exposed to deaden the room). Surface finishes were selected carefully to meet Lucas's personal esthetics as well as provide appropriate reverberation and acoustic response.

The *quality* of the reverberation also is important; for example, flutter echoes between hard parallel surfaces are to be avoided. The proposed architectural design for the screening and final mixing rooms thus came under acoustic scrutiny during the design process because of plaster arches.

"There were elements of another screening room, in San Rafael, California, that George [Lucas] wanted to incorporate in the technical building in the final mix and screening rooms," Schwind said. "The style incorporates hard plaster arches, which we felt might reflect sound back and forth between one side of the arch and the other. We tried various schemes to make arches less archlike acoustically, but George rejected them as being not archlike visually."

The arches were designed to scatter sound and diffuse it, but the acoustic engineers' experience with flutter echoes caused by hard, reflecting surfaces lying in a common vertical plane on the walls and ceilings suggested further study. The design team commissioned a model builder to construct a 1:10 scale model. "This model, as far as I know, was unique in that it had a dual purpose," Schwind said. "One was that it be visually representative of what was to happen—colorwise and appearancewise—as well as be accurate as a model of acoustic materials so that we could test it using ultrasonic means."

Plexiglas was used in the model to substitute for the reflective surfaces, taking the place of glass-fiber-reinforced gypsum (GFRG) used in the actual design, and a combination of felt and a dense, molded, glass fiber product substituted as the sound-absorptive material. "Technically, choosing the model materials was very difficult because everything had to come down in scale by a factor of 10," Schwind said. "Since reflectance of materials is not directly linear, we had to test materials for their absorption values in 1:10 scale until we found materials that simulated what we were specifying." A one-eighth-inch-diameter microphone was used to receive the test signal in the model. The tests, which indicated that the plaster arches, as designed, would provide adequate sound diffusion, were confirmed by the built performance, Schwind said.

It is also desirable that the sound field be uniform and diffuse throughout an interior space, so listeners at all locations hear the same thing, and that it create many good microphone recording places. Surfaces that diffuse sound do not reflect in a specular manner, but rather distribute the energy over a wide range of angles. To this end, sound-diffusing panels were applied in the audio dubbing and solo recording rooms as well as on the rear wall of the scoring stage control room. The panels, approximately eight inches deep, were also relatively cheap. As part of the testing program, a 1:10 scale model sound-diffusing element was designed and tested. Interior wall surfaces of the A spaces were covered with acoustically transparent cloth accented with the hard, reflecting GFRG nosings. The cloth and nosings are supported by an independent wood framing system braced back to the gypsumboard sound-isolation envelope. The framing is positioned to create variable-depth air cavities (between the cloth and the gypsumboard) that are used to accommodate sound-absorbing and diffusing materials as required.

Sometimes, the special acoustic requirements of a particular use required compromise. For example, Foley effects restrict the room's contribution to the sound field as much as possible. In fact, the optimum situation for Foley effects is to record semi-anechoically in a silent area outdoors and then add reverberation and other special effects. Likewise, to a certain extent, the audio dubbing room also has conflicting acoustic requirements. The room should sound as natural as possible for the actor to feel comfortable and not as though speaking into a dead, anechoic chamber. On the other hand, the microphone and recording requirements would be better satisfied by an anechoic chamber, so that any special effects could be added without deleterious effects from the room.

In addition to the acoustically sensitive recording and mixing studios, the technical building houses 30 sound-editing suites to serve two independent film companies, as well as projection, control, transfer and machine rooms, technical workrooms, and offices for engineering, research, administrative, and operations staff. To verify the repetitive design and demonstrate to the contractor the minimum level of performance demanded, a mock-up pair of editing suites was constructed by accelerating the construction schedule in one small area. The wall partition tested at approximately STC 60 and then was used as the yardstick for workmanship and performance in all other partitions for sound control rooms. According to the acoustic engineers, the major advantages to this quality-assurance program were that the owner's representatives knew the desired level of acoustic performance could be achieved and the contractor knew how to achieve it before constructing all of the walls.

Present and future requirements

Because Lucasfilm not only produces films but also advances the techniques and technologies by which they are made, the Skywalker facility had to be designed for flexibility to accommodate unknown future program requirements. For example, though Lucasfilm anticipated an eventual changeover to emerging digital technology, the building initially was set up with analog equipment. The coming digital technology may dictate changes in the relationships and functions of the spaces. The electrical and mechanical systems are most likely to be affected; therefore, the sound rooms, editing rooms, and support spaces are linked to a centrally located computer/machine-room core (stacked vertically on three floors of the building) via easily accessible underfloor communications trenches. Similarly, the building's main mechanical vault was designed to accommodate an additional fan/chiller/compressor unit, and chilled water pipes serving individual mechanical units were oversized to accommodate additional heat loads expected with future equipment and functional changes.

The technical sophistication of the building also meant coordinating specialized programmatic requirements. The mechanical system can be monitored and controlled by the central building computer and can also produce a signal to shut down the computer equipment in an orderly fashion in the event of a cooling failure. The HVAC system can accept and appropriately process a signal from a Halon fire protection system. Should a power failure occur, the building's emergency power system can provide enough power to store work in progress as well as perform an orderly shutdown of all building equipment.

The scoring stage ceiling also demonstrates the need for interdisciplinary systems design to meet present and future demands, including supporting future television lighting, integrating the air distribution system, and maintaining variable acoustic conditions through a series of motor-operated, sound-absorptive ceiling panels. The result is a ceiling suspended on one-inch-deflection spring vibration isolators carrying structural steel tubes to which ductwork, lighting, and plaster are attached.

"The real test of any building is the actual use of the facilities and whether it functions as it was planned," said Lucasfilm spokesman Tom Kobayashi. "The technical building passed with flying colors as it successfully finished the postproduction work on Lucasfilm's feature motion picture productions of 'Willow' and 'Tucker.'" □

Right, large viewing screen in one of two final mixing rooms.

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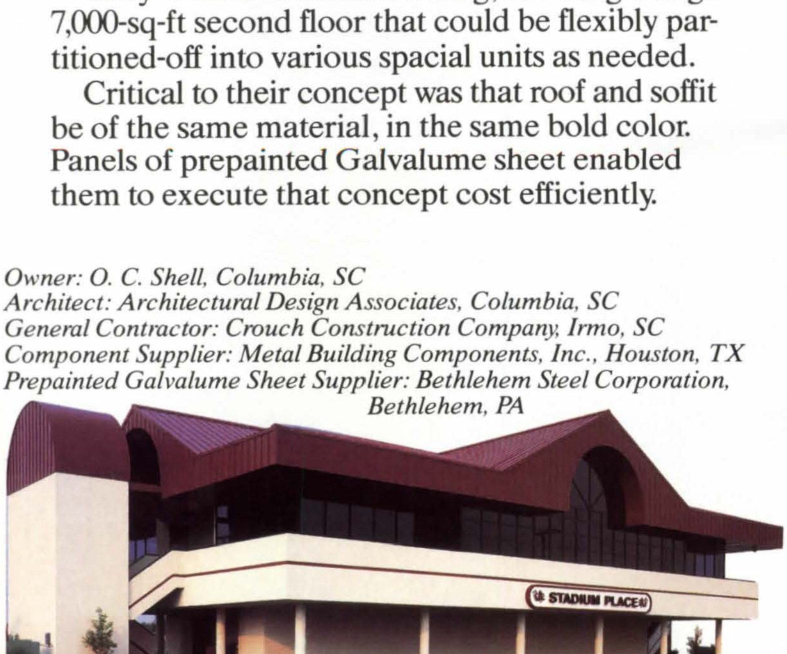

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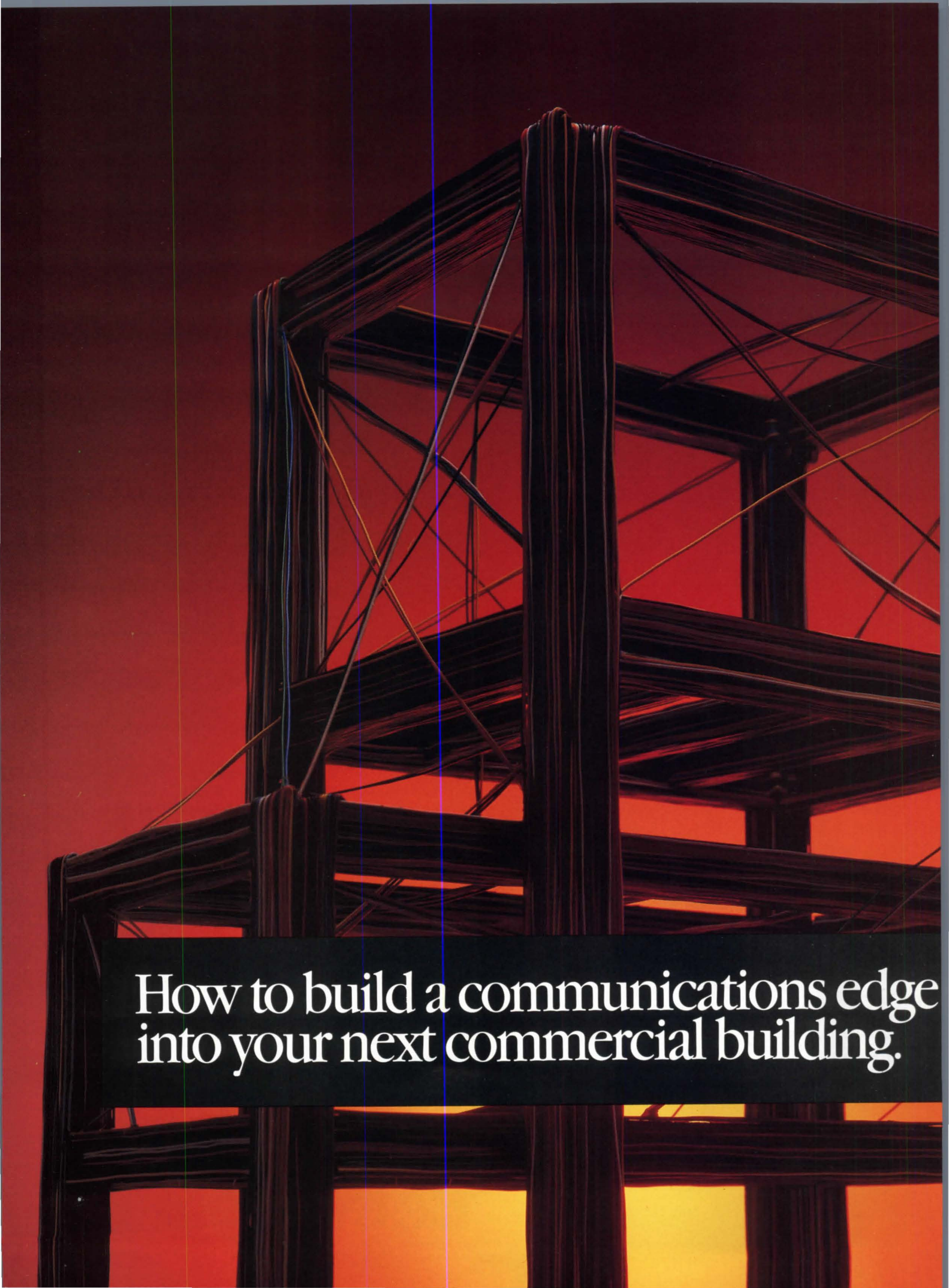
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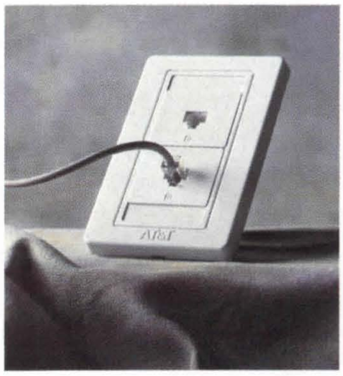

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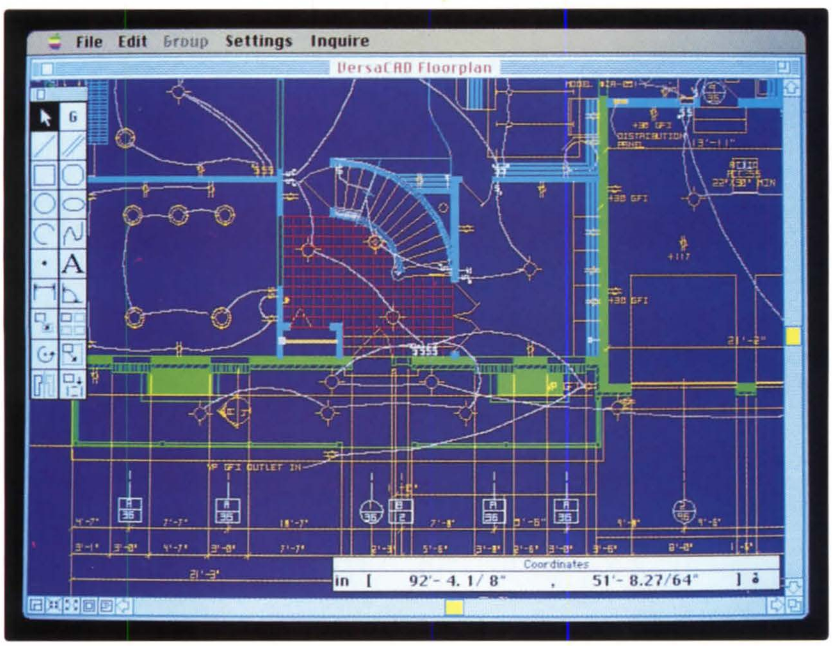

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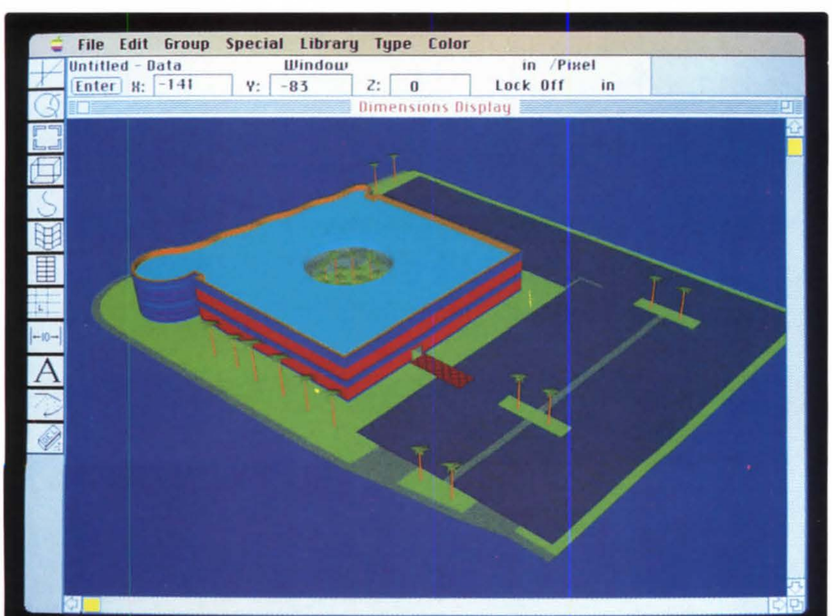

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Evaluating Software for 'The Friendly Mac'

Introduction by Oliver R. Witte

Easy to learn, hard to forget, fun to use, and graphically oriented, the Macintosh personal computer is finding a surprising niche in the architectural profession: architects who don't want to know anything about computers. Even those who are suspicious of anything that hums are falling in love with the friendly Mac. It's the kind of computer that architects are drawn to. To find out how this graphic power has been harnessed for computer-aided design, we identified eight programs as potentially suitable for architectural use and invited 16 architects, clustered in the Chicago area, to put them to use in their offices. The software was furnished to them for evaluation, but they had to purchase their own Macintosh computers and related equipment.

The evaluators were organized into teams of two, with each team working on a different program. On July 18, the evaluators met at Triton College in River Grove, Ill., to exchange information. Their reports follow this introduction. The eight programs are Archicad by Graphisoft, Dreams by Innovative Data Design, Mac Architrion by Gimeor, Minicad by Graphsoft, Pegasys II by IGC Technology, PowerDraw by Engineered Software, Snap by Data Basics, and Versacad by Versacad Corp. To add perspective to the views of the Macintosh users, we asked two longtime reviewers of CADD programs that run under the IBM disk-operating system (DOS) to sit in as observers. Their report compares DOS-based CADD programs with Macintosh-based CADD programs.

To accept a Macintosh CADD program, or any Macintosh application, it is first necessary to accept its operating environment, set by the Macintosh developer, Apple Computer. Arguments between DOS users and Macintosh users often get so hung up on this point that they never get to the merits of the software. The issue is the way the Macintosh and the user communicate with each other—the "interface" as it's called. This interface produces a distinctive "look" that tends to be much more standardized among Macintosh programs than among DOS programs.

The Macintosh user interface is designed around six principles:
1. Graphic metaphors. The primary metaphor is the desktop, which means that the screen appears as the surface on which users keep drawings, documents, and tools. Other metaphors include file folders and the wastebasket.
2. Direct manipulation. Physical actions have physical results that are visible on the screen in ways that look like normal activities. Deleting a file from the computer involves picking it up and carrying it to the wastebasket, which then bulges. The file can be retrieved from the wastebasket until it is emptied.
3. See and point. Macintosh users rely on recognition, not recall. Step 1 is to select an object; Step 2 is to select an action. Available actions are shown in menus and symbols, so users can jog their memory simply by looking at what's available and pointing at what they want. The user is not forced to remember (or look up) computer syntax and type it in.
4. WYSIWYG. This became a tired acronym (What You See Is What You Get) long before any computer except Macintosh was implementing it fully. No other system can so affordably integrate text, headings, pictures, drawings, and other graphic elements on the screen as they will appear in the document.
5. Consistency. Standards set by Apple enable documents from dissimilar applications to be merged simply into a single piece. These standards also enable a huge variety of equipment to be simply plugged in and operated. Versacad, for example, has 130 drivers for DOS-based monitors and one for Macintosh-based monitors. Yet the one Macintosh driver will operate monitors by dozens of manufacturers. Mix and match, plug and play. There is integration of both data and equipment.
6. Connectivity. Links have been developed into all major operating environments, including DOS, Unix and VAX. Creating a network of Macintosh and IBM PC computers is especially easy. Either a Macintosh Plus or an IBM-XT makes an excellent network server.

Macintosh users like to talk about "leveraged learning." At its most basic level, a tool is presented on the screen as a symbol. The form suggests the function. Once you've learned how to draw a rectangle, you can infer how to draw lines, ellipses, arcs, etc.

In a compound metaphor, secondary visual cues suggest different ways to draw a rectangle. Learning one method of compounding makes it possible to guess correctly at others. Modifiers can be added so that learning one opens your eyes to the way others operate. Thus, learning three concepts—tools, methods, and modifiers—gives access to more than 5,000 functions.

As visual as the Macintosh is, some understanding of terminology still is helpful. The Macintosh screen presents a graphic glossary of basic command elements. It shows a desktop with the Menu Bar on top and two windows. The lower window shows the contents of the folder; the upper window shows symbols. Each application (program) has a distinctive symbol called an icon. All documents (files, drawings) created with that application also have a common icon with a distinctive name below. Icons are used not only on the screen but also on the back of the computer to help users get the correct cable plugged into the correct port. Above the printer port is a tiny icon of a printer. Folders can contain applications, documents, or other folders. Opening the document automatically opens the application, regardless of where it exists on the current disk. The pointer is shown as an arrow. This is its most common shape, but it takes several others that serve as cues to the function in progress.

Examples of commands that can be "pulled down" from functions shown on the Menu Bar are found with the reviews. Almost all Macintosh programs have Apple, File, and Edit menus and they contain the same commands. The Edit menu, for example, always contains Undo, Cut, Copy, and Paste. The Apple menu always has a calculator, notepad, alarm clock, scrapbook, file finder, and a function called Chooser. The scrapbook is a holding area for frequently used text or graphics. Chooser recognizes peripheral devices like printers. To switch output from, say, a QMS-PS810 laser printer to a Tektronics color thermal printer requires only pulling down the Apple menu to Chooser and pointing at the new output device. Find File searches the disk for any document for which you recall the name.

The heart of the Macintosh family of computers is the Motorolla 68000 series of 32-bit microprocessors. The Macintosh II, running at 16.7 megahertz with a 68020 chip, is about as fast as an IBM AT computer. That's not very fast these days, but if a 386-class computer were asked to perform the same graphics magic and if it were running under a Windows operating environment, the resulting speed wouldn't be much faster. A second chip, called a coprocessor, relieves the main processor by taking charge of the math calculations needed to display coordinate geometry on the screen.

The primary pointing device is a mechanical mouse, a handheld tool with a plastic ball on the bottom. Moving the mouse across a flat surface moves the pointer on the screen. The mouse has one button on top. Tapping on it is called clicking. A single click selects an icon, which then appears highlighted on the screen. Two clicks open an application or document. Pointing at an icon and pressing and holding the mouse button causes the document or application icon to follow the pointer—perhaps into a folder, into the trash, or just to another location on the desktop. All are examples of direct manipulation. Pressing the shift key while pointing and clicking modifies the function the same way that pressing the shift key before typing a keyboard character modifies its function.

Graphics differences are obvious even in word processing. Most functions on the Macintosh call for repainting the screen, which takes time. By contrast, editing a DOS-based document usually involves no more than pulling text up or pushing it down. But that's about all a DOS word processor can do, whereas the Macintosh will display type in the size and shape it will look when printed out.

The software that helps developers implement the Macintosh user interface is called the Toolbox. It provides a set of 700 graphics routines that programmers can call automatically from the QuickDraw memory chip built into every Macintosh.

Software licensing usually forbids a program to be run on more than one computer at a time. To do otherwise is illegal and has subjected some violators to prosecution. In addition to this prohibition, half of the CADD programs evaluated here employ some sort of system intended to prevent unauthorized use. Archicad and Mac Architrion use a device that attaches to the SCSI port on the back of the computer. Minicad requires the master diskette to be reinserted every 20 times the program is booted. PowerDraw prevents its program from being copied except once to the hard disk.

Such limitations on software are highly controversial. Users dislike them because they are subject to failure at critical times, devices and disks get misplaced, and at best they are a nuisance. Vendors scoff and maintain that failure is rare. But the devices used by Mac Architrion and Archicad each failed on the system used in the evaluation meeting. Two days before the meeting, during a search for "viruses," two hidden, locked, and unidentified files were discovered in the system folder and were removed. They turned out to be part of the copy protection scheme for PowerDraw, and prompted emergency phone calls on a Sunday to Engineered Software.

The expectation is that a Macintosh II computer system will cost less than its DOS-based equivalent. This is not necessarily true in all instances, but the comparison is unfair since the computers are not really comparable. An office could decide that it needs both its existing DOS-based computer and a Macintosh, with each doing what it does best but networked together for maximum productivity. The evaluation team tried it and it works—easily, as expected.

Where a Macintosh office can save money is in buying more than one computer. A transportable Macintosh SE costs $2,770 plus $130 for a keyboard and $1,300 for a 20-megabyte internal hard disk. The computer comes with one megabyte of RAM, expandable to four megabytes. A Macintosh Plus, which is adequate for most secretarial functions, lists at $1,800 plus $400 for a second floppy disk drive. More savings are available if an early-generation Macintosh or XT can be used as a file server for a network of computers.

The chart also omits some equipment that might prove irresistible. Running a computer without a backup system is like skydiving without a parachute. At least one printer also is essential. An Apple ImageWriter II lists at $625, but many architects are finding a laser printer essential, even though it is priced at $3,000 to $5,000 depending on make and model. The $4,000 allowance for plotters will cover a Hewlett Packard DraftPro, which accepts paper in C or D sizes and draws with eight pens, or the Enter Computer's ENCAD SP1000, which accepts A through D sized paper and supports one pen. Others will prefer the better speed, acceleration, and line quality of the HP DraftMaster for $9,900. If really fast throughput and the ability to display both raster and vector information is important, it might be worth digging all the way down for the HP 7600 series of electrostatic plotters, which start at $22,900. For maximum flexibility at minimum cost, Houston Instrument offers the DMP-61, which plots in A through D sizes from $4,295. The DMP-62, at $6,500, goes through E size. For those who can't decide between a plotter and a printer, JDL makes a plotter/printer capable of fulfilling both functions. The JDL 850 GL+ is priced at $3,845.

One of the benefits of the Macintosh is the ability to take a completed CAD drawing and render it in color on the computer for presentations. The computer offers all the usual advantages over Magic Markers and colored pencils for this task. But finding a suitable output device is difficult. Most plotters recognize vector data. Raster data is ignored. To get both in vivid colors requires a quality color thermal printer such as the Tektronix 4693D. It has the ability to separate the colors onto different sheets with registration marks on each. The printer for this system costs $8,500.

Monitors offer still more temptation to upgrade. A 19-inch monitor enables the architect to see much more of the drawing at a time than does a 13-inch monitor. The T-19 from E-Machines was selected for evaluation, but the T-16 sets the standard for crispness and clarity. The former is priced at $6,000 and the latter at $3,300. SuperMac has just introduced a graphics card that offers hardware pan and zoom. Just move the cursor to the edge of the screen and it pushes more drawing into sight. RasterOps makes a 24-bit graphics card that can display 16 million colors simultaneously. The images appear lifelike. The standard Apple color card, by contrast, displays 256 colors.

Perhaps the hottest peripheral today is the scanner, which can take details and other drawings directly into the computer. Photographs also can be scanned in and merged with a computer model of a proposed project to show how it will look. An architect will want the flat-bed model. The IS-300F by Laser Connection displays 16 shades of gray for $1,250. For 256 shades of gray, Microtek offers the MSF-300G for $3,500. Software capable of recognizing scanned text as editable letters and words costs an additional $200 but saves a lot of retyping. DEST offers scanning with optical character recognition for $2,700 including software. Sharp makes a state-of-the-art color scanner. Scanners give best results when used with a good picture processing program like Digital Darkroom or Image Studio. Going the other way, the Matrix ProColor desktop film recorder can take an image from the computer and scan it into a high-resolution, 35 mm slide. It costs $6,495.

Although 40 megabytes might sound like a lot of storage, hard disks are like closets: there's no such thing as enough space in them. Jasmine and SuperMac are among the leaders in high-capacity disks.

Video capture boards take output from a TV camera or cassette player and bring the images into the computer for manipulation. A leader is QuickCapture by Data Translation.

And don't overlook a modem, compact disk player, and some software to go with the CADD program.

Excel by Microsoft is the largest-selling spreadsheet program for the Macintosh. MacWrite from Claris and Word from Microsoft lead in word processors. Of the many good drawing programs, don't overlook Freehand, Illustrator, SuperPaint, PixelPaint, FullPaint, Modern Artist, LaserWare, Canvas, MacDraw, and MacPaint. Perhaps the finest introduction to the Macintosh is the pair of tutorials for MacDraw II by Claris. Note that some drawing programs are in bit-mapped format, others are object oriented, and a couple are both. Bit-mapped applications are faster, but object-oriented drawings print at higher resolution. The two also differ significantly in how they are edited. The protypical bit-mapped program is MacPaint. Its object-oriented counterpart is MacDraw. Both are by Claris.

In desktop publishing, the leaders are PageMaker, ReadySetGo, and Quark. Indispensable desktop accessories include SmartScrap, Suitcase, Sidekick, and QuickDex.

And, of the accounting programs, Overlays A.M.S. is one of the few that follows the AIA accounting guidelines.

Archicad

Enter a simple plan in Archicad, press the Convert to 3D command, and on the screen appears a color 3D image that can be viewed from any point, shaded from a user-specified sun location, rotated, and colored. Then try the Create Spreadsheet File command to produce a bill of materials takeoff in one stroke. Your seduction is complete.

Archicad is the only Macintosh CADD program that offers 2D, 3D, bill of materials, color, and macro capabilities. Pegasys and Mac Architrion might be evaluated in the same class, but Pegasys provides only a rudimentary wire frame in 3D, while Mac Architrion lacks the macro and color capabilities of Archicad.

Although Archicad, priced at $3,950, costs two to eight times more than its competitors, the different capabilities of the programs are impressive. The developer, Graphisoft, is located in Hungary. Like Mac Architrion, the program is protected with a hardware device that attaches to the rear of the computer.

Since we both work in small firms, we wanted a tool that could be used effectively in all project phases. We need to optimize our time in tasks such as design and budgeting as well as drafting, and we looked for the most powerful and friendliest CADD program in the Macintosh format.

Because any program takes time to learn, it made sense to spend that time on a program that would meet our needs for the foreseeable future: perform existing tasks faster, improve the quality of our work, help in marketing and design presentations, and, especially, help in the design process.

Creation of an initial plan with Archicad requires constant thought about the 3D result because all 3D data originates in plan form. Elements entered in the plan are described via a dialog box, with specified heights, widths, depths, slopes, hatching mode, plotter pen, and drawing layer. Inserting a window, for example, requires entry of sill height, window width and height, setback in wall, and, if desired, a window type selected from the library or created via built-in programming.

The data can be edited later, but that might require individually selecting and changing building elements. Because so much data is included with this plan, this is probably more time-consuming than with some 2D programs. It is possible to use Archicad strictly in 2D, speeding plan entry, but then the 3D aspect is useless.

In actual drawing, generation of a plan is easy. A command, Clean Drawing, automatically cleans up line intersections. Walls are drawn hatched, not as lines to be hatched later as with Mac Architrion. Windows and doors are inserted and wall breaks made automatically. For locating roofs, a command to Cut Walls will proceed to edit the height of the walls to meet the roof intersection.

A disadvantage with Archicad is that line widths and types may be specified for plotting but they are not displayed on the screen, as they are in some other programs. Also lacking is an easy way to locate partitions by center line, rather than by face.

Standard commands, such as mirroring (which maintains left-reading text), rotating, repeating, dragging, or repeating and dragging a selected number of times, are straightforward. If a module will be repeated frequently, a module file can be stored for insertion with the click of the mouse.

Dimensioning in feet and inches is semi-automatic, as are area calculations. Hatching also is semi-automatic and includes everything within the specified boundary. To exclude objects within the area from hatching, they must each be tediously outlined. For example, to hatch the floor of a bathroom, all symbols—including toilet, lavatory, and bathtub—must be outlined individually for exclusion.

Text can be located on the drawing and then typed in, sized, and rotated before actual placement. But the text that appears on the screen is always the same size and placed horizontally. To show how the drawing actually will appear, a framed text-format command provides a blank box showing the text size and orientation but not the text itself. The same is true of dimension notations.

At any time during the progress of the plan, the user can switch to 3D and choose among isometric, axon, or perspective views, both for the exterior and the interior. Walls can be viewed in wire-frame or solid, with shading in color and hidden lines removed. Another outstanding feature is that sections can be made, cutting through walls at any angle and displaying the sections in 3D. A 3D Section command simultaneously displays three views on the screen. A fourth view can be displayed or printed as well.

All changes must be made in plan mode to keep the plan and

3D views consistent. This requires some back-and-forth manipulation to edit in plan view and check the result in 3D view. Of course, as the plan becomes more complex, redrawing takes up more time. Both 2D and 3D redraw times can be shortened if one selects for display only the necessary layers from the 16 available.

Archicad has effective visual cues. The normal cursor, a small cross, changes to a pencil when drawing. It darkens when a line or wall meets a previously entered line or wall. When locating a door, the cursor turns into an eye to cue the user to indicate the direction of the door swing.

Lack of attention to printer output is probably the biggest weakness of the program. The Archicad manual explains a great deal about plotting but very little about printing. Producing the desired drawing on printer paper is not explained nor is it obvious. Some of the plotting techniques, such as dashed lines, are not achievable with a printer.

Plotting or printing is possible at any scale, but default settings reflect the program's metric origin. Architectural scales are defined as a ratio —1/96—instead of the more familiar ⅛ inch = 1 foot. Printouts, however, are accurately scaled.

Colors are easily edited at any stage, even from the 3D mode. However, the plan view is difficult to read when the 3D view is being studied in pale colors. If different colors are desired for plan and 3D views, the 3D view must be stored as a 2D drawing, which renders it inactive for changes to the plan. It would be better to permit the plan to remain in black and white while the 3D view is in color.

A small object library comes with the program. The objects may be dimensioned and rotated before being placed in the plan, but they do not appear dynamically on the screen prior to placement.

Quantities are calculated with a single command and include all data used to define any element in the plan. If, for example, two doors are identical except for pen number, the quantity calculations will list them separately or together, as desired. Properties such as price and manufacturer can be attached to each item with the Edit Properties command.

The program is difficult to learn without training. Archicad's manual does not include a tutorial; this is unfortunate in view of the complex possibilities of the program. Basic needs, such as how to set up a standard drawing sheet with title box, are never explained. The program does handle this well, but it takes experience for the user to learn how. The manual also is difficult to understand, and often is not specific.

How energetically the program will be supported and developed remains the biggest question for Archicad.

—Martha A. Bell, AIA, and Adolph A. Schumann Jr.

Ms. Bell, a sole practitioner in Palatine, Ill., specializes in office interiors. The Macintosh II is her first computer. Mr. Schumann is senior architect at Facilities Design in Hickory Hills, Ill. Working with Archicad was his first computer experience. Mr. Johnson's new firm, Eastlake Studios in Chicago, has integrated Macintoshes into its entire operation. He has 10 years of computer experience. Mr. Fielding's computer experience includes three years of word processing with an IBM and six weeks with the Macintosh. Mr. Walo, an architect for Davis Associates, Chicago, works with an Intergraph system in addition to the Macintosh. Mr. McClellan, an associate of Richard L. Johnson Associates, Rockford, Ill., has four years of Macintosh experience.

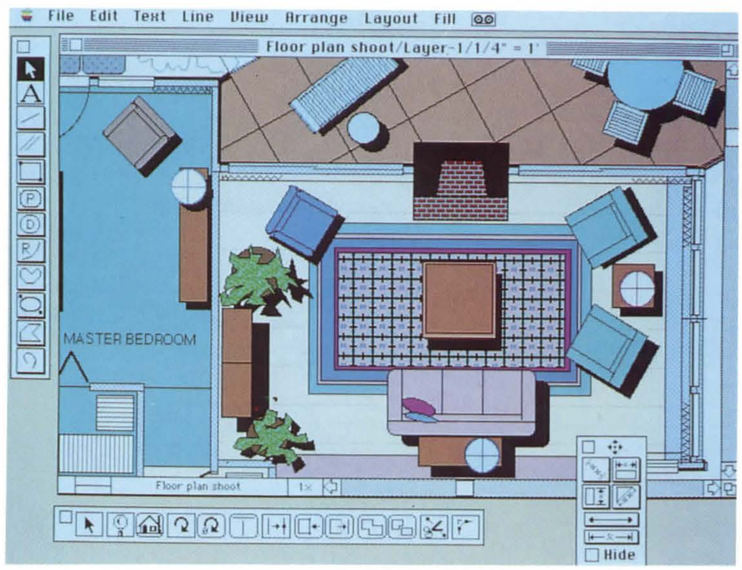
Dreams

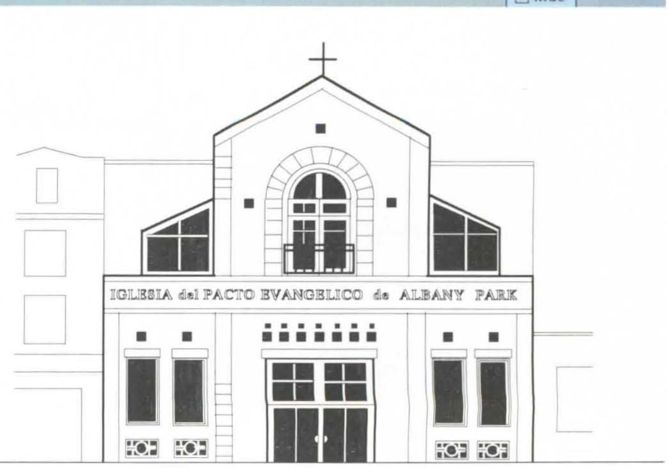
Design and documentation is largely a visual process. Dreams software provides us with a visually oriented and intuitive user interface that is as simple to learn and operate as its predecessor, MacDraft, yet with many more advanced drawing and editing capabilities. It has a consistent, fluid interface, an output that is eminently transportable to other applications, and an affordable learning curve.

Dreams begins to bridge the gap between CADD and desktop publishing. It is a program that we can use as a marketing, presentation, design, and publishing tool, as well as a device to produce working drawings. Its color capabilities are superior, perhaps the best of the eight programs under evaluation here.

Unfortunately, the paint is still not quite dry for Dreams. The program has color printing power, but the cost of color printing devices prohibits our taking full advantage of it. Furthermore, some simple features remain to be implemented. Cleaning up Ls and Ts at line intersections when drawing in parallel line mode needs work. To us as designers, a 3D capability is much needed. Also missing are the ability to extract data for a bill of materi-

The color rendered floor plan, below, with symbols displayed was accomplished with Dreams. The church, bottom, was completely designed with Dreams by Randall Fielding after only six weeks of using a Macintosh.





als and support for standard file format conversion utilities such as DXF.

But not all of these features will be equally important to all architects. We think too much emphasis has been placed on walls, doors, and windows. More important are simplicity in placing and editing text, lines, and symbols; fluid movement between commands; and a program structure that allows the designer freedom of expression. This is where Dreams excels.

The program might not be as comprehensive as Versacad, but it's a delight to use. It has proved to be useful and fun from the start—not just as a powerful tool but also as a powerful stimulus to define ideas and explore design.

—David J. Johnson, AIA, and Randall J. Fielding

Mac Architrion

Mac Architrion is unusual for its architectural orientation. Most other CADD programs present themselves as generic boxes of drafting tools. Architects who have spent hundreds of hours building study models, drawing design sketches, and doing perspectives for presentation will be amazed at the capability of this program in creating axonometric wire frames and 3D solid models of their designs. As you work in plan in the 3D module, any view of your project is constructed with a few mouse clicks or keyboard strokes.

Like Archicad, the program is protected with a hardware device that attaches to the rear of the computer. Mac Architrion was developed in France by Gimeor. It sells for $1,495.

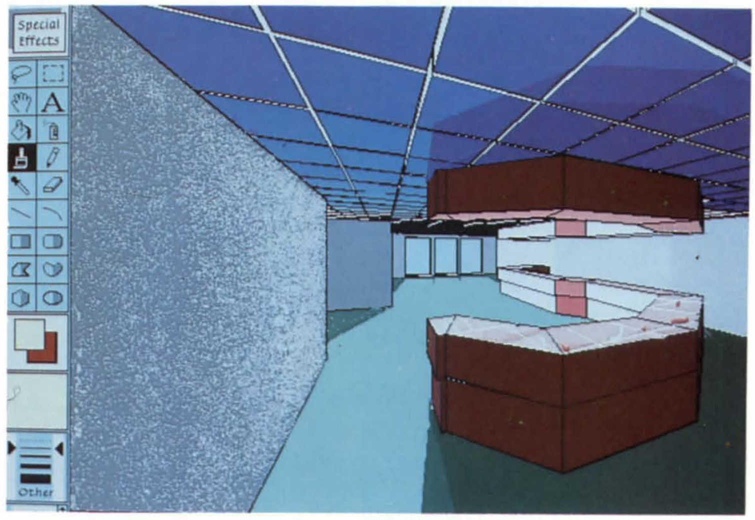
The 3D module is the real strength of the program, and it alone is worth the price. Plans, sections, elevations, and perspectives are transferred from the 3D module to the 2D module for enhancement and delineation. The other program module is called Quantifier, which produces a bill of materials from a 3D file. The idea is that work you do in schematic design and design development is naturally used in the contract document phase, so the work flows the same way it always has in your office. Drawing takes place on a layer called the worksheet, a safety measure to prevent any accidental modifications to other layers. Objects can be moved to any of eight other layers.

The program remembers your input as three-dimensional blocks in real-world units. Once the proper massing is achieved, you delineate the plan by tracing around the edges of the wall blocks. The data base requires all blocks to have four sides in plan so all corners are left with the end faces remaining. These edge line segments are removed by means of the Optimizer program, which is run after the 3D plan is transferred to 2D.

The four-sided block requirement is a drawback in the creation of curved shapes in 3D, executed by duplicating and rotating a series of blocks. The base and top of the blocks can be stepped up or down as they are rotated and duplicated. On the other hand, this permits creation of some objects, such as spiral staircases, that are very hard to draw in perspective by hand.

Block faces have a vertical orientation only. Because this doesn't allow for sloped fascias, walls, and the like, you end up using multiple blocks with one or two faces inclined for a single mass. The program does permit creation of inclined blocks for sloping roof planes, but the ability to modify blocks and otherwise work in section, rather than in plan only, would be a great advantage.

Productivity in any CADD system is enhanced with symbol libraries. Mac Architrion incorporates three types of libraries.



Above, perspective drawing of a project designed with Mac Architrion and colored for presentation with Pixel Paint.

The 3D software has a Frame Library and a general 3D library. The 2D program library elements are called accessories. These libraries are not interchangeable and must be used independently.

Placing a 3D frame into the drawing requires the creation of an opening in a wall at user-defined width, height, and position, and then installation of the frame into the opening. The frame will be scaled automatically to fit the opening.

Use of architectural terms for options in the dialog boxes is another unusual feature. They include, to name just a few, sill height, lintel height, jamb to jamb dimension, and center line to center line. This not only shows the developer's commitment to architecture, but it reduces the learning curve as well.

The 2D module is not the most sophisticated. Eight is a very limited number of layers and needs to be increased. Dimensioning capabilities are displayed in an unconventional format, adding to the limitations of creating notes. Plotting works through the 2D module. Vector fonts, which work well with plotters, are supported but Macintosh type fonts, which work well with printers, are not.

The best feature of the 2D module is that the command icons are similar to those in the 3D module. Dimensioning may be either manual or automatic but not associative, so when you modify your plan the dimensions are not updated automatically. The 3.7 version we used didn't have witness lines connecting the dimension string to the dimensioned object.

Most of these problems can be traced directly to the program's European roots, where conventions differ from those in the United States. A major problem with Mac Architrion is the hardware key protection. Europeans do not seem to object as much as Americans to losing a portal to a security device.

Mac Architrion provides one of the best sets of instruction materials we have seen. Tutorial and reference sets are provided both in manuals and in Hypercard stacks. Further help is available toll-free or on the MacNet bulletin board system, which operates 24 hours a day.

Within the 35 minutes we were allowed at the evaluation session, on Mac Architrion we were able to draw and represent the hotel example as a solid model in 3D. We believe we made the point that the program not only is a slick design tool but also can be used productively within a short time.

—Gary R. Walo, AIA, and Richard G. McClellan, AIA

Minicad

Minicad hints at greatness and utility. Excellent features are described in the manual. Speed is impressive because of the use of integer math as opposed to the more common floating point.

The program also is unusual for its support of a digitizing tablet, which is a better drawing tool than a mouse and more useful when tracing an existing drawing. The digitizer supported by Minicad is the PenMac by 4Site Technologies, which can be mapped directly to the application rather than just to the screen.

This means that a drawing can be taped to the digitizer and the program instructed to recognize the corners of the digitizer as the corners of the drawing. Moving the digitizer's stylus to the left side of the drawing moves the screen image to the left to reveal the left side of the drawing. With most other digitizers and programs, the corners of the digitizer reflect the corners of the screen. Tracing accurately becomes difficult except for small drawings at large scales. Matching the program, digitizer, and drawing is not unusual in CADD on the IBM, but it is rare in CADD on the Macintosh.

At $495, Minicad appears the least expensive of the eight programs included in this evaluation, undercutting Dreams by $5. However, the software to permit drawings to be reproduced on a pen plotter costs an additional $300. And the software to convert files to the IGES and DXF formats for exchange with other CADD programs is a $495 optional extra. An architectural symbols library also is available for purchase separately.

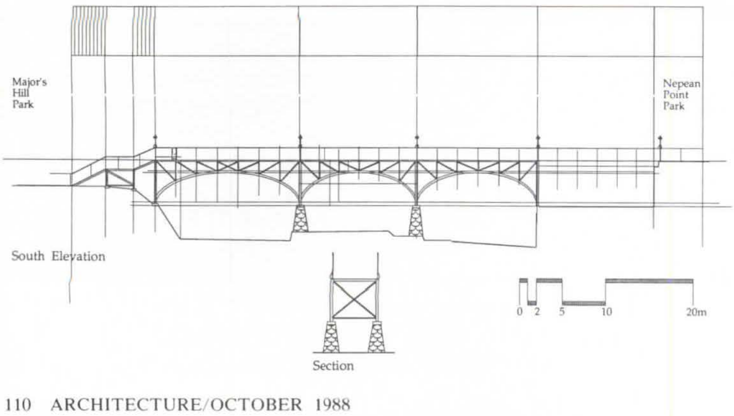
Graphsoft, the developer of Minicad, discourages unauthorized use with a technique called "boot protection." The program counts every time it is opened, and at the 20th time it insists that the user insert the master disk to reset the counter to zero.

Unfortunately, this protection scheme also discourages authorized use. Regular requests to insert the disk for updating are a nuisance, especially if you are in a hurry or the master disk isn't handy at the moment.

More annoying is the frequent "freezing" of the screen. The program is particularly vulnerable to crashing with the Undo command, which, when one is learning a CADD program, is used rather often. We had no choice at that point but to switch off the computer and start up again, having lost all our work done since the last time we saved it. Another peculiar trait is that some lines disappear when the program is zooming in.

Minicad was not developed by or for architects, as is apparent in the manual's explanation of scale relationships: "In Minicad, the user can always be thinking of the objects which he draws in terms of their actual size, since he no longer has to keep track of a particular 'drawing scale.' Using Minicad, the user can arbitrarily assign or change the 'drawing scale' [which, in this document, is called paper scale] as he sees fit."

The elevation of an iron footbridge, the 2D section, and the lettering all were done with Minicad.



Similarly, the available precision of 4 quintillion points on a coordinate system is impressive but of little use when providing information to carpenters. We would happily reduce this accuracy in exchange for any of several missing features, such as on-line help, splines, Bezier curves, automatic cleanup of Ts and Ls when drawing walls, easy placement of doors and windows in walls, a more precise snap feature, and a bill of materials.

The program does provide a 3D module, but it does not support instant conversion to 3D for design study.

In the hotel example used for the evaluation, the program was not easy to use. It does not lend itself easily to the movement of fairly complex drawings. Trying to duplicate the rooms that were on one side of a hallway for use on the other side produced a copy that appeared slightly offset over the original. Moving it was impossible.

When tried with plain geometric shapes, copying and moving were easily done, with one exception: the program makes the fundamental mistake of mirroring the text with the drawing. Other CADD programs maintain the text as left-reading when mirroring.

The manual also is hard to use and seems too short. The explanations at times are vague and lacking in illustrations. One reason may be that we were using Version 4.07 and the manual was written for Version 3.0, supplemented with a 4.0 addendum. There is a tutorial overemphasis on the use of data boxes as a method for drawing walls. Our marginal notes kept saying "doesn't work" and "how does this work?"

Macintosh users expect things to be simple, even CADD. Unfortunately, Minicad is neither simple nor easy to use, although previous versions seem to have been very popular with architects. Minicad appears to have many desirable features, but it is so difficult to learn to use them that they are not really available.

—Mitchell A. Goldman, AIA, and Michael Tzanetis

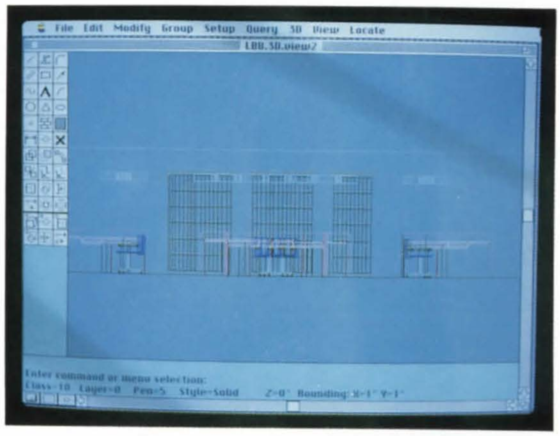
Pegasys II

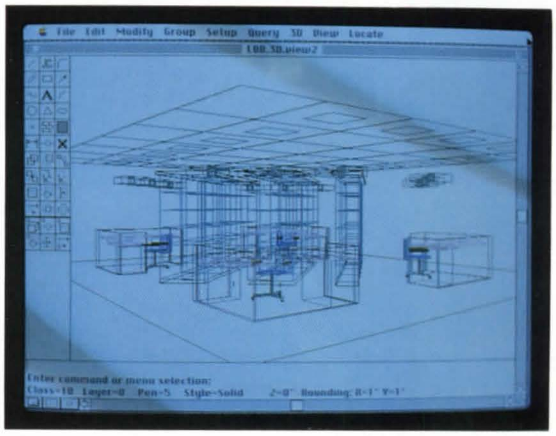
When price, ease of use, and power are considered, Pegasys II may be the best Macintosh CADD program for the production-oriented design office. Its strength is its complete, cohesive, and workable combination of features. Although some might not be as powerful as we would like, at least we know that they really exist and can evolve together. This is unlike some CADD programs that seem to work one module at a time, requiring the user to think in slightly different ways when using the modules.

In addition to providing an excellent framework to produce 2D working drawings quickly and easily, Pegasys has other tools that make it a complete design package: the ability to display a 3D model in wire frame, the ability to extract information from the drawing to create a bill of materials, the opportunity to automate repetitive procedures with macros and a macro programming language, and the option to bypass the icons and menus to type in commands directly.

The following "must have" features also are all found in this program: displayable line weights; dashed lines that can be plotted in different lengths and spacings; multiple fonts; crosshatch patterns that plot well and rotate with the walls; options for the display of pointers, coordinates, line terminators, and dimension strings; symbols that can be inserted into walls; and support for

Right, Pegasys 2D and 3D wire-frame drawings with icons displayed along the side.





operating both plotters and printers if so desired.

Pegasys has a slightly different graphic interface from that of other Macintosh drawing programs. For example, the user must select a tool or an operation first and then select the object on which to use the tool. We found this approach more intuitive because in most architectural situations the designer is likely to perform the same operation on many different objects at once, grouping work by operation not by object.

Below the drawing window are three information lines. The first is the command line, where experienced users can enter commands directly, bypassing menus and dialog boxes. Second is the query line, where users are prompted for information and are never left wondering where they are in the program. Third is the status line, indicating the current layer, pen number, coordinates, etc.

Users may switch scales at any time. This means details and drawings of different scales can be placed on the same page.

Objects can be grouped and named, either at the time of creation or later, for easy identification. Whenever the user is selecting objects to modify, a dialog box provides a filter. Only objects that meet defined criteria will be chosen. This is a great feature, allowing one, for example, to double the scale of all text in one area of the drawing only.

The technique for inserting doors and windows in walls is unusual. Instead of breaking the wall, the user places an opaque mask over a portion of the wall and places the symbol over the mask. The procedure, called gapping, works well and enables the user to move or modify the symbol without affecting the wall below. No wall and line cleanup must be done with each new placement of the door. However, the gapping tool had trouble determining which portion of the segment to gap. The user must make sure that the segment is placed at the front of the drawing—not a difficult task, but not intuitive, either.

Double clicking on a tool icon produces a dialog box with options. A click with the shift key held down will remember the tool's last settings without the user's having to re-enter them—a nice shortcut.

After learning the icons and pull-down menus, the user can build speed by using single-key command equivalents. This power is multiplied by the macros and command language. When a repetitive operation is anticipated, merely turn on the keystroke recorder, perform one repetition of the procedure, turn the recorder off, and play it back. Revisions can be made in a text editor.

The 3D capabilities of the program seemed powerful and intuitive. The ability to mix 2D and 3D information in a data file seems to be unusual. For example, a portion of a floor plan can be copied, converted to 3D, displayed beside the plan view, and rotated to show a client.

Perhaps the worst feature of Pegasys is its manual. It is much too technical for a novice to follow, it does not explain how to perform some basic functions like drawing parallel line walls, and it ignores entirely the Menu Bar options. No tutorial is available, and the training diskette that was provided wouldn't run. A computer novice trying to learn both the Macintosh and Pegasys at the same time probably will be frustrated.

The symbol library for Pegasys is very limited, definitely not a plus. Plotting works well, but the program needs to be able to store the configuration settings so that the options do not have to be reselected each session. Although the program allows drawings to be stored in the PICT format, it does not support IGES, DXF, or SIF file conversion.

Panning and zooming are not allowed beyond the boundaries of the drawing sheet. But it is possible to place objects beyond the boundaries of the page; to retrieve them, the user enlarges the drawing sheet. It would be better if the program were consistent—either permitting the former or prohibiting the latter. A View All command would solve the problem easily and effectively.

The bill of materials feature worked well enough, but it was complicated and difficult to reorganize later. Although the Inquire command will report lengths and areas and keep running totals, the program needs more. It should work more automatically to export to a spreadsheet such as Excel.

Some bugs remained in the program we reviewed. The Ungroup command can produce unexpected results, and the terminology of the manual doesn't always match the terminology of the program.

Although plenty of room for improvement remains, Pegasys II appears to have the power and tools for our needs.

—Richard E. Sipin and Joe Woo Jr., AIA

Mr Goldman is associate architect for the University of Chicago. His office has been using Macintosh computers for three years. Mr. Tzanetis is a sole practitioner in Elmhurst, Ill., and had two years computer experience before buying a Macintosh II. Mr. Sipin is computer manager for DePalma Group, Chicago, and has five years of computer experience—one on the Macintosh. Mr. Woo owns his own firm in Chicago. He purchased his first computer two weeks before the evaluation.

PowerDraw

PowerDraw is a powerful 2D drawing tool, but it has not been developed solely for architects or engineers. Thus its palette of tools is not tailored for architects.

The program is copy protected. This means that it can be loaded onto one computer at a time. If it is to be used on another computer, the program must be de-installed from the first computer and installed on the other.

PowerDraw clearly has the potential to do high-quality preliminary presentation and working drawings. It is better than the 2D module of Autocad.

Except for PowerDraw's inability to generate a bill of materials, none of the other programs in this evaluation appeared to have more 2D capabilities than PowerDraw.

Unlike most of the current crop of Macintosh CADD software, which seems to have been ported over from the IBM world, PowerDraw was created specifically for the Macintosh and thus is more intuitive than, say, Versacad.

Hoffman Corp. was able to generate usable output after 20 to 30 hours of practice. In the first week of using the software, preliminary plans for a psychiatrist's office were drawn and presented to the client. The output was of good quality, but this initial project took three to four times longer than hand drafting.

On the second attempt, the software was used to generate some basic bubble diagrams for an athletic complex addition to a high school. Starting the afternoon before an early morning presentation, existing building lines were drawn and two schemes generated for presentation. Some problems were encountered in scaling the output for presentation, but the drawings were ready and the presentation was completed on time. The ability of the software to calculate areas of the various spaces was a help in keeping the initial bubble diagrams in close proximity to the programmed area limitations.

Winters Barr Truitt & Miller set out to learn PowerDraw by reading the manual. More than 390 pages and a month and a half later, one week's worth of work had been completed and the firm was looking for its "Macintosh roots" with a more basic program, such as Canvas or Dreams.

The developer of PowerDraw, Engineered Software, doesn't do much to get users off to a fast start. The manual is a methodical explanation of the function of each tool and each menu selection. There is no tutorial, no training, and no toll-free telephone support. If I want to repair my car, a manual that tells me only how a crescent wrench works is of little use.

Engineered Software says in its manual, "High level professionals, with time too valuable to study computer science, will find PowerDraw intuitive and immediately productive. Offices with personnel changes will find new PowerDraw users to be productive quickly, thus eliminating the need for computer operators."

We did not find this to be true. Professionals who have mastered manual drafting will find many excuses to avoid using PowerDraw. Like Autocad, it takes time and extensive training to learn the program; this contradicts the very reason that Macintosh computers are in our offices.

The philosophy of Hoffman Corp. and Winters Barr Truitt & Miller is that computers are only a tool to produce architecture, and not an end in themselves. PowerDraw is not, in its current form, the drawing tool we are looking for. We hope modifications are coming, since the power of the program makes its use desirable. —Charles Barr, AIA and Martin E. Sell, AIA

The PowerDraw elevation of a hotel, above, shows the software's potential for high-quality presentation drawings.

Snap

Snap is a generic 2D program based on the Intergraph minicomputer system. It shares much of the same approach as well as many similar commands. The program "feels like" Intergraph and even can import or export Intergraph files with the use of an optional program from Snap's vendor, Data Basics.

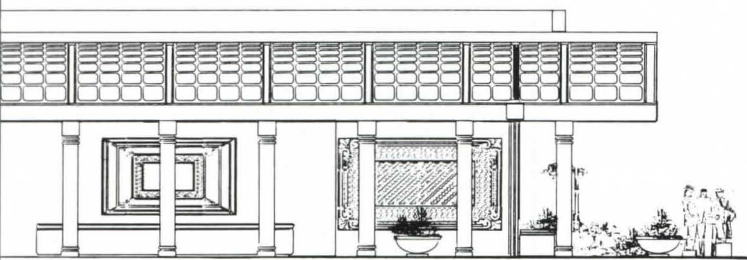
The least Mac-like of the programs included in this evaluation, Snap does not use a tool palette. Double clicking on the program icon brings up a blank screen with only one active menu item, File. The other menu bar choices are dimmed until the user selects Create or Open a drawing file. There are no tool icons.

Snap supports the menu options with a series of two-character commands. The alternate keystroke commands found in many Macintosh programs are basically worthless attempts to make a Macintosh feel like a PC. Snap's commands, on the other hand, are supplementary and avoid layer upon layer of menus and dialog boxes to do a simple maneuver such as place a 4¼-foot line at an angle of 28 degrees.

In most Macintosh drawing programs, the object is selected first and then edited. In Snap, the operation (delete, move, copy etc.) is selected first, followed by identification of the objects to be edited.

Other standard Macintosh features that are missing include the close box, scroll bars, windows, and copy/paste editing. Some of these features can be more of a burden than a benefit with complex graphic files, where the need for speed and precision far exceeds the need for ease of use.

We were impressed with the error-free quality of Snap and with its logical consistency. This is that same intangible that makes a Macintosh Mac-like—a consistent approach to each operation, making it far simpler to learn because much of the



knowledge is transferrable. The system never crashed, nor did it corrupt or destroy files.

Snap has incorporated Intergraph's "design plane" philosophy, and it is a feature worth considering. The design plane is simply a 2D plane of a billion points (in each direction), which you then define to meet your needs.

For example, each point might represent 1 one-hundredth of a foot, making your design plane roughly 1,900 miles in each direction. Sheets are not related conceptually to the design plane; they are merely space upon it. For example, a D-size sheet is just a rectangle 128x144 feet if you wish to plot at ¼-inch scale, or 256x288 feet at ⅛-inch scale.

Practically, this allows you to deal consistently in scale for all drawings. A large-scale section is nothing more than the smaller-scale section with more detail added on a different level, and output at a different scale. Also, more than one "sheet" can be incorporated into the design plane, allowing flipping or copying plans and elevations between sheets.

Snap is lacking some of the features found in Pegasys or Versacad, the two programs with which it is best compared. The most noticeable omissions are parallel lines, the automatic placement of doors and windows into walls, and hatching. But we have never found these operations to be time-consuming once you develop your own techniques.

The major drawback to the program is its lack of dynamic editing and dragging of symbols during placement. They should be added. We also would like to see support for macros and custom menus. Programmability and bill-of-materials functions also would be desirable for those who need them.

In compensation, Snap has one of the easiest to use auto dimensioning facilities we have seen yet. Two active views are always available and can be swapped on the screen with each other or resized and viewed jointly. Up to five other views may be saved for reference.

The program supports symbol placement and includes a symbol library. Each layer may have multiple line types, weights, and colors. The reference manual is good and includes a tutorial.

Snap's most attractive features are its solid, very functional performance and its reasonable price, $695. It is well worth considering.—Bruce D. Kieffer, AIA, and Don M. Beasley Jr.

Mr. Barr is a partner in Winters Barr Truitt & Miller in Rockford, Ill., He has been working on the Macintosh for three years. Mr. Sell is vice president of Hoffman Corp., Beaver Dam, Wis. He, too, has used a computer for three years and recently started on the Macintosh II and SE. Mr. Kieffer teaches at the University of Wisconsin and is a principal of NorthDesign. He has 10 years of computer experience—two on the Macintosh. Mr. Beasley is principal of his own Chicago firm. His 20 years of computer use include four with the Macintosh.

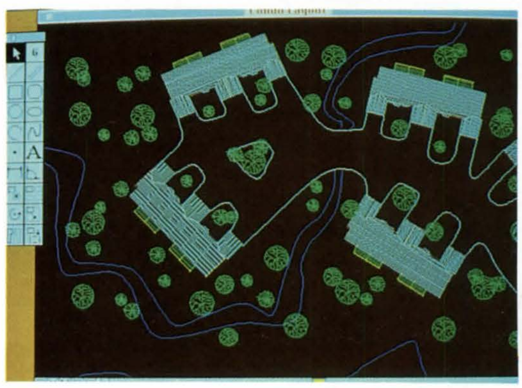
Versacad Macintosh

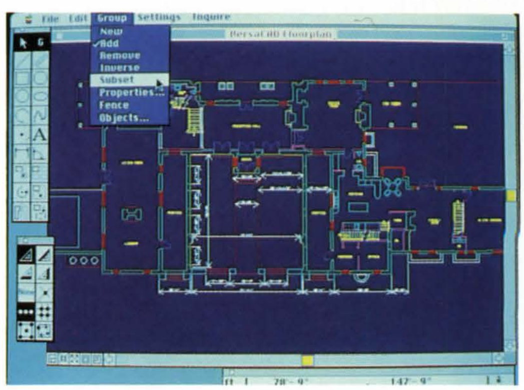
Versacad Macintosh was introduced last January and immediately became the standard of comparison for Macintosh CADD programs. In our discussions, the other evaluators selected Versacad more often than any other program as the point of reference to explain where their programs were ahead or behind. It is the clear leader, having most of what architects need to use CADD effectively—depth, power, and the backing of a strong company.

As newcomers to CADD, we took for granted developments that weren't available to early users and, like the other evaluators, expected our program to be easy to learn and use. With Versacad, it was.

Within a few weeks and after two days of training, several architects in our offices were using Versacad on current office projects. Already we are under pressure to schedule time on our Mac IIs and to develop CADD standards to assure consistency in our documentation. We are confident that this program's flexibility and power will meet our more complex architectural needs. In judging a CADD program, much depends on the user's needs and expectations. Versacad is a 2D tool that excels in producing working drawings.

Ideally, a CADD program should first be used to produce a schematic design, which then can be refined to the level of design development and finally supplemented with additional detail into completed working drawings. The conceptual difference between Dreams and the other programs is that they start from opposite ends of the process. Dreams offers powerful schematic-design/design-development tools in 2D. Versacad has elected to begin with the production capability and add enhancements to fill out the design/design-development needs. Archicad and Mac Architrion, on the other hand, offer 3D design tools but lack the refinement of Versacad in production drafting.





Screen shots of an aerial layout and a floor plan, both created on Versacad for the Macintosh, with icons displayed.

	Archicad	Dreams	Mac Architrion	Minicad	Pegasys II	PowerDraw	Snap	Versacad
Version evaluated	3.11	Beta	3.7	4.07	3.0	2.0	2.02	1.11
Price	$3,950	$500	$1,499	$495	$1,795	$695	$695	$1,995
Toll-free support	No	No	Yes	No	No	No	No	OPT
Use protected?	Yes	No	Yes	Yes	No	Yes	No	No
Date of first sale	11/86	9/88	1/85	12/85	11/87	8/87	9.86	10/87
Sale as of 7/1/88	600	New	2,000	5,000	New	N/A	450	8,500
% to Architects	100%	N/A	80%	70%	N/A	50%	30%	42%
RAM required, Mac II	2MB	2MB	1MB	1MG	1MB	1MB	1MB	2MB
All in RAM?	No	No	Yes	Yes	Yes	No	Yes	Yes
Integer based?	No	Yes	Yes	Yes	Yes	4 Decimals	Yes	No
Mac II required?	Yes	No	No	No	Yes	No	No	No
Coprocessor required?	Yes	No	No	No	No	No	No	No
Quality of manual	Fair	N/A	Excellent	Fair	Poor	Fair	Exc.	Good
Tutorial?	No	Yes	Yes	Yes	No	No	Yes	Yes
Help in context?	No	Yes	No	No	No	No	No	No
Newsletter?	No	Quarterly	No	Bimonthly	No	No	No	Monthly
Digitizer support	No	No	No	Yes	No	No	No	No
3-D?	Yes	No	Yes	Yes	Yes	No	No	No
Auto dimensioning?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Associative dimension?	No	Yes	No	No	Yes	No	No	No
Cleans up Ts and Ls?	Yes	No	Not in 2-D	No	Yes	Yes	No	Yes
Stretch wall?	Yes	No	No	No	Yes	No	No	Yes
Symbols library?	Yes	OPT	Yes	No	Yes	No	OPT	Yes
Auto place symbol?	Yes	Yes	Not in 2-D	Yes	Yes	No	No	Yes
Scale/rotate symbol?	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Dynamic drag?	No	No	No	Yes	Yes	No	No	Yes
Search and replace?	Yes	No	No	Yes	Yes	No	Yes	Search
Bill of materials?	Yes	No	Yes	No	Yes	No	No	Yes
Mirrored text reads OK?	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Snap to intersection?	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Automatic hatching?	No	Yes	Yes	Yes	Yes	Yes	No	No
Number of layers	16	No limit	9	40	255	120	63	250
Display line weights?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Nested commands?	Yes	Yes	No	No	Yes	Yes	No	Yes
Complex curves?	No	Yes	No	No	Yes	Yes	Yes	Yes
Macros?	Yes	No	No	No	Yes	Yes	No	No
2-way DXF?	No	No	No	OPT	Yes	Yes	OPT	Yes
Supports PICT format?	Yes	Yes	Yes	Yes	Yes	Yes	Out Only	No
Exports to PageMaker?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supports pen plotters?	Yes	OPT	Yes	OPT	Yes	Yes	Yes	Yes

How the Evaluators Rank the Programs

	Archicad	Dreams	Mac Architrion	Minicad	Pegasys II	PowerDraw	Snap	Versacad
Bell	1	4	2	9	3	6	7	5
Schumann	3	4	1	7	2	6	5	8
Fielding	2	3	1	9	5	6	7	4
Johnson	5	1	3	9	4	7	8	2
McClellan	4	2	1	8	3	5	7	6
Walo	4	5	1	9	3	6	2	7
Goldman	1	3	2	7	4	5	*	*
Tzanetis	2	5	1	9	4	7	6	3
Sipin	5	6	2	8	1	4	7	3
Woo	4	5	2	6	1	8	7	3
Barr	7	1	6	8	3	2	4	5
Sell	6	2	1	9	5	4	7	3
Beasley	7	3	1	9	4	5	2	6
Kieffer	*	2	*	4	5	3	1	*
Bunten	7	2	4	8	3	6	5	1
Moretta	7	2	3	8	4	6	5	1
Engelke	5	6	3	9	1	8	4	2
Wenzler	1	3	2	6	4	*	*	*

NOTES:
* = Not rated.
Highlighting indicates the program assigned to each evaluator.

Except for the lack of 3D, Versacad is comprehensive. Thus, even the basics are a great deal for a new user to absorb. But this occurs with surprising speed, and then the fun begins.

After a short exposure to the tutorial, the user should read the manual cover to cover. Some experience with the program is required to understand the manual, and it is necessary to read the manual to operate the program. The functions of all the icons are not obvious; and the program provides separate palettes for tools, construct, and constraints.

The system also has a coordinate display and a message window that prompts the user with the next required input or command, once a device is chosen. This is very helpful.

An architectural symbols library is included, but we wish it were more extensive and varied. Symbols can be retrieved easily and placed visually, scaled, rotated, mirrored, and cut into existing linework with intersections automatically cleaned up.

Versacad is very forgiving. Drawings, including formats, colors, levels, lines, and text, are easily edited as decisions are made.

We found it easiest to enter all information for a drawing in a format we thought was right, and then, by grouping sets of lines, symbols, or text, edit their geometry or properties. For example, once the drawing is visually complete, decisions such as outline line weights or hatch line weights are made easily. Pattern hatching to indicate various materials still is needed.

Exporting or importing files in Versacad, ASCII, IGES, or DXF formats is done with Versalink, which is included with the program. Oddly, the program does not support the most basic Macintosh drawing exchange format, called PICT.

One of the most valuable features of the program, also included in the $1,995 price, is a set of Hypercard stacks that Versacad calls Hypercad. It adds three important powers: Bill of Materials, Level Manager, and Data Base.

Bill of Materials permits creation of Hypercard stacks of objects such as doors and windows, to which costs for materials as well as time and labor can be attached. From this data, reports can be generated for budgeting or cost control.

Level Manager lets the user name and describe each level of the drawing and transfer data from level to level. This is useful to keep track of what is where on multilevel projects.

The Data Base can record every drawing. Browsing through it is as easy as clicking on the mouse. Data such as the numbers and attributes of symbols and their highlighted locations on the drawing can be viewed easily.

Support is free to all callers, but access to the firm's 800 number requires payment of a fee. Versacad Corp. is a CADD pioneer, having developed one of the first CADD programs to run on an early-generation Apple computer. When the IBM PC was introduced, the company, then known as T & W Systems, switched its efforts to the DOS world and became the second-largest vendor of CADD software, after Autodesk. Versacad Macintosh was derived from the IBM version but without some of its features, most notably 3D.

—Marshall J. Moretta, AIA, and Roger J. Bunten, AIA

Mr. Moretta is a partner in Moretta & Sheehy, Evanston, Ill. He has five years of computer experience, one month of it with the Macintosh. Mr. Bunten directs operations for LZT Associates, Peoria, Ill. He has four years of computer experience. Mr. Wenzler, a partner of William Wenzler & Associates, Milwaukee, is an evaluator of Datacad. Mr. Engelke, vice president of Potter, Lawson & Pawlowsky, Madison, Wis., has evaluated several 2D and 3D programs, including Autocad.

Macintosh versus IBM

To provide a perspective on how Macintosh CADD programs compare with IBM CADD programs, Architecture *asked two members from the IBM CADD evaluation teams to observe the presentations of the eight programs reviewed here.*

We felt that the Macintosh-based CADD programs are off to a good start but are generally where their IBM competition was two years ago. Some of the Macintosh CADD programs are still working on the basics—for example, drawing walls, cleaning up wall intersections, copying, and mirroring without reversing text. The choice of Macintosh or IBM really boils down to using an intuitive operating system based on a graphic approach and a "young" CADD product versus surviving IBM's DOS and choosing among some very complete CADD programs.

The comparison of operating philosophies involves some fundamental differences. DOS still holds untold mysteries for us. To use an IBM computer, we are required to memorize commands, which are issued by typing them on the keyboard. The Macintosh accomplishes its housekeeping functions through graphic means, and the Finder system seems incredibly easy to understand and very intuitive to operate.

Still, our first impression was that Lotus 123 would never work on the Macintosh because all the Macintosh programs have the same look and feel. It appears that the typical Macintosh user thrives on the standard user interface and prefers just to load new programs and go. We miss the individual, colorful screens of different programs.

CADD is relatively new to the Macintosh; thus IBM-oriented programmers have had three or four years to develop their capabilities. Even Versacad doesn't offer as many features on its Macintosh version as on its IBM version. However, when you compare Macintosh CADD programs with new IBM CADD programs or with IBM CADD programs costing less than $500, the Mac programs may be slightly ahead.

Color, hatching, and integration are the forte of the Macintosh. The graphics are great, but they do not come inexpensively. A 19-inch monitor (the best size for CADD to reduce the amount of zooming) costs more than $4,000 and requires more memory than smaller monitors. It appeared to us that CADD on the Macintosh costs about as much as CADD on the IBM.

CADD programs on the IBM have three main advantages: the ability to customize the program to suit user needs, macro-level programming to automate repetitive tasks, and third-party support. Another area of concern is the apparent inclination of several Macintosh CADD developers to use copy protection or related kinds of use-limiting techniques. Rather few CADD programs running on the IBM suffer this handicap. We cannot believe that any office would seriously consider a CADD program that included any form of protection.

Although the Macintosh CADD programs are in an early stage of development, our impression is that they won't be far behind for long. The architectural profession now has another option.

—Edward W. Wenzler, AIA, and David J. Engelke, AIA

Following is vendor contact information for the Macintosh CADD programs reviewed here. Archicad, (714) 380-0333. Dreams, (415) 680-6818. Mac Architrion, (202) 223-4373. Minicad, (301) 461-9488. Pegasys II, (415) 945-7300. PowerDraw, (919) 299-4843. Snap, (803) 878-7484. Versacad Macintosh, (714) 960-7720.

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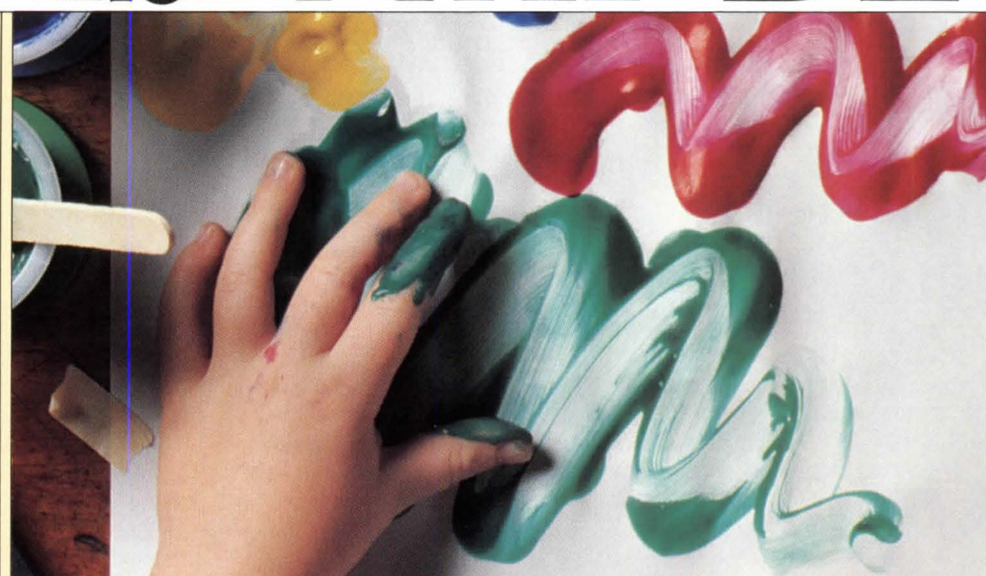

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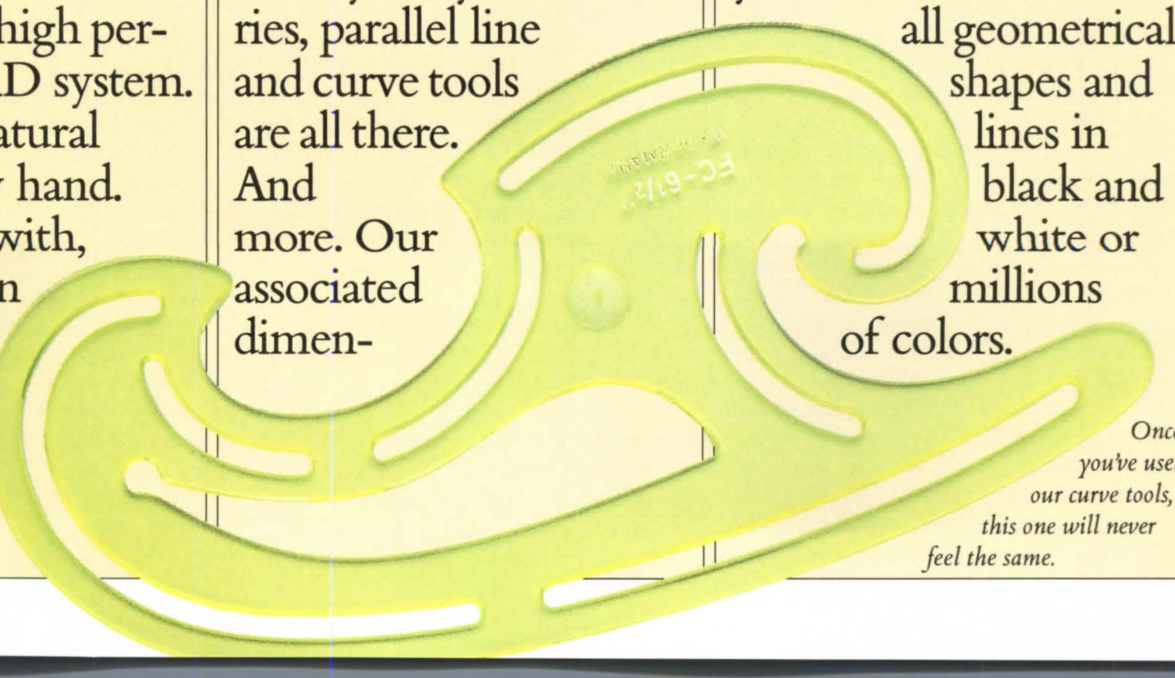

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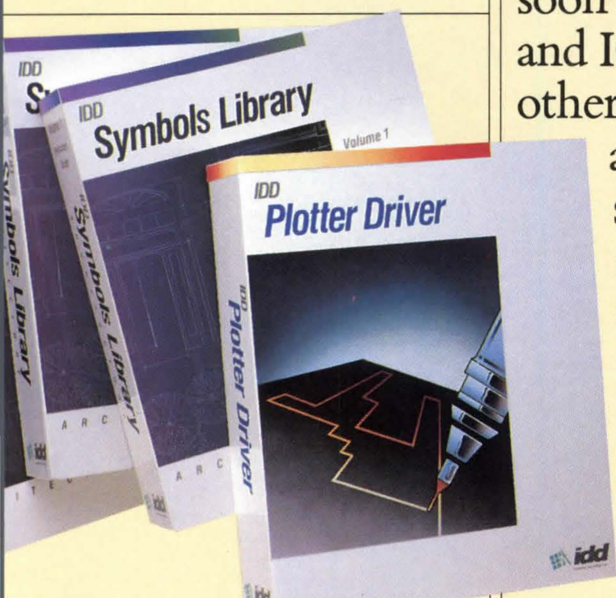

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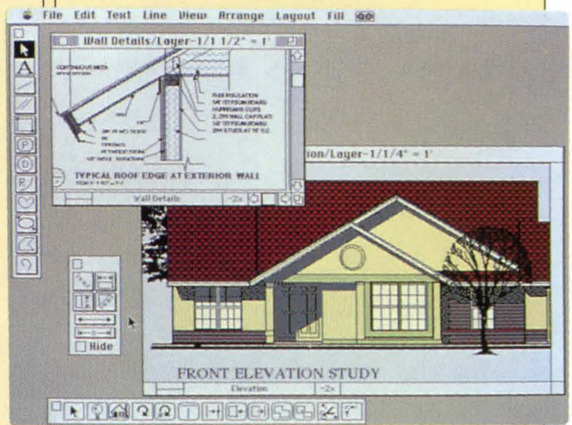

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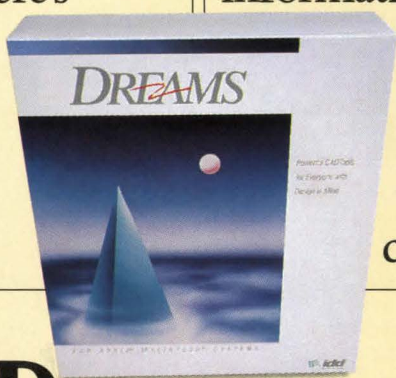

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A Hundred Years (Or So) Of AIA Standard Documents

By Joseph Dundin

Admittedly, the choice of 1988 as the centennial of the AIA documents is somewhat arbitrary. Minor standardized documents dating from as early as 1867 have surfaced, and the first edition of the Standard Documents (including the General Conditions of the Contract, the ancestor of the present A201) was not published until 1911. However, the architects who met to draft the latter documents had a specific precedent in mind: the Uniform Contract, first published in 1888.

The Uniform Contract was three legal-size pages long. Today, it is difficult to imagine how three pages of filled-in blanks and boilerplate could govern adequately anything as complex as the construction of a building, even the much simpler buildings of a century ago. Yet it was an accurate reflection of American business and professional relationships as they existed at that time. The construction industry as we know it today, with architects and contractors clearly distinguished from one another, was just getting on its feet.

So was the legal profession. Handshake agreements were no longer enough. And a national economy was taking shape, one in which an architect or contractor from one region might be confronted with unfamiliar customs and practices in another. Three organizations—AIA, the Western Association of Architects (which merged with AIA in 1889), and the National Association of Builders—recognized the need for a standard contract form and appointed a committee from among their members to draft one.

Notwithstanding its brevity and archaic language ("The Contractor shall and will well and sufficiently perform and finish . . . "), the Uniform Contract contained many provisions that were carried over into the 1911 General Conditions of the Contract and remain in A201 today. The Uniform Contract provided for arbitration, required the contractor to give the architect access to work in progress, allowed for adjustment of the contract time in the event of delay not the fault of the contractor, required the owner to provide fire insurance for the work, and stated that the drawings and specifications "are and remain the property of the Architect."

The next major development came in 1907, when the AIA convention authorized publication of a new set of standard contract documents, with general conditions separate from the agreement form. A committee went through five drafts in the four years it spent working on these documents.

In addition to the Form of Agreement and the General Conditions of the Contract, the Standard Documents of 1911 included an invitation to bid, instructions to bidders, a form of proposal, and a bond form. The focus, however, was on the contract between owner and contractor. Under the 1911 general conditions, as under the present ones, this contract was defined to include the drawings and specifications as well as the agreement form and the general conditions themselves.

The general conditions of 1911 introduced other concepts that are still found in A201. Then, as now, the owner and contractor were required to maintain separate insurance. Each could, after due notice, terminate the contract upon default of the other, although termination by the owner was conditioned upon certification by the architect that such action was justified. A one-year correction period was specified, and arbitration procedures, with time limits, were set out in considerable detail.

The 1911 committee apparently recognized the experimental nature of its work, because the Standard Documents were published with an explanatory note stating that the new documents were not intended to diminish the use of the Uniform Contract, which would continue in publication. This was fortunate, for the 1911 Standard Documents were not widely used. The General Conditions met with considerable resistance, in part because the organization of its articles was thought to be needlessly complex. A more serious problem was the opposition of contractors, particularly those organized in the National Association of Builders' Exchanges, who found certain of its provisions onerous and effectively boycotted the document.

The lack of acceptable standard documents was addressed by the Boston Society of Architects, an AIA component, when it met with the Master Builders' Association of Boston in 1912. By September 1914, the joint advisory committee formed by these two organizations had developed its own proposed form of agreement and general conditions. A Boston architect, R. Clipston Sturgis, had succeeded to the presidency of AIA the previous year. Sturgis brought the joint committee's proposals to Washington. He also brought the architect who had chaired that committee, a young member of his firm named William Stanley Parker.

Older readers will recognize Parker as the "documents czar" who ran the documents program more or less as a one-man show

Mr. Dundin is an editor with the AIA documents program.

until the early 1950s. To younger readers, the role he played for nearly half a century may seem almost mythical. Yet the AIA of that time was a much smaller organization with a much smaller staff and a correspondingly larger role open to interested volunteers. Parker was never on staff, but beginning in 1915 he seems to have spent roughly half his time on Institute business and on the documents in particular. He served as secretary of the Institute from 1916 to 1923, as vice president from 1923 to 1924, and as a member of the contracts committee—later called the committee on contract documents, the ancestor of the present documents committee—more or less continuously from 1916 to 1954. He chaired the committee from 1938 to 1954 and served as a consultant until his death in 1964.

The general conditions developed by the Boston group had a considerable influence on the next generation of Standard Documents, published in 1915. The 1915 general conditions contained numerous small changes for the benefit of the contractor: fire insurance once again became the responsibility of the owner; more detailed payment provisions were included; and final payment, rather than payments generally, was made contingent upon the release of liens. The scope of the arbitration provisions, which had been limited to certain types of disputes in the 1911 General Conditions, was broadened to include any decision of the architect. One change that in retrospect seems especially profound is the transfer to the contractor of the authority to act in emergencies, along with the liability that authority carries. Article 9 first used the term *supervision* with reference to the architect's role during construction, a term that would give rise to a bitter struggle within the profession 45 years later.

The Standard Documents of 1915 were well received. A 1918 edition followed, with minor changes in the General Conditions made to adapt that document to the New York City market. Overall, however, 1915 marks the coming of age of the General Conditions, and with this edition the Uniform Contract was finally withdrawn.

In 1917, the Institute published two Forms of Agreement Between Owner and Architect, one for percentage-fee services and one for services performed on a cost-plus-fee basis. The owner-architect agreements went through a breaking-in process similar to that of the General Conditions. The 1917 editions encountered resistance from owners, who found too great a stress laid on the duties of the owner and not enough on the responsibilities of the architect. These objections were addressed in new editions published in 1926, which were intended for use with the revised General Conditions published the previous year.

With the publication of the revised owner-architect agreements in 1926, the documents assumed the form they would retain until the 1950s. It is amazing to consider the stability of contractual relationships that permitted the documents to continue in use for more than two decades without essential change.

Stability of this kind was in part a product of gross instability in other areas. During the 1930s, architects and contractors fortunate enough to be working were not inclined to haggle over terms. (In 1932, the Institute decided the time had come to raise the price of the documents—so few copies were being sold that it was felt hardly anyone would notice.) The war reversed the economic situation, but it also brought pressure from the federal government to get on with the job and not waste time in disputes. It would take postwar prosperity to produce the litigious environment we take for granted today.

Numerous factors contributed to this environment. The increase in volume of construction following the war meant that more claims would arise. It was also a time when many new technologies were just coming into general use.

Changes in the law were at least as important as changes in construction technology. The revised Federal Rules of Civil Procedure, adopted by a combination of judicial and legislative action in 1938 and subsequently copied in most states, made it much easier for a plaintiff to join multiple defendants in a suit. Also, erosion of the doctrine of acceptance, and more especially the doctrine of privity, greatly increased the architect's liability exposure.

Removal of the defense of privity—the rule, now largely restricted to actions for economic loss, that a case for breach of contract can be brought only by a party to that contract—meant that a contractor or subcontractor could sue the architect for breach of a contractual duty to the owner. Previously, their right of action against the architect had been limited to tort claims—that is, claims based on rights implied in law rather than expressed in a contract—and these are more difficult to prove. The incentive to sue the architect was even greater for injured workers and for the survivors of workers who had been killed. These parties were barred from proceeding against the statutory employer—the contractor or subcontractor under worker's compensation laws, which in many states failed to provide adequate compensation for catastrophic losses. With the defense of privity removed, however, nothing prevented them from proceeding against the architect, who might be shown to have neglected some item in the supervision or direction of the work. The owner had less exposure but might still be held liable if it could be shown that a breach of the contract for construction by the owner had contributed to the worker's injury.

These developments were just beginning to affect the AIA documents in 1951, when the sixth edition of the General Conditions came out. Perhaps significantly, most of the substantive changes in it related to insurance. It is possible to see in these provisions a concerted effort by Parker and the other drafters to allocate risk as far as it was possible to do so in a standard document. Another significant change was the addition of language specifically allowing the architect to withhold certificates for payment. Already, conflicts between the owner and contractor were impinging on the architect in the role of arbiter and requiring that that role be more closely defined.

The 1950s were a time of accelerated change for the construction industry, the architecture profession, and AIA. The increase in litigation continued, and architects found themselves increasingly likely to be named in suits arising from construction claims. This prompted the Institute to work with Victor O. Schinnerer & Co. to develop the first comprehensive professional liability policy for architects (at the time called errors and omissions insurance). The policy was written by Continental Insurance, which later was bought out by CNA.

The Institute was changing as well. Between 1950 and 1960, industry growth and a rise in the number of architecture graduates under the G.I. Bill boosted membership by two-thirds. The new members, in turn, changed the character of the Institute. In 1950, it was still something of an old boys' club, as professional associations historically had tended to be; by 1960, the old boys were outnumbered by the new.

This process was mirrored in the 1958 edition of the General Conditions. Among the more significant changes from the 1951 edition were a mutual waiver by the owner, contractor, and subcontractors of rights for damages (other than insurance proceeds) for loss due to fire; language making the contractor responsible for checking field measurements; and language clarifying the distinction between the contractor's warranty and the one-year correction period.

Two significant changes were not evident in the printed document. One was the involvement of the Engineers' Joint Committee, the forerunner of the Engineers' Joint Contract Documents Committee (EJCDC). This organization worked closely with the AIA committee and issued a parallel set of general conditions for engineering work. The other was that the AIA committee on office practice, which drafted the 1958 edition, was no longer chaired by William Stanley Parker. In fact, he was no longer a member, although he continued in the drafting process as a consultant. Parker was 80 years old by this time, and it seemed likely that his involvement would gradually cease.

Parker was destined to go out with a bang, however.

The explosive charge had been supplied in 1957 by a trial court in Louisiana, whose decision in the case of *Day v. National U.S. Radiator Corporation et al.* held an architect solely liable for the death of a worker killed in a boiler explosion. The subcontractor employing the worker had installed the boiler without the thermostat and pressure relief valve called for in the specifications and had mistakenly installed these devices on a hot water storage tank instead. He then test-fired the boiler without notifying the architect, and the boiler exploded. Nevertheless, the court ruled that the architect, charged with "supervision of the work" under the contract, was responsible for the accident.

While the contract in question had not been based on the AIA General Conditions, the equivalent language in the AIA document read: "The Architect shall have general supervision and direction of the work." The Institute filed an *amicus* brief in the appeal of *Day*—an appeal that ultimately succeeded when the Supreme Court of Louisiana reversed the lower court's decision. AIA also responded, through its committee on office practice, by revising the relevant language in the General Conditions to read: "The Architect shall be the Owner's representative during the construction period and he shall observe the work in process on behalf of the Owner."

Elimination of the word *supervise* was anathema to Parker, who considered supervision central to the architect's role during construction. Prior to publication of the 1961 edition, he marshaled his arguments in a pamphlet printed at his own expense and that of subscribing AIA members and appealed the issue directly to the membership. Shortly thereafter, his title was changed to consultant emeritus.

There is an old Chinese curse that says, "May you live in interesting times." The early 1960s certainly were interesting times for the documents program. In addition to the fight over "supervision," the Institute was engaged in a brushfire war with a committee of the American Bar Association, which charged that publication and dissemination of the AIA documents constituted unauthorized practice of law. This issue disappeared rather suddenly in 1962, when the chairman of the ABA committee had his arguments dealt with summarily, not to say derisively, in a Florida court.

An issue that remained longer was of the Institute's own making. The job of drafting the documents had been reassigned to a documents review committee made up of the chairs of several other committees and the practice commission. Under the rules of the board in effect at that time, the tenure of committee members was limited to three years and that of committee chairs to one year. This meant that the membership of the documents review committee turned over annually. In addition to lack of continuity, there was not enough staff to handle production of completed drafts. "Staff was practically nothing," says Rocky Rothschild, FAIA, a longtime committee member. "Things would be finished and it would take a year to publish them. We'd find them in people's desk drawers."

There was also considerable turnover in the General Conditions around this time. A 1963 edition introduced language to describe the architect's status that is essentially the same as the language in A201 today. The 1963 edition, incidentally, was the first to carry the A201 designation.

A 1966 edition embodied the first major reorganization since 1915: paragraphs, subparagraphs, and clauses were introduced as formal subdivisions of the articles. "Changing from 44 articles to 14 meant scrutinizing every sentence," recalls Dean Hilfinger, FAIA, who chaired the committee at that time. "We had to have a thorough grasp of the provisions in order to change their sequence without altering the meaning."

This edition also introduced an indemnification provision whereby the contractor held the architect and owner harmless from all losses caused by the contractor or the contractor's subcontractors or employees. Not surprisingly, this was not popular with contractors. The sticking point for them was causation—what if the architect had a part in it? AIA made an exception for errors contained in the drawings and specifications, but Association of General Contractors representatives argued that an architect's errors need not be embodied in these documents. Contractors boycotted the General Conditions in a face-off that looked like 1911 all over again. Ultimately, AIA agreed to a broader exception and included it in a revised 1967 printing. Further minor revisions, including an adjustment in the claims procedure, were incorporated in a new edition later that year.

By 1970, the drafting process had stabilized. The committee had been reconstituted as the documents board, a temporary arrangement that solved the continuity problem: since the drafting board was no longer a committee, it was no longer required to turn over in the manner of a committee. In that year, too, the architect's authority to stop work was taken out of the General Conditions. This was done because certain court decisions suggested that, in the event of a loss suffered by the contractor, a subcontractor, or one of their employees, and despite a disclaimer to the contrary, the architect might be held liable.

The 1976 and 1987 General Conditions are contemporary topics and have been dealt with at length elsewhere. It would be appropriate, however, to consider the General Conditions in the context of the other AIA documents. There are about 80 of them, excluding the F-series accounting forms. They include owner-contractor, owner-architect, contractor-subcontractor, and architect-consultant forms. Construction management documents were introduced in 1975, interiors documents in 1977, and design/build documents in 1985. Although new, these documents contain provisions based on those in A201 and related documents going back to 1911, and ultimately on experience dating back to the Uniform Contract of 1888.

Today's AIA documents committee strives to maintain a revision cycle of 10 years, recognizing that what William Stanley Parker wrote in the *Bulletin* of September 1949 is still true: "No standard document should be looked upon as permanent, never to be changed. However, it is interpretation by the courts that gradually defines its meaning, and the opportunity to get this definition will be lost if a document is constantly revised." □


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Construction of Retaining Walls

I stood looking down into the trench with the building contractor and the city inspector. An hour earlier, a front-end loader had cut back the sides of the trench, and rescue workers had retrieved the body of a worker who was crushed to death when the trench walls collapsed in on him. Armed only with a shovel, he'd gone down to locate a pipe in a trench that was almost 20 feet deep and no wider than a backhoe bucket. "This is my third this year," said the inspector. "They never learn."

This kind of tragedy should never occur. OSHA safety regulations for building excavations *require* that every trench over five feet in depth be shored or sloped back at a 45 degree angle in "normal soils." If the slope method is chosen, the site has to be quite large to accommodate that shallow a cut. Some national codes require even flatter slopes; for instance, the Uniform Building Code requires a slope of two horizontal feet to every vertical foot. Sloped excavations may seem attractive economically, but the money saved by not building a retaining structure is going to be offset, at least partially, by increased excavation and backfill. And in many urban areas, a retaining structure must be used to protect workers from cave-ins simply because sites are too small to support the necessary slope. Typical retaining wall systems include Berlin walls, sheet-piles, and concrete diaphragms.

Retaining wall systems

Berlin walls are constructed of wide flange beams ("soldier piles") and timber sheeting ("lagging"). The driven piles are placed 6 feet to 10 feet on center, and the lagging then is installed between the flanges of the piles as the excavation proceeds.

Because the piles are driven and therefore relatively rigid, horizontal earth pressure is concentrated on the piles rather than on the lagging. But the lateral soil load on the lagging must be evenly distributed and transferred back to the piles. Lateral displacements are often the result of lagging deflection caused by poor workmanship either in trimming (cutting away the soil between the flanges in order to insert the lagging) or installation of lagging itself. Careful supervision of the workers doing trimming is necessary to ensure that they avoid large voids behind the lagging. If large voids do appear, they must be filled with grout or mortar. If the piles are used as permanent reinforcement in a structural wall, they must be completely exposed to provide room for the lagging and spacers.

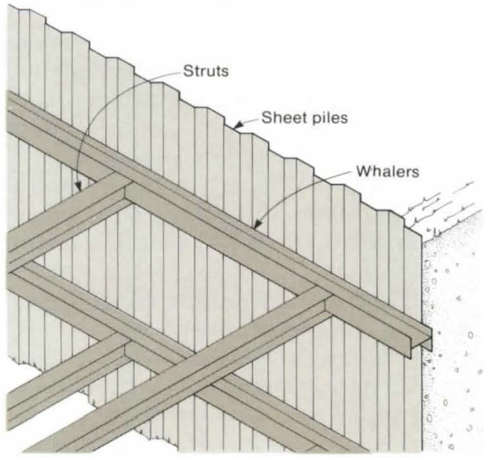
Because it's often necessary to leave portions of the soil wall unsupported during trimming and lagging, only clay soils with some over-consolidation are compatible with the Berlin wall system. And because gaps between the lagging make leakage inevitable, Berlin walls are best suited either for soils above the water table or for homogeneous, free-draining soils.

Sheet-pile walls, made of timber or steel, also are installed by driving, but, unlike soldier piles, they create a continuous wall. Sheet piles therefore are less appropriate under hard driving conditions, and irregular rock surfaces can damage them.

Wakefield sheeting, a common form of sheet piles, consists of three planks spiked together to form a tongue and groove. The Wakefield tongue and groove sheeting provides a relatively tight water seal. If the sheet timbers are driven carefully into a soil that has even slight cohesion, little water seepage will occur.

Steel sheets are the most economical in deep excavations with soft soils, where retention of higher earth pressures is expected. Standard steel sheet piling in the United States is $\frac{3}{8}$ to $\frac{1}{2}$ inch thick with a "thumb and finger" or "bowl and ball" interlock shape along the edges to make it nearly watertight. But driving steel sheets into loose, sandy soils can cause adjacent ground settlement. Also, when the sheet piles are terminated below the water level in sandy soils, the upward flow of water into the excavation can cause loss of support and erosion at the toe.

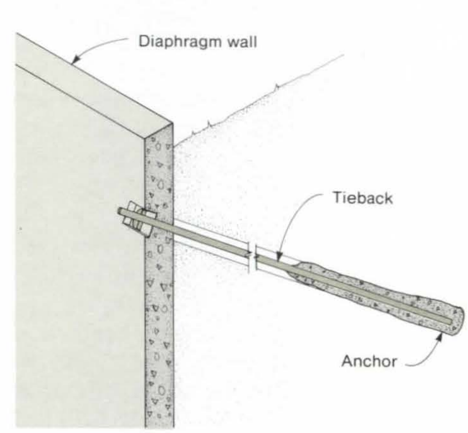
Cross lot bracing and sheet pile walls



Concrete diaphragm walls, because they can be installed with a minimum of backslope subsidence and ultimately are part of the permanent structure, are becoming the retaining structure of choice. The construction sequence starts with a shallow guide wall of concrete or steel. Then, with a thin-grab clamshell, excavation of the panel (a panel can be up to 23 feet long and 20 to 40 inches thick) begins. As the clamshell descends, a bentonite slurry is pumped in to hold the earth walls in place. Once the desired depth is reached, a prefabricated reinforcing cage is lowered into the excavation. Tremie concrete is then pumped into the excavation, displacing the slurry.

Since the concrete walls are impervious, dewatering often isn't necessary. But because the wall is poured in panel sections, "windows" (gaps) can occur. Windows discovered below groundwater level need immediate remedial steps to prevent a sudden, disastrous loss of soil behind the wall. The contractor should have injection grouting equipment and materials available on site just in case.

Concrete diaphragm wall and tieback

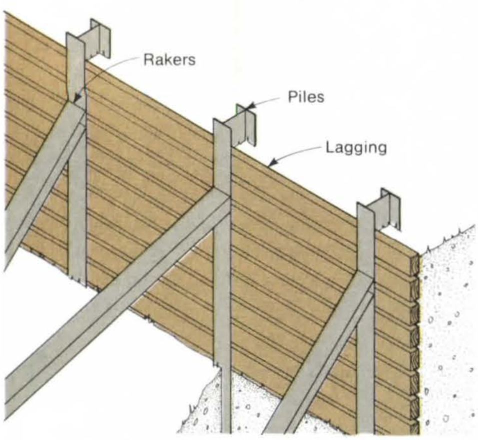


Wall supports. Once the soldier or sheet piles are driven into place and the excavation starts, some method of support is necessary to prevent the piles from falling into the excavation. Before the bracing is installed, horizontal members called "whalers" are welded to the piles to tie them together.

Lateral movement of braced walls is common, caused either by cantilever deflection of the upper wall before the bracing can be placed or by lateral movement of the wall as the excavation deepens. Cantilever deflection will result in settlement adjacent to the wall, while lateral movement allows spread settlement away from the wall. However, over-excavation before the bracing is erected is the most common cause of subsidence.

Rakers and berms are a common type of bracing system. Once the center section of a site is excavated down to foundation level, kicker blocks are formed and the upper portion of the wall is braced with "rakers." The "berm" (leftover soil) is then cut away and the next level of rakers installed. An advantage of this system is that it leaves the center portion of the site clear for excavation.

Rakers and berms, soldier piles and lagging



Because of the construction procedure, the raker and berm system allows more lateral movement than any of the other bracing systems. However, extensive deformation or complete collapse of the system can result from insufficient resistance in the berm, slope failure in the berm, or heave below the berm.

Tiebacks are unique among bracing systems because their anchoring is located in the earth outside the excavation area and because they work in tension. The most common method of installing tiebacks is to drill a hole into the earth wall and place either a prestressing bar or multiple prestressing strands (a "tendon") into it. A portion of the hole is then filled with concrete, which acts as the anchor. Once completed, the remaining portion of the hole can be backfilled. The end of the tendon protruding into the excavation is usually threaded to receive the whaler.

Tiebacks allow only minimal wall deflection and therefore better subsidence control. They are always prestressed to remove the slack from the system, and as a consequence they are able to maintain a load evenly during excavation and construction. If deformation should become a problem, additional tiebacks can be added. Finally, the greatest advantage to tiebacks is that they keep the excavation open and free of obstructions.

Tiebacks do have their limitations, however. Since the sheeting is usually placed near the property line, the tiebacks are often on neighboring property or beneath city streets, requiring permission. Subways, utility tunnels, and sewer pipes may interfere with tieback placement. Some soils, such as soft clay, make tiebacks uneconomical. And finally, because of the strong vertical force component in the tieback system, retaining walls may be pulled downward or walls may deflect away from the excavation.

Rules of thumb

Whichever retaining and bracing methods are chosen, there are several points that the architect should keep in mind for preparing the excavation site.

1. Determine the dimensions of the excavation. In tight sites, these can dictate the method of excavation and type of wall and support system.
2. Run soils tests to the bottom of the excavation. This is important particularly when stratified soils are suspected. Locate and measure the water table to determine if dewatering is necessary. This can affect both the cost and the scheduling method of retention, as well as the type of bracing or anchoring.
3. Predict the soil movement caused by dewatering and excavation. Compare the predicted movement with the allowable movement.
4. Make a careful survey of adjacent structures and utilities. It's a good idea to photograph and measure any existing structural defect, such as settlement cracks. If the owner agrees, do an interior survey as well. In congested urban areas, a utilities survey also is a must, especially if you plan on using tiebacks. Keep all surveys on record.
5. Select the wall and bracing system, considering local experience (particularly important if you are doing a job in an unfamiliar part of the country), cost, depth of the wall, and bracing type and spacing.
6. Monitor the site, with instruments if necessary, during both excavation and construction. If there are signs of movement in the wall or of soil subsidence, it may be necessary to alter the bracing, the retaining wall construction, or both.
7. Specify that the installation of the piles, sheeting, underpinning, shoring, and bracing be supervised by a specialist.

—Timothy B. McDonald

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PRODUCTS

Streamlined Chair
The Notorious chairs (right), designed by Massimo Iosa-Ghini for the Italian manufacturer Moroso, possess soft curves and a streamlined curvilinearity familiar to followers of the Bolidist movement, which is influenced by the moderne movement of the 1930s in its emphasis on the sleek and streamlined and in its use of soft curves in design. The Iosa-Ghini Collection comprises 16 tables, chairs, and upholstered pieces. The chairs are constructed of wood, metal, wicker, and leather, and measure 32¼x22x17½ inches. They are also available with arms. Morosa designs are sold in the United States through Palazzetti and its showrooms.
Palazzetti Inc.
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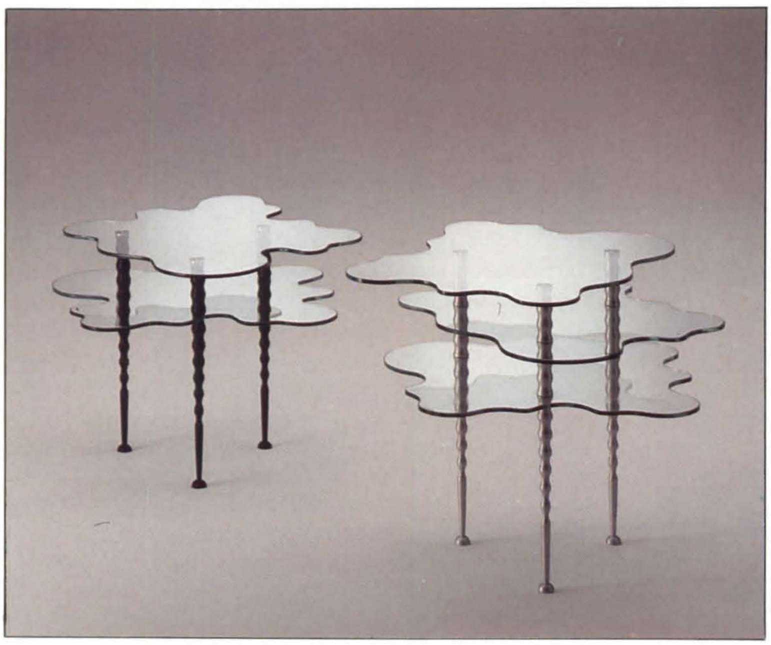
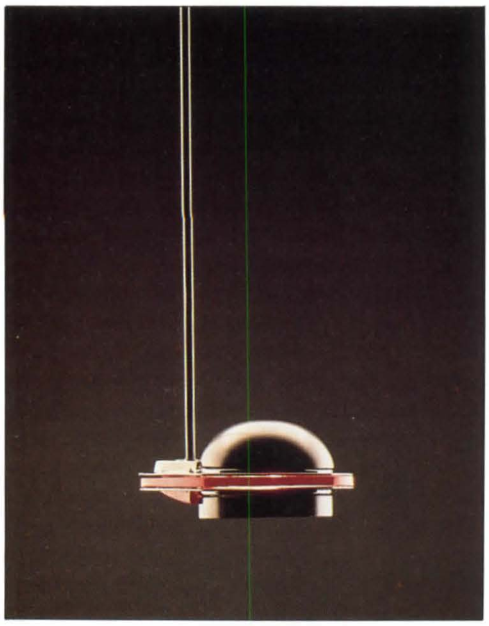


Fanciful Table
The coffee or petite table (above) was designed by Alessandro Mendini in 1985, and its production began in 1987. The slight table appears to float, cloud-like; its two or three tops in millimeter, shaped, and hand-cut glass are anchored by legs of burnished steel or natural or black anodized aluminum, which screw onto steel discs fixed to the glass.
Zanotta
Circle 403 on information card

Rail System
The ARC railing system (above) is a steel stanchion support system that is designed to combine great strength with a lightweight appearance. Stainless steel rods, cables, and turnbuckles, or ½x1-inch horizontal bars for radius and corners, form the horizontal members between the side-mounted posts. The handrail is two inches in diameter. The handrail and post components are available in a wide range of materials and finishes.
Livers Bronze Company
Circle 404 on information card

Track Lighting System
The Expanded Line Network, a colorful track lighting system (shown below), was designed by architects Perry A. King and Santiago Miranda. Four to six fixtures can be suspended from a 1.4-inch-diameter, low-voltage aluminum track with outlets for fixture heads. A gray power cord enters one or both sides. The four or six outlet channels come with two 78-inch-long suspension cables of stainless steel for mounting to the ceiling and are available in pearl white or anodized blue, red, or black. The fixture head shown is called the Alma. Alma 50 features a 20-inch stem, and the Alma 80 has a 31-inch stem. Both provide either direct or ambient light. Four dramatic styles of lamphead fixtures are available for mixing, matching, or to angle in different lengths.
Flos Inc.
Circle 402 on information card



Antimicrobial Carpeting
Sylgard residential and commercial carpet treatment developed from Dow Corning reputedly stops the growth of common bacteria, fungi, yeasts, molds, and mildew. It prevents odors, discoloration, and damage caused by unchecked microbial growth. Because antimicrobial molecules become an integral part of the carpet fiber, the treatment is not water soluble, so its protection won't be lost after repeated vacuuming, shampooing, or steam cleaning. Carpet treated with Sylgard is suggested for use in hospitals, clinics, schools, institutions, food service areas, recreation facilities, hotels, and motels.

Lees Commercial Carpet Co., a division of Burlington Industries, also uses the Sylgard treatment in its line of Biogard antimicrobial carpet. Various textures and constructions are stocked in nearly 100 colors.
Dow Corning Corporation
Circle 407 on information card
Lees Commercial Carpet Company, division of Burlington Industries
Circle 408 on information card

Resource Guide to Wool Carpeting
The Wool Bureau lists Woolmark quality carpets and 80 percent wool blend carpets in a resource and specification guide designed to assist architects in carpet selection. Additionally, a computer-operated carpet life-cycle costing program draws upon a data bank to give figures for the initial cost of carpets, the cost of their maintenance, and the comparative cost of the carpets over a given period, as well as other pertinent information.
The Wool Bureau Inc.
Circle 409 on information card

Computer Aided Maintenance
A Computer Aided Maintenance Plan—CAMP—demonstrates the progression of steps that can be taken in developing a tailored carpet maintenance program for a building or a single floor. Floor plans are programmed into the CAMP computer and are color coded to indicate where soiling occurs, how final vacuuming and cleaning plans are created, and a cost summary for budgeting maintenance costs for the year. A calendar indicates each day's work plan, the time required for cleaning activities, and labor and material costs.
Racine Industries, CAMP department
Circle 410 on information card

Water Conditioning System
The Magnetizer water conditioner polarizes water, neutralizing acids and dissolving hard water scale, resulting in soft water without the need for energy, salt, or chemical additives.

The Magnetizer causes scale-forming minerals to be magnetically suspended and dissolved in the water. Green stains are reputedly removed from plumbing fixtures, eliminating acidic pipe deterioration. Although the water remains safe to drink, the manufacturer suggests the use of a filter, since the Magnetizer does not remove toxins. The product also creates de-gasification of the water, which decreases sulfur and chlorine gases, resulting in water without a "chemical" taste.
The Magnetizer Group
Circle 411 on information card

Signage System
A process called the Kroy Sign Studio uses a Macintosh computer and Laser Writer laser printer with software and supplies by Kroy to produce architecture signage in seconds that mixes text and graphics on screen in about 1,000 possible combinations of type styles, with 15 insert and 60 lettering colors possible. Kroy also manufactures sign frames in plastic, wood, and metal, all with matching insert stock for the system.

A color presentation graphics system called Color Plus enables the user to create color presentation graphics in more than 50 colors and matte, gloss, and metallic finishes.
Kroy Inc.
Circle 412 on information card

Sensor Chair Enhancements
The Steelcase Sensor chair (above) now features a sled-base model in three new upholstery fabrics and a palette of new shell colors, as well as options such as leather and enclosed armrests. The fabrics coordinate with other Steelcase surface materials.

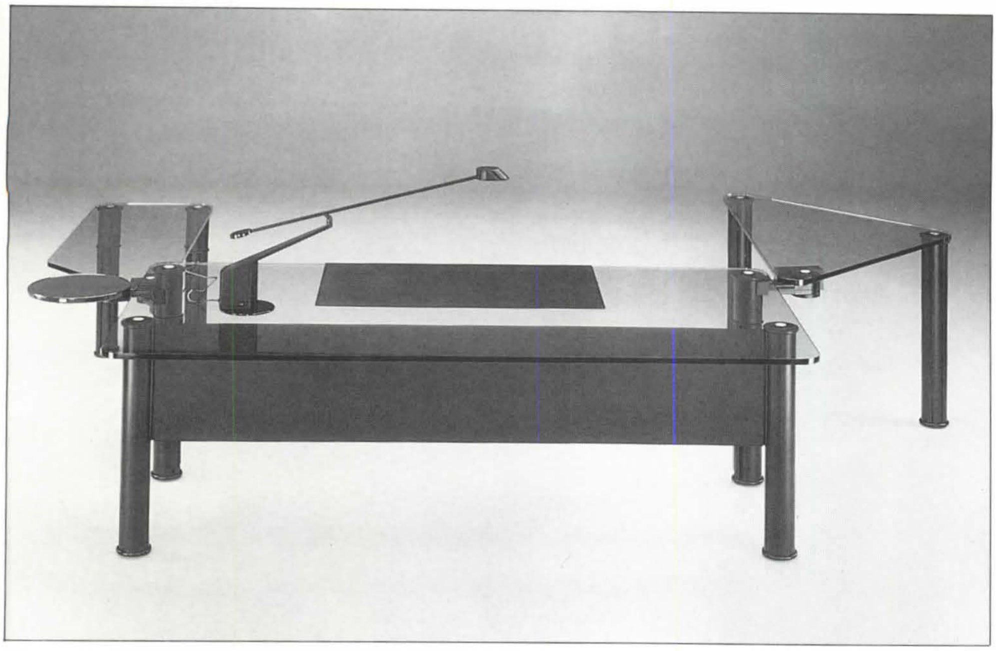
The sled-base model offers the same ergonomic qualities as the original Sensor task chair introduced in 1986. The new frame design includes arms as standard, and color-matched arm caps as an alternative option. Three lighter shell colors in cool gray, warm gray/taupe, or neutral beige are available.
Steelcase Inc.
Circle 413 on information card

Acoustical Control System
An Acoustical Control System (ACS) adjusts the acoustical properties throughout a space to meet desired acoustical requirements by reproducing multiple sound reflections in a natural way according to the laws of physics.

The system consists of an array of microphones and softspeakers (so called because of their subtlety in adding existing sound energy in a hall or room), grouped in the space. The softspeakers are typically located on perimeter walls and the microphones distributed within the area. The microphones are connected to a central processor by cable where their input is interpreted and returned through the softspeakers. ACS is space dependent and adds energy to the reflections in the space, extending reverberation and compensating for sound absorption. The central processor recognizes and allows independent adjustment through each octave band from 30 to 16,000 Hertz.

ACS can be used in new or retrofit construction, and is available in several standard configurations or may be customized to suit specific requirements.
decoustics
Circle 414 on information card

Products continued on page 130



Innovative Desk Series
Desks in the new "Ring" series (above) have three die-cast, removable molded rings in both front legs that can be replaced with supports for side top returns. The four-inch-diameter legs are joined to rectangular, triangular, wedge, and half-moon shaped desk and side unit tops by recessed brass caps. Credenzas and desktops come in tempered glass; black metal legs are 24 and 28 inches high. A black leather desk pad is an option, as well as double center drawers and black leather back panels on some models.
Kinetics
Circle 405 on information card

Low Ceiling Luminaire
The LCI-Low Ceiling Indirect luminaire is a fluorescent fixture designed to light spaces whose ceiling heights are as low as 8½ feet. Its lamp and reflector system is designed to produce a smooth spread of light on the ceiling, with an efficiency of 89 percent. The LCI was the only fluorescent fixture selected in the "Preview of Products" session at New York's Light World V this year.
Litecontrol
Circle 427 on information card

Mobile Storeage/Filing Systems
Three new high-density mobile storage/filing systems for office, institutional, and industrial applications have been developed by Spacesaver Corp.

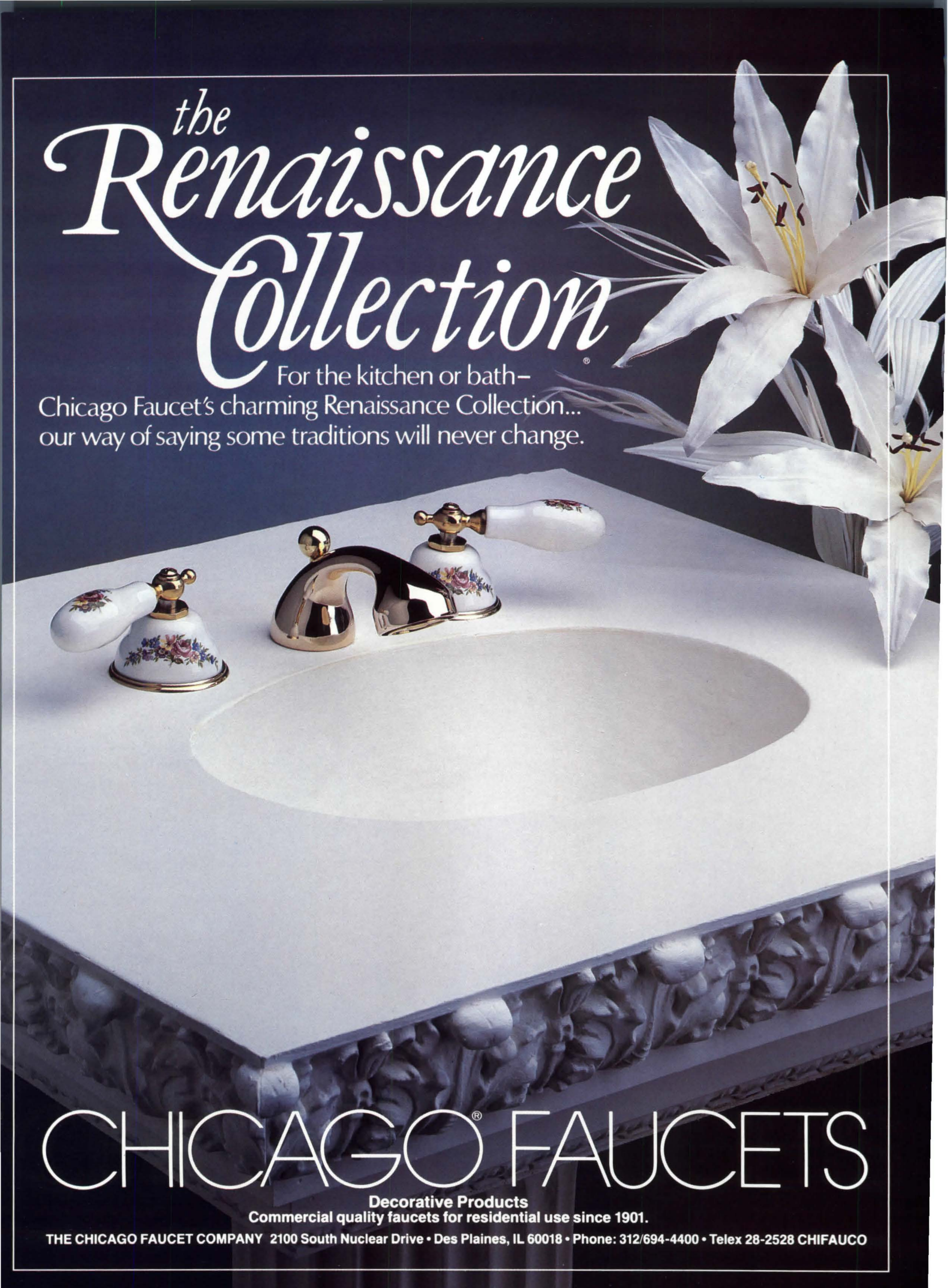
To provide a solid foundation and assure low maintenance and easy operation under heavy, long-term cyclic stress loads, one-piece low-profile structural steel T-rails with tongue-and-groove splices and high-strength hydraulic polymer floor grout fully distribute heavy wheel point loads to the floor. This reduces rail deflection, maintains rail alignment, and eliminates rail separation. Additional features of the storage system include flush rail/floor design; fully welded uniframe aluminum carriages that have no exposed assembly holes or protruding hardware; and ⅝-inch recessed shelf mounting, to assure "no shift" mounting and alignment of all types of shelving and cabinets. There are several models to choose from. The Spacesaver Model S/2 series, designed for maximum performance, is rated at 1,000 pounds of load minimum per carriage foot, and features a tapered-center flange wheel guidance system. Model S/2-M hand-controlled manual systems come in standard carriage lengths to 16 feet. Model S/2-MA is a mechanical assist (hand crank) system that is available to 21 feet; and the Model S/2-E electric system ranges to 24 feet or longer. The S/2-E electric models can be equipped with a safety floor and ramp that automatically deactivates the system to prevent carriage movement with a person in an open aisle.
Spacesaver Corporation
Circle 426 on information card

Laminates
The Surfacing Safari collection from Wilsonart consists of eight decorative, patterned laminates designed to coordinate and work with the colors, patterns, and textures of the Color Quest line of 110 solid color laminates. The collection, which can be specified in general purpose, vertical surface, and postforming grades, is inspired by earth tones and textures of the sea and sand. The newly introduced Touchstone finish option provides a lightly pebbled finish that adds texture and dimension to the laminate surface. The finish is available on Wilsonart patterns Diamondhead, Surfside, and Maui.
Wilsonart, Ralph Wilson Plastics Company
Circle 428 on information card

Low-Voltage Electronic Dimmers
Lutron Electronics' Sol-Lo technology dimmer is a UL-listed lighting control for electronic low-voltage lighting. The dimmer is incorporated into three additions of the Nova T*, Nova, and Skylark dimmer families, controlling electronic transformer-supplied low-voltage lamps either alone or in combination with standard incandescent lamps. Also available in the three product families are Lutron low-voltage dimmers for low-voltage fixtures using magnetic transformers.
Lutron Electronics Company
Circle 420 on information card

Sun Control Product
Skylid self-operating insulating louvers are sets of panels that open beneath a skylight to allow sunlight and heat to enter during the day and close to prevent heat loss at night. The sun controls their responsive weight-shifting system. The louvers are oriented parallel to the sun's rays during the day. A manual override allows the louvers to be held in a closed or partially closed position to prevent overheating or to control light levels. Skylid louvers are constructed to withstand intense solar radiation while providing insulation. There are no plastic parts to degrade in the heat and sunlight. Standard Skylid lengths range from four to 10 feet. Sets of two or three louvers are assembled in the frame. Standard louver finishes are painted white or clear satin anodized.
Zomeworks Corporation
Circle 421 on information card

Modern Rocker
A streamlined contemporary rocking chair of stainless steel and leather folds up completely when not in use and weighs only 23 pounds. Rocking action is achieved through interaction of cable supports and a two-piece polished stainless steel frame. The frame consists of two independent stainless steel units and two flexible steel cables, so each element indirectly supports the other. The Euroka chair was designed by Mark Singer and is for sale at the Museum of Modern Art as well as furniture and department stores nationwide.
Melamede International
Circle 422 on information card
Products continued on page 132



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Expansion Joints/Spacers

Silicone expansion joints and spacers resist ozone, oxidation, and compression-set at low temperatures; therefore they are useful in highway expansion joints, bridge bearings, glazing gaskets, and other sealing components in the building and construction industry. The most outstanding property of silicone elastomers is their broad service temperature range, designed to exceed the scope of other commercially available elastomers. Silicone base stocks can be compounded to perform for extended periods at temperatures from 150 degrees below zero to 500 degrees Fahrenheit in static applications and from 100 degrees below zero to 500 degrees Fahrenheit under dynamic conditions.
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Service Provides Research, Analysis

Competitek, a technical update service that provides research and market analysis on electrical efficiency, is a project of the Rocky Mountain Institute, a nonprofit resource policy center that analyzes the latest electricity-saving hardware, practical implementation methods, and the measured results of these methods.

Competitek assists architects by showing them how to cut electricity use while decreasing hard construction costs at the same time. A systematic guide can be provided that shows how to cut lighting power consumption while maintaining lighting levels and improving lighting quality at every stage of the project's design.

The service has a series of annual technical reports explaining and critiquing current techniques for using electricity. New ways to save on electrical costs in both new and retrofit construction projects are covered in the areas of lighting, drive power (HVAC, domestic, and industrial), appliances, water and space heating, and space cooling, including air handling.

Quarterly hardware updates serve as refreshers to the reports and are topical notices of pertinent technological developments that help keep the reports current until the annual rewrites. Quarterly implementation papers describe a range of issues and latest developments, and annual forums and member seminars are set up to discuss current issues. Special services and member studies are also available.
Competitek, an information service of Rocky Mountain Institute
Circle 424 on information card

High Window Control System

Manual or motorized control systems for inaccessible windows may be surface mounted or concealed within walls. For new buildings the system permits operable vents for natural ventilation or to supplement airconditioning. In existing buildings or additions to older structures the systems replace bulky hardware or are used as a substitute for poles that open and close clerestory windows.
Clearline Inc.
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Security Door Viewer

A security door viewer (below) features a larger than ordinary peephole, designed to increase visibility for determining who is at the door without opening it. The lens system is composed of three separate elements to provide a clear, undistorted outward view while inhibiting callers from seeing in.

Two inner lens elements are made of linear polarizing butyrate. One lens rotates to provide light control. When not in use, the rotating lens is left closed, preventing vision inward. It is not necessary to place the eye close to the lens to see out.
Rejan Inc.
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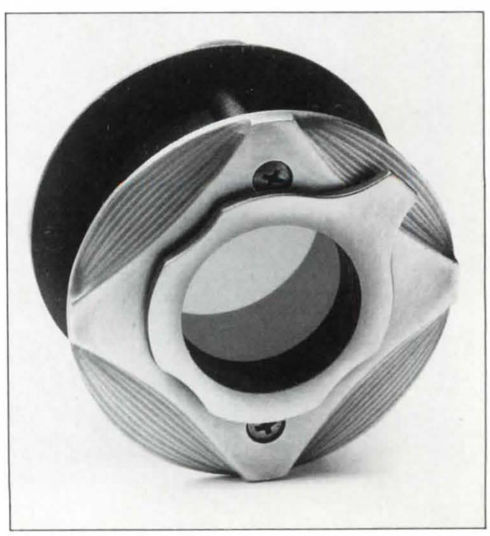
Products continued on page 134

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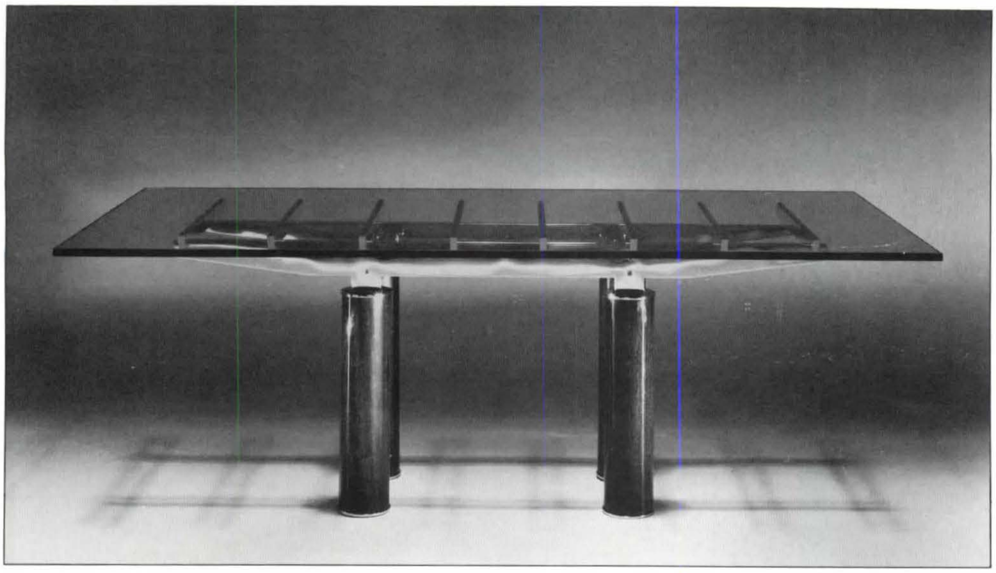

TNT Table
The TNT Table series from Brueton Industries (above) is designed by architects Cary Tamarkin, AIA, and Timothy Techler of the Boston-based Tamarkin Techler Group, an architecture, interiors, and product design firm. The architects said their inspiration for the tables came from observations of the simplicity and grace of 19th-century garden architecture. The rectangular or square high and low tables are constructed of stainless steel, glass, and wood veneer. The legs, available in many Brueton wood choices, connect to the stainless steel "trellis," which supports a glass tabletop. The trellis comes in either a polished or satin stainless steel finish or in high-gloss opaque colors. The table comes in a variety of sizes, and special orders are also available.
Brueton Industries Inc.
Circle 406 on information card

Office Chair
Model 6626½ secretarial chair features an adjustable back support and a larger, thicker seat. The chair measures 18½ inches wide with an adjustable seat height of 18 to 21¾ inches. Depth adjusts from 20 to 22 inches.
The Alma Companies
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Reinforced Cement Panel
The Glasweld opaque mineral fiber reinforced cement panel from Eternit Inc. can be used for curtainwalls, cladding systems, fascias, and interiors. It is available in 17 colors and is warranted to be colorfast for 20 years. Glasweld contains no asbestos and reputedly retains its structural integrity for the life of the installation.

The Glasweld panel is suitable for installation in wall systems where a high wind-load resistance is required. It is also suggested for applications where fire-resistant structures are a priority. Recent advances in adhesive attachment make it possible to clad monolithic facades without the need for moldings or mechanical fasteners. Major wall areas can be surfaced with a minimum of articulation. The Glasweld panel can also be installed using custom-designed extrusions to fit particular project requirements.
Eternit Inc.
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Visual Presentation Boards
A new line of presentation boards features a thin-line design and a soft white writing surface. The boards are available in wood as well as laminate, color polyurethane, and wood trim laminate. Boards may be ordered lineal, curvilineal, radiused, or in the traditional style.
Nevers Industries
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Credits on page 136

4

5

6

3

2

1

Another six reasons to specify Sloan... the first time.

At first glance, it's difficult to imagine how these six different buildings are related. But if you take a closer look at their histories, you'll find they all share a common theme: the washrooms in all six buildings have been refitted with Sloan flushometers.

True, these buildings don't look old enough to need major plumbing repairs. But the fact is, the original flushometers that were installed just didn't hold up. Even after repeated servicing, they continued to malfunction. They didn't shut off properly. They leaked at the stops. In some cases, they even flooded the washrooms. In short, they weren't Sloan flushometers.

Unlike substitutes, Sloan flushometers offer proven, reliable service. With built-in quality at an affordable price. That's why today more buildings are equipped with Sloan flushometers than with any other brand.

Only Sloan's rugged, tamper-proof design can assure the quiet, dependable operation so critical in buildings like these. Plus, Sloan flushometers are built to last for years with only minimal, routine maintenance—an important consideration for specifiers who value time and money.

The next time you consider specifying a substitute, think about these six buildings. Then specify Sloan. The first time.

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Flagstaff City/Coconino County Library, Flagstaff, Ariz. (page 58). *Architect: Snowdon & Hopkins Architects, Vail, Colo.* Project managers: Pamela Hopkins, AIA, and Craig Snowdon, AIA. Electrical engineer: Torgerson Yingling & Associates. Mechanical engineer: Ensar Group Inc. Structural engineer: Johnson Voiland & Archuleta. General contractor: R.M.A. Inc. Interior design: Snowdon & Hopkins Architects.

Rockport United Methodist Church, Rockport, Mass. (page 62). *Architect: Hilgenhurst Associates Inc., Boston.* Principal in charge: George D. Fisher, AIA. Principal for design: William D. Buckingham. Electrical and mechanical engineer: Lev Zetlin Associates. Structural engineer: Souza, True & Partners Inc. General contractor: Cameron & Hogan.

Science Discovery Museum, Acton, Mass. (page 64). *Architect: E. Verner Johnson & Associates, Boston.* Principals: E. Verner Johnson, AIA, and Louis Sirianni, AIA. Project manager: Doug Mund. Structural engineer: Cowen Associates. Electrical and mechanical engineer: Fales, Letendre & Ziobro Inc. Landscape design: Liz Steinfeld.

East Hampton Community Center, East Hampton, Conn. (page 70). *Architect: Mark Simon, AIA, of Centerbrook Architects, Essex, Conn.* Project manager: Stephen L. Lloyd, AIA. Structural engineer: Besier Gibble Norden. Mechanical engineer: Energy Research Group. Contractor: Naek Construction Co. Graphics/signage: M.A. Rumney Associates.

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Moore House, Rankin County, Miss. (page 84). *Architect: Mockbee Coker Howorth Architects, Jackson Miss.* Principal in charge: Samuel Mockbee, AIA. General contractors: Randy Russ and Wes Busbee.

Riverfront Apartments, Nashville (page 86). *Architect: Tuck Hinton Everton Architects, Nashville.* Partner in charge: Seab A. Tuck III, AIA. Project manager: Virginia Campbell, AIA. Developer: Nelson Andrews and Miles Warfield of Brookside Properties.

Office of Clemens Bruns Schaub & Associates, Pensacola, Fla. (page 88). *Architect: Clemens Bruns Schaub & Associates, Pensacola, Fla.* Principal in charge: Clemens Schaub, AIA. Project manager: Judy Royal, AIA. Design team: Brian Spencer, AIA, and Randy Maxwell, AIA. Electrical and mechanical engineer: Klocke, McLaughlin & Associates. Structural engineer: James Mallett. Landscape architect: Clemens Schaub, AIA. General contractor: Norton-DelGallo Renovations Inc. Interior design: Clemens Bruns Schaub & Associates. □

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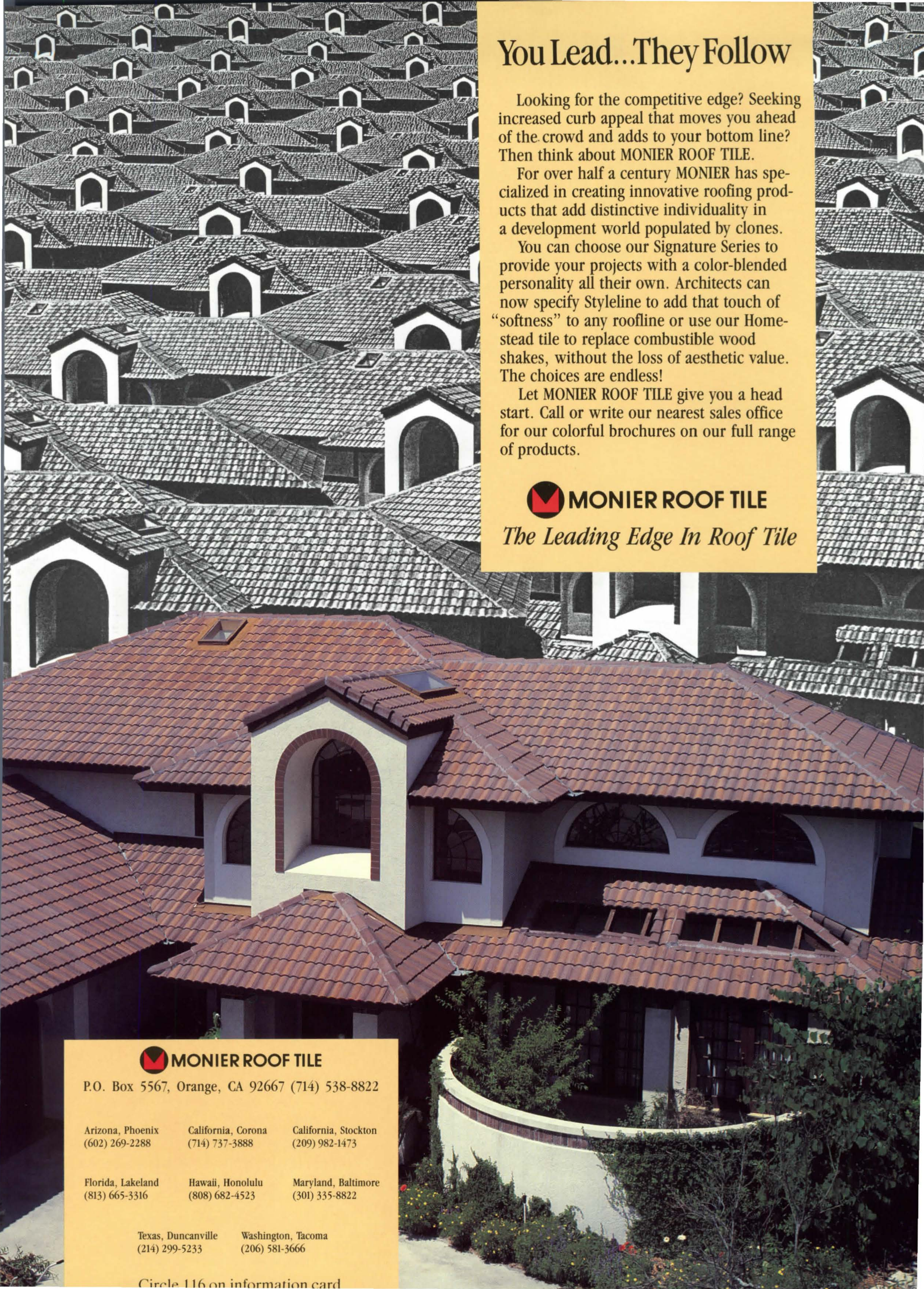

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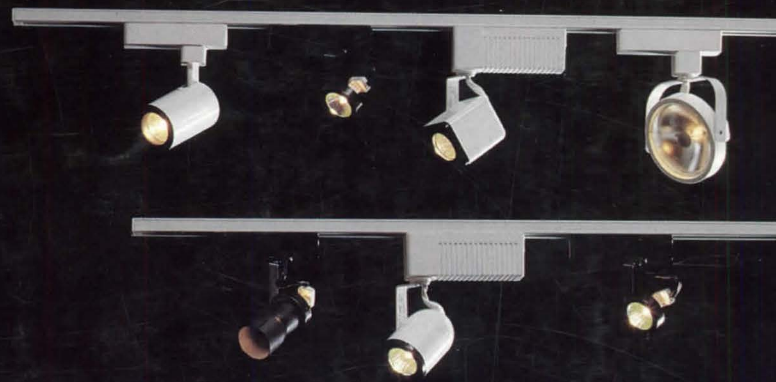

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