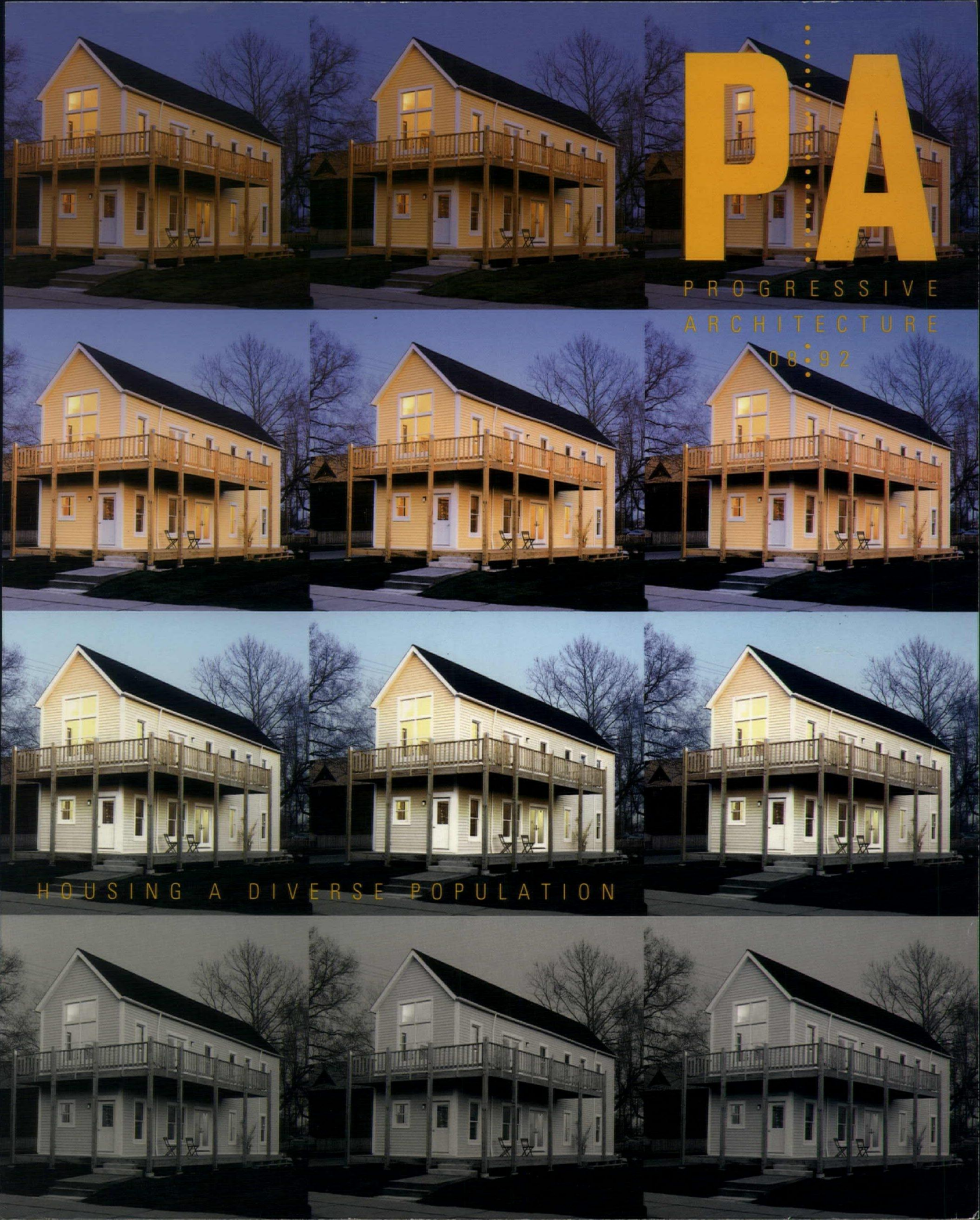

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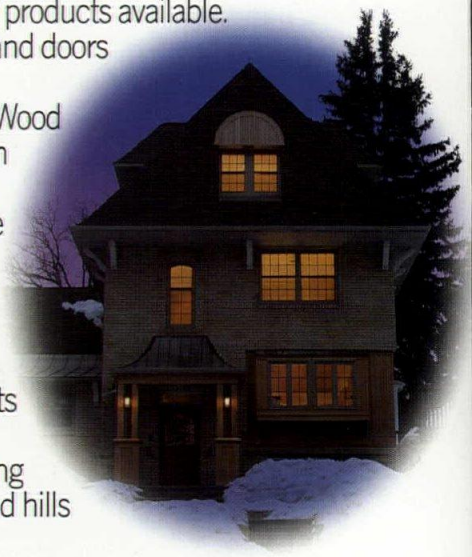

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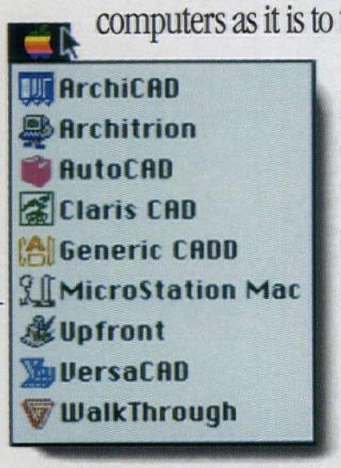

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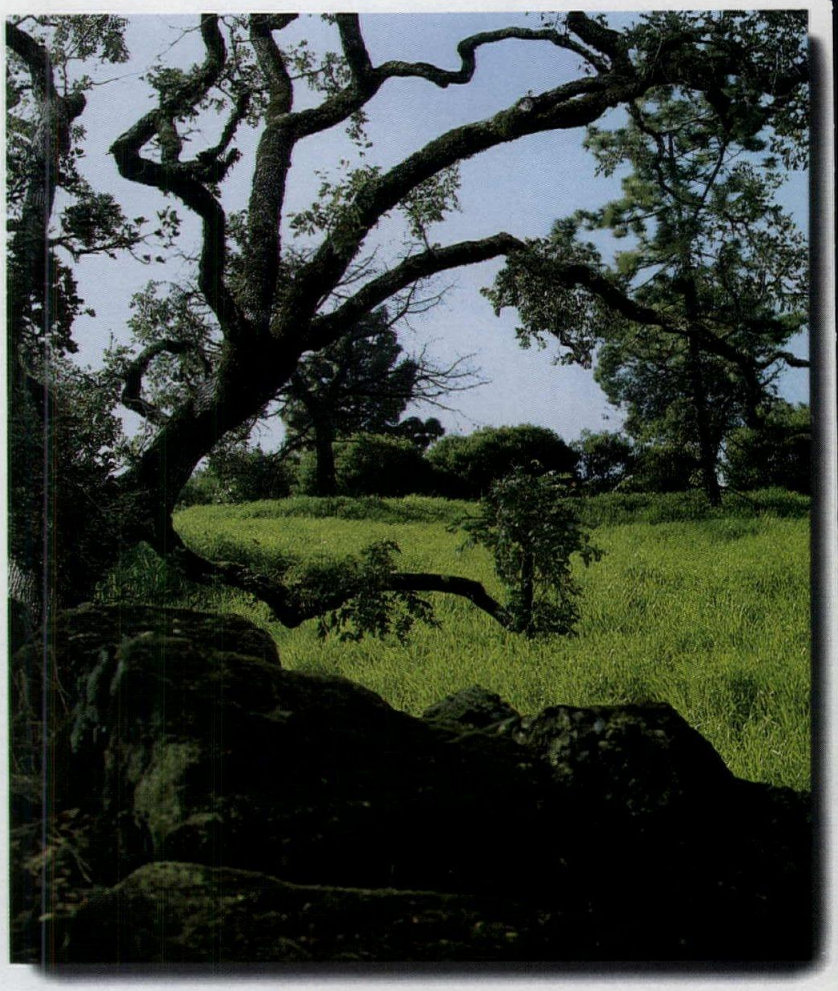

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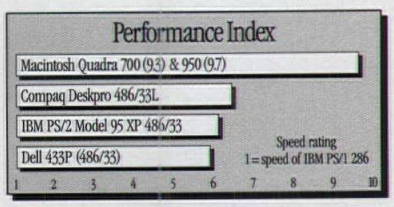

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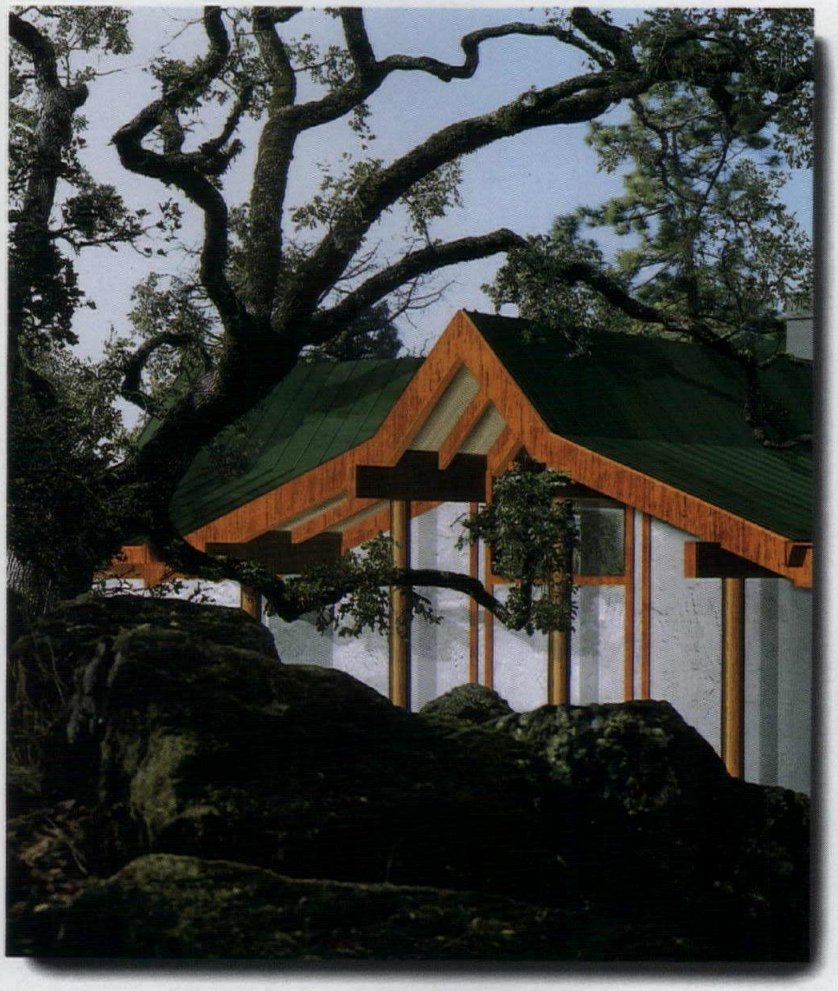

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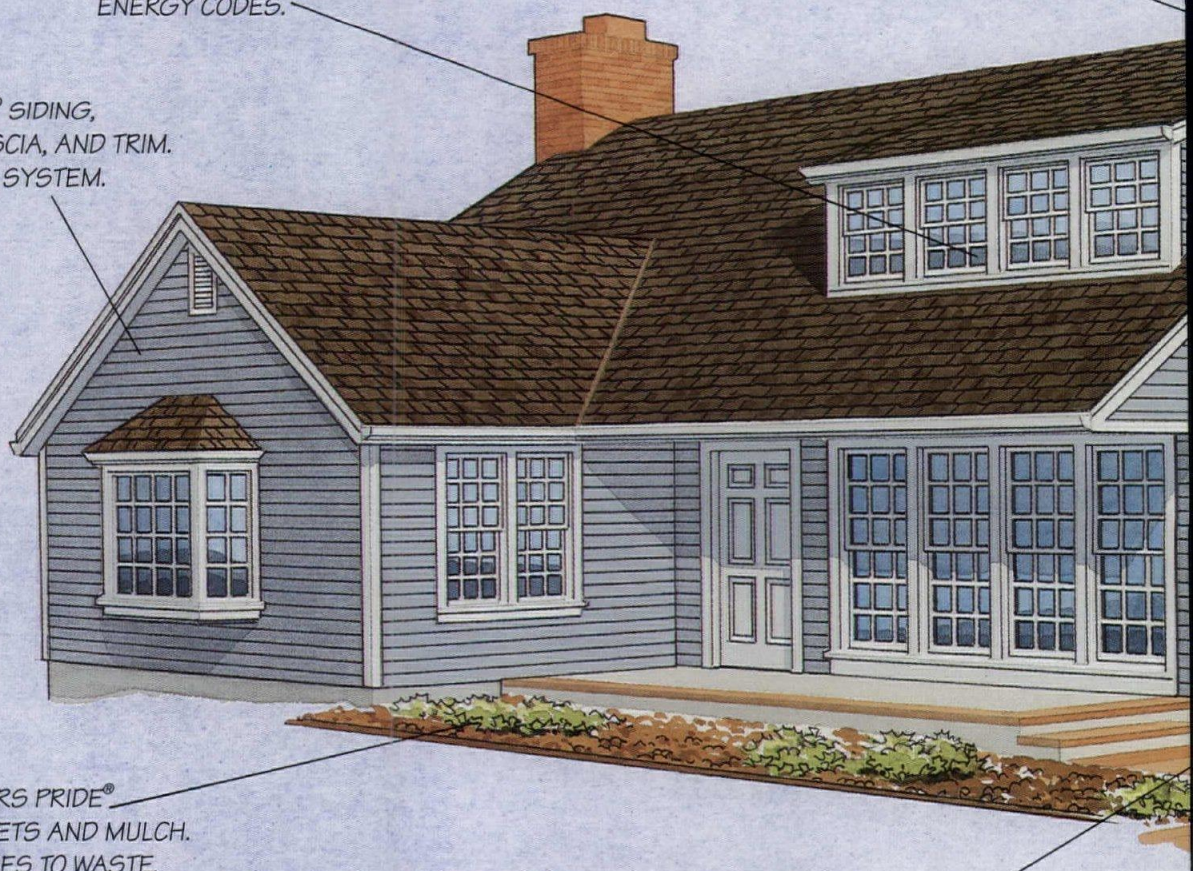

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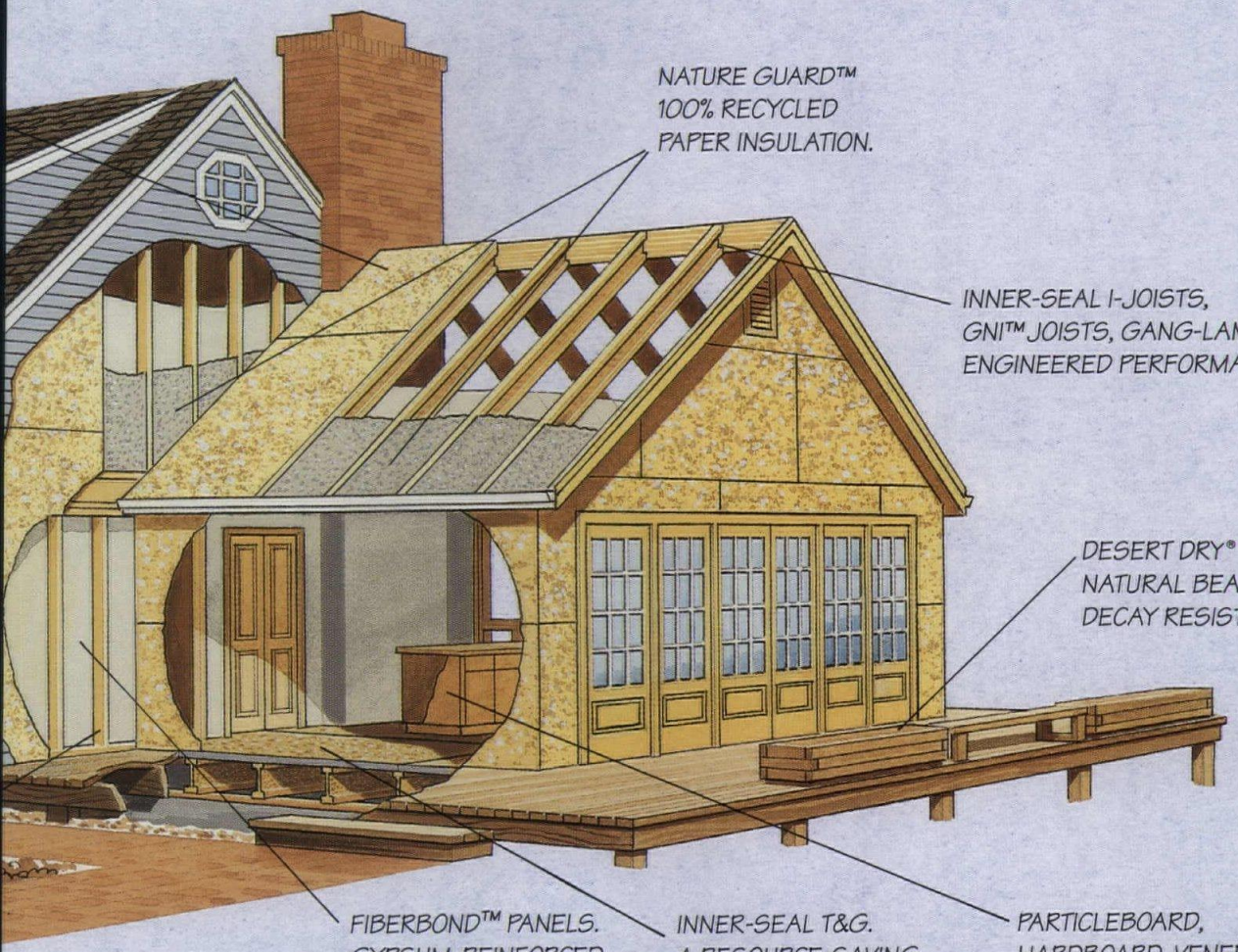

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Editorial
Marketing a Housing Dream

Anne Tate of Abacus Architects & Planners argues that the time has come for architects to challenge the assumptions behind the American dream house.

We are facing a twofold crisis of available housing in this country. First, the cost of housing has gone out of sight, rising steeply while income has been declining. The average burden of home ownership has risen from 16 percent of income in 1959 to 44 percent in 1987. Houses are getting bigger and more expensive while households get smaller and poorer.

Second, our households have changed. In the last 20 years the number of married couple households has dropped slightly while the total household count has increased 50 percent. Female-headed households and "non-family" households have doubled. Should we assume that such households are best accommodated in the typical condos and three-bedroom houses we are building? If most new households could benefit from a different house type, why hasn't the market filled that need? This is a complex question, having more to do with our images of our lifestyles than the facts of our lives.

Underlying the uniformity of market housing is an implicit critique of the real American households. The constant evocation of the "American family" by developers, advertisers, and politicians implies that anyone who doesn't live in a standard nuclear family is either disadvantaged or deviant.

Who is standing at the kitchen sink, watching the kids in the backyard all afternoon, if Mom is out earning a living? Is the dining room a comforting image of the potential of family interaction or a continual reproach to the parent who works late and feeds the kids in the kitchen? What is the meaning of the "family room" in a household of three unrelated adults, each with his or her own friends? Who gets the "Master" suite? Do these spaces embody our aspirations or reproach us for the realities of our lives?

Clearly there is both strength and beauty in the nuclear family. But these qualities exist in "non-traditional" households as well. Single people may find life more affordable, more supportive, and more interesting in shared households. Working parents can benefit from sharing responsibilities with other adults, and children gain a broader view of the world with exposure to different lifestyles. And single women raising children can share expenses and responsibilities when they share a house.

The current interpretation of the American dream focuses heavily on the self-reliant individual and by extension, the autonomous nuclear family. But, there is an alternative tradition in this country, which is about interdependence, extended families, and strong communities. We need to support these social structures in order to increase people's ability to take care of themselves, not necessarily by themselves. The fact is that these alternatives don't facilitate the sale of cars and washing machines, so they are not propagated by our national mythmakers, the advertising world.

It is possible to design housing that describes the strengths of other styles of life without mandating any set of relationships or behavior patterns. We can make simple, economical houses that provide well-proportioned rooms with good light and ventilation for people to live in as they determine. Within the house, economy can be achieved by efficiency and flexibility, with multiple "living" rooms, spacious kitchens, convenient compartmentalized bathrooms, and separate rooms arranged to be used as bedrooms or studies.

These considerations will work no magic. The fundamental facts of affordability are beyond the scope of building design. As architects, we can marginally reduce the cost of construction. As planners we have strategies to mitigate expensive automobile-dependence, the speculative value of land, the wasteful requirements of most zoning regulations, and the sterile, neglected quality of our public places. Effecting these changes requires community will, a reconceptualizing of our lifestyles, and political commitment.

As designers, we can limit ourselves to responding to the market, which will ask us to design status symbols. Or, we can take the initiative to counter the tyranny of a single normative vision of the "American Family" and the "American Dream House" by creating and promoting designs that acknowledge and enhance the actual circumstances of everyday life, houses that are intended to work and not just to be sold. Working families, single parents, the elderly, children, and single people are often ill-served by the prototypical single family house on a large lot, even if they can afford it, which increasingly they cannot. By ignoring their real lifestyles and needs, we convey the message that they do not count. Yet these "new" households are the majority. In fact, they are us. **Anne Tate** ■

The author is a partner in the Boston firm of Abacus Architects & Planners, which designed the P/A demonstration affordable house covered on page 44.

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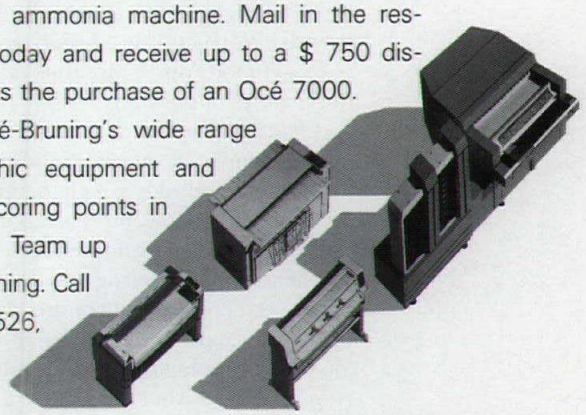

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Public Needs: Opposing View

There is more than a little accuracy to the often heard observation that there are more socialists left on the faculties of American universities than in all the previously socialist paradises of Eastern Europe and the former Soviet Union. For surely only too much chablis and brie with the economics department could explain Dean Steward's advocacy of programs which would primarily benefit the collusion of big government and big business (i.e., socialism), for after all, he is president of an association whose members overwhelmingly work in small business.

With all due respect, W. Cecil Steward, FAIA's, advocacy of more government as a solution to our problems (Editorial, P/A, April 1992, p. 7), a notion now thoroughly repudiated by the empirical reality of history, is surely a case of a good man having fallen in with bad company. Undoubtedly the common sense side of Dean Steward knows that bleeding more money from the overtaxed private sector into the inefficient, corrupt, and politically-favored, group-quota-ridden government sector couldn't possibly produce prosperity. And if Dean Steward has been so long in academia that the ivy has entangled his thinking, then just ask one of us little guys still slaving away out here to pay his salary. Or better yet, perhaps he should spend his next paid sabbatical in Havana to get a first-hand look at big government at work.

Thomas Jefferson never attained the exalted title of FAIA; however, we do find that his work routinely appears on the "10 Best of American Architecture" lists compiled from surveys of practicing architects. So in deference to this man who understood something about architecture and government, let us heed Mr. Jefferson's warning that "when we look to Washington for when to plant and when to sow, we shall soon want for bread."

Milton W. Grenfell, AIA
Charlotte, North Carolina

[While we should all heed the wisdom of Jefferson's warning, we do not see the specter of unreasonable economic control in Cecil Steward's message. It does not advocate "more government," much less socialism. And the idea that "the collusion of big government and big business" equals socialism would surely surprise the current leaders in Washington as much as those in Havana. –Editor]

The Unbeaten Organic Path

Contemporary Organic Architecture is a complex and difficult topic, and I was impressed with how well your correspondents handled it in the June issue (pages 68–91).

The remarkably comprehensive overview – "A Breed Apart" by Mark Alden Branch – was quite well balanced, and I appreciated being quoted so accurately. But there were some important omissions:

1) There are a lot of younger practitioners of organic, visionary, and futurist architecture such as Eugene Tsui, Bob Oshatz, Arthur Dyson, Glen Small, and many others who were not mentioned. I know you did the best you could with the space available, but there is a lot of spectacular innovative work out there which is off the beaten path and is just not getting published. I hope you'll be able to give such work more attention in the future.

(continued on page 106)

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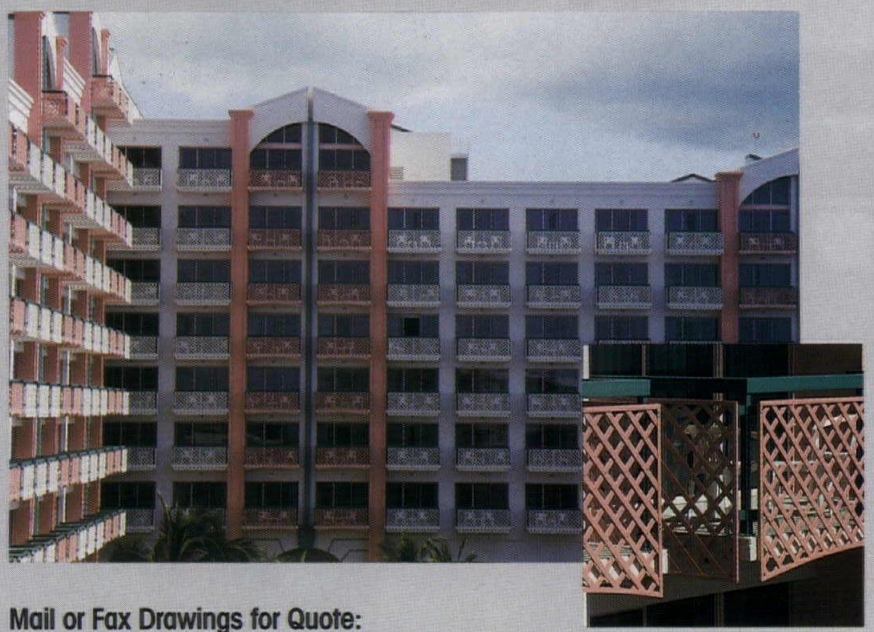

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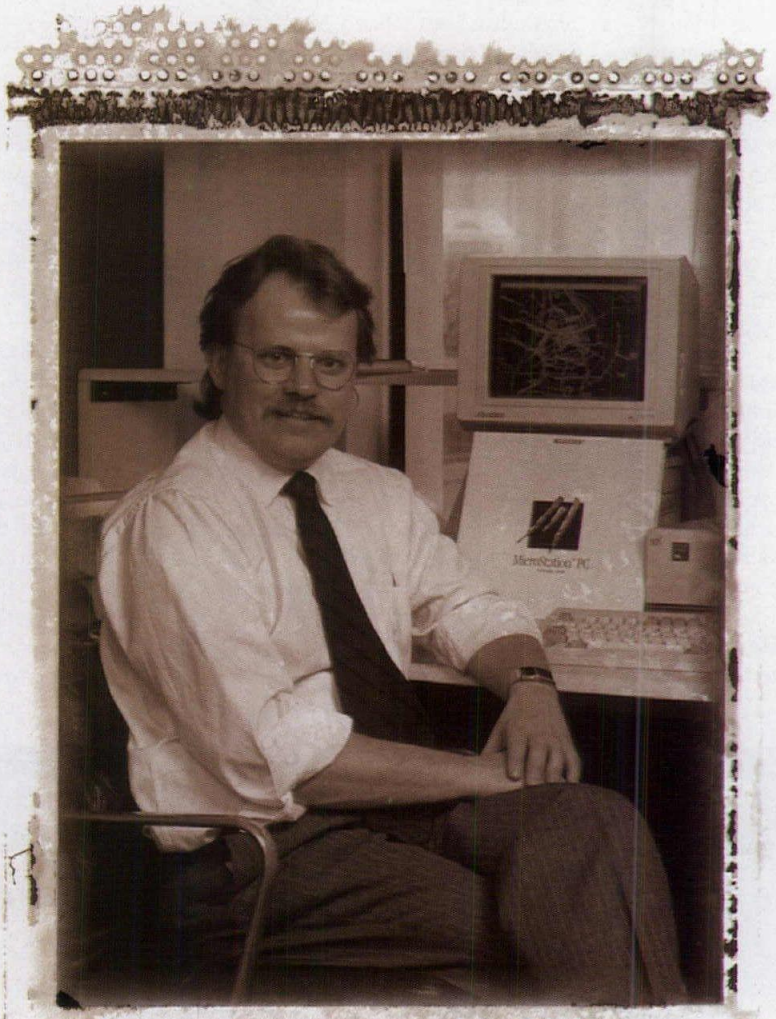

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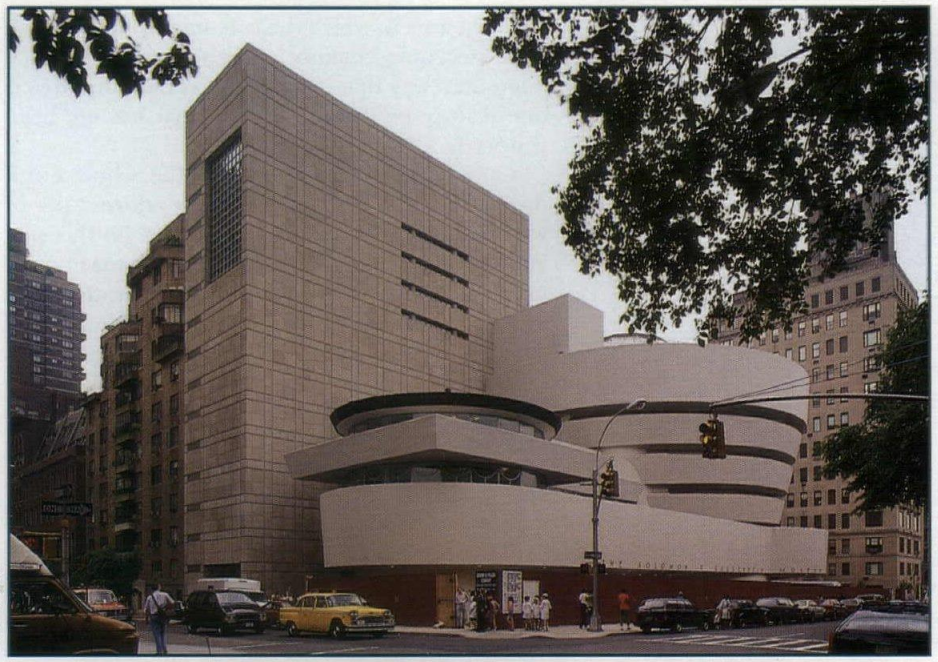

Jeff Goldberg/Esto

Newly reopened Guggenheim, with Gwathmey Siegel's addition at left.

Guggenheim Reopens, Expanded and Renovated

The latest big milepost in the museum-addition derby is the opening this June of the expanded Guggenheim Museum in New York. Interestingly, this extension-renovation of a Frank Lloyd Wright masterwork – which aroused ire when first proposed in 1985 (P/A, Dec. 1985, p. 25) – has been received with largely uncritical applause. Indeed, because the Gwathmey Siegel scheme had been so curtailed in response to early objections, little remains to cause offense, but the result nevertheless reveals ironies that are worth considering.

The most prominent and questionable element in the Guggenheim expansion is the ten-story tower, which replaces an earlier four-story annex at the northeast corner of the complex. To win city approval, this new tower was considerably reduced in size and given a courteous-to-a-fault limestone front, but it nonetheless fills space that was previously open, and it intersects the museum's great spiral form, which used to stand free. (A tower of similar form appears in Wright drawings from the 1950s, appearing to slip behind the big spiral without touching it; given the museum's property lines, Wright too would have been unable to convert this fond image into reality.) For a volume of its size, shape, and position, the tower does minimum visual damage.

What the new tower provides, mainly, is a stack of four galleries, some rising two stories and all of them higher than the confined display spaces along Wright's art-unfriendly spiral. Above these galleries are two floors of offices and a mechanical floor; below them is a truck dock. To compensate for the shrinkage imposed on the new tower, the architects also added 10,000 square feet of auxiliary space beneath the broad sidewalk.

Linked to some of the tower's gallery floors by ramps and passages are the three upper floors of Wright's original "monitor" wing. For the first time ever, its central light well and its extensive glazing can be enjoyed by the public. One windowless floor of the wing had contained a gallery for decades, but the airy upper floors had been carved up for offices; now the glass-enclosed portions are occupied by sculpture, the portions more sheltered from sunlight by paintings. Just behind the peak of the "monitor's" roof is a 900-square-foot sculpture terrace, accessible from one of the tower galleries, which offers a view of Central Park.

En route through these various galleries, one has ample opportunity to compare Wright's quirky, sometimes offhand detailing with Gwathmey Siegel's serviceable but slightly clunky counterparts. While Wright made almost all of his surfaces of the same virtually textureless concrete-or-is-it-plaster, with minimal use of steel around his glass, the tower galleries display a veritable catalog of gray-coated aluminum mullions, brass handrails on white-painted pipe supports, perforated stainless steel balustrades, etc.

The larger problem with these galleries – a problem dogging other museums that have grown piecemeal – is their incoherent sequence for the visitor. The original spiral had a clear path from the highest elevator stop to the rotunda floor; except for a couple of auxiliary galleries, it was all visible at once. But the tower and "monitor" galleries cannot easily be traversed except by returning repeatedly – in some cases through rather mean passages – to the main spiral. What with discontinuous or even sloping floors, plans are of little help in establishing one's position.

The major virtue of the whole effort is that we get to see some features of the original Wright design restored (P/A, April 1989, p. 82). Besides the newly accessible monitor wing, the project has also revealed the band of skylights that Wright designed to follow the spiral all the way up. (They had been covered soon after construction to keep

British architect James Stirling, whose recent death came "at the height of his powers with much still to do," is remembered. See page 16.

Columbus's Saved Harbor: Renzo Piano's epic work in the historic port of Genoa offers strategies for urban reclamation. See Perspectives, page 78.

Pencil Points

Two directories of African-American architects have been announced. The University of Cincinnati's Center for the Study of the Practice of Architecture has published a directory of registered architects; contact: School of Architecture, ML 16, University of Cincinnati, Cincinnati, OH 45221 (513) 556-6426; cost: $6. Black Women in Architecture (P/A, Apr. 1992, p. 27) is compiling a directory of black women in architecture and related fields. For inclusion or information, contact: BWA, c/o Pamela Fountain, 8395 Morven Rd., Baltimore, MD 21234 (410) 528-8600 (include a self-addressed stamped envelope).

Norman Foster & Partners has been selected for the $16-million redevelopment of the Joslyn Art Museum in Omaha, Nebraska. Finalists in the invited competition included James Ingo Freed of Pei Cobb Freed & Partners, New York; Renzo Piano of Renzo Piano Building Workshop, Genoa, Italy; Christian de Portzamparc, Paris; and Antoine Predock, Albuquerque, New Mexico.

The Loading Dock is a nonprofit building supply recycler established to collect donations of reusable construction materials and equipment and to distribute the supplies to low-income housing projects. For more information, contact: Loading Dock, Inc., 2523 Gwynns Falls Parkway, Baltimore, MD 21216 (301) 728-DOCK.

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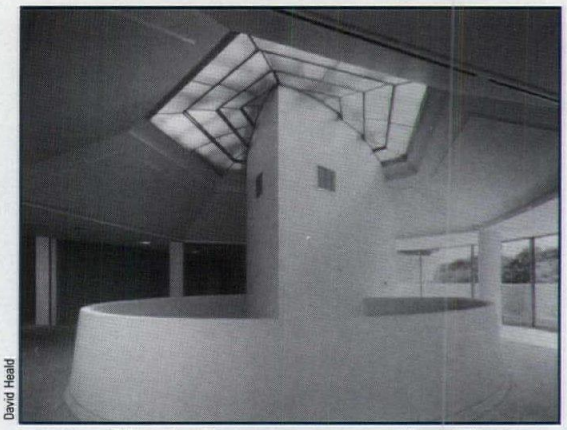


David Heald

Interior of "monitor" wing, now open to the public.

out unwanted daylight.) The high-performance glass that has now been installed has made fidelity to Wright's intentions more practicable. The decision to reinstall the museum's café in the first-floor space Wright originally designed for it is an ironic restoration, since the space turns out to be oddly proportioned and meanly lighted. The more pleasant area to which the café had been displaced is now occupied mainly by the museum shop; the open driveway that originally occupied this area is one feature of Wright's design that has not been restored.

One of the major ironies of the whole event involves the question – never fully addressed – of why the Guggenheim had to expand on this site. When the museum unveiled its first tower proposal in 1985, critics urged decentralization as a way to leave the landmark untouched. Now, along with its expanded main facility, the Guggenheim is inaugurating an exhibition space in the SoHo district (a loft conversion by architect Arata Isozaki), plus an administrative-technical-storage facility on Manhattan's West Side (Thomas W. Hut, architect). And it has also unveiled designs for new branches in Bilbao, Spain (by Frank O. Gehry) and Salzburg, Austria (Hans Hollein). The Guggenheim expansion and its new outposts are potentially major cultural assets, but the need to compromise Wright's brilliant building is by no means proven. **John Morris Dixon** ■

Neocon 92: Place for Homework

The annual contract furniture fair held in June at the Merchandise Mart in Chicago was characterized this year by more questions than certainties. Judging by the showrooms of large companies such as Steelcase, Knoll, and Herman Miller, manufacturers are trying to come to grips with an emerging high-technology workplace, geared to white-collar workers operating in an increasingly horizontal, team-oriented structure.

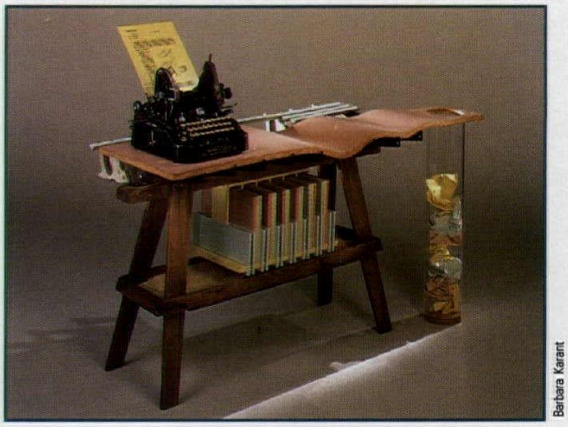
Steelcase, for instance, should be commended for a courageous "first": the presentation of hitherto unseen prototypes of adjustable cell-like offices, tailored to the knowledge worker's requirement for interchangeable private and collaborative work spaces. In preparation for seeing these "products" (which may never be made) viewers were treated to a rather mind-boggling rapid-fire slide show on the vast changes sweeping the globe; a seven-minute video on the "knowledge worker"; and a slew of wall-mounted research papers. Feedback was encouraged via computerized surveys.

At the other end of the information spectrum was a show entitled "Found Futures," mounted outside the Mart by Formica Corporation, in which eight Chicago architects were invited to "transform" or recycle extant objects using laminates. Most engaging were an elegant jalousie-like vertical screen of aircraft cable, wood, leather, and laminate-backing paper by Daniel Wheeler; a clever coat of many colors by Douglas Garofalo, made of sample chips affixed to a blazer; and the "Desk for a Bureaucrat" by Ralph Johnson, assembled from an old sawhorse, an antique typewriter, and a wavy laminate top.

In the middle ground between art and science were a handful of fine product launches: Unifor's trapezoidal ganging tables by Luciano Pagani and Angelo Perversi and a folding table by Luca Meda were ingeniously conceived and detailed.

Stow Davis weighed in with "Nines," a refined wood casegoods line named after its nine-square motif, designed by Don Brinkmann of Gensler & Associates/Architects.

The rewards of research and collaboration were evident also in "Evo," an ergonomic chair designed by Don Chadwick for American Seating.



Barbara Karant

Ralph Johnson's "Desk for a Bureaucrat" for Formica.

Using "Zytel" nylon, a new flexible resin from Du Pont, the chair is cast of a highly resilient "unibody" frame joining back, spine, seat, and knee tilt; its cantilever spring of composite polymers offers an impressive dynamic range, freed of cumbersome engineering.

On the whole, it was not surprising that alongside the serious efforts of some firms, other manufacturers had simply jumped on the research bandwagon, sloganizing the bywords. Given the prodigious information to be assimilated, one hopes that designers will not just bypass what is momentarily less accessible and resort to voting with their eyes. **Ziva Freiman** ■

Design Retrospective at the Pompidou Center

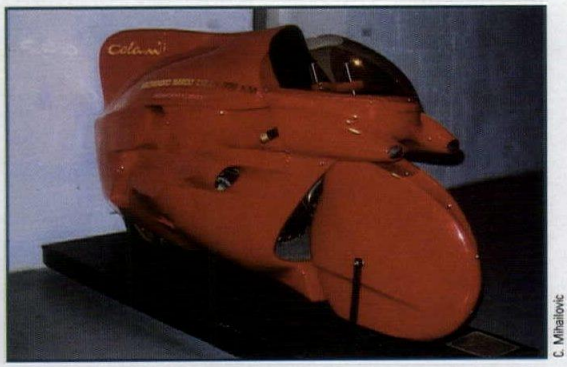
The entire Pompidou Center in Paris now houses an international design retrospective of the last 30 years. Every phase of design is represented, from the museum's collection of 33,000 items: graphics and drawings, architecture, plastic arts, video, film, photography, and industrial design. The entire exhibition, called "Manifeste: 1960–1990," will remain on view until September 28th; some parts may be seen until November 9th.

The architecture section presents only 12 architects (the one American being Frank Gehry), because the museum's acquisition of architectural documents started only eight months ago. But the more than 200 drawings and 50 models range from Archigram to Aldo Rossi. The United States is best represented in a separate section devoted to work commissioned by the IBM Corporation (first seen at Washington, D.C.'s National Building Museum – see P/A, May 1990, p. 26).

Looking over the show as a whole, the industrial design sections (300 pieces) are the most compelling, reminding us by analogy that the great eras of architecture came when architects were striving to extend technical constraints. The most exciting artifacts, small or large, arise from the mastery of new functional demands. The star of the show is Luigi Colani's bright red aerodynamic sculptured motorcycle of 1986, which won the world speed record of 210 miles per hour. Here is the stunning union of function and form; the human body is a sculpted void within the positive volume of the machine.

The curve of development of industrial design runs from prettied-up objects whose functional outlines are smoothed into visual coherence, like the classic 1960s wasp-waisted Moulinex coffee grinder, on to the apex: a complete synthesis of use and visual form. Ettore Sottsass's Olivetti typewriters, Dieter Rams's domestic appliances for Braun, or Roger Tallon's high-speed trains epitomize this high classic period.

Mannerism and finally degeneracy and kitsch set in when design has contempt for function, as in metal sculptures that happen to be radios or tea kettles or lamps (by Philippe Starck, among others) and chairs too numerous to mention that could more accurately be called torture seats. This end of the design spectrum becomes barely usable: coy sculpture. Such objects, whether office buildings or electric razors, are those whose technical or conceptual limits no longer strain the designer's imagination. **Barbara Shortt** ■



C. Mihailović

Form and function: record-breaking mortorcycle in Pompidou show.

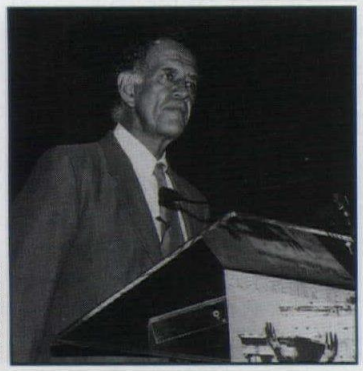
The author is a New York architect who writes frequently on French architecture.

AIA Convenes in Beantown

Nearly 9000 people attended the 124th annual AIA Convention, held June 19–22 in Boston.

Architect Ricardo Legorreta, tapped as one of four speakers on the convention's theme ("Engaging Society in Vital Ways"), was the highlight of the weekend, giving a quiet, poetic talk that challenged architects to abandon the "star system," emphasize teamwork over genius, and make fine design available to all classes: "We have the money and the talent," he said, "but not the will."

In official business, delegates approved a bylaws change to make continuing education a requirement for AIA membership; the requirement will take effect in January, 1996. A perennial proposal to allow voting for national officers by mail was defeated, as was a proposal to eliminate the AIA Political Action Committee. L. William Chapin II, Rochester, New York, was elected first vice-president/president-elect for 1993. Elected as vice-presidents were Francis A. Guffey II, Charleston, West Virginia; Cynthia Weese, Chicago; and Chester A. Widom, Santa Monica, California. Betsey Olenick Dougherty, Newport Beach, California, was elected to a two-year term as secretary.



Oscar & Associates

Ricardo Legorreta addresses the AIA Convention.

One of the livelier, if smaller, seminars discussed discrimination and harassment in the workplace on all bases, from race to sexual orientation. Panelists Stephen Glassman, Roberta Washington, and Jack Travis were alternately sanguine and adamant about the eight-point exhortation the AIA Task Force on Diversity had recently written – a call for stronger affirmative action to diversify the ranks of architects. But the panelists seemed to be speaking to an audience (not more than 60) of the already converted.

There was a special satisfaction this year in

(continued on next page)

Washington Report

The two most recent "wake-up calls" from America's cities – serious flooding in central Chicago and rioting in Los Angeles – have at least caused some national leaders to begin reexamining the country's deeply rooted anti-urban biases. The events gave dramatic evidence of the extent to which our physical and social urban structures have deteriorated.

For two decades before these disasters, says one observer, "the cities had left us alone, and so we returned the favor; policy makers felt [cities] could be ignored with impunity."

No longer. Urban America is back on the political agenda, compelling the Presidential candidates, two of whom had remained largely silent on urban policies, to demonstrate their ideas and plans for the cities.

According to census figures, Federal spending on city dwellers (for housing assistance, health- care, job training, childcare, and other social programs) fell by almost 60 percent during the 1980s. Signs suggest that these trends may slowly be reversed, through both heightened political discourse and new or redirected programs.

The White House is placing most of its faith in bigger and better Federally-backed urban enterprise zones, which rely on regulatory relief and tax breaks to draw private business into poor areas. This approach appears to ignore evidence that tax incentives alone will not overcome investors' fears of drug- and crime-infested urban areas. And even when new businesses have located in such zones, most of their skilled employees come from outside.

Responding to criticisms, the current administration developed "Operation Weed and Seed," a combination of intensive police action and strategic job training, drug rehabilitation counseling, and childcare programs. Housing secretary Jack Kemp, placed anew in the limelight, also stressed programs designed to encourage public housing tenants to buy their units. But many regarded the administration's programs as flawed and too little too late.

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Washington Report

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Although Congress and the White House reached a compromise earlier this summer on a long-term urban aid package that had been backed by Democrats (it would spend $2.5 billion over a five-year period), few were enthusiastic about the outcome of the long and difficult wrangling. "It's just a step in the right direction," is all the House Majority Leader could say.

There are bolder visions. In June of this year the AIA issued "An Urban Agenda," calling for public works and direct public investment programs aimed at distressed inner cities. "We must overcome the paralyzing misconception that we do not know what to do," the AIA said.

The AIA is urging creation of "community improvement programs," using an integrated array of tax incentives and direct investments targeted at specific neighborhoods with a high degree of local participation. Their program is mostly "seed," with provisions that promise richer soil and more nourishment.

The AIA's urban agenda also calls for creation of a "civilian conservation and construction corps," to "house and train young people in a disciplined environment."

After training in a place that sounds a lot like boot camp, the conscripts or volunteers (it's not clear which) would construct and maintain urban parks and forests, renovate housing, and rebuild or maintain infrastructure.

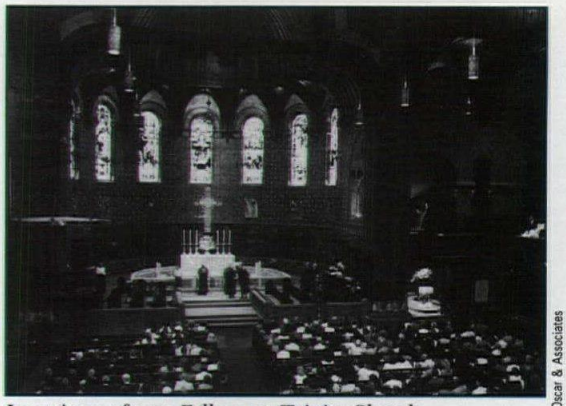
While these ideas had not been fully developed or described by the AIA – or publicly seized upon by politicians in midsummer – the AIA staff expressed strong optimism. Said a senior lobbyist: "For the first time in many years, Congress is listening hard on urban policy."

Discussing the sense of urgency, the breadth, and the seriousness of the challenges facing urban America, and underscoring the need for new thinking and action, Senator Daniel Patrick Moynihan (D-N.Y.) said recently in an interview: "We just don't have any models for this. This has never happened to a society before."

Thomas Vonier ■

meeting in an architecturally distinguished building, Kallmann McKinnell & Wood's Hynes Convention Center (P/A, May 1989, p. 65). The center's top-floor ballroom made a particularly generous, restrained setting for the general sessions. Outside the Center, there was the architectural pleasure of the Fellows' investiture ceremony in H.H. Richardson's Trinity Church. And one of the convention's evenings offered an unstructured ramble through the Faneuil Hall Marketplace, brainchild of Benjamin Thompson, this year's Gold Medal winner (P/A, Jan. 1992, p. 21). ■

(Reported by John Morris Dixon, Jim Murphy, Philip Arcidi, Thomas Vonier.)



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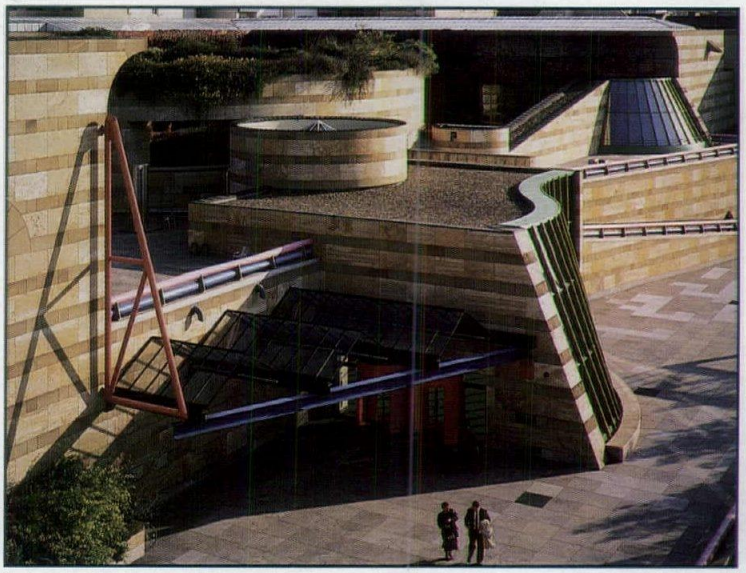
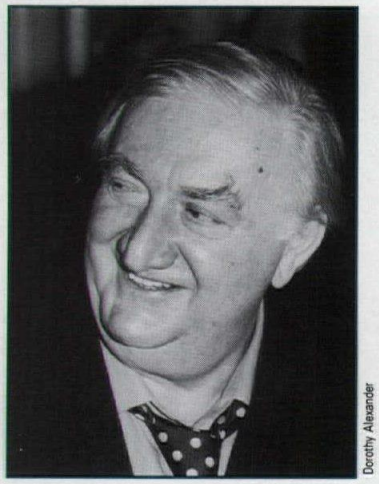
Investiture of new Fellows at Trinity Church.

The late James Stirling (below) and his Staatsgallerie in Stuttgart (left).



Richard Bryant



Dorothy Alexander

James Stirling 1926–1992

James Stirling was one of the "chosen few." Not since Lutyens had Britain produced an architect who could take a place amongst the greatest architects of the century. His recent death in London on June 25 was shocking; that it was premature was doubly shocking. By way of comparison, had Le Corbusier reached only the age of 66 his *oeuvres* would have been dramatically *incomplètes*. Stirling was at the height of his powers with much still to do. It is ironic that he should have been knighted for his "services to architecture" only 12 days before his death. His steady and comprehensive collection of the world's highest honors in architecture was lost on his own countrymen. North Americans, Japanese, and Europeans over the last decade would frequently address their correspondence to "Sir James," confident in the misguided belief that someone as important as Jim would also be recognized in his own country.

Stirling was affectionately known as "big Jim" throughout the architectural world. He was a flagship for a particular generation that wished to see that there was no contradiction between an enthusiasm for the past and the Modern project, and that the plan of rooms was not incompatible with the free plan. This meant that he had to be vigilant and to defend himself on two fronts. This he did with his drawings, which were sharp, clear, unshaded, uncolored, and above all unsentimental. His axonometrics have taken on the celebrity of a Choisy or a Letarouilly. They became his handwriting and were inseparable from an understanding of his built work. With extraordinary editorial power, they revealed the architectural promenade and the essential sequence of volumes.

Unlike the English affection for a soft and subtle watercolor palette, Jim's color preferences were more extreme and for some even violent. His use of acid green and purple was never conciliatory but was rather an imprint of the present, a personal signature on a more lasting fabric.

Jim loved America. He attributed this affection to the fact that he was conceived on the East River during his mother's only visit to America aboard his father's ship. Like many of his contemporaries it was in America that he was celebrated. Colin Rowe, his friend and mentor at Liverpool, departed for America in 1962, followed by other colleagues. It could be said that England's architectural conscience got up and left during this decade, with institutions like Princeton taking on the mantle of an English school in exile. Jim was a

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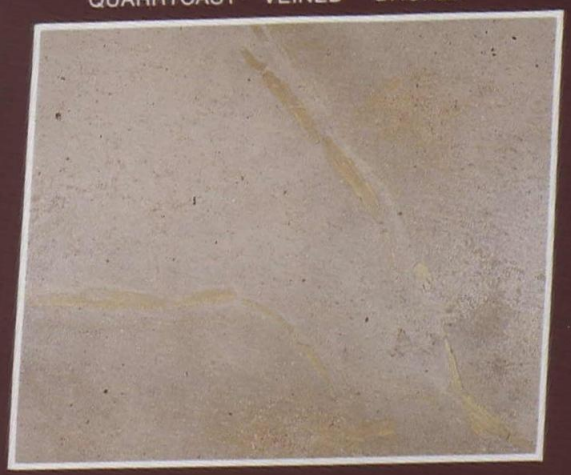

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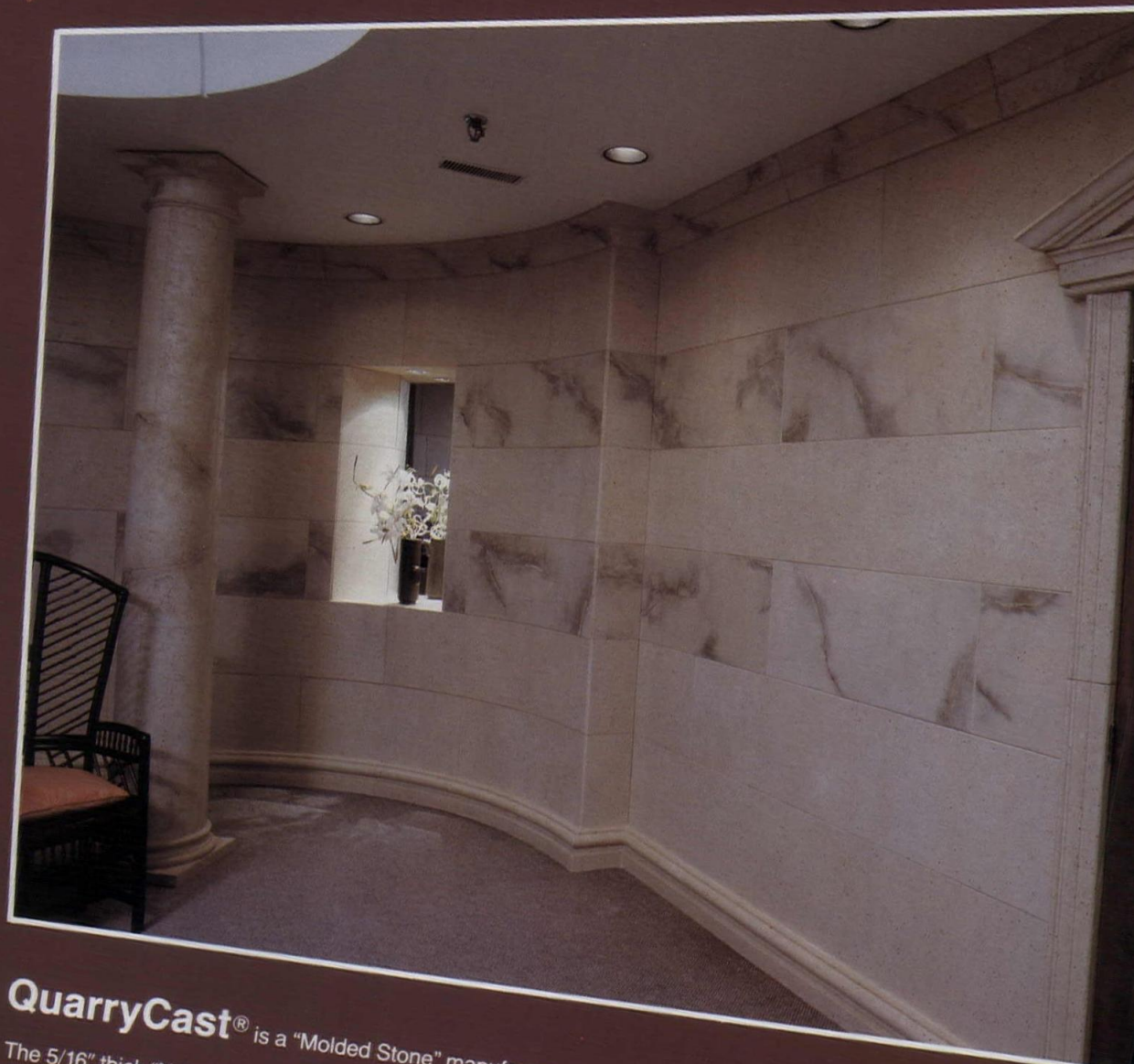

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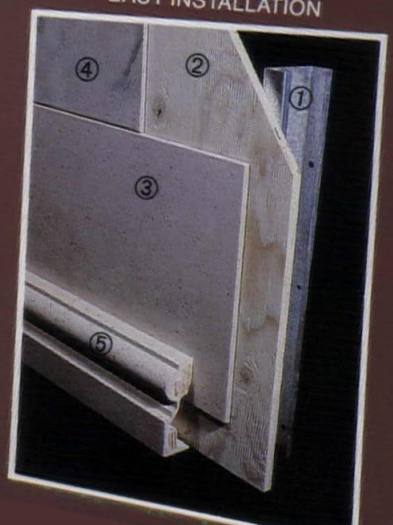

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Stirling *(continued from page 16)*

visiting professor at Yale from 1960 and Charles Davenport Professor from 1967–1984.

The impressive thing about Stirling was that he was always renewing his work. Just at the moment one might have thought that he was beginning to repeat himself, he would change direction and surprise everyone: from the early reworking of Le Corbusier's Maison Jaoul at Ham Common (1955–1958) to the formal set piece of the Churchill College entry of 1958; from the magnificent Leicester University engineering building (1959–1963, with James Gowan) and its progeny, the Cambridge Library (1964–1967) and the Florey building at Oxford, to the preoccupation with industrial production as at the student dormitories at St. Andrews and the ill-fated housing at Runcorn. Here was an architecture that gave a place to the anger and frustration felt by a generation of architects brought up on the disingenuous diet of the Festival of Britain era.

By the beginning of the 1970s it was clear that another shift was occurring in the work. The Derby Town Centre competition of 1970 was a pivotal project in which the hand of Leon Krier is evident. In 1975 the two competition entries for the museums in Dusseldorf and Cologne of 1975 were epoch-making. Here we have an extraordinary confluence of figural space, Platonic solids, and Cubist overlay and transparency. A new agenda had been set with the magnificent Staatsgallerie in Stuttgart (P/A, Oct. 1984, p. 67) as its demonstration. It should also be noted that since 1960 Michael Wilford has been a constant and evolving presence; his influence has been and continues to be fundamental to the success and reputation of their remarkable practice.

By the end of the 1980s, the work had taken a more abstract direction, as demonstrated in competition entries for the Los Angeles Philharmonic Hall (1988), the Tokyo Forum (1989), and the Bibliothèque de France (P/A, Dec. 1990, p. 96). In these later works we glimpse the project reinvigorated and returning less ambiguously to the cause of Modern architecture.

If one holds a recent and lasting mental image of Jim, it might be of his obvious pleasure in the tumultuous reception he received – dressed in a green sunhat and green shirt mimicking the copper roof of his own building – at the official opening of his delightful bookstore for Electa at the 1991 Venice Biennale (P/A, Nov. 1991, p. 25).

Stirling is survived by his wife, furniture designer Mary Shand, and three children. He was cremated on June 30 following a funeral in St. Mary Woolnoth Church in London. Appropriately, this simple and private occasion was attended by his family and close friends, accompanied by Mozart's *Requiem* and the architecture of Nicholas Hawksmoor. **Edward Jones** ■

The author, an architect in London, wrote A Guide to the Architecture of London.

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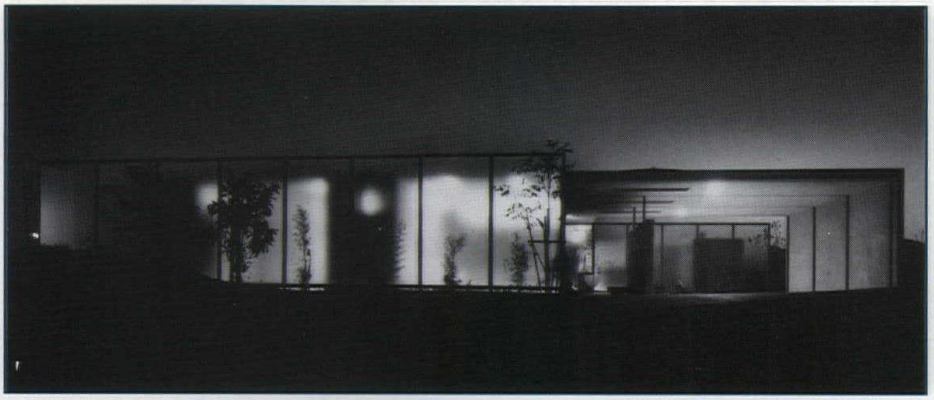
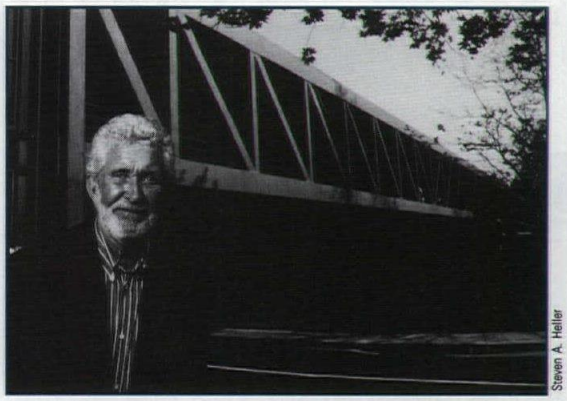
ENERGY EFFICIENT, HISTORICALLY CORRECT PELLA WINDOW, 1992.



Marvin Rand



Steven A. Heller

Craig Ellwood's Case Study House #16 (left) and the architect himself at his Art Center College of Design.

Craig Ellwood, 1922-1992

Craig Ellwood, one of Southern California's second-generation Modernists, died May 30 in Pérgine Valdarno, Italy. Known for the elegance of his Mies-inspired steel detailing, Ellwood designed many houses and small commercial buildings in the Los Angeles area. A Texas native who learned the construction trades in California, Ellwood took engineering courses, but never formally studied architecture; he was internationally recognized for design long before he finally became registered.

Early in his career, Ellwood was selected to design three of the Case Study Houses, sponsored by *Arts and Architecture* magazine. These buildings, dating from 1952, 1956, and 1957, were essays in fluid space, slipping wall planes, and refinements of steel detail. Of his numerous works from the 1960s, a house in the Bay Area was the only one outside Southern California. His major institutional commission was the Art Center College of Design in Pasadena, which won a P/A citation (P/A, Jan. 1976, p. 71) and was completed in 1977 (P/A, Aug. 1977, p. 62); the trussed central portion of this Miesian steel-framed structure spans 192 feet across a canyon.

In the late 1970s, Ellwood acquired a farm in Tuscany, where he devoted increasing time to his painting. In the mid-1980s he gave up architectural practice entirely, returning to California for occasional teaching stints at Cal Poly in Pomona.

John Morris Dixon ■

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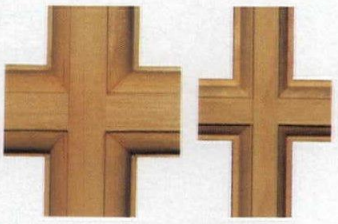

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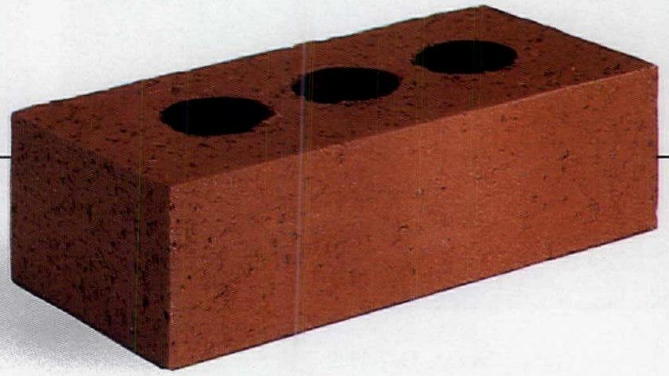

Belden Brick is made in over 116 colors that include 2 choices in black, 28 browns, 7 tans, 8 buffs, 3 creams, 18 grays, 16 pinks, 26 reds, and 8 whites.

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Belden also offers a choice of extruded brick or molded brick (with the character of hand-made brick.) Each category includes a wide range of colors and textures providing more than adequate design latitude.

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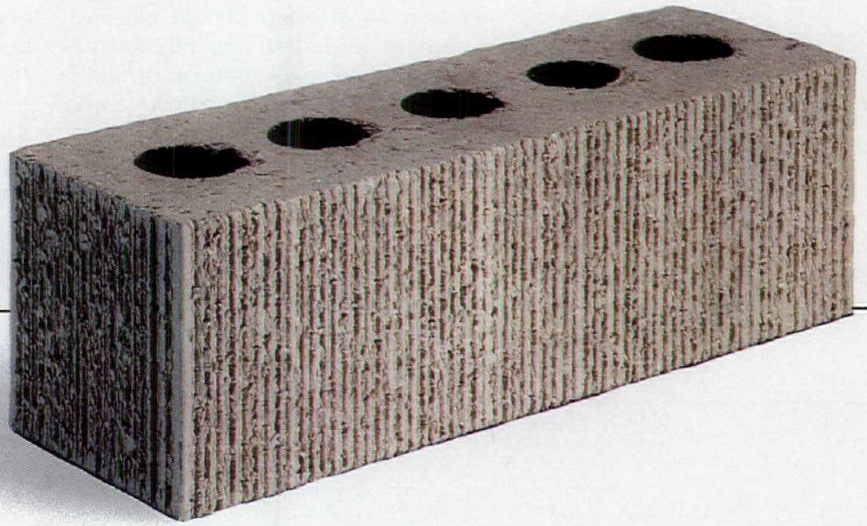
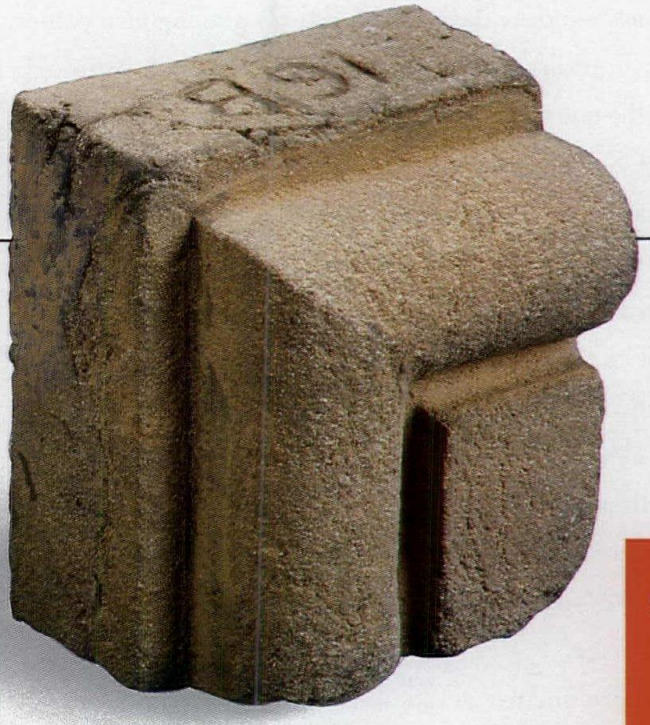


Belden Brick is predominantly made in thirteen different sizes, representing the spectrum of Belden Brick colors and textures. Your design opportunities are broadened by the availability of virtually every Belden Brick color choice as pavers.

SHAPES



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"We Do More Than We Have To"

Calendar

Exhibitions

The Chair
Through August 30

New York. "Designs for Seating," part of "The Cooper-Hewitt Collections: A Design Resource" exhibition, focuses on the process of chair design. Cooper-Hewitt.

Common Products
Through September 6

Miami. "Out of the Ordinary," the 8th Arango International Design Exhibition, includes common products designed with equal attention to form, function, and innovation. Center for the Fine Arts.

Miniature Golf
Through September 6

New York. Frank Gehry and Michael Graves are among the architects and artists invited to be course designers in "Putt-Modernism," an 18-hole tribute to the small-scale green. Artists Space.

Competitions

Black Architects, Juried Exhibition
Submission deadline August 31

Chicago. Work by black architects from Africa, Europe, and the Americas may be submitted for possible inclusion in an international traveling exhibition titled "Design Diaspora: Black Architects – An International Survey 1970-1990." Registered architects may enter architectural and design projects in several categories. Contact Christian Laine, Chicago Athenaeum (312) 829-9650 or Carolyn Armenta Davis, 235 W. Eugenie, Suite #M7, Chicago, IL 60614 (312) 266-0269 or (312) 854-5884.

P/A Awards
Entry deadline September 11

Stamford, Connecticut. The 40th annual P/A Awards (see p. 107) recognize unbuilt projects in the categories of architectural design, urban design, and architectural research. Projects must be scheduled for completion after January 1, 1993. Winning entries will be featured in P/A's January 1993 issue. Contact Awards Editor, P/A, P.O. Box 1361, 600 Summer St., Stamford, CT 06904 (203) 348-7531 or FAX (203) 348-4023.

Planning Awards
Submission deadline September 23

Washington, D.C. The American Planning Association's 1993 National Planning Awards program includes 16 categories. Contact Karen Finucan or Tuesday Georges, APA 1993 Awards Program, 1776 Massachusetts Ave., N.W., Washington, D.C. 20036 (202) 872-0611.

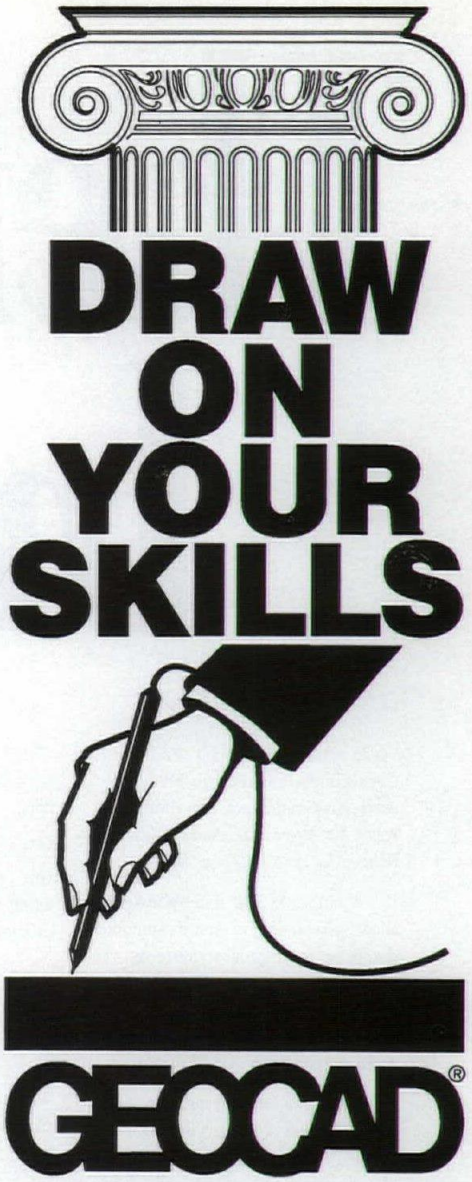
Takiron Competition
Registration deadline October 12, Submission deadline October 30

Tokyo. The fourth annual Takiron Design Competition theme is "Path of Wind, Path of Water." Entrants are asked to contemplate the current frenzied state of the world and to formulate "channels for new information," "environmental systems," and "roadways of architecture." Competition results will be published in the March 1993 issue of *The Japan Architect.* Contact Shinkenchiku-sha Co., Ltd., Takiron Design Competition, 2-31-2 Yushima, Bunkyo-ku, Tokyo, Japan 113 tel. 3-3811-7101.

Conferences

Wright Building Conservancy
September 17–20

Manchester, New Hampshire. The third annual conference of the Frank Lloyd Wright Building Conservancy is hosted by the Currier Art Gallery and the owners of Wright's Isadore J. and Lucille Zimmerman House. September 1 is the registration deadline. Contact Frank Lloyd Wright Building Conservancy, P.O. Box 5466, River Forest, IL 60305 (708) 848-1411. ■



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13. Nested entity dimensioning. Entities within blocks or external references are now easily dimensioned.

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15. PostScript output feature lets you enhance AutoCAD drawings by using PostScript-compatible imaging programs.

16. Release 12 and Release 11 drawings are forward and backward compatible.

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18. You can plot without leaving the drawing editor. (And without losing the UNDO file.)

19. Now you can import TIFF, GIF and PCX raster images into your drawing.

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26. AutoCAD's new integrated calculator performs calculations based on existing geometry and includes extensive algebraic and geometric functions.

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37. Shift and Control key combinations allow you to invoke more commands with your mouse and digitizer buttons.

38. Single mouse click-and-release action for selecting pull-down menus.

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40. Enhanced CONFIG command allows for configuring AutoCAD from the drawing editor.

41. New dialog boxes give you control of dimension variables and styles.

42. Dimension dragging feature provides visual feedback while creating dimensions.

43. RECTANGLE command now allows you to create a rectangle with just two screen picks.

44. Enhanced Write Block command helps developers maintain "smart" drawings (entity handles).

45. Enhanced command transparency lets more commands be used inside other commands.

46. Transparent "Object Filters" dialog box allows more flexible definition of selection sets.

47. ZOOM Window is now the default.

48. DXFIX utility reads R12 DXF™ files and translates them into R10 files.

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50. Now you can fill closed polylines with PostScript patterns for extremely high-quality output.

51. Network users can view and plot AutoCAD drawings without using server authorization.

52. Database-specific drivers link AutoCAD and external nongraphic databases, such as dBase,® Paradox,® Oracle® and others.

53. Create New Drawing command now allows you to start with an unnamed

New Features Release 12.

drawing or specify a prototype drawing.

54. OPEN command presents "Open File" dialog box to simplify loading of existing drawings.

55. SAVE AS command now changes the current drawing name to new name specified.

56. END and QUIT commands prompt you for a file name when exiting an unnamed drawing, to prevent you from losing data.

57. Several AutoLISP® enhancements, including much faster loading of LISP routines.

58. A wide range of new and enhanced system variables, especially created for the power user.

59. DD Modify command allows for interactive editing of entity parameters.

60. New Units Control dialog box shows all units, angles and direction values on-screen as well as precision settings.

61. New special context-sensitive help dialog boxes allow you to browse through available help files.

62. New View Control dialog box allows selecting with a pick instead of typing in view name.

63. You can plot AutoCAD drawings as bit map files in PCF, TIFF, TGA and GIF formats. You can even automatically FAX your drawings to a subcontractor or client.

64. 24-bit, true color rendering is supported by appropriate hardware.

65. PostScript files can be brought in as outlines or fully rendered images.

66. Modify Entity dialog box enables you to edit an entity's properties directly.

67. Mirrored blocks can now be exploded.

68. List and load standard AutoCAD SHX fonts as well as Adobe Type 1 PostScript fonts from dialog box.

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76–174. Unfortunately, we're out of space. But you get the idea. Release 12 is the most significant enhancement of AutoCAD ever. Its improved performance will pay off for every AutoCAD user. So the cost of an upgrade can pay for itself in a couple of weeks.

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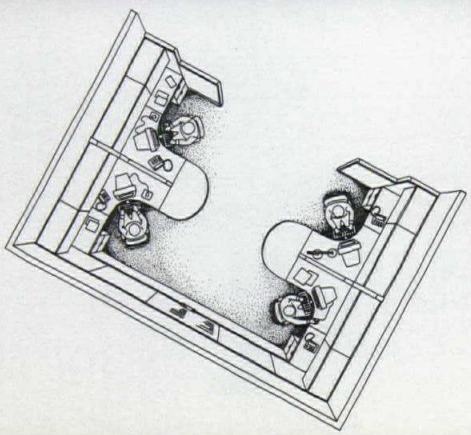

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Technics
Wood Protection Detailing

Wood structures consultant **Gerald E. Sherwood** presents detailing criteria to avoid decay in wood frame buildings.

Additional Information

The Wood Protection Council of the National Institute of Building Sciences (NIBS) is currently developing an extensive document, *Wood Protection Detailing – Protecting Wood from Decay and Termites*. It has a projected publication date of December 1992. For more information, contact NIBS later in the year and watch P/A's "Tech Notes" column. Detailed information on various aspects of wood protection is also available from a number of trade associations and government agencies:

American Plywood Association, P.O. Box 11700, Tacoma, WA 98411 (206) 565-6600.

American Wood-Preservers' Association, P.O. Box 286, Woodstock, MD 21163-0286 (410) 465-3169.

California Redwood Association, 405 Enfrente Drive, Suite 200, Novato, CA 94949 (415) 382-0662.

Cedar Shake and Shingle Bureau, 515 116th Avenue NE, Suite 275, Bellevue, WA 98004 (206) 455-1323.

National Forest Products Association, 1250 Connecticut Avenue NW, Washington, D.C. 20036 (202) 463-2700.

National Wood Window and Door Association, 1400 East Touhy Avenue, #G-54, Des Plaines, IL 60018 (708) 299-5200.

Southern Forest Products Association, Box 52468, New Orleans, LA 70152 (504) 443-4464.

Western Wood Products Association, 522 SW 5th Avenue, Yeon Bldg., Portland, OR 97204-2122 (503) 224-3930.

Wood Protection Council, National Institute of Building Sciences, 1201 L Street NW, Washington, DC 20005 (202) 289-7800

Wood has dominated as a building material for low-rise construction because of its economy, beauty, workability, and availability. With our present environmental emphasis, it also offers the advantages of being a renewable resource and having a low energy requirement for production and manufacture. Like all building materials, however, wood requires some special detailing for optimum performance. Details presented in this article are primarily aimed at prevention of decay that can occur under certain conditions of moisture, temperature, and oxygen supply.

Designers and builders have learned basic methods of detailing to prevent decay, as demonstrated by the existence of wood structures in the United States that are 300 or more years old. Unfortunately, changes in techniques are often made in developing popular designs that do not adequately consider wood protection. Also, our transient society has led to the copying of designs in various geographic locations that have different climates and different requirements for wood protection. This article presents the basics of why wood decays as well as specific construction details for decay prevention.

Basics of Wood Decay

Wood decomposes as a result of fungi feeding on it. Spores of decay fungi are almost universally present in the air. These spores have four basic requirements for growth: a food source, water, a temperature between 40 F and 100 F, and oxygen. Cellulose in wood provides the food source. Most wood contains some water held in its fibers, but fungi require *free water*, the quantity that exceeds the amount held in the fibers alone. Free water is water that is able to move freely in its liquid state; it must be supplied by leakage, condensation, or capillary rise, and not, for example, by high ambient relative humidity. The condition in which wood contains about 30 percent moisture by weight results in *fiber saturation*. So moisture contents higher than this must exist for fungi to have access to the water.

When wood is dried below fiber saturation, growth of fungi stops even though existing decayed wood is not removed. At temperatures below 40 F or above 100 F, fungi go dormant, but will return to active growth if temperatures return to favorable levels. If wood is immersed in water, buried in the ground, or placed in other situations where the oxygen supply is cut off, decay cannot progress.

Decay is often referred to as "rot" or sometimes as "dry rot." The term "dry rot" is misleading since water is required in all cases for decay to advance. Material may be dry when decay is found, but the existence of decayed wood indicates that excessive water has been present at some time.

Effects of Climate

Details shown in this article are recommended for all geographic locations; however, they are more critical in some than in others. Potential for wood decay is most prevalent in regions where high humidity and rainfall occur. While the advance of decay may be slower in dry regions, the same general construction details will assure prevention of decay in all regions. Relative severity of decay in various geographic regions is based on the amount and number of days of rainfall.

Very dry climates like the Southwest allow designers and builders to "get by" with some construction practices that would present a definite hazard in the Gulf Coast region. An example is the practice of using no roof overhang in California, where rainfall is light; this can cause serious maintenance problems in Florida, where rain occurs almost daily. Similarly, naturally durable woods such as redwood and cedar can be left unfinished in dry climates, but in humid climates will be discolored by mildew and may undergo excessive dimensional change from cycles of wetting and drying.

General Principles of Wood Protection

Moisture content of wood at the time of construction can have a direct effect on service life. Wood framing and sheathing materials should have a moisture content of 19 percent or less prior to being enclosed in a structure. Higher moisture contents may trap moisture (within stud walls, for example) and promote decay. Wood siding, exterior millwork and trim should have a moisture content of 15 percent or less at the time of installation. Higher moisture contents may result in excessive shrinkage, with the consequent opening of joints that allows water to enter.

Exposed members must be sloped so water will not stand and soak in. Joints between members should be caulked or spaced for drainage and air drying. It is particularly important to protect end grain from exposure to water, because water is

absorbed very quickly in the direction of the grain and will travel several inches into the wood in a short time. A water-repellent coating is recommended to protect all exposed wood from water absorption. In humid climates, a preservative should be added to the water repellent to inhibit mildew growth. This combination is often referred to as a water-repellent preservative (WRP). Untreated wood should never be placed in contact with the ground, and adequate distance between wood and the ground is required to prevent absorption of ground moisture.

Some species of wood contain extractives that are resistant to decay. These are usually referred to as "naturally durable"; however, only the heartwood, or darker, center portion of a log contains the extractives that give it durability. Lighter-colored sapwood has no natural durability in any species. Commercially available species that have naturally durable heartwood are redwood and the cedars. Specifications for natural durability allow up to 10 percent sapwood in an occasional piece not to exceed 10 percent of the pieces in a parcel or shipment. Complete information use is available from the California Redwood Association and the Western Wood Products Association.

Most wood protection details in this article assume the use of untreated wood. If the principles in these details cannot be followed, wood must be preservative-treated by a pressure process that poisons the entire cross section so that decay fungi cannot feed on it. Such wood can be used in ground contact or in other situations where it would be constantly wet (see sidebar).

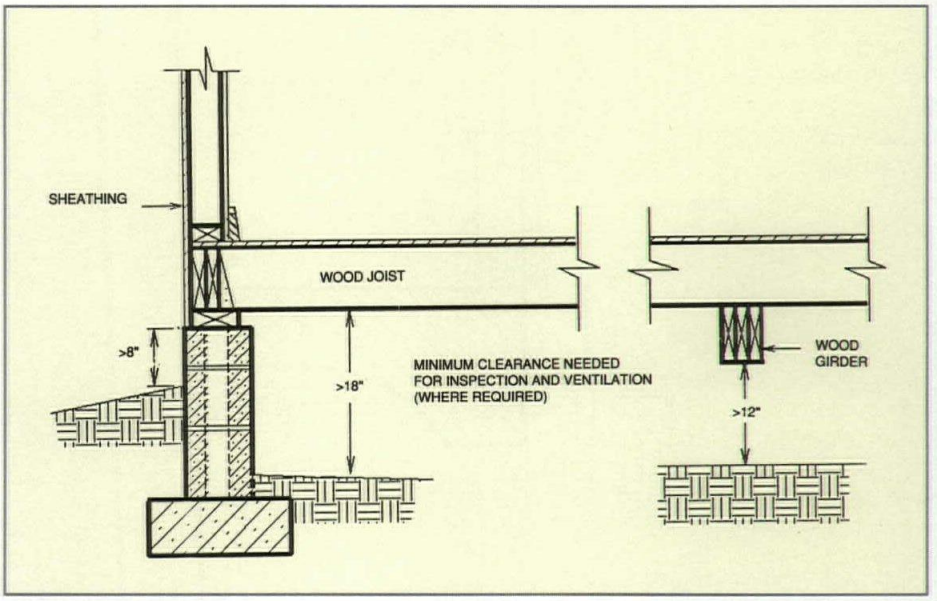
Good practice construction details for wood protection include:

- separation from soil moisture;
- protection of joints from water entry and retention;
- drip edges on roofs to prevent rain water from curling back under edges of members;
- prevention of water from flowing over end grain of members;
- ventilation of spaces where moisture build-up could result in condensation on wood surfaces;
- protective finishes on all exposed wood.

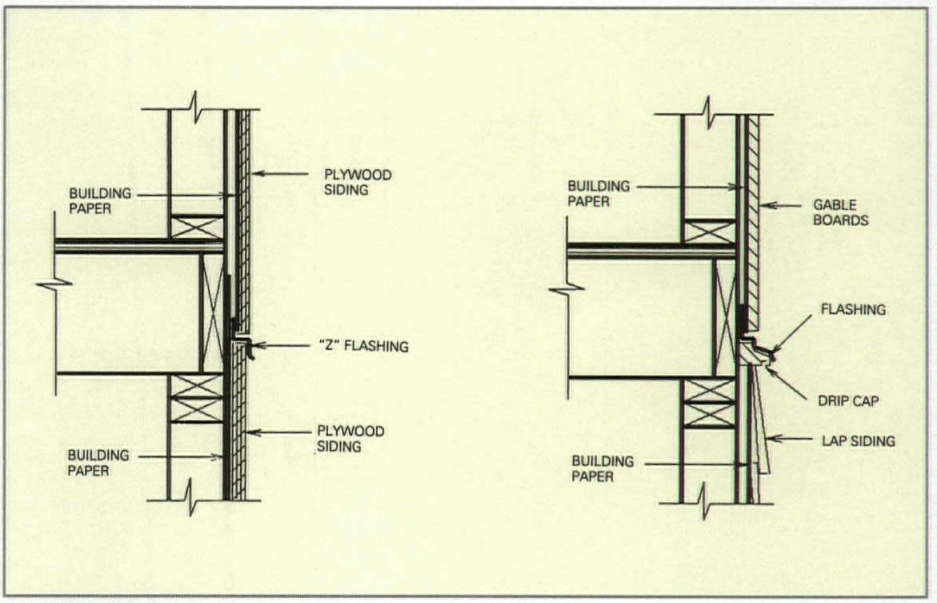
While this article does not address insect attack, most of these details will be helpful in preventing such attack. Simply preventing decay helps prevent insect damage, because most insects are attracted to wood that has been softened by decay. The following discussion of details will begin by presenting details at the ground level, proceeding to the highest level of the building.

Framing and Sheathing

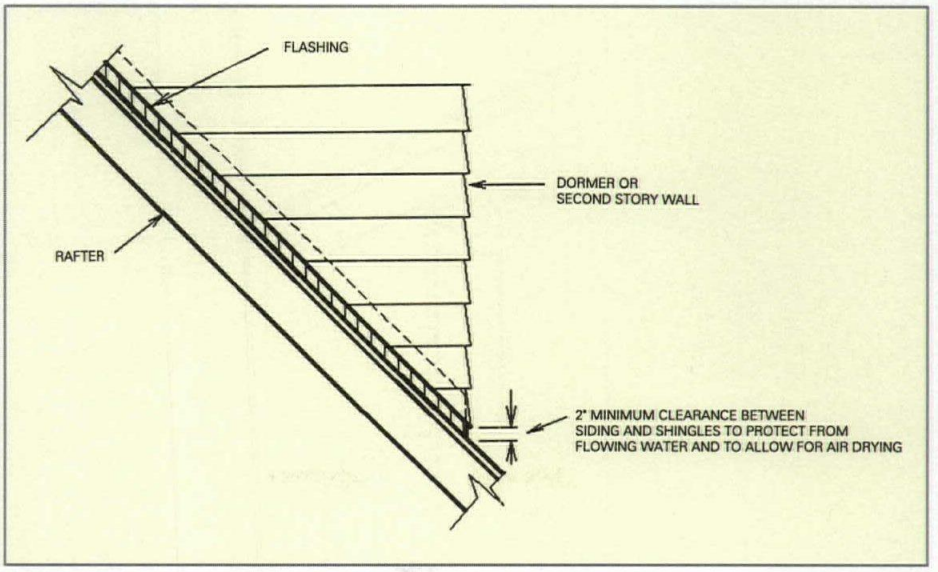
Wood floor joists or the bottom of a wood structural floor without joists should be a minimum of 18″ above exposed ground in a crawl space. This allows access for inspection as well as ventilation. Wood girders are permitted a minimum of 12″ above ground since they are widely spaced, so access is available between the girders. All wood framing and sheathing should be a



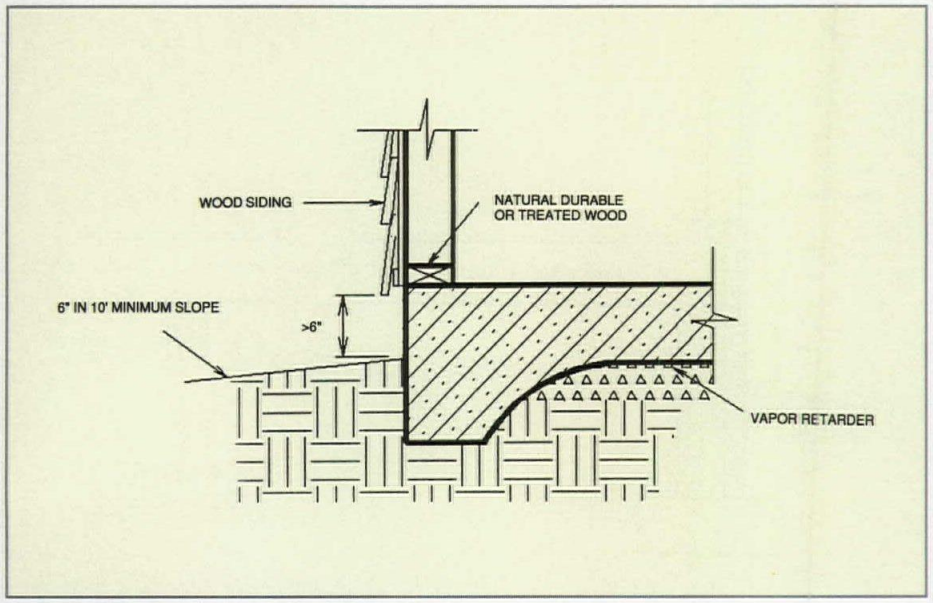
1 CLEARANCES ABOVE SOIL FOR UNTREATED WOOD IN CRAWL SPACES



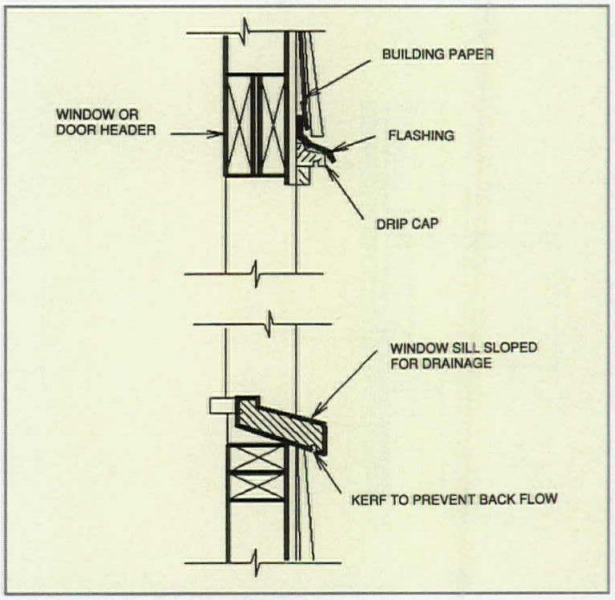
2 FLASHING REQUIREMENTS AT HORIZONTAL SIDING JOINTS



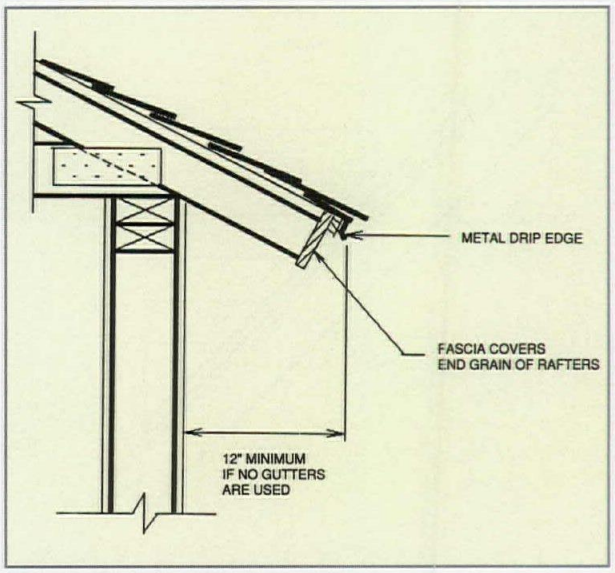
3 CLEARANCE REQUIREMENT BETWEEN SIDING AND ROOFING SHINGLES



4 CLEARANCE REQUIREMENT BETWEEN SIDING AND SOIL



5 FLASHING FOR WINDOW AND DOOR HEADERS



6 PROTECTION FOR ROOF EDGE AND END OF RAFTERS

minimum of 8″ above exposed earth (1).

In addition to clearances between soil and wood, good drainage of surface water is essential. On the exterior, a drop of at least 6″ in 10′ away from the building is recommended. If a crawl space is below the exterior ground level, soil should be sloped to the center, and have a positive drain away from the building.

Siding

A wide roof overhang and adequate gutter and downspout systems help protect wood siding from the effects of rain, but certain detailing is still critical to prevent rain water from entering joints or, in some cases to allow air drying at joints. Where two types of siding join between first floor and second floor or gable end, flashing and drip edges are required. In the case of plywood siding, which is only available in lengths for one story, a Z flashing is needed at horizontal joints (2). All cut ends of horizontal siding boards should be saturated with a water repellent to reduce water absorption in the end grain.

Wherever wood siding intersects a roof, as at a dormer or where a one-story wing joins a two-story section, the siding needs to be at least 2″ above the roofing to keep it away from the water flow and allow for air drying (3). Flashing is also required at these locations.

Siding should always be kept at least 6″ above ground (4). In addition, downspouts should carry water well away from the building to limit backsplash from the ground during rain. A 15-lb asphalt-saturated building paper or a housewrap is recommended immediately under all siding to prevent wind-driven rain from entering sheathing or framing.

Diagonally placed tongue-and-groove siding can cause unexpected problems by channeling water downward into door and window frames. When diagonal application is used, the joint at vertical trim members should be carefully flashed.

Exterior Trim and Millwork

Exposed end grain should be minimized or eliminated wherever possible. This can sometimes be accomplished by mitering joints at corners to prevent end grain exposure. All cut ends of members should be thoroughly saturated with a water repellent, and joints should be caulked or flashed, depending on location and orientation. A drip cap and flashing over window and door headers is essential (5). Window and door sills must be sloped to drain. Exterior doors should be set back from the plane of the exterior wall in openings to prevent water from flowing directly over them, and should be protected from backsplash of rain water onto the sill.

Factory manufactured millwork should be treated in accordance with National Wood Window and Door Association (NWWDA) I.S.4, *Industry Standard for the Water-Repellent Preservative Treatment for Millwork*, and bear the mark of a third party certification agency that assures conform-

ance to it. All cuts made at the job site should be sealed with a water-repellent preservative.

Roof Edges

Roof edges, including fascia boards and framing, require special protection to prevent water from constantly flowing over them or curling back under the shingles and damaging the roof sheathing. A minimum of 1′ overhang is recommended, especially in regions with high levels of rainfall. The added cost will be minor compared to savings in maintenance. If extension of structural members beyond the roof line is desired, preservative-treated wood is recommended. Some protection of these members is possible by using sheet metal covering over tops and ends, but this must be specifically designed for each application.

Rafters extended outside the exterior wall should have ends protected to prevent end-grain absorption. They should be cut back at an angle and be covered with a fascia board. Flashing with drip edges is necessary in all cases to prevent water from curling back under the roofing (6).

Wood Roofing

Wood roofing can be either naturally durable or non-durable species. Durable roofing species include heartwood of western red cedar and redwood. Non-durable species include southern pine, larch, and Douglas fir. Roofing of durable species is permitted by model building codes in all climate regions, but non-durable species require preservative treatment except in very dry areas. The minimum roof pitch for all shakes and shingles is 4/12. Specifications and application instructions for cedar and redwood are set forth by the Cedar Shake and Shingle Bureau. Specifications for manufacturing, treating, and applying treated southern pine roofing are available from the Southern Forest Products Association.

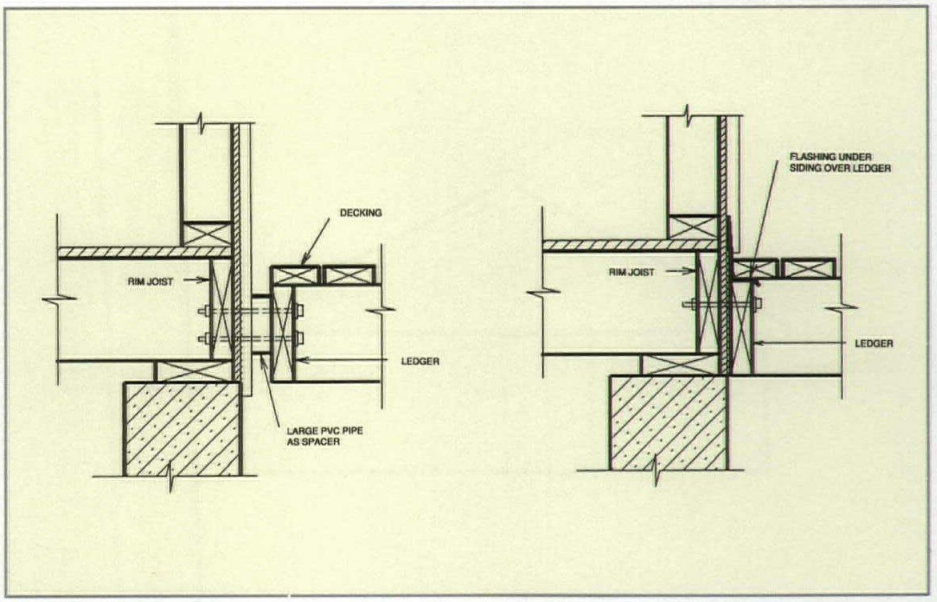
Decks and Porches

Naturally durable or treated wood is recommended for all exposed wood decks; however, the primary detail of concern for decay prevention is their attachment to the building. One method is to space the deck out from the building to allow drainage and air circulation between the deck framing and siding. This can be accomplished by using washers or a section of large-diameter PVC pipe as spacers at the bolted connection of the deck to a band joist (7). An alternative is to place flashing under the siding over the deck ledger, and provide a drip under the deck.

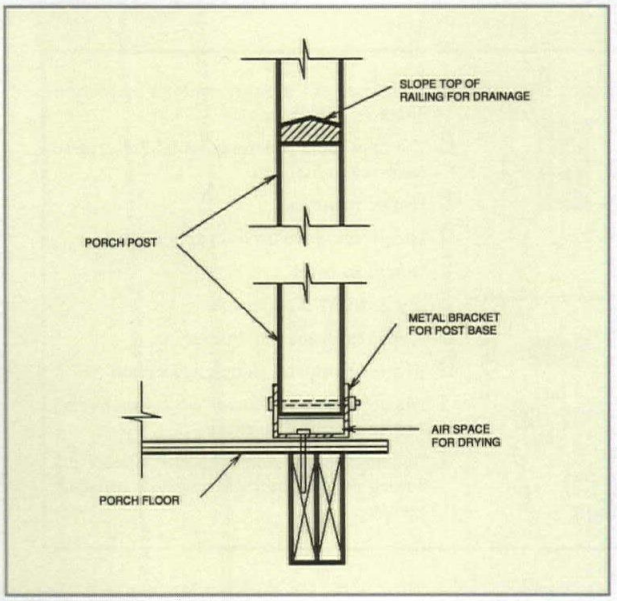
Untreated railings on decks or porches have requirements for drainage and drying of end grain. Posts should be set above the floor on brackets to assure the ends do not stand in water, and to allow air drying of the ends. Railing caps should be sloped for positive drainage (8).

Exterior Balconies

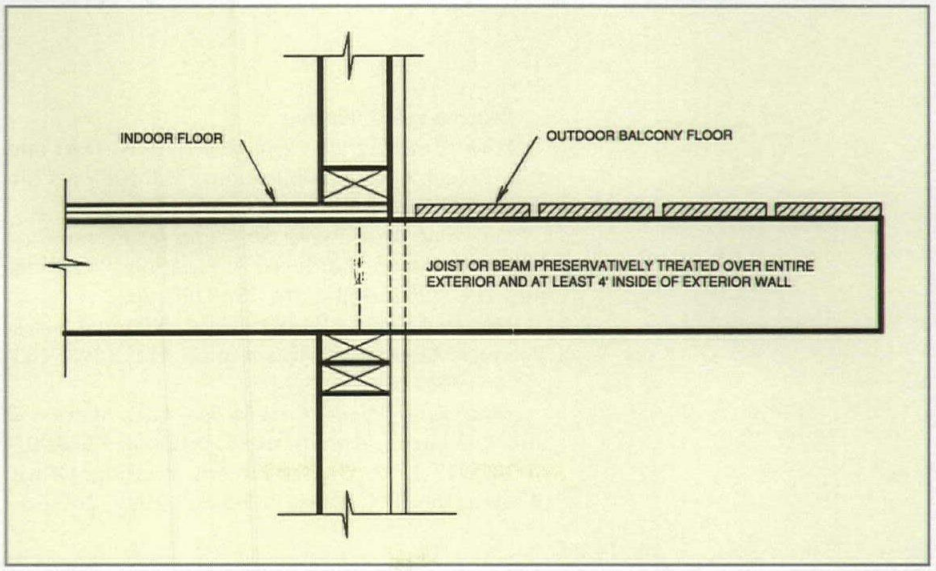
Exterior balconies are often cantilevered by extending joists or beams from inside a building to



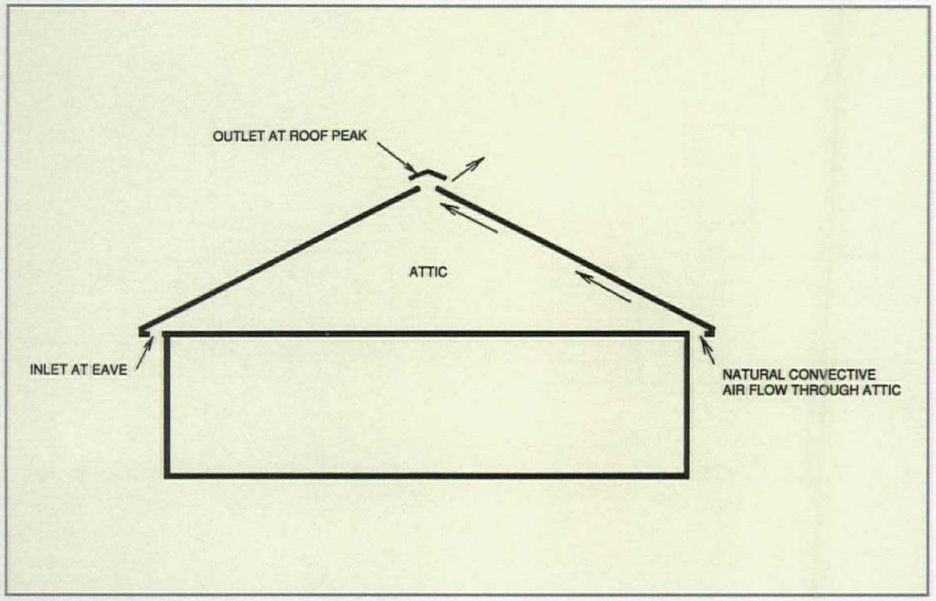
7 TWO METHODS OF ATTACHING AN OUTDOOR DECK



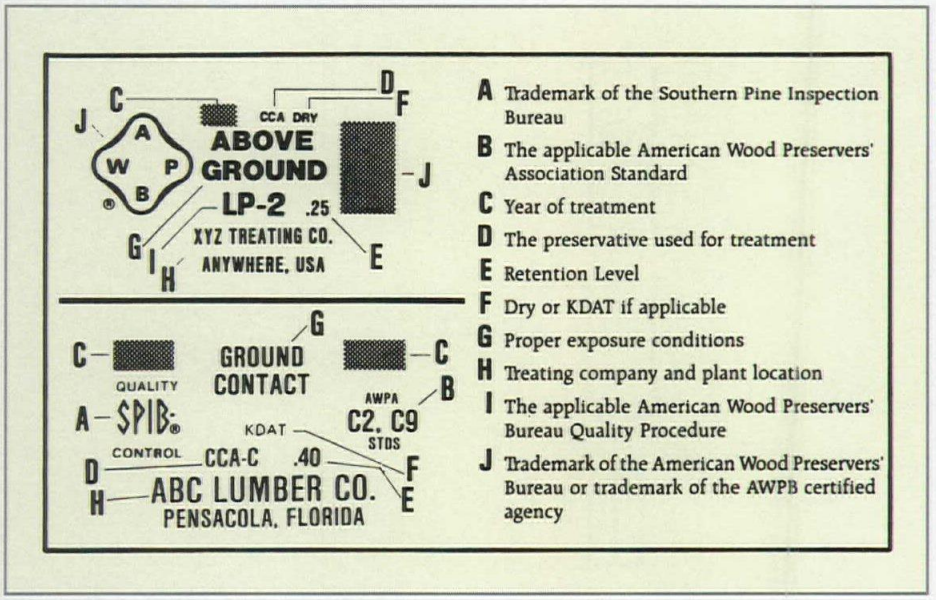
8 PORCH POST BRACKET AND SLOPED RAILING CAP



9 OUTDOOR BALCONY JOIST OR BEAM PRESERVATIVELY TREATED



10 ATTIC VENTILATION WITH INLET AT EAVE OUTLET AT PEAK



11 TYPICAL QUALITY MARKS FOR TREATED LUMBER

the required distance beyond the outside wall. This practice is not recommended with untreated wood. Where such a structure is desired, the entire structural member should be treated, since moisture travels easily in the direction of the wood grain and could cause decay for some distance inside the building (9).

Ventilation of Structural Spaces

The amount of ventilation in foundation crawl spaces and attics is usually specified by local building codes. Ventilation is required in these areas because cold surfaces such as floor joists or roof sheathing act as condensation planes for humidity in the air. Decay results when condensation occurs frequently and there is no mechanism for drying. The primary detail of concern is in providing vents so that air will move through the space rather than stagnate. In foundation crawl spaces, this is accomplished by placing vents near corners and having vents on opposite sides of the building. In attics, it is critical to have outlets near the peak to prevent warm air containing moisture from rising to the peak so moisture consistently condenses on the roof sheathing (10).

Pressure Treated Wood

Pressure treated wood is impregnated with preservatives by a vacuum-pressure process. The treatment process and the treated wood should meet the standards of the American Wood-Preservers' Association (AWPA). Most treated wood that is commercially available for use in building construction is treated with a waterborne preservative. Commonly used are chromated copper arsenate (CCA) and ammoniacal copper zinc arsenate (ACZA). These preservatives chemically bond to the wood fibers, so they do not leach out and are safe for most building applications.

The level of treatment (of retention level) is dictated by the end use. Common use designations are "above ground" and "ground contact." Higher levels of retention and special quality control are required where treated wood is used in foundations to support a permanent structure. Since the treatment is by a water process, it may be quite wet when delivered unless specified as "kiln dried after treatment" (KDAT). Requirements for treatment for various applications are specified by AWPA. The stamp of a recognized quality control agency should appear on each piece of treated wood or on a heavy plastic end tag to verify conformance with the appropriate AWPA standard (11). **Gerald E. Sherwood, PE** ■

The author is a wood structures consultant in Chantilly, Virginia, offering services in technology transfer, research, and problem analysis and resolution. He served on the technical staff of the National Forest Products Association from 1988 to 1991. For the previous 21 years he was a research engineer with the Forest Products Laboratory, U.S. Department of Agriculture, and has also served on the extension faculties of the University of Wisconsin and the University of Florida.

Recommended Reading

Wood: Detailing for Performance, W.A. Dost and E.E. Botsai, GRDA Publications, Mill Valley, California (415) 388-6080, 1990, 173 pp.

Design of Wood Frame Structures for Permanence, National Forest Products Association, Washington, D.C. (202) 463-2700, 1988, 17 pp.

Finishing Exterior Wood Products, National Forest Products Association, Washington, D.C. (202) 463-2700, 1991, 18 pp.

Wood Frame House Construction, G.E. Sherwood and R.C. Stroh, Agriculture Handbook 73, #001-000-04547-4, U.S. Government Printing Office, Washington, D.C. (202) 783-3238, 1989, 260 pp.

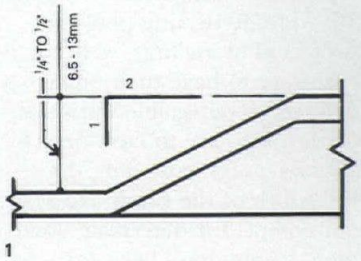
Technics Topics
Access for the Disabled: Part II

Charles Kridler and **R.K. Stewart** of Gensler & Associates, Architects, continue their discussion of compliance with the *Americans with Disabilities Act* in the second part of a three-part article.

Last month we discussed the nature of the *Americans with Disabilities Act* and some of its design implications with respect to wheelchair access (July, 1992, pp. 41–42). This month we continue with a look at floors, stairs, areas of rescue assistance, elevators, and alarms.

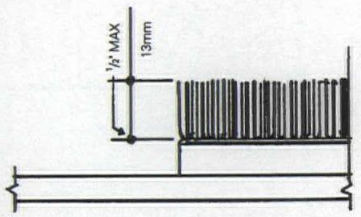
Floor Surfaces

Floor surfaces are addressed under the provisions of the Act. Surfaces are to be slip resistant, which may affect the use of certain tile and stone finishes [see P/A, July 1991, pp. 45–48]. Slopes in excess of 1:20 constitute a ramp and must comply with ramp requirements, including slope and handrails. Cross-slopes may not exceed 1:50, which may affect drainage of exterior walkways, particularly in climates subject to snow and ice. Changes in level up to ¼″ may be vertical. Level changes between ¼″ and ½″ may be accomplished with a beveled surface (1). If a level change exceeding ½″ is necessary, it must be accomplished by way of a ramp or lift.



1

Carpets must be firmly attached to the floor and the thickness is limited so as not to inhibit the movement of crutch and cane tips or manual wheelchairs. The maximum pile thickness allowable is ½″ without consideration of the pad's thickness (2). The pad thickness and the carpet's face density must be selected with care to ensure they meet this requirement's intent.



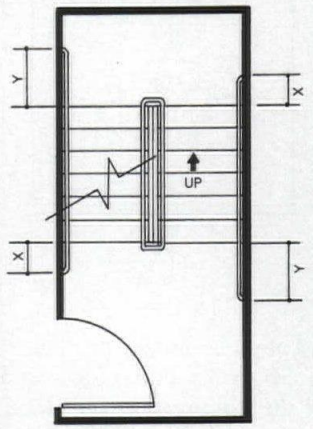
2

Exposed edges of carpets are required to be fastened to the floor surface and have edge trim along the entire length. The edge trim must conform with the ¼″ vertical level change and ½″ sloped level change discussed above. This requirement limits the use of area rugs; they must be less than ¼″ thick – which is not practical – be inset, or have an edge strip. Each option will have a major impact on the aesthetics of a space.

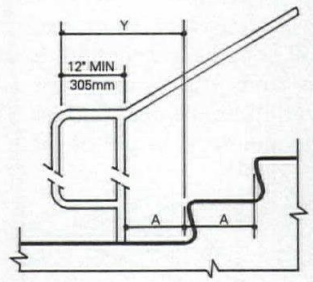
Stairs

The requirements for stairs are fewer than those of the model codes and generally match the code provisions. The prohibition against open risers and a requirement for 11″ tread width should come as no surprise. The width of the stair is not addressed in the *Guidelines*, with one exception. The area of rescue assistance, which may be required by other provisions of the *Guidelines*, also requires a stair width of 48″ between the handrails.

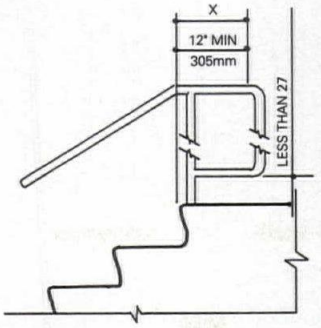
The most significant feature of the stair requirements concerns handrails. Handrails must be continuous along both sides of the stair and at the inside of switchback stairs. Where handrails are not continuous – at stair landings, for example – they should extend beyond the top and bottom risers of the stair (3a, 3b, 3c). These extensions allow people with mobility and balance impairments to move from landings to stairs with a decreased risk of falling.



3a



3b



3c

Tech Notes

The 5th International Jacques Cartier Conference, *Indoor Air Quality, Ventilation and Energy Conservation*, will be held in Montreal, October 7–9. More than 25 experts will discuss standards, technology, and HVAC system design. Proceedings will be available at the meeting. Association Québecoise pour la Maîtrise de L'Energie, Montreal (514) 866-5584.

***Advanced Framing: Techniques, Troubleshooting, and Structural Design* compiles 46 articles since 1982 from the *Journal of Light Construction*. Although aimed at builders, it offers valuable insights into the challenges of the job site. JLC Bookstore, Richmond, VT (802) 434-5241, 281 pp., 250+ illustrations, $24.95.**

***The Thermal Performance of the Exterior Envelopes of Buildings V* will be held December 7–10 in Clearwater Beach, Florida, by ASHRAE, DOE, and the Building Thermal Envelope Coordinating Council. Like previous Envelopes meetings, presentations are not limited to energy performance. Oak Ridge National Lab, Oak Ridge, TN (615) 574-4345.**

***Bugs, Mold & Rot*, the proceedings of a 1991 workshop sponsored by the National Institute of Building Sciences, contains eight papers on moisture problems, biological agents (indoor air quality), insect pests, attics, basements, and crawl spaces. NIBS, Washington, D.C. (202) 289-7800, 71 pp., $25.**

Areas of Rescue Assistance

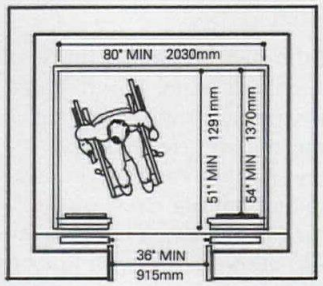
The area of rescue assistance is intended to provide a safe area for the disabled to await evacuation from a building. A space to accommodate two wheelchairs, 30″ x 48″ each, is to be provided in one of several locations. The locations include a portion of stairway landings, a portion of exit balcony, a portion of rated exit corridor, a portion of vestibule adjacent to an exit enclosure, a portion of a room separated from the building by smoke barriers, or a pressurized elevator lobby. The stair adjacent to the area of rescue assistance is to be of greater width, as noted above. A two-way communication system to the primary entry or approved location is required. Signage is to be provided to identify the area. New facilities that have a supervised automatic sprinkler system are exempted from this requirement.

The requirement for areas of rescue assistance has generated much concern among fire department officials in various jurisdictions. Their concern centers on possible conflicts between fire fighters using stairs as they attack a fire and people awaiting evacuation in the stairway. During non-fire emergencies, such as bomb threats or earthquakes, more immediate evacuation may be advisable. We can expect a great deal more discussion on this provision of the ADA.

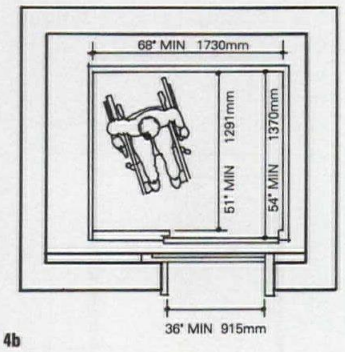
Elevators

Elevators ease vertical movement for a great many people, including those in wheelchairs. A key provision of the ADA is the prohibition of the use of freight elevators as the only way of providing access for the disabled, the intent being to integrate all public traffic along the same route. The only exception to this prohibition is where an elevator for freight and passengers is provided for both public and employee use.

While the spatial requirements of wheelchair movements are important, the elevator controls are critical for the visually impaired. The clear plan dimensions of elevator cars correspond to accepted industry standard platform sizes (4a, 4b). Elevator car controls and hall call buttons must be raised or flush; recessed buttons are no longer acceptable. Hall lanterns are to acknowledge which car is answering a call and its direction by visible

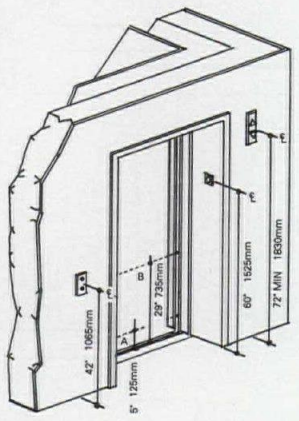


4a



4b

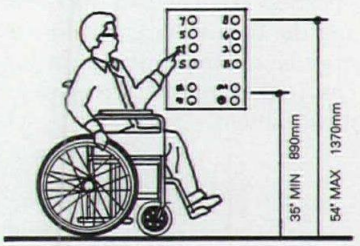
and audible signals. Audible signals shall sound a tone once for the up direction and twice for the down direction, or say "up" or "down" by way of verbal annunciators. Floor levels shall be indicated on both hoistway jambs using raised characters and braille designations. The mounting height of these



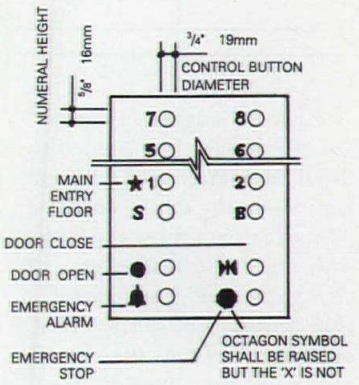
5

elements is specified (5).

Car controls must meet similar requirements to enable their use by the disabled. The size of the buttons, use of raised or flush buttons, and their mounting heights are identified in the *Guidelines* (6a, 6b). Raised letter and braille designations, as well as standard symbols, must be provided to the left of the appropriate control button. This requirement corresponds to American Society of Mechanical Engineers Code (ASME, New York, (800) 321-2633)) A17.1–



6a



6b

1990. The position of the elevator as it passes floors is to be indicated by illuminated numerals of ½″ minimum height and an audible signal. In lieu of the floor passage signal, a verbal announcement of the floor at which the elevator is stopping may be substituted. Emergency communications are also to be provided as required by ASME A17.1–1990. The mounting height, raised letter and braille identification, handset cord length, and door hardware are identified. A key provision of this communication system is that voice communication is not required.

Alarm Systems

Alarm systems must provide warning to both visually- and hearing-impaired people. Alarms must be located in areas of general use, including restrooms, hallways, and lobbies. Audible alarms are to produce a sound that exceeds the "prevailing" sound level in the room by 5 dbA; alternately, the sound may exceed the maximum sound level for 60 seconds by 5 dbA, whichever is louder, but the sound level may not exceed 120 dbA.

Visual alarms shall be integrated into the building alarm system. The lamp is to be a xenon strobe type, or its equivalent, in clear or white color of a minimum 75 candela intensity. The pulse is to have a 0.2 second duration with a maximum duty cycle of 40 percent and flash rate of 1 Hz minimum and 3 Hz maximum. Units are to be mounted 80″ above the floor or 6″ below the ceiling, whichever is lower. No portion of a room shall be more than 50′ in a horizontal plane from a signal unit. In rooms larger than 100′, such as auditoriums, units may be placed around the perimeter at 100′ maximum spacing rather than suspended from the ceiling.

Detectable warnings consist of raised, truncated domes to create a textural and audible change in a walking surface. The domes are to be 0.9″ in diameter, 0.2″ in height and spaced 2.35″ center to center. The domes are to contrast with adjoining surfaces, light on dark or dark on light. The detectable warnings are to define the boundary between pedestrian and vehicular areas not separated by curbs with a band 36″ wide. Reflecting pools not protected by railings, walls, or curbs are to have their edges defined by detectable warnings. Curb ramps are to have detectable warnings extending the full width of the ramp. No requirements for detectable warnings at stairs have been included at this time.

Charles Kridler and **R.K. Stewart** ■

The authors are vice president and senior associate in the San Francisco office of Gensler and Associates, Architects.

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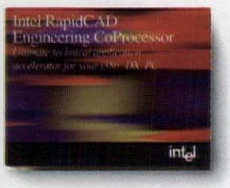

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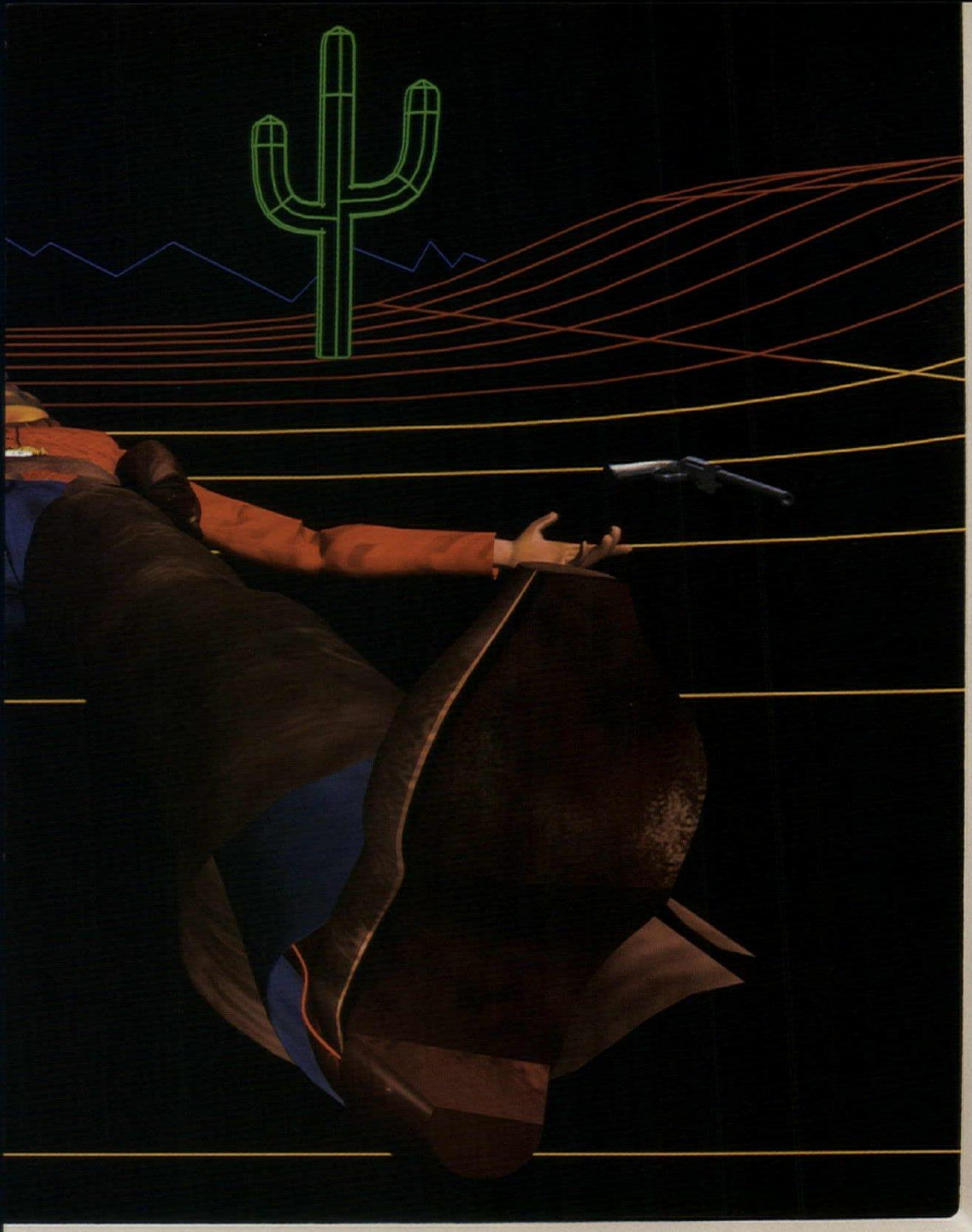

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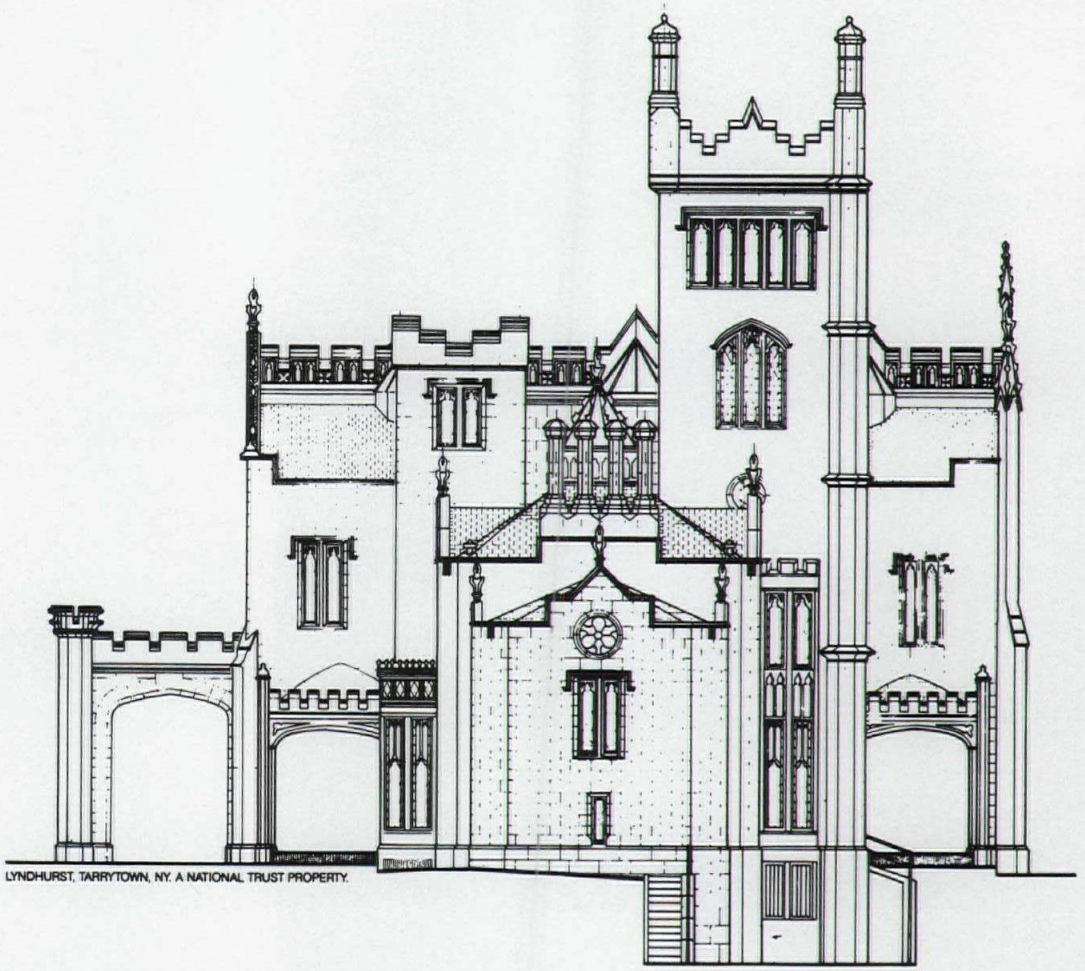

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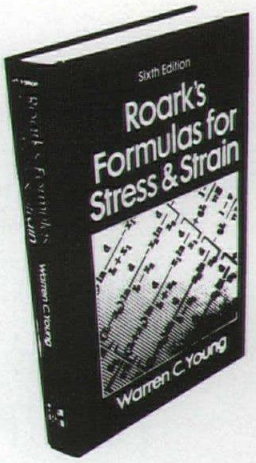

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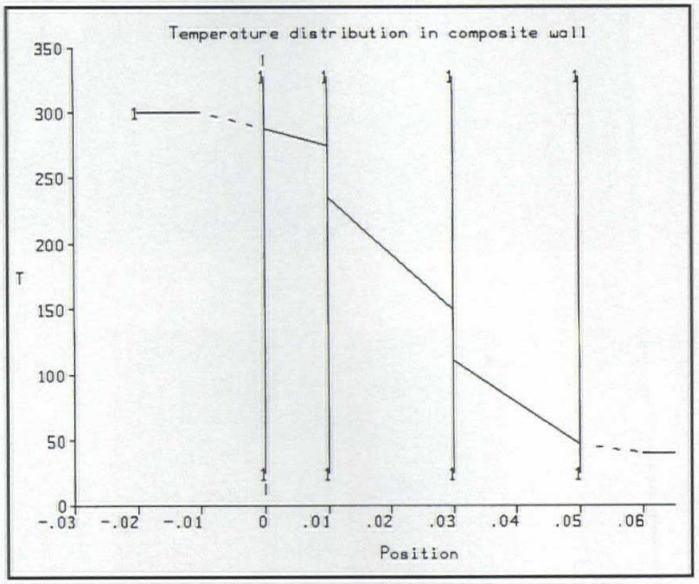

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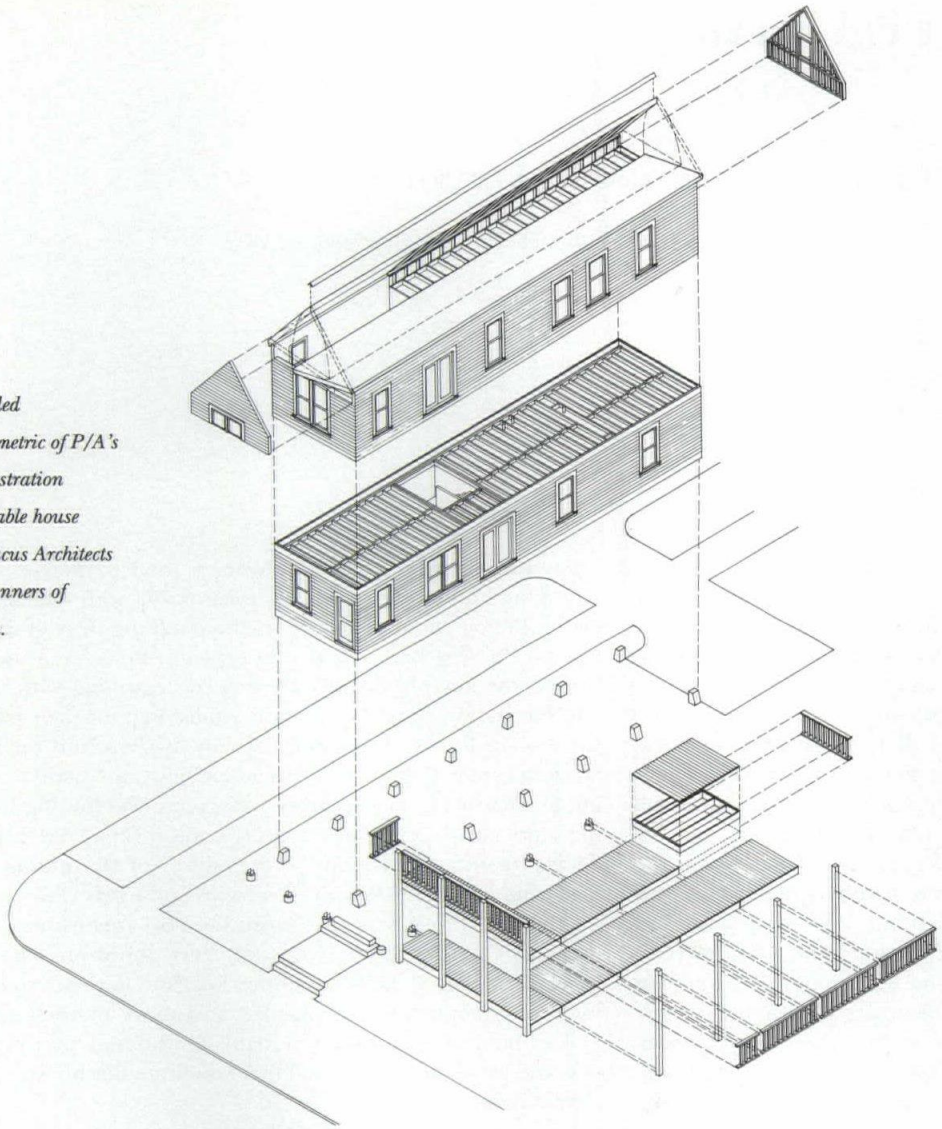
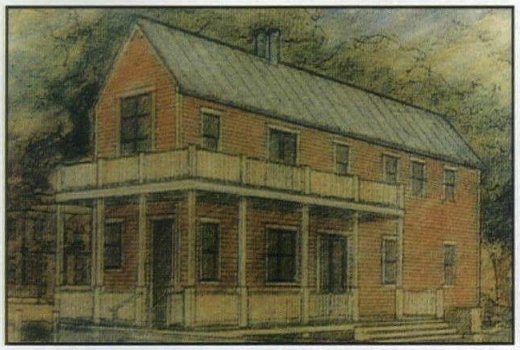


Exploded axonometric of P/A's demonstration affordable house by Abacus Architects & Planners of Boston.

Housing a Diverse Population

For too long the design of housing in this country has adhered to rigid patterns, with variations on a few plan types geared to the "average" family – mom, pop, and the kids. As a result, too many people with other needs – now a large part of the market – must put up with housing that ill suits them. This issue looks at new housing attuned to the increasingly diverse populations of the U.S. and Canada. It includes the flexible prototype for a single-family house commissioned by P/A, as well as multifamily housing adjusted to residual (and thus more affordable) sites and accommodating various groups – artist-residents, homeless mothers, single men, senior citizens, and poor families.



Competition entry drawing (June, 1991, pp. 76–77).

The P/A House

Abacus Architects & Planners describe the design and construction of P/A's affordable house

and discuss some of the lessons learned along the way.

Prologue

We have learned a lot in this, the first structure built in P/A's affordable housing initiative. Yet of all the lessons discussed below, perhaps most rewarding to me, as an architecturally trained magazine editor, was what it takes to be a client. Having myself been victimized, while working in firms, by building owners second-guessing my every decision, I began this project convinced that the best architectural work is done when a client remains interested and involved in a project, making prompt decisions when called upon, but otherwise standing back and accepting the judgment of the architect.

This initiative has only reinforced that conviction. I have spent the last year working with Abacus Architects & Planners of Boston, who seemed always to know – certainly long before I did – what needed to be done when: when to insist on a design feature and when to compromise, when to push the manufacturing technology and when to accept its limits, when to cajole the subcontractors and when to bang a few heads. What this house represents to me, then, is not just a demonstration that you can build high-quality, highly flexible housing for around $65,000, but that the best way to get an outstanding building is the old-fashioned way, by hiring a good architect.

Seeing no reason to alter my relationship with Abacus for this article, I will now stand aside and let them tell the story of this house and discuss the lessons learned. Before I do, however, I want to thank, briefly, the key players in this project, beginning with the P/A staff and our parent company, Penton Publishing, for their patience; Bank One for its financial support; the City of Cleveland for its flexibility; Strattan Building Systems for its adaptability; the Ohio Board of Building Standards for its responsiveness; Nearwest Housing for its caretaking; and Burus Development Corporation for its last-minute efforts. Special thanks are also due to the editors of Decorating Remodeling magazine, especially Wendy Silverstein and Chris Churchill, who took on the enormous task of decorating and furnishing the house at breakneck speed; to our engineer, Vern Johnston, who found solutions when others said it was impossible; and to the partners of Abacus for their commitment, intelligence, and above all, their good humor.

Last but not least, I want to thank all who took part in the competition and its judging; it is to you that I dedicate this house.

Thomas Fisher ■

The Idea of the House

Like many in our generation, we at Abacus Architects find ourselves positioned between the model family of the 1950s and new types of households with new sets of concerns. We and our friends live in a variety of arrangements: families with two working parents, families with single parents, multigenerational households, and unrelated adults sharing the same house. We understand the practical limits of the large-lot single-family house in the suburbs. While working for developers selling their version of the American Dream, we have asked ourselves "Who are these 'typical' home buyers and, more particularly, where does everyone else live?"

We designed this prototype to address a gap that exists between most of the housing being produced in America today and the requirements of a majority of the population. We are interested in finding the middle ground between market myths and real needs. People want to own their own house with a yard on a safe street. Can we assume that means they really want a tract house on a quarter-acre, 20 minutes by car from shops and services and twice or three times that distance to their jobs? Why can't we make affordable, appropriate houses with yards on attractive streets in coherent city neighborhoods, as a convenient alternative to the draw of the suburbs?

This house is designed to strengthen the relationship between the household and the community. Its form, perhaps best described by juror Mark Mack as "generic vernacular" (P/A, June 1991, p. 76), is a distillation of traditional forms. It is respectful of existing setback lines and reinforces the space of the street. Emphasizing this continuity is the front porch, which is scaled to match the neighborhood and is wrapped around the house to provide an outdoor extension of the living areas, with views of the street and the yard. The kitchen, situated at the front of the house, further encourages a connection between the life of the house and the life of the street.

The Plan Idea

The plan accommodates the needs of different households by providing a number of distinct areas within a very small house. By simply closing a door or a series of doors one can isolate parts of the house for privacy. In this way togetherness becomes optional rather than mandated, with probable benefits to everyone's sanity, even in a traditional family. The placement of the living room and dining room/kitchen on different floors also increases flexibility. Children can do homework in the second-floor living room while meal preparation and socializing go on downstairs. Two single parents can share the house, each having a family suite of bedrooms and a bath. In another scenario, the back room with its own outside door can be a home-office. Storage space is available in the unfinished attic.

Many of the essential characteristics of this house relate to its nature as a manufactured product. Some of these aspects derive from our initial assumptions about prefabricated building; others from design development during work with the manufacturer and the structural engineers.

North and west sides of house with wraparound porch and two entrances.

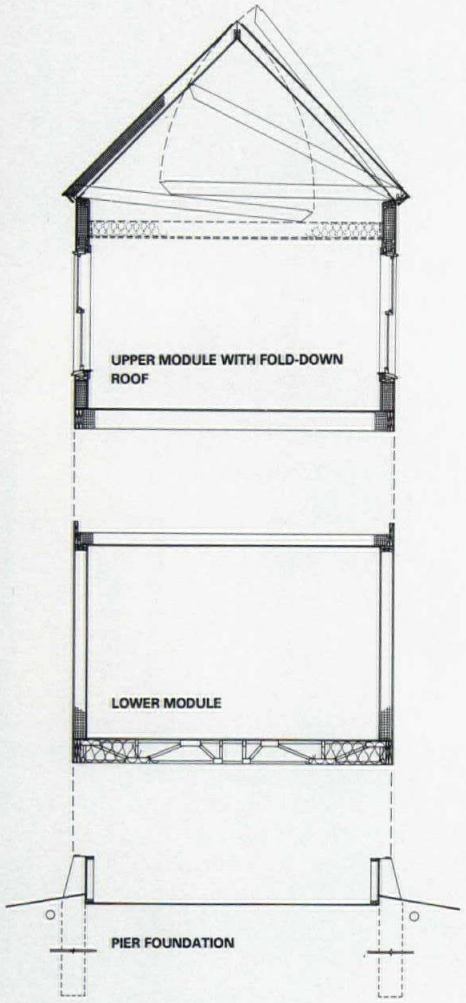
Because P/A's competition brief required that the house accommodate a variety of family types and have broad applications, we knew that the design had to be both generic and simple. We were drawn to manufactured building technology because we wanted to produce a house that was flexible and manipulable in its parts (the standard wood-frame construction can be easily modified over time), easily reproducible, and, especially, cheap. Production cost estimates of $25 to $35 per square foot in the factory sounded amazing to architects working in Boston. Installed costs were obviously higher, but by then, the hook was set.

As designers we were drawn to the physical limitations of the process – the specific shapes, sizes, and technologies of manufactured housing – and to the demands of transporting the finished product. We were also intrigued by the proportion resulting from stacking two boxes to make a "double high," in contrast to the ubiquitous "double wide." This interest was reinforced by the realization that the living room could be located upstairs, a sensible if heretical transformation of the typical house. This allowed us to stack similar floor plans efficiently and to expose the full height of the gable roof in the living room. Finishing the roof and ceiling together seemed to us an obvious application of the standard practice among manufacturers of hinging roofs and folding them down for transportation. We were surprised to find that, as far as we could determine, no manufacturers had done this and very few were willing to even consider trying it. One of the most interesting lessons we have learned through this process is that strictly technical limitations rarely come into play. Almost every barrier we encountered was related to inertia in the marketplace, and an assembly-line mind-set that conceives of a house's kit-of-parts as a closed set of pieces and processes already in production.

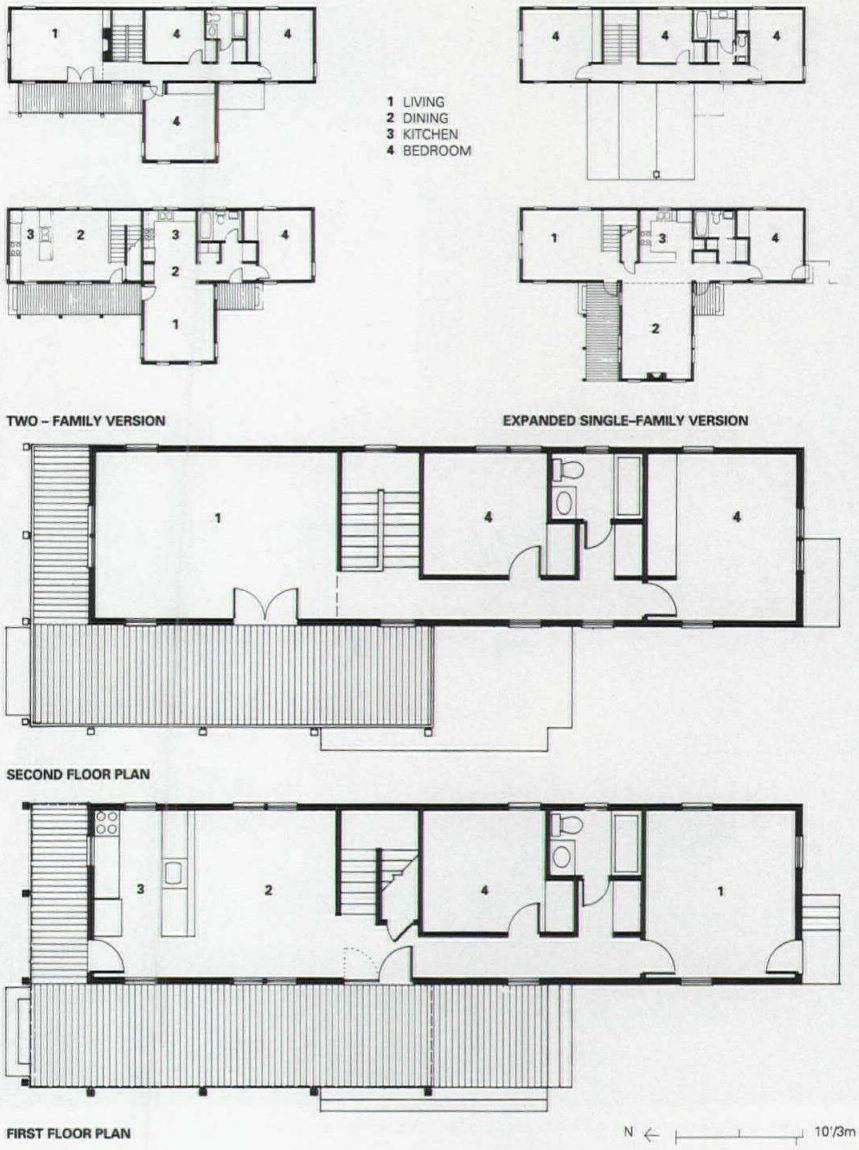
Finding a Manufacturer

Consequently, selecting a manufacturer required a diligent search. As with any assembly-line process, volume is critical to industrialized housing manufacturers and they are not excited about doing single innovative houses. Theirs is a conservative industry that competes fiercely on the basis of how long they take and how much they charge to deliver their product. The quality of design is not a major issue. We reviewed the product lines of dozens of manufacturers and found that the majority of the selections fall into a few basic categories: split-level, ranch, colonial, or Cape Cod. Minor plan variations abound, but they refer to the same paradigm: living room, formal dining room, kitchen, and family room on the first floor, with the bedrooms upstairs. Because our house challenged the norm both in plan and in technical innovation, many manufacturers were decidedly cool to our queries.

This reluctance coupled with a highly regulated industrialized housing industry in Ohio (P/A, December 1991, p. 47) quickly thinned the field of prospective bidders. Starting with a list of approximately 20 manufacturers approved by the State of Ohio, we found less than half willing to consider doing something that was not already in their catalog. Half again dropped out when they realized we were



SECTION SHOWING STACKED MODULES 10'/3m



building only one unit. Of those remaining, most spent as much time trying to talk us out of pursuing the unique features of the house as they did trying to figure out how to make it work. Finally, impressed as much with their open-mindedness and willingness to innovate as with their price, we chose Strattan Building Systems Incorporated of Knox, Pennsylvania. With the selection of Strattan as the builder of the unit and C.V. Johnston & Associates of Hebron, Ohio, as the engineer, we proceeded into design development and construction documentation.

Design Development

Industrialized housing is product design and for that reason comprehensive drawings, detailing all components and fastening systems, were developed on AutoCAD by our engineers. Every element of the house was carefully dimensioned and detailed to make sure we were getting what we wanted and that no conflicts or discrepancies would arise once the house proceeded to the assembly line. Working with engineer Vern Johnston and plant manager Bob Telesz we modified and refined the house to comply with State of Ohio standards for industrialized housing and Strattan's fabrication techniques.

In Ohio, every variant of a manufactured house requires a new permit, so it was important to design the building's systems for maximum flexibility. To permit choices in HVAC and plumbing systems, both in this and in future units, we used 3/4" tongue-and-groove "sturdi-floor" decking, glued to open-web trusses, 2'-0" on center for the first floor. This accommodates a wide variety of heating and cooling strategies, from natural gas forced air to radiant heat to baseboards. After calculating the energy consumption for each system along with the up-front costs we opted for electric baseboards in tandem with the R-2000 energy conservation system.

The R-2000 system was developed by the Ontario Home Builders Association to utilize standard building products and techniques in ways that achieve high levels of energy efficiency. Items such as superinsulation (R21 in the walls and R42 in the first floor and roof), insulated low-emissivity glass, thorough taping and caulking of the vapor barrier around doors, windows, and receptacles, and an air exchange unit combine to achieve energy savings of approximately 40 percent over standard construction. The projected utility cost for the house is $1,050/year at current Cleveland utility rates.

The design of the roof and ceiling of the living room was the focus of extensive debates and alternate designs. Ironically, what we thought was a simple idea based on existing techniques – two flat planes hinged at the edge – seemed to baffle builders who routinely build roofs with folding eaves and multiple rows of hinges. The critical difference is that the folding roofs in most manufactured houses also utilize a closed flat ceiling below. Nevertheless our engineer designed a system uniquely suited to manufacturing. Because of the controlled conditions of the plant, sophisticated adhesives could be used and dimensional tolerances achieved that could not be duplicated on site-constructed projects. By designing each leg of the roof as a stress skin panel, with the interior and exterior sheathing glued to the rafters, we

Front face of the 14-foot-wide house.

Rear of house with an office/bedroom entry.

achieved the configuration desired while avoiding collar ties altogether. The gabled end wall and the interior wall at the staircase are framed to resist the outward thrust generated by the roof.

Special hinges were fabricated and mounted on the top plate of the second-floor wall, which allowed the roof to swing down into the unit so that the module height is less than the eleven-foot clearance needed for transportation. (This height is the remaining allowance after subtracting the 2'-0" trailer height and a 6" safety margin from the minimum 13'-6" interstate highway bridge clearance.) When swung into place the roof is fastened along the ridge, locking the assembly together.

We deliberated at length about how to attach the unit to the foundation. The issue was how to space the piers far enough apart to keep our foundation costs minimal while avoiding a span that would require an expensive built-up beam on the long sides of the floor assembly. Here too we were aided by the merits of the existing technology. Because standard practice in manufactured housing calls for gluing and screwing the interior and exterior sheathing to the 2x6 framing, and the bottom plate of the wall to the floor plate, the walls essentially act as deep beams. This allowed us to space the piers 9'-8" on center with double 2x12's on the perimeter of the floor assembly. Poured integrally into each pier is a 1/4" steel top plate through which two 1/2"x4" lag bolts are fastened up into the 2x12's.

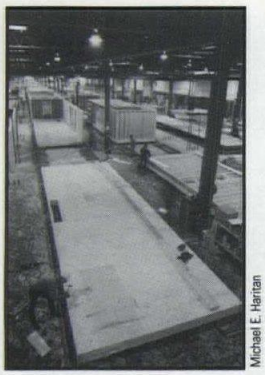
Fabricating the House

Developing and documenting all details into a complete shop drawing set took approximately three and one-half months. Simultaneously, we developed options to the basic prototype (alternate window layouts, finish schedules, and so forth) prior to submitting the set to the State of Ohio Board of Building Standards. We received our approval letter in the middle of this March and the house went on Strattan's assembly line Monday, March 23, 1992. Suddenly, the pace changed.

Arriving for a factory visit the following morning, we found both upper and lower modules well on their way down the assembly line. The floor assemblies were completed and all walls were sheetrocked and in place. (A general practice among industrialized manufacturers is to work from the inside out; among other benefits, this allows plumbing, HVAC, and electrical trades to work and move freely about the outside of the unit as it proceeds.)

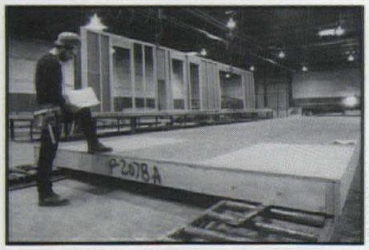
Even though the shop drawings were very thorough, we brought the line to a halt numerous times as our assumptions regarding detailing and finish work collided with the standard practices at Strattan. The builders are fast and efficient, and their habits deeply ingrained. There is no denying that asking them to do things differently slowed things down; to Strattan's credit they remained willing and patient with our revisions as the prototype worked its way down the line.

The only major technical problem occurred when the composite siding originally specified was pulled by the manufacturer and



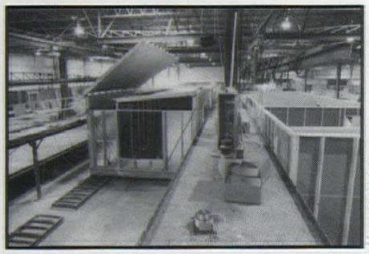
Michael E. Haritan

Floors being framed with trusses on first floor and joists on the second.



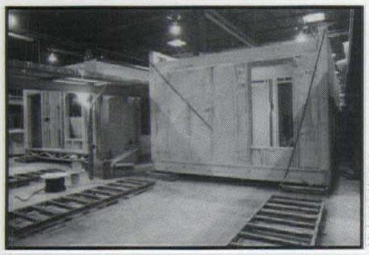
Michael E. Haritan

Walls are built on side tables and set into place with cranes.



Michael E. Haritan

Hinged roof installed then folded down to allow transport.

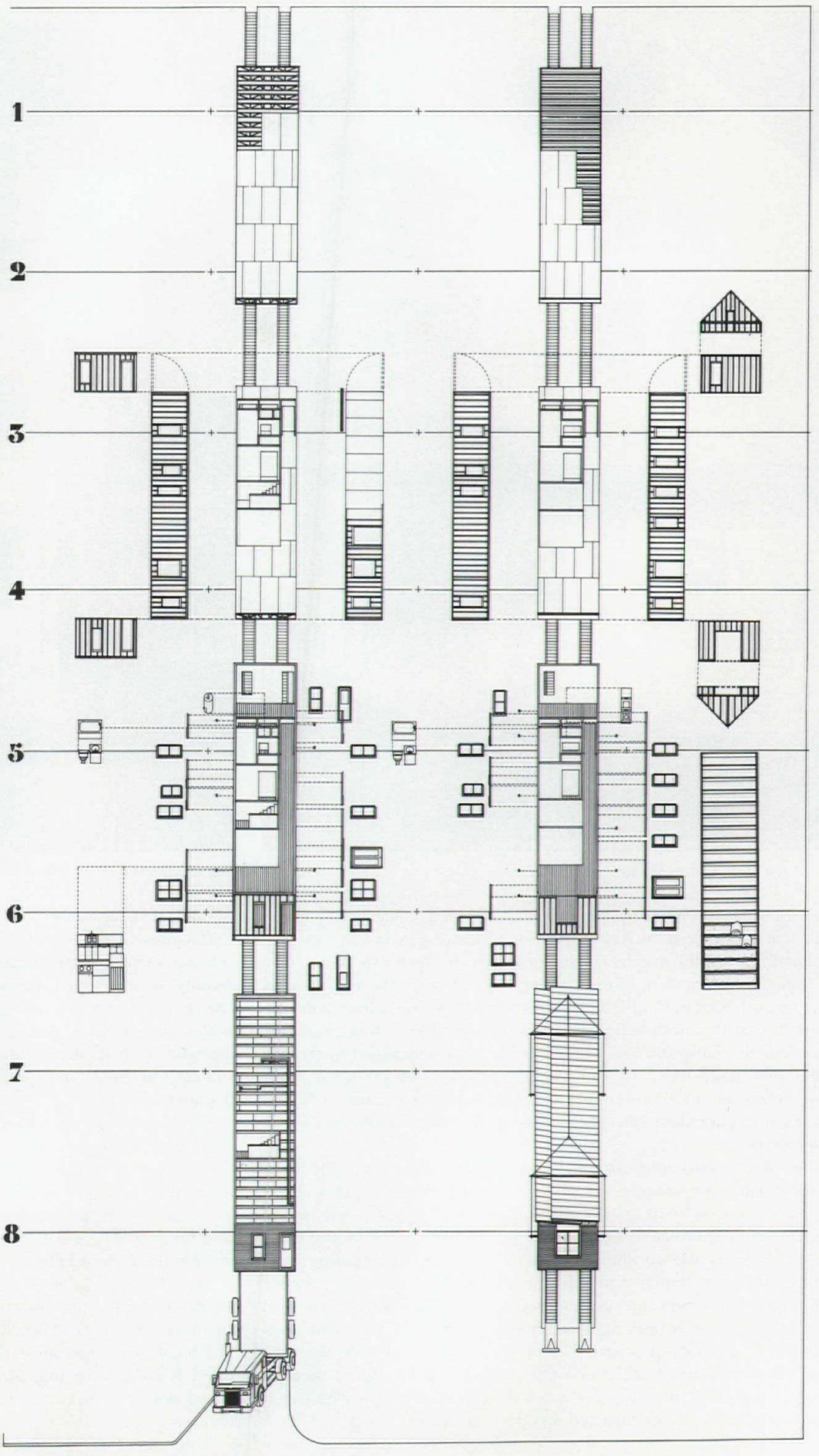


Michael E. Haritan

Walls are wired, plumbed and insulated from the outside.

Tim Ryan

Modules are set on the foundation with a crane in one day.



EXPLODED AXONOMETRIC OF FACTORY CONSTRUCTION SEQUENCE

Cost Breakdown

What follows is a breakdown of the hard and soft costs of this house. Because the house was a prototype, the soft costs are high in comparison with the hard costs. We began this project expecting just that, knowing that research and development do not come cheap. But now that the R&D is done, this "product" is ready for the market and can be ordered (and delivered to a site in a matter of weeks) by calling Strattan Building Systems (800) 327-5677.

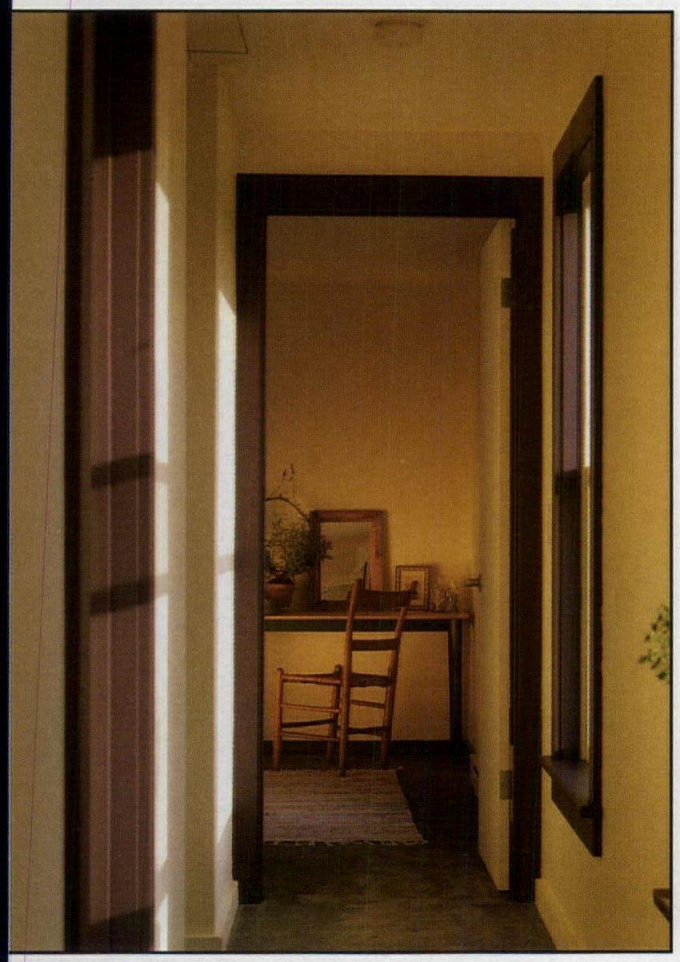
Hard Costs:	
Manufactured Unit (Strattan)	
Base Price	$43,729
Sales Tax	1,836
State Seal	400
Set-up Allowance	1,500
Freight Charge	1,389
Subtotal	48,854
Foundation (Burus)	4,348
Rough Carpentry (Burus)	6,066
Sitework (Burus)	3,936
Car Pad (Burus)	500
Builder's Fee (Burus)	3,000
General Conditions (Burus)	
Billed Supervision	1,000
Permits	1,015
Misc. Labor	800
Tool Rental	60
Temp. Power	300
Prints	75
Engineering	250
Portable Toilet	100
Clean-up	300
Dumping Fee	200
Subtotal	4,100
Capping Water Lines	1,140
Hard Cost Total	$71,944

There were some mitigating factors with some of the costs. The City of Cleveland picked up the tab for capping the water lines ($1,140). Also, the competition brief stated that costs related to dealing with the rubble from the previous apartment building were not to be applied to the construction cost (approximately $2,500). This brings the actual construction cost to $68,404.

Soft Costs:	
Architectural (Abacus)	$16,235
Subsurface Soil Investigation (BBC&M)	1,876
Structural and Site Engineering (C.V.Johnston)	4,784
Mechanical Engineering (C.V.Johnston)	1,100
State of Ohio Unit Documents (C.V.Johnston)	6,000
Soft Cost Total	$29,995

Western side of house with a view of downtown Cleveland.

Eastern side of house and 19th- and early 20th-Century houses across the street.



First floor hall.

Combined kitchen and dining room.

replaced with red cedar clapboards at no additional cost. Not including delays incurred as a result of the siding difficulties, construction of the two modules in the factory took approximately ten days.

In tandem with activity at Strattan, the foundation and utility work was being completed by the local contractor, Burus Development Corporation. Our original strategy was to use an auger drill to bore below the rubble of the previous building – an idea that was simple and elegant but, on this site, impossible. The debris from the demolished apartment building ranged from steel beams and sections of masonry walls to remnants of the boiler – items the auger could not penetrate. Also, the site's sandy soil tended to cave in any hole being bored. In the end, half of the pier holes had to be dug with a backhoe.

On Tuesday, April 14th, both modules arrived at the site in Cleveland from Strattan (150 miles distant) at approximately 11:30 a.m. By the end of the day both units had been set in place, the roof unfolded, and the triangular gable ends fastened. In the following days the "buttoning up" work was carried out, which included installing the trim boards, clapboarding the seam between modules, making the utility connections, and sheetrocking the interior access holes and the seams between modules.

The porch design had undergone two important modifications from the original entry design. We lowered the porch floor to improve the sense of flow from the yard up into the house and to avoid the requirement for handrails and over 50 feet of porch railing. We also detailed the porch so that it could be prefabricated in the factory and assembled on site. The columns sit outside the perimeter of the porch, enabling the deck to be built in panelized sections, which were then to be lifted into position and bolted to the columns. Along the house, 1"-diameter galvanized pipe lengths are countersunk into the rim plate of the deck and the siding of the house; these act as spacers through which lag bolts are fastened to the framing of the house. In this way we could avoid the time and expense of flashing the connection of the porch to the house. Unfortunately, scheduling and manpower dictated that we build the porch on site, so our ideas about its prefabrication were never put to the test.

There were the usual aggravations of bad weather, back-ordered material, and inattentive subcontractors. The addition of a hovering architect, some energetic interior designers (who were furnishing the house as it was being finished), and a major public relations event made the construction site a hectic place the last two weeks in April. Five and one-half weeks after starting on the assembly line, the house was formally dedicated and photographed for publication.

Lessons Learned

This house has always been considered a prototype, and we have learned many general lessons from it, some mundane and pedantic, others far more profound. When P/A first announced this competition in January of 1991, the editors expressed a desire to take a more active role in addressing the housing problems that plague this country. With some sense of urgency P/A sought to examine the obstacles

Second floor living room with sloped ceiling.

Project: *P/A's Affordable Housing Initiative, Cleveland, Ohio.*
Architects: *Abacus Architects & Planners, Boston (Bryan Irwin, David Pollak, Anne Tate, principals, with Gabriel Feld; Douglas Dolezal, Susan Hoadley, Carmen Lenzi, Kristopher Musumano, project team).*
Client: *Penton Publishing, Cleveland.*
Site: *nearly flat corner lot, 66' x 103', in older neighborhood, with buried debris from former apartment building.*
Program: *freestanding house to accommodate variety of households: a conventional family of two adults and two children, a single parent with three children, three unrelated adults, two unrelated adults each with a child, and parent with an adult child who also has a child.*
Structural system: *pier foundation with standard wood-frame bearing walls; roof with stress-skin panels.*
Major materials: *red cedar siding, asphalt shingle roof, pressure-treated lumber porch (see Building Materials, p. 113).*
Mechanical system: *electric baseboards in tandem with R2000 Energy Construction Package.*
Consultants: Decorating Remodeling *magazine (Wendy Silverstein, Chris Churchill) and Abacus, interiors; C.V. Johnston & Associates, structural and mechanical; BBC&M Engineering, geotechnical.*
Contractors: *Strattan Building Systems, module manufacturer; Burus Development Corporation, local contractor; Wright Landscaping, Green Valley Farms, Garick Landscapers, landscaping.*
Photos: *Walter Smalling (except where noted).*

to providing meaningful and affordable housing for a wide spectrum of households. We hope that through this process we have helped identify and describe some of these hurdles.

First, there is a recurring economic paradox in the need to spend money in order to save money. Innovative design requires a substantial initial investment. Without the commitment from P/A, we would have been unable to invest our time, Strattan might not have been interested in one house, and the city and the bank would not have bent over backwards to help the project move forward. This process illuminated for us the significant role that P/A played, a role that has at times in the past been filled by corporate and government initiatives aimed at encouraging the construction of housing.

Rising soft costs constantly threaten to absorb savings made in the hard costs of housing. The City of Cleveland sold the lot through a land bank program for only $100, but we were required to cap the old water lines running into the site, at a cost of $1,140. Also, a potential home owner applying for a construction or home loan would normally be required by the bank to have an environmental assessment performed to ensure that the bank would not hold title to a site with environmental liabilities. The average assessment fee is approximately $2,000. These two costs alone would amount to nearly 5 percent of the $65,000 target construction price.

Although the industrialized housing industry offers great potential in terms of low-cost construction, start-up costs for new models are expensive, and manufacturers have little incentive to experiment. Much of the expense is regulatory, particularly in a state such as Ohio, which lays down a gauntlet of bureaucracy for manufacturers, the likes of which no stick-built contractor has ever seen. This resistance to change is reinforced by a very conservative housing market, where people are often looking for safe resale value over an appropriate lifestyle match.

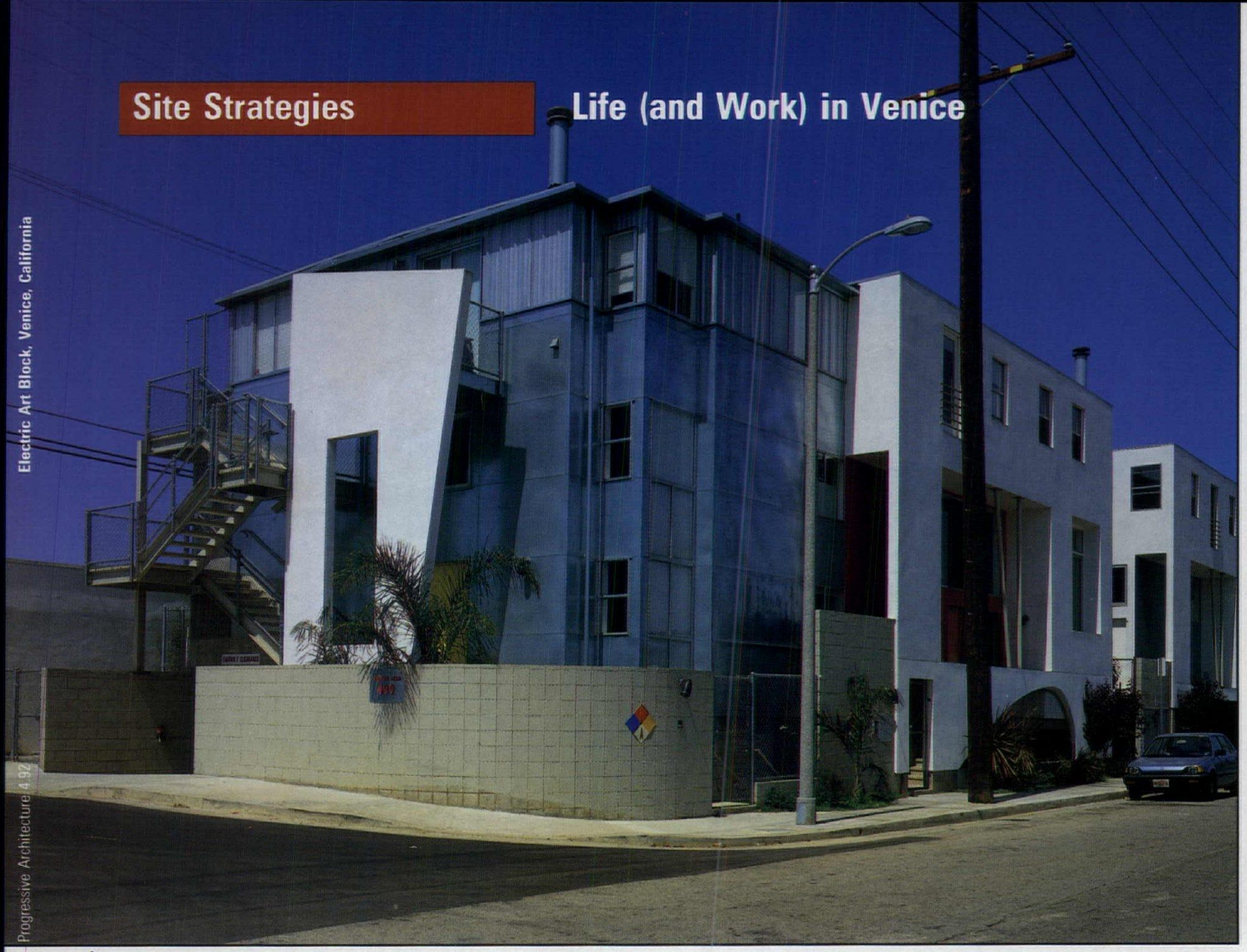
Second, we as architects need to be a more effective force in finding solutions. This means moving beyond thinking of ourselves as a service industry, reacting to society's market demands. We have an important perspective to bring to policies of land use, regulation, and financing. We should actively challenge the banking industry, which often refuses to provide financing for housing initiatives. We should actively challenge certain code and regulatory requirements that add costs to housing with little or no payback in terms of public safety and that are often the result of lobbying efforts by the insurance industry or labor unions.

But most important, armed with the awareness that our landscape and built environment are not the products of unseen and unknown forces, we as architects must get involved.

Bryan Irwin, David Pollak, Anne Tate. ■

The authors are partners in the Boston firm of Abacus Architects & Planners. Bryan Irwin teaches at Harvard's Graduate School of Design, David Pollak at the architecture school at Roger Williams College, and Anne Tate at the architecture school at the Rhode Island School of Design.

Life (and Work) in Venice



Electric Art Block, Venice, California

1

On a former streetcar easement, architects Koning Eizenberg design lofts for the artist's life.

The Venice Art Block by Koning Eizenberg represents a new kind of housing: newly built artists' lofts. The project is also notable for finding a use for a narrow parcel that had formerly been a streetcar easement.

The project consists of a row of 20 townhouses and apartments on a 50-foot-by-360-foot parcel, formerly part of the old Red Car line that linked much of greater Los Angeles. The Venice area has traditionally been a colony of artists and architects, who have increasingly faced the pressure of rising rents in this fast-gentrifying area. Venice, in fact, is one of the few communities where people of different income levels coexist in close proximity: the area is a sometimes lumpy mix of affluent advertising executives, low-income creative people, and the urban poor. To help keep artists in the area, a recent Los Angeles city ordinance created an "overlay" zoning on commercial land allowing artists to both live and work in the same building. (People must have artists' sales licenses from the city to be eligible as tenants in the Art Block.)

The project mediates between a busy commercial strip to the immediate south and a neighbor-

2

hood of prim little houses to the north. Because the water table is high at this oceanside location, the developers were able to excavate only about six feet; a parking garage occupies the garden level, and front entrances are a half-flight up.

To break up the 300-foot length of the project, architects Julie Eizenberg and Hank Koning shaped the block into five white "blocks," each about 40 feet across, that alternate with narrower, recessed spaces. "The average residential parcel is about 40 feet across, so we tried to preserve that rhythm," says Koning. On the south side of the project are open decks, which can be seen from busy Abbott Kinney Boulevard; the sight of people on the decks adds a sense of scale and humanity to a project that some local residents have criticized as tall and aggressive. Residents include a composer, who has created a Soho-style "performance space" in his loft, and a fabric designer.

The rawness of the materials – galvanized steel, tension cables, off-the-shelf steel steps, concrete block – reflects both the "shell" aesthetic of loft housing and the rage for industrial materials in surrounding Venice. The Art Block, in fact, appears almost conservative in an area where the sorcerer's apprentice of avant-garde architecture has been let loose.

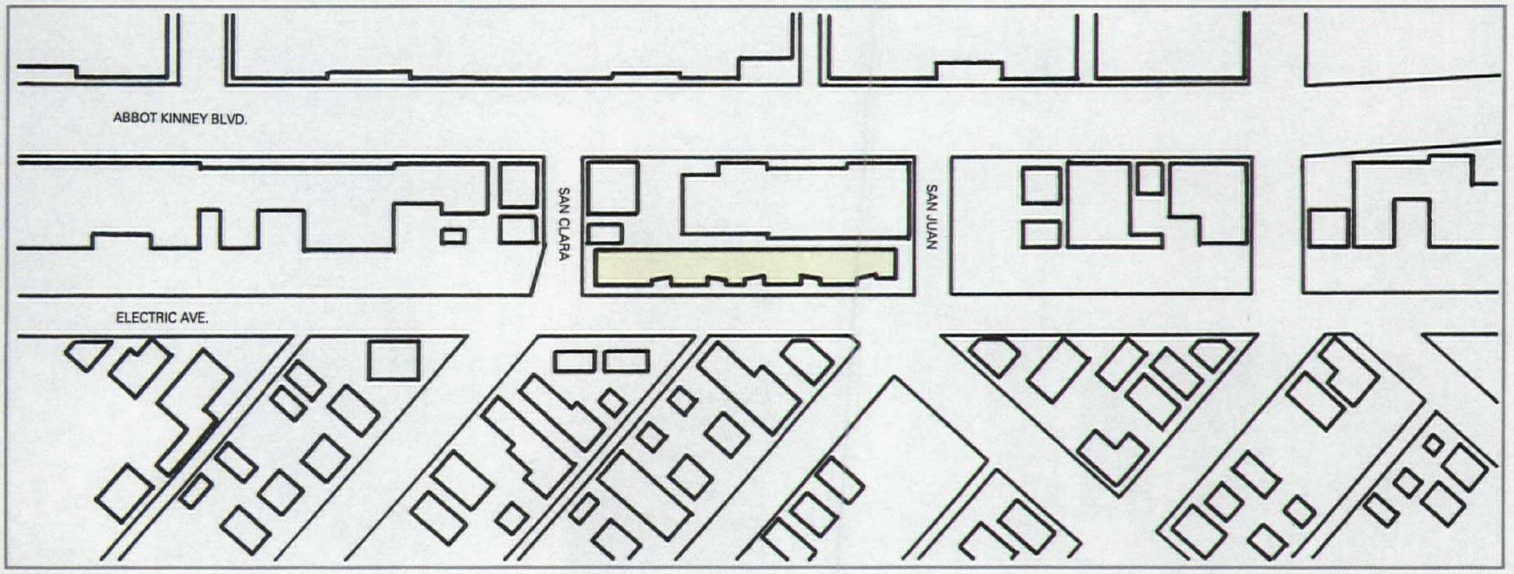
Inside, the units are very simple: open stairs lead to a second-story mezzanine overlooking the ground-level space, while a third story provides further privacy and features an open roof deck. The orientation of the Art Block, almost exactly on an east-west orientation, is well suited for daylighting; the architects included large north windows and provided external shades for the south-facing windows to block out most of the summer sun. The open stair towers employ passive cooling, with the air shafts serving as thermal chimneys by allowing warm air to rise and create a breeze.

The units range in size from from 485 to 1670 square feet. The developer, Glenn Erikson, whose development company is the general partner in the project, is currently a resident of the Art Block, along with his wife and two young children. "In most houses where you work at home, work seems peripheral to living," he says. "In the Art Block, work seems central and living seems peripheral."

Morris Newman ■

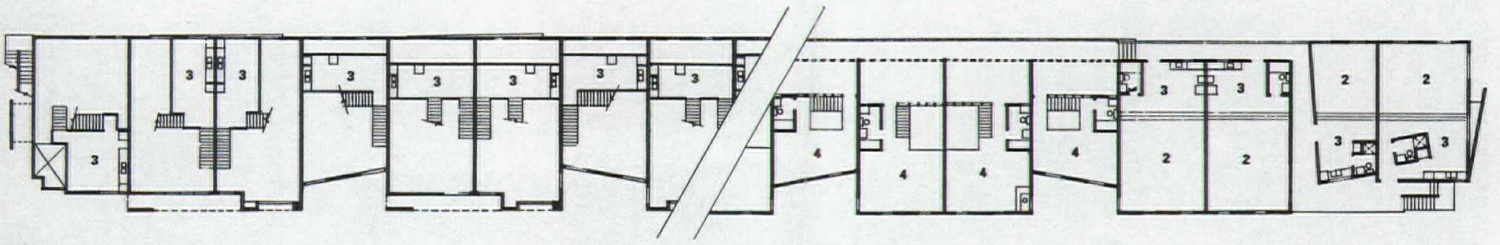
The author is P/A's correspondent in Los Angeles and senior editor of California Planning and Development Report.

The Art Block is divided into 40-foot blocks of stucco-covered concrete block, alternating with narrower recesses covered with galvanized metal (2); the massing echoes the rhythm of surrounding blocks of single-family houses. The architects say that the massing is also intended to suggest train cars, in homage to a trolley line formerly located on the site. Large windows accented by metal rods provide the artists and artisans with north light. A view of the east end (1) reveals the shallow 50-foot depth of the parcel. The screen wall regulates sunlight for east-facing balconies.



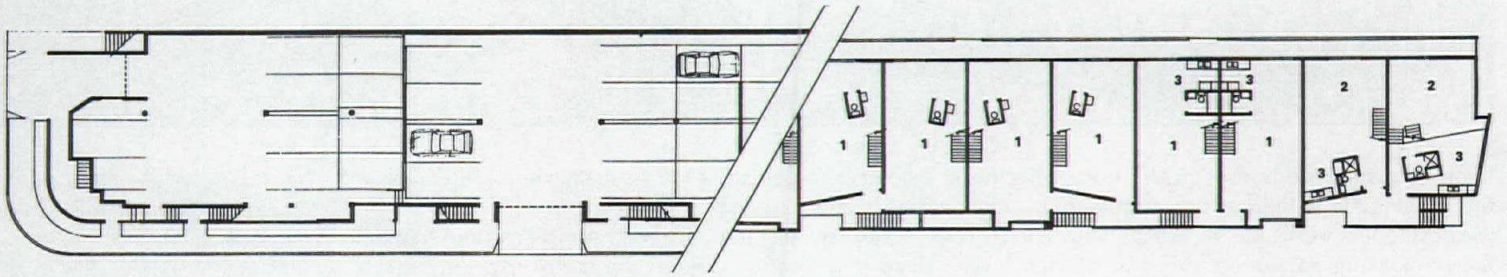
SITE PLAN

N 100'/30m



MEZZANINE FLOOR PLAN

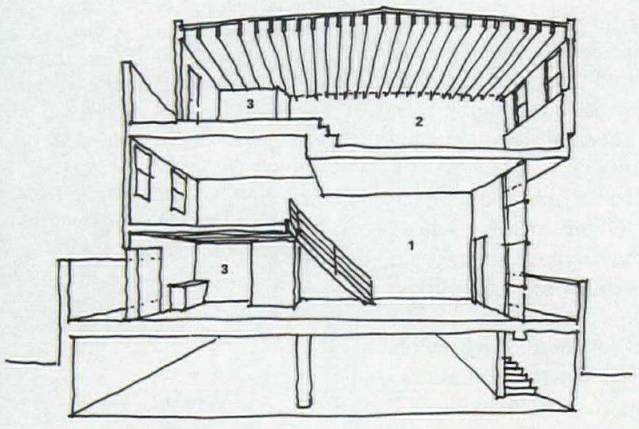
SECOND FLOOR PLAN



GARAGE FLOOR PLAN

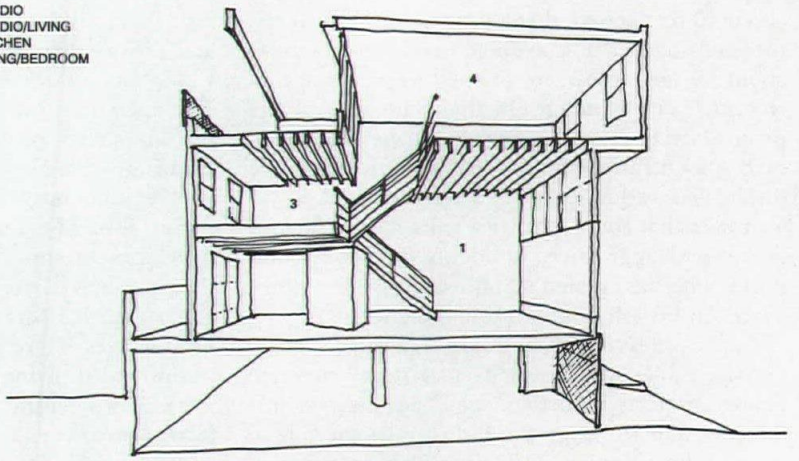
40'/12m

FIRST FLOOR PLAN



SECTION THROUGH TWO-LEVEL UNIT AND FLAT

1 STUDIO
2 STUDIO/LIVING
3 KITCHEN
4 LIVING/BEDROOM



SECTION THROUGH THREE-LEVEL UNIT

3

Smaller studio units are clustered in the block at the building's west end (3). A typical three-level unit (4) includes a first-floor workspace, a mezzanine kitchen, and a third-floor living area. The shell-like simplicity of the spaces is a reminder that the Art Block has been marketed as artists' lofts.

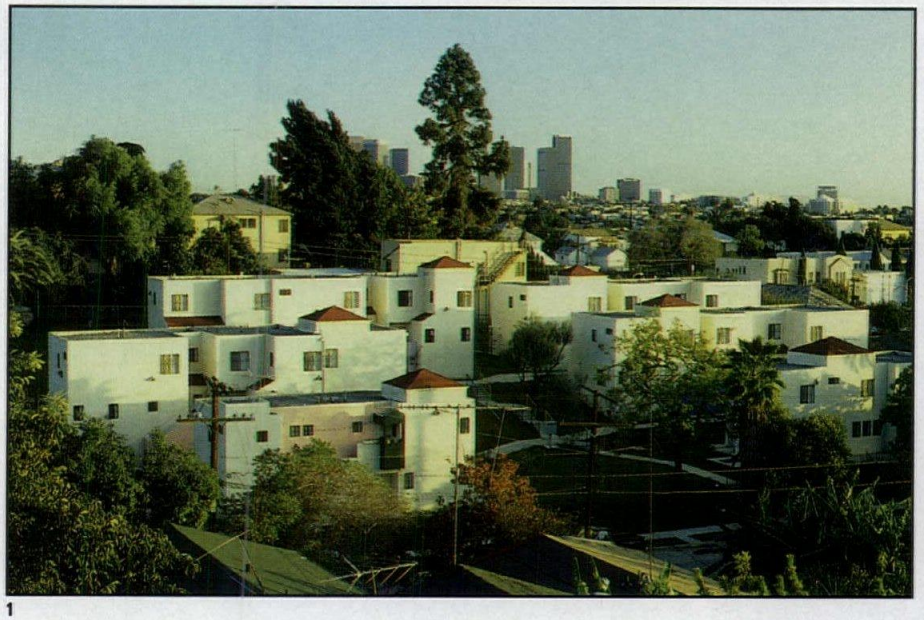
Project: *Electric Art Block, Venice, California.*
Architects: *Koning Eizenberg Architecture, Santa Monica, California (Julie Eizenberg and Hank Koning, principals in charge; Stuart Emmons, project architect; David Woo, Susan Stevens, Leem Jong Jang, Tim Andreas, project team), with Glenn Robert Erikson, AIA.*
Client: *Venice Art Block, Ltd., Los Angeles.*

Site: *a 0.4-acre former railroad easement running between low-scale commercial and single-family residential areas.*
Program: *20 live/work spaces for artists totaling 23,467 sq ft, with enclosed parking for 46 vehicles.*
Structural system: *wood frame over cast-in-place concrete deck with concrete block foundation walls.*
Major materials: *galvanized sheet metal, smooth-troweled stucco, chain link, exposed wood framing, paint (see Building Materials, p. 113).*
Mechanical systems: *individual, industrial-type gas space heaters; central solar water heating.*
Consultants: *Jay Griffith, Griffith West, landscape; Jilla Almozafar, P.E., structural; Group de Ville, energy.*
General contractor: *Herman Construction, Tarzana, California.*
Costs: *$1,621,000 ($36/sq ft, including garage).*
Photos: *Roland Bishop.*

4

Affordable Hillside

On an unused parcel designated for a freeway, Bruce Sternberg's Imogen Apartments borrow from L.A.'s single-family housing tradition.



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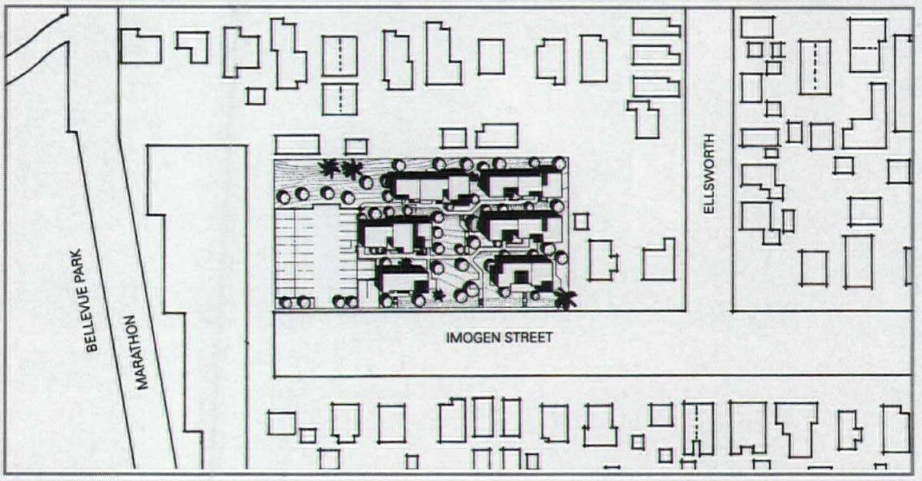
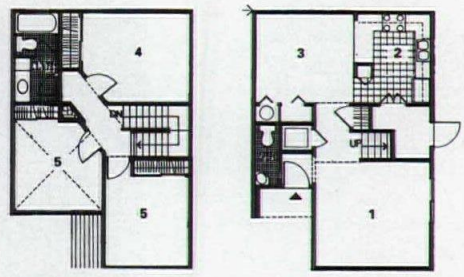


SITE PLAN

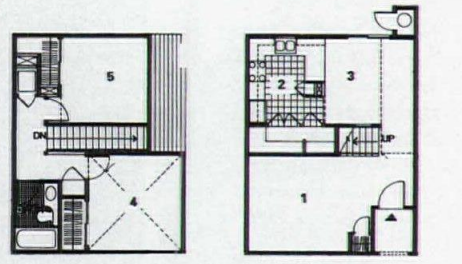
Bruce Sternberg's Imogen Apartments are an attempt to create medium-density housing in a neighborhood of aging, single-family bungalows without disrupting the character of the street. The neighborhood is a largely Hispanic area near downtown Los Angeles, on the edge of the hilly Silverlake district. The developer bought the sloping, one-acre parcel from the California Department of Transportation, which had earlier intended it for freeway construction.

The developer, a nonprofit home builder, had originally planned the 16-unit townhouse complex as co-op housing, and intends to convert them over time. Sternberg thus arranged the housing in six free-standing clusters to emphasize the sense of privacy and ownership, avoiding the centralized courtyard scheme more typically seen in affordable housing on a small site. To his regret, the backyard fences which would have provided further privacy were never built, exposing the underdetailed backs of the townhouses.

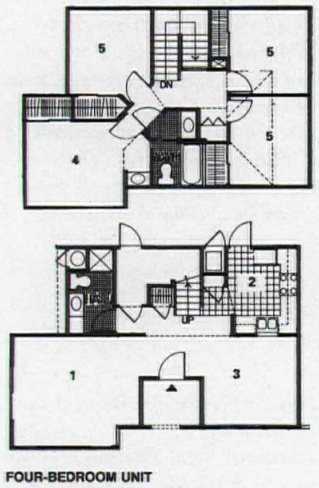
The steep site presented a number of challenges, particularly given the builder's spartan budget. Rather than excavate, the architect chose to place the buildings atop "stem walls." This



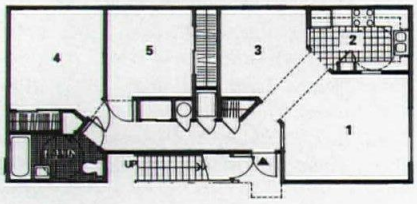
THREE-BEDROOM UNIT



TWO-BEDROOM UNIT



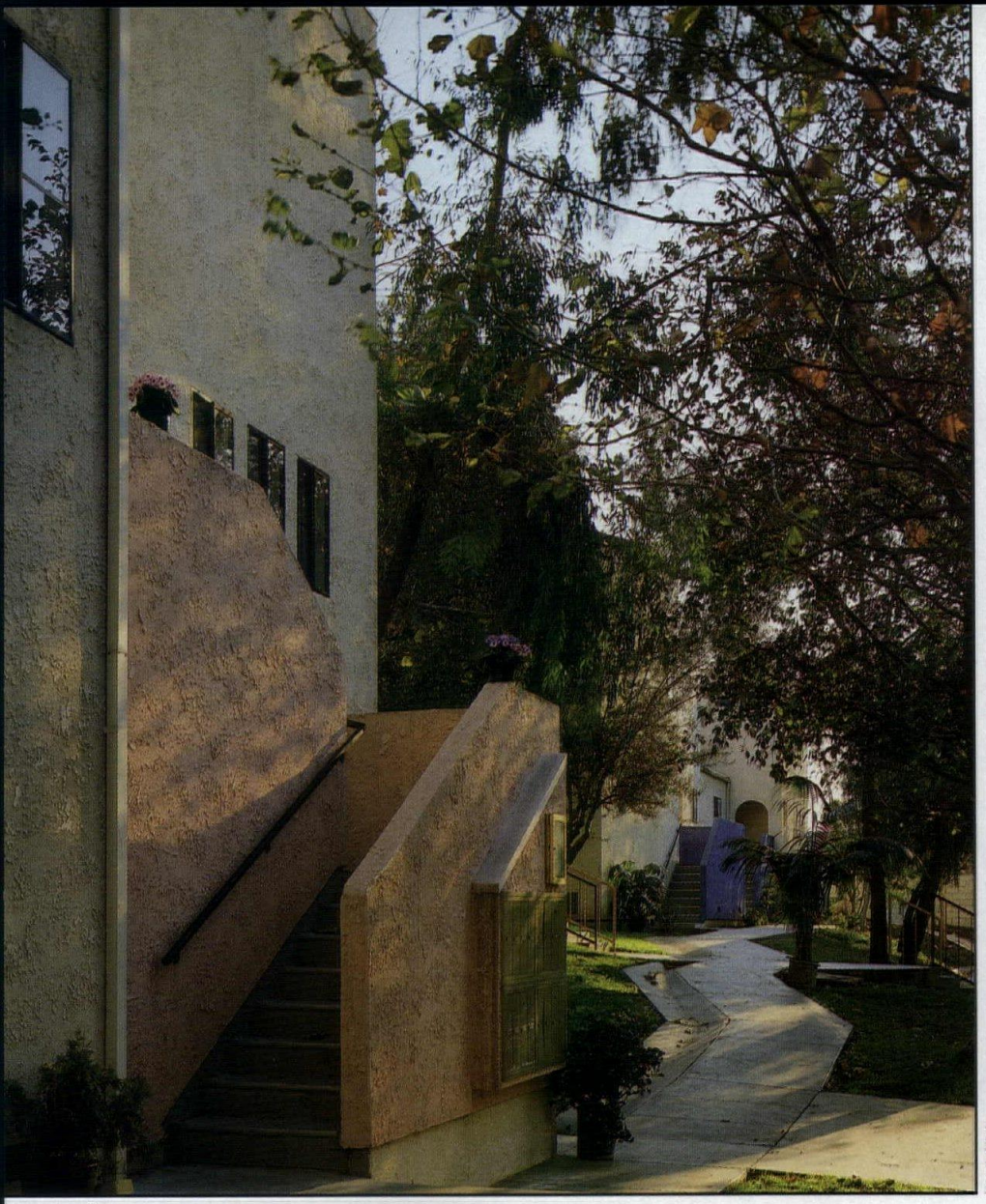
FOUR-BEDROOM UNIT



HANDICAPPED-ACCESSIBLE UNIT

1 LIVING
2 KITCHEN
3 DINING
4 MASTER BEDROOM
5 BEDROOM

20'/6m



2

To make the project conform to the scale and rhythm of the surrounding single-family homes (1, site plan), two small buildings, each containing two units, occupy the street frontage; the remainder of the buildings, each containing four units, are located farther from the street. Within the site, stairs and entries provide semi-private space (2). Interiors (3) are inspired by Los Angeles bungalows.

Derek Rath

3

strategy means the front door is often several feet above grade, creating the need for stairs, which become strong diagonal elements in the elevations.

Sternberg completed the Imogen Apartments project in 1987, before Neo-Traditional planning gained wide attention, but his approach has some features in common with that doctrine: his design emphasizes the importance of covered entries and front stairs. The stairs, shielded by a wall, provide a "semi-private" space that intervenes between the absolute privacy of the home and the public area.

Unlike the Neo-Traditionalists, however, Sternberg accomplishes his contextualism not through copy-cat design, but through subtle, minimal nods to tradition. The imagery of the apartments derives in part from the so-called Spanish style of home building common to the neighborhood. The simple arches and diagonal profiles of external stairs are suggestive of the thick-walled building of Hispanic tradition.

Most traditional are the plans of the Imogen Apartments, which offer an approximation of the bungalow style of living. Instead of simplifying and combining interior spaces in the manner of many affordable housing schemes, Sternberg created many discrete spaces in each unit.

Informal landscaping covers the steep up-slope of the site, and continues north beyond the housing, to provide a green margin to a prosaic parking lot. "People often socialize here as they work on their cars, so I thought it would be good to make the environment as nice as possible," says Sternberg. He adds that local residents nixed plans to plant trees in the parking lot itself: they did not want tree resin to fall on their newly waxed cars.

Not all developers and designers in Los Angeles show as much care in multifamily housing as have Sternberg and his client. Shortly after the Imogen Apartments were completed, developers built a high-density apartment complex at the end of Imogen Street, blocking the view and denying easy access to the park behind it. The context that Sternberg worked hard to preserve has been all but destroyed by insensitive zoning and the wrong kind of developer incentives. In this setting, Sternberg's sensitive project appears a defiant David against a Goliath of speculation. **Morris Newman** ■

The author is P/A's Los Angeles correspondent and senior editor of California Planning and Development Report.

Project: *Imogen Apartments, Los Angeles.*
Architect: *Bruce Sternberg, Los Angeles.*
Client: *Route 2 Community Housing Corp., Los Angeles.*
Site: *sloping one-acre tract intended for freeway construction in residential neighborhood.*
Program: *16 apartment units ranging from 850 to 1250 sq ft, to be converted to a limited equity cooperative (total area: 16,165 sq ft).*
Structural system: *wood frame on spread concrete footings.*
Major materials: *plaster, carpet, vinyl tile, gypsum board (see Building Materials, p. 113).*
Mechanical system: *package hot-air gas furnaces.*
Consultants: *Barrio Planners, landscape; Albert Halimi, structural; Rouhy Dehbibi, mechanical; Mirahmadi & Associates, electrical engineering; Christopher C. Chan, civil engineering.*
General contractor: *EAC Construction.*
Costs: *$717,000 ($44.35/sq ft).*

Stick and Steel

The Benedict Cottages, Lawrence, Kansas

1

The preservation of a historic house and the addition of three cottages designed by Rockhill & Associates yield five unusual apartments in Lawrence, Kansas.

A restored Victorian house and three steel-clad cottages have attracted attention in the Oread neighborhood near the University of Kansas. The house and its cottages represent a strategy to preserve historic assets while at the same time offering an opportunity for innovative new construction. Furthermore, by employing previously used materials and the handicraft of their own design-build staff, Rockhill & Associates have offered a new high-quality housing option for the community at a modest cost. Each of the five two-bedroom apartments rents for about $600.

Dan Rockhill, who teaches architecture at the university, has watched builders clear out historic single-family houses and replace them with low-rent, cinderblock student apartments. Although this cookie-cutter housing is cheap, it is designed for transient populations, ignoring the community's need for durable housing. When the Lawrence Preservation Alliance bought the Queen-Anne-style Benedict House in 1987 to save it from destruction, they planned on renovating it as a single-family house. But serious structural problems and the high cost of land near downtown Lawrence meant that simply renovating the house, even with volunteer labor, would cost the Alliance more than the house could be sold for.

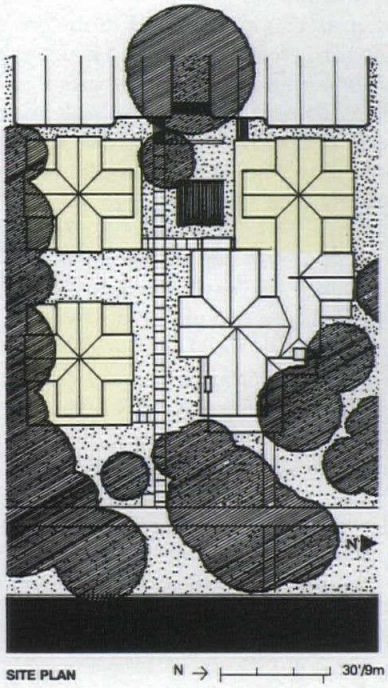
The Alliance approached Rockhill to develop a scheme to save the house. The solution was to divide the house into two rental apartments and use the generous double lot to construct a "campus" of three more cottage apartments. Income from the rentals would offset the cost of construction loans. A tight $198,000 budget included the renovation (which had to meet State and National preservation guidelines to qualify for loans) and new construction. Extensive repairs to the Benedict House entailed moving the entire building to replace its foundation. Because this work would not have been feasible without the cottages, it was one of the first projects consisting of both preservation and significant new construction to receive a National Trust loan .

A Sense of Craft

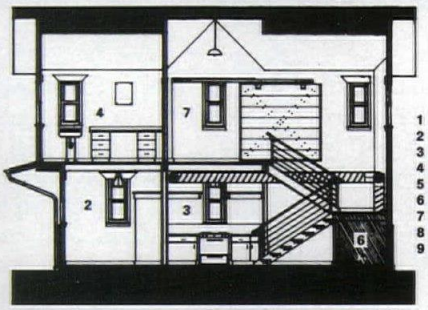
The preservation of the house, although labor-intensive, was straightforward. It is the three new cottages, however, that stand out. In massing and form, the cottages echo the Victorian house, but the materials and programmatic flexibilty are in-

2

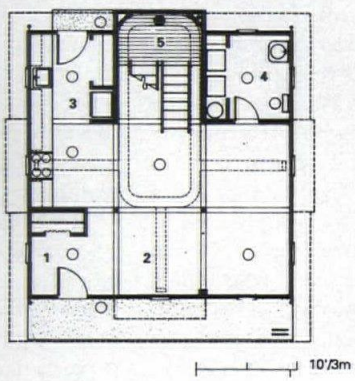
3



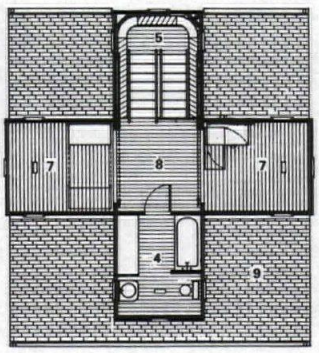
SITE PLAN



COTTAGE SECTION



COTTAGE FIRST FLOOR WITH REFLECTED CEILING PLAN



COTTAGE SECOND FLOOR

The Benedict House, a Kansas State Landmark originally constructed in stages between 1867 and 1890, now shares its double lot in a residential neighborhood with three steel-clad cottages (1).

Previously used materials contributed to construction economy. On the interior, the stair railing is made from angle stock and gussets once used for the construction of electric transmission towers (3). Kitchen and bathroom cabinets were salvaged from a chemistry laboratory. New materials were used with minimum finishes – polished concrete floors, clear-finished wood, and exposed ductwork. On the exterior, the base of the cottages is salvaged 7/8-inch-thick Virginia greenstone, a material found in a demolition yard and purchased at a cost of 35 cents a square foot. The exterior solid-core oak veneer doors come from university classrooms; the light fixture is also salvaged (2).

4

The cottages are carefully detailed at eye level with green stone, half-round downspouts, and hand-folded shingles (4). The shingles were made by cutting the 4' x 8' sheets of galvanized metal into 12" x 12" squares.

Project: *Benedict House and Cottages, Lawrence, Kansas.*
Architects: *Dan Rockhill & Associates, Lawrence (Dan Rockhill, David Sain).*
Client: *Lawrence Preservation.*
Site: *a double city lot.*
Program: *the rehabilitation of the Benedict House and the construction of three new units.*
Major materials: *see Building Materials, p. 117.*
Contractor: *Dan Rockhill & Associates.*
Cost: *$198,000 ($45/sq ft.)*
Photos: *Hobart Jackson.*

novative. Rather than imitate the style of the Benedict House, Rockhill aimed to create the "same level of craft and detail."

The most striking example of Rockhill's craft is apparent in the 26-gauge galvanized steel cladding cut, folded, and installed by hand. Other details such as interior columns that express the structural grid and the star-shaped ceiling vault that marks the center of the roof create a sense of connection with the building's construction .

Although neighbors objected to the shiny metal cladding, which in Kansas conjures up images of rural poverty, the architects have been able to resist those who wish to paint it white. To support his use of exterior steel, Rockhill's research demonstrated that the use of sheet-metal siding here is historically correct. Sheet metal was widely used in building in the late 19th Century (though it was generally used for roofing and commercial buildings). As early as 1850, A.J. Downing, in his book *The Architecture of Country Houses,* advocated the use of metal in building. This material, says Rockhill, comes from the same roots as "the ubiquitous aluminum siding."

Economy and Flexibility

A number of strategies contributed to the cottages' high quality on a low budget. Construction and the use of materials were standardized as much as possible by using a nine-square grid, and the salvaged materials allowed the use of more durable materials than the budget would ordinarily have allowed. The plan provides flexible living spaces that can accommodate a variety of lifestyles. The downstairs living area is open and the upper floor has movable barn doors that allow the floor to be divided into two private bedrooms, a bedroom and a study, or one large space. Like the Benedict House, the cottages have no closets upstairs, but have freestanding wardrobes that can be moved to suit the tenants needs.

Rockhill & Associates are currently working on a second set of "historic house and cottages" a few blocks away that employs an entirely different palette of materials relating to the history of the house and the regional traditions. This second project, like the first, demonstrates that Rockhill's approach is a flexible and inventive model for infill housing. **Julie M. Trelstad** ■

Housing for Women

Nurturing Independence

1

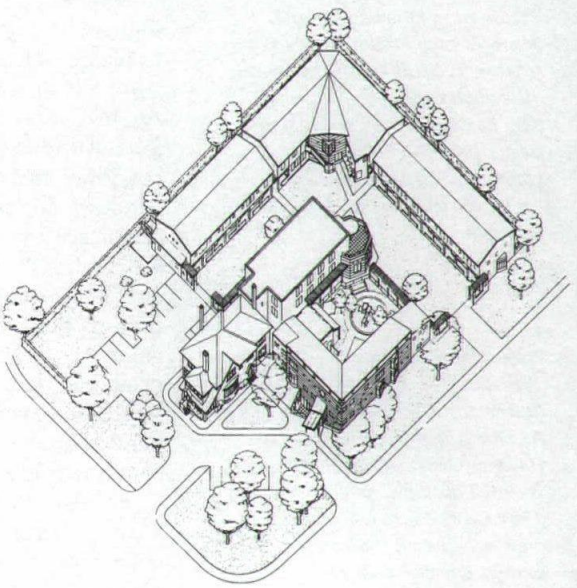
Single mothers are educated in self-reliance at Massey Centre, a courtyard-style refuge in Toronto by Paul Reuber.

Colonnaded housing façades reflect Massey Centre's intimate scale; communal facilities are behind the banded brick façade (1).

For young single women in need of pre- and post-natal care, the Massey Centre for Women in Toronto is an oasis, providing its residents with whatever it takes to cope with parenthood and achieve self-sufficiency. In addition to obstetric support, Massey Centre offers subsidized housing, cooking lessons, high school instruction, job counseling, and childcare facilities. The program was launched one year ago with the expansion and renovation of Victor House, a 1902 Victorian structure with a 1950s addition, and construction of 27 new apartments and townhouses.

"This [project] didn't need design. It needed the fine tuning of ideology," explains Paul Reuber, a Toronto architect who specializes in social housing. At Massey, two-story, colonnaded living quarters frame a series of courtyards and were inspired, says Reuber, by the connecting colonnades and private gardens of Carthusian monasteries and by the gracious quadrangles of English college campuses. Trellis-covered walkways are one of many elements designed to create a domestic environment.

Furnished one-bedroom apartments are used by dependent mothers and their newborns for up



MASSEY CENTRE FOR WOMEN, SITE AXONOMETRIC

2

Trellis-covered walkways and Massey's community daycare center form a small courtyard within the complex's larger quadrangle (2). The community center's entrance portal (4) and one of its playrooms (3) demonstrate Reuber's conscientious use of material and color.

Project: *Massey Centre for Women, Toronto.*
Architect: *Reuber Incorporated Architect (Paul Reuber, Chris Radigan, design; Chris Radigan, Dimitri Papatheodorou, presentation; Terry Cecil, Andrzej Wodkiewicz, drawing; Andrzej Wodkiewicz, contract administration).*
Client: *Nancy Peters, executive director; Massey Centre, Housing and Resources for Pregnant Young Women and Single Mothers.*
(continued on next page)

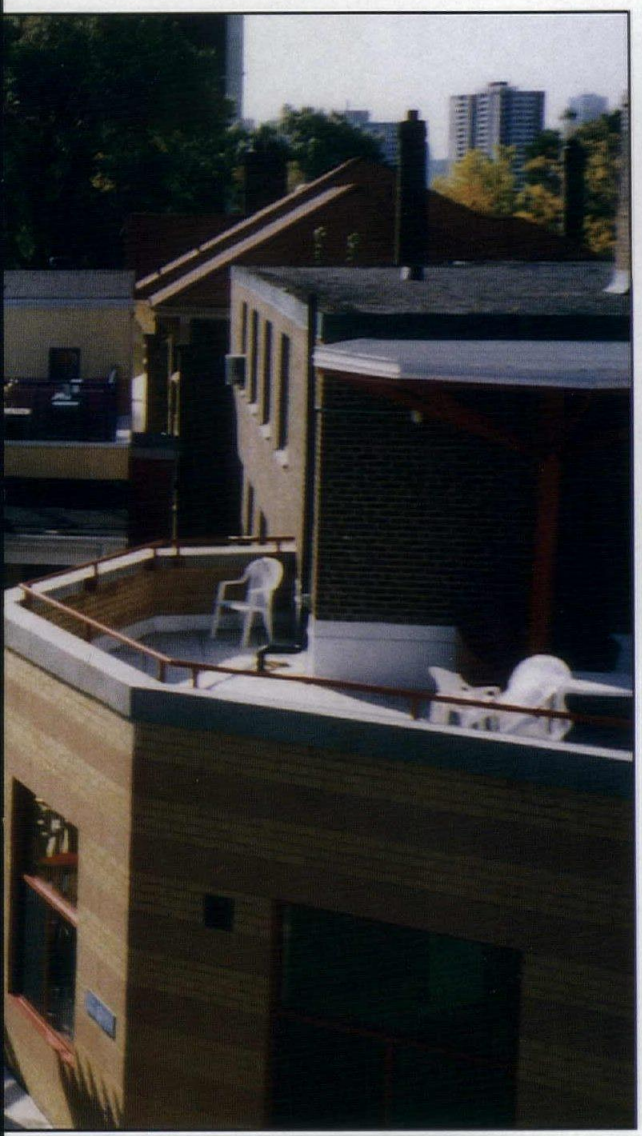
to six months; here, a 24-hour nursing station, a lounge, a teaching kitchen, and a laundry are available. The apartment building is flanked by two rows of townhouses, where mothers may live for two years while they resume their studies or jobs. All units are on two floors to dispense with corridors and allow for more fenestration (sealed windows are set at toddler height); kitchen windows face the courtyard so that children may be watched.

The L-shaped community daycare center – used by both Massey residents and neighborhood children – is adjacent to Victor House and its new octagonal addition, forming a courtyard and garden. The daycare center is suitably buoyant with a banded brick street elevation and tricolored stucco courtyard side.

Funded by government and private money, Massey Centre was completed despite NIMBY objections and politicians' old-fashioned complaints about the rewards of sin. Implicitly and by design, it is an example of architecture in service to conscience. **Adele Freedman** ■

The author is design critic for The Globe and Mail *of Toronto.*

3



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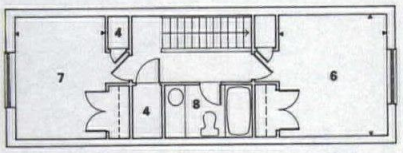
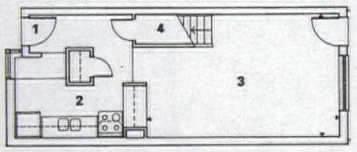
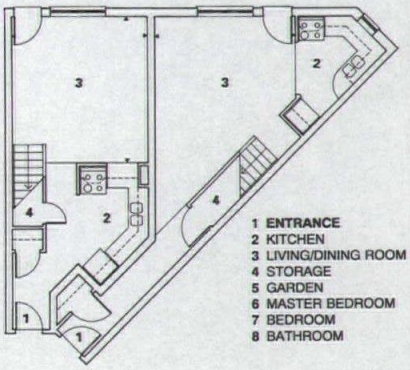




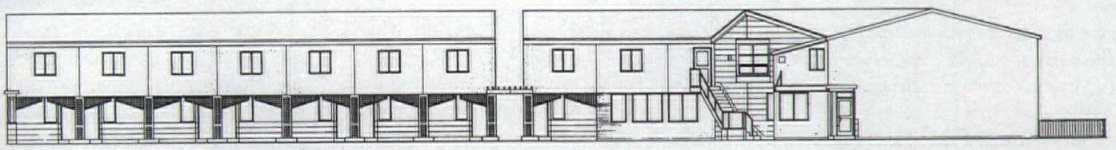
TYPICAL TWO-BEDROOM TOWNHOUSE, GROUND AND FIRST FLOOR PLANS



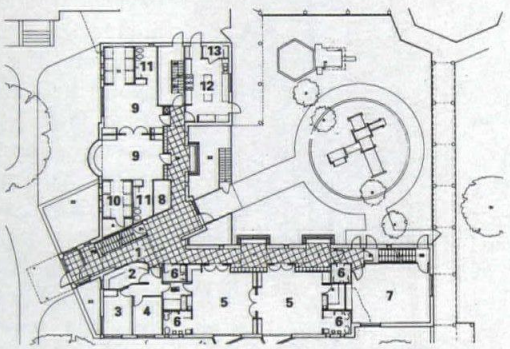
CORNER ONE-BEDROOM APARTMENTS, GROUND FLOOR PLAN

(continued from previous page)

Site: *rectangular site bordering commercial and residential properties.*
Program: *three residential infill buildings comprising 16 townhouses and 11 apartments, nursing and supervisor's offices, and laundry; a daycare center comprising reception, administrative, and staff offices, playrooms, and support facilities.*
Structural system: *wood frame.*
Major materials: *brick, reconstituted stone block, batt and rigid insulation, drywall, stucco.*
Mechanical system: *beneath slab heating cables, electrical baseboard heating, tempered makeup air (residential); forced air furnace (daycare).*
Consultants: *James Floyd & Associates Landscape Architects, landscape; C&V Engineering Structural Engineers, structural; Sigma Engineering, mechanical, electrical.*
General contractor: *Penn-Co Construction Ltd.*
Costs: *$3,772,232.*



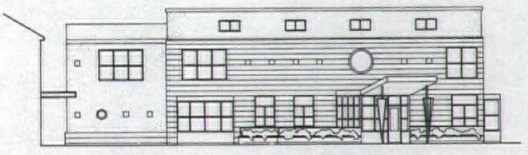
TOWNHOUSE AND APARTMENT BUILDING, WEST ELEVATION



1 LOBBY
2 RECEPTION
3 SUPERVISOR'S OFFICE
4 ADMINISTRATIVE OFFICE
5 TODDLER PLAYROOM
6 BATHROOM
7 MULTIPURPOSE ROOM
8 STORAGE FOR BABY CARRIAGES
9 INFANT PLAYROOM
10 INFANT SLEEP ROOM
11 INFANT CHANGE/BATHROOM
12 KITCHEN
13 PANTRY

N 20'/6m

COMMUNITY DAYCARE CENTER, GROUND FLOOR PLAN



COMMUNITY DAYCARE CENTER, SOUTHWEST ELEVATION 20'/6m

Housing for Women

Safely Linked

A village enclave by Mostoller & Travisano provides homeless mothers and children a suburban haven.

1

2

Approached from the driveway, the entrance to Amandla Crossing (1) appears subordinate to the houses that frame it. Seen from the air (3), the front door's relation to the compound's internal structure becomes clear. The yard, framed by axial buildings, has a playground, but the patios proposed here and between the houses were unfortunately dropped for cost reasons. The common lounge (2) is between the entrance and the daycare center, to give priority to Amandla Crossing's residential character. Offices line one of the flanking halls.

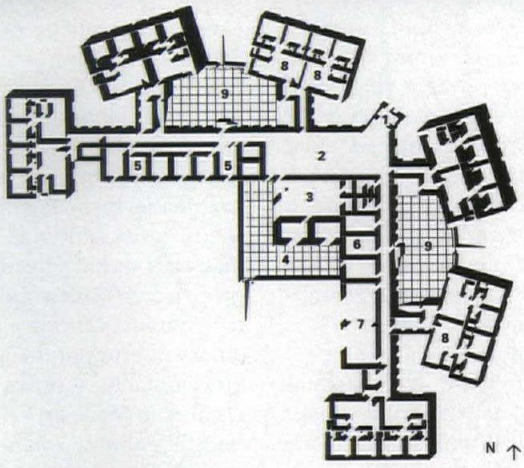
The broadest view of Amandla Crossing is also the most misleading: when photographed from the air, it resembles a *parti* model of grafted parts, with suburban houses annexed to two arms of Jeremy Bentham's 19th-Century Panopticon. Biased by this photo, I expected Amandla Crossing to be ungainly and stark: notions of domesticity were displaced by images of social engineering in the spirit of Bentham and his fellow Utilitarians.

But to visit the building and experience it on solid ground is to discover its successes: Amandla Crossing (the name comes from the Zulu word for power) is foremost a collection of multifamily houses, not an institution. It's a comfortable place to live, less rigid than it appears from above. Seen from the driveway, the six houses are sited in a curved pattern typical of the New Jersey suburbs. The array renders the apartments (five per house) a screen for the axes that contain a daycare center and counseling offices. These are an armature of support for the mothers and children who live at Amandla Crossing, a refuge from negligent and abusive husbands. During the course of a year here, women enroll in job training or at a community college – scarce options in welfare motels, their most likely alternative.

The architects, Michael Mostoller and Fred Travisano of Princeton, New Jersey, envisioned Amandla Crossing as a village with a Shaker aesthetic, economically rendered in vinyl siding. The *parti* changed to incorporate a single monitored entrance, a means to keep antagonistic (ex)husbands at bay. As a result, front and back are reversed: each house is a tributary to the support armature, with front doors in the cross axes. It's a curiously apt way to segregate the domestic from the institutional.

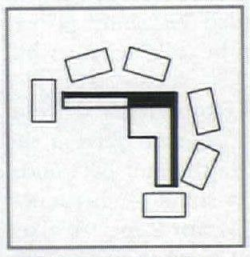
The outdoor areas between the houses were to have had patios with doors to the hallways, but limited funds mandated trees and grass, without the doors. The substitution highlights a shortcoming in the site strategy: the actual backyard – a broad lawn – is not addressed from Amandla Crossing's most important space, the junction of the two hallways. It seems fitting that the daycare center, adjacent to this crossing, has the best access and views of the yard. But mothers and older children ought to have a comparable vantage point and a more gracious route to the outdoors. Likewise, the sequence from the front entry and lounge to the daycare center seems more circumstantial than intentional. The array of houses is deliberately non-hierarchical to keep a modest public profile. But a clearer internal structure need not be more imposing. Instead, it could render Amandla Crossing a richer place for the families who call it home. **Philip Arcidi** ■

3

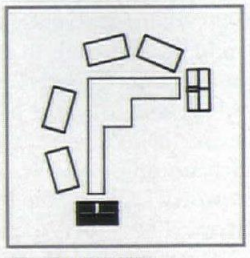


1 SECURE ENTRY
2 COMMON LOUNGE
3 DAYCARE
4 SITE OF PLAYGROUND
5 STAFF/COUNSELING
6 SERVICE
7 LIBRARY
8 2-BEDROOM APARTMENT
9 SITE OF LANDSCAPED SIDE YARD

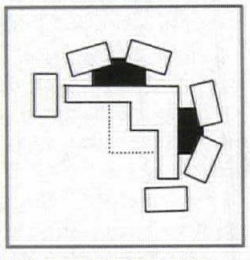
FIRST FLOOR PLAN



COMMUNAL INTERIOR SPACE



PRIVATE LIVING UNITS



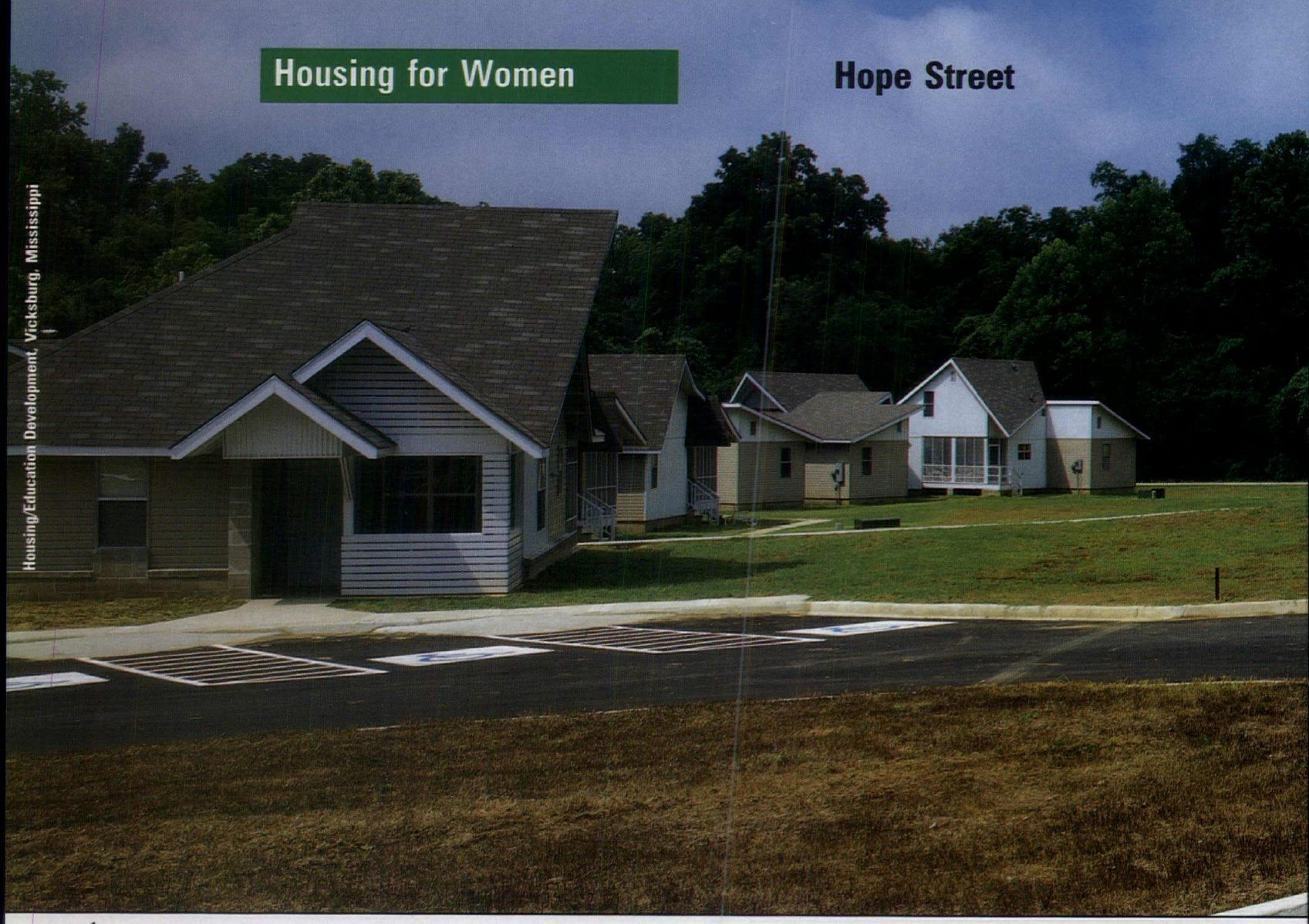
PROTECTED OUTDOOR SPACE

PRIVATE/PUBLIC STRUCTURES

Project: *Amandla Crossing, Edison, New Jersey.*
Architects: *Michael Mostoller-Fred Travisano Architects, Princeton (Fred Travisano, principal-in-charge; Randy Herko, project assistant).*
Client: *Middlesex Interfaith Partners with the Homeless.*
Site: *3.09 acres of surplus Federal land surrounded by industrial buildings, a community college, and single family homes.*
Program: *27 of 30 apartments in the 23,200-sq-ft complex are homes for single mothers and children for one year.*
Structural system: *wood frame, concrete slab on grade.*
Major materials: *vinyl siding, fiberglass roof, aluminum windows (see Building Materials, p. 117).*
Mechanical system: *gas-fired HVAC.*
Consultants: *Henry Arnold, landscape; Kipcon, structural/mechanical.*
Contractor: *Carl F. Jacobelli.*
Costs: *$1,464,594; $63.13/sq. ft.*
Photos: *Leigh Photographic Group.*

Housing for Women

Hope Street



Housing/Education Development, Vicksburg, Mississippi

1

A housing and social service center in Mississippi by Howorth & Associates provides a supportive environment for single mothers and children.

Driving through rural Mississippi, architect Tom Howorth points out houses in awful condition, signs of the crippling poverty that keeps people focused on survival. Single mothers in this condition are especially trapped: without childcare, they can't receive job training; without a job, they can't afford childcare. They are dependent on an array of social services and are often forced into substandard or overcrowded housing. "These women can't ask themselves 'What am I going to be doing five years from now?' " Howorth says. "That question is inconceivable."

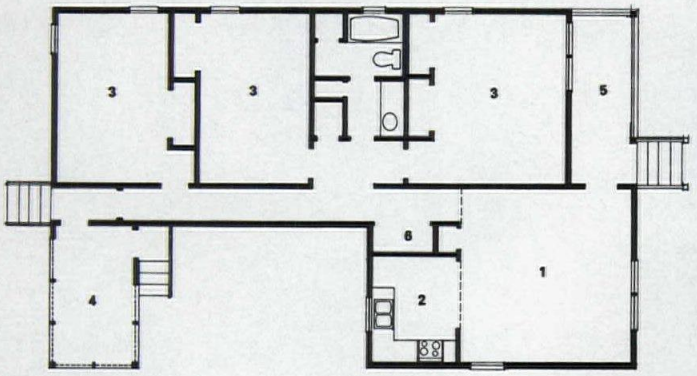
But a recent project by Howorth's firm in Vicksburg, Mississippi, hopes to provide women with the space and support to make a future for themselves. A nonprofit development group called V-Burg, Inc., with a combination of Federal, county, and city funds and private donations, has built a community of nine houses (four more are planned) where single mothers and their children can live and receive vital social services while being focused on a goal of self-sufficiency. The program, which includes childcare and job counseling, requires the women to enroll in an academic or technical program at a community college during their two-year stay in the project.

Ironically, Tom Howorth's inspiration for the design of the houses looks back to the dilapidated vernacular houses that are so indicative of this state's problem. These vernacular houses have a pragmatic formal language – screened porches, shed-roofed additions, asymmetrical gables, mixed materials – that Howorth considers especially appropriate to Mississippi. Howorth and former partners Samuel Mockbee and Coleman Coker used a quirky interpretation of this language in their work, most notably a series of houses for poor rural families in Madison County, Mississippi. That project, still unbuilt, won a First Award in the 1987 P/A Awards (Jan. 1987, p. 88). Howorth left the firm in 1990, taking the newly awarded Vicksburg project – and an approach to design he calls "familiar but transcendent" – with him.

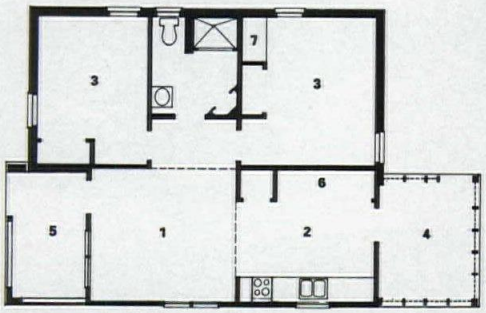
The site for the houses, formerly a drive-in movie theater, is in a valley, sheltered from the surrounding town by topography and by woods. Howorth's plan called for a street – christened "Hope Street" by Vicksburg Mayor Robert Walker – to run around the perimeter of the open site.

2

Sited in a sheltered "bowl," the Vicksburg houses and community buildings are grouped around a lawn (1). Four more houses are planned to complete the enclosure. The community buildings (2), which house childcare services, common spaces, and offices, echo the vernacular of the houses in steel and concrete block.

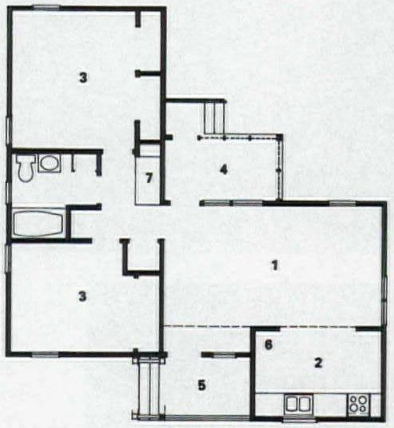


THREE-BEDROOM UNIT

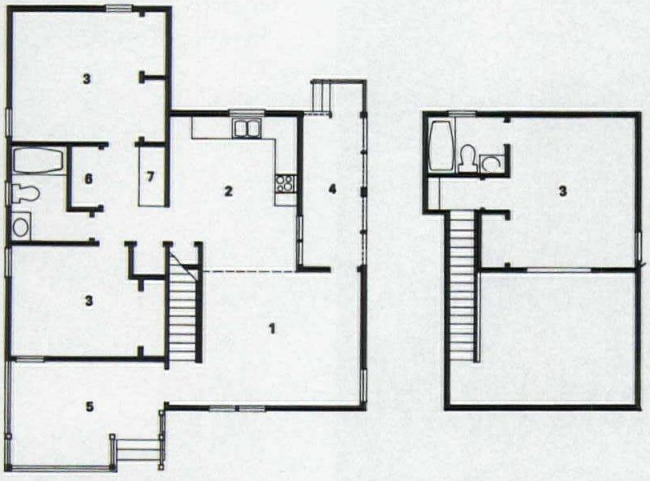


HANDICAPPED-ACCESSIBLE UNIT

1 LIVING
2 KITCHEN
3 BEDROOM
4 SCREENED PORCH
5 FRONT PORCH
6 LAUNDRY
7 STUDY DESK



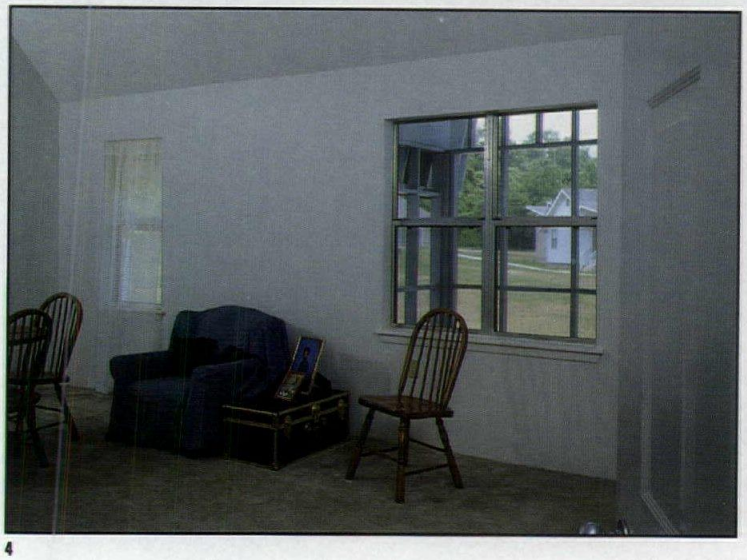
TWO-BEDROOM UNIT



THREE-BEDROOM UNIT WITH LOFT

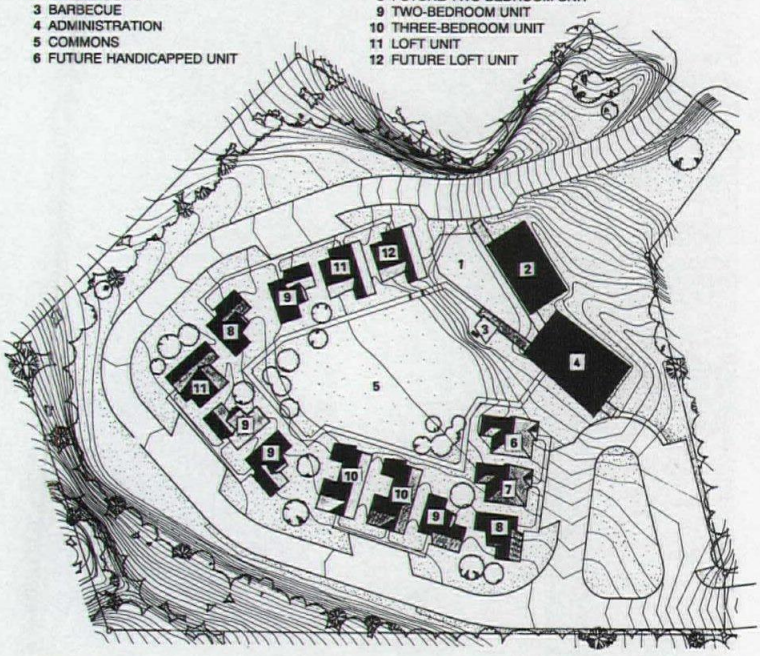
10'/3m

3



4

1 PLAYGROUND
2 CLASSROOMS
3 BARBECUE
4 ADMINISTRATION
5 COMMONS
6 FUTURE HANDICAPPED UNIT
7 HANDICAPPED UNIT
8 FUTURE TWO-BEDROOM UNIT
9 TWO-BEDROOM UNIT
10 THREE-BEDROOM UNIT
11 LOFT UNIT
12 FUTURE LOFT UNIT



SITE PLAN

N

100'/30m

5

The houses face the street, but are designed to open up to the central yard they share with the community buildings. The "backs" of the houses have screened porches, to heighten the sense of community while providing a measure of privacy. The prefabricated metal community buildings house childcare facilities, a pre-school, offices, a "community room," and a kitchen.

The first nine families moved in at the beginning of June, too soon for them to evaluate their new homes, but the mothers' enthusiasm and determination are visible. Where the women go after their stay is also a concern of V-Burg, Inc.: the organization is currently working on grant proposals to improve housing conditions in six neighborhoods surrounding the project.

The Vicksburg experiment is an important prototype for social housing. Besides bringing a variety of social services together for more efficient delivery, the plan brings women into a community where they can support each other. And Howorth's contribution – affordable, flexible housing with dignity and humanity – is an essential part of making it work. **Mark Alden Branch** ■

Four unit types (see plans, facing page) are arranged on a perimeter street. The houses present a guarded face to the street (3), with front porches Howorth describes as symbolic. Interiors (4) are conventional, except for vaulted ceilings in most living rooms. The rear screened porches (5) focus family life around the communal lawn.

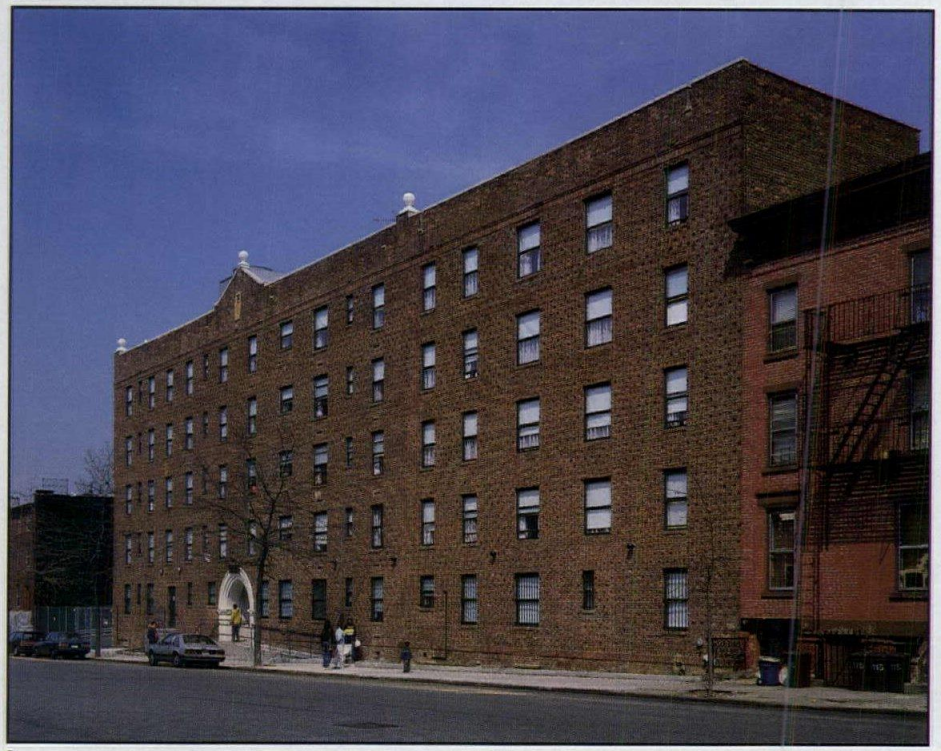
Project: *Housing/Education Development for V-Burg, Inc., Vicksburg, Mississippi.*
Architects: *Howorth & Associates, Jackson, Mississippi (Tom Howorth, AIA, principal in charge; Daniel Wooldridge, AIA, project architect; John Beard, Alex McCord, Kelly Griffin, Jody Coleman, AIA, project team).*
Client: *V-Burg, Inc., Vicksburg, Mississippi (Linda Perry, project manager).*
Site: *4.5-acre tract, formerly the site of a drive-in movie theater on the outskirts of central Vicksburg.*
Program: *13 single-family houses (9 built) at 853 to 1367 sq ft; 4835-sq-ft community building and pre-school.*
Structural systems: *wood frame on concrete foundation (housing); metal building system on concrete slab (community/education center).*
Major materials: *vinyl siding, corrugated metal siding, asphalt shingles, concrete block, gypsum board, vinyl flooring (see Building Materials, p. 117).*
Mechanical systems: *earth-coupled and conventional heat pumps, contributed by Mississippi Power & Light.*
Consultants: *Cameron Till, P.E. (structural); Colvin Mann, P.E., civil engineering).*
General contractor: *Roxco, Ltd.*
Costs: *$889,595 (houses: $38/sq ft; community buildings: $48/sq ft).*
Photos: *Alan Karchmer.*

Housing Rehabilitation

Three for One

Brooklyn Gardens, Brooklyn, New York

1



2

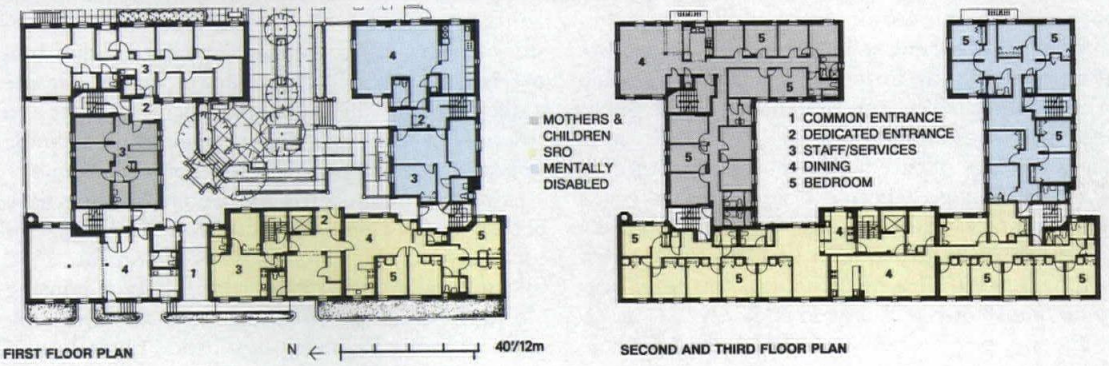
An apartment block transformed by a team of Brooklyn architects offers an exemplary collection of special needs housing.

The Brooklyn neighborhood of Fort Greene is like many in New York, with housing projects that rise like modern Leviathans above traditional apartment blocks. Likewise, stories of the old survivors' rebirth have become typical of the city, as renovations of pre-war housing continue to gather momentum. Brooklyn Gardens offers a new episode in these accounts. This 60-year-old apartment building, once moribund, has a program unprecedented in the city, and perhaps the nation: today it comprises a transitional residence for single mothers and their children, a single room

3

Brooklyn Gardens' courtyard (1) is an outdoor room shared by children and adults. The white arch of the street portal (2) is an indication of the haven within. Like the rest of the façade, it looks virtually the same as it did in the 1930s. Each floor of the wing for mothers and children has a kitchen/dining area with a lounge (3).

Project: *Brooklyn Gardens, Brooklyn, New York.*
Architects: *Harden Van Arnam, Brooklyn, (Cindy L. Harden, project architect; Chris Benedict, project manager); in association with Pratt Architectural Collaborative, Brooklyn, and Peter Woll Architects, New York, (Chuck Brome, project manager).*
Client: *Pastoral and Educational Services, Brooklyn.*
Site: *5-floor building on .47 acre.*
Program: *transitional housing for single women and children; housing for mentally disabled adults; SRO residence.*
Structural system: *gut rehabilitation of existing building.*
Major materials: *wood joists and steel studs installed in brick structure (see Building Materials, p. 117).*
Mechanical system: *central heater/chiller with fan coil units.*
Consultants: *Alan Abrahams, interiors; Robert Silman Associates, structural; Veldshteyn/Slutsky Associates, mechanical.*
Contractor: *Saffuto Construction.*
Costs: *$5.4 million.*



FIRST FLOOR PLAN

SECOND AND THIRD FLOOR PLAN

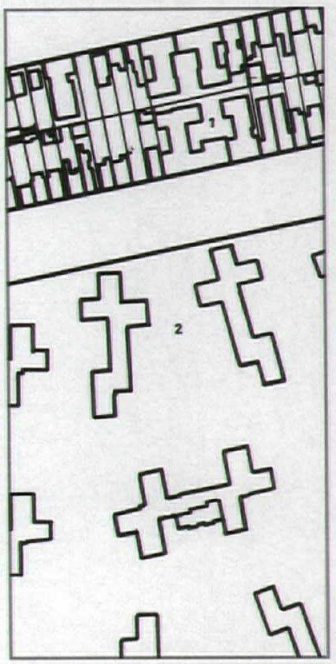
occupancy hotel, and a home for the mentally disabled. All are grouped around a courtyard – less lush than a bona fide garden, but nonetheless a prized asset for the 180 residents.

Brooklyn Gardens is across the street from Fort Greene Houses, 3500 apartments built as free-standing megabuildings in 1944. There's more than a formal contrast between the two: people who live in Fort Greene Houses are typical of the neighborhood, even though the architecture is not. Brooklyn Gardens' scenario is the reverse, with special needs enveloped in a generic residential façade. It implies that people here are part of everyday life in the borough, not an urban anomaly. The old building is also more secure, literally and figuratively: occasionally there is gunfire at Fort Greene Houses, but those living in Brooklyn Gardens have their own protected domain in the midst of the city.

As ordinary as it seems, Brooklyn Gardens was a bold leap for New York's Human Resources Administration, which rarely supports composite special needs housing. But this agenda made sense to the client, Pastoral and Educational Services (PAES), an ecumenical group in Brooklyn, and to Cindy L. Harden, the design architect. Having won title from the city to a sizable vacant apartment building, Doris Clark of PAES envisioned it as a community that would not leave the mentally disabled in isolation.

The structure, classified as a new law apartment block, was divided into three stacks by its fire stairs; the pattern seemed right for the trio of user groups. Because the building was always residential, the sequence of spaces is not oppressively institutional, with well considered, if modest, features: entry thresholds are implied by returns in the halls of the SRO; the mothers' laundry overlooks an enclosed play yard. Brooklyn Gardens is not one large commune – each division is fairly autonomous – but it has become a lively household. There's a wealth of self-help circles, from Alcoholics Anonymous to a jogging group: the support structure within is as solid as the façade.

Philip Arcidi ■

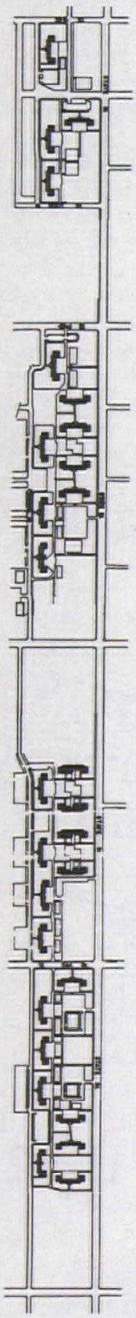


SITE PLAN
1 BROOKLYN GARDENS
2 FORT GREENE HOUSES

Poor Architecture: A Cautionary Tale

Ross Miller discusses the thinking behind the design and recent rehabilitation of highrise public housing in Chicago.

Rehabilitated housing with a new plaza, entrance, and elevator/stair tower providing greater security and safety for residents (1).



SITE PLAN, ROBERT TAYLOR HOMES

The majority of Chicago's public housing consists of multistory concrete apartment blocks, in large U-shaped groups of three, confined to barren ground. Vincent Lane, Chairman of the Chicago Housing Authority – landlord for 140,000 people – says, "If I had the money to replace highrise public housing, I'd be the first one with a sledgehammer knocking down the buildings." Instead, Lane is gambling on rehabilitating them.

During the 1940s and early 1950s, Chicago, like other American cities, had millions of dollars of Federal aid for building public housing. This came at a particularly unhappy intersection of government's long-held moralistic attitudes toward the poor and the untested utopian housing schemes of architects. Enamored of Ludwig Mies van der Rohe's desire for pure form and Le Corbusier's vision of great megablock cities, architects used public housing as a grotesque proving ground for both. Mies's ideology of bare-bones structure and algebra of square footage, where every unit of space was equal to every other unit, was interpreted literally and placed awkwardly within Le Corbusier's essentially anti-urban idea of planning. The result was monotonous towers, reiterated endlessly in Chicago on moonscapes created by the bulldozing of whole neighborhoods. No questions asked.

This was a strange parody of what was going on upscale and uptown at around the same time. In the 1950s, with minimalist glass-and-steel apartment buildings on the lakefront, Mies demonstrated the expressive beauty of a building's structural components when made of the finest industrial materials. However, huge firms like Skidmore, Owings & Merrill took Miesian rigor as a style and re-applied it indiscriminately to big social projects like the Harold Ickes (1955) and Governor Henry Horner Homes (1957). SOM exposed the concrete frame and used brick infill in a way that Mies might have technically approved, but they drained it of its spirit by neglecting to question the appropriateness of highrises for dense family housing. Architects hid behind Modernist theory and collected the profits from these huge public works. The highrise's one-time design costs, flat plates, and regularized concrete bays made them economical and profitable, while their prison image of surveillance and control made them easy to sell to a public wary of underclass revolt.

Because of the sheer scale of these projects, even when an architect attempted to ameliorate the effect of highrise housing, he created new horrors. In 1951 George Fred Keck tried, in Prairie Avenue Court, to create passive housing by opening the building's southern façade. Keck thought that this simple adjustment might lessen the effect of Chicago's punishing winters and at the same time eliminate claustrophobic doubleloaded corridors. However, in the end, he succeeded only in popularizing open galleries, which soon became the most hated element of public housing. Soon after Keck's limited experiment, these open balconies were chain-linked from concrete floor to overhang to keep small children from falling. Now residents reasonably complain that the caged outdoor spaces originally designed for their comfort make them feel "locked-in like animals." Projects like the 28 identical sixteen-story Robert Taylor Homes were sited indiscriminately and their one open side, in winter, became a deep freeze. The architecture which began as a response to need soon degenerated into a formula to house as many people as cheaply as possible.

Modern architecture and public housing have been linked for decades, not through an image of construction, but one of demolition: the 1972 dynamiting of three of the 16 Pruitt-Igoe housing blocks in St. Louis. The image of buildings smoking and listing helplessly until they implode in a dusty pile of rubble satisfies the same longing for instant solutions to recalcitrant social problems that created highrise housing blocks in the first place. In his efforts on behalf of rehabilitating Chicago's public housing stock, Vincent Lane has resisted this continuing fantasy of summary execution. As a result, he has focused new attention on a major element of urban architecture formerly relegated to the shadows and completely absent from standard post-war architectural histories. He is working with tenant groups to find out what they want and has hired architects like Johnson & Lee and Thomas Hickey & Associates, whose work for the Metropolitan Planning Council in 1990 provided a working model for the current approach to securing, rehabilitating, and relieving the numbing regularity of the projects.

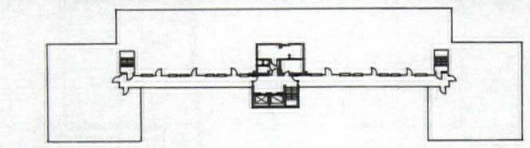
While his architects have found a practical way to proceed, Chairman Lane has moved to correct some of the misguided policies that helped the projects to fail. In an effort to remove income ceilings, which penalize people in public housing for working, Mr. Lane has gotten the Federal government to approve a demonstration program for mixed income communities (MINCS) to replace the current homogeneously impoverished population in which more

1

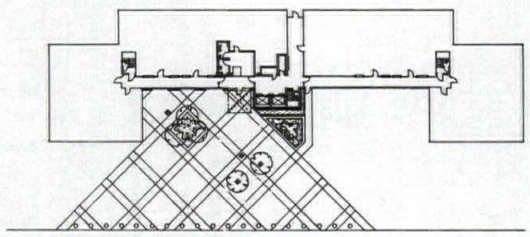
than 80 percent of the residents are on public assistance. And architects now have a chance to correct the mess they helped create.

The CHC is in the first stage of a six-year $1 billion plan to transform public housing, significantly undercutting rents in the private housing market. On the lakefront with great views of Lake Michigan and nearby downtown, for example, studio to five-bedroom apartments rent from $260 to $597. Buildings now have secure, attractive lobbies, well-landscaped recreational spaces, safe elevators and stairs, wood cabinets in the kitchens, shower heads in the baths, plastered walls, mini blinds, real closet doors, a ceiling fan over the dining area, even an outlet for an air-conditioning unit which HUD rules still prohibit. The "symbols of upward mobility," Chairman Lane calls these architectural details. "I think public housing families should have what any other family should have," he adds. "It gives them something. Then you can hold them accountable." **Ross Miller** ■

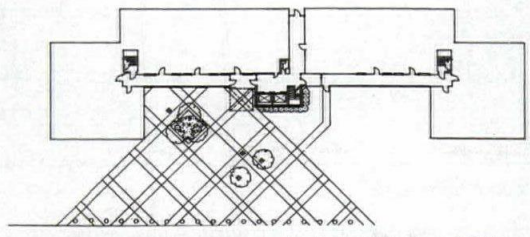
The author, P/A's correspondent at-large, has written American Apocalypse: The Great Fire and the Myth of Chicago *and is currently working on a book on American architecture after urban renewal.*



REVISED UPPER FLOOR PLAN



REVISED GROUND FLOOR PLAN



PROTOTYPE GROUND FLOOR PLAN

Project: *CHA Robert Taylor Homes, Chicago.*
Architects: *Johnson & Lee, Architects, Chicago, (Phillip Craig Johnson, Frank Christopher Lee, Anthony Akindele, John Odom, Raynay Collier); Thomas Hickey & Associates, Chicago, (Thomas Hickey, Brad McCormick, Justine Kim, Tim Kent).*
Site: *28 public housing towers, next to the Dan Ryan Expressway.*
Program: *provide secure entrances, enclose elevator lobbies, and redesign plazas.*
Structural system: *precast concrete stair walls, concrete masonry walls.*
Major materials: *precast concrete, solid glass block, prefabricated metal stairs, cemetitious exterior insulation system.*
Mechanical system: *surface-mounted electric heaters.*
Consultants: *Getty, White & Mason, structural; Galloway Ltd., mechanical.*
General contractor: *Wil-Freds Construction Inc.*
Costs: *$3 million ($56/sq. ft.)*
Photos: *Paul Zakoian.*

Projects
Affordable Housing

A portfolio of five proposals presents high-caliber design at budget rates.

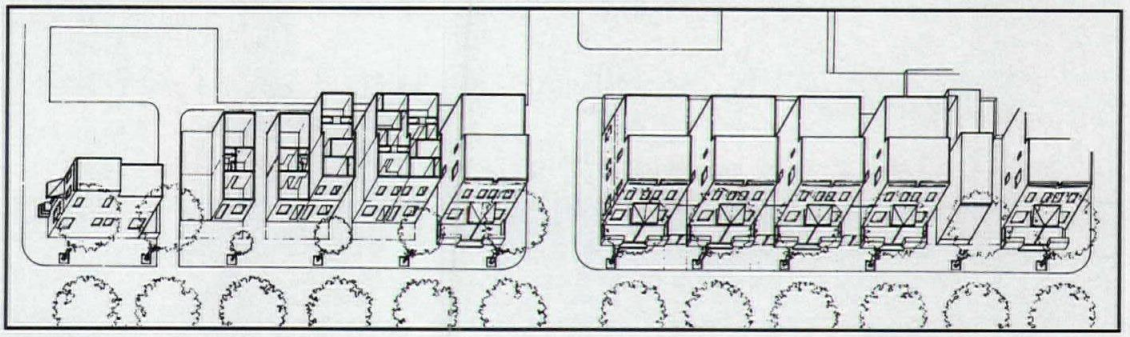
WILLIAM'S ROW HOUSING, STREET PERSPECTIVE

William's Row Infill Housing
Camden, New Jersey

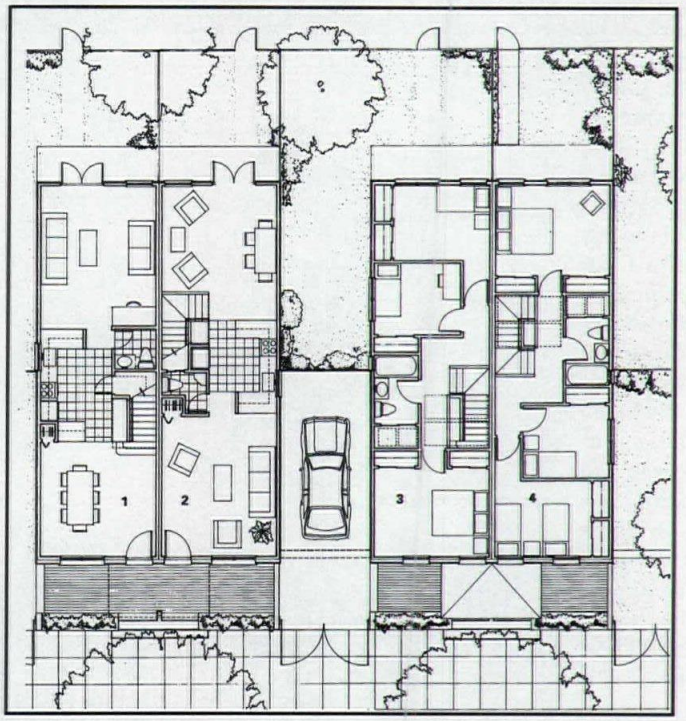
Architects: *Adèle Naudé Santos & Associates, Philadelphia*

Twin houses – duplexes of side-by-side units – offer the density of rowhouses with a third façade, a rare urban dividend. In Camden, where twins are historically a more prestigious house type, Adèle Naudé Santos & Associates proposed 24 paired units for a strip of vacant sites near a historic district. Their competition-winning scheme (the final version is forthcoming) will mix middle- and low-income households: the former can buy two units at $62,000 apiece and lease one to a family that earns rent subsidies. The A-B-B-A rhythm of the twins will be used to advantage, with zero lot line boundaries perpendicular to the houses; they divide the side yards into front and back halves – more useful than the 5-foot slivers typical on 25-foot wide lots.

In each house the kitchen (usually windowless in a rowhouse) will overlook a side yard – a common request of parents with youngsters. Because this room, the center of household activity, is in the middle of the house, each family can choose to dine in the front or back: the large rooms that bracket the kitchen create two separable zones on the first floor, an asset for intergenerational families.

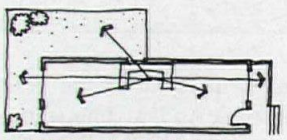


AXONOMETRIC

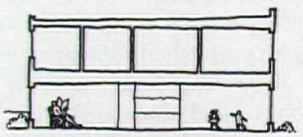


COMPOSITE FLOOR PLANS

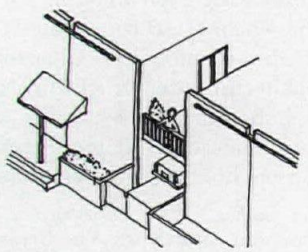
1 FIRST FLOOR/REAR YARD UNIT
2 FIRST FLOOR/FRONT YARD UNIT
3 SECOND FLOOR/REAR YARD UNIT
4 SECOND FLOOR/FRONT YARD UNIT



MULTIPLE SIGHTLINES FROM CENTRAL KITCHEN



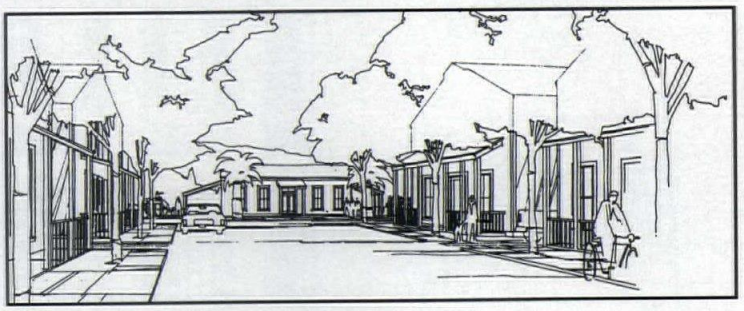
TWO LIVING SPACES ON FIRST FLOOR



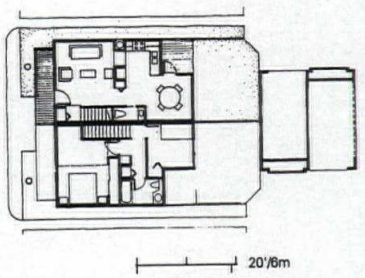
PARKING SPACE CAN ACCOMMODATE UPSTAIRS DECK

Modelmaker: Valerie Ortlie/Model photographer: Peter Henricks

WEST SPAIN STREET HOUSING, MODEL



PERSPECTIVE FACING COMMUNITY BUILDING

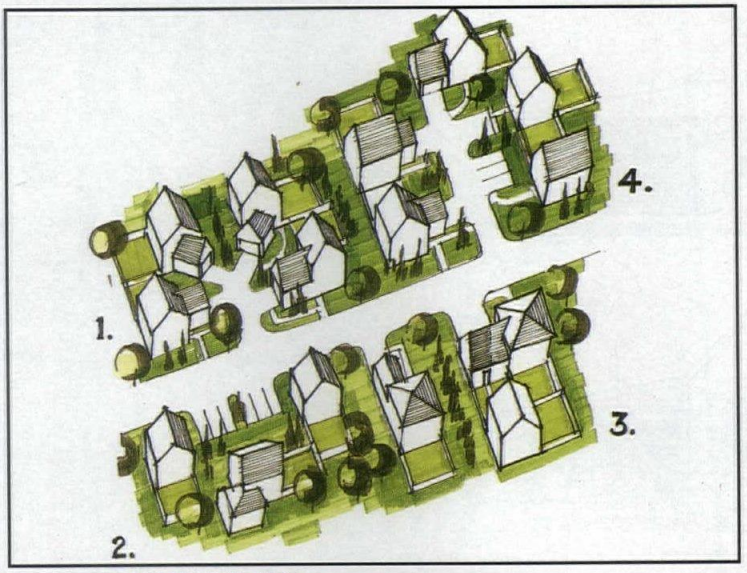


TYPICAL DUPLEX FIRST/SECOND FLOOR PLAN

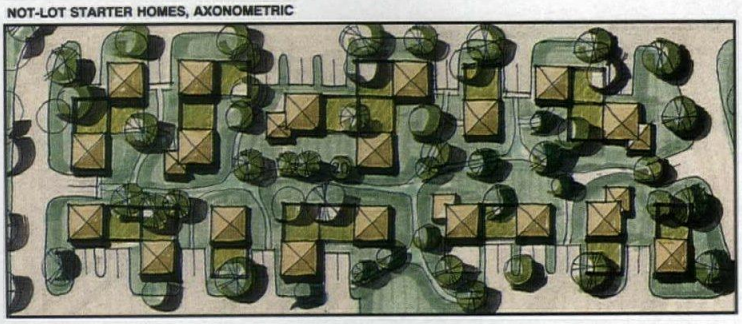
West Spain Street Housing
Sonoma, California

Architects: *William Turnbull Associates, San Francisco*

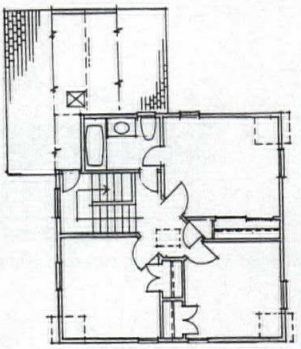
Mansions and cottages are often side by side in Sonoma (pop. 8000) – a composite that inspired this competition-winning infill scheme. It is a 34-unit plan for a dense neighborhood of starter homes to be bought by young local families. A community building with a daycare center and garden plots will teminate a new cul-de-sac, opposite a ranch-style gateway framed by stacked duplexes. The street in between will be lined with side-by-side duplexes that emulate the single-family vernacular of Sonoma before World War II. Cars will be relegated to garages at the back of each lot, with shared drives (side yards for children) and staggered entrances. Each 900-square-foot unit will be sold by a private developer for about $100,000 – a bargain in a community where, few houses cost less than $250,000.



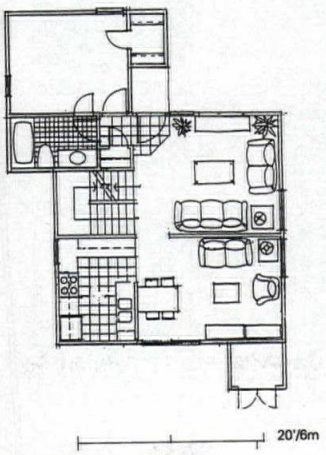
NOT-LOT STARTER HOMES, AXONOMETRIC



PARTIAL SITE PLAN



TYPICAL SECOND FLOOR PLAN



TYPICAL FIRST FLOOR PLAN

Not-Lot Starter Homes
Rocky Hill, Connecticut

Architects: *Zane Yost & Associates, Bridgeport, Connecticut*

This strategy renders the building lot superfluous for the small suburban home. Most of the land that surrounds a typical house – front and back yards and driveways – would be held in common, as in a condominium, and each household would own a 24-foot-square dwelling, a side yard of equal dimensions, and a garage or parking area.

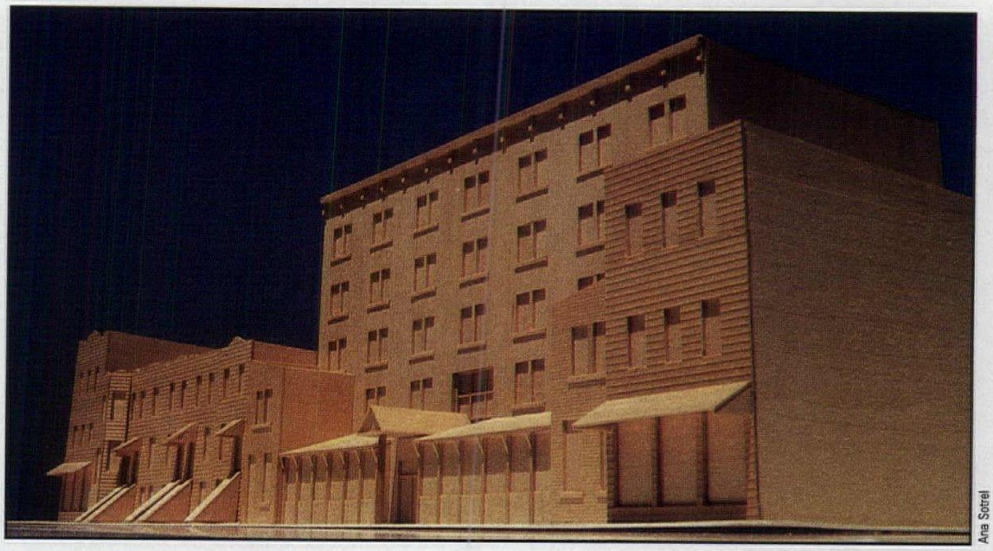
Zane Yost designed this prototype for a site approved for 130 condominium units; the developer will tap the Hartford area's strong market for free-standing houses at prices typical of condominiums. If 30 percent of the units are sold at $145,000, the region's affordable housing rate, the complex will comprise eight units per acre, with the balance offered at $175,000 – $50,000 less than the norm for suburban Hartford's starter homes.

Service-Enriched SRO Residence
Brooklyn, New York

Architects: *Architrope, New York*

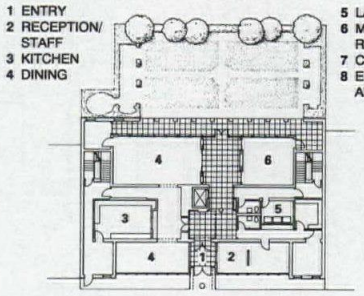
Many of the homeless who sleep on the stoops of New York are mentally disabled, yet quite capable of living independently. The 48-bed residence illustrated here, designed by Jonathan Kirschenfeld and Andrew Bartle, would provide them a permanent, well-staffed place to live, an alternative to the state hospitals they left years ago. It will be under the jurisdiction of a private nonprofit – Services for the Underserved – and built for $2,850,000 by the State Office of Mental Health.

Part of an initiative to create 3000 SRO beds in New York, it is more than an apartment house: each resident has space for a private life, and can choose from an array of congregate activities. Two-floor pavilions modulate the shift in scale from the adjacent rowhouses, a residential frame for an institutional program.

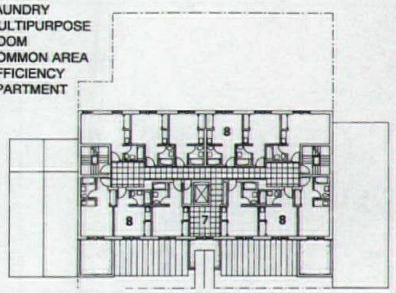


Ana Sotrel

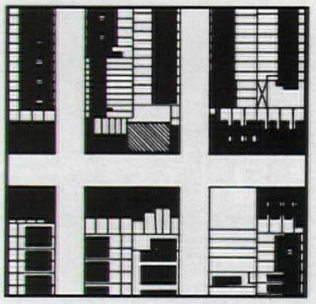
SERVICE-ENRICHED SRO RESIDENCE, MODEL



FIRST FLOOR PLAN 40'/12m



THIRD THRU FIFTH FLOOR PLANS



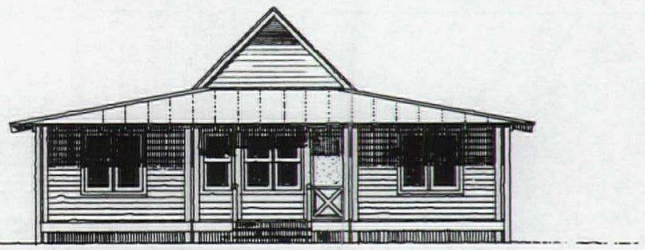
SITE PLAN N 200'/60m

Nationwide Homes: A Factory-Built Prototype

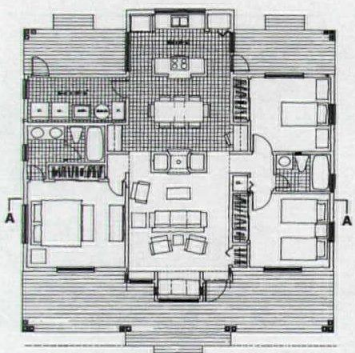
Design Team: *Michael O'Brien, Steve Tenace, Virginia Polytechnic Institute, Blacksburg*

The width of our highway lanes determines the breadth of prefabricated housing modules – 14 feet. To Professor Michael O'Brien, it is not an impediment, but instead a parameter that promotes clear design: the same dimension is common to dog-trot houses, I-houses, shotgun shacks, and other vernacular icons of the American South.

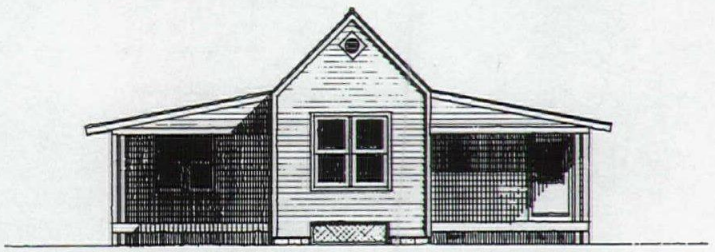
To bring the "houseness" of these types to factory-built residences, O'Brien and three graduate students developed three prototypes for Nationwide Homes, a modular house fabricator that aspires to a broader market. Each new model has thoughtfully layered spaces with visual and acoustical privacy. A version of the prototype illustrated here is popular with do-it-yourselfers; their sweat equity shaves 15 to 20 percent off the $65,000 price tag. **Philip Arcidi**



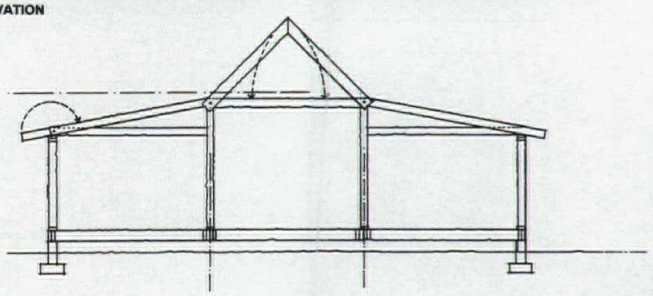
NATIONWIDE HOMES PROTOTYPE, FRONT ELEVATION



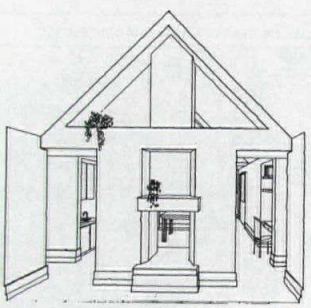
FLOOR PLAN 20'/6m



BACK ELEVATION



SECTION A A 10'/3m



INTERIOR PERSPECTIVE

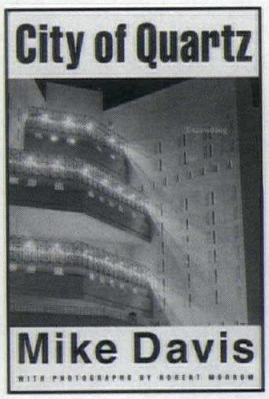
Books

The Adamant Angelino

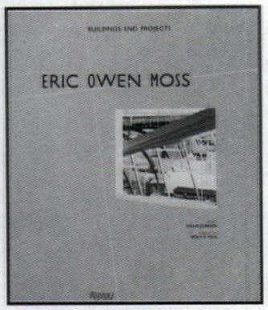
Mike Davis slams the Los Angeles establishment; **Richard Weinstein** sifts through the wreckage.

Eric Moss and James Joyce

Thomas Fisher links Eric Owen Moss's ambiguous architecture to James Joyce's intricate prose.



City of Quartz: Excavating the Future in Los Angeles *by Mike Davis, Verso, New York, 1990, 462 pp., $24.95.*



Eric Owen Moss, Buildings and Projects, *preface by Philip Johnson, introduction by Wolf Prix. Rizzoli, New York, 1991, 224 pp., $50 cloth, $35 paper.*

This remarkable book is more a work of literature than it is a reliable analysis of contemporary Los Angeles. It is the work of Mike Davis, a muckraking journalist of a very *noir* and left temperament, acutely sensitive to a particular set of social and political forces (he also teaches at SCI-Arc). It's a polemic rather than a balanced history. But measured accuracy is not Davis's goal, despite all his footnotes – many of which are unsupported opinions cited from the work of other journalists. In fact, it would be a daunting task to separate opinion from fact in *City of Quartz*, which seeks to unmask the alleged conspiracies of power that have shaped contemporary Los Angeles. The impact of the book – its substantial impact – is sometimes undercut by evidence of careless scholarship. I suspect that those with special knowledge of the subjects that Davis discusses could catalogue their own disappointments. For example, Frank Gehry, unmasked as Dirty Harry, is seen as the willing tool of a proto-fascist establishment. The evidence cited is his manipulation of Devil/Client Michael Eisner, C.E.O of Disney, to obtain the commission for Disney Hall, the new home of the L.A. Philharmonic. Here, Davis derives much of his authority by taking on the character of the "inside dopester," as David Riesman put it in *The Lonely Crowd*. To borrow from the Seven Dwarfs, we must ask how Dopey is Davis about other conspiracies?

While unreliable as a scholarly history, *City of Quartz* is compelling as dark satire and urban criticism. Davis is an impressive writer who uses people and events to support an artistic rage against a "spread" city that is full of misery, lost chances, and dark portents for the future.

The book is largely an interpretation of what has

(continued on page 117)

Of what relevance to architecture is the writing of James Joyce? That is a question few of us might ask, but it turns out to be a rather important one for architecture and a question that the Los Angeles architect Eric Owen Moss asks repeatly in his work. As Moss admits in the introduction to his Rizzoli monograph, "Joyce is such an interesting ... source for strategy."

What was Joyce's strategy? In one sense, Joyce was a high-style Modernist, using abstract language to envision the world anew. But in another, more important sense, Joyce was one of the first writers to undercut Modernism. He sought not to reject the past, but to reinterpret it; as Moss points out, *Ulysses* was like a "plan view" of the Homeric story. Nor did Joyce share the Modernist affinity for rationalism. Rather, he portrayed the world as fundamentally irrational and contingent, adrift in double meanings, multiple interpretations, and puns.

It is this second side of Joyce's writing that Moss explores in his work. Like Joyce, Moss is a master of the *non sequitur*, joining things that seem unrelated to reveal deeper affinities. Are the drainpipes Moss often uses as columns a Modern pun on the Doric order, a Dada-like elevation of the ordinary object, or a reminder of the false distinctions we make between architecture above and below grade, between what we express and what we suppress?

Moss also shares with Joyce an almost Baroque taste for complexity and movement (ambiguously layered spaces, dynamic and vaguely threatening images) and an apparent interest, akin to the 19th-Century Romantics, in the grotesque (roofs that appear to melt down over the walls and to have slid off them). Yet Moss, again like Joyce, remains very

(continued on page 117)

Books of Note

Aldo Rossi: Architecture 1981-1991 ***edited by Morris Adjmi, introduction by Diane Ghirardo, text and essay by Karen Stein, Princeton Architectural Press, New York, 1991, 300 pp., $60 cloth, $40 paper.***
Adjmi defines the global and regional relevance of Rossi's recent work as ``a new International Style.'' Rossi's compelling drawings and watercolors are used to great effect.

In What Style Should We Build?: The German Debate on Architectural Style ***introduction and translation by Wolfgang Herrmann, The Getty Center for the History of Art and the Humanities, Santa Monica, California, 1992, 202 pp., $29.95 cloth, $19.95 paper.***
This exquisitely produced reprint of Heinrich Hübsch's provocative book from 1828 is supplemented with essays by four contemporaries; the collection magnifies today's debates about style.

Interior Landscape Design ***by Nelson Hammer, McGraw-Hill, New York, 1992, 288 pp., $59.95.***
Extensively illustrated and succinctly written, this sourcebook includes technical information and five case studies.

Aarhus City Hall ***by Erik Møller and Kjeld Vindum, Danish Architectural Press, Copenhagen, 1991, 92 pp., $32.***
Arne Jacobsen's and Erik Møller's competition-winning design for this 50-year-old icon of Danish Modernism is celebrated in an elegant yet simple monograph.

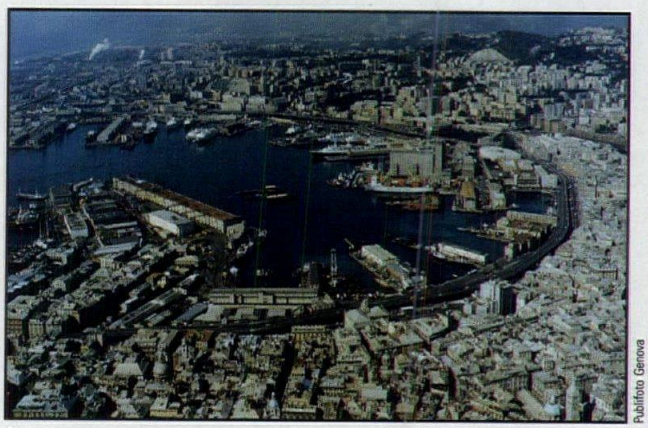
Perspectives

Renzo Piano's epic work in the historic port of Genoa suggests complex, yet moderate strategies for **urban reclamation.**

Columbus's Saved Harbor

Renzo Piano's $500 million rehabilitation of Genoa's ancient harbor is not long on "architecture" – at least not the formalist turns we've come to associate with the term. But perhaps that is its strength: as a series of strategies geared to reviving the city's historic center, the vast project is like a lens through which the quandaries of late 20th-Century urban reclamation may be examined. Its scope raises issues of program, language, and the balance between conservation and invention. Above all, as a great civic piece, it is timely in focusing on the role of the architect in the urban and public realms.

By Piano's account, in proposing the locus of the project the architect played visionary, pointing the way for the municipal client. His "expert eyes" discerned the opportunity; his international reputation was collateral. "This is a *grand projet,* because of the money, because of the challenge – to put your hands on the historic center of the historic town," Piano says. "It was a bit mad. It's so much easier to make new buildings in the outskirts." Most Italians scoff at the pretension of the *grand projet* rhetoric, he adds wryly. "Things like this may happen in Italy, but you have to find a pretext."



Publifoto Genova

1

Columbus, "accidentally born in Genoa," provided the perfect excuse. Back in 1983, the mayor called Piano, asking for advice on how to commemorate the quincentenary of Genoa's greatest mariner. Piano proposed that the celebration be held in the ancient harbor, derelict since modern shipping had moved to more advanced port facilities in outlying areas. And once the Bureau International des Expositions granted permission for an Expo on "Columbus, the Ship, and the Sea" to run concurrently with the Seville World's Fair, there was no backing down.

The rehabilitation comprises a whole spectrum of works, ranging from archeological excavation to new construction, from the restoration of 17th-Century buildings to the adaptive use of 19th- and early 20th-Century structures. In addition, Renzo Piano Building Workshop (RPBW) is overseeing the construction of a submerged traffic artery and metro tunnel which will run along the perimeter of the old port precinct – an enormous undertaking that pushes the total budget of the project close to $1 billion.

One of the major components of the reclamation was the reconstruction of the Cotton Warehouse, a 1300-foot-long industrial building of the 19th Century. Its immediate function was to house pavilions for the Expo, but its life after the fair was Piano's primary concern. One-third of the building was given over to a large congress hall, which can be subdivided into two separate auditoriums. The rest of the building, with its new steel open-bay structure and escalator lobby, will likely be taken over by one of Genoa's universities, possibly to house technical faculties such as shipbuilding. A new freestanding service spine runs the length of the old structure, connected to it by metal catwalks.

Accomplishments like the Cotton Warehouse rejuvenation are often underappreciated because the magnitude of the effort involved – in this case complete gutting, replacement of the double-gabled roof, and reconstruction of the building within its restored historic shell – is all but invisible.

The Molo Vecchio, or old pier fronting the warehouse was refurbished; its antique cargo-loading derricks cleaned up and left as milestones of early technology. For the duration of the fair, the Japanese pavilion (a fully equipped ocean liner readied, typically, way in advance of the fairground) has been docked at the deep end.

The other edge of the Expo compound is defined by new construction, which leads off the historic Ponte Spinola, an arrow-shaped quay named after one of Genoa's ruling families. Piano built an attenuated wharf – the Via del Mare – that extends virtually to the center of the small bay. At its end, one is treated to a panoramic view of the city, perched on the mountains that cradle the natural harbor. In creating this unusual belvedere, it was Piano's intention to somehow simulate the moment of arrival experienced by seafarers.

The Italian pavilion, an engineless ship designed by associates of Piano's office, is docked at the Via del Mare. Between the rather barge-like pavilion and the shore is the new aquarium, which RPBW designed in collaboration with Peter Chermayeff of Cambridge Seven Associates in Boston. As in other Cambridge Seven projects, the interior of the aquarium is organized around a meticulously choreographed procession, which affords visitors diverse glimpses of sea life as delivered by varying sectional relationships between the path and the displays. The exterior of the building was Piano's bailiwick: continuing the nautical imagery, the RPBW design team devised a linear concrete-paneled mass with rounded "hulls," tubular rails, brightly painted stacks, porthole windows, and metal grate decking, which *in toto* evoke a ship under construction. The concrete surface was treated to simulate a painted steel-plate finish.

Midway between the Cotton Warehouse and the Aquarium are the Deposito Franco customs houses, a series of four 17th-Century pavilions, modeled after Renaissance *palazzine,* with slate roofs and walls covered with frescoes of faux architectural detail. Originally there were eight; four were demolished to make way for an elevated highway, which also lopped off the corner of one of the surviving structures. These have been scrupulously restored, down to their faux façades. During the Expo, they will house various displays, including the U.S. exhibit.

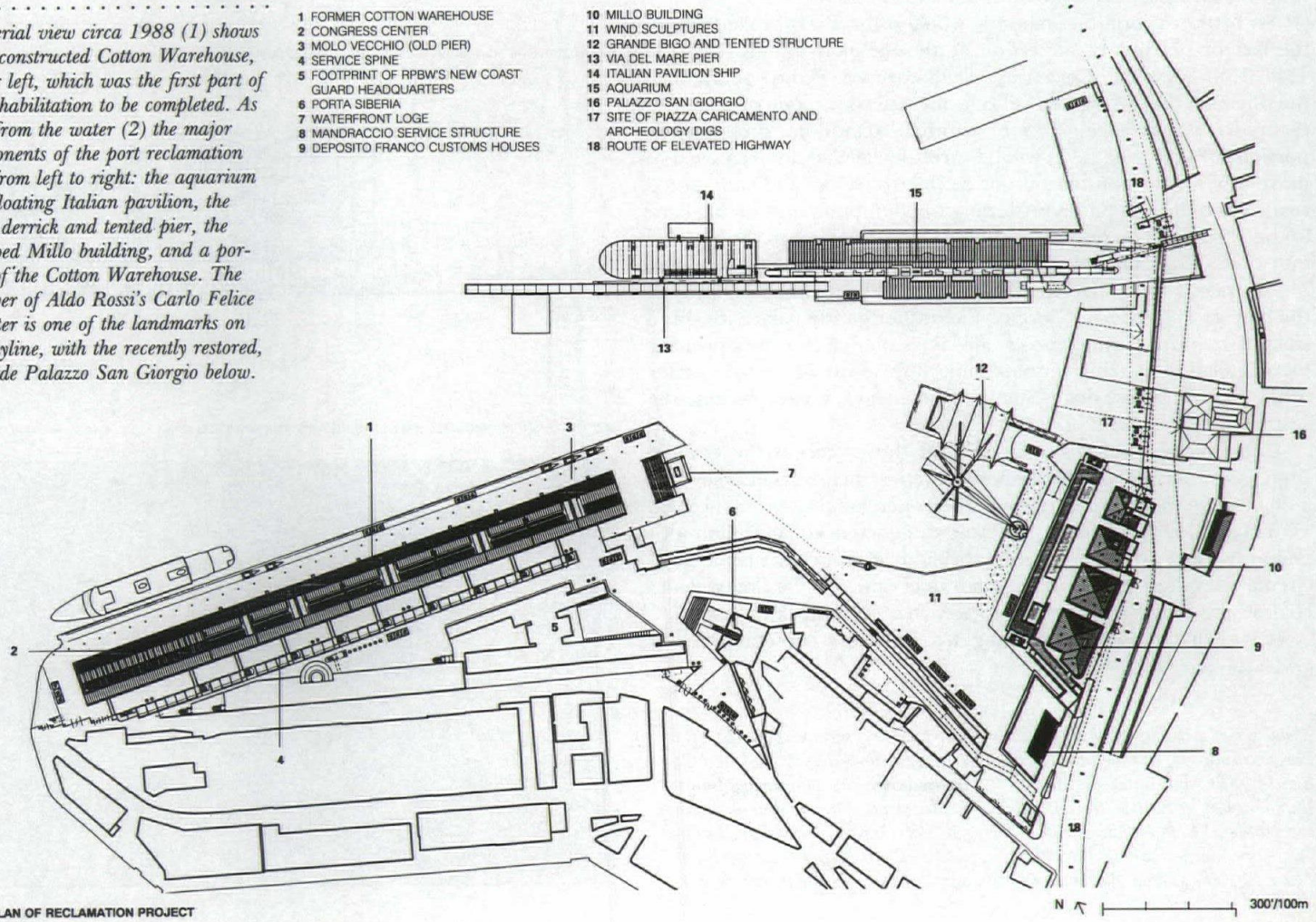
It is unfortunate that these small edifices are obscured by the Millo, an ungainly 19th-Century wall-like building of which a portion has also been renovated, with a new metal stair and a mechanical support structure appended at one end. The building is finished with a deep, ruddy stucco that will eventually fade to match Genoa's subdued palette. Originally much larger, the Millo typifies the barriers erected by the Genovese between port and city. One must be thankful that Piano preserved as little of it as he could get away with.

The area between the Customs Houses and the Aquarium is the focal space of the entire project, and the site where the architect's romantic vision played the most prominent part. To appreciate Piano's interventions here, it is useful to consider the architect's

2

An aerial view circa 1988 (1) shows the reconstructed Cotton Warehouse, center left, which was the first part of the rehabilitation to be completed. As seen from the water (2) the major components of the port reclamation are, from left to right: the aquarium and floating Italian pavilion, the great derrick and tented pier, the stuccoed Millo building, and a portion of the Cotton Warehouse. The flytower of Aldo Rossi's Carlo Felice Theater is one of the landmarks on the skyline, with the recently restored, portside Palazzo San Giorgio below.

1 FORMER COTTON WAREHOUSE
2 CONGRESS CENTER
3 MOLO VECCHIO (OLD PIER)
4 SERVICE SPINE
5 FOOTPRINT OF RPBW'S NEW COAST GUARD HEADQUARTERS
6 PORTA SIBERIA
7 WATERFRONT LOGE
8 MANDRACCIO SERVICE STRUCTURE
9 DEPOSITO FRANCO CUSTOMS HOUSES
10 MILLO BUILDING
11 WIND SCULPTURES
12 GRANDE BIGO AND TENTED STRUCTURE
13 VIA DEL MARE PIER
14 ITALIAN PAVILION SHIP
15 AQUARIUM
16 PALAZZO SAN GIORGIO
17 SITE OF PIAZZA CARICAMENTO AND ARCHEOLOGY DIGS
18 ROUTE OF ELEVATED HIGHWAY



SITE PLAN OF RECLAMATION PROJECT

"In proposing the locus of the project the architect played visionary, pointing the way for the municipal client."

insights into the character of his native town. Unlike the Venetians, their historic rivals, the Genovese have always had a conflicted approach to the sea, a "complex love-hate relationship," as Piano puts it, evident in the way the town turned its back on the water.

The historic center (one of Europe's largest surviving Medieval fabrics) is characterized by extremely dense buildings and narrow, steep alleys, with court-sized piazzas interspersed like landings among them. Piano is fond of Paul Valéry's description of the town's cramped quality: "Genoa," he quotes, "is carved in slate," alluding to the severity and introversion of the populace as much as to a prevalent roofing material. Expansiveness, urbanistic and otherwise, is uncommon. "Genoa has no real large squares, except the small piazzas that are like refuges from the sea," Piano asserts. "The only big place you were allowed to imagine was the harbor – it was the place for conviviality, for business; the rest was private life."

Acting on these premises, the architect resolved "to return the town to the sea" and to restore its great room in the form of the Piazza Caricamento, a large square, where up until the 19th Century, cargo was loaded and much of the city commerce took place.

The obstacles to achieving this are formidable: an elevated highway following the curve of the harbor separates the wharves from the city proper, cutting in front of the ornate Palazzo San Giorgio (now the seat of the Port Authority). Unhappily, nothing will be done about the road in the forseeable future; the cost of its removal surpasses even the most ambitious municipal budget.

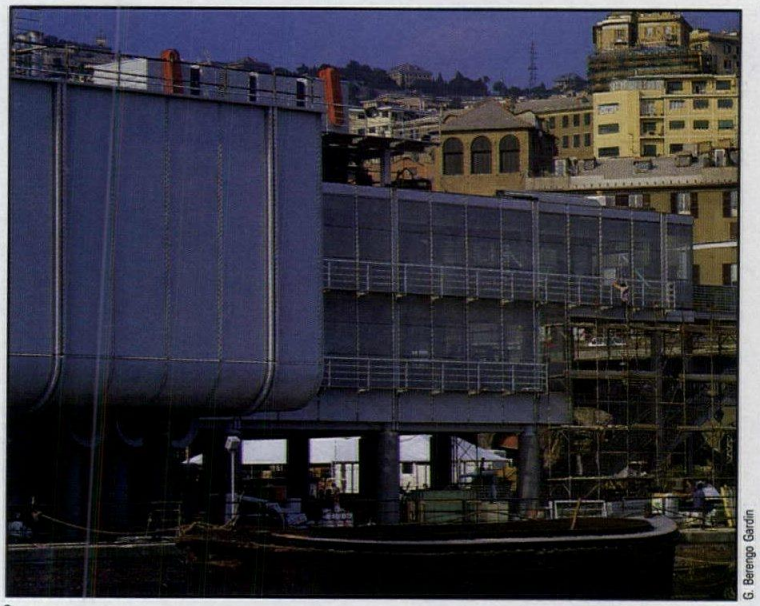
To further complicate matters, when ground was broken within the harbor precinct, a succession of ancient piers dating from the 13th, 15th, and 17th Centuries was discovered. Piano's solution to the dilemma they presented reflects our latterday mode of penance: the piers will require years of careful excavation; subsequently portions of the stone relics will be carefully labeled and removed to make way for the construction of the metro tunnel and submerged road. Then the antiquities (including wooden fragments dating back to the 1200s) will be reset as part of an "archeological park" blended into Piazza Caricamento.

The piazza is planned to extend beneath the elevated highway to the base of Palazzo San Giorgio. The rather gaudy palace itself is a suitable monument to Genoa's heyday as one of Europe's premier mercantile and banking centers: built in the 14th Century by order of the first Genovese doge, Simone Boccanegra, it later became the seat of the powerful Bank of St. George.

Undoubtedly the crowning piece of the project is the Grande Bigo (great derrick) and its suspended tent structure, which shelters a 20,000-square-foot pier intended for open air theater. Conceived as "a metaphor of a sunken ship," and designed in collaboration with engineer Peter Rice, the Bigo is thrilling, gratuitous; with a small circular elevator that delivers a panoramic view, it is the closest Piano comes here to the structural virtuosity that is his stock in trade.

It is clear from the astonishing array of work presented in this

(continued on page 84)



G. Berengo Gardin

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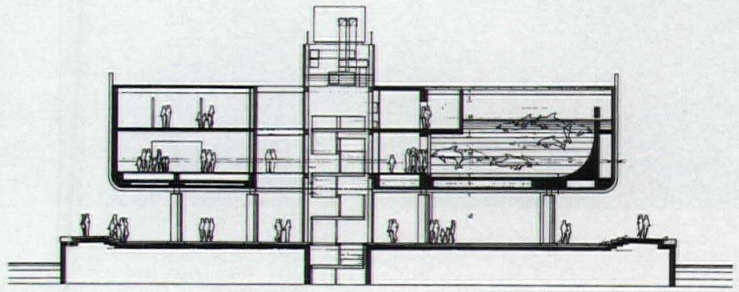
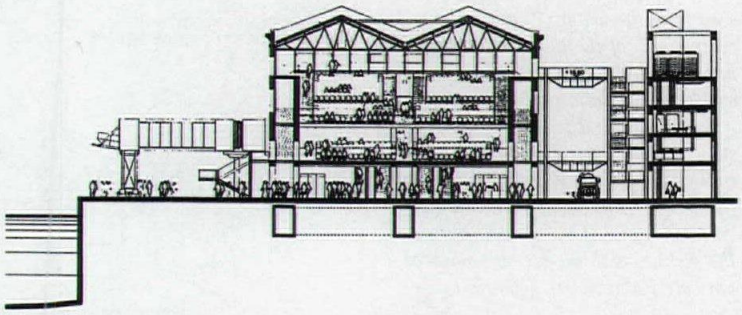


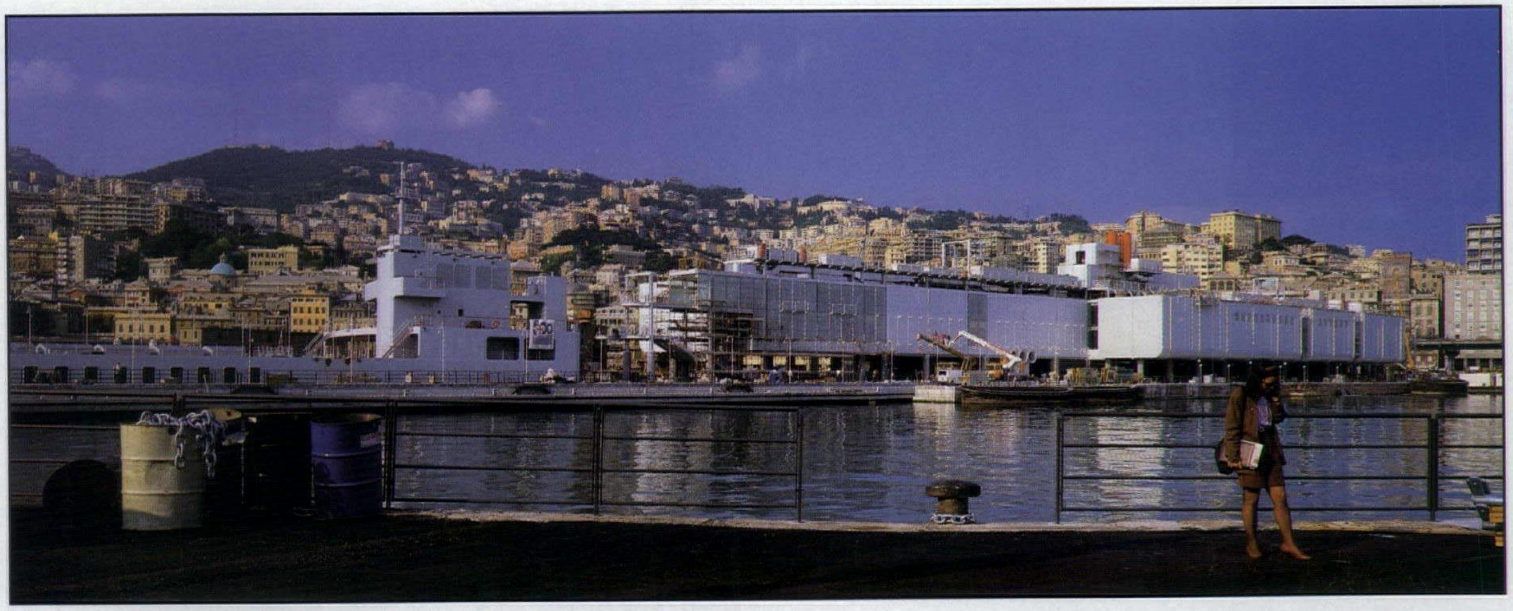
CHARACTERISTIC SCHEMATIC SECTION THROUGH AQUARIUM 40'/12m



SECTION THROUGH CONGRESS HALL IN FORMER COTTON WAREHOUSE 40'/12m

4

Metal scrim walls set off the aquarium entrance (3); at the opposite end, a metal stair leads to the engineless ship designed by RPBW for the Italian pavilion. Both building and barge are "docked" along Via del Mare (5). The Cotton Warehouse's free-standing service spine (6, left) echoes the brick panels and steel Piano used for the adjacent new Coast Guard headquarters. Within the Cotton Warehouse's restored shell (7), a new steel structure (4) evokes the spirit of the 19th-Century original.



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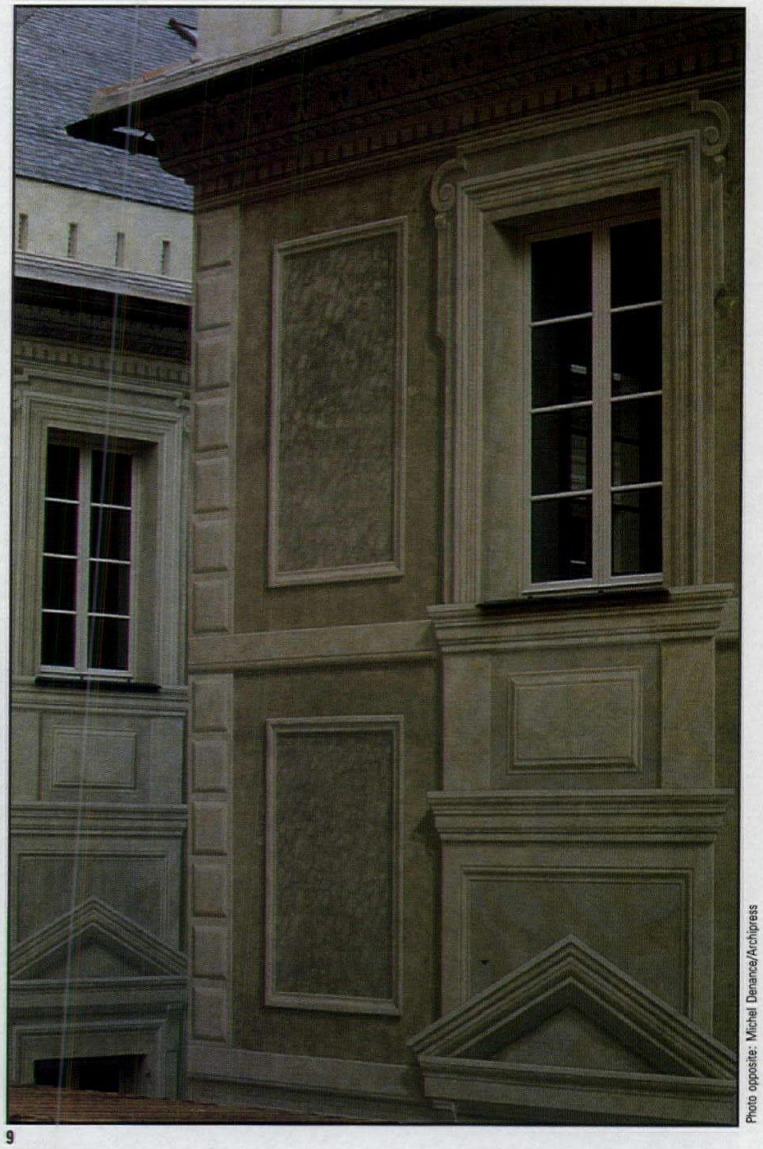
7

"Piano's solution to the dilemma presented by

[the archeological finds] reflects our latterday mode of penance."

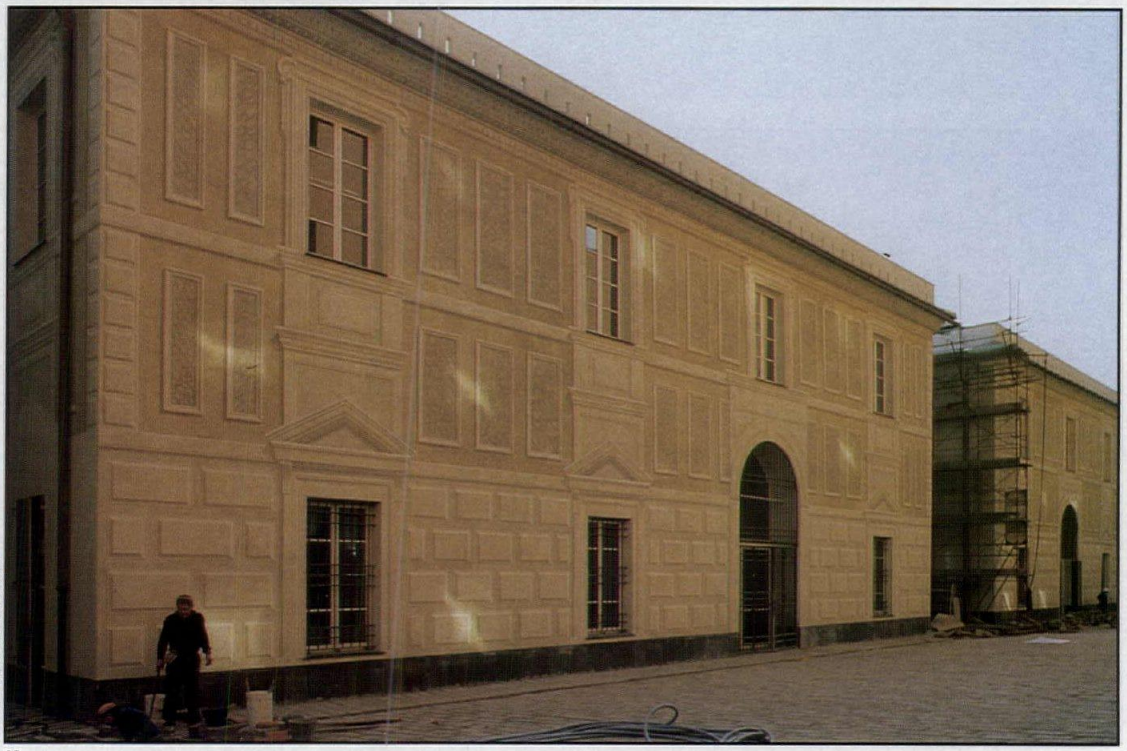
8



9

Photo opposite: Michel Denance/Archipress

Frescoed façades are a Genovese tradition, reflected in the restored 17th-Century Deposito Franco custom houses (9, 10). A portion of the old city wall (8, right) was incorporated into the customs houses complex. The alleys surrounding the buildings are paved with old stones salvaged from the port. A similar treatment is planned for the Piazza Caricamento, the focal square of the harbor designed to stretch beneath the elevated highway to the base of the Palazzo San Giorgio (11). This part of the reclamation is years away from completion: lengthy archeological excavations to uncover a succession of historic piers located on the site, and subsequent infrastructural improvements (see section on facing page) will commence once the Expo closes on August 15.



Photos this page: G. Berengo Gardin

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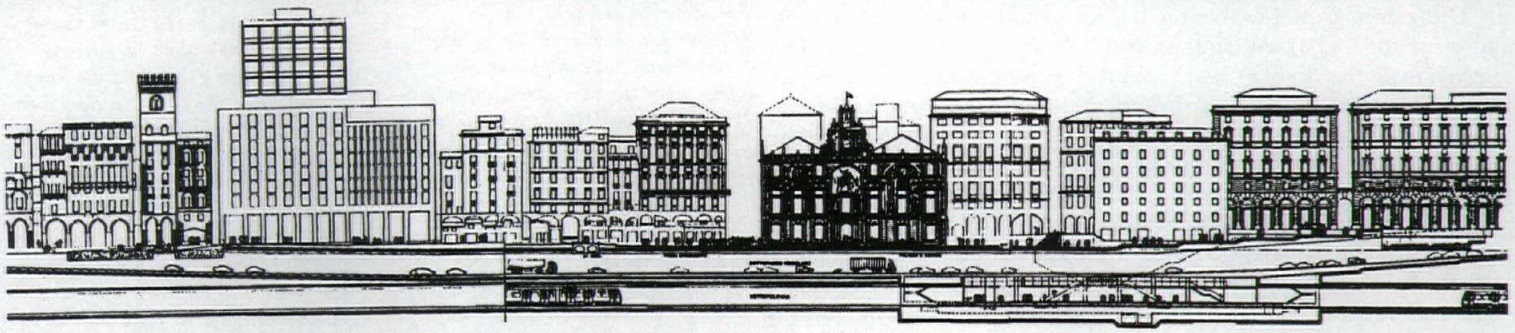


SECTION SHOWING TRAFFIC UNDERPASS, METRO TUNNEL, AND PORTIONS OF ARCHEOLOGY PARK

100'/30m

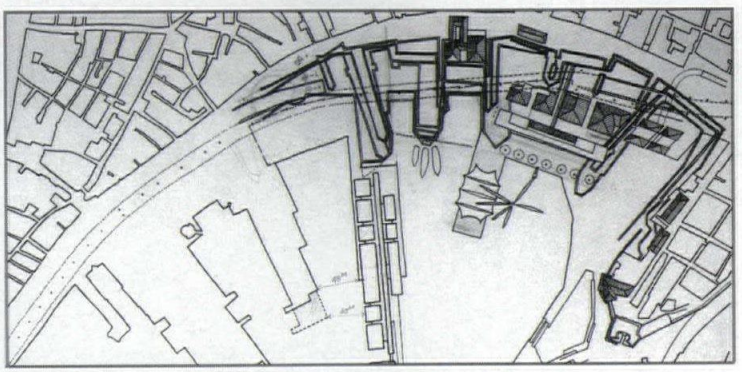


DIAGRAM OF HISTORIC PIER SITES

N

400'/120m

"The aesthetic choices made by the design team have implications for architects deliberating the extent of their authority and artistic license in relation to the city."

(continued from page 80)

article that Piano has had to strike a subtle balance between doing too much and doing too little – between "arrogance and cowardice." The project did not tax his fundamental affinity for innovation. "Modernity is not a leap in the dark, it is fed by memory," he asserts. "Carlo Levi said that the future has an antique heart."

On the level of the individual buildings, the aesthetic choices made by the design team have implications for architects deliberating the extent of their authority and artistic license in relation to the city. Piano's convictions on this score ring timely and true. Stylistic manipulations will not be our salvation, he declares with some force. "Architecture is a great art contaminated by life: by money, time, organization, technology, politics, memory, culture, local character, sociality, ambition, aspiration. Unless you accept this logic you become a formalist. Architecture," says this architect, "is a dirty job in the best sense."

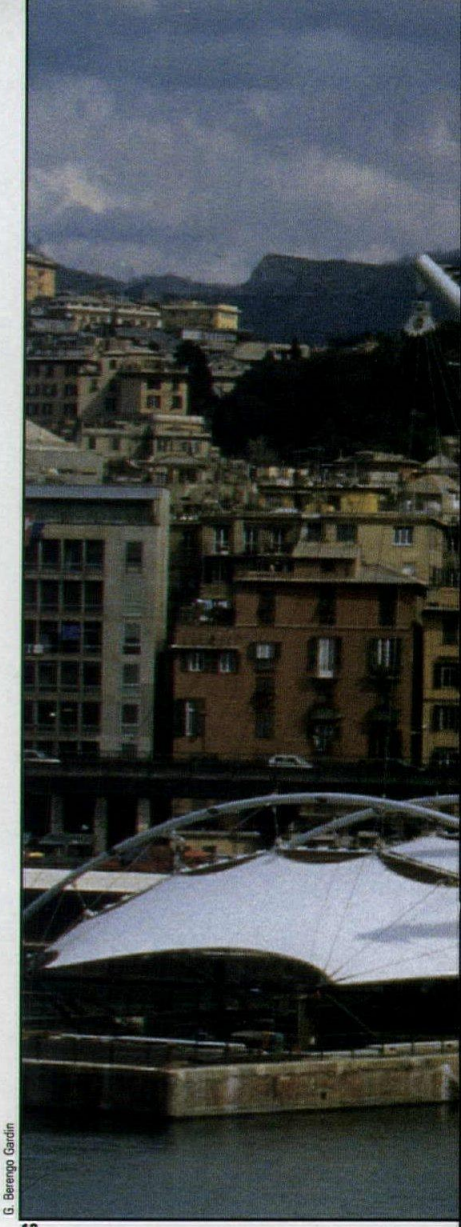
On the urban level, the equilibrium of boldness and restraint that Piano's crew had to find in Genoa bears on similar reclamations under way or pending in many Western cities, which now must turn from outward expansion to revitalize their historic and defunct industrial centers.

Some of the design decisions taken in Genoa may be questioned. For instance, most of the open areas connecting the various components are bereft of the customary trappings of public urban spaces: with the exception of a small canal and fountain that Piano created close to the Porta Siberia, a surviving gate of the old city wall, and a section of the nearby quay that steps down to the water to form a loge, there are no arcades or street furniture to speak of; and the apparent lack of adequate parking may undermine the potential of the port to become a center for retail, residences, or recreation. Whether RPBW has correctly assessed what will trigger, or at any rate be hospitable to significant urban regeneration remains to be seen. Piano reveals a deep concern in this regard.

Ultimately, he hopes that the harbor initiative (and the economic boost of the Expo) will spur growth in the old city quarters. The design team has done its best to think beyond the Expo's immediate requirements to create an environment that will support diverse uses once the fair is over. But, as Piano points out, "big projects are the physical manifestation of energy, growing culturally, physically, economically. Florence [of the Medici] is an example." And the reclamation of Genoa's harbor does not necessarily augur that kind of momentum. "If this was coming from the natural organic capacity of the town, without any pretext, then it would be much safer, because the same energy creating this would create the rest," Piano explains. "Since this came mainly from a pretext. . . from time to time I don't sleep at night."

A historical perspective might provide some consolation: It is fitting that Genoa should seek the renewal of its fortunes by way of this ambitious reclamation. After all, the harbor has through the ages been its source of wealth and influence. Valuable progress may be seen in the civic nature of this endeavor, particularly if one remembers that for centuries Genoa's destiny (and those of many other Western cities) were governed by narrow commercial interests. And the fact that an architect was enlisted to spearhead this effort may well be the most encouraging development of all. **Ziva Freiman** ■

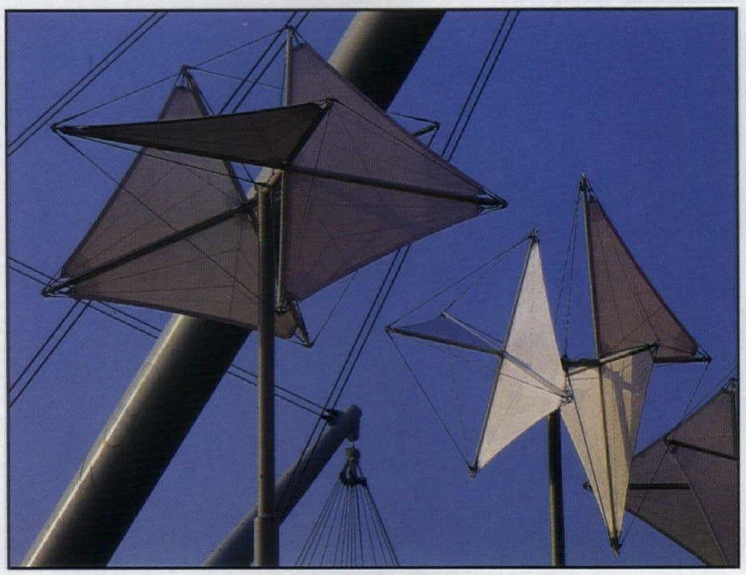
Project: *rehabilitation of historic harbor, Genoa.*
Architects: *Renzo Piano Building Workshop, Genoa (Renzo Piano, principal; Shunji Ishida, design associate; Flavio Marano, engineering associate; Mark Gesen Carroll, Renzo Venanzio Trufelli, Emanuela Baglietto, Giorgio G. Bianchi, Olaf De Nooyer, Giorgio Grandi, Donald L. Hart, Claudio Manfreddo, Vittorio Tolu, O. Di Blasi, M. Varratta, design team).*
Collaborators on aquarium: *Peter Chermayeff of Cambridge Seven Associates, Boston.*
Client: *Ente Colombo '92 Esposizione Di Genova, City of Genoa (Renato Salvatori, chief executive; Gianfranco Medri, chief of operations; Liciano Moni, director of works).*
Site: *a section of the old harbor adjacent to the historic quarter.*
Program: *to rehabilitate a part of the historic port for an international exposition; to reclaim a portion of the urban waterfront for public use. Total area, 915,000 sq ft; total gross building surface approximately 1.2 million sq ft.*
General Contractor: *Iritecna, Genoa (Corrado Gasco, Maurizio Morten, project managers).*
Consultants: *for Customs Houses and Millo building, Mario Semino, building conservation; Vittorio Nascimbene, structural; for Aquarium, Bruno Ballerini, structural; for Cotton Warehouse and Congress center, Luciano Mascia, Donatella Mascia, Paolo Costa, Luigi Lembo, structural; Piero Castiglioni, lighting; for the Grande Bigo, Ove Arup & Partners, Peter Rice, team leader; Sidercad; Bruno Balleri, structural; kinetic sculpture by Susumu Shingu; for Italia ship, Cetena, naval engineer; Marco and Matteo Lavarello, associate architects.*
Costs: *approximately $500,000 not including the infrastructural projects (road and metro) on the perimeter of the harbor.*
Photos: *Michel Denance/Archipress, except as noted.*



G. Berengo Gardin

12

The Grande Bigo (12), reminiscent of a great ship's spars, is the structural coup de grace *and the iconic centerpiece of the harbor reclamation. The tented structure it supports shelters a large rectangular pier, where a three-ring theatrical production of Moby Dick was to be staged during Expo. In keeping with the imagery of sails and rigging, a procession of kinetic wind sculptures (13), by artist Susumu Shingu, lines the dock in front of the Bigo (for placement, see fig. 2 on p. 79). One of the derrick's eccentric booms supports a circular elevator (14), which Piano imagined would afford the thrill of "discovery."*



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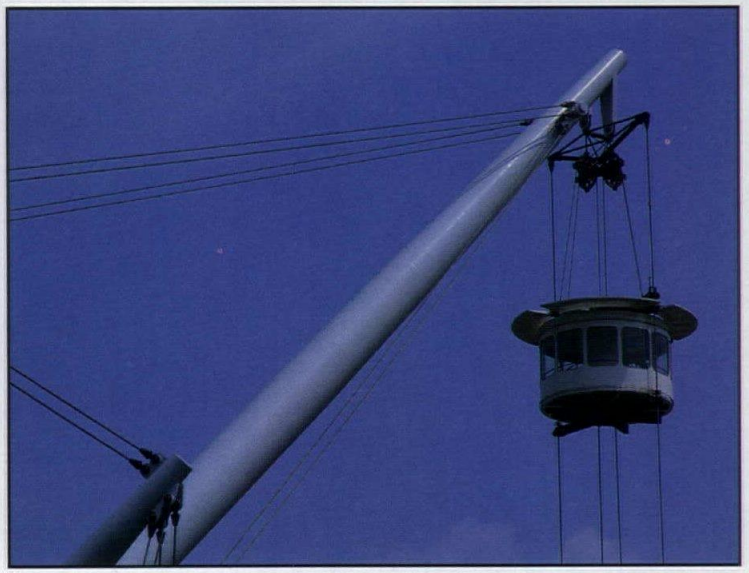

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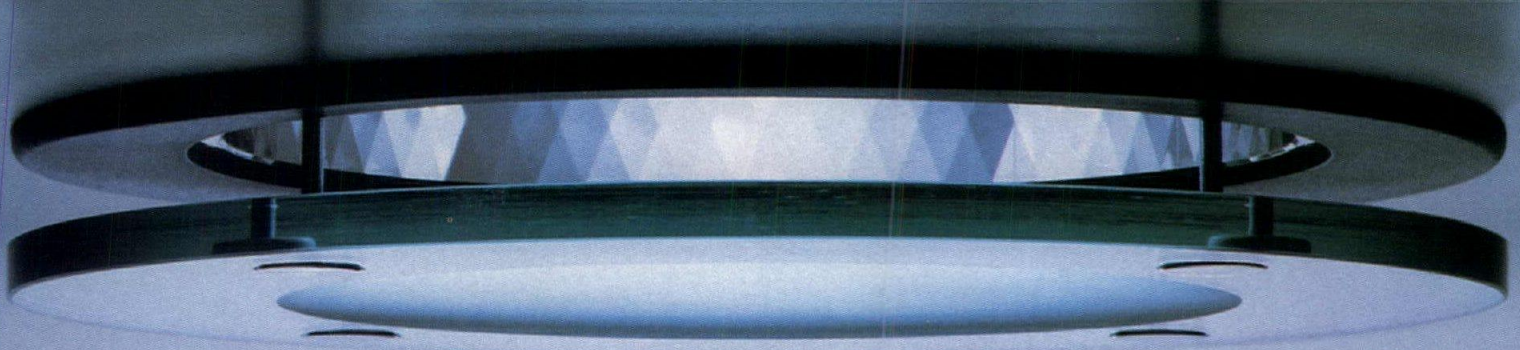

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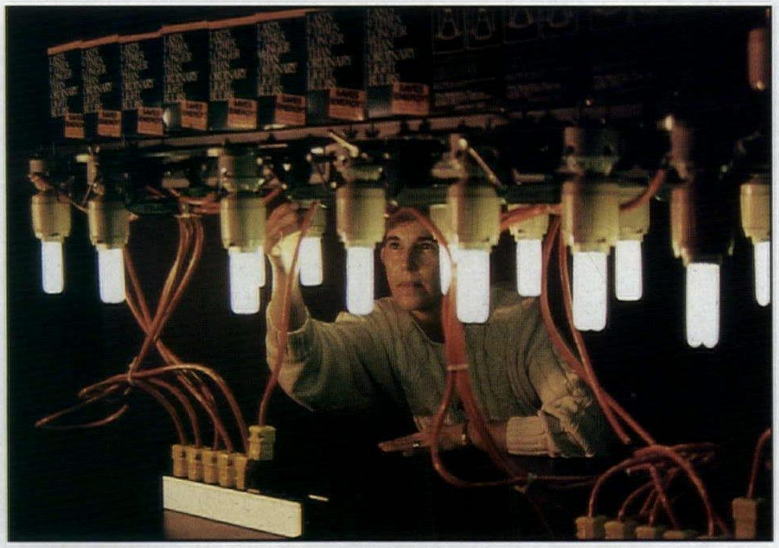
Technics Focus: Lighting

P/A reports findings of recent studies on compact fluorescent lamps, delivers the verdict on high-frequency electronic ballasts, and offers design guidelines for lighting automatic teller machines



Researcher Jana Svec adjusting a compact fluorescent lamp in the National Research Council Canada's Lighting Laboratory, part of the Building Performance Laboratory at the Institute for Research in Construction. The lamps are being "burnt in" for a series of tests on compact fluorescent lamp performance under different temperature and power quality conditions.

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Technics Focus
Compact Fluorescent Lamps: What You Should Know

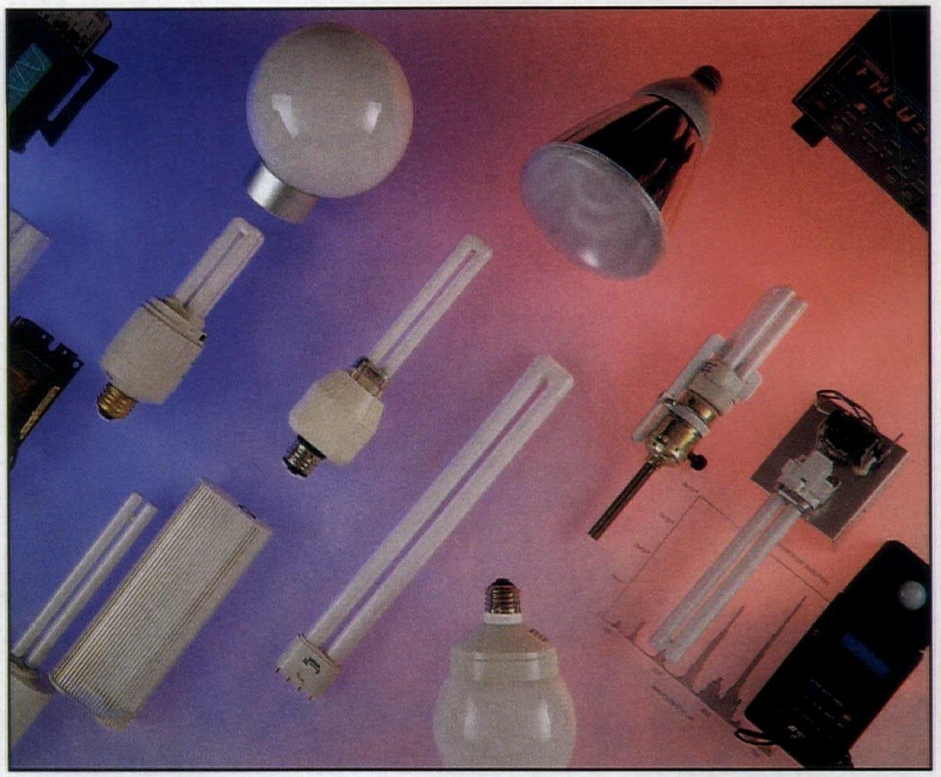
Researchers **David Finn** and **Michael Ouellette** of the National Research Council Canada discuss how CF lamps and ballasts work – and how to make best use of them.

The increasing popularity of energy-efficient lighting has led to a virtual explosion of new lamps and ballasts. Compact fluorescent (CF) lamps are a lamp of choice for those looking for an energy-efficient alternative to incandescent lamps: they are praised for consuming as little as one-fifth of the power and lasting up to 13 times longer than incandescent lamps. From a designer's viewpoint, the increasing variety in shape and color and the small size of CF lamps have made them more versatile and acceptable than traditional long-tube fluorescent lamps.

The energy-saving potential of compact fluorescent technology is undeniable. The high initial cost of purchasing ballasts and lamps can often be recouped in a short time, and utilities often provide cash rebates to reduce the payback period to one year. The long life of CF lamps means that maintenance costs can be much lower than for incandescent lighting. Moreover, it is said that a single CF lamp can save enough coal-fired electricity to keep a ton of carbon dioxide out of the atmosphere.

The use of CF lamps appears destined to continue growing for some time. What most designers should fully consider is that CF lamps are much more complex than the incandescent lamps they are often meant to replace. CF lamps can have different "warmths" and colors, some are dimmable, some are enclosed, and some have ballasts that are attached to the lamp that must be discarded when the lamp fails. Ballasts themselves can be "standard" electromagnetic, "energy-efficient" electromagnetic, or electronic, and may have power factor correction, radio interference suppression, and/or other features unheard of in the world of incandescent lighting.

This variety has made the design of successful compact fluorescent lighting systems more complicated. Moreover, the performance aspects of CF lamps and ballasts have not been standardized. For example, the actual light output and power consumption of a "13W" CF lamp can vary from brand to brand, and can change with different ballasts and mounting positions. Knowing some of the technical details about how CF lamps and ballasts work and perform can help you make better decisions about how, where, and when to apply them.



1

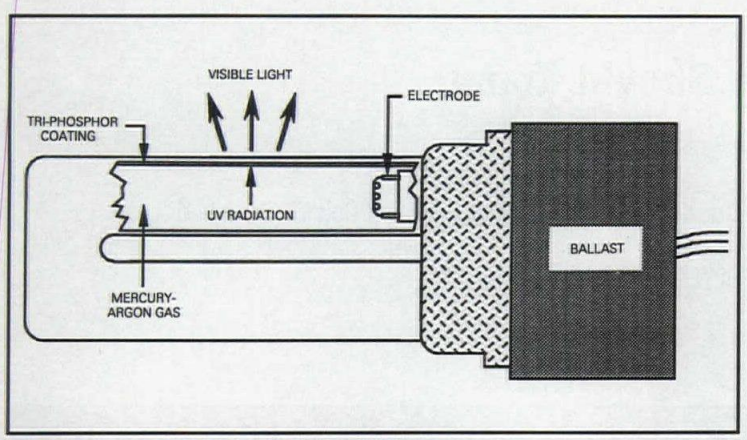
1 *An ever-widening variety of compact fluorescent lamps and ballasts is available on the lighting market. Lamps can be of varying shapes, sizes, wattages, lumen outputs, and colors. They may be enclosed or open. Ballasts can be either electronic or magnetic, and can be screw-in adaptors attached directly to the lamp or remote wall plug-ins. Performance of compact fluorescent systems can depend greatly upon the choice of the individual components selected.*

How They Work

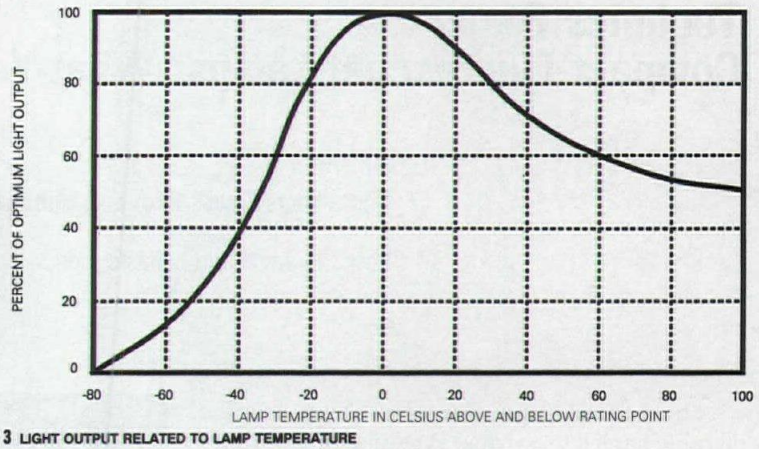
The visible light from a CF lamp is produced by a mixture of three phosphors on the inside of the lamp. They give off light when exposed to ultraviolet radiation released by mercury atoms as they are bombarded by electrons. The flow of electrons is produced by an arc between two electrodes at the ends of the tube.

An essential part of any compact fluorescent system is a ballast. The ballast provides the high initial voltage required to create the starting arc, and then limits current to prevent the lamp from self-destructing. There are several types of ballasts available for CF lamps; ballasts may be electromagnetic or electronic, attached directly to the lamp or separately wired, disposable or reusable. Some have features that improve power factor, reduce harmonic distortions, suppress radio interference, and even provide constant illumination during brownouts.

Electromagnetic ballasts have been around the longest, employing a wire-wound core to limit current drawn by the lamp. These ballasts typically consume an additional 15% – 25% of the lamp wattage, producing heat as a by-product. More energy-efficient



2 COMPONENTS OF A TYPICAL COMPACT FLUORESCENT LAMP



3 LIGHT OUTPUT RELATED TO LAMP TEMPERATURE

2 *A compact fluorescent lamp consists of a gas-filled glass tube with two electrodes mounted in an end cap. It contains a low-pressure mix of argon gas, mercury vapor, and liquid mercury, and is coated on the inside with three different phosphors. The electrodes provide a stream of electrons to the lamp and the ballast controls the current and voltage flowing into the assembly. The ballast may be attached directly to the lamp, or may be remotely connected.*

3 *Variation in light output of a typical compact fluorescent lamp with changes in temperature. The coldest spot on the lamp surface is the temperature that controls the light output of a compact fluorescent lamp. The optimum temperature for compact fluorescent lamps is typically 100 F (38 C). The curve will vary for different compact fluorescent lamps and ballasts, but the same general behavior will, with some exceptions, be observed. For this typical lamp and ballast combination, less than 40% of the maximum light output will be achieved at 32 F (0 C).*

magnetic ballasts have been developed recently using improved materials and manufacturing processes, but they tend to be slightly larger and more expensive than standard ballasts.

Most magnetic ballasts deliver current to the CF lamp at the same 60 Hz frequency supplied by the utility. The most recently developed ballasts are the smaller, lighter, and more energy-efficient high-frequency electronic ballasts. These ballasts use transistors or thyristors to boost the input 60 Hz power to the frequency range of 25–40 kHz. High-frequency operation offers the advantages of improved overall efficiency, improved efficacy, reduced hum, and increased lamp life. On the other hand, such ballasts are more likely to cause electromagnetic interference and are more susceptible to damage from supply voltage spikes and other transients. Many new electronic ballasts, however, now come with built-in filtering and protection circuits to reduce or eliminate problems of this kind.

Color

The first fluorescent lighting systems used a single phosphor coating inside the lamp and produced a cool white light. With the development of more efficient "tri-phosphor" coatings came smaller "compact fluorescent" lamps with light outputs rivaling those of incandescent lamps of similar size. The three phosphors produce light in the red, blue, and green regions of the visible spectrum, giving white light when blended together. By changing the relative balance of these phosphors, manufacturers can produce CF lamps in a range of apparent color temperatures [see P/A, Aug. 1990, p. 59] from a cool 4100 K (degrees Kelvin) to a warm 2700 K. Incandescent lamps have a color temperature of about 2900 K.

The Color Rendering Index (CRI) of a lamp reflects how accurately the color of an object can be determined under a given light source. Compact fluorescent lamps have a CRI of 82 (out of 100), which is considered excellent for fluorescent sources and good for artificial light in general. Incandescent lamps have a CRI of 97. Incandescent lamps provide excellent color rendering because of the full spectrum of color wavelengths present in the light they produce.

Temperature Effects on Performance

The ambient temperature around a CF lamp can have a significant effect on light output and lamp efficacy. The temperature of the coldest spot on the surface of the lamp is where mercury vapor will condense to liquid form, and this temperature (the "minimum lamp wall temperature") controls the vapor pressure inside the lamp. The optimum lamp wall temperature for CF lamps is generally 100 F (38 C). At temperatures below the optimum, mercury vapor will condense at the cold spot, reducing the number of mercury atoms available to emit UV radiation: light output drops. At temperatures above the optimum, an excess of mercury vapor is present, absorbing the UV radiation before it can reach the phosphors: light output also drops.

Low temperatures pose the greatest problems for CF lamps. Not all compact fluorescent systems are equally susceptible to low temperature problems, but in general, as temperature drops, so does light output and efficacy. At very low temperatures (below 32 F or 0 C), lamp output can decline to one-third the rated value or less. It is important to note that some CF lamps will have to warm up a while before producing sufficient light under cold conditions, some may take several minutes to ignite, and some won't start at all.

For cold applications (either indoors or out), choose CF lamps and ballasts designed specifically for low temperature operation. These lamps are usually equipped with electronic ballasts and can be enclosed in globes or recesses to prevent wind chill of the lamp. Even with these precautions, it should not be assumed that the lamp will operate at the same efficiency and produce the same amount of light as it would under more hospitable weather conditions.

High ambient temperatures can be produced around enclosed CF lamps in interior lighting applications. In addition, less efficient ballasts will introduce more heat into fixture enclosures. The *IES Lighting Handbook* points out that a 1% loss in light output (for fluorescent lamps in general) can be expected for every 2 F (1.1 C) above the optimum ambient temperature of 76 F (25 C). Efficiency can also drop, to some degree, at these higher temperatures. Ventilated fixtures for CF lamps remove excess heat from the enclosure.

Where excess heat cannot be completely removed, designers should be prepared to compensate for reduced light levels.

Harmonic Distortion

Computers, electric variable-speed drives, electric motors, arc furnaces and welders, induction heaters, and, unfortunately, ballasts for compact fluorescent lighting systems, all can produce harmonics that distort the magnitude and wave shape of the current and voltage supply. In short, harmonics can cause a range of minor to major problems with power systems equipment and connected devices. These include overheated capacitors, electric motors, and transformers; overheated neutral conductors in 3-phase electrical systems; blown fuses; malfunction of computers and other electronic equipment; and interference on communication lines.

The consequences, if any, of harmonic distortions depends on the nature of other connected electrical loads. If the existing power is relatively "clean" (that is, most other connected loads do not generate high THDs), then even the worst CF lamps will not seriously affect the overall power, as long as the CF lamps comprise only a small portion of the overall load. As an analogy, it takes more than a bucket of muddy water to darken a lake.

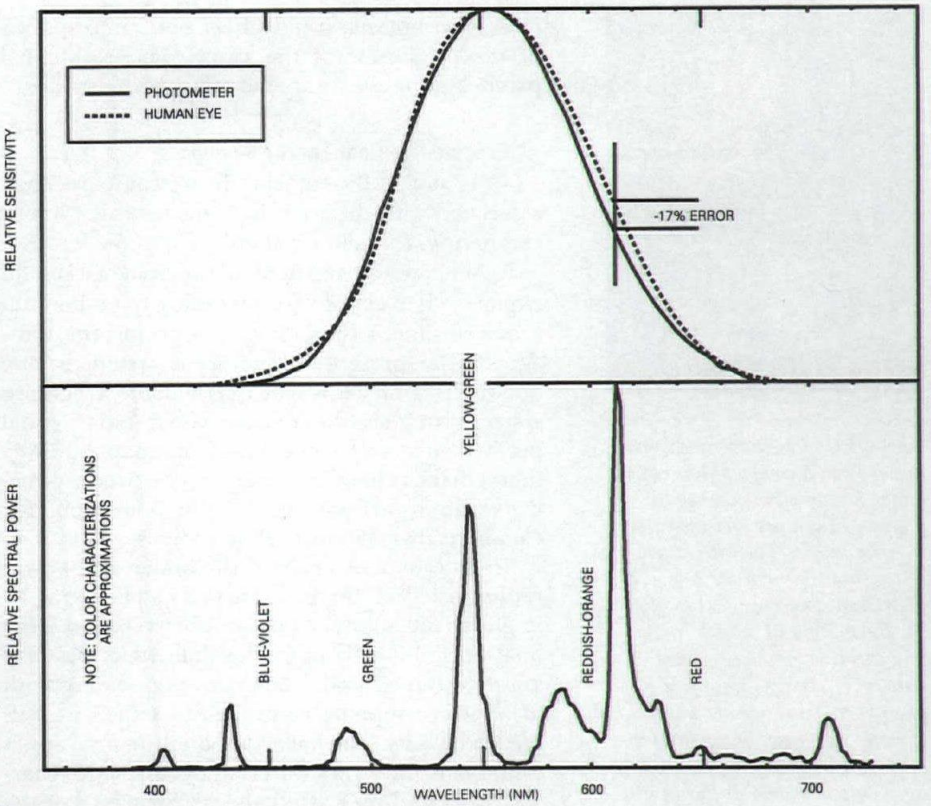
Not all CF systems cause the same degree of harmonic distortions. Some ballasts, for example, have circuits specifically tailored to reduce harmonic distortions. Total harmonic distortion (THD) ratings for CF systems are measures of total harmonic distortion of the current waveform.

Power Factor and Switching

The power the utility delivers is called *apparent power*. It is the vector sum of two components: *active power* (which does all the work in electrical devices) and *reactive power* (which does no work). The ratio of active power to apparent power is called the *power factor*. Incandescent lamps have a power factor of unity (1.0), while CF systems have power factors ranging from 0.3 to near unity. Power factors below 0.6 are generally considered poor, while values above 0.9 are very good.

Residential utility meters measure only active power, so utility companies can't charge homeowners for reactive power, even though it costs them money to transport it over transmission lines. Some larger utility customers are charged for apparent power. Apparent power increases as power factor decreases, so larger utility customers might prefer CF systems that include a power factor correction circuit.

It is a popular myth that incandescent and fluorescent lamps should be left burning continuously to minimize lamp wear and to prevent expensive energy surges when switching. Energy surges from both incandescent and fluorescent lamp switching are too brief to appreciably affect metering. While incandescent lamps do not suffer any reduction in service life from switching, fluorescent lamps do, to a small extent. Consequently, the costs of shortened lamp life should not be overlooked when considering CF lamps in applications requiring frequent switching.



4 SPECTRAL SENSITIVITIES OF PHOTOMETER AND EYE COMPARED TO CFL OUTPUT

Occupant Satisfaction

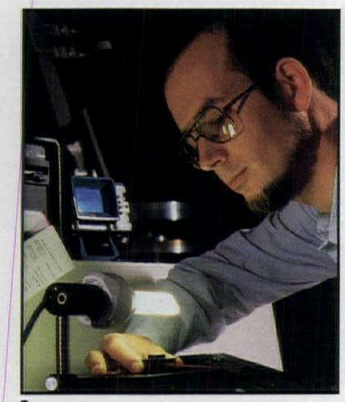
A compact fluorescent lighting system that in the end maintains good power quality, delivers good lighting, and saves energy and money may not necessarily be perceived by building occupants as satisfactory or acceptable. Incandescent lighting is sometimes replaced by CF lighting and the end-user complains that it isn't bright enough – even though the CF lamp is rated to produce at least as much light as the incandescent one.

Could the manufacturers' specs be wrong? Not necessarily. Lamp specs are usually given in lumens — the total luminous flux emitted by the lamp. This is not to be confused with the amount of illumination reaching the work space. A fixture intended for an incandescent lamp may not distribute light where needed when fitted with a CF lamp. Fixtures are designed for specific lamp sizes and shapes, and light from a different lamp will not necessarily be distributed at optimum efficiency. Lamps and fixtures should be properly matched to avoid occupant dissatisfaction. When existing fixtures must be used, the designer or retrofitter may have to install higher-lumen CF lamps to achieve desired illumination levels.

In addition, the physical appearance and brightness of luminaires can affect one's impressions of brightness in a space. Light from CF lamps, in comparison to incandescent lamps, is typically more uniformly distributed over a larger portion of the lamp surface area. One might therefore propose that these differences in lumi-

4 *Broadband photometers are the most widely used light measuring devices in North America. A problem can arise when a user assumes that the manufacturer's quoted accuracy applies to each wavelength in the visible spectrum. Some manufacturers quote an integrated error throughout the visible spectrum, with overestimates at some wavelengths canceling underestimates at others. The canceling procedure usually applies to the balance of spectral energy from incandescent lamps, not compact fluorescent.*

The top graph, based on manufacturer's data, shows that while this particular photometer is highly accurate at the 560 nanometer (nm) wavelength, an error of 17% can result at the 612 nm wavelength – a major wavelength for compact fluorescent lamps, as shown in the spectral power distribution (bottom) for a typical commercially available lamp. More accurate photometric and spectroradiometric instruments are available, but their high costs place them outside the budget of smaller organizations.



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5 *An NRCC researcher measuring flicker from a compact fluorescent lamp. Flicker can occasionally produce headaches and eyestrain in some people. The 60 Hz flow of electrons through the compact fluorescent lamp results in a 120 Hz fluctuation in the UV radiation incident on the phosphor coating. The stable nature of phosphorescence smooths out the effect of this cycle, but the instantaneous variations in fluorescent light output known as flicker still occur. The 120 Hz variation is too fast to be seen by most human eyes, but a stroboscopic effect can be observed when rapidly moving or rotating objects are viewed. High-frequency ballasts that send current through the lamp at frequencies up to 40 kHz can be used to prevent flicker problems.*

Total Harmonic Distortion

Two different definitions of THD are commonly used. One is expressed in terms of percent RMS current or voltage. The other is based on percent fundamental current or voltage. The two definitions are equally valid, but they can give different THD values, especially when distortions are high. THD based on RMS values can range from zero to 100%, while THD based on the fundamental values can range from zero to infinity. A given lighting system could have THD ratings of 80% based on RMS and 150% based on the fundamental. Therefore, when comparing different CF systems, it is important to ensure that the same definitions of THD are used. Values below 20% (of either RMS or fundamental) are generally considered tolerable; values exceeding 50% of RMS or 40% of fundamental are often considered high.

nous distributions could affect one's impressions of the brightness of the space. These potential psychological effects are currently being studied.

Expected-vs-Real Energy Savings

It is not sufficient simply to compare costs associated with different lighting systems without comparing the illumination they provide. If a space is currently overlighted, the designer should explore other options for providing the minimum required illumination. Simply reducing the wattage of the present incandescent system is one option. If a space is not overlighted, a lighting system giving less illumination could impair visual performance and could lower occupant satisfaction. Financial losses resulting from lower productivity can dwarf savings on the power bill for commercial and industrial operations.

In an economic analysis, the lumen and power ratings listed on the manufacturer's packaging or in glossy catalogues should not be considered the final word. Many lamp performance specifications are determined under laboratory conditions with ideal power supplies controlled by expensive reference ballasts. The ballast used in the final application may have very different performance characteristics and may affect the performance of the lamp as well. The ballast itself will also consume electricity, so it must be considered in the analysis. In addition, the ambient temperature, mounting position, and the presence of drafts and even the quality of the electrical supply can affect performance, as discussed above.

International Research Program

The Institute for Research in Construction, National Research Council Canada, has launched a research program in conjunction with national lighting and metrology labs in Canada, the U.S., and abroad, to study the electrical and photometric performance of a wide range of CF systems under a wide range of operating conditions. The results of this program will help designers make more effective use of CF lighting. The work is being done under contract to both the Canadian Electrical Association (CEA) and the CANMET program of Energy, Mines and Resources Canada. The CEA project is entitled "The Evaluation of CF Lamps for Energy Conservation" (CEA 9038 U 828).

Conclusion

Compact fluorescent lighting systems offer the potential for significant economic and environmental savings. A versatile range of different lamp-ballast configurations is available that can provide a comfortable, productive, and well-illuminated space if properly used. Designers should review as much detailed technical information on CF lamps as possible, some of which is available from manufacturers and electrical utilities.

David Finn and **Michael Ouellette** ■

David Finn is a research council officer with the Seminar Service of the Institute for Research in Construction (IRC) of the National Research Council Canada. He is coordinating IRC's "Building Science Insight 1992," a series of one-day seminars on energy-efficient lighting to be held in major cities across Canada this fall. For more information call 613-993-8951.

Michael Ouellette is a senior technical officer with the Building Performance Section of IRC. He has participated as a team member in the lighting research program investigating visual performance, emergency lighting, energy conservation, photometry, and ergonomics. He is active in technical committees of the IES, IEEE, CIE, and the Canadian Standards Association.

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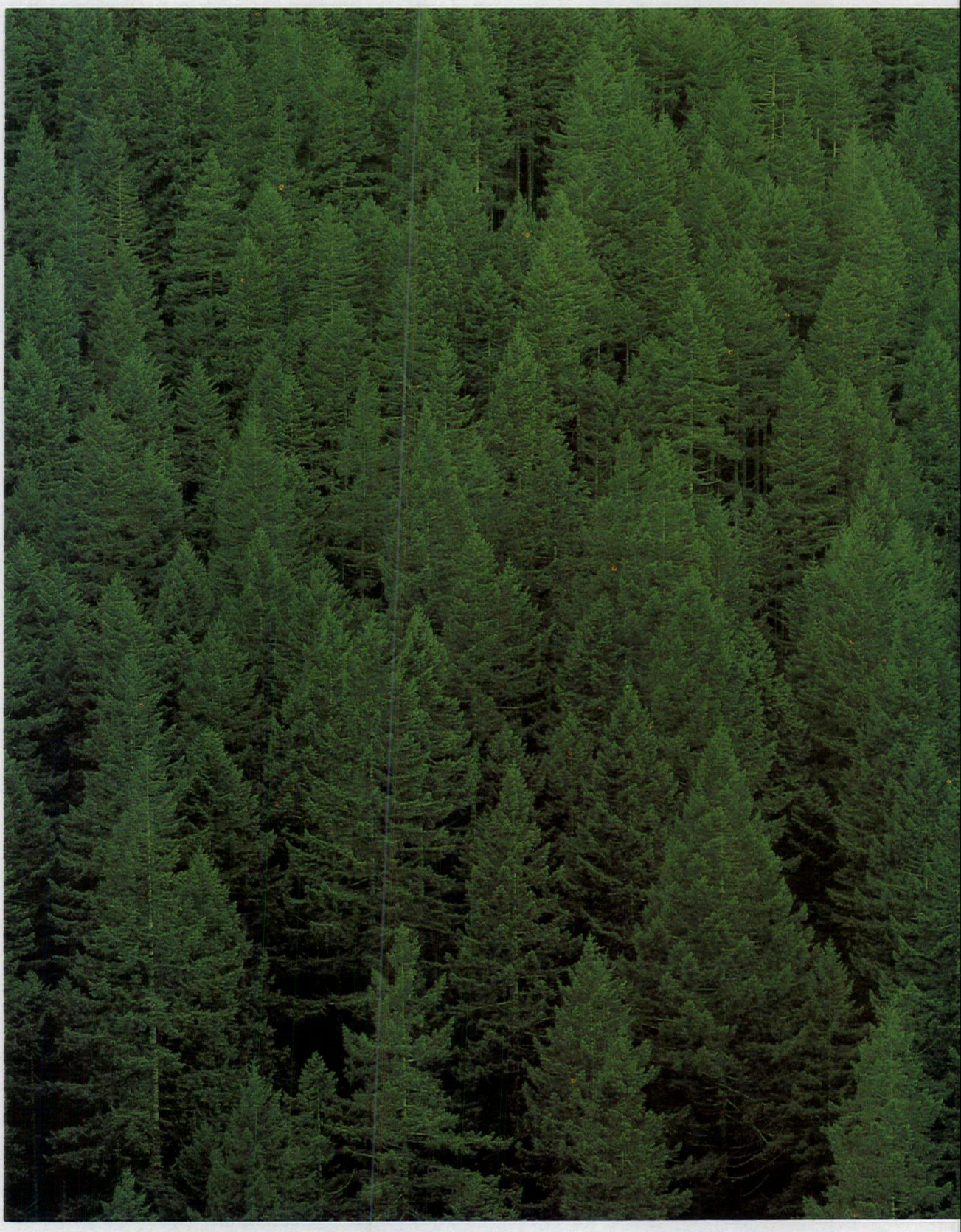
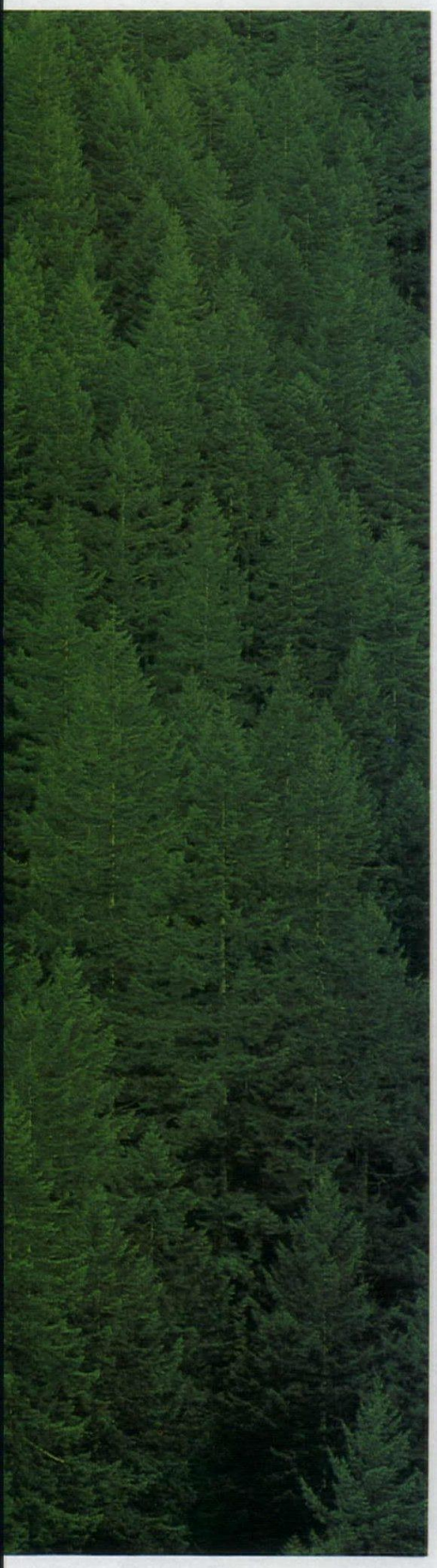


C-943 Comparative information based on the published catalogs of U.S. manufacturers of such lamps, Feb. 1992.

Industries.



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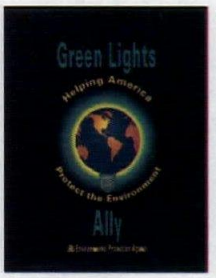

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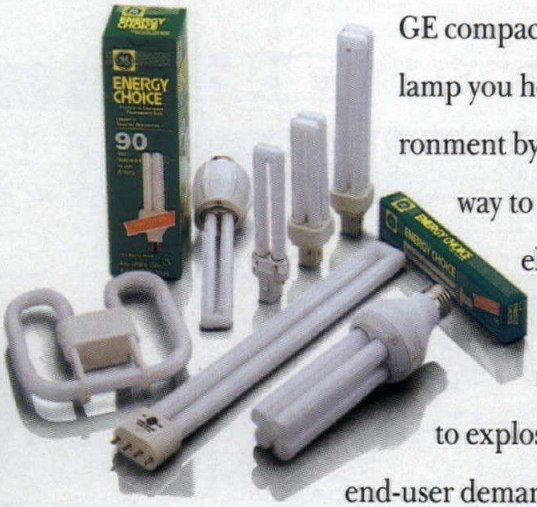

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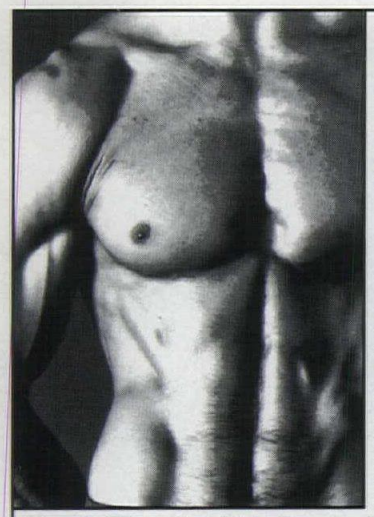

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Technics Focus
The High-Frequency Fluorescent Lamp System

Lawrence Berkeley Laboratory staff scientist **Rudolph Verderber** explains how electronic ballasts offer superior performance over electromagnetic ones.

The fluorescent lamp is the primary lamp used for general lighting. It is a high efficacy and low intensity distributed light source that provides uniform light distribution. These lamps, unlike incandescent lamps, require an auxiliary control, in the form of a ballast, to operate. The standard ballast is an electromagnetic circuit element that conditions the input (120 or 277 volts, 60 Hz) to provide a high voltage to initiate the discharge and, once started, it immediately limits the magnitude of the current to safely sustain the discharge.

The magnetic ballast has evolved over the past 50 years to be a reliable and rugged device with a typical life of about 10–12 years. In the 1960s, an era of cheap electricity, ballast manufacturers reduced cost by using aluminum wire and low-cost magnetics. This reduced ballast efficiency (typical system efficacy for the standard two-lamp T-12 fluorescent lamp system in the 1970s was about 63 lumens per watt) as well as substantially reducing its life. Soon after the 1973 oil crisis, with rising electricity costs, ballast manufacturers returned to using copper wire and better magnetics, improving the system efficacy about 9% (69 lm/W) and restoring its previous long life.

In the mid-1970s, a new electronic ballast technology emerged that provided the same functions as the magnetic ballast but operated the fluorescent lamp at a high frequency (about 25 kHz). It was known back in 1941 that fluorescent lamps operated at high frequencies had a higher efficacy (10%–15%).[1] But it wasn't until the mid-1970s that it was possible to provide the high frequency to the lamp in a package the same size and shape as the electromagnetic ballast.

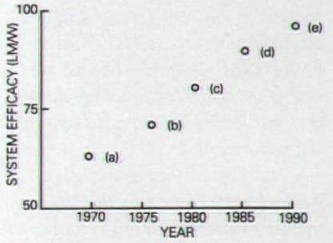
The new ballast employs a rectifying circuit combined with an oscillator output circuit in which the 60 Hz input is converted to direct current (DC) and is then inverted to high frequency. This "switching power supply" uses active semiconducting devices (diodes and transistors) as well as passive devices (resistors, capacitors, and chokes used in the standard ballasts) in their circuits. The new ballast is 10% more efficient in conditioning the input power to the lamp's requirement such that the standard two-lamp system's efficacy is improved by 20%–25%, to about 80 lm/W. Today, with new smaller diameter lamps and rare earth phosphors (4′ 32 W F32 T-8 lamp system), the high frequency system efficacy has reached 90 lm/W, a 43% increase compared to the standard 1970 electromagnetic two-lamp 40 watt F40 T-12 rapid start, cool white system.

Issues and New Potential

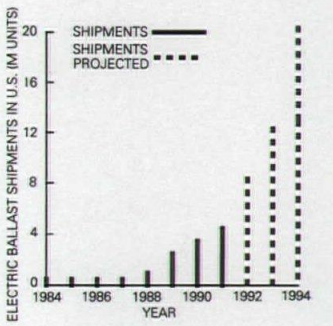
The new technology, in addition to its high efficacy, brought an exciting new tool for architects and lighting designers, particularly for those wishing to integrate daylighting and electric lighting for energy efficiency. The electronic high frequency ballast can continuously vary the light output of fluorescent lamps over a wide range with no loss of lamp life. Unlike fluorescent dimming systems with electromagnetic ballasts, electronic ballast dimming methods do not require conditioning the input power. This means high frequency systems can dim one lamp as well as small and large groups, independent of the electrical distribution system. This allows architects to choose groups of luminaires to be controlled together, based on the layout and function of the space as well as the building's fenestration.

There were concerns with the new technology. When the electronic ballast was first introduced in the late 1970s and early 1980s, failure rates were unacceptable in products from small manufacturers. Architects and lighting designers, generally not well versed in electronic technology, were not aware of the problems and hesitated to specify the new ballasts. To add to their confusion, issues even more foreign to these professionals – electromagnetic interference, poor lamp life, low ballast factors, and poor power quality – were associated with the new technology.

In 1976, the U.S. Department of Energy (DOE) established a National Lighting Program at the Lawrence Berkeley Laboratory (LBL). The first project was to assess the technical and economic commercial viability of electronic high-frequency fluorescent ballasts. The program selected two groups to develop an electronic ballast and, with the aid of the lighting community (primarily the American National Standards Institute's fluorescent lamp and ballast committee), developed a set of specifications that the product should meet to maintain safe operation of the lamps. LBL set up a laboratory to test the products and to manage large-scale on-site ballast demonstrations. As the above issues were raised, it was LBL's mission, on behalf of DOE, to address them to assure they could be properly resolved.



1 *Increasing system efficacy for the 4′ fluorescent lamp system: (a) standard magnetic ballast with 40W F40 T-12 rapid start (RS) cool white (CW) lamp; (b) energy-efficient magnetic ballast with 40W F40 T-12 RS, CW lamp; (c) electronic high-frequency (HF) ballast with 40W F40 T-12 RS, CW lamp; (d) electronic HF ballast with 32W F32 T-8 RS, rare earth (RE) lamp; (e) electronic HF ballast with 32W F32 T-8 instant start, RE lamp.*



2 *The annual and projected sales of electronic high-frequency fluorescent lamp ballasts in the United States. By 1992, there should be over 12 million ballasts in operation. The sales in 1992 are projected to pass 8 million units – nearly 20% of the ballast market for which electronic ballasts are available. Ballast sales do not include electronic ballasts for compact fluorescent lamps, the market for which is expected to grow rapidly.*[4]

3 *Typical ranges of harmonics measured for 4′ and 8′ fluorescent lamps operated with electromagnetic or electronic high-frequency ballasts.[5] Generally, the harmonic content for the energy-saving 4′ 34-watt F40 lamps operated with electromagnetic F40 ballasts will be 8% greater than for the 40-watt F40 lamps. When replacing magnetic ballasts with electronic ballasts in existing spaces, there should not be any problems, even if the harmonic content is slightly greater for the electronic ballast system. This is because the electronic ballast system is more efficacious and there is a reduction in power to obtain the same light level.*

The percent harmonic is expressed with respect to the fundamental; thus, the absolute value of the harmonic would be about the same. For example, if the power is 50% less for the new system, the absolute value of a 30% harmonic is equivalent to a 20% harmonic from the replaced system. For new construction, the electrical distribution engineer can provide the proper wire size for the known harmonics and specify the correct K-Factor rating for the transformer.

3 RANGE OF HARMONIC CONTENT OF SOME FLUORESCENT LAMP-BALLAST SYSTEMS

LAMP	4′ 40W F40	8′ 110W F96	4′40W F40	4′32W F32
BALLAST	MAGNETIC	MAGNETIC	ELECTRONIC	ELECTRONIC
HARMONIC				
3RD (%)	12-22	22-45*	6-35	6-45
THD (%)	18-28	26-50	10-45	12-55

*[REF. 5]

Reliability

The most significant study concerned with reliability was conducted by staff of the University of California, Berkeley.[2] They installed over 35,000 electronic ballasts from three manufacturers and monitored ballast failures for a period of over four years. They found that failure rates were under 1% for two of the manufacturers' products. This clearly established that reliable and long life electronic ballasts could be designed and manufactured in large numbers, providing significant energy savings for lighting buildings.

The sale of over 4 million electronic ballasts in 1991, with 8 million units projected to be sold in 1992 is further verification of the acceptance of this technology.[3] Electronic ballasts for the most commonly used fluorescent lamps are now available from more than 10 manufacturers.

Lamp/Ballast Issues

From 1977 to the early 1980s, several other issues were raised, including filament power, lamp life, and ballast factor. It was learned that to maintain the manufacturer's rated lamp life, filament power had to be maintained when lamps were operated at high frequency; other than that, all other lamp input parameters were the same as for 60 Hz operation. For example, starting voltage (< 250 volts) and lamp current crest factor (< 1.7) were required specifications for both modes of operation. The most efficacious method of operating the 1″ diameter, 4′ T-8 lamp is in the instant start mode (no filament power during starting or operation), rather than the rapid start mode (filament power during starting and operation). Lamp manufacturers derate lamp life from 20,000 hours to 15,000 hours when F32 lamps are operated in the instant start mode. However, for dedicated applications, it is cost-effective, since the increased efficacy (5 lm/W) reduces operating cost, more than making up for the loss in lamp life. In fact, for most commercial application – 10 hours of operation per start – the life in the instant start mode is only slightly less than in the rapid start lamps.

An important feature of the electronic ballast is the availability of different ballast factors (ballast factor is the percent of light output that a system will provide relative to the lamp manufacturer's rated light output). For example, a high ballast factor (higher light output) is generally specified to minimize the number of luminaires to obtain a particular illuminance level. However, an effective energy-saving strategy is to use low ballast factor ballasts to light non-critical task areas such as aisles, washrooms, and copying rooms.

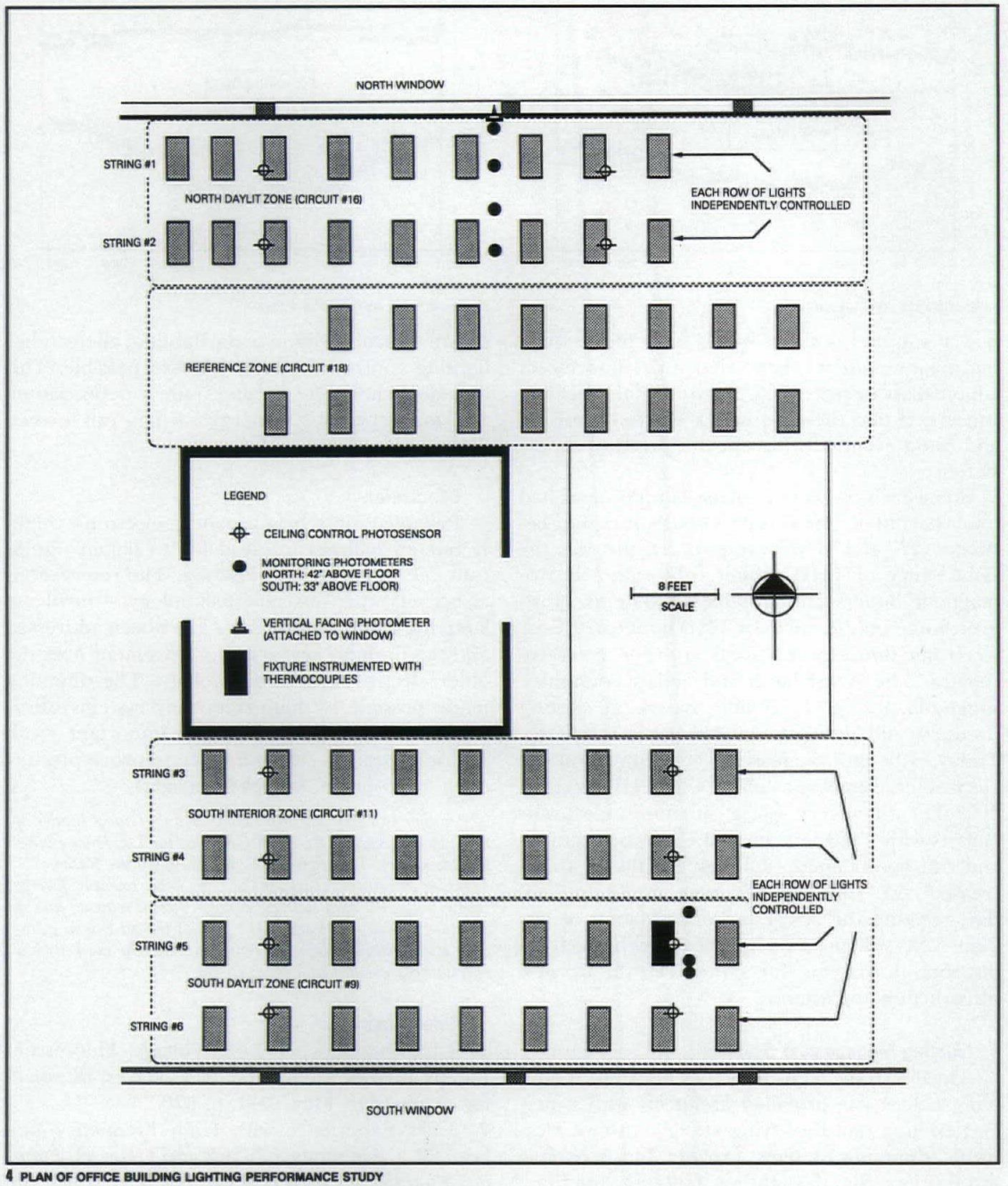
Power Quality

Poor power quality results in inefficient operation of equipment, potential fire hazards, and possible interference with other equipment on the electrical distribution system. Power quality issues include electromagnetic interference (EMI), power factor, and harmonics. However, the familiar 60 Hz electromagnetic fluorescent lamp/ballast system is a non-linear system and may have just as poor power quality as electronic high-frequency lamp/ballast systems.

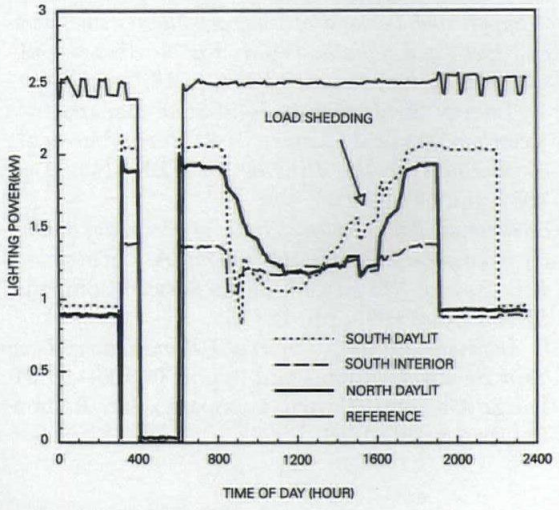
Electromagnetic Interference. In 1982, LBL's Lighting Systems Research Group invited the lighting community to a workshop addressing EMI concerns. The result was that the Federal Communications Commission (FCC) – which regulates electromagnetic emissions from all types of devices, not just radio and television transmissions – requested that the National Electrical Manufacturers Association (NEMA) develop EMI limits for both conducted and radiated emissions for lighting systems. Today, for the first time, lighting systems are regulated by Part 18 of the FCC regulations. All lamp/ballast systems must be tested to show that they meet these requirements. A demonstration in a Veterans Administration Medical Center[4] showed that any space in the facility illuminated with a standard fluorescent system could also employ a high-frequency lighting system.

Power Factor. Early electronic ballasts had power factors equal to and exceeding the electromagnetic 60 Hz ballast. Electromagnetic ballasts improve power factor with a capacitor at their inputs; the electronic ballast system must achieve the high ballast factor through its basic design, using special integrated circuits. In any case, the results are the same, a high power factor.

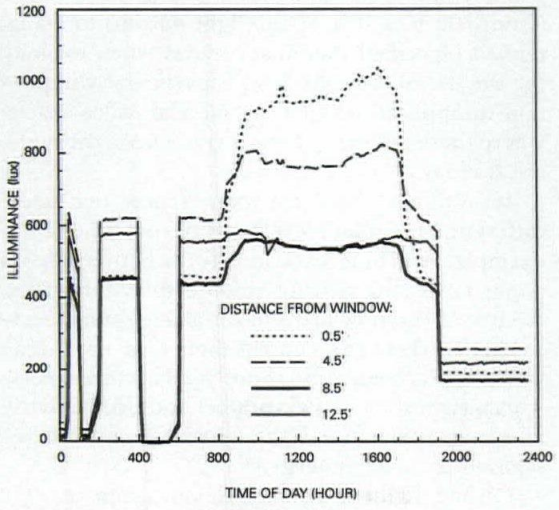
Harmonics. The final power concern that has just recently emerged regards harmonics that are generated not only by magnetic and electronic fluorescent ballast systems, but by several new energy-saving devices that are based on semiconductor technology. The list includes personal computers, variable speed motors, and uninterruptible



4 PLAN OF OFFICE BUILDING LIGHTING PERFORMANCE STUDY



5a POWER USE ON A SUMMER DAY

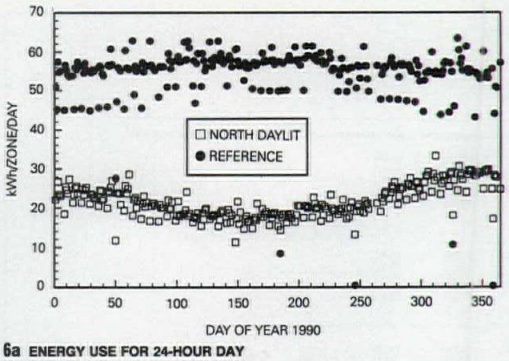


5b ILLUMINANCE LEVELS AT DIFFERENT LOCATIONS

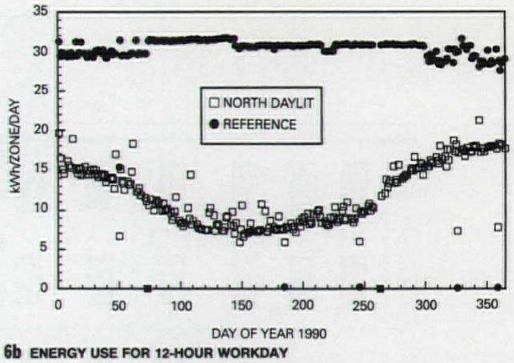
4 *Layout of an on-site lighting control demonstration of an office building in Emeryville, California.[6] The ballasts were three-lamp, electronic high-frequency fluorescent ballasts. Two rows of lamps were operated from branch circuits, #16, #18, #11, and #9. However, the light level of each row of lamps was controlled independently of the others using low-voltage wiring. The control system could conduct all of the lighting control strategies, and the energy savings for the cumulative effect was determined.*

5a *Actual power use in the four zones for a summer day. Notice, in the south exterior zone at about 900 hours (9:00 a.m.), the sharp drop in electrical use, indicating increased daylighting contribution, and the increase because of lowering the shades to reduce glare. At about 1600 hours (4:00 p.m.), the electric lights were reduced about 15%, simulating a need to shed load because of excess power demand. Questionnaires distributed to occupants after the demonstration indicated they did not notice the change.[5]*

5b *Measurement of the illuminance on selected tasks in the space. Notice that the required illuminance in the different zones was maintained or exceeded during the entire day. This indicated that the sensing photocell that controlled the electric lighting was properly calibrated to compensate for the daylight illumination on the tasks. It is important to properly place, design, and calibrate the sensing photocell when using daylighting to illuminate interiors, especially in general office applications.[6]*



6a ENERGY USE FOR 24-HOUR DAY



6b ENERGY USE FOR 12-HOUR WORKDAY

6 *The daily workday energy use in the north external (daylit) zone for an entire year. The left-hand data are for the entire 24-hour period. The data show considerable spread since there were many days the staff worked throughout the night. The right-hand figure is the data for the working period 6:00 a.m. to 6:00 p.m. The savings during the summer months are greater than 70%; however, the savings include the savings (20%) from the electronic ballast system's increased efficacy. Also notice the 7% increase in energy use on the first day and the last day of the year. This is the first measurement of the lumen depreciation control strategy. The initial illuminance is reduced to the specified levels, decreasing energy use; as the output of the lamps decreases because of lumen depreciation, the system automatically increases the power to maintain lumen output, hence, maintain the specified illuminance.*[6]

power supplies – all of which have higher total harmonic content than electronic fluorescent lamp/ballast systems. The reason for the present concern is that these systems are growing in use and could eventually disrupt the electrical supply system.

Some early electronic ballast-lamp systems had total harmonic distortion (THD) ranging between 12% and 40%. Interestingly, this was the same range of THD exhibited by some electromagnetic fluorescent lamp/ballast systems. However, some utilities posed a THD limit of 20% for electronic fluorescent ballasts in order to receive rebates. The ANSI lamp and ballast committee suggested a 32% THD limit based on existing products and international harmonic standards. Today, with little increase in cost, low-harmonic electronic ballasts are available with THD less than 20%. For a few very special situations, electronic ballasts with THD less than 10% may be required and can be obtained, although usually at an increased cost. However, for most applications today, meeting the ANSI recommendation of less than 32% will pose no problems with electrical distribution systems for either retrofit or new construction applications.

Lighting Management Systems

The electronic high-frequency fluorescent dimming ballast has provided architects with a new and exciting tool for saving energy. In fact, electronic dimming systems provide the economic justification for daylighting building interiors. These systems can dim lamps over a wide range (from 100% to 10% of full light output) to maintain the specified illuminance level when exploiting the use of daylight. This is particularly important in applications like commercial office spaces where there are many critical visual tasks throughout the day.

In addition, there are many spaces that need different illuminance levels at different times – for example, switching back and forth between hard paper tasks and viewing video display terminals. Architects can now provide variable lighting levels so that workers can control their own task areas without interfering with those of adjacent workers. This will improve visual comfort and productivity, and may well exceed the economic advantages realized by saving energy.

On-site lighting control demonstrations with the electronic ballasted dimming systems have shown that, in addition to daylighting, all the other lighting control strategies are also possible. This includes scheduling, tuning, lumen depreciation, and load shedding. Energy savings can exceed 70% in some areas.

Conclusion

Reliable, high performance, electronic high-frequency ballasts are available to obtain significant energy savings for lighting. The reservations associated with this new technology – involving lamp life and power quality – have been addressed and the findings reveal an improvement over the older electromagnetic technology. The dimming made possible by high-frequency systems offers further energy savings, but more important – with judicious design – dimming can improve productivity and comfort. **Rudolph R. Verderber** ■

The author is a staff scientist and is Deputy Group Leader of the Lighting Systems Research Group at the Lawrence Berkeley Laboratory. The Lighting Group manages the National Lighting Program (NLP) for the U.S. Department of Energy, researching new light sources, energy-efficient fixtures, and the effects of lighting on people. The goal of the NLP is to introduce energy-efficient lighting equipment into the market while maintaining comfort and productivity.

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Technics Focus
ATM Security Lighting

Lighting designer **Hyman Kaplan** discusses lighting factors affecting security and safety at automatic teller machines.

When banking was 9:00 to 5:00, Monday through Friday, security lighting was a minor problem. Now, offering bank services 24 hours a day, seven days a week, the automatic teller machine (ATM) has made customer security a major concern. Proper lighting is of primary importance in protecting ATM users both while obtaining money and when leaving the area.

The Automatic Teller Machine (ATM)

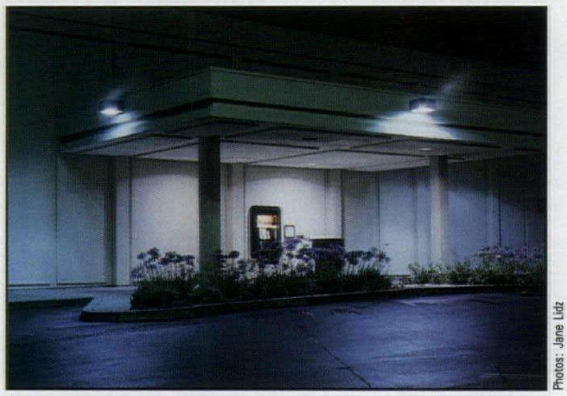
Most of us have had experiences with these devices in our daily banking activities. From the front, they appear as a combination of pushbuttons, a video screen, and several openings to allow for transactions. Behind the face is a complicated electronic/mechanical machine that accepts and reads bank cards, communicates over telephone lines to the bank's main computer, and, when requested, disperses paper money. Many ATM units are equipped with a concealed video camera to record the user during activities. The camera may also be used to observe activity and provide security for the surrounding areas.

During the day, there is usually adequate daylight to provide for use of the ATM and for security of the surrounding area. The only potential problem is that at certain directions and times of the day, the daylight may produce veiling glare on the video display screen that can seriously affect the use of the machine. This veiling glare can be solved by proper placement of the ATM and by the use of screening material to reduce the glare. The screening can be designed so as to allow visibility of the unit for security. The real problem with ATM use occurs at night: electric lighting must then be provided to illuminate the ATM and surrounding areas both for use of the machine and for personal security. But, how much lighting and where to light are the real questions.

Regulations

In determining the amount of required lighting, the first question most people ask is what, if any, regulations prevail. Regulations may be promulgated by national organizations and Federal agencies (the Federal Banking Administration, for example), model building codes, the states, and by vendors of equipment or services. As of this writing, it appears that there are no national regulations, and only California has a state regulation. Several equipment vendors have recommendations, mainly for use with their video equipment.

1a



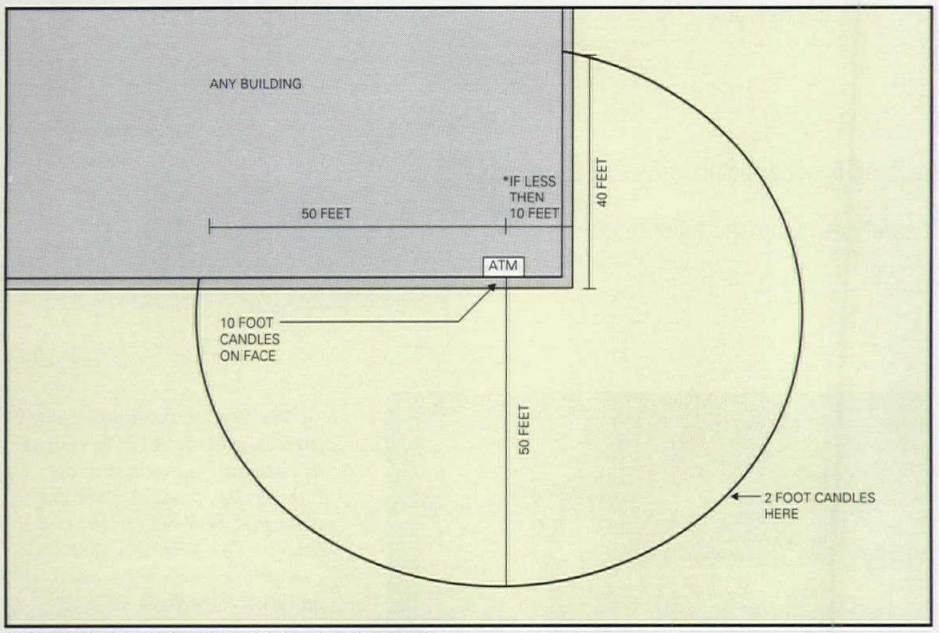
1b

Photos: Jane Lidz

1a, 1b *Although the approach and area around the ATM appear to be adequately illuminated, the light sources produce glare that can affect both pedestrians and drivers. The lighting under the canopy does provide adequate illumination to perform all tasks.*

In many cases, regulations are written by lay people who lack the technical knowledge to cover all conditions. The California regulation is an example; it creates as many problems as it attempts to solve. It covers two areas: first, there should be 10 footcandles at the face of the ATM and 5′ outward, and second, there should be 2 footcandles at 50′ from the ATM. The first requirement involves light toward the operating surface of the unit, and the function of this light is only to allow the user to see the keyboard and openings easily; it does not discuss the effect of the lighting (and its potential glare) on the video screen. Disability glare from other outdoor lighting when users turn from the ATM to leave is not covered in the requirements.

The need for adequate light on the user to perform tasks – such as writing and reading transactions – and to permit proper use of video equipment is not included. With regard to the perimeter lighting of 2 footcandles at a distance of 50′ from the ATM, this portion discusses only the end



2 SCHEMATIC OF CALIFORNIA'S ATM LIGHTING REQUIREMENTS

2 *California now sets illumination requirements for ATM machines and their surroundings. As discussed in the text, poorly written regulations can create new problems, even as they solve existing ones.*

3a, 3b *Cut-off type light sources produce appropriate lighting for safe walking without glare. The HID fixture mounted to the side of the ATM provides proper lighting at all angles.*

results and totally ignores the levels or uniformity of lighting over the entire area between the ATM and the extreme. There is no indication whether the lighting levels are horizontal or vertical, or at what height the level is to be measured. Therefore, although a lighting design may comply with the regulation, it may not necessarily provide a truly safe environment.

Design Considerations

Issues that should be taken into account to provide a safe environment for ATM transactions and the surrounding areas include:

- lighting for the ATM and a 10′ surrounding area,
- the approach area to the ATM,
- obstructions (physical and visual),
- light sources (including color),
- light levels,
- directions of light and lighting uniformity, and
- glare.

These factors cannot be taken one at a time, but should be considered interrelated. First, at the ATM and its immediate surround, the lighting should allow for use of the ATM unit, but should be controlled to reduce veiling glare on the information visual display terminal. Light must be provided for the work surface where preparation of transactions occurs, and for video recording (even if not initially installed, video equipment can easily be added to the ATM at any time), and it must be properly directed to highlight the walking area, especially curbs, railings, and other special features.

As for the light sources, they can be fluorescent, metal halide, or high-pressure sodium vapor lamps. Fluorescent lighting will normally be effective only if there are large overhangs. High-pressure sodium vapor lighting is recommended where high color rendering is not desired. Since all the lighting concerns require different levels of lighting, and these levels vary according to their use and the surrounding area ambient lighting levels, the Illuminating Engineering Society (IES) *Application Handbook* is the major reference for determining actual requirements (see sidebar).

The approach area to the ATM from the sidewalk or parking lot generates other lighting concerns. The lighting has to provide a safe and secure approach to and departure from the ATM unit. On the approach to the ATM, the lighting should permit complete recognition of the surrounding area – including any tripping hazards such as curbs, broken pavement, and rocks – without creating disabling glare. The lighting should provide the same function for people leaving the ATM, but should also assist in determining if someone is hiding in the area.

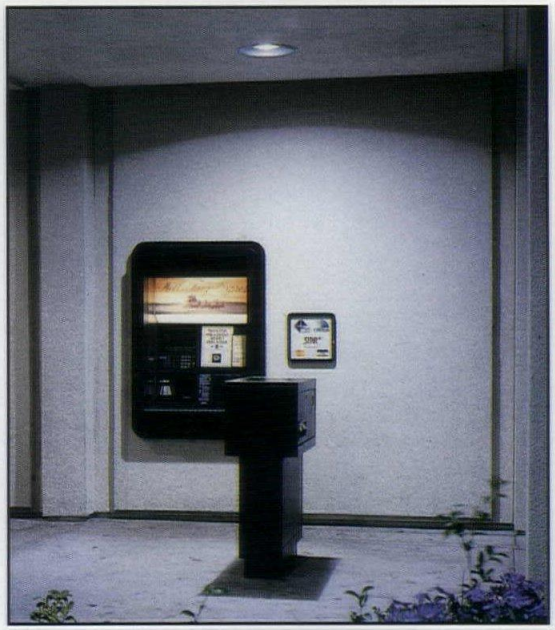
Places where an assailant can hide are around building corners, within landscape plantings, and behind landscape features (such as berms), signs, and other objects. The direction of lighting and its uniformity are very important in these areas. Because foot traffic moves in both directions, it is important that the lighting come from both directions, on the building and along the perimeter. If the distance of light throw is greater than 2.5 times the mounting height above grade, the lighting may not allow for determining the existence of potential threats and hazards, and it can produce disabling glare to the user.

Color can help in the recognition of objects when lighting levels are low: a person wearing a blue jacket might be concealed when adjacent to a green bush, except for the color difference between them. The color rendering of the light source can, therefore, be important in some situations. Within planter areas and around berms, it is also important to provide low-mounted lighting to illuminate the shadows created by overhead lighting. Even with the highest lighting levels, systems can be ineffective if there are sources that produce visual glare. This disabling glare may temporarily prevent the user from seeing anything in the direction of the glare source.

Video Requirements

At many ATM units, financial institutions are installing videotaping equipment to record use of the system (to assure that the proper people have used their access cards). At other times, the cameras are used to record activity within the proximity of the unit. The two different uses have similar requirements: these include light levels, direction of lights and glare, and color.

The lighting levels should be determined for the camera and lens to be used. Most cameras and lenses can adequately record sufficient detail for recognition in the range of about 5 footcandles. Again, the best video system can be useless if there is glare in the lens, the wrong surface is illuminated (source from above only lighting the top of the head and shoulder of the person being observed), or the color of the light source distorts the colors recorded by the film.



3a

Photos: Jane Lidz

3b

Types of Solutions

As discussed previously, a number of conditions of buildings and sites can affect the lighting design. The following are some typical problems and how they can be successfully solved, though these solutions may not always apply.

Overhang or Canopy. If there is an overhang or canopy at the ATM and surrounding area, recessed fixtures with wide light distribution should be considered, either fluorescent or high intensity discharge (metal halide or high pressure sodium) lamps. Fixtures should be located to both sides of the ATM unit to allow the light to emanate from both directions and to permit safe and adequate lighting of the unit itself.

No Overhang or Canopy. Without an overhang or canopy, high intensity discharge (HID) wall sources with controlled, forward distribution can be used. They should be located on both sides of the unit to produce the best illumination for this installation, as stated earlier.

Large Approach Area. The approach to the ATM raises many different problems and types of solutions. If the approach is across a large area – over 2.5 times the mounting height of the fixtures – the fixture should be installed at both the building, lighting outward, and at the perimeter of the approach, lighting inward.

If the wall of the building where the ATM is installed allows the light fixture to be placed 12′ above the ground, the light can adequately cover, without producing glare, a space of up to 30′ (12′ × 2.5) from the building. The exact dimensions will vary with type of light fixture and distribution pattern selected. The higher the fixtures, the further the light can be projected. In many cases, horizontal cut-off type fixtures should be considered, as they can project the light and do so without producing glare.

Floodlights. Floodlights, unless mounted high, out of the visual area, should be avoided as they produce direct glare in many instances.

Conclusion

Although security lighting at ATMs is becoming a major concern, there is very little definitive information on how it can be accomplished. One state has an ordinance that does not appear to address all of the concerns. Some other states, meanwhile, are considering standards. The Financial Facilities Committee of the Illuminating Engineering Society (IES) is presently working on a report to expand the concerns and make recommendations for lighting levels in all task areas.

An effective means today to solve the problem of lighting for security at ATMs is to consult a qualified lighting designer. The designer will either review the site and building plans (for new design) or visit the site (for existing facilities), and will recommend light fixtures and lamps. He or she will determine mounting height in accordance with the building design and site configuration, and will verify all the requirements of agencies having jurisdiction. The lighting designer can also provide a computer-generated light output printout showing the uniformity and direction of the design lighting system. **Hyman Kaplan, IALD, PE** ■

The author is the lighting specialist with Belden, Inc., Electrical Consulting Engineers, of San Leandro, California. Prior to joining Belden, Inc., he was principal of a consulting firm in Southern California. A registered electrical engineer, he is the chair of the IES Financial Facilities Committee and is active in the energy committees of both IALD and IES.

References

IES Lighting Handbook: 1987 Applications Volume, Illuminating Engineering Society of North America, New York (212) 705-7925.

Recommended Illumination Levels

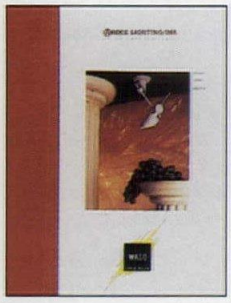
Following is a partial list of illumination levels for bank customer service areas recommended in the the *IES Handbook, 1987 Applications Volume:*

Area/Task	Illuminance Category
Bank/Lobby	
General	C
Writing	D
CRT (VDT) Screen	B
Handwritten Task	D
(ballpoint/felt-tip)	D
Service Areas	B

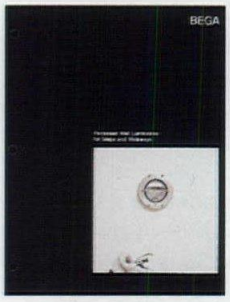
Category	Illuminance Range (footcandles)
B	5 – 7.5 – 10
C	10 – 15 – 20
D	20 – 30 – 50

Lighting and Related Products Literature Digest

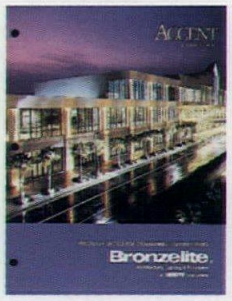
A new 24-page, four-color catalog displays Alkco's improved/expanded line of under-cabinet lighting fixtures and design options. The catalog includes a host of new task-optimized models. The Little Inch, a one inch-thin miniature fluorescent with a new proprietary, high-performance ballast made exclusively for Alkco by Radionic Industries is featured. **Alkco.** Circle No. 336



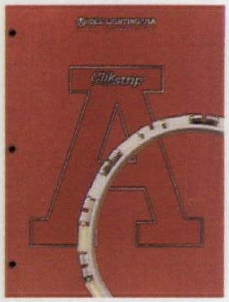
Ardee Lighting/USA introduces the new WACO Lighting Products eight-page color catalog. The "Side-Kick" and "Heads & Tails" are a series of multi-functional light fixtures that have cast aluminum bodies with powder-coated finishes that incorporate the use of MR-11, AR-48, or MR-16 lamps. **Ardee Lighting/USA.** Circle No. 337



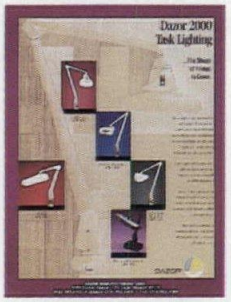
BEGA presents new versatile small-scale die cast aluminum Low Voltage Recessed Wall Luminaires. They have a four-inch recess depth for installation into standard 2′ × 4′ construction systems; 4¾″ and 6¾″ round and rectangular sizes; polymer rough-in housing for poured concrete or masonry construction; and U.L.-listed for wet locations and all construction types. **Bega.** Circle No. 338



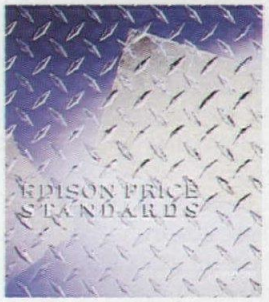
This brochure details the latest in Bronzelite landscape lighting technology. Bronzelite now offers four new reflector systems designed to provide pinpoint lighting control for flagpoles, trees, and facade features. Add these new optics to their existing line of lighting systems to achieve an array of light distribution systems capable of accenting any landscape lighting task. **Bronzelite.** Circle No. 340



CLIKSTRIP. . . linear lighting perfect. The Clickstrip brings together the best qualitites of low-voltage linear light strips: compact size, high illumination, flexibility, incandescent, or argon festoon lamps shipped pre-installed, halogen inserts for G4 base and MR-11 lamps, standard and custom spacing. Clickstrip is UL Class I. **Ardee/Clickstrip** Circle No. 341



Dazor Manufacturing Corp., produces a full range of flexible, adjustable-arm task lights designed for applications that include: offices, workstations, computer terminals, drafting/engineering/art/graphics tables, examintion/inspection. Light sources include: fluorescent, incandescent, halogen, and high-intensity. **Dazor Manufacturing Corp.** Circle No. 342

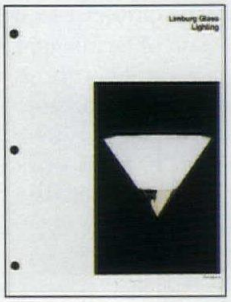


Energy Efficient Architectural Lighting. This updated catalog includes full descriptions, photographs, drawings and photometrics for Edison Price Lighting's Standards. It offers the highest quality specification-grade line. Sections include: compact fluorescent, low-voltage, A-lamp, Par lamp, HID. The products are energy efficient with excellent performance characteristics. **Edison Price Lighting.** Circle No. 343

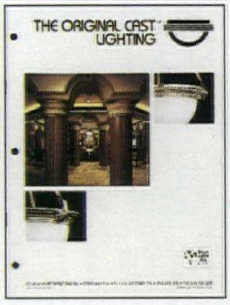
Durable, efficient, low-profile lighting. The new Sentinall™ architectural series will operate economically and efficiently with low-wattage twin tube, quad tube, and medium base HPS lamps sources. A contemporary low-profile design deflects abuse and allows for architectural versatility. Provides uniform illumination and requires minimal maintenance. Ideal for hallways, soffits, and foyers. **Kenall Lighting.** Circle No. 344

Outdoor Lighting. This fold-out brochure provides an overview of the company's entire line of exterior fixtures, including large area luminaires, floodlights, path and landscape lighting, bollards, and fountain lighting. Color photos are accompanied by brief descriptions of the high-performance luminaires. More detailed information will be mailed upon request.
Kim Lighting. Circle No. 345

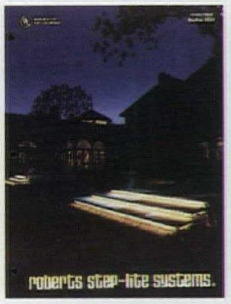
Lumen-Micro 5 is a graphics-oriented, PC-based, indoor lighting design and analysis program. Features include: point-by-point calculations; the ability to specify partitions; 3D perspective renderings for presentations; luminaire aiming; DXF file format output providing compatibility with various CAD programs; and complete daylighting analysis. **Lighting Technologies, Inc.** Circle No. 346



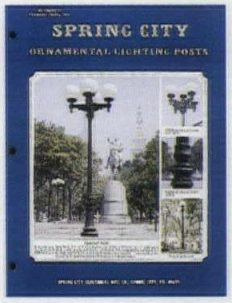
The new *Limburg Glass Lighting Catalog 1A* includes new designs and finishes available with a beautiful selection of glass lighting: three-ply opal glass, veiled crystal glass, topaz glass, clear crystal glass, and more — all with brass, chrome, and white and black metal accents. Fourteen new single product sheets containing 92 all-new designs are also available. **Bega.** Circle No. 339



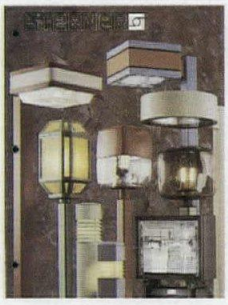
The Original Cast Lighting's 20th anniversary catalog, features energy efficient compact fluorescent lamps and HID sources in exciting new indirect fixtures and other classic items. This company is dedicated to providing the highest standards of excellence and quality craftsmanship in each of their products. This is called "Classic Technology." **Original Cast Lighting/Art Directions.** Circle No. 384



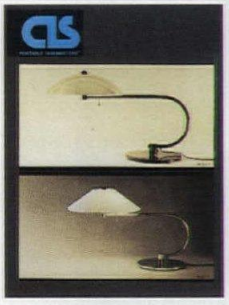
Roberts Step-Lite System® is a patented lighting system designed to provide an aesthetic solution to the problem of lighting interior and exterior steps, handrails, and cove moulding. Five, ten, or twenty-five footcandles of uninterrupted light from a concealed source are in lengths up to twenty feet in a single fixture. Also offered is a line of six systems as well as transformers and photometrics.
Robert Step-Lite Systems®. Circle No. 347



This six-page, full-color brochure illustrates and describes the line of beautiful, cast iron lighting posts from SPRING CITY ELECTRICAL MFG., CO., Spring City, Pennsylvania, the leader in ornamental lighting posts. **Spring City Electrical.** Circle No. 348



Sterner Lighting Systems Inc., works jointly with you from the time a lighting or energy management need is identified all the way through analysis, budgeting, solution, and project completion. This catalog desscribes the full line of ambient/task lighting systems, specialty lighting, lighting control systems, Infranor floodlights, and company resources and facilities. **Sterner Lighting Systems, Inc.** Circle No. 349



Taskmasters are luminaires for the office environment. Space-saving models attach to office screens; others bolt through work surfaces or have weighted bases. All types are equipped for two energy saving type PL-9 lamps. Ideal user controls reduce glare and eye fatigue at computer terminals. All models are U.L.-approved.
Tsao & CLS. Circle No. 380

3M brand ¼-inch mini data cartridges are just what you need for unattended backup of important data or storing files and applications. (And a lot less expensive than a growing pile of diskettes.)

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It's another reason why more businesses protect important information on 3M brand data storage products than any other brand in the world. Find out more. Call 1-800-888-1889, ext.53.

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*Based on 3½-inch DS, DD 1.0 MB diskette and DC2120 capacity comparison. Quarter-inch mini data cartridges require compatible drives.
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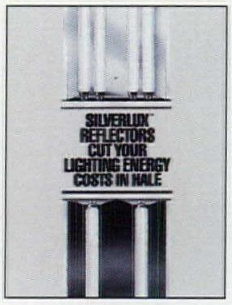
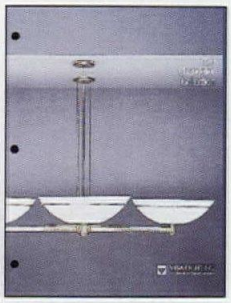
Circle **No. 004** on Reader Service Card



3M Silverlux™ is a highly reflective silver film that reflects ninety five percent of available light, allowing for the removal of up to half of the fluorescent lamps in use. This results in far lower lighting costs, with increased efficiency in light delivery. The reflectors are installed by professional 3M authorized dealers and are warranted for five years.
3M. Circle No. 381



The 920 Chandelier Collection combines the integrity of traditional detailing, the clarity of contemporary styling, and the aesthetic of performance illumination. Compact fluorescent, incandescent, tungsten-halogen, and metal halide lamping may be specified. The collection compliments auditoriums, concourses, and civic buildings.
Visa Lighting. Circle No. 382

Selections by Zumtobel Lighting, Inc., is a product line overview featuring selected luminaires and applications. Custom lighting services and Zumtobel's company background are presented in this eight-page catalog.
Zumtobel Lighting, Inc. Circle No. 383

(continued from page 11)

2) It should be noted that our new school, San Francisco Institute of Architecture, has a special mission besides allowing students to fully explore and sharpen their creative powers. We're mainly devoted to studying architectural education and how to improve it in every realm. That means giving special attention to oft-neglected subjects of architectural technology and management. After all, there's no point in doing highly creative design if your buildings fall down or you mismanage yourself into bankruptcy. I teamed up early on with Louis Marines, recent Executive Director of the AIA, to explore how a top-notch MBA program could be created for architects. Lou has a superb team of faculty now and is doing a great job with his Advance Management Institute in affiliation with SFIA. I hope you'll be able to give his work proper recognition in due course.

Fred Stitt, Director
The San Francisco Institute
of Architecture
Orinda, California

Fire-rating of Glazing

In an article on fire-rated glazing (April, p. 143) a reference to products that have met the conditions of ASTM E 119 (p. 145, second column) mistakenly indicates that the products illustrated on the facing page (photos 2a–2d) meet these requirements. Systems that actually have been approved according to ASTM E 119 are described in the remainder of the paragraph, but not illustrated.

40th Annual P/A Awards

Progressive Architecture announces its 40th annual P/A Awards program.

The purpose of this competition is to recognize and encourage outstanding work in architecture and related environmental design fields before it is executed.

Submissions are invited in the three general categories of architectural design, urban design, and architectural research.

Designations of first award, award, and citation may be made by the invited jury, based on overall excellence and advances in the art.

Jury for the 40th P/A Awards

Architectural Design

Thomas Beeby, *FAIA, Principal, Hammond Beeby & Babka, Inc., Chicago.*
Alan Colquhoun, *RIBA, AA Dip, Class of 1913 Lecturer, School of Architecture, Princeton University, Princeton, New Jersey.*
Julie Eizenberg, *Principal, Koning Eizenberg Architecture, Inc., Santa Monica, California, and Lecturer, Graduate School of Architecture and Urban Planning, U.C.L.A.*
Ada Karmi-Melamede, *AIA, IIA, Karmi Architects & Company, Tel Aviv, Israel.*

Urban Design

John Kaliski, *AIA, Principal Architect, Community Redevelopment Agency, Los Angeles, and faculty, Southern California Institute of Architecture.*
Alan Ward, *ASLA, Principal Urban Designer and Landscape Architect, Sasaki Associates, Watertown, Massachusetts.*

Research

John Carmody, *Architectural Researcher, Associate Director, Underground Space Center, University of Minnesota, Minneapolis.*
Ben Refuerzo, *Principal, R-2ARCH, Designers/Researchers, Los Angeles and New Orleans, and Associate Professor of Architecture, U.C.L.A.*

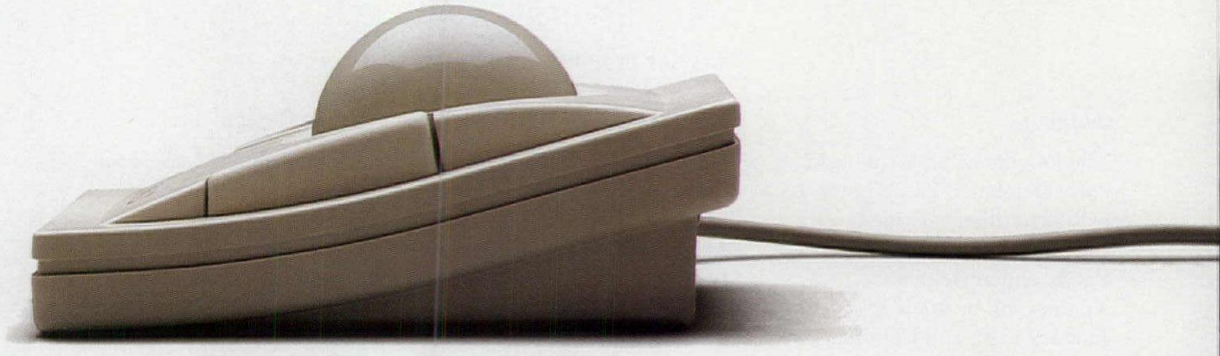
Judging

The judging will take place in early October 1992. Winners will be notified, confidentially, before October 31. Public announcement of winners will be made in January 1993, and winning entries will be featured in the January issue of P/A. Clients, as well as professionals responsible, will be recognized. P/A will arrange for coverage of winning entries in national and local media.

For entry forms, *see June issue, p. 16, and July issue, p. 30, or call Agi Muller at 203-348-7531.*

DEADLINE FOR SUBMISSIONS: SEPTEMBER 11, 1992

INSTALLING VELUX® ROOF WINDOWS AND SKYLIGHTS IS SO SIMPLE EVEN A MOUSE CAN DO IT.



The new VELCAD™ software is not only easy to use, but also quick, efficient and flexible as well. Operable with or without AutoCAD®, this new software enables users to edit our drawings and specifications with the touch of a button. And with standard features such as built-in editors and a memory like that of an elephant, it's the only software your firm will need for specifying the best roof windows and skylights made in the world. VELUX®. For more information call us at our toll-free number, 1-800-283-2831.

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Circle **No. 318** on Reader Service Card

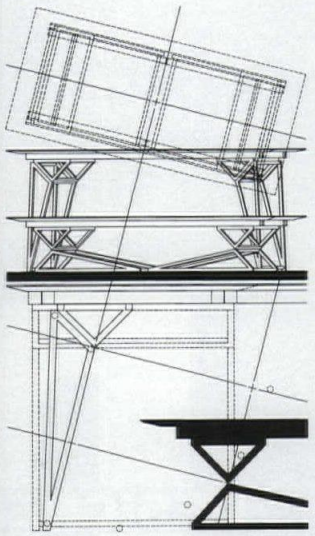
New Products and Literature

Nuggets of invention at the International Contemporary Furniture Fair

suggest an alternative vision for the industry.

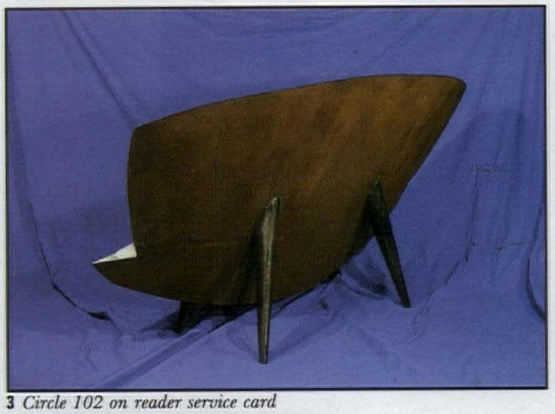
Andrew Bordwin © 1992

1a *Circle 100 on reader service card*



1b

2 *Circle 101 on reader service card*



3 *Circle 102 on reader service card*

4 *Circle 103 on reader service card*

Bryce Sander's "Kneeling Table" (1a), in a composite drawing (1b); Randy Castellon's stacker for Zinc Details (2); Sean O'Harra's "Minus One" sofa (3); and Maxine Naylor's "Theo" pendant for Resolute (4).

Report from New York

Although New York's International Contemporary Furniture Fair has become a pot-luck affair, an everchanging group of talented designers and astute manufacturers have made it a significant event. Its fourth incarnation, held in May, was no different.

Architect Bryce Sanders's multifunctional "Kneeling Table" was the gutsiest piece at the fair. Its welded, brushed aluminum legs have an ingeniously positioned hinge point, allowing its height to change from 12½ to 29 inches; maple-veneer plywood extension leaf can be used at either height.

Sanders's sophisticated industrial aesthetic was counterbalanced by the raw sensibility of Sean O'Harra pieces. O'Harra's "Minus One" sofa cradles its soft, white cotton-covered cushion and back in the patinated carcass of found-industrial steel.

A middle ground between the two were the calendared aramid fiber light fixtures by Resolute, including the pliable, luminous "Theo" pendant by Maxine Naylor.

The questioning of preconceived notions of design and production was reinforced at the fair by Zinc Details. The company's mission to promote affordable, functional design, embodied in the exposed structure and animated profile of Randy Castellon's birch plywood and cherrywood stacking chair, serves as an example of just what the furniture industry can achieve. **Abby Bussel** ■

(continued on page 111)

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Building Products

Glazed Masonry Units
Twenty-seven new colors were recently made available in the "Astra-Glaze-SW" line of concrete blocks. The permanent glaze can be molded to one or more block faces. Trenwyth.
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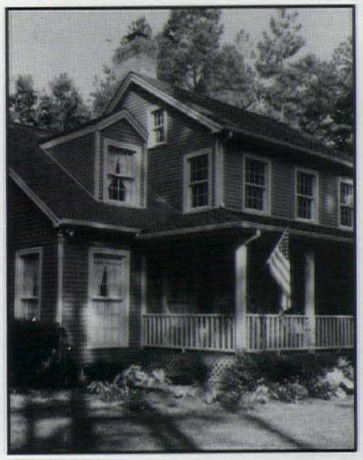

Vinyl Siding
"Lake Forest Exteriors," a combination of high-tech polymers and resins and Kynar fluoropolymer, is resistant to harsh weather conditions and does not need to be painted, stained, or repaired. Horizontal, dutch-lap, and vertical profiles with matching soffits and accessories are available in six colors. Alcoa.
Circle 105 on reader service card

Gypsum Construction Handbook
The *Gypsum Construction Handbook* is now available in a fourth edition. Information on drywall construction techniques and materials has been reorganized and application and product specifications updated. Contact USG, Dept. 193-Handbook, P.O. Box 806278, Chicago, IL 60680–4124. Cost: $16.95.

Healthy Carpeting Adhesives
"Healthguard® Adhesives" are guaranteed to have no adverse odors or toxic out-gassing. They are also said to be free of volatile organic compounds and hazardous vapors. Bentley Mills.
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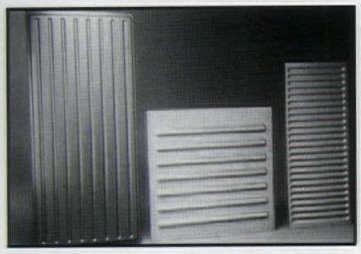
High Pressure Laminates
The pattern and colors of the "Milano" collection of high pressure laminates was inspired by its Italian namesake. Forty-six colorways are available. Abet.
Circle 107 on reader service card



Exterior Aluminum Panels
Three heat-formed ribbed panels for exterior applications include: flat or curved, large or small vertical panels with concave-style ribs and a metallic PVF2 paint finish (far left and right); rain screen, deep-ribbed cladding panels are polyester powder-coated (middle). Superform USA.
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Reinforcing Steel Report
A four-page technical engineering report on the use of welded wire fabric and reinforcing bars for slabs-on-grade are available from the Concrete Reinforcing Steel Institute and the Wire Reinforcement Institute. CRSI.
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(continued on page 112)

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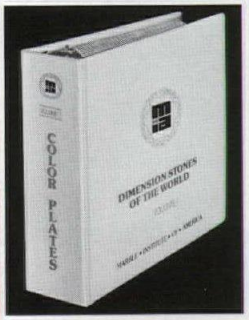

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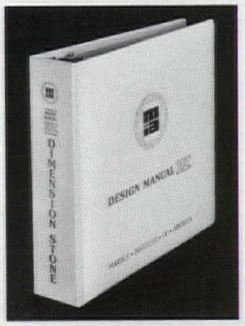
ASTM Specifications and Standards.



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(continued from page 111)

Compact Fluorescent Lamp
The energy-saving "Earth Light SL*17," a mini compact fluorescent lamp, "uses 17 watts of electricity to produce more light than a standard 60-watt incandescent lamp."
Philips Lighting.
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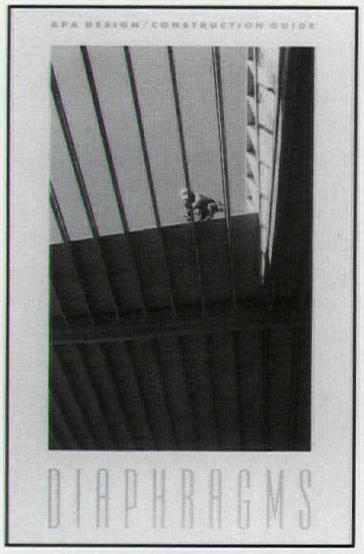

Structural Wood Panel Diaphragms
APA Design/Construction Guide: Diaphragms describes how diaphragm construction with wood structural panels can be designed to resist lateral loads generated by natural sources. Design methods for single- and multi-story buildings are illustrated. Contact American Plywood Association, Dept. L350, P.O. Box 117000, Tacoma, WA 98411–0700. cost: $1.

Dens-Shield for Flooring
An improved version of "Dens-Shield" backer board has been approved for wood frame residential and light commercial flooring. It is also suitable for ceilings, countertops, and walls. The refinement of its acrylic coating has strengthened vapor retardant properties and reduced its permeability. "Dens-Shield" has a silicone-treated gypsum core. Georgia-Pacific.
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INFORMATION

For additional information about any product or service featured, please circle the appropriate reader service number on the postage-free card at the back of the magazine.

P/A

Major materials suppliers as they were furnished to P/A by the architects for buildings featured this month.

P/A Affordable Housing Initiative, Cleveland, Ohio. (p. 44). *Architects: Abacus Architects & Planners, Boston.* Red cedar siding: Weyerhaeuser. Perma-Shield Narrowline windows: Andersen. Steel entry doors: Morgan. French doors: Andersen. Maple floors: Harris-Tarkett. Asphalt shingles: CertainTeed. Paint: Sherwin-Williams. Locksets: Schlage. Security: Ademco. Lighting: Progress. Tub/shower unit: Lasco. Water closet: JPI Plumbing. (The following materials were donated for the open house): Appliances: Whirlpool. Blinds/shades: Hunter Douglas. Furniture: Workbench, Conrans. Accessories: IKEA; Sears Catalog. Landscaping: Wright Landscaping, Green Valley Turf Farms.

Project: Electric Art Block, Venice, California (p. 52). *Architects: Koning Eizenberg Architecture, Santa Monica, California.* Solid core hardboard doors: T.M. Cobb. Elastomeric decking: Pacific Polymers. Interior paint: Dunn Edwards. Hinges: Hager. Locksets: Schlage. Intercom: Touch & Talk. Lighting: Hubbell. Water closets: Norris. Plumbing fittings: Delta. Gas space heaters: Relnor.

Project: Imogen Apartments, Los Angeles (p. 56). *Architect: Bruce Sternberg, Los Angeles.* Aluminum windows: Premiere. Masonite doors: Haley Bros. Vinyl flooring: Armstrong. Carpet: Walter Carpets. Built-up roofing: Polycoat Products. Paint: Dunn Edwards. Hinges: Hager. Locksets: Kwikset. Door closers: Parker Hardware. Metal door frames: Steelcraft. Grab bars: Tubular Specialties. Ranges: Brown Stove Co. Refrigerators, range vents: Hotpoint. Mailboxes: Jensen. Bath accessories: Donner Manufacturing.

(continued on page 117)

Why it takes legwork to flatten your stomach.

You can't reduce stomach fat by exercising abdominal muscles alone.

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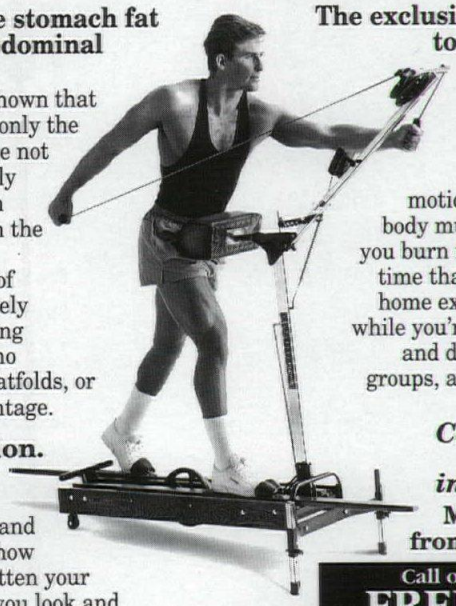

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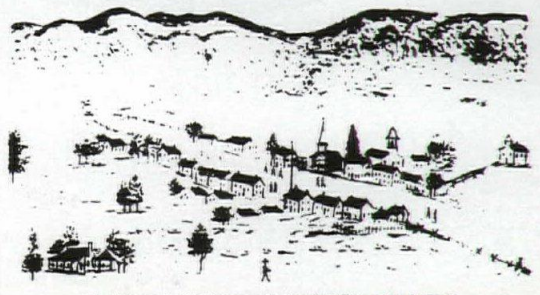

Blacksburg in 1853, from the Lewis Miller sketchbook
(Courtesy of the Abby Aldrich Rockefeller Folk Art Center, Williamsburg, VA)

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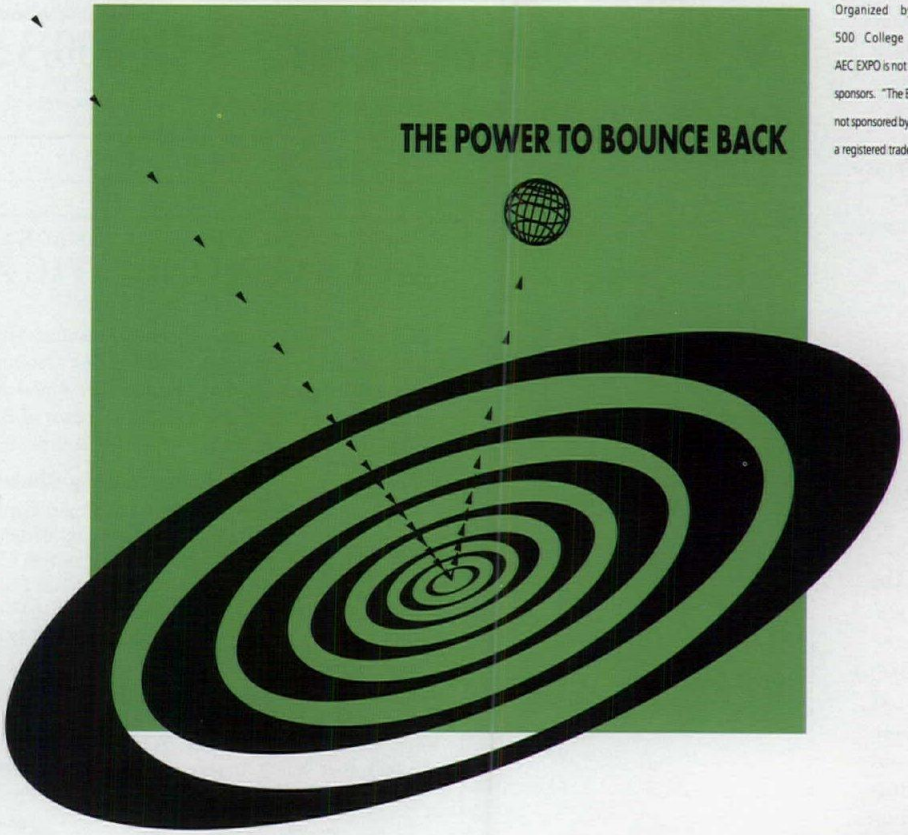

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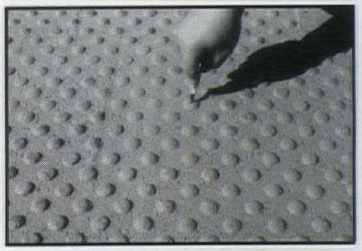
Technics-Related Products

The guides, resources, and products listed here complement the Tech Topics article on the Americans with Disabilities Act, (see p. 35).

AIA on ADA
The AIA has three publications designed to help architects understand and work with ADA legislation. The *Americans with Disabilities Act Accessibility Kit* includes ADA laws, Titles II and III, compliance dates ($9.95 for members, $15.95 for nonmembers). The *Resource Guide* includes the same information as the kit plus a glossary on disability terminology, liability issues, and tax credit possibilities ($30 for members, $40 for nonmembers). The *ADA Compliance Guide and Checklist for Your Building* has a workbook-style format designed to help architects walk clients through their buildings ($30 for members, $40 nonmembers). Contact AIA (800) 365-2724.



Detectable Warning Pavement
Compliant with ADA Section 4.29.2 requiring walking surfaces of nominal dimensional and contrast color in areas where pedestrian and vehicular traffic intersect, "Detectable Warning" pavement is available as an imprinted, cast-in-place concrete system or "Flextech"™ recycled rubber system. The concrete system is intended for exterior jobs, while "Flextech"™ is for both interior and exterior applications. Bomanite®.
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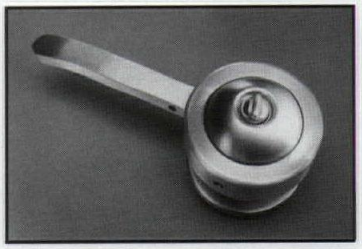
ADA-Compliant Product Search Service
An architectural and assistive products database holds more than 2700 manufacturer and distributor names. Product category listings, photocopies of product literature, and advice on product alternatives are among the services available. Contact Product Search Facilities, Institute for Technology Development, Advanced Living Systems Division, 428 N. Lamar, Oxford, MI 38655–3204 (601) 234-0158.

Public Accommodations Manual
ADA Public Accommodation Compliance Manual is a guide to Title III accessibility standards in a loose-leaf binder format by Kenneth L. Wooten. Contact: Institute of Technology Development. Contact Fulfillment Dept., M. Lee Smith Publishers & Printers, 162 Fourth Ave., N., Nashville, TN 37219-0678 (615) 242-7395 or Fax (615) 256-6601.

Accessible Products Directory
Products manufactured for or suitable to people with disabilities and the elderly are described and illustrated in *The Directory of Accessible Building Products*. Articles on accessibility are included; the directory will be updated yearly. Contact NAHB Research Center, 400 Prince George's Blvd., Upper Marlboro, MD 20772–8731 (301) 249-4000 or FAX (301) 249-0305. Cost: $2.

Tactile Tile
"Transit-Tile" is an integrally-colored yellow quarry tile designed to meet ADA detectable walking surfaces criteria. Tiles are 6 13/16-inches square, ½-inch thick, and have ⅕-inch raised domes. American Olean.
Circle 113 on reader service card



Lever Retrofit
The "Model ADA-I" lever can be fitted to 2⅛- and 2¼-inch doorknobs. It is available in brushed aluminum, anodized bronze, or black, and custom finishes. Access Specialties and Products.
Circle 114 on reader service card

Accessible Housing Alternatives
The Accessible Housing Design File (1991, 00 pp.), written by Ron Mace of Barrier Free Environments, is "a collection of widely applicable designs for accessibility which can be unobtrusively integrated into any type of new housing." ANSI standards for the ADA are included. Contact Van Nostrand Reinhold, 115 Fifth Ave., New York, NY 10003. Cost: $44.95, paper.

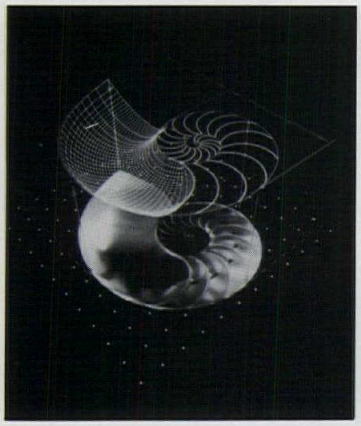
Product Listings, References
The Trace Research and Development Center at the University of Wisconsin at Madison, a rehabilitation engineering center for access to communications, computer, and electronic devices by people with disabilities, has published several documents relating to accessibility, among them are: *Accessible Design of Consumer Products: Guidelines for the Design of Consumer Products to Increase Their Accessibility to People with Disabilities or Who are Aging* by Gregg C. Vanderheiden and Katherine R. Vanderheiden ($15); *Trace ResourceBook*, 1991–1992 edition ($50). Contact Reprint Service Trace R & D Center, S-151 Waisman Center, 1500 Highland Ave., Madison, WI 53705.

Interiors for Elderly, Disabled
Housing Interiors for the Disabled and Elderly (1991, 360 pp.), written by Bettyann Boetticher Raschko, demonstrates methods of designing environments to achieve user independence. Issues relating to anthropometrics, spatial relationships, body mechanics, product and furniture design, security, safety, and mechanical systems are covered. Contact Van Nostrand Reinhold, 115 Fifth Ave., New York, NY 10003. Cost: $34.95, paper.

Keyed Levers
The new "S-Series" keyed levers are ADA-compliant and are applicable for light and medium duty commercial and multifamily housing applications. Schlage.
Circle 115 on reader service card

Door Pressure Gauge
Two pressure gauge models, designed to measure door function, are used to determine ADA compliance. The "DPG," with a 0 to 35-pound force range, measures force; the "U 237 X," with a 0 to 7-pound force range, is a light-duty gauge designed to determine lower limitations of door opening and closing forces. Howard Manufacturing.
Circle 116 on reader service card
(continued on page 116)

Computer Products



Release 12AutoCAD

Release 12 offers a bundle of new features including significant graphics acceleration, multiple output device configuration, a plot preview option, a graphical user interface, file management improvements, and the ability to read and write PostScript files. A new SQL extension allows users to create database links, and the inclusion of AutoShade in the package allows users to create rendered models in AutoCAD. The new release is compatible with Release 11; upgrades are available at a reasonable cost. Autodesk.

Circle 117 on reader service card

Drawing Database

Release 108 of Drawbase-386 now allows users to perform all drafting functions in 3D views. "Spaces," a Drawbase utility that automatically tracks area and perimeter values of graphics, now supports holes and islands. Other new features include enhanced plotter support, extended "undo" capability, and a DXF import/export option. CADworks.

Circle 118 on reader service card

GEOCAD UNIX

A SUN/UNIX version of GEOCAD Version 3.5, architectural application software for AutoCAD Release 10 and 11, is now available. The UNIX package, like the DOS version, includes a design element library, preprogrammed architectural drafting procedures, and a laminated tablet menu. GEOCAD.

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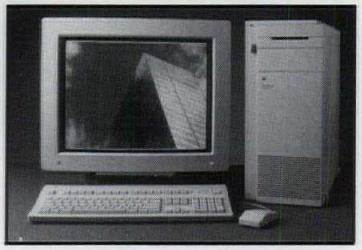

Macintosh Quadra

The new Macintosh Quadra™ 950, based on the 33MHz Motorola 68040 microprocessor, is a new high-end workstation suited for 3D modeling, rendering, and animation. Built-in features include 24-bit color, Ethernet networking, sound input and output. Quadra 900 owners can upgrade to the 950 by having a new logic board installed. Apple.

Circle 120 on reader service card

MicroStation Nexus

A package of new features for MicroStation on all platforms is available free to users of MicroStation 4.0.3. Features of the add-on package include: Microsoft Windows support, AutoCAD access, a Flythrough/Animation producer, and customizable desktop menus. Intergraph.

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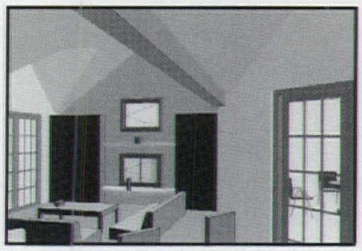

Macintosh CAD

ArchiCAD 4.1, a 2D/3D architectural CAD package includes a number of enhancements: new parallel perpendicular tools, customizable mouse constraint, faster rendering and hidden line removal, and improved 2D drafting and construction documentation tools. Graphisoft.

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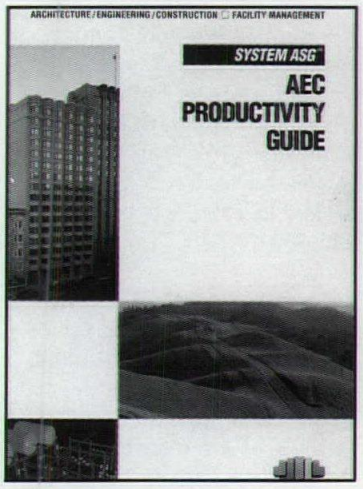

CAD Integration Guide

The "AEC Productivity Guide" is a 56-page booklet describing a full range of ASG AutoCAD applications for architecture, engineering, construction, and facility management. The guide describes available symbol libraries, Vertex detailing software, and ASG Architectural Version 5.0. ASG.

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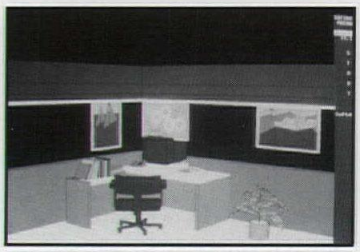

Auto-Architect Upgrade

New enhancements to Auto-Architect, an architectural application for AutoCAD, include the ability to place wall surfaces at any angle (to make soffits, chair rails, or other complex sections), "smart" placement of doors and windows, and stair routines that allow a user to draw in 2D and 3D simultaneously. Softdesk.

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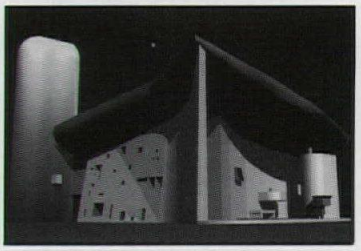

3D Modeling Tool

FormZ 2.0 for the Macintosh is a 3D solids and surfaces modeling software. Features include a wide range of curved line tools (including NURBS, B-Splines, and Bezier curves), meshes that can be created on any surface and moved "in ways that resemble clay modeling," and enhanced user features including tear-off menus, extended help, and improved numeric input. Auto·des·sys.

Circle 124 on reader service card

(continued from page 113)
Kitchen cabinets: Bilt-Rite. Draperies: Horizon West.

Project: Benedict House and Cottages, Lawrence, Kansas (p. 58). *Architects: Dan Rockhill & Associates, Lawrence.* Wood double-hung windows: Semco. Shingle roofing: GAF. Barn door hardware: National. Interior paint: Porter Paint. Mortise locks: Corbin. Tub & lavatories: Kohler. Toilets: Mayfield. Plumbing fittings: Kohler.

Project: Amandla Crossing, Edison, New Jersey (p. 64). *Architects: Michael Mostoller-Fred Travisano, Princeton.* Wood trusses: Component Technology. Vinyl siding: Alcan Aluminum. Interior walls & ceilings: National Gypsum. Aluminum windows: Acorn. Skylights: Naturalite. VCT floors: Kentile. Carpet: Stevens. Fiberglass roof shingles: G.A.F. Aluminum gutters & downspouts: Alcoa. Kitchen & laundry appliances: Sears. Bathroom fixtures: American Standard, McKinney Parker. Gas fired hot air furnace, condensing units, and DX cooling coil: Lenox.

Project: Housing/Education Development for V-Burg, Inc., Vicksburg, Mississippi (p. 66). *Architects: Howorth & Associates, Jackson, Mississippi.* Metal building system: Gulf States Manufacturing. Aluminum storefront: Kawneer. Vinyl siding: Bird. Corrugated metal siding: Corra Clad. Aluminum windows: Better-Bilt. Wood doors: Triangle. Vinyl flooring: Kentile. Shingles: Owens Corning. Movable partitions: Curtition. Paint: Glidden. Hinges: Hager, Ives. Locksets: Yale. Thresholds: National Guard. Screen door hardware: Hager. Push plates/pulls: Trego. Ranges, dishwashers: General Electric. Exterior lighting: Cooper Lighting. Interior lighting: Lithonia, Halo, Avolite, Ruud, Leviton, Lightolier, Thomas, Nutone, Progress. Tubs and lavatories: Aqua Glass. Water closets, bathroom accessories: Kohler. Plumbing fittings: Delta. Toilet stalls: Bobrick. Water fountains: Elkay. Grinder pump: Homa. Heat pump: Climate Master/Janitrol.

Project: Brooklyn Gardens, Brooklyn, New York (p. 70). *Architects: Harden Van Arnam Architects, Pratt Architectural Collaborative, Peter Woll Architects, Brooklyn, New York.* Double hung, double glazed windows: Mannix Windows. Hollow metal & glass doors: Firedoor. V.C.T. floors: Amtico. Ceramic tile: American Olean. Modified Bitumen roofing: Firestone. Paint: Benjamin Moore. Door hardware: Russwin. Commercial kitchen equipment: Hobart. Residential kitchen ranges: G.E. Undercounter refrigerators: Acme. Intercom: Jeron. Fire alarm/sprinklers: Simplex. Hydraulic elevator: Vertitch. Tubs & lavatories: American Standard-.Heater/chiller: Hitachi.

City of Quartz

(continued from page 77)
happened to Los Angeles since World War II. Davis contends that the region's fragmented pattern of growth is linked to the incorporation of cities (there are well over 60 in the Los Angeles region). Incorporation proliferated, it is argued, to protect homeowners against in-migration by ethnics, and was made possible by county subsidies for municipal services. But the analysis is incomplete. The impulse to create small political subdivisions has been part of Los Angeles since the mid-19th Century, and is attributable, at least in part, to an attempt by settlers to re-establish the village communities they left in the Midwest. But this explanation might not suffice if your main intention (and gift) is to construct a vision of place that is coherent, integrated, and as full of despair as indignation. Then you might select and emphasize according to passion rather than reflective scholarship.

Perhaps the radical transformation of urban life that is under way needs a shocking presentation: someone needs to pay attention. Davis demands it for Los Angeles, our most complete expression of the new urbanity we live in. The city is our case study for the urban growth patterns that will extend into the next century. Our resolution of the issues raised in Los Angeles will determine the fate of Super-Suburban America where more than 50 percent of our population lives.

City of Quartz makes many connections between policy, politics, and urban form, and one of its chief virtues is to show how social, cultural, and economic forces determine those political actions that make the built environment. Davis succeeds in setting in motion a world of people and events in which (if one suspends disbelief) a plausible vision illuminates how we got here.

It is a profoundly disturbing vision, with the horrible appeal of the Hell's Angels who emerged from the *Götterdämmerung* of Fontana, the city where Davis was born. He says that it was once something like Broadacre City and later profited by the humane capitalism of Kaiser Steel. Both were sequentially trashed by brutish historical forces. This most powerful and fully realized section of the book is an arresting metaphor of urban failure against which black leather jackets and motorcycles have a disquieting allure – they seem almost a purgation, with violence and despair understood as an alternative to corruption. Some of these themes find poetic expression in the most provocative work of the more interesting local architects (that is another subject). They have also found their expression in the L.A. riots, prefigured in Davis's dark ruminations.

City of Quartz should be taken as a tonic against the boosterism, themed entertainments, and optimism that until recently were traditions in Los Angeles. At the same time, the book should not be taken as a cure.

Richard Weinstein ■

The author is a professor and dean of the Graduate School of Architecture and Urban Planning at the University of California at Los Angeles.

Eric Owen Moss

(continued from page 77)
much a 20th-Century figure. Throughout the book there echo the existential dilemmas of our times – the loss of certainty, the death of religion, the impossibility of universal truth.

It is here that Joyce's work may have its greatest relevance for an architectural profession that seems forever in search of a a new movement. A Joycean architecture cannot provide solutions but can only explore problems as a type of research. As Moss writes in the last line of his text, "Every answer delivers another question."

Ironically, what Moss's work may have most in common with Joyce is the need for explication. Just as a reader can benefit from an analysis of the layered references in *Ulysses*, so too is a full understanding of Moss's architecture aided by his descriptions of it in this book. **Thomas Fisher** ■

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