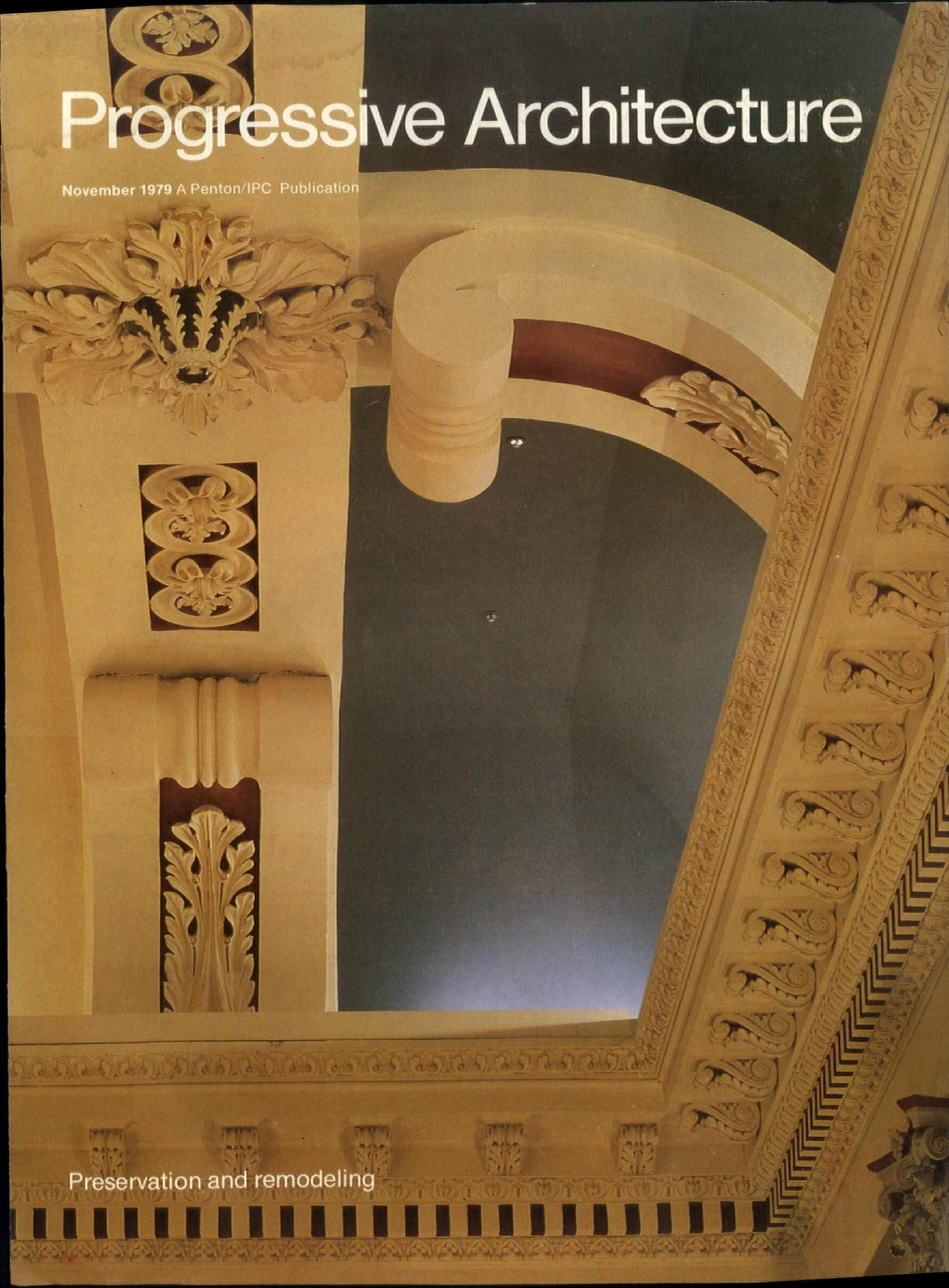
Progressive Architecture

November 1979 A Penton/IPC Publication



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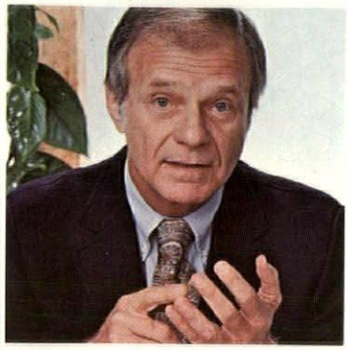

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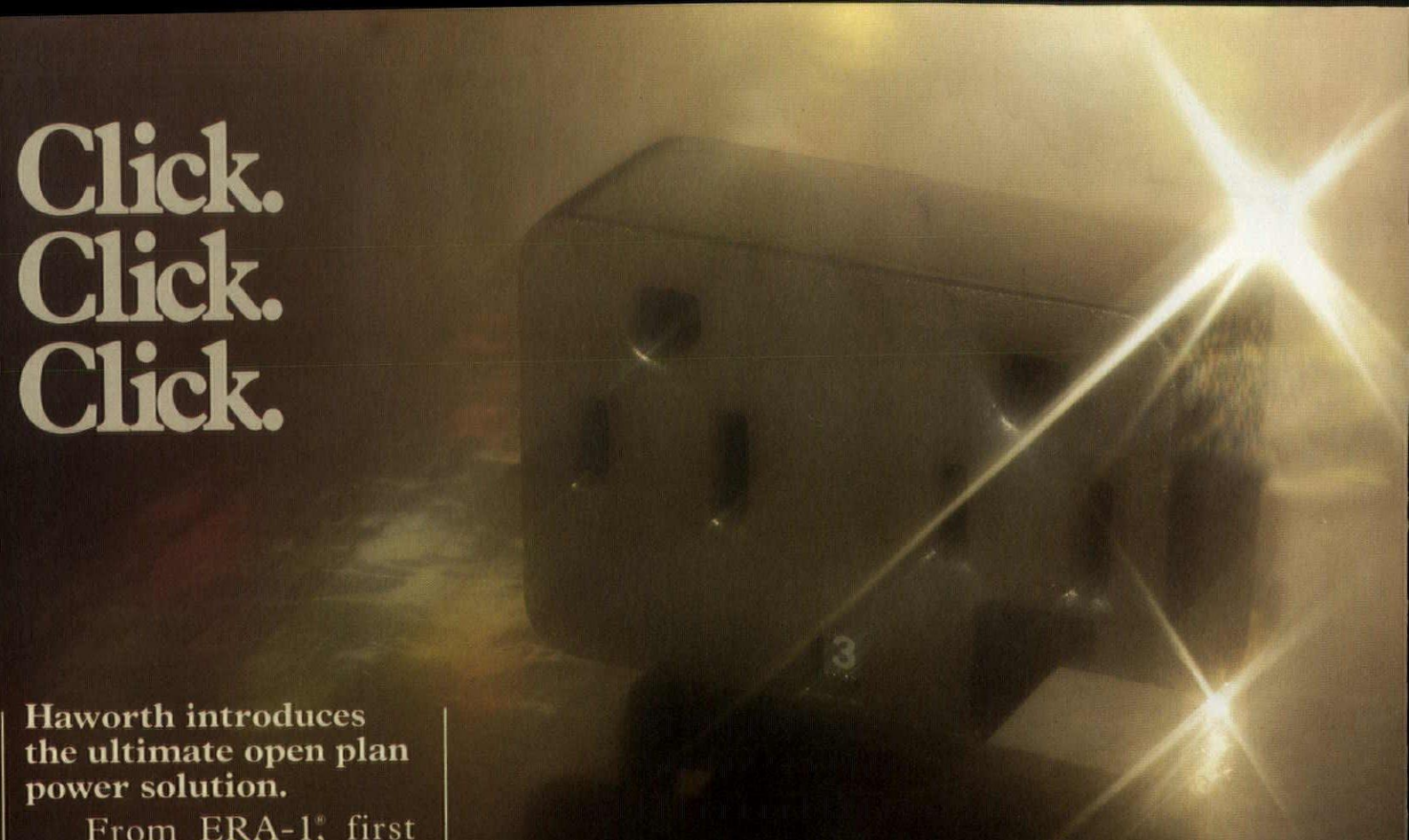

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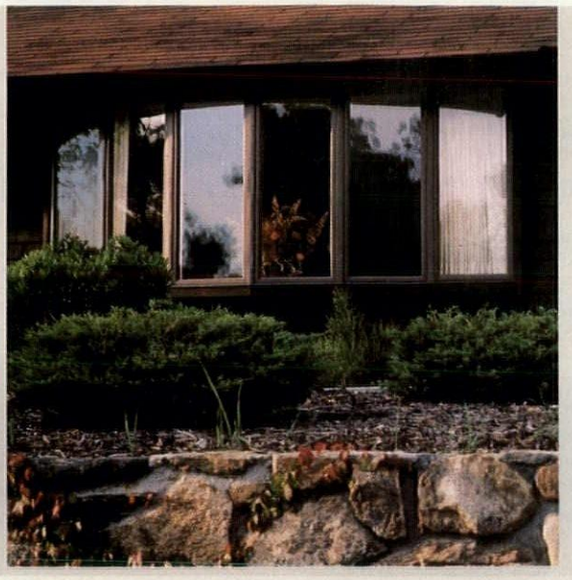
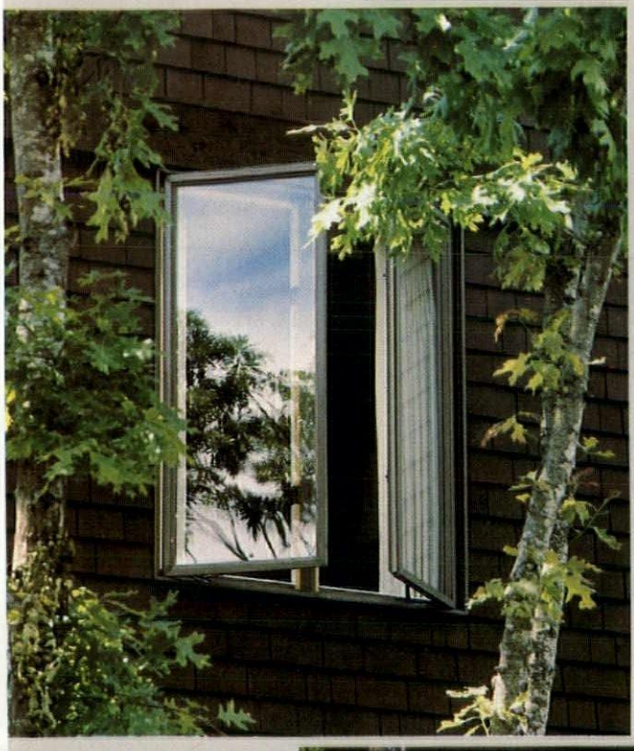
ABP ABC MPA

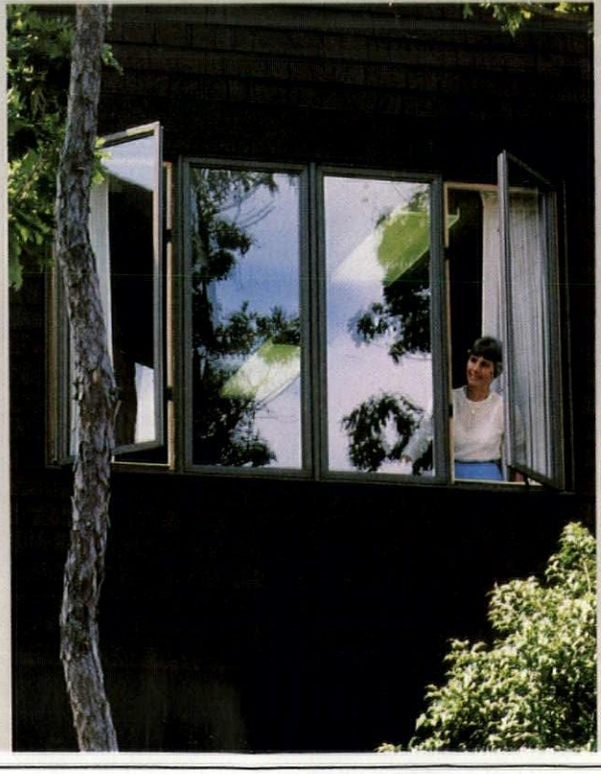
November 1979

Progressive Architecture

Cover: Detail of the ornamented, coffered ceiling of Mechanics Hall, Worcester, Ma (p. 84) restored by architects Anderson Notter Finegold.







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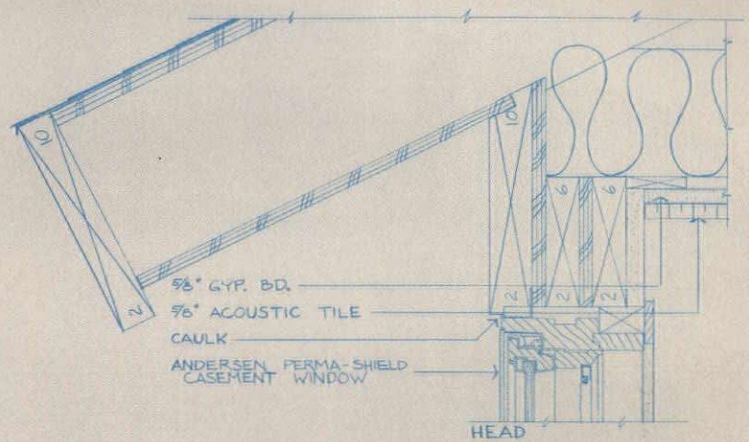

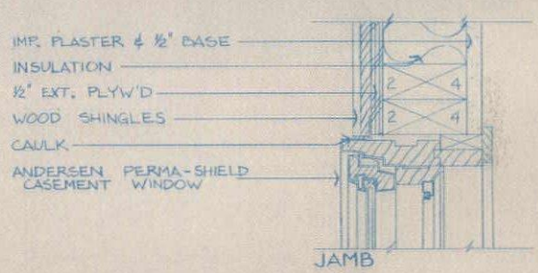

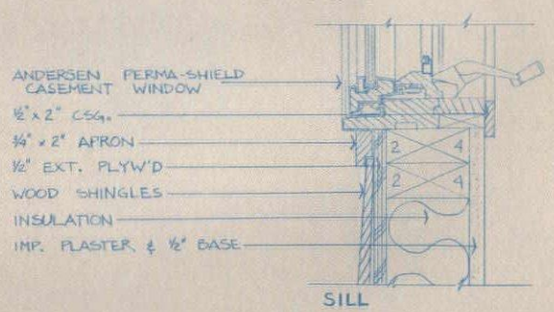

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Ethics V
Preserved for whom?

November 1979

The architectural profession seems to place more value on buildings than on people; so does the preservation movement. It's not that members of these overlapping groups don't have high social goals, but rather that they tend to see better buildings, new or old, as public benefits.

It was around 1960 that architects as a group began to doubt the social value of the massive public housing projects they had been designing. By 1970, architects and planners were realizing that bulldozer urban renewal projects, while they may have kept some urban cores alive, too often subsidized the rich at the expense of the poor. By then, rehabilitation of the existing urban fabric was coming to be seen as a less disruptive, socially responsible procedure.

But preservation, too, has its social drawbacks, which are increasingly referred to by the term "gentrification," a handy term—like it or not—borrowed from the British. It is simply a convenient label for the displacement of the less affluent by the more affluent, through the processes of rehabilitation and/or reuse.

Gentrification is not limited to the renovation of inner-city housing. A similar process goes on whenever a loft or warehouse district is converted to residential use, an everyday shopping district blossoms with boutiques, or substantial numbers of apartments are converted to condominiums. Most of us can readily sympathize with low-income residents—typically either elderly or members of minority groups—who may have great difficulty finding (and surviving in) alternative accommodations; we are less likely to see the social costs of displacing a threadbare shop, a seedy bar, or a "marginal" industrial enterprise; yet many such businesses simply perish if priced out of their spaces—or move beyond city limits.

Gentrification is generally a private enterprise. That is not to say that some apparently well-intentioned public policies don't encourage the process: the benefits for renovation of buildings in landmark districts, under the Tax Reform Act of 1976, promote the process; the limitation of Section 8 rent-supplement support only to new units seems to serve the otherwise divergent interests of homebuilders and urban preservationists, who are not eager to see subsidized residents in the next townhouse.

In the early stages of urban rehabilitation, the fact that middle-income people would invest in old urban buildings could only be seen as a favorable sign. Initially, the numbers displaced were usually small compared with the alternative places they could move to. And the first middle-income families buying into a low-income neighborhood or the first artist infiltrating a loft district, like the tenants they displaced faced limited options in a cold-hearted real estate market; most were risking whatever capital they could scrape together—with no help from the banks and no sympathy from building officials.

If and when these risk-takers demonstrated the potential of an area, however, a real estate rush developed—urged on by speculators. More stringent building code enforcement (which somehow always follows) and higher tax assessments further increased the cost of quarters. The result, in instances all over the country, has been to price out not only original tenants, but would-be buyers of modest means—like those who started the process. The newcomers come to view their properties—now high-priced—as investments, and the loss of neighborhood diversity is mourned by few. Meanwhile, widespread abandonment, lack of government-sponsored housing, and the success of gentrification itself have drastically reduced the options for those displaced.

What, then, can be done to reconcile rehabilitation with social justice? In some cases, community opposition has discouraged gentrification. But if alternative programs for maintaining and rehabilitating are not effective, the result can be terminal deterioration, as in Detroit's Woodward East neighborhood, for instance.

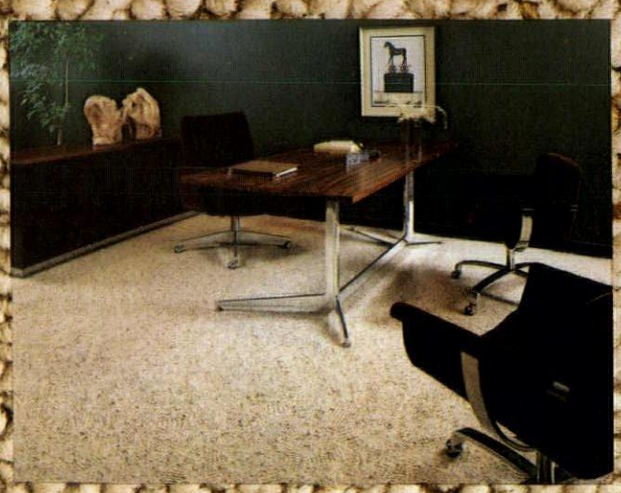
There are favorable reports from Mt. Auburn in Cincinnati, the Manchester section of Pittsburgh, from areas of Savannah, Hartford, and Denver—all of which have mechanisms for letting low-income residents remain as owners. The Pike Place Market in Seattle is an outstanding example of a commercial rehabilitation which, while it has attracted tourists and their wares, is still devoted mainly to the sale of real food to local people; and its neighborhood rooming houses are being rehabbed as rooming houses. What is generally required is an organization with funds to buy properties or make down payments and low-interest loans on behalf of the community—one that can ensure city services and outbid speculators, if necessary.

Opposition to gentrification is being heard, and governments are reacting. The city of Philadelphia has recently placed an 18-month moratorium on conversion of residential buildings to condominiums. In New York, the landmark Singer Building has been the subject of prolonged confrontation between its conversion-minded owners and city authorities. A lawsuit by one hold-out hat-maker may determine whether city regulations can protect industries and their employees from the profit-making process of residential conversion.

What can architectural professionals do? Our first obligation is to *understand* the social and economic issues involved with rehabilitation and to take them into account in our recommendations or decisions. Beyond that, we must support efforts to give low-income tenants a stake in rehabilitation—to support initiatives at the local level and try to put forward, if possible, some appropriate national policies.

John Morris Dixon

E UNUM PLURIBUS.



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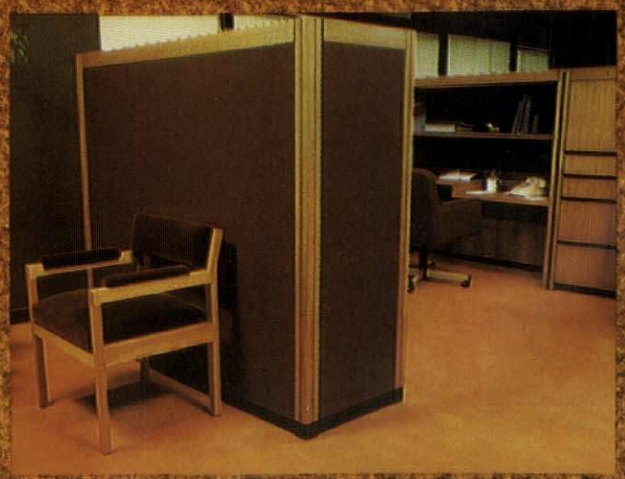

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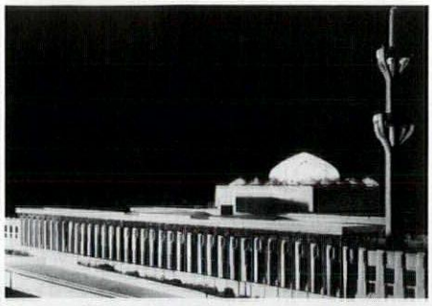

Intermediate scheme for the mosque in Rome showing smooth dome proposed by Mousawi.

Mosque miscue?

I have just received your article "Mosque planned for Rome by 1981" (Feb. 1979) pages 30 and 31 published in your magazine *Progressive Architecture* based on an interview with Paulo Portoghesi. You have stated:

1) The collaboration of the two firms of Sami Mousawi and Paulo Portoghesi & V. Gigliotti appears to be nonproductive and Portoghesi terms it "a continual battle."

2) The monumental outcome seems mainly credited to Portoghesi.

The whole article shows quite clearly that the actual design quality of the project is credited to Paulo Portoghesi and this is, of course, neither a correct nor fair statement. I would like to take this opportunity to inform you that you must get your facts right on such a highly sensitive issue before you publish such a misleading statement. I hereby confirm the following:

The final outcome of the international competition was for Paulo Portoghesi and V. Gigliotti to work in collaboration with Sami Mousawi to produce a new scheme based on the most favoured scheme submitted by Sami Mousawi together with the Mosque ceiling as designed in the Paulo Portoghesi & V. Gigliotti scheme.

In October 1976 we submitted a new joint scheme. This work, together with the model scale 1/200 as shown in your article, has been carried out in our office. Final approval and acceptance have been received from the client and on this basis we have been appointed as architects for the project. I enclose photographs of the original schemes of Paulo Portoghesi & V. Gigliotti and Sami Mousawi.

I would like to emphasize the fact that I have insisted on using the same column form for the inside and outside spaces of the Mosque, as shown in the Paulo Portoghesi & V. Gigliotti design for the Mosque ceiling, to create a sense of unity which is one of the most fundamental principles and features of Islamic architecture.

Arabic calligraphy, Islamic detail and decoration, and the landscape of the courtyards of the building have been introduced as basic elements in the design.

The main contribution of Paulo Portoghesi can be summarized as follows:

1) Introducing a curved line in the 4 wings of the main body apart from the central religious area which must be straight; Islam means order and discipline. This expresses a new line and a new feeling—we are entering the world of Baroque.

2) Express the main dome with external steps and beams showing the Baroque and Roman feature in the most meaningful and essential element in the whole project.

3) Introducing too many different materials for the external skin of the building, showing no unity of material.

4) The concept idea of the Mosque ceiling. We enclose photographs of our proposal based on Portoghesi's scheme showing the geometrical order and structural form of the ceiling, together with the Islamic detail and decoration. This work has been done in close cooperation with our Structural Engineer, Ove Arup & Partners.

Sami Mousawi
Dipl. Ing. Architekt
Manchester, England

[In P/A's opinion, the architectural merit of the mosque design (as shown in P/A, Feb. 1979, pp. 30–31) is due mainly to the elements that Portoghesi contributed: the column form, the curved wings, the stepped dome, the variegated exterior, and the interior of the domed ceiling. While the Mousawi design, judging from photos, would have served the function adequately, the formal elements introduced by Portoghesi, we believe, would distinguish the mosque as an Islamic landmark with its own architectural tradition.—Editors]

Designers are learning

I am appalled at how you managed to ignore any insight from those of us who are Interior Designers teaching Interior Design. If the Interior Design Profession is coming into full maturity and designers are doing great things, I submit that we educators must have been doing something right. . . . Or were all the good designers educated by architects?

Kingsley K. Wu
Head, Design Group
Department of Creative Arts
Purdue University
West Lafayette, In

Department of interiors

The anticipation I felt upon receipt of the September issue turned to disappointment and chagrin after a brief look at the editorial content.

I wonder whether it was sloth or oppressive provincialism that led you to believe that New York City and its surrounding area was/is/will be so dominant in the interior design arena. A summary of the 1970s only had 5 of 19 examples away from the New York area. The portfolio had 7 out of 11 in New York City. The insiders' outlook had 24 of 33 opinions from the New York axis.

I expect that any magazine based in Connecticut would be biased in favor of its home territory, but it is unfortunate that the bias is becoming a wall that prevents a proper perspective of good work of all good people throughout this country.

James S. Hentschell, AIA
Creve Coeur, Mo

[The editors are acutely aware of a tilt toward New York in this September design issue in particular. We do find that in interior design, more so than in architectural design, New York seems to occupy a leading position. We had anticipated, however, a broader geographic representation in this issue which was thwarted by minor delays in completion, photography, and other factors beyond our control.—Editors]

Photo credits

Photo of the State University of New York College Library at Plattsburgh by Mitchell/Giurgola Architects (P/A, Sept. 1979, p. 136) was taken by George Cserna.

Photos of Franks for the Memory by Richard Fernau (P/A, Sept. 1979, p. 173) were taken by Lew Watts.

Credit correction

General contractor for Franks for the Memory was Dinwiddie Construction Co. with Golden Gate Drywall.

Correction

In Oct. P/A, p. 89, middle column, 1. 31, sentence should be: The metal is not hot enough to melt and actually reform as metal foil.

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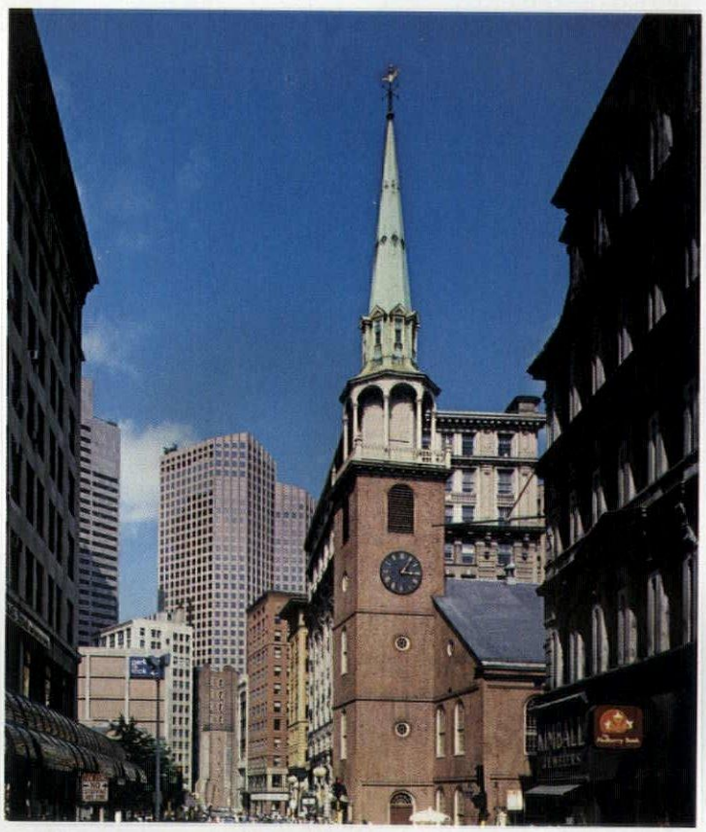

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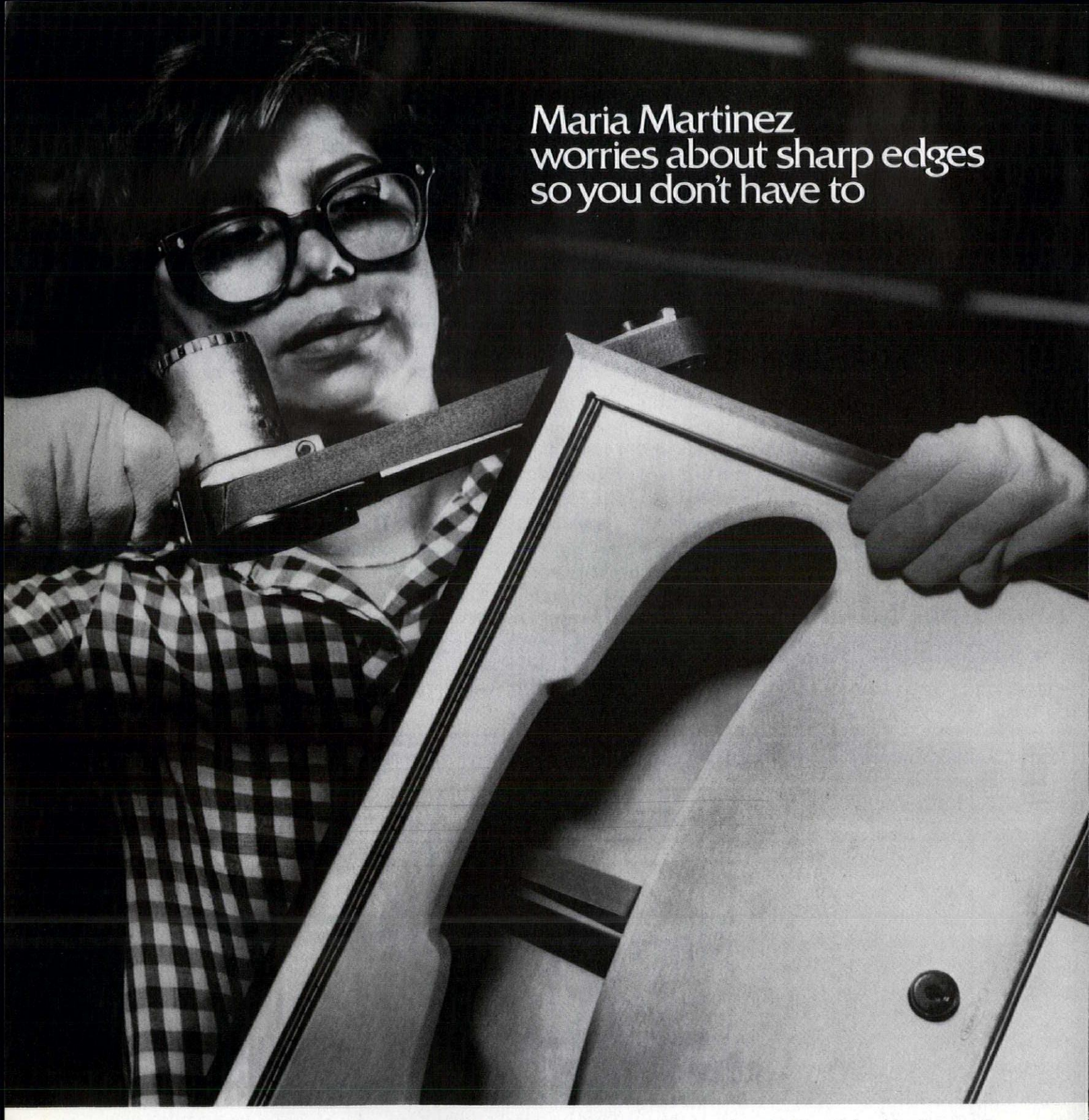

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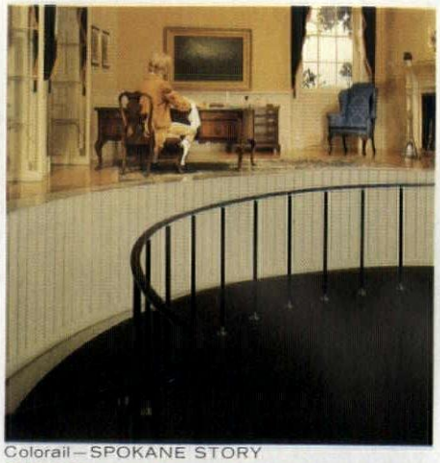

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Arch: Naetzker/Englund Architects;
Fabr: Jamestown Fabricating Steel.

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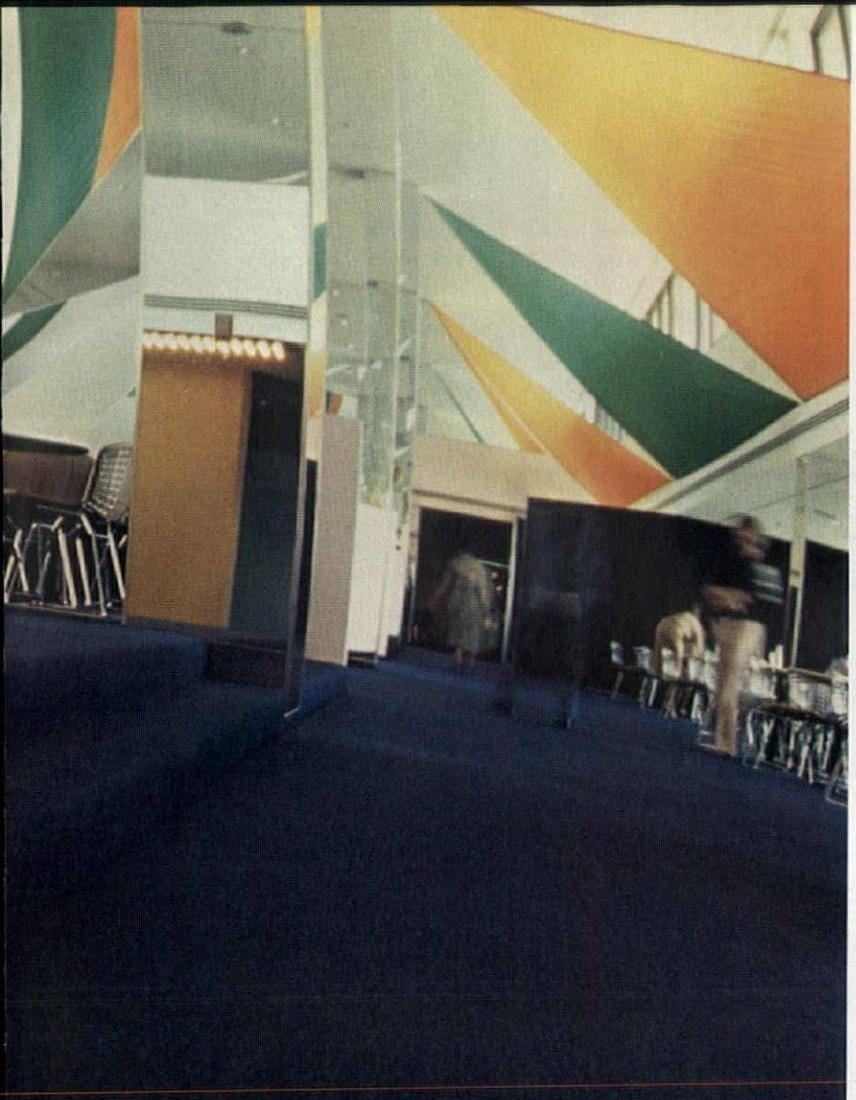
Arch: Cooper Carry & Associates, Inc.;
Fabr: Justice Steel Company.



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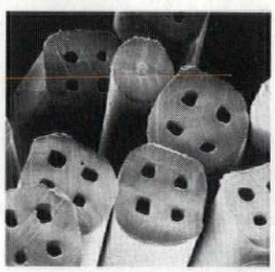

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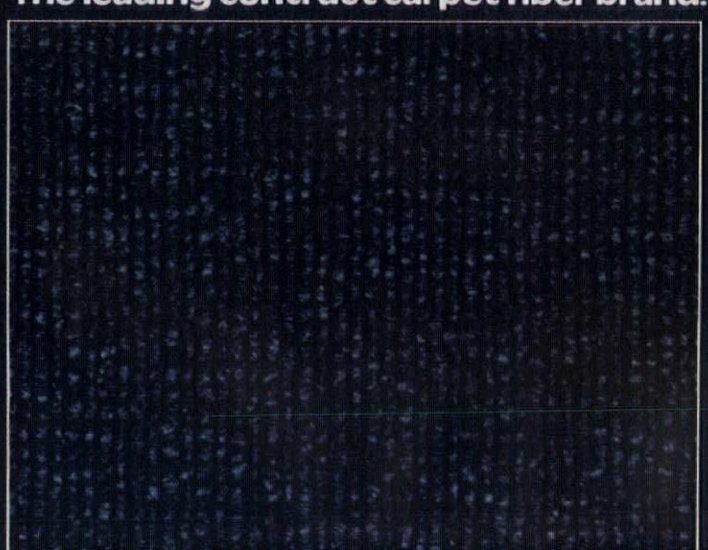

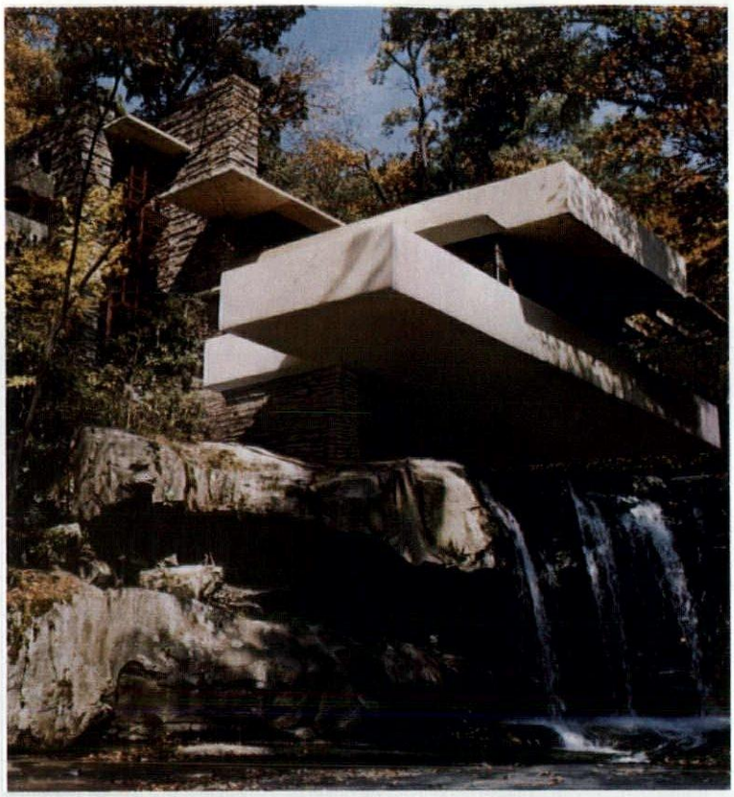

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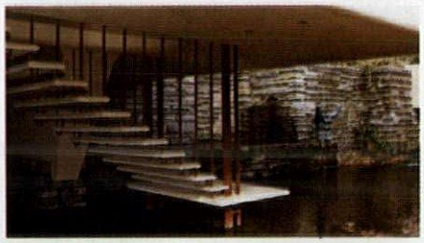

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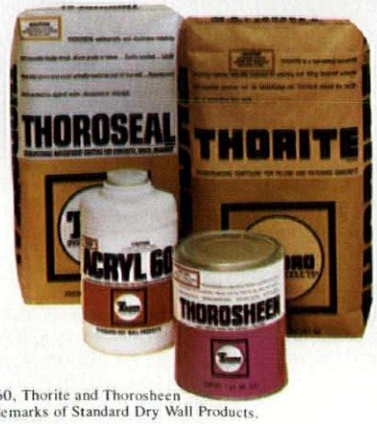

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News report

Town offices in character

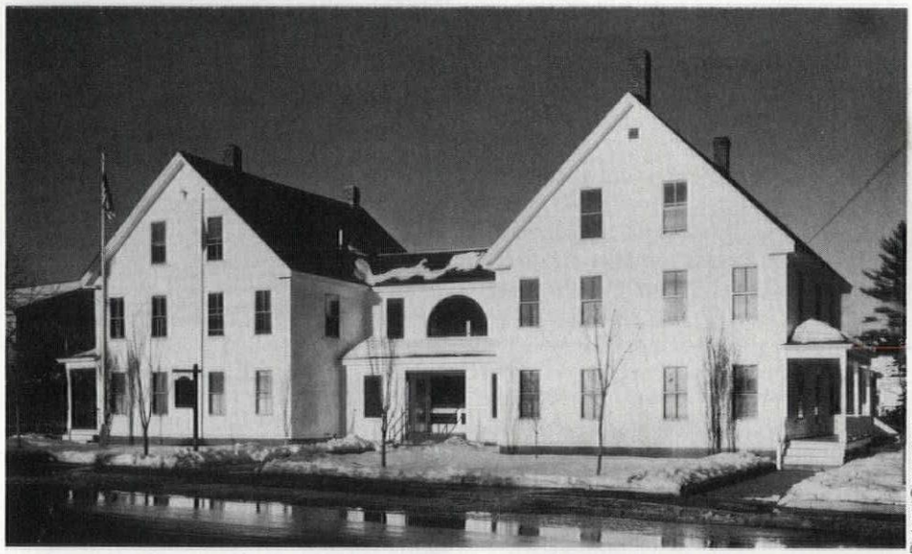
The town offices of Durham, NH moved from the Town Hall about six years ago, looking for larger quarters. Around the corner, they found two 1920s two-family frame houses. Their Colonial style fitted in well with the surrounding designated historic district, and the buildings' character seemed appropriate to house the small New England town administration. The town asked architect John Benson of Beckstoffer & Associates, Boston, Ma, to create a unified functional layout within the existing façades and spaces, preserving these as much as possible.

Benson's solution, completed in Sept. 1978, was to restore the exteriors of the two houses to a semblance of their original appearance, make them structurally sound, and add a two-story connector. The simple design succeeds on a functional, aesthetic, and even semiotic level.

The interiors of the houses are left with their original layouts, except in a few places where small rooms were combined to make staff areas. Other rooms were refurbished as individual offices. The central hall, a two-story space with a second-story balcony along the front, acts as the entry and circulation core and a display space.

The hall's exterior is finished in white clapboard and dark asphalt shingle to match the "bookend" houses, yet distinguished from the offices proper by its central arched-head window. In reality two windows split by a pitched roof, this element provides a focus for the form.

Benson intended the window to set the building apart from the surrounding residential architecture, distinguishing it as a civic structure. But the window's Palladian connotations, and the formal relationships established between the hall and the two houses, also allow the house to be read as a New England version of the classical villa: two squat towers joined by a narrower body. For $160,758 ($22 per sq ft), Durham acquired Town Offices decorous in all senses of the word: unpretentious, useful and distinguished.



Richard Bonnanggo

Palladian connector makes two New England frame houses one civic structure.

Mooning over the beach

Miami Beach has developed a recognized architectural past on which it is building for its future. This is quite an achievement for a seven-mile-long island community that was not incorporated until 1915, suffered a major hurricane in 1926, and grew from 6500 population in 1930 to 28,000 in 1940—with 75,000 seasonal visitors. Some stagnation has set in since the 1960s, and the problem of how to renew the resort community physically and economically—while minimizing the social costs—has recently engendered heated debate and legal skirmishes.

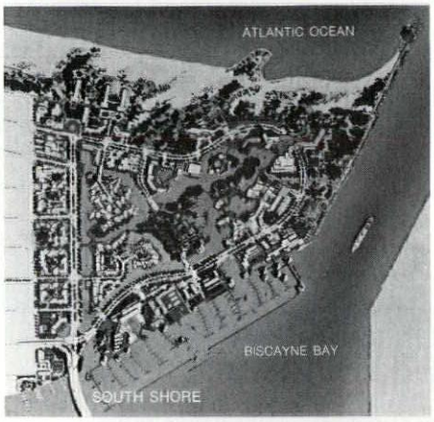
The Miami Beach Redevelopment Agency plans to clear the land on the southern tip of Miami Beach, relocate the residents, and entice new tourism investment. Conservationists who object strongly to the South Beach redevelopment, called South Shore, scored a major victory recently when the Old Miami Beach area (north of South Shore) was nominated to the National Register of Historic Places—as its first 20th-Century historic district. Other projects, such as the revitalization of several streets and the reconstruction of the beach front, are being coordinated through the city's new comprehensive plan.

South Shore

The Redevelopment Agency, created in 1976, is moving forward with a 250-acre South Shore project which will involve planned expenditures of $635 million, $440 million by private developers. Its development plan, prepared by a team led

[News report continued on page 22]

News report continued from page 21



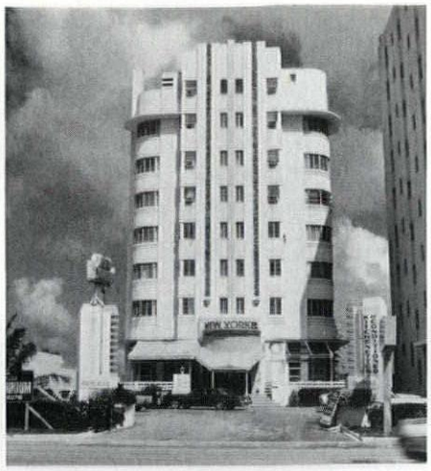
by the architectural firm of Wurster, Bernardi & Emmons of San Francisco, calls for the area to be almost completely rebuilt. The proposed development will include nine hotels, 3300 residential units, specialty shops, restaurants, and a marina. Though assisted by a $3.018-million U.S. Economic Development Administration grant, the project will also be supported by a combination of tax-increment and lease revenue bond financing. The developers are the Chicago architectural/engineering firm of Lester B. Knight, the Atlanta firm of Worsham Bros., Inc., Turner Construction of Chicago, ICLS of America of New York, and the First Boston Corp. of New York.

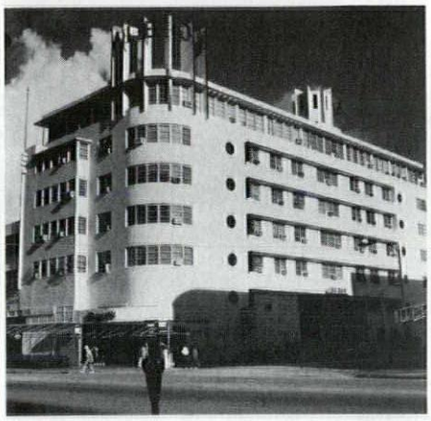
Plans currently call for construction to be done in three phases, with completion by 1985. Land acquisition is to be completed by 1981. Offerings of parcels to private developers included a set of "Architectural Development Controls and Guidelines," which replaces the city zoning requirements. A key feature of the proposed development is to eliminate all local public agency reviews outside the Redevelopment Agency.

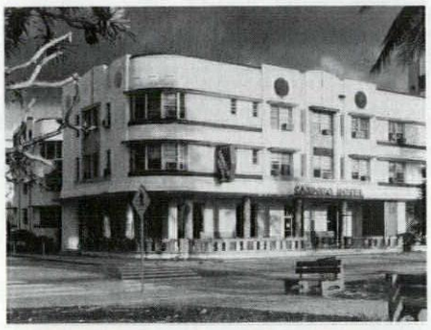
Significant community opposition to the proposal is leading to a series of legal battles. A decision on the first of these—a bond sale challenge questioning the area's designation as "blighted"—is expected soon.

The plan calls for a network of canals, a feature which will maximize water frontage and thus increase the recreational tourism potential—much to the developers' benefit. The canals, however, will also decrease the area's resistance to hurricanes and increase the expense of the publicly financed project. The project's controversial environmental impact statement has not yet been approved by HUD.

Last, a recent HEW-sponsored report by two University of Miami faculty members on the potential threat posed by the development to the predominantly elderly lower-class community of South Shore recommended "immediate research into the effects of DISLOCATION of elderly citizens," which the proposal would entail.







Photos: Ralph Warburton

The marvelous Art Deco hotels of Miami Beach; from top: New Yorker Hotel, 1940, by Henry Hohauser; Albion Hotel, 1939, by Igor Polevitsky and T. Trip Russell; Cardozo Hotel, 1933, by Henry Hohauser; and Berkeley Shore Hotel, 1940, by Albert Anis. The hotels and their neighbors constitute possibly the largest stand of significant Art Deco anywhere.

Old Miami Beach

Like the Redevelopment Agency, the Miami Design Preservation League was founded in 1976. The MDPL, a grass-roots community organization, accomplished the designation of the square-mile "Old Miami Beach" area as a historic district. As described by Andres Fabregas, current MDPL president, the notable buildings in the district are predominantly "Spanish" or "Art Deco," with an infill of not-so-notable "speco." "Moderne" and "Streamline" are prominent among the Deco structures, built between 1925 and 1946.

Some 25 architects designed about 75 percent of the buildings: among the prominent are Henry Hohauser and Murray Dixon. This small group of architects, working with a similarly finite group of developers, established a cohesive district on the 300′ x 400′ blocks without a central plan, using low- to mid-rise buildings. This may be the largest single concentration of significant Art Deco architecture in the world.

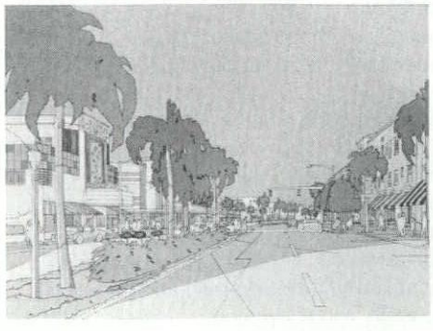
Rough estimates by MDPL sources place the overall cost of restoring the almost 800 noteworthy buildings to appropriate glory at $100 million. Funds are being sought from a variety of sources. MDPL has received grants totaling $330,000 from city, state, and federal (NEA and CETA) government sources to extend its activities into the preparation of restoration guidelines.

Washington Avenue

An associated project, the "Action Plan for Washington Avenue," developed by Venturi & Rauch (Denise Scott Brown, planner in charge), commissioned by the City of Miami Beach, covers the 12-block-long commercial corridor running north-south through the Old Miami Beach district.

The work aims to maintain and revitalize the character of the area through public actions such as the extension of old pink sidewalks, use of Art Deco street lighting fixtures, coordinated signage, and the widening of the median. The Action Plan also calls for public assistance to shopkeepers to upgrade their property, and

Venturi's plan for Washington Ave.



aesthetic and other controls—including a design review board and restoration guidelines—to achieve private-sector compliance. The plan has been approved, some elements adopted, and current activity involves detailed work on two target blocks.

More pieces

Other relevant work includes Boston architect Theodore Monicelli's emerging studies for Lincoln Road, now incompletely developed as a pedestrian shopping mall. The overall concept, drawn up by the architectural/planning firm of Wallace McHarg Roberts & Todd of Philadelphia, is to extend this mall east to the beach as part of an integrated open space system for the city.

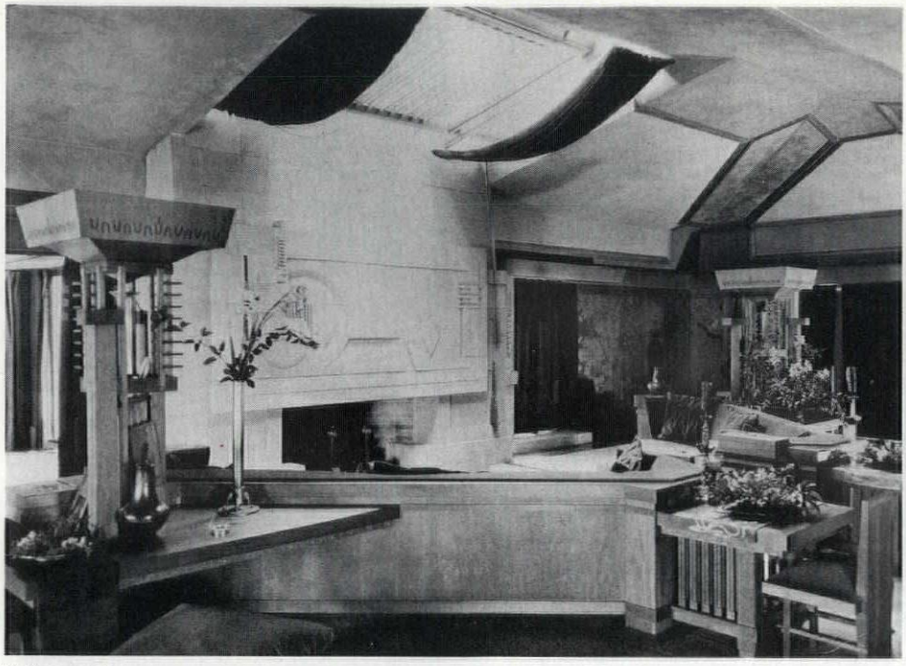
The WMRT recreation planning includes the development of a new beach front, Promenade Way, a linear park created as part of the current beach restoration and widening. Public access to Promenade Way would be via streets such as Lincoln Road, with some pedestrian connections made to the large, redeveloped Flamingo Park to the west of the island.

Public awareness of the potentials and problems of Miami Beach development is increasing, under the stimulus of such government activities as the historic preservation incentives now in the federal tax code and the HUD Community Development loan interest write-offs (down to 3 percent) for commercial rehabilitation. It is also fostered by activities of MDPL (such as an Art Deco Week in October) and this fall's Art Deco Museum exhibits at the Lowe Art Museum of the University of Miami and the Art and Culture Center of Hollywood, Fl. Will a sun of beauty, society, and prosperity rise again on Miami Beach? [Ralph Warburton]

FLW's Hollyhock House reblooms at 60

"A restless spirit disinclined to stay long in any one place," Frank Lloyd Wright said of Aline Barnsdall, client for his 1919–21 Hollyhock House.

This "spirit" embraced most cultural and political causes of the first quarter of the century—from Edward Gordon Craig's experimental theater to Emma Goldman's anarchist-feminist publication, *Mother Earth;* from Margaret Sanger's birth control movement to the Petri method of progressive education. Barnsdall was determined to found an experimental theater in Los Angeles, and when she acquired the 38-acre Olive Hill her faith in the new architecture prompted her to ask Wright to design a cultural center. The plan called for a house for herself, a 1200-seat theater, artists' studios, apartments for actors and artists, a director's house, guest house, and incidental structures—all in a romantic setting landscaped by Lloyd Wright in 1918. When Barnsdall bore a child (but scorned marriage) Wright added "The Little Dipper" kindergarten.



Hollyhock House living room as originally furnished, 1922.

She lived no more than two or three years in Hollyhock House before offering it and 11 acres to the City of Los Angeles—accepted reluctantly and leased to the California Art Club. But in 1931 her offer of the balance of the Hill to the city was rejected, and eventually three sides of the Hill were cut away for commercial development. The Vermont Ave. side, where Wright had planned a large lake fed by numerous pools and fountains, is now a row of tacky shops.

Besides Hollyhock House, the only plans executed were for the director's house (now a crafts studio) and the guest house ("The Oleanders," where Barnsdall died in 1946 at age 62).

The last work Wright did on the Hill was a temporary gallery, commissioned by the Municipal Art Patrons in 1954 and opened with the Wright show, "Sixty Years of Living Architecture." The gallery and part of Lloyd's pine groves were demolished when the city built the Junior Arts Center in 1967 and the Municipal Art Gallery in 1971.

In 1942 the house, which had gone without repairs for 20 years, was condemned because of termites and dry rot; it was reprieved when the Art Club raised funds for repairs. The city took over the house in 1963, the same year it was named a monument by the Cultural Heritage Board; two years later it was placed on the National Register, but it was not until 1969 that further repairs were made. In 1975 the city allocated $500,000 for complete restoration, with Lloyd Wright as consulting architect.

The only structural change made over the years was the removal of partitions between bedrooms to gain a gallery space, but vandals and thieves had broken or carried off leaded glass from doors and windows, ripped out lamps and finials. These were all replaced, and rugs and curtains close to the originals chosen. Refurbishing continues: many of Wright's famous high-backed chairs are intact, but with the present plan to return the living room to its 1922 state, other chairs will have to be fabricated, sofas and tables copied.

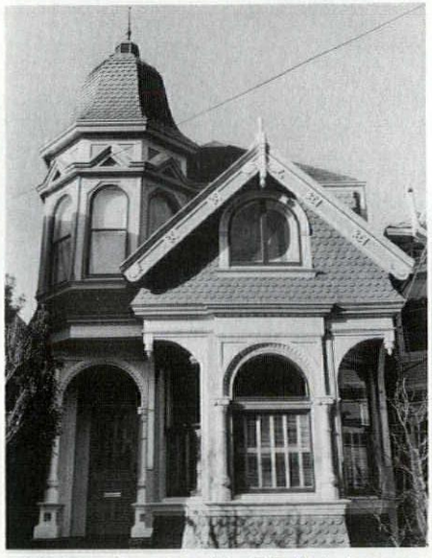
Lloyd Wright's plan for transitional garden spaces and pools between the house and the patio of the art gallery is yet to be executed. All fountains and pools have been relined, except the pool around the living room hearth where goldfish swam.

Open to the public on Tuesdays, Thursdays, and the first Saturday of each month, the house is to be a center for the study of Wright's Olive Hill plans and documents; later, perhaps, a repository for drawings of all his California work. Barnsdall's papers and memorabilia will be opened to researchers—a rich lode for the understanding of an early 20th-Century liberated woman. [Esther McCoy]

Re-Victorianizing San Francisco

Twenty years ago, homeowners in San Francisco were *de*-Victorianizing their houses. But now, the formerly unwanted bric-a-brac is *in;* the neutered look, achieved with stucco or synthetic siding, is *out.*
[News report continued on page 24]

News report continued from page 23



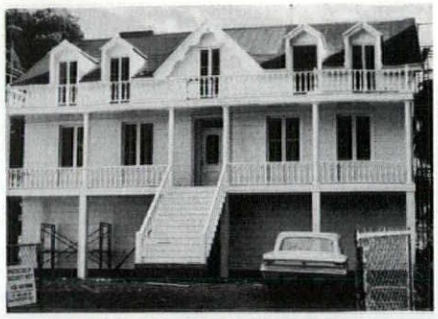
159 Delmar St. restored by S.F. Victoriana.

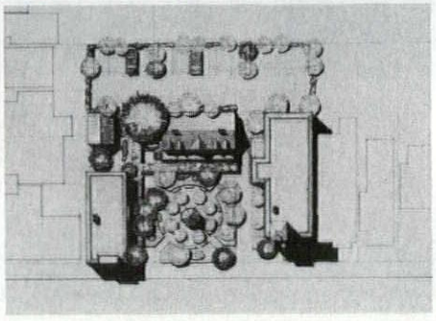
The current Victorian Restoration movement may even end up producing a stand of totally new but authentically designed buildings to perplex future historians and archaeologists. Though the new creations mostly loom in the future, the firm responsible for about 75 recreated house façades is building its first Victorian house totally from scratch this year. The 6-year-old firm is San Francisco Victoriana. Three of the original partners, Gary Root, William Lambert, and Gary Kray, still direct its steadily expanding operations.

Kray believes that the firm functions to some degree as a wish-fulfillment mechanism for many people who dream of recreating the Victorian house. Their actual work has taken extensive research plus an outlay of time and money that has yet to be materially returned. Pride and commitment to preserving these first city residences must compensate. "After six years," says Kray, "not one of us owns his own property." The implications of this situation explain the absence of any real competitors.

Working largely from 19th-Century pattern books, S.F. Victoriana has built up a stock of moldings, door and window casings, wainscotings, cornice moldings, and plaster ceiling centerpieces which makes possible their total design service, including supplies and supervision. Gary Root directs three trained millwrights at the plant where an impressive array of machinery produces their stock. The showroom features such items as Lincrusta Walton frieze papers and lighting fixtures, in addition to the millwork.

How much does a restored façade cost? The estimate for the average complete housefront is 10 to 20 percent of the current market value of the building, depending on the degree of defacement. The price is now running about $5000.





Phelps House and plan for surrounding complex.

The other outstanding firm involved in re-Victorianizing the city is The Preservation Group, a development corporation whose president, Keith Roberts, is an attorney. The seven-member design staff is headed by Harold Majors, AIA, and includes an interior designer, Rhoda Parks.

In the past three years the firm has undertaken 11 projects, 8 of which involve 19th-Century buildings. The most historically significant project now in progress involves four residential structures which range from a 1425-sq-ft cottage to a 6600-sq-ft mansion. When finished later this year, this half-block in the Western Addition, one of the principal Victorian neighborhoods, will be recreated as an office and restoration complex on a plaza. The houses will be meticulously restored on the outside with moderate changes to the inside.

To form the plaza, the project's centerpiece and the city's oldest house, the Phelps residence (1850 or 1860) was rotated 180 degrees. An 1880s house which stood between the Phelps house and the street was moved down the block. All this house-moving may seem to be tampering with history, but in fact the Phelps house had already been moved twice in the 19th Century. [Sally Woodbridge]

Kemper rebuilt without architects

Many of the country's architects were in town when the roof of Kansas City's Kemper Arena was hammered by 70 mph winds and heavy rains on June 4. One has to wonder how many of them felt the cold sweat and sudden dryness of palate which accompanies acute disaster empathy.

Following the roof failure, the Kansas City officials went directly to C.F. Murphy Associates' Helmut Jahn, the arena's designer, for help. In town for the AIA Convention, Jahn advised the city to hire a neutral consultant. (The city eventually chose James L. Stratta, a California-based consulting engineer.) C.F. Murphy then had the clean-up procedures halted long enough for accurate records to be made of the fallen structure. Shortly thereafter, direct correspondence between designers and client was replaced by lawyers. By contrast, the contractor kept his channels of communication open, and offered to rebuild the roof at cost.

Although there were no casualties, rescue officials were jolted into reconsidering emergency plans. Had the building been fully occupied on the night of June 4, thousands of injuries could have resulted.

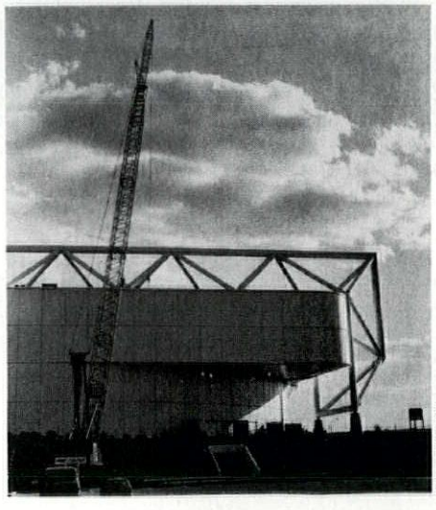
The collapse took its toll on the city, however. The arena managers braced for the loss of nearly six months of revenue as well as a serious promotional effort to entice a skittish population back into the rebuilt structure. Retail stores surrounding the arena lost so much revenue that small-business loans were suggested to keep them afloat until the February 1980 scheduled reopening.

The roof failure is also taking its toll on the architectural profession. There is no architect for the rebuilding. C.F. Murphy is almost the only member of the original building team which is not participating in the reconstruction. The original contractors and steel erector are placing the new roof, designed by the man who investigated the failure for the city, James Stratta.

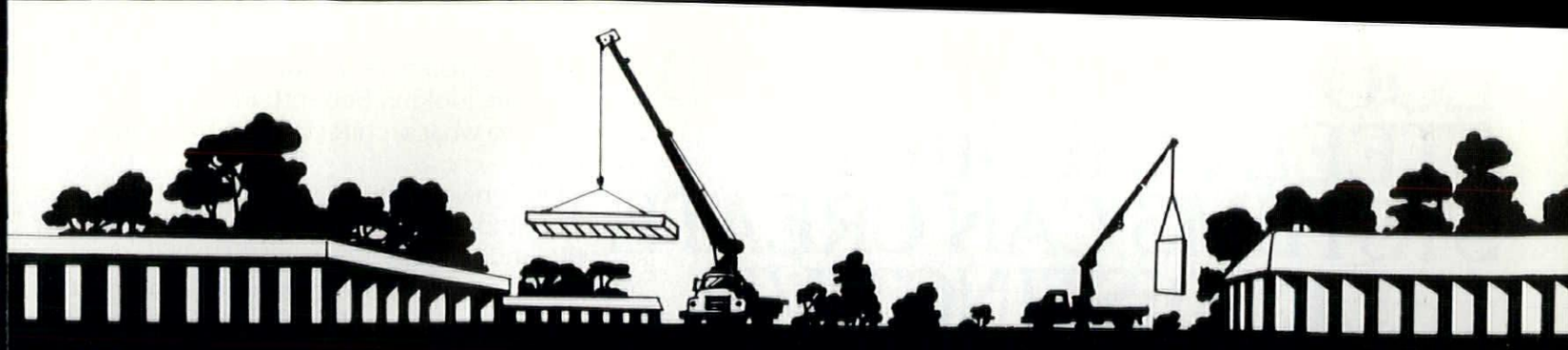
Also notably absent in the reconstruction are the bolts. The 1⅜-in. A490 bolts originally used to secure the roof hangers to roof trusses are being replaced by welded joints. The official diagnosis of the failure blamed the collapse on a fatigue

[News report continued on page 28]

Kemper arena under reconstruction.



Richard Rush



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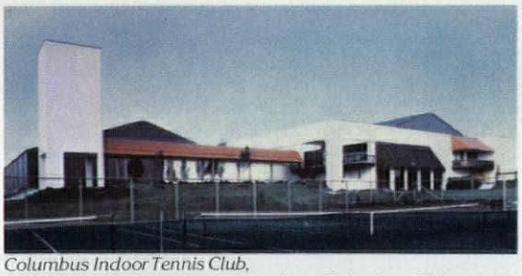
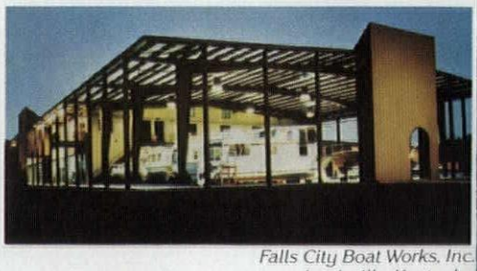
Architect
Richard Reif
Tucson, Arizona

Plaza 75 Shopping Center
Phoenix, Arizona
Architect:
W.W. Witte
Phoenix, Arizona



Columbus Indoor Tennis Club,
North-Oak Creek Gymnastics Academy-Columbus, Ohio
Architect:
Acock White and Associates-Columbus, Ohio

Web International Warehouse
Jacksonville, Florida
Architect:
Howard H. Humburg, A.I.A.
Jacksonville, Florida



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Architect:
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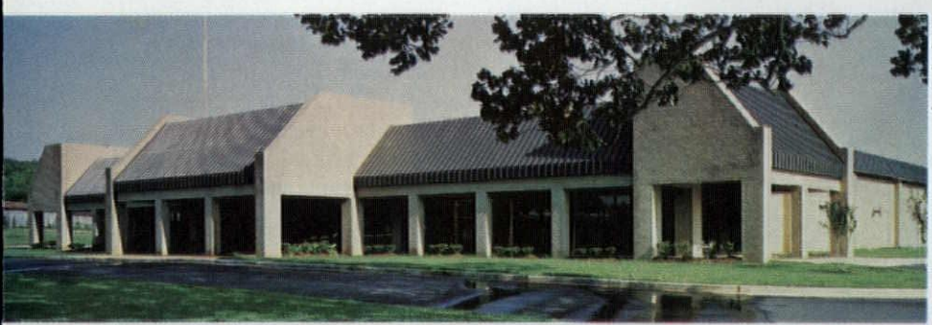
John Don Puckett
Gainesville, Florida

Georgia Pacific Corp.
Distribution Div.
Baton Rouge, Louisiana
Architect:
Pesce Clendening Associates
Dallas, Texas

Indianapolis Freightliner-White
Indianapolis, Indiana
Architect:
Fisher Medalen Corp.
Indianapolis, Indiana

California Recreational Park
Chicago, Illinois
Architect:
J. Ahrendt Heinzelman
Chicago, Illinois



Don Kazery's Furniture Co. Inc.
Jackson, Mississippi
Architect:
Dean & Dean
Jackson, Mississippi

Ming Auto Beauty Center
North Miami, Florida
Architect:
Curtis & Associates
Shawnee Mission, Kansas

Parker Cadillac
Little Rock, Arkansas
Architect:
Weaver & Heigel Associated
Little Rock, Arkansas

Fowler Brothers
Furniture Store
Knoxville, Tennessee
Architect:
James R. Johnson & Associates
Knoxville, Tennessee

Weis Companies Office/Warehouse
Rochester, Minnesota
Architect:
Chris Colby
Rochester, Minnesota

Office Building
Spokane, Washington
Architect:
Robert J. Randall, Jr.
Spokane, Washington

Century Harbor Racquetball Club
Middleton, Wisconsin
Architect:
Routhitt Associates, Inc.
Madison, Wisconsin

Maumelle Community Center
Maumelle New Town, Arkansas
Architect:
Fletcher, Miller, Dean & Associates
Little Rock, Arkansas

News report continued from page 24

and tension failure of the bolts, and the new design avoided using them. As a further precaution, the new roof pitch will drain to the perimeter of the building instead of to interior drains. Installation of permanent strain gages on the roof is being considered to further insure future safety. Federal, regional, and state aid is likely to complement insurance funds for the rebuilding.

Another question raised in the aftermath of the collapse is: how should architects cope with building failures? Liability insurance rates reflect the growing concern in the country over the number of structural failures in recent years. Some architects are forming their own insurance companies.

Risk Analysis & Research Corporation of San Francisco has made a business out of studying procedures for architects in the aftermath of building failure. The firm is conducting seminars around the country on the subject and has written an excellent book: *Untangling The Web of Professional Liability*. According to RARC, architects should keep calm, rehearse emergency behavior, and avoid shutting down communication with the client. They warn against the "good guy syndrome"; at the time of a failure there is a strong tendency to accept blame—an action which may well have legal consequences. They advise calling in outside help when there is evidence of need for it.

Of course protecting yourself from litigation is only half the battle. The other half is avoiding failure in the first place. To this end the AIA has set up a committee to study the failure of long-span structures. Kansas City may eventually mend its apparent breach with C.F. Murphy, but the forces of nature are likely to be much less forgiving towards buildings. [RR]

Kennedy Center leaks cost Stone fee

The upshot of the five-year legal battle between the estate of architect Edward Durrell Stone and the federal government over the Kennedy Center is a settlement that will cost the Stone estate $25,000. The Stone estate has agreed to pay the Government nearly $25,000 in damages for design defects in the Center; the government will pay still-owed architects' fees of $225,000.

The agreement, settled in late August, means that the Stone estate has in effect admitted partial responsibility for the faults in the design which helped to cause leaks in the roof and cracks in the concrete on the adjacent drive. The government claim cited inadequate drains and slopes for drainage as well as improper beam cuts and fixture installations. The agreement, which also settled with the contractors indicated in the government claim, represents quite a compromise: in 1974, Stone's attorneys were suing for some $300,000 in fees, while the government claimed $2 million in damages.

Conferences

First International Conference of Architectural Museums
August 20–25
Helsinki, Finland

With few exceptions, museums specifically concerned with architecture have been established recently, most within the last 15 years. Many are still formulating their programs and all are responding to the ever-increasing interest in architecture from the general public. Therefore, the time was ripe for an international conference allowing for exchange, aid, and cooperation on both practical and theoretical levels.

Initiated and planned by the Museum of Finnish Architecture, the meeting was sponsored by the Finnish government. Thirty-three persons representing 16 countries attended the working sessions, held at the 18th-Century island fortress of Suomenlinna, in Helsinki Harbor.

Judging from the roster of speakers, it

[News report continued on page 33]

For Interior Elegance and Durability Whitacre-Greer Thin Pavers in Warm Earth Tones

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Whitacre-Greer Architectural Pavers are products of one of the country's richest clay areas — east central Ohio. The character and wide appeal of this unique range of earth tones is due to these rich Ohio deposits, processed with a variety of additives, under rigidly controlled firing conditions.

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Thin pavers shown here are available as 3⅝″ x 7⅝″ rectangles. All are 5/8″ thick. Compressive strength 10,500 psi. Maximum average absorption rate 4%. Freeze-thaw cycles, 100 minimum. Size and distortion tolerance and color variations on pavers will meet ASTM Designation C-216, Type FBS.

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ANTIQUE RANGE | FLINT RANGE IRON SPOT | MULBERRY FLASHED RANGE

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Ching Dynasty (1662-1722) porcelain enamel vase
courtesy of Marshall Galleries, Cleveland, Ohio.

We're not trying to sell you a vase, just the idea behind it.

Beautiful, isn't it?

Even though it's centuries old, the colors are exciting.

That's durability. And that's because it's porcelain enamel.

At AllianceWall, we adapted the idea to help you make buildings beautiful and to keep them looking that way. Permanently. Inside and out.

Our architectural wall panels are inherently beautiful.

They're also inherently durable. The porcelain is fused to steel at such high temperatures that it actually becomes part of the metal. So they resist most everything—fire, fading, stains, even scratches. And you can imagine the maintenance. Or rather, the lack of it.

If you can picture the perfect wall surface, this is it. It can be made to your specifications, laminated to virtually anything. Even used as a wall curtain for exterior and interior with insulation between. And if insulated to a thickness of just 1," the R-value is the same as a 12" brick wall (imagine the delight of an energy conscious client!).

There's a wide range of matte and semi-gloss colors available in smooth finish. And with our Wolverine line, you can get into shapes, patterns, textures and graphics that are limited only by your imagination.

AllianceWall porcelain enamel panels.

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For more information, drop a line to AllianceWall Corporation, Dept. 1C, P.O. Box 247, Alliance, OH 44601.

New Mexico Bank, Albuquerque, New Mexico
Architect: W. E. Kruger & Associates

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AllianceWall Corporation

Architectural accessories by Landscape Forms are notable for meticulous design and imaginative use of woods and fiberglass in tables and seats, benches, planters, planter-benches and receptacles. The complete catalog includes more than 5,000 products in a great variety of styles, sizes, materials, and finishes. For more information write to: Landscape Forms, Inc. Route 3, Kalamazoo, Michigan 49001 or call 616/381-0396.

LANDSCAPE FORMS

News report continued from page 28

would appear that Northern Europe and the USSR are the leaders in this field. Discussions regarded the appelation "museum," its connotations, its functions, its obligations to scholars and the public alike, and the means of meeting these obligations. Participants then separated into smaller sections to work on specific technical questions; the results of these various discussions were presented to the whole assembly on the last afternoon.

Several methods to improve communication and cooperation were agreed upon. A newsletter is to be circulated twice a year. Each institution will prepare its own entries to be sent to the Museum of Finnish Architecture, where a compendium will be bound and distributed. In addition, it was agreed that a free exchange of publications, monographs, research reports, and general printed information would begin immediately.

In order to facilitate the circulating of exhibitions, more information on the internal structure of the various institutions is needed. Questions relating to funding, government affiliation, and the like will be included in a short questionnaire; a second form will detail long-term exhibition plans.

Finally, a unanimous vote of approval was given a charter consisting of the following nine propositions:

By individual and corporate effort:

1) To raise the built environment's quality.

2) To stimulate public response to architecture and its allied fields.

3) To expand understanding of cultural continuity and environmental context through the knowledge of history as a source for architectural practice.

4) To foster a critical attitude towards architecture and its allied fields.

5) To act to protect the quality of the built environment when it is threatened.

6) To exchange information on the history and practice of architecture.

7) To support the exchange of scholars, architects, and allied professionals.

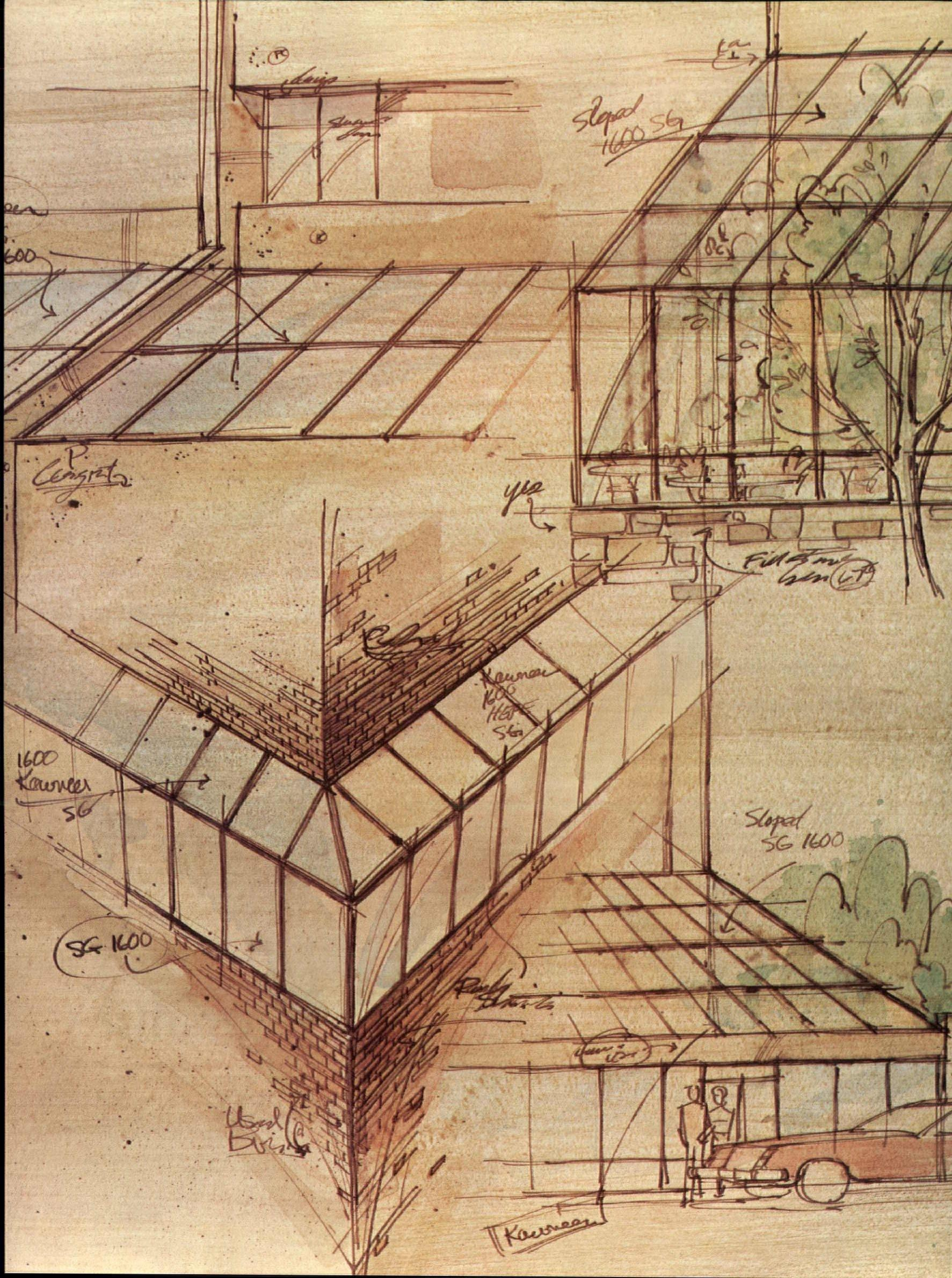
8) To record the whereabouts of architectural records, to aid in their preservation, and to share this information.

9) The cooperation of all interested groups will be sought.

The conference closed in an atmosphere of enthusiastic cooperation. Satisfaction at basic work completed was matched by the expectation of beneficial things to come. For information on future conferences, contact Museum of Finnish Architecture, Puistokatu 4, SF-00140, Helsinki 14, Finland.

[Catha Grace Rambusch]

[News report continued on page 36]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IMAGINATION.

The only tool needed to design with Kawneer 1600 SG.

Sometimes, the skylight is the limit.

The addition of sloped glazing to a building's design can be a frustrating, time-consuming experience. After hours of design, drafting and consultation, the choice is often between budget breaking costs or painful performance compromise. With a large budget and custom design, the sky is the limit. But, in many cases it is the skylight which is the limit.

Introducing Kawneer 1600 SG for Sloped Glazing.

1600 SG by Kawneer is a companion system to the 1600 Curtainwall System. It can be used to easily create a variety of building skylight accents. It allows an architect an extended vista of design opportunity. And, because Kawneer 1600 SG is based on an existing wall system, it does not make the design and dollar demands of custom-engineered systems.

Kawneer 1600 SG is a pre-engineered, standardized sloped glazing system. Design, performance and life cycle savings are built in before 1600 SG ever leaves the factory. This includes features such as internal drainage gutters, a unique, baffled sill assembly for continuous drainage and a PVC thermal barrier to minimize heat loss and to control condensation.

Kawneer 1600 SG can be integrated with vertical walls, or applied to curbs, or to structural steel sub-framing, or even used with inside and outside corners. It is not only compatible with Kawneer's 1600 curtainwall system, it can be blended with all Kawneer entrance systems for a truly unique design. 1600 SG can accommodate a variety of slopes and configurations.

Most important, 1600 SG by Kawneer is a system that performs. It has been performance tested under conditions equivalent to 8 inches per hour of rainfall and winds of more than 60 mph. These test reports are certified and available upon request.

Where would you like your piece of the sky?

Kawneer 1600 SG for sloped glazing does not require extra effort, long custom-engineering lead times, expensive installation, or performance compromises. All it needs is your imagination.

Talk to your Kawneer representative about designing with 1600 SG for sloped glazing. Or for more information, write: Kawneer Architectural Products, 1105 N. Front Street, Niles, MI 49120.

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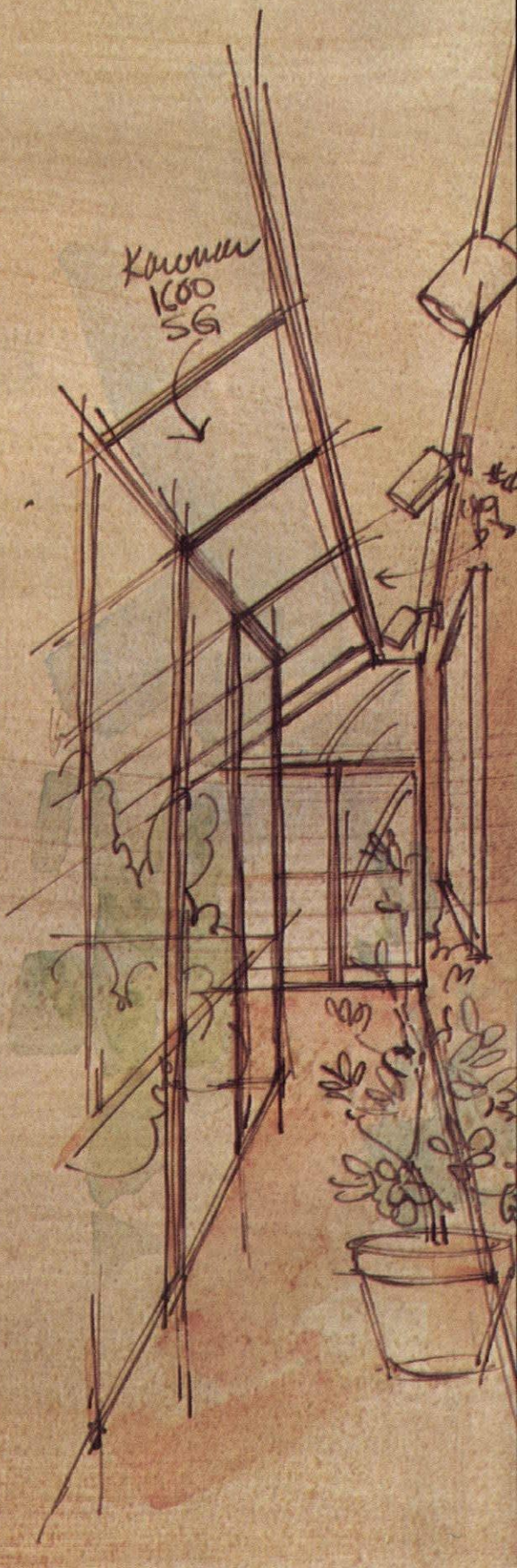


Kawneer
The designer's element

1600 SG covered by U.S. Patent: 4,070,806

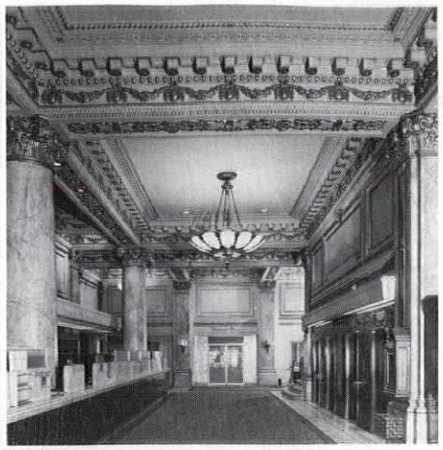
News report continued from page 33

The Bellevue Stratford . . . er Fairmont Hotel

"Take me to the old Bellevue Stratford Hotel," I asked. "You mean the new Fairmont!" the taximan snapped. Philadelphians are anxious to forget the hotel's macabre bout with Legionnaire's disease which closed the old hotel.

The new Fairmont is a welcome addition to the arsenal of hotel space Philadelphia has to offer business. The new lobby was filled with people wallowing in the richness of the color and texture and brushing shoulders with the dignitaries who arrived to christen the reborn building. Party rooms are already handling bookings up to 1990. On opening, the hotel was only about 75 percent complete. But by mid-November, the last crews will be tidying up.

The renovation inspires a mixed response. What Hyman Myers of Day & Zimmerman could control of the building is superb. The lobby and the 19th-floor party rooms present the exquisite freshness of the original early 19th-Century building all gussied up with new imported Portuguese chandeliers. All of the remaining plasterers in Philadelphia worked on the building at one time or another. An expert craftsman restored the damage to the point that only the most expert eye can tell the real marble used from the restored scagliola. The lobby was redesigned in plan, moving the registration desk to one side to reduce the congestion which plagued the old entry.



Restored Bellevue Stratford: mixed results.

The hotel is clearly not a restoration of museum quality. It is a working hotel which fully expects to make money. Some areas were possible to reclaim—others were either beyond restoration or too expensive to restore.

With the exception of an occasional splash of incredible marble, the hotel restaurants could be any imitation theme restaurant. Carpets and wallpaper in some meeting rooms approach garishness with the same boldness with which the lobby approaches the refinement of turn-of-the-century detailing. The hotel rooms verge on ho-hum suburbia and seem to defy furniture placement.

Yet to be completed is the first-floor grand ballroom and accompanying anteroom and staircase, as well as a bombshell of a corner room which deftly sports a population of alternating men's and women's faces as a cornice around the room. To be called "the red room," it will most certainly be a favored space.

The ballroom is complete with a stage which can be raised and lowered and a sumptuous balcony. Too big to gut and redo in classic style, and clumsily treated in a mid-Century remodeling, it is likely to suffer most from compromise.

Most of the decisions for the renovation were made "thinking like a 19th-Century architect." Where the thoughts are clear and could be followed, this process worked. The ballroom called for something else—a bold stroke. If restoration was not possible it could have been San Francisco'd or Charles Moore'd back to life. When history fails to tell an interesting tale, we must be ready with a yarn of our own. [RR]

[News report continued on page 41]

Holophane architectural outdoor lighting.

For your freedom of choice.

A vote for the new Caribe™ Design Series is a vote for the freedom of choice.

Create the luminaire that will best complement your design theme by coordinating outer geometric shapes and colors, inner refractors and lamps. Then choose from handsome mounting arrangements with square or round poles.

All in all, you can create well over a thousand variations to make each of your projects a unique and very personal statement.

Caribe is quite extraordinary. But esthetic choice isn't the only benefit it offers.

Prismatic refractors provide precise light control. Clean appearance is achieved by a concealed wedge-lock mechanism (patent pending), that eliminates exterior hardware. And rugged construction discourages vandalism.

Find out just how choosy you can be with Caribe. Ask your local Holophane® sales representative to go over all the details with you.

Or contact Jim Dresden, Johns-Manville Sales Corporation, Holophane Division, P.O. Box 5108-PA11, Denver, CO 80217. Phone 303/979-1000.

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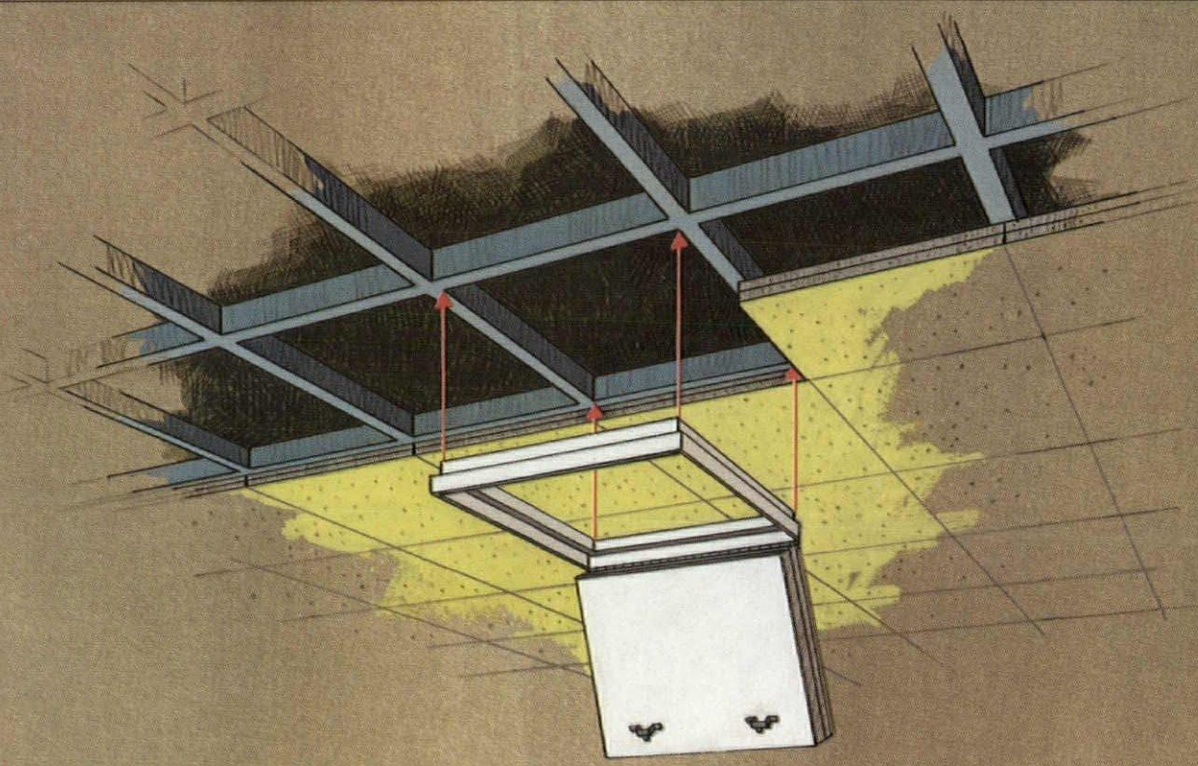

Milcor® Brand Steel Access Door for Fire Resistive Suspended Drywall Ceilings.
Door panel is recessed to receive double layer of wallboard or layer of wallboard and layer of ceiling tile to maintain integrity of fire resistive ceiling surfaces. Inside frame is offset for installation in ceiling supporting grid system without additional framing or grid adjustments. Units are custom sized to match modular sizes of wallboard and tile, eliminating material waste.

Catalog 33-1 describes this and other styles of Milcor access doors for walls and ceilings. See Sweet's, section 8.12/Inr, or send for your copy.

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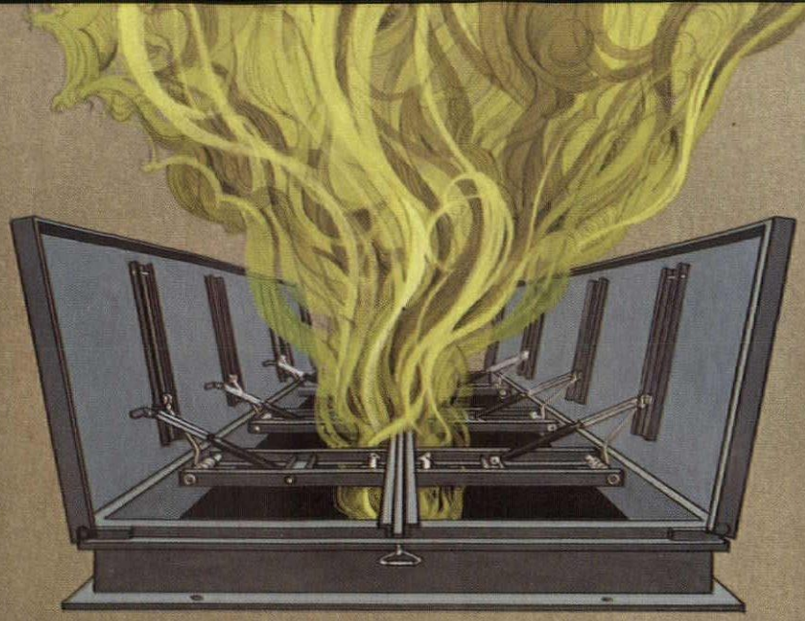

Big Smoky™ – Heat and Smoke Vents for 5′ 0″, 5′ 6″ and 6′ 0″ Joist Spacings.
The first automatically operating Heat and Smoke Vent available in economical steel construction in widths to span wide joist spacings…permitting installation without special supplemental framing. Furnished in lengths from 6′ 0″ thru 12′ 0″. Underwriters' Laboratories listed and Factory Mutual approved. Also available in aluminum.

Catalog 34-1 has complete details on Big Smoky and other Inryco/Milcor heat and smoke vents, roof hatches and floor and sidewalk doors. See Sweet's, section 7.8/In or send coupon for catalog.

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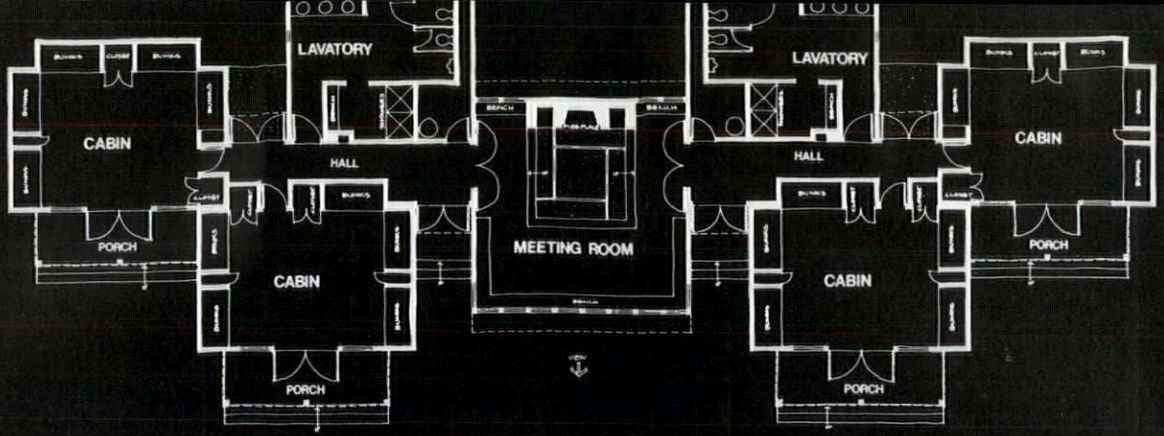
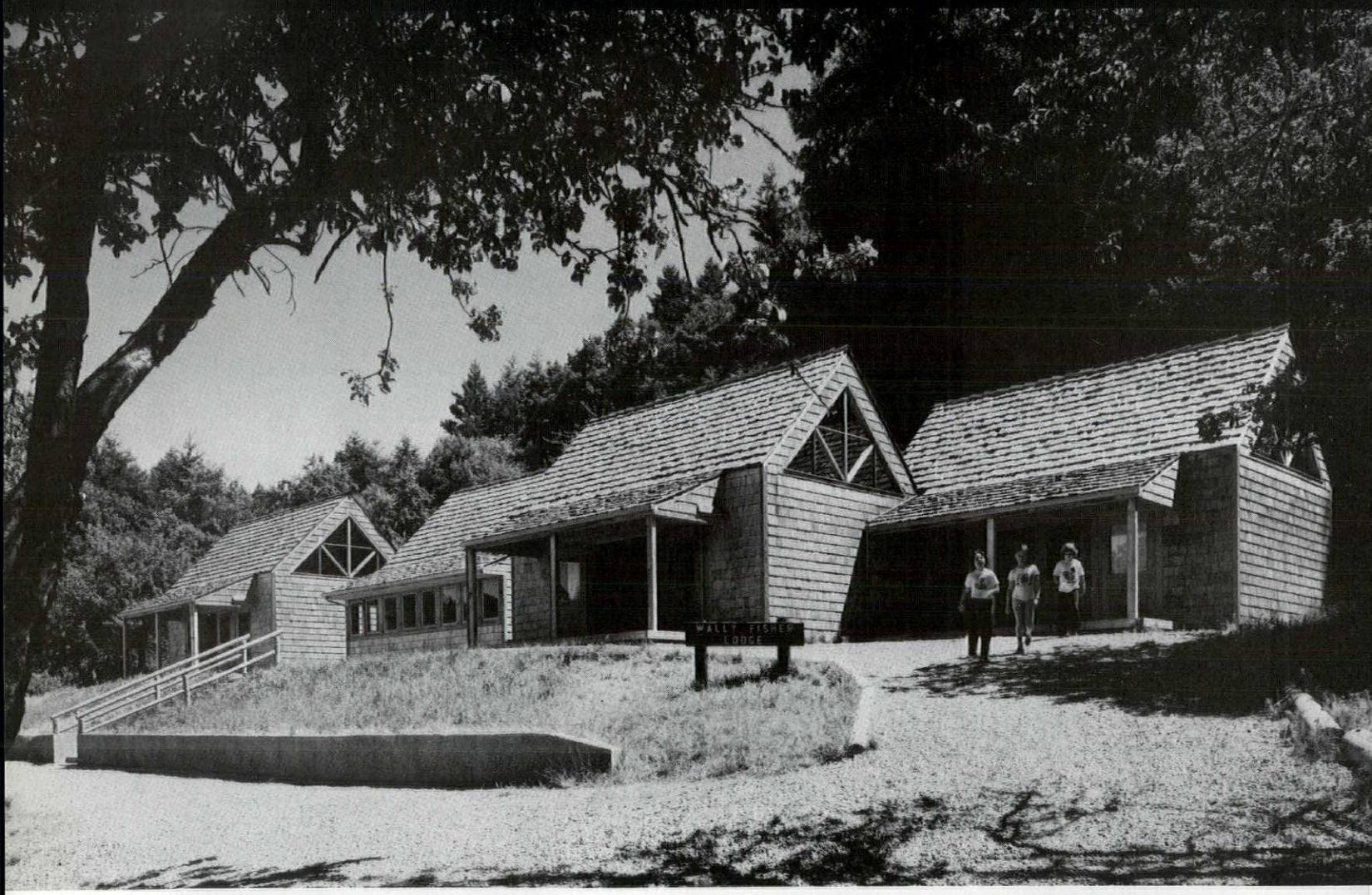


Wally Fisher Lodge: Simple, robust, durable Red Cedar.



Y.M.C.A. Camp, Orcas Island, Washington.
Architects: The Richardson Associates.

"Compatibility of the housing unit with the character of the small, separate, woodsy cabins was paramount.

"Cedar shakes on the roofs and shingles on the walls help keep the building scale small and personal—and are natural and rustic materials traditional to the camp's history"—James E. Hussey, A.I.A.

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Tlingit canoe paddle of cedar painted with a blackberry juice and ash mixture.
Cedar. To touch the earth.

Red Cedar Shingle & Handsplit Shake Bureau

News report continued from page 36

Report from Texas

Carter pulls a "nix" on San Antonio

Successful inclusion of San Antonio's historic "river missions" in an attachment to national legislation for the Pennsylvania Avenue Development Corporation (S. 1829) hit a temporary snag as funds for the project were blocked by President Carter. Proposed as the San Antonio Mission National Historic Park, the concept was the most recent development in over four decades of effort by the San Antonio Conservation Society, local architects, and agencies to maintain and activate an awareness of the city's Hispanic heritage. Its blockage at this point reflects a curious mix of Constitutional issues.

The Historic Preservation Act of 1935 was initiated in the Maverick-Byrd Bill. Maurey Maverick, at one time Mayor of San Antonio, was a major force behind implementation of the development of the River Walk (Paseo del Rio). He was a key supporter of the initial WPA project which saved and revitalized historic "La Villita" as an arts colony now a major focus on the River Walk. As a result of this legislation identifying national landmarks, San Antonio's Mission San Jose was the fifth building to be so designated, and the first outside of New England.

San Jose, built in 1720 and still functioning as an active church for its local community, is indisputably the best of the four missions (including Conception, Espada, and San Juan) strung along the San Antonio River in the city's south side, a predominantly Mexican-American area. Through the WPA, initial restoration work was done to San Jose in the late 1930s, and a precedent for cooperative ventures was established between the Conservation Society, Bexar County, the (then) Texas Parks Department, the Archdiocese, and the National Park Service. In 1941, all property was transferred to the state, and an advisory board comprising members from both Bexar County and the Conservation Society oversaw improvements. As a result, all the missions continue to function while retaining a large degree of their character as historic places.

In the 1950s, ambitious plans were initiated for the missions, forming the basis of later studies, although the actual concept extended as far back as the "Comprehensive Plan for San Antonio" of 1933. In 1962, the Catholic Church, Conservation Society, Chamber of Commerce and the City developed a Mission Parkway Plan, initiated by land purchases two years later with funds provided by a bond issue. The National Park Service began a study at the same time with the idea of developing a National Parkway. By 1966, the NPS proposal was issued, and the San Antonio Planning Department submitted an abbreviated plan to HUD which resulted in a 50/50 matching grant supported locally by the initial bond issue and a second one in 1970. By 1974, a modified route was completed, linking all four missions together along the River and described in the 1973 document "The Missions of San Antonio—A Plan" prepared by the Community Development and Planning Department. Also in 1973, the River Corridor Study (see P/A, Jan. 1974, p. 76 and June 1975, p. 62) enlarged the thrust to a comprehensive overview of the river's role within the entire life of the city. With the River Corridor Project, the linear park concept for the historic missions and development for the city's south side became, in effect, a matter of public policy. The lobbying for a new bill was a part of a continuing tradition as well as reflecting the new public attitude.

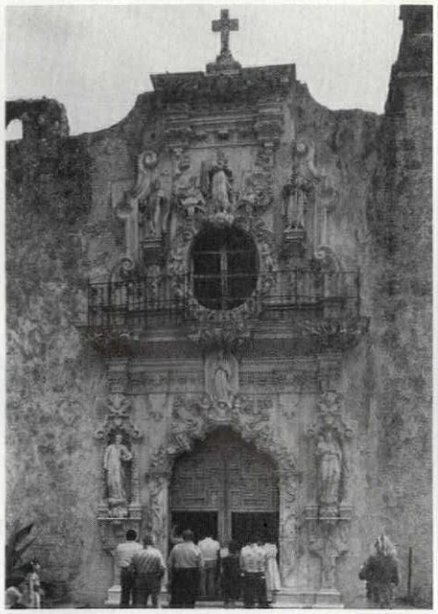
Nuestra Senora de la Purisima Conception.

However, President Carter expressed concern that the bill's provisions might ". . . lead to unacceptable entanglements of the federal government in the operations of active churches." Sensitive to these issues of church and state, but advised by Phil Burton (D-California) that the Pennsylvania Avenue legislation had to go ahead, Carter signed the bill last November but subsequently sent a memo to the Interior Department not to spend money on the project as long as the four missions are owned by the Catholic Church. In essence, Carter initiated a line-item veto, arguably an unconstitutional action.

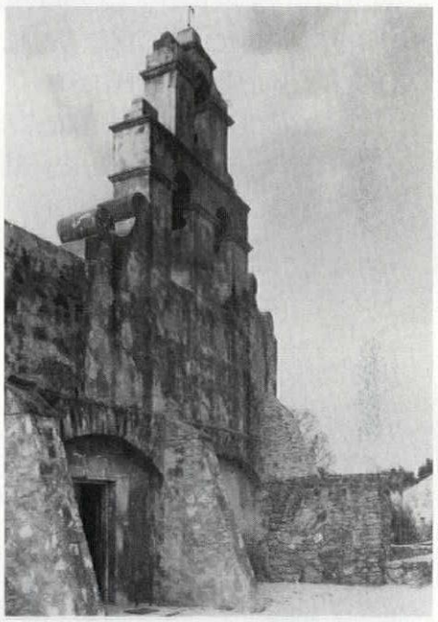
At stake is the relationship between urban planning and historic preservation, in these unique circumstances. A confusion exists about both the relationship between the Interior Department and active churches, and the potential effectiveness of specific funds ($10 million) earmarked. Elliot Cutter of OMB has contended that upwards of $50 million is needed while San Antonio architect O'Neil Ford has stated that only $2 million will be needed for restoration work.

Representative Abraham Kazen (D-

[News report continued on page 44]

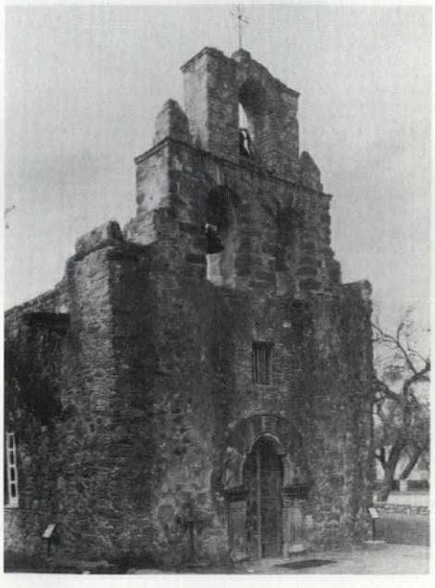


Mission San Jose.



Mission San Juan.

Mission San Francisco de la Espada.



Photos: Peter Papademetriou

THERE'S A BIG
BETWEEN GAFSTAR
THE LEAD
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It's ironic. When you're about to specify a floor, all you get to see are beautiful new samples. Which gives you absolutely no idea of what the floor will look like when it really counts. In the future.

Unfortunately, that's when your clients' happiness is at stake. Along with your reputation.

That's why with Gafstar® Contracfloor™ sheet vinyl we give you a look at its future, by showing you how well it stood up in the past.

ANY FLOOR CAN SHINE WHEN IT'S NEW. GAFSTAR CONTRACFLOOR SHINES WHEN IT'S OLD.

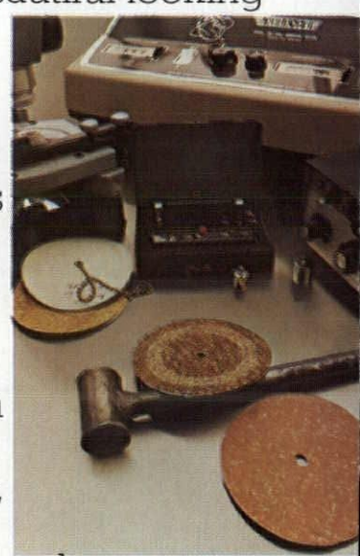
In this busy corridor of Brackenridge Hospital in Austin, Texas for example, this Contracfloor took a lot of abuse.

Twenty-four hours a day, for three years, patients' beds rolled over it. Doctors, nurses and hospital staff hurried back and forth. And visitors paced up and down.

But you can hardly see a trace of wear. It's still a shining example of a beautiful floor.

TESTS PROVE OUR FLOOR STAYS BEAUTIFUL LONGER.

The key to our beautiful-looking floor is its tough no-wax surface.



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And even though the leading inlaid's wearlayer is thicker, the only gauge that means anything is how it wears.

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In 6,000 cycles abrasives significantly wore into the pattern of the leading inlaid. While they didn't make a dent in ours.

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After years of wear, your clients will still have the same beautiful-looking Contracfloor they started with.

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A BRIGHT FUTURE WITH VERY LITTLE WORK.

Contracfloor gets off to a beautiful start. With many different designs and colors in widths up to 12-feet. Which means Contracfloor has fewer seams. And it's more flexible than the leading inlaid, so it's not only easier to install, it's faster too. Which makes it beautifully economical as well.

But a beautiful floor isn't worth much, unless it's easy to keep that way. And that's where Contracfloor really shines.

The durable surface is a stain-resistant no-wax. Simple washing and buffing keep it clean and glossy.

Since it's solid and non-porous too, dirt and germs have nowhere to hide. Which means Contracfloor is healthier to be around.

And it's more comfortable to walk on. With a Quiet-Cor® vinyl foam interlayer that makes it easy on the feet.

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Circle **No. 343**

News report continued from page 41

Texas) and Senator Lloyd Bentsen (D-Texas) are working with the National Park Service to convince President Carter that "there is ample precedent for the federal government in providing funds to historic churches." The Conservation Society contends that the churches are the basis of the park concept, and are part of San Antonio's living Hispanic heritage. The amount of funding needed can only be determined after a definitive master plan is prepared. The mechanism for a cooperative venture involving both the public and private sectors already exists. Perhaps Carter's myopia is correctable.
[Peter C. Papademetriou]

Gio Ponti: 1891–1979

His first love was painting—his late works were exhibited a year before his death. But in 1958 he gave Italy its symbol of postwar renewal, the boat-shaped Pirelli building in Milan, one of the half-dozen great buildings of postwar Europe.

His early work was unique in that while his heart was in tradition and symmetry his head opted for technology and rationalist floor planning. Often he was the agent of change by being in the right place at the right time. The Pirelli building, for example, changed the planning scheme for the heavily bombed area near the railway station, anchoring a new development.

Never a polemicist (although a friend of Eduardo Persico who was) he invited the Rationalists to publish in the pages of *Domus*, the magazine he established in 1928, and when he organized Triennale V in 1933 he offered the then-dispersed Rationalists comfort and space.

Though an architect, he was unwilling to confine himself to buildings. While he worked on the 1934 Institute of Mathematics for the University of Rome and the 1936 Montecatini block in Milan, he designed ballet and opera costumes for La Scala. His ceramics of 1923 were not tributes to handcraft methods—they were designed for mass production, an early instance of collaboration between art and industry.

The small house he designed for the 1957 Triennale was a showcase for his machine crafts, from the toilet with back molded to the human form, to flatware and linens, ceramic wall and floor tiles; glass was designed for production in Venice, Chiavari chairs and other furniture for production in the small towns around Lake Como. The tiles facing the Pirelli building, Denver Museum, and later buildings are of his own design.

[News report continued on page 46]

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News report continued from page 44

His creative energy erupted spontaneously. Critic, editor, and author of several books on architecture, he also wrote a book of one-line poems about clouds, one of the drawings of a cloud seated on his elegant Chiavari chair. (The seat of the chair, incidentally, is of chords of cellophane.) [Esther McCoy]

Competitions

Building Stone Institute
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The BSI invites submissions of outstanding structures in natural stone in the following categories: 1) nonresidential, completed within the last five years; 2) completed over 25 years ago and still in use; 3) residential, completed in the last five years; 4) landscape. Contact: BSI, 420 Lexington Ave., New York, NY 10017.

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National Trust president Biddle to retire

It was not the best of times during the National Trust for Historic Preservation's 30th annual meeting in San Francisco from October 3–7. Due to lack of maintenance, the cable cars were not running; the Bay Area Rapid Transit System was on strike; the city's teachers were on strike; and a sniper was shooting at people on Market Street. The Fitzhugh Building, the subject of a long preservation battle, was now gone from Union Square, and everyone was aware that a similar fate may await the City of Paris store on the other side of the square. Moods were not improved when James Biddle announced his impending retirement, after having served as president of the Trust for 11 years. During that time, the organization grew from a membership of 12,000 operating on a budget of $1 million a year, and run by a staff of 40, to today's membership of 155,000, a budget of $15 million, and a staff of over 200. Such figures helped to improve spirits, as did the spectacular weather outside the Fairmont Hotel on Nob Hill. [DM]

[News report continued on page 49]

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News report continued from page 46

In perspective

Photos: Teresa Beyer

Portland's ex-station, above, now a music center; left, gargoyle on Kansas City station.

When they grew up

Fire stations are built for a highly specific function, to accommodate an unusual set of equipment. At once public and private, they combine aspects of a garage, a city monument, and a rooming house. As equipment changes and departments centralize, old fire stations are abandoned. Since fire stations are city-owned, they are usually offered free or for a token rent to other municipal agencies before being put up for auction. Now and then, a city will make creative use of its surplus.

Architects and city officials responsible for three conversions of fire stations to community centers in Portland, Or, Baton Rouge, La, and Kansas City, Ks, have taken advantage of some of the peculiar aspects of fire-station architecture to design three splendidly apt rehabs.

In many ways the transition is a natural one. Large apparatus and dormitory areas easily become all-purpose performing and assembly space, small rooms are made over into offices and classrooms, big institutional bathrooms and kitchens are kept for their original uses. Having been constructed to hold up under continual use by firemen, these buildings can usually take abuse. And the fire station, already a local landmark, is a neighborhood center even before the neighborhood center moves in.

Portland Community Music Center
Former Engine 25
Built 1912, Emil Schacht & Son, archs.
Decommissioned ca. 1965
Rehab. 1968–69, Robert Oringdulph, arch.

The Portland Community Music Center, a nonprofit corporation founded in 1955 to "assist the city in offering music for recreation," moved to this vacated fire station in the Southeast section of Portland in 1968. Designed with overtones of the Tudor style made popular in the Northwest by the Craftsman movement, the red-brick structure combines Flemish and Tudor-style details with a prominent, quirky tower.

Once they got the city to agree to rent the station at a dollar a year, the Center staff raised some $85,000 for renovation. Architect Robert Oringdulph offered to donate his services. The Center directors urged Oringdulph to "build the building to its maximum capacity." Very little of the original interior was retained. Oringdulph changed the orientation of the building by filling in the old apparatus doors with plate-glass windows, enlarging the former side entrance, and putting in two new staircases, one in the former hayloft area and one in the tower. The ground floor got a new entrance foyer with small rooms off to the side for offices, a kitchen, and a music library. With one added wall, the old apparatus room became a small, flexible recital hall.

The second floor was divided into classrooms arranged off a new central corridor. The basement was converted into a piano laboratory with the addition of acoustic tile and prefabricated practice rooms. The architect added columns to reinforce the upper floors and an exterior stair to allow quick egress from the lower level. Soundproofing was added wherever possible.

Inside, Oringdulph's effort to make the building "warm and inviting" won out over his attempt to maintain its "original attitudes." The auditorium and classrooms, with their white or newly exposed brick walls, dark carpeting, and modern furnishings, are certainly handsome but not identifiable as part of a fire station.

Arts and Humanities Council of Greater Baton Rouge
Former Robert Bogan Fire Station
Built 1924, W. T. Nolan, arch.
Decommissioned 1975
Rehab. 1977–78, William Burks, Barbay Associates, arch.

When the Arts and Humanities Council of Baton Rouge got its present home, it became associated with an important part of local history. The former Central Station was built as headquarters in 1924 during the administration of Robert Bogan, first chief of the newly formed paid city fire department, and a local hero. The building itself, the first city station designed for trucks instead of horse-drawn fire engines, was designed to look modern and distinguished, as befits a department headquarters. It is relieved from institutional grimness by a lovely, decorative façade of blond terra cotta and glazed brick, ornamented with delicate touches of pink and green on tracery, shields, and discreetly emblematic torches.

The city agreed to commit funds to restore the station as a home for the Council on the condition that the first floor of the building be turned into a fire museum—to include a special collection of Chief Bogan's memorabilia. William Burks, of the engineering firm Barbay Associates, was hired as architect for the $500,000 renovation.

Much of Burks' work involved trying to undo the damage done when the building was "modernized" in the 1950s. The interior had been almost completely gutted; there were new hung ceilings throughout. Two hardwood floors, a bathroom, and some hardware fixtures were all that remained of the original. The exterior had not fared much better: a false front had been added, original moldings and doors were replaced with steel beams and overhead doors, and the second-story windows were covered over with aluminum siding. After removing the false front, Burks found enough of the original terra cotta to replicate pieces to cover the steel beams and return the door and window openings to their intended shape. The only substantial alteration to the exterior was the replacement of four apparatus openings with plate-glass windows for displays.

Surprisingly few major changes from the 1924 design were made inside. The foyer was redesigned to include a new elevator, but the staircase there was retained. Burks created a flexible space for the museum by leaving the apparatus room open and installing track lighting. All of the ground-floor rooms were refurbished and the

[News report continued on page 52]

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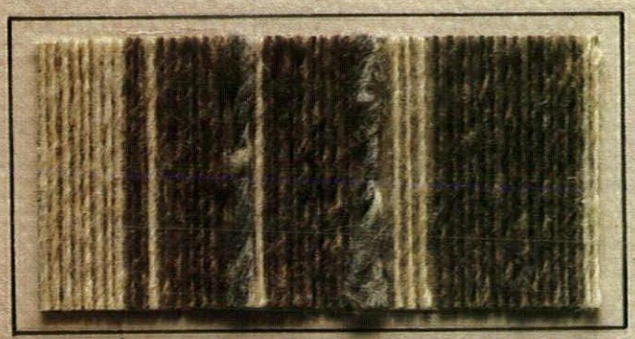

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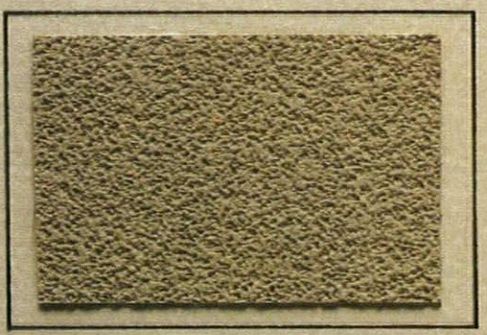

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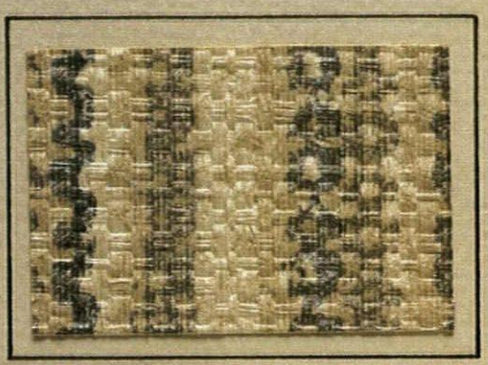

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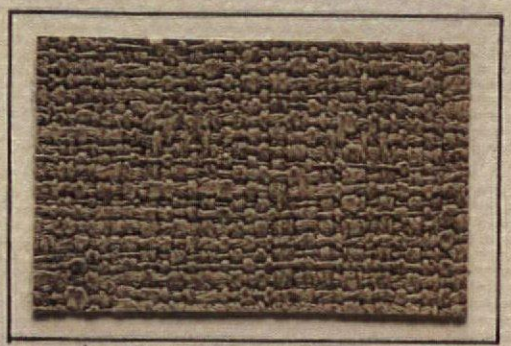

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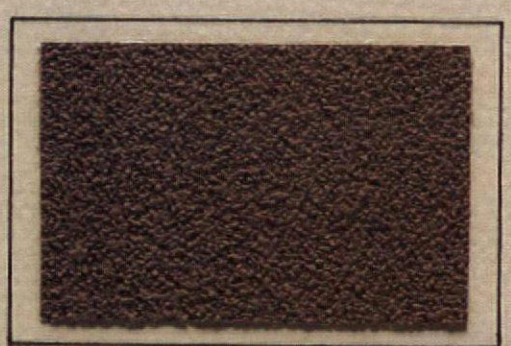

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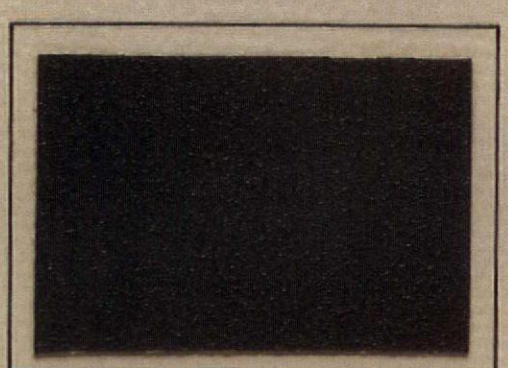

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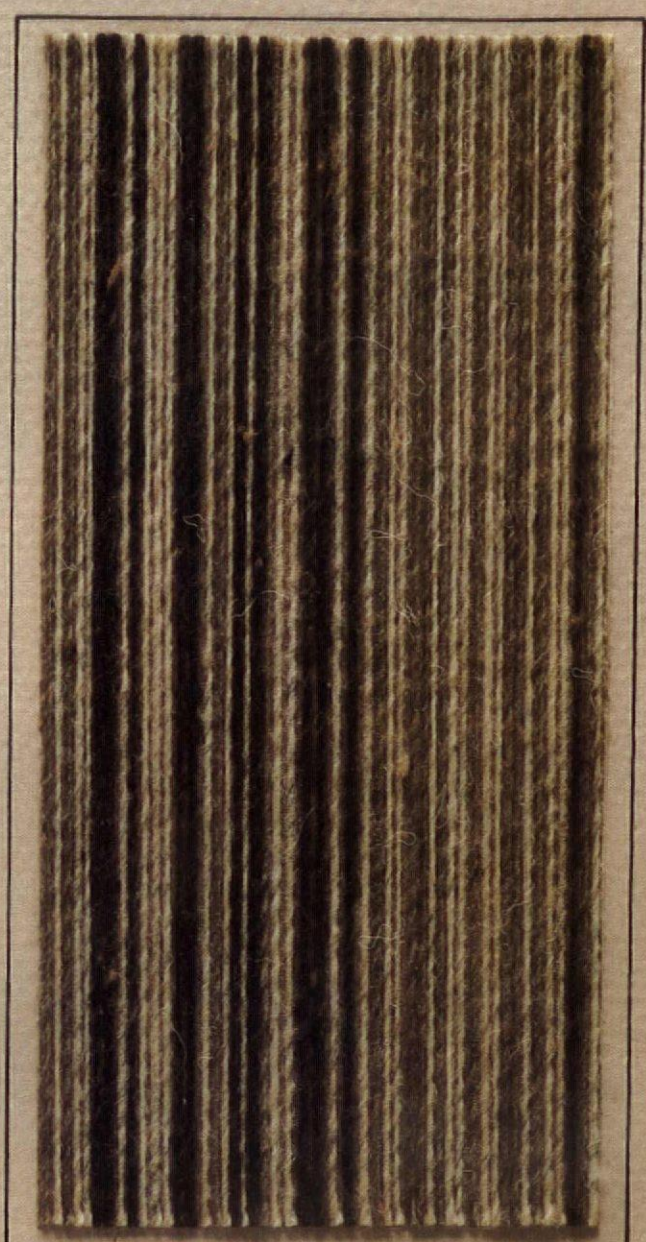


board room

News report continued from page 49

mechanical systems replaced.

Once the old bathrooms, lockers, and kitchen were taken out, the large second-floor dormitory area easily became a multipurpose room used for exhibitions, performances, and classes. The entire front end of the second floor, formerly officers' quarters, offices, and locker rooms, was easily made into a suite of offices.

As in Portland, the finished interior is suave and "designed" in a way that a fire station never would have been. But the careful attention Burks paid to what was already there reveals itself: the new rooms seem integrated with the original design of the building, and the decoration and scale are traditional rather than aggressively contemporary.

Gleason Photography

Portland interior: office retains pole, right.

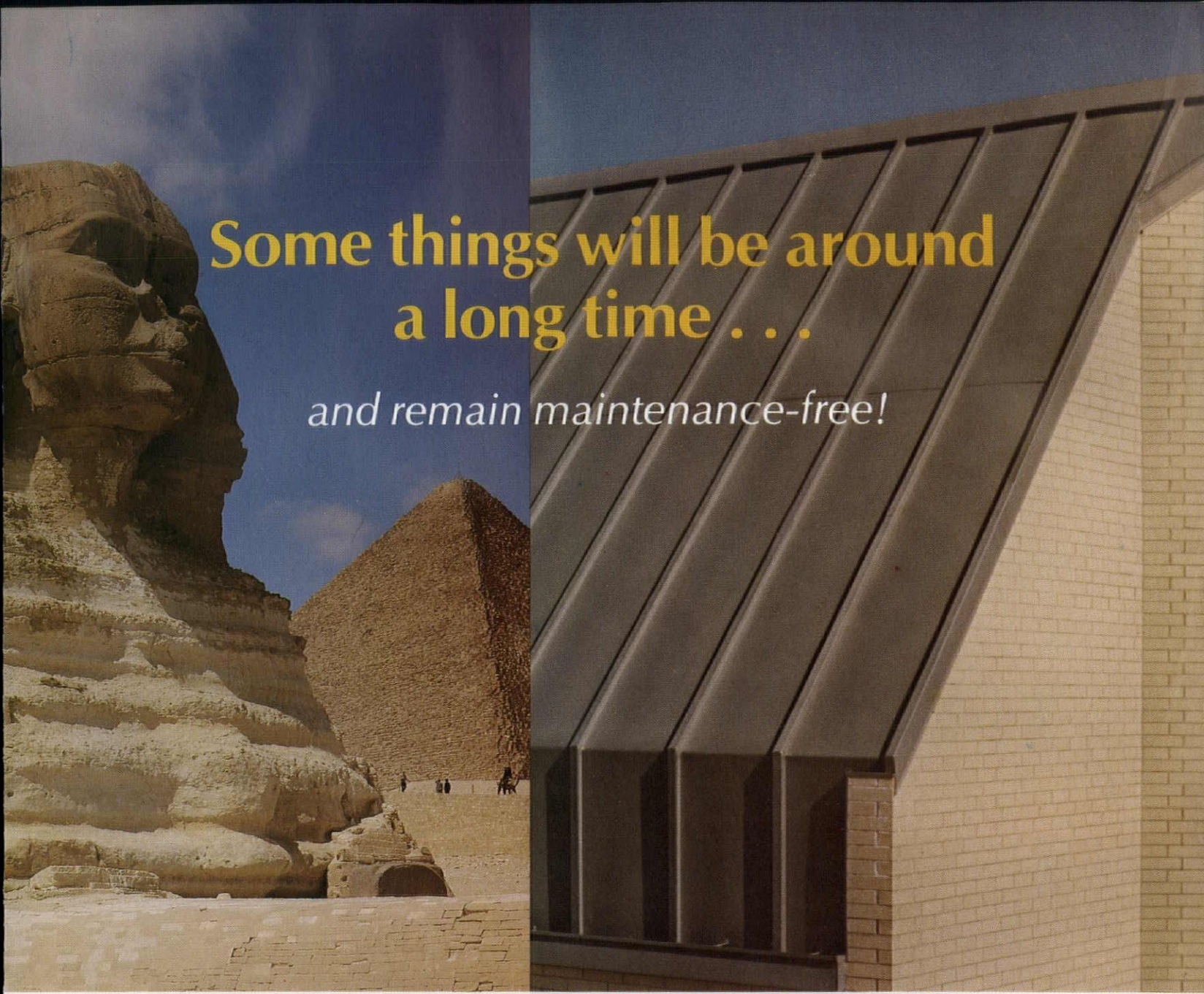
Prescott Neighborhood Center
Former Fire Station Number 9
Built 1910, William E. Harris, arch.
Decommissioned 1965
Rehab. 1976–79, Solomon, Claybaugh, Young, archs.

In the renovation of the Prescott Neighborhood Center, a number of official preservation programs were used as they are supposed to be: preservationists, city officials, and a grass-roots organization worked together to everyone's advantage.

The Grandview section of Kansas City (Ks) was built up between 1890 and World War I as a prosperous residential and commercial district. The fire station was designed in the same solid yellow brick and tile roof adaptation of Prairie style found in many of the surrounding houses, but is set apart by its tower and pseudo-Gothic trim (featuring little fireman gargoyles). In the last 40 years the neighborhood has become a tight community of lower-middle-class whites, and many of the nonresidential buildings have been boarded up. The fire station went out of service in 1965 and soon became a neighborhood eyesore.

In 1975, when Kansas City's Community Development (CD) agency received fed-

[News report continued on page 57]



National Federation of High School Associations Headquarters, Kansas City, MO., *Architect:* Kiene & Bradley Partnership, Topeka, KS., *Installation:* Kaw Roofing & Sheet Metal, Inc., Kansas City, KS.

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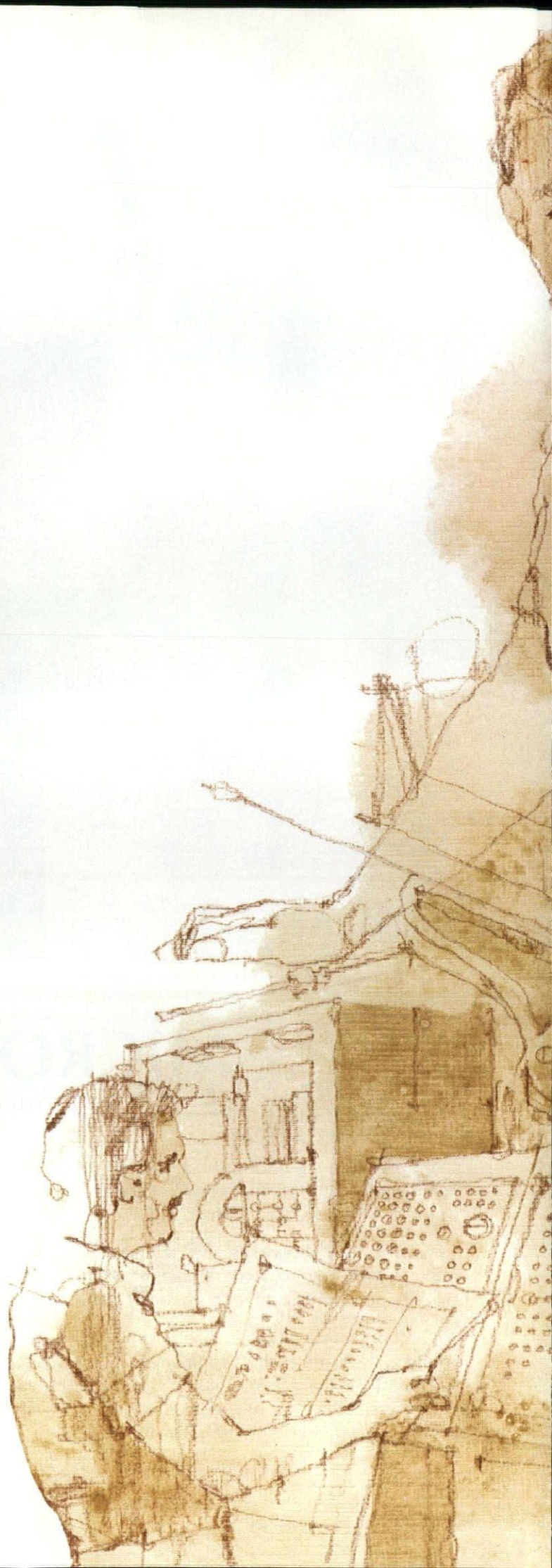

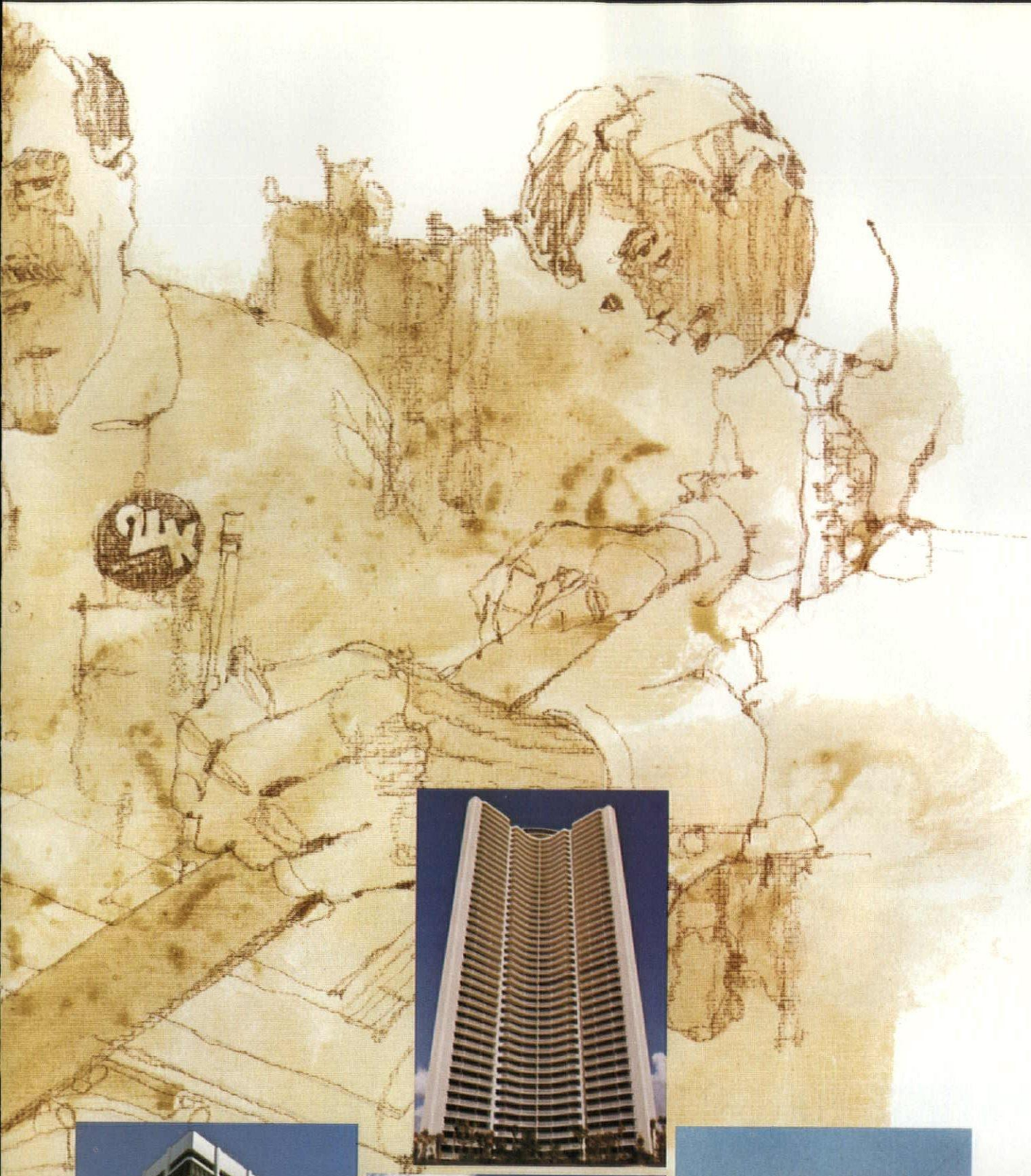

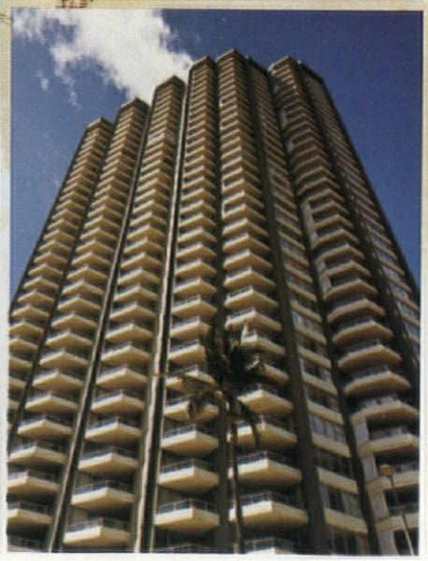

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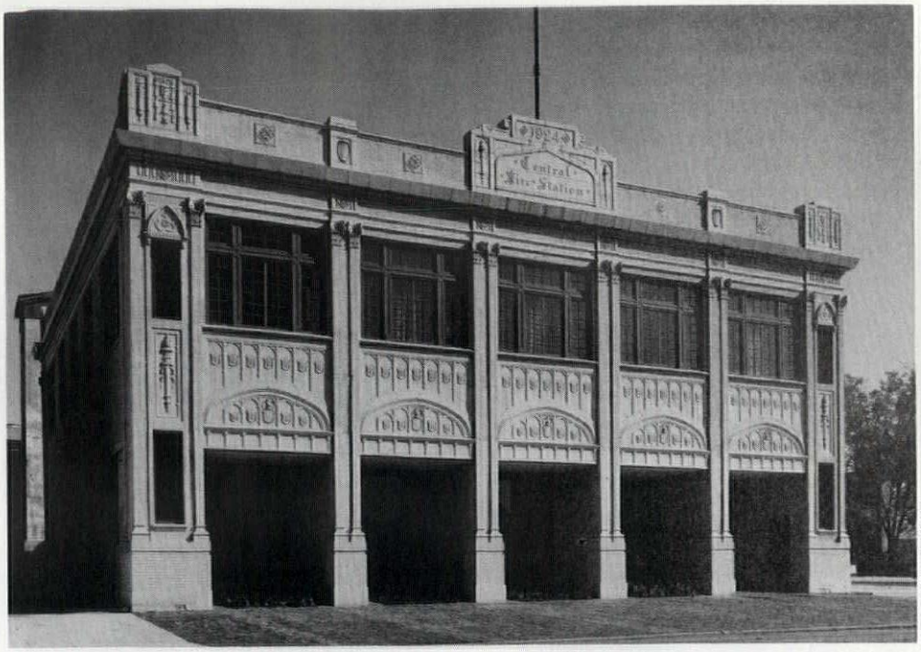
News report continued from page 52

William Burks



Gleason Photography

Baton Rouge's terra-cotta façade: above, prior to restoration; right, after façade refurbishment, including plate-glass windows replacing the old apparatus doors.

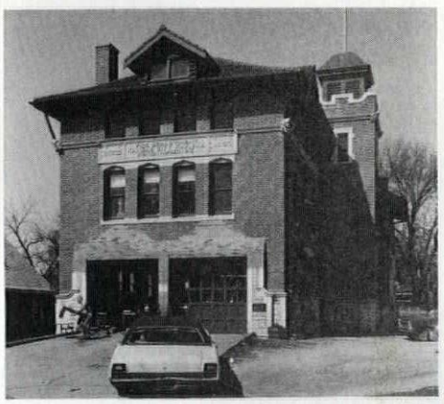
eral money to distribute to locally initiated groups for neighborhood improvement, residents founded the Prescott Neighborhood Association as a means of "creating an identity" for the neighborhood. Under CD, the city supervised and paid for the renovation of the building to be the group's headquarters and the city remains its legal owner. The work was done in three phases—exterior, interior, and landscaping—funded by CD and the Prescott Association. Total cost of the project to date has been $73,680.

Surprisingly, this low budget covered a rehab better researched and more historically accurate than that of either Portland or Baton Rouge. As in Baton Rouge, this fire station had undergone renovation in the 1950s. Working from old photographs, Larry Hancks, director of the city's CD, had architects Solomon, Claybaugh, Young of Kansas City, Mo, design new rear and side doors similar to the originals. Hopes of getting federal support to reconstruct the front apparatus doors fell this year when the building was denied a state recommendation for inclusion on the National Register on the "Catch-22" rationale that it was missing the front doors! Exterior woodwork was scraped down to determine its 1910 color, then repainted in that green. The rest of the exterior restoration consisted of standard repointing, structural strengthening, and repairs to the roof.

Inside, too, the emphasis was on restoration. The third-floor room was refinished in its original colors, but otherwise historic accuracy was achieved by omission rather than commission. The budget prohibited any major changes and besides, as Claybaugh noted, "the building didn't need changing to function as a community center." The neighborhood center accumulated furniture by buying surplus from the city and by donations.

The simplest of the three rehabilitations, this has proved to be the most versatile. The first floor, with its cement apparatus floor, has been kept as one large room. The large front doors, which still function, are usually kept open. The room serves as a community lounge or, when auditorium seating is moved to the center, as a meeting space for community groups. The kitchen and large bathroom upstairs still perform their original functions, and the old day room next to the kitchen is still used as a lounge. The large dorm room at the front of the building, lit by windows on three sides, is a classroom. The entire third floor, originally a gym, was converted to a dance studio; the basement has been put to use as a ceramics studio. Unlike the Music Center, where certain programs are inhibited by the building, this fire station should continue to be able to accommodate almost anything the Prescott Neighborhood Association can dream up.

In addition to preservation of architectural details, this rehabilitation remains true to the building's original atmosphere. Old fire stations did not have wall-to-wall carpeting or track lighting. They were, and usually still are, furnished with odds and ends. This is one of the few renovated fire stations anywhere in which the front doors have been kept as front doors. The delight of this building is that the preservationists' accuracy can be so easy to live with.



Teresa Beyer

Retaining the original doors (though federal funds for their restoration were denied), the Prescott Center in Kansas City keeps the neighborhood atmosphere of a fire station.

The building's initial appeal to the Association was not its architecture but its availability at no cost. Since that time they have come to identify with the station. The process of rehabilitation has also made the neighborhood more aware of its own architecture, fostering neighborhood identity and pride.

These three rehabs illustrate different programs for neighborhood centers and approaches to adaptive reuse. But in each case, the architects exploited the physical layout and the special character of the fire station to create places where special things happen. [Rebecca Zurier]

Ms. Zurier is working on a book on fire-station architecture based on NEH-funded research.

[News: Eleni Constantine except as noted]

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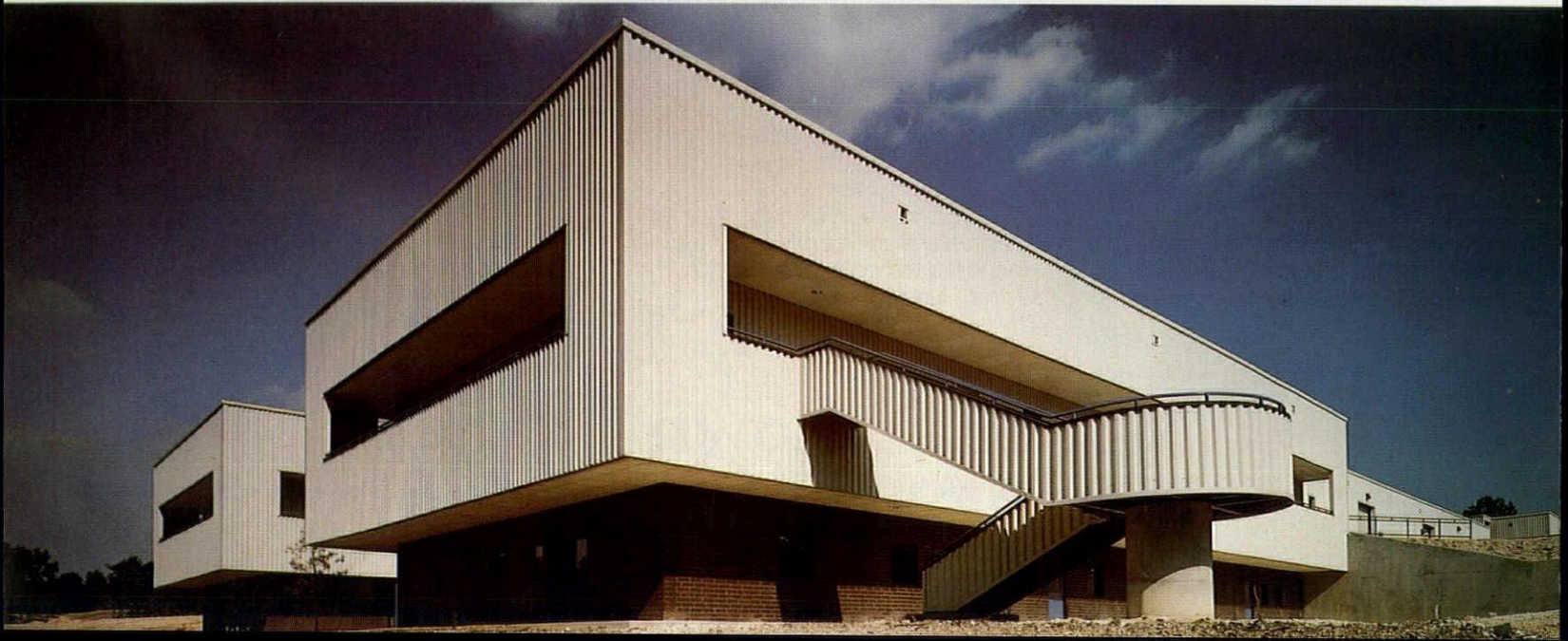

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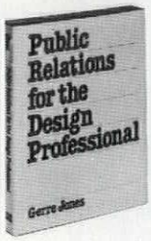

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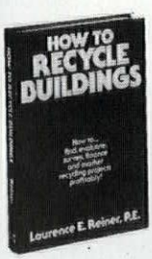

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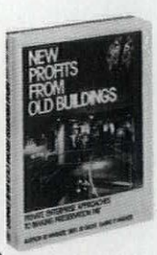

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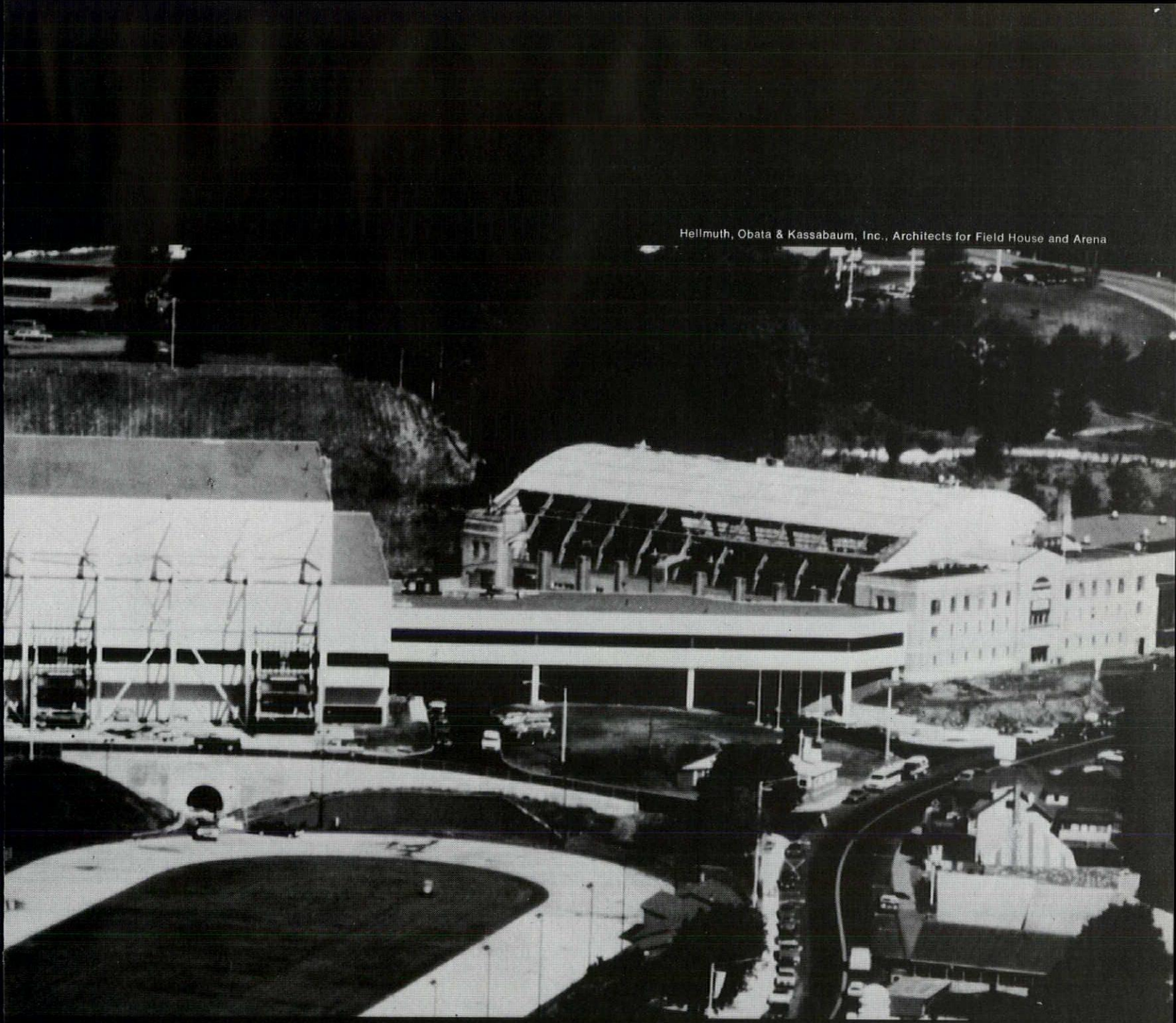

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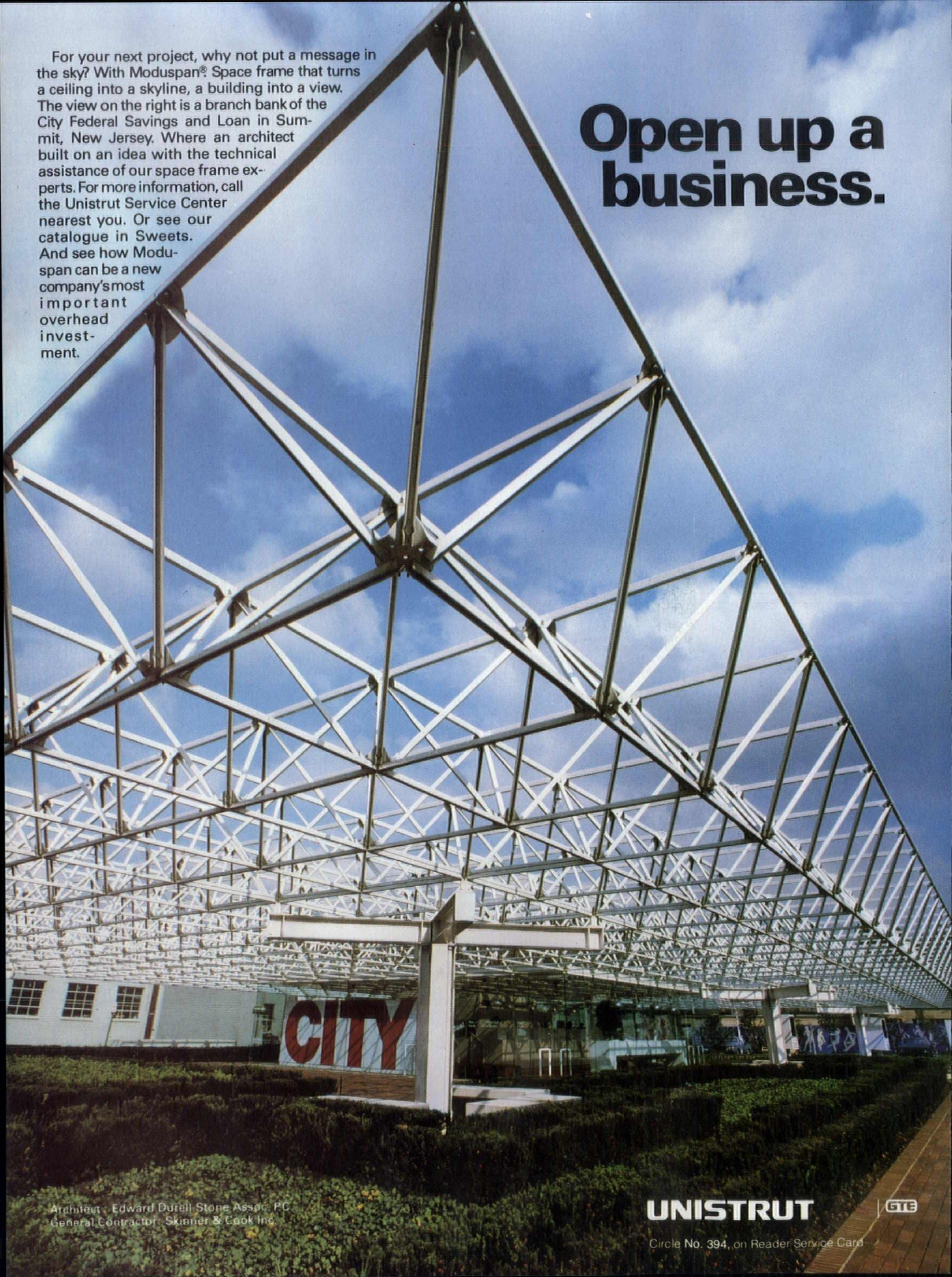

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Now you see it . . .

Tidy demolition of San Francisco's Fitzhugh Building reminded all of the slap in the face they were getting, down to the last stone. Built in the 1920s/listed on the National Register of Historic Places/demolished 1979.

Michael Nelsen

Although we continue to lose important structures, the variety of preservation effort is wider now than it has ever been.

San Francisco's Fitzhugh Building, which was the subject of the introduction to our annual preservation issue last November, is now gone. A new Saks Fifth Avenue will rise in its place. Across Union Square from the site, a similar fate may await the city's beloved City of Paris department store. Neiman-Marcus has been given permission to demolish the building, which is listed on the National Register of Historic Places, but at this writing a restraining order is preventing that action. The Foundation for San Francisco's Architectural Heritage, which fought so hard to save the Fitzhugh, has joined forces with four other preservation-minded organizations in a law suit against the city's Planning Commission. The restraining order will remain in effect until the courts decide the case, which is yet to be scheduled.

All is not lost

All is not lost, though, even in California. The National Trust for Historic Preservation held its annual meeting in San Francisco last month, and that, with its huge attendance, brought a welcome boost to conservation efforts there. Ironically, California figures into this issue of P/A rather prominently as the location of the subjects of two of our major feature articles. The California State Capitol restoration and the John F. Otto Service Center, both in Sacramento, also represent extremes of the projects shown on the following pages, each of which has been carefully selected to illustrate the extraordinarily wide diversity of activity within the preservation field.

The Otto service center, the most modest project included here, is 40 percent composed of materials from the warehouse formerly occupying its site. The Capitol, being shown here "in progress," is the largest restoration project ever undertaken in the Western Hemisphere. In the Far East, however, a much more massive effort can be seen in the preservation of China's Imperial Palace in Peking. In Bologna, Italy, a group of architects has reconstructed Le Corbusier's 1925 Pavillon de l'Esprit Nouveau, which can now be studied "in the flesh" as a seminal work of the Modern Movement. In Worcester, Ma, Mechanics Hall came close to departure, but that acoustical masterpiece has now been saved, restored, and given a very active new life.

For the preservation purist, however, the most satisfying project shown in this issue should be the one in Pittsburgh. There, the waiting room of a railway terminal has been turned into the elegant and lavish Grand Concourse Restaurant. The project is especially satisfying because the building has never been seriously endangered, it has always been decently maintained, it accepted a radical change of use with grace, and its original owners still occupy the floors upstairs. This example of the continuity of life that is possible for a building is much too rare. [David Morton]

Grand Concourse, Pittsburgh, Pa

Edwardian elegance

Roger Sherman Associates and the History & Landmarks Foundation created a restaurant masterpiece in Pittsburgh.

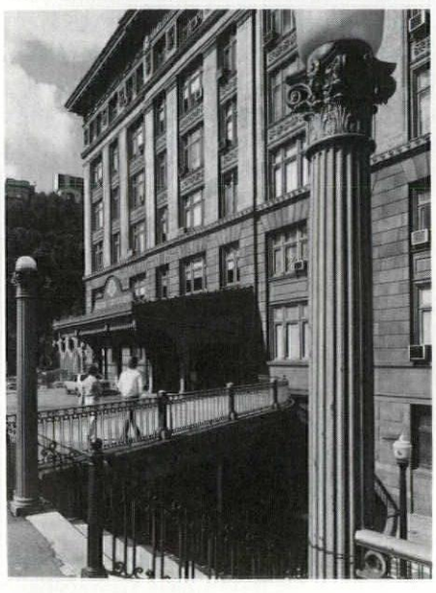
There is a unique system of landmarks conservation in Pittsburgh through which the Pittsburgh History and Landmarks Foundation, a private, nonprofit organization, leases or purchases unused or underused older properties, for which it then seeks appropriate tenants or buyers. Such was the case with the P & L E (Pittsburgh and Lake Erie) railway station—a National Register structure, designed by William George Burns in 1901, located just across the Monongahela River from the heart of Downtown.

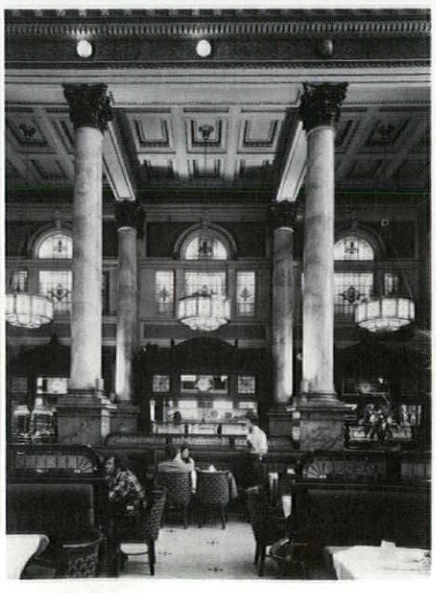
Although the railroad company still has a large and very healthy freight operation, its passenger service could no longer justify the maintenance of lavish facilities for the few travelers who used the remaining rail lines available to them. P & L E leased the concourse level of its seven-story building to the Foundation for 50 years, but retained the rest of the space for its own offices, which remained almost unaltered since the railroad company constructed the building. The Foundation invited Detroit restaurateur Charles A. Muer, who has become well known for his sensitive use of older buildings, to visit Pittsburgh to consider opening a restaurant there. After seeing the station's concourse level and the Foundation's concept planning for it, he committed himself to a 50-year lease.

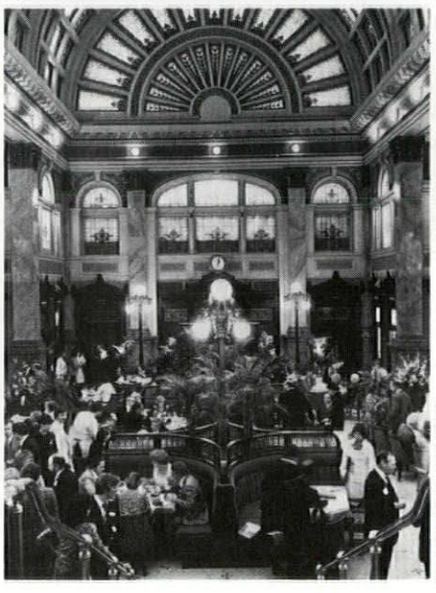
The central portion of the 24,500-sq-ft floor rises four stories to a coffered, stained-glass vaulted ceiling. It is defined at the sides by massive "marble" (marbelized plaster) columns and is enclosed at the rear by a system of arched windows topped by a huge fan window under the ceiling vault. At the front of the room, a tripartite reredos leads to a colonnaded vestibule, through which a grand staircase descends from street level into the room. The floors are surfaced with marble mosaic, and the walls, which the Foundation refurbished, are either painted, stencil-decorated, marbelized, or gilded. The room is one of the great extant examples of American Edwardian architecture, and for the most part it has remained unaltered throughout its 78-year life. It was the sort of room that would not have seemed appropriate as a place for intimate dining. But it is, and there are two major reasons why, having to do with the way in which the space has been sectioned, and the style in which it has been refurbished.

The architects have broken down the space by a system of borne-type banquettes forming a series of intimate dining areas that together seat a total of 172 patrons. Where necessary, such as in the middle of the room and in some other places, these areas have been given added privacy by extending the back rests with leaded, etched glass and wood-frame galleries. Each area is further individualized through the placement of tall light standards and high, living plants at its center. It is not just the physical configuration of these elements that makes them so successful though; the style of their design is equally important to the ambience of elegance, intimacy, and warmth that has been created. Because few of the original furniture or lighting fixtures remained in

The P & L E railway terminal pedestrian concourse has been turned into a restaurant complex of five dining rooms and three bars seating 500.







Roger Sherman Associates

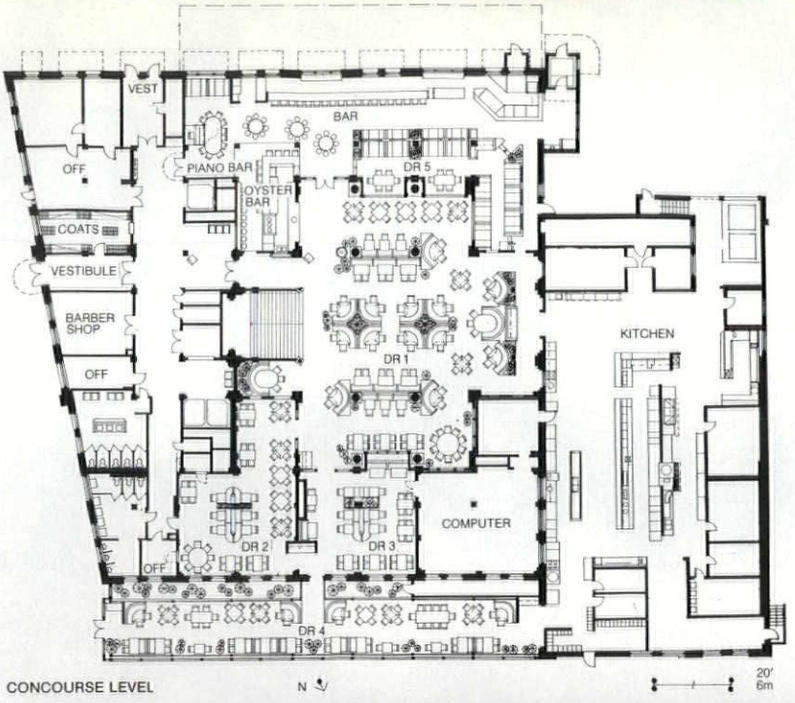
Grand Concourse

any of the public portions of the building, these pieces had to be recreated. Here the architects had a choice: they could either "adapt to contemporary use," as is often the case today, or they could recreate an authentic Edwardian interior. The fact that they chose the latter is a major—perhaps *the* major—key to the restaurant's success. As one group of patrons, who had strolled across the bridge from Downtown, said, "We love this place because it doesn't look as if it's been restored; you feel good when you walk in, and comfortable the whole time you're here."

In this main room and throughout the rest of the floor, where there are four more dining rooms, an oyster bar, a piano bar, and a normal bar, the architects designed and had built, or were able to buy from catalogs and adapt, the furniture and lighting, all of which is authentic to the period of the building. The leaded glass chandeliers and fixtures, the borne seating and other settees, the white marble-topped bars and other inlaid-marble table tops were designed in the architect's office. The 19th-Century light standards are reproductions that had to be adapted for custom installation, but most of the dining chairs and bar stools, which are authentic for the period, are readily available pieces that have been in continuous production since around the turn of the century.

The only parts of the restaurant that are not almost complete inventions are the main dining room, and the small dining rooms numbered two and three, in an area which was the original Ladies Waiting Room. Those spaces were lavishly painted, decorated, and detailed, and needed little more than a good washing, some repair, and refurnishing. The other spaces, though, were a different story. The glass-enclosed garden terrace on the side of the building facing the river and Downtown was originally only a roofed walkway facing the train tracks. The bars and dining room five were formerly the ticketing and railway offices, a room for the safe, and baggage storage. Everything in them now is new.

There is a consistency to the Grand Concourse that never lets one down; you never turn a corner or walk into a room and think, "Oh, they blew it here." When it comes time to go to the bathroom, you walk in, and all of a sudden the shock comes. The shock is not that it isn't done right, but that it is. You have come into an authentic 19th-Century bathroom complete to the last detail of white octagonal tile flooring, pedestal sinks, painted wainscoting, and louvered doors on the stalls. This was not necessary, and certainly not expected. But it is representative of a level of sensitivity and commitment to a job that is almost never experienced. It is that concern, which is manifest throughout the project, that makes the Grand Concourse one of the most important examples of adaptive reuse to be seen today. There is something else, though, that further enhances the importance of this endeavor, and that is that the P & L E railroad company continues to occupy the rest of the building, and will be in it at least for the next 50 years with a tenant who joins them in working for its future. [David Morton]



A former canopied walkway facing the river and downtown is now the terrace dining room #4.

Data

Project: Grand Concourse Restaurant and Gandy Dancer Saloon, Pittsburgh, Pa.
Architects: Pittsburgh History and Landmarks Foundation, concept planning; Roger Sherman Assocs., Dearborn, Mi, interior design; Roger Sherman, Joy Noteboom, designers; Ian Brownlie, project architect.
Original architect: William George Burns.
Program: conversion of 24,457-sq-ft concourse level of P & L E railroad terminal into a restaurant of five dining rooms and three bars.
Major materials: period lighting, furniture, furnishings, and fabrics; new kitchen added in existing train shed at rear of building (see Building materials, p. 142).
Consultants: Gussow & Dean, mechanical; C.E. Pohl Assocs., logo and menu design; C.A. Muer Corp. and Goldstar Products, kitchen.
Client: C.A. Muer Corp., Detroit, Mi.
Cost: $2,500,000, including fees, construction, furnishings, kitchen equipment.
Photography: ARTOG/D.G. Olshavsky, unless otherwise noted.

Roger Sherman Associates

Dining room #2 (above) uses original benches in what was the Ladies Waiting Room; the bars (above right, below) are completely new creations.

Pavillon de l'Esprit Nouveau, Bologna, Italy

Reconstructing a postulation

Jon Michael Schwarting

An exploration into the development of an architect's polemic, the Pavillon de l'Esprit Nouveau appeared only briefly in Paris in 1925. Now, however, it has been reconstructed and provides us with a more profound understanding of concepts behind Modern architecture.

In 1925 the committee for the 1925 Decorative Arts exhibition in Paris looked at Le Corbusier's Pavillon de l'Esprit Nouveau and expressed the opinion that "there was no architecture" in the project. The pavilion was built, but the committee erected a six-meter-high wall to conceal it. Only minutes before the opening was the wall removed through the intervention of the Minister of Fine Arts.

Because the Pavillon was quickly dismantled after the exposition, this building has escaped careful examination as a canonical work of Modern architecture. It has been viewed more as an idea than as built form. But Le Corbusier's ideas were always very closely related to physical manifestation, and now that we can experience it, its position in any discussion of the formal, cultural, and social structure of early Modern architecture cannot be avoided.

The Pavillon has often been viewed as one of those more pedantic exercises of Corbusier's when compared to the more complex and "loaded" houses that were built at about the same time around Paris. It seems upon more careful examination, however, that it was one of Le Corbusier's more important statements, if not for its effect on the directions of theory at the time, then on his own work for 20 years following its construction.

Author: Jon Michael Schwarting is a partner with Design Collaborative architects in New York City and teaches architecture at Columbia University and Cooper Union.

Recent resuscitation

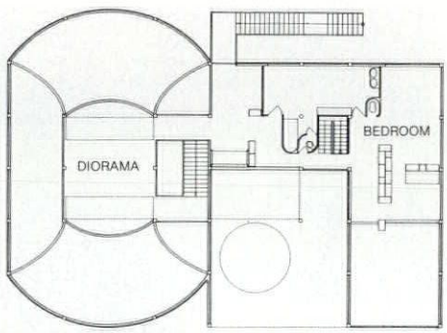
In 1977 the Pavillon de l'Esprit Nouveau was rebuilt adjacent to the Museum of Modern Art in the International Exposition grounds of Bologna, Italy as part of the industrial building fair, SAIE '77. An idea initiated by Parametro, the architecture and planning magazine located in Bologna, it was supported by a consortium of producers and made possible through careful research into the architectural drawings of the Fondation Le Corbusier in Paris.

The Pavillon's location in the fair grounds in Bologna actually is quite appropriate to its original intent, for the Fiere di Bologna is located outside the city in a planned workers quarters. Since the 1920s, with the growing popularity of Gramscian communism, Bologna has developed a very progressive municipal and provincial administration. This has had its effect on architecture and planning through numerous experiments, including public participation in programming and design. Given this framework, it is not surprising that a seminal and didactic work by one of the most prophetic architects of the 20th Century was rebuilt in Bologna as a free museum to perpetuate an ongoing search into architectural issues, not a nostalgic recapturing of the past.

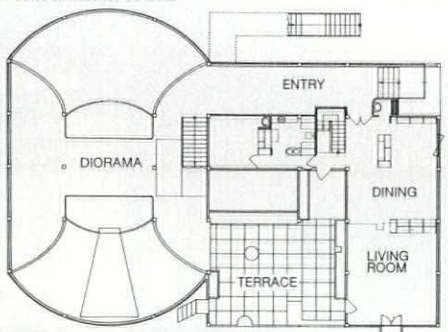
1925 context

The original 1925 building by Corbusier was surrounded by heavily ornamented and richly decorated Art Deco pavilions. The exhibition covered a wide field of contemporary, industrial, and decorative arts that were to show "originality, fulfill a practical need, and express a modern inspiration," as one observer wrote at the time.

In counterpoint to the richness of the Art Deco exhibits, Le Corbusier proposed different means to fulfill the definition of the exhibition, through "equipment" rather than decorative furnishings. The Pavillon actually was not a pavilion in the ordinary



PLAN SECOND LEVEL

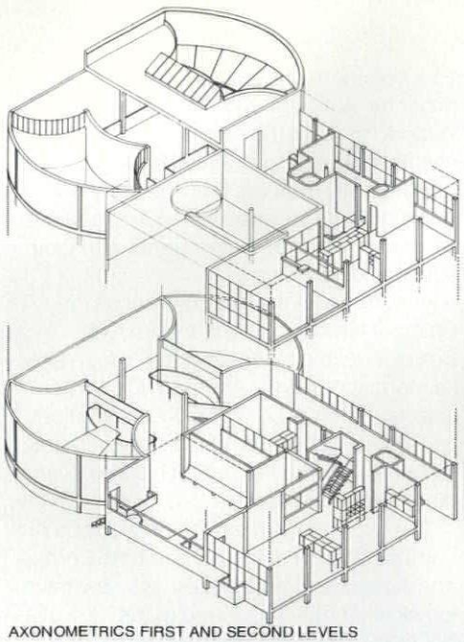


PLAN FIRST LEVEL

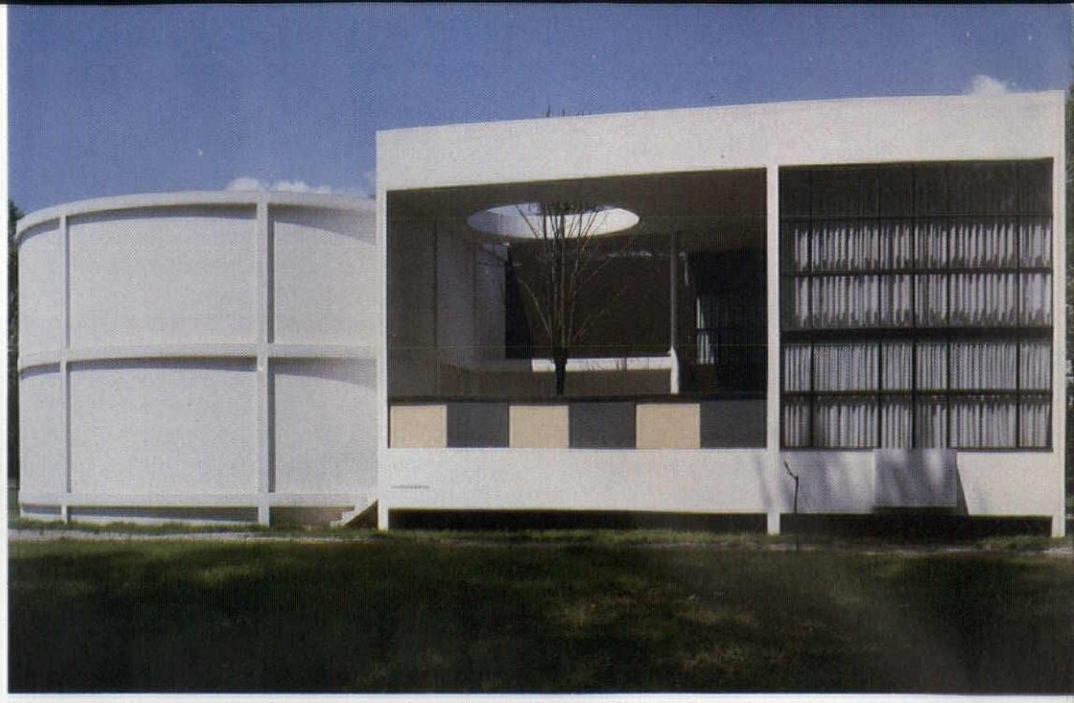
sense, but rather a "model-unit" of his "Immeubles-Villas" apartment building project. An attached exhibit space on the Pavillon, bound by curved walls containing diorama perspectives, demonstrated Corbusier's vision of the future city that was to contain these apartment blocks.

Experiential aspects

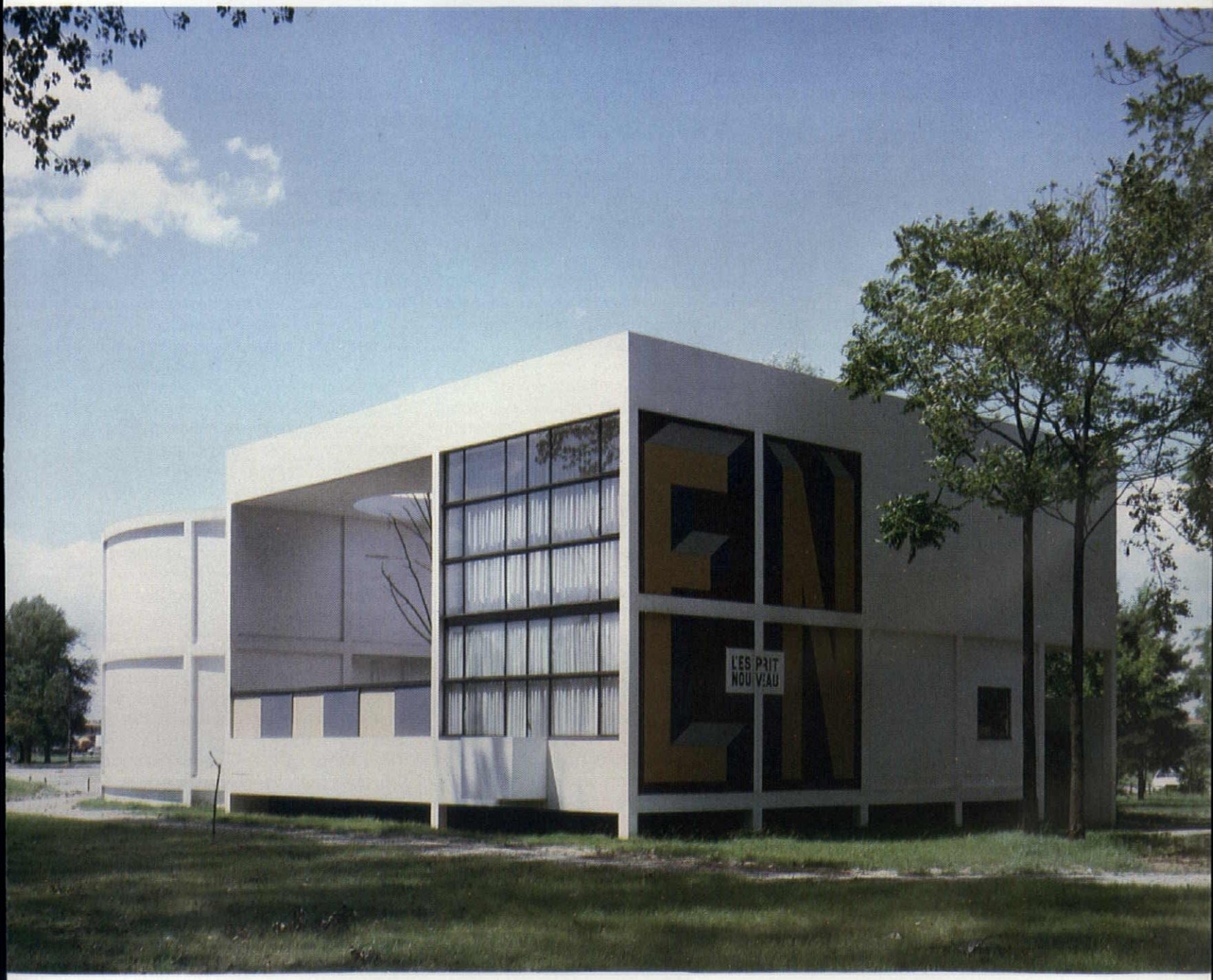
The two-bedroom unit in the 1925 Pavillon was spacious, with an interior floor area of 2200 sq ft and a terrace of 700 sq ft—larger than the three-bedroom, 1850-sq-ft proposal of 1922. Even though the individual areas or rooms themselves are not large, the sense of spaciousness is heightened by the sequence of movement, vista, and surprise. Upon entry into the unit, one views the full length of the apartment and looks through a grid of mullions in a large glass wall to the natural land-



AXONOMETRICS FIRST AND SECOND LEVELS



Diorama and house pavilion (above), elevation with entry foyer and mural (below).



scape outside. The foyer, located in a corner of the double-square public space, is articulated—like the library, dining, and living spaces—as a specific entity by careful disposition of two cabinets. Both the whole and the parts can be read simultaneously in this free plan. The double-height space gives grandeur to the living area while the balcony ceiling creates intimate adjoining spaces. There is seemingly a contradictory sense of compression and expansion in these spaces.

A more intriguing contradiction is provided by the wall between the living room and terrace. Although one cannot visually apprehend both simultaneously because they are double-height volumes, they are cognitively linked through memory. This is conceptually as strong as the perceptual interplay in the living and dining rooms or in the boudoir. The witholding of the terrace from view, except for a few carefully located windows in this solid black wall forming an "L" in the middle of the plan, causes the terrace to have a conscious rather than a visual presence. Surfaces and walls are molded by color, sometimes subtle and delicate, sometimes bold. The blue balcony ceiling, the blue and black walls, and object shapes of coral, yellow, and blue with the yellow cabinets are essential to the character of the spatial experience. The frame construction is exposed and articulated by making the infill thinner and flush on one or the other side. The recesses are usually painted; the frame and infill further modify the spatial readings. The painting of l'Esprit Nouveau on the entry side of the unit functions as a sign of the system as well as the intention.

Theme and variation

Le Corbusier so strictly followed a few self-evolved and self-imposed principles through all his life, such as the "Five Points," that the development of the Pavillon or Immeubles-Villas project of 1922 to which the Pavillon is directly related, is easy to trace. The Maison Domino or frame diagram of 1915 and the Maison Citrohan bearing or party wall scheme of 1920 merge in the 1922 Immeubles-Villas project of mass-produced units raised off the ground and inserted into a frame forming an urban block. The Pavillon was intended as a symbol of this social solution set on blocks, so as not to touch the ground, and then (literally) filled with propaganda about its implied use.

In looking at the numerous multiple-dwelling and urban or suburban housing projects in the first volume of the *Oeuvre Complete* (1910–1929), one can easily observe the deep concern for housing and social problems as they relate to architecture. Le Corbusier continued this polemical social argument for the remainder of his career, finally realizing it in the less socially polemical and more compromised form of the Unité apartment blocks of the 1940s and 1950s.

As opposed to the German and Russian studies for minimum dwelling, Corbusier's statements and schemes always implied that society should strive to provide the highest artistic and scientific conditions possible. This proposition does assume an adequate political system, an area Corbusier never really investigated.

The development of elements like the free plan, the double-height living room duplexes, and the incorporation of large terraces into a dwelling unit not accessible immediately to the ground, were all statements about the kind of minimum existence dwelling that the 20th-Century technology could provide.

If we are to agree with Colin Rowe that the most important new development in Modern architecture was the free plan, we can see that this formal and technological proposition is inextricably related to a solution to social change. The free plan allows greater conception and perception of the whole container (or infinity as in the case of Mies), as well as the individual spaces. The plan permitted an acceptance of multiple uses of space rather than only one. With the historical change from designing upper-class villas to middle-class dwellings and finally to lower-class shelter, the space-making techniques had changed by the early 20th Century.

The major houses produced in the five years succeeding the Pavillon de l'Espirit Nouveau must be more closely examined in relation to the Pavillon and its argument. Most of the means for manipulating space prevalent in Corbusier's other houses—layered space, transparent readings of the free plan, the grid as an abstract frame containing objects or free forms, in other words, issues revolving around conceptual reality versus physical reality—are explored in this unit.

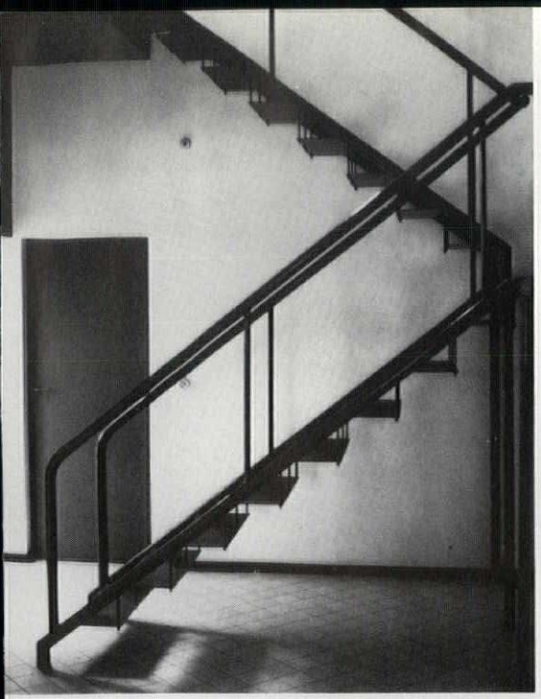
The abstract grid so simply stated in Maison Citrohan and the Immeubles-Villas projects provides a basis (like the Domino frame and the "Five Points" from which later house designs are extrapolated). In this "tartan grid" theme, Corbusier often divides a fundamental square, or adds other squares and/or golden rectangles to create a mathematical organization with a sense of overlap or displacement and a tension of fracturing similar to Palladio's. Villa Meyer, Maison Cook, Villa Stein and Savoye all have basic quadrant divisions. More or less literally each creates an open space in one quadrant. (Meyer and Garches are nearly literal copies of the Pavillon.) And assisted by pilotis, they appear independent of the ground and serve as a comment or question about private property. Although the later houses, developed to meet the needs of particular clients and particular sites, are more complex formally than the Pavillon, they are best understood when measured against Corbusier's earlier experiments with their social underpinnings.

And thus with this reconstruction in Bologna we can understand Le Corbusier's development and motivation a little more accurately. Although Corbusier was never overtly or consciously political, he worked with a strong insistent humanistic philosophy as the root of his formal and technical production.

The original 1925 exhibition was one of a number of such exhibitions in both Europe and America. Unfortunately, we now have to ask what has happened to the idea of a housing exhibition. The problem of the need for quality in public housing has not disappeared; only the possibility of active government sponsorship seems to have diminished. Building on the positive concerns of Modernism is an appropriate direction for "Post-Modern" architects to pursue. Somehow it seemed the Pavillon de l'Esprit Nouveau was asking this question, besides demanding careful examination of it as a strangely unfulfilled prophecy. Resurrecting the Barcelona Pavilion would not have meant as much. □

Data

Project: Pavillon de l'Esprit Nouveau, Bologna, Italy (reconstruction).
Architect: Le Corbusier designed it in 1925 for the International Exposition of Decorative Arts in Paris. Reconstruction efforts were spearheaded by Parametro magazine and its editors, Giorgio Trebbi and Giuliano Gresleri, assisted by Fondation Le Corbusier of Paris (which provided drawings and information) and aided by a group of architects led by Andre Wogensky.
Construction: Grandi Lavori S.P.A.
Site: adjacent to Museum of Modern Art on the International exposition grounds of Bologna.
Program: reconstruct pavilion for industrial building fair, 1977 (Salone Internazionale dell Industrializzazione Edilizia).
Structure and materials: original pavilion was reinforced-concrete frame with Solomite infill panels—a prefabricated panel of straw and sprayed cement which was plastered on the surface. Unfortunately it proved technically vulnerable. The new pavilion has a steel frame with concrete panels that were precast on the site.
Clients: project supported by the fair itself, Ente Autonomo per le Fiere di Bologna; plus a consortium of producers, the Cooperative di Produzione e Lavoro di Bologna; an industrial organization, the Sviluppo Edilizia Coordinata; and the Commune di Bologna.
Photographs: David Morton, p. 71; Atelier International (representing Cassina), p. 73 top and bottom left; and Jon Michael Schwarting, p. 73 bottom right.



Stair by entry (above left), conference room over diorama space (above right), and diorama (below left), living room window wall (below right).

Restoring and rehabilitation:

The Imperial Palace

Adele Chatfield-Taylor

As new construction begins in China, a concern about preserving a heritage, monumental and vernacular, mounts. The Women's China Study Group has prepared two articles on the issues.

Perhaps more than any other city in the world, Peking is the city under the microscope at the moment. Many pressures of change are being brought to bear there, now that China is open, and this city is its gateway: they include the need to build a capital from which to govern the 25 percent of the earth's population that occupies China; the demand to increase, improve and centralize services; and the hope to raise the standard of living. Underneath it all is the desire to do away with some of the old and introduce the new, to make Peking a major modern city.

At the same time, there are clear signs that Peking has been the capital of the world's oldest civilization. Although some evidence of this fact has vanished since the revolution of 1949, much of it still remains, and because of the tension between the old and the new, between the traditional and the revolutionary, Peking is at this moment a historic preservationist's paradise. Of all the cities and towns in China, this is the most appropriate place to ask the question: When the oldest civilization in history suddenly becomes the newest civilization in history, what do you elect to keep?

It is a surprise to many foreigners that historic preservation goes on in modern China. Believing that all evidence of the former regimes would be erased, they are amazed to learn that even buildings built during the most extreme oppression are painstakingly preserved. But they learn that the buildings are preserved not because those eras are revered, but because the ingenuity of the builders is.

The symbol of traditional China, and something the Chinese have definitely decided to keep, is Peking's Imperial Palace, also known as the Palace Museum, the Forbidden City, the Gu gong or the Old Palace. Although China has many buildings of greater age than those in the Imperial Palace, this 550-year-old, 7,750,000-sq-ft, 9000-room collection is the largest, grandest, and most important complex of historic buildings surviving in China. With its 35-ft enclosing walls and 162-ft moat surrounding, the complex has arrived unscathed at the 20th Century and its future seems secure for years to come.

The Palace Museum has stood on more or less the same site since building began in 1403, when the Third Ming Emperor decided to establish the capital of the Empire at Peking. The outlines of the original plan and parts of some of the original buildings survive, although the palaces were rebuilt and rearranged during the 24 reigns that followed the first occupant. Most of the present buildings date from the 1700s.

Four towers stand at the corners of the complex. They were once higher than any other buildings in the city, and they still overshadow much of modern Peking. Their glazed tile roofs signal their importance; the massive surrounding walls remind the observer that for centuries the palace grounds were forbidden to the public.

The buildings, most of which are two stories, are classic examples of traditional Chinese architecture. The ingredients are simple, but resplendent in their simplicity. Composed of essentially three elements —a stone or brick base, vertical wooden columns, and a wooden and tile roof— the buildings are characterized by lightness, symmetry, and a regard for straight lines. The buildings lie on a north/south axis and are arranged around courtyards.

They cannot be viewed as solitary objects but as part of the context in which they are built. They belong to the landscape the way the yin belongs to the yang. Besides the vivid reds, yellows, and whites that predominate in the color schemes of the buildings themselves, the bright blue sky, the green trees, and the stone plazas are part of the color composition of the whole. The proportions of the spaces between buildings, the echoes of the rooflines one after another, and the secret unveiling of the courtyards all act as ingredients in the design.

Style and ritual

Like so much of Chinese culture, traditional architecture is characterized not only by fixed stylistic considerations, but also by use patterns that are easy to perceive in principle, although astoundingly complex in practice.

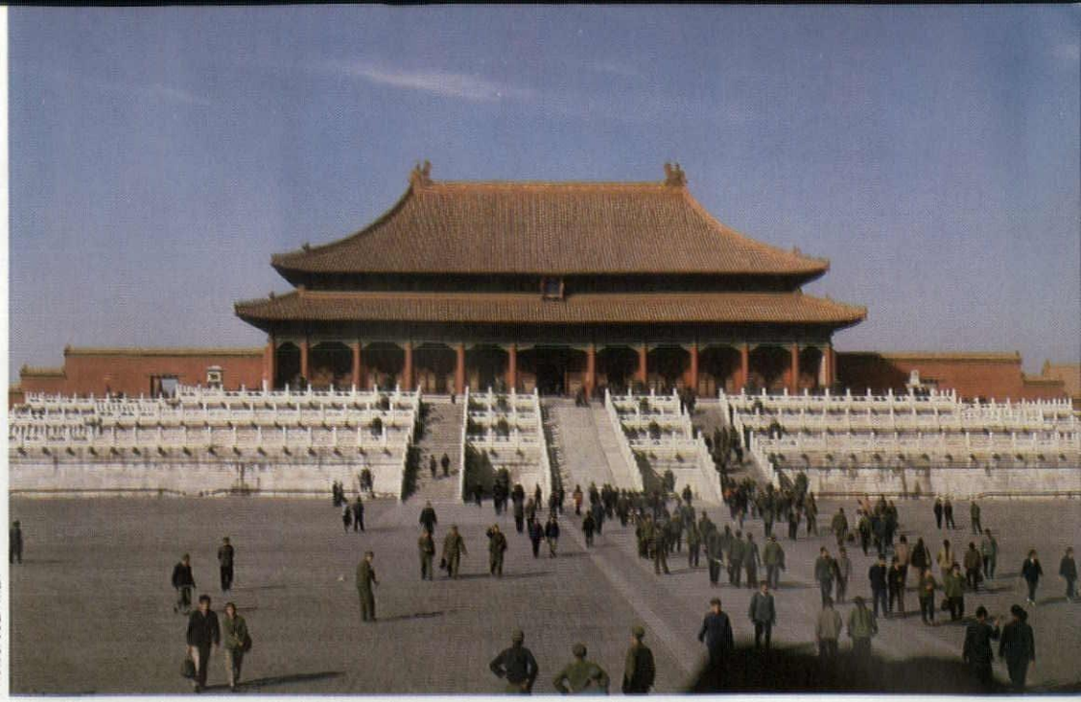
The Palace enclave consists of two sections. The first segment comprises the ceremonial buildings for official state occasions, including the three great halls: the Hall of Supreme Harmony (throne room), the Hall of Perfect Harmony (antechamber) and the Hall of Preserving Harmony (reception hall). The platforms on which the buildings sit—some of them multitiered—have hierarchical significance. The higher the attending official, the higher the tier on which he stood. The second section is the Inner Sanctum, or the living quarters for the Imperial Family, the Forbidden City proper, to which entry was restricted.

Auxiliary palace structures surround these two major centers within the walls of the 250-acre site. They have names like the "Gate of Culture and Character," the "Palace of Peace and Longevity," the "Palace of the Culture of the Mind," the "Palace of Abstinence," and, unforgettably, for the Empress, the secondary wives and widows, the "Palace of Accumulated Elegance."

For centuries, the Imperial Palace was in the heart of a self-sufficient compound, six times larger, called the Imperial City. The outer complex housed the guilds that

worked on the upkeep of the Palace, the stonemasons, bricklayers, painters, and carpenters, as well as the suppliers and administrative bodies that supervised the craftsmen.

When the Empire fell in the early part of the 20th Century, the outer walls of the Imperial City "seriously inconvenienced east/west communications" and so the north, east, and west ones were destroyed. The palace now stands alone at the north end of Tien-an-men Square, the largest assembly plaza in the world and the symbol of the revolution that brought about the People's Republic of China in 1949. Elsewhere around the Square are huge modern monuments, most notably the Great Hall of the People and the Mao Tse-tung Memorial Hall. But the integrity of the serene achievement of the Imperial Palace seems undisturbed, and even well protected.



Photos: Jean Mah

Hall of Supreme Harmony at Forbidden City, now known as the Palace Museum.

Preserving the Palace

Major rehabilitation and restoration have gone on continuously since the 15th Century, soon after the buildings were started. War, arson, and Imperial conceit brought about constant construction and revision in the architecture. Just after 1900, when the Imperial regime began to disintegrate, some of the outer buildings were opened to the public, and the living quarters of the palace dwindled into the service of a more ordinary domestic life (albeit still for the Imperial family). The last official use of the royal buildings occurred in 1922. Various other members of the Imperial family stayed on until the late 1920s in some of the buildings. But their homes were not subject to the lavish expenditures that they had been. In fact, the buildings began to be neglected and run-down, and for 40 years there was almost no maintenance or preservation whatsoever.

In the 1950s, restoration and preservation of the Imperial Palace began under the auspices of the People's Republic of China, and for the last 20 years the buildings have been the centerpiece of historic preservation efforts for the whole country.

No longer the self-sufficient entity that it once was, with a whole city to keep it going, the Palace Museum now has what is called a maintenance team that restores and maintains the hundreds of buildings in sequence. The older craftsmen train young apprentices on the job. Like a great cathedral, the complex will never be in pristine condition all at the same time, and preservation will be an ongoing activity even after the major restoration has been completed. The preservation activity itself is an interesting attraction to the more than 13,000 visitors—both Chinese and foreigners—that visit the Imperial Palaces every year.

In terms of building activity in the past, the complex is finished now, and because

there are no major additions and "improvements," the preservation program is geared to maintaining what is there.

The first priority of preservation is maintenance. Structural elements are replaced only when absolutely necessary. First, mechanical means are used to stabilize deteriorated conditions, using angle irons, screws, or other metal reinforcements on the wood or tile. Sometimes chemicals are injected. Every method is employed to avoid replacement of architectural elements, according to Palace Museum preservation officials.

Whenever possible, maintenance procedures are exactly those of the original architects and builders. Sometimes procedures are adapted from the original methods or materials, as is the case with some of the exterior painting. Most buildings are painted every ten years. Originally, ground-up minerals were used for pigment, whereas now longer-lasting chemically based paints are considered by museum officials to be an acceptable substitution in some cases.

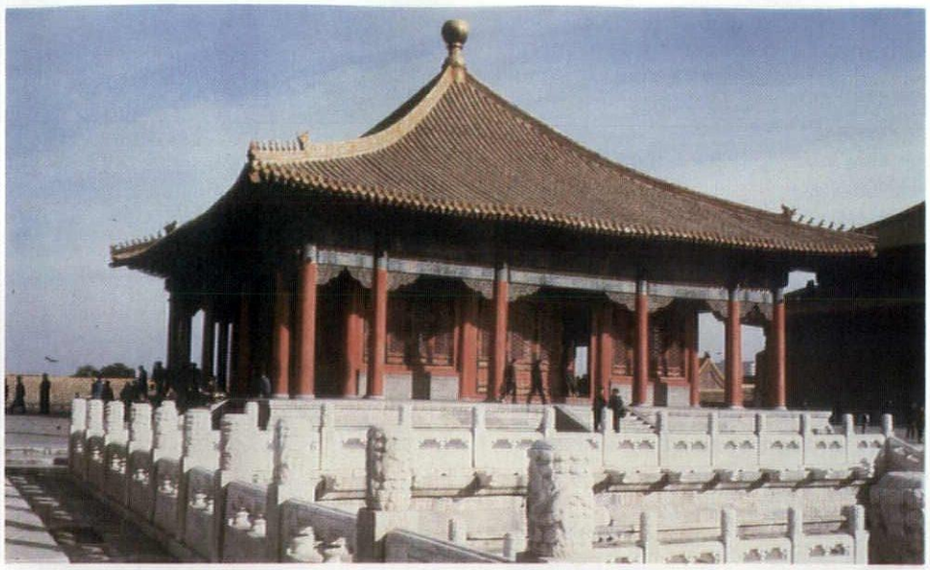
But the painting procedure is an exception. Whenever replacement is necessary, new materials are almost always the same as the originals. Silks to reupholster the Dowager Empress's throne were taken from the bolts of material that were woven for it in the *first* instance. In many other cases either the old material can be obtained easily or a new version can be manufactured to match the old exactly.

Records are kept of all work and replacements, for posterity and for ease of identifying facsimilies or substitutes. The Research Institute makes surveys and photographic drawings of indigenous architecture, as well as these classic traditional buildings. They recognize that documentation is important to the study of architectural design and shows how a building type adapts to indigenous materials and building methods.

Guiding the process

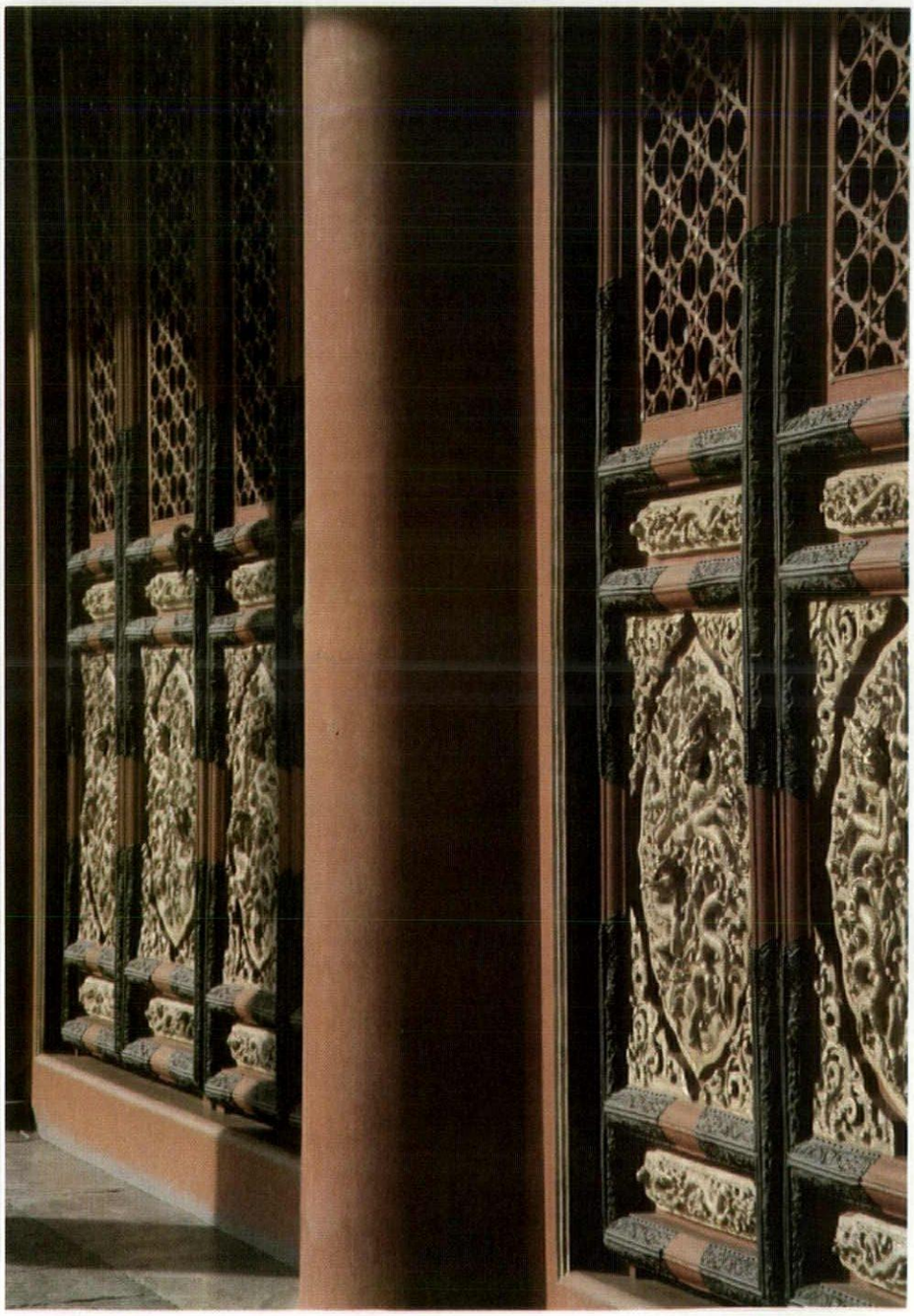
The Chinese approach the Imperial Palaces as a historic preservation problem the same way they do any serious administrative matter, and that is to say they entrust it to the old people. The Chinese believe that age and experience bring wisdom and understanding, so those in charge of the restoration and preservation are those who have lived with the buildings a long time.

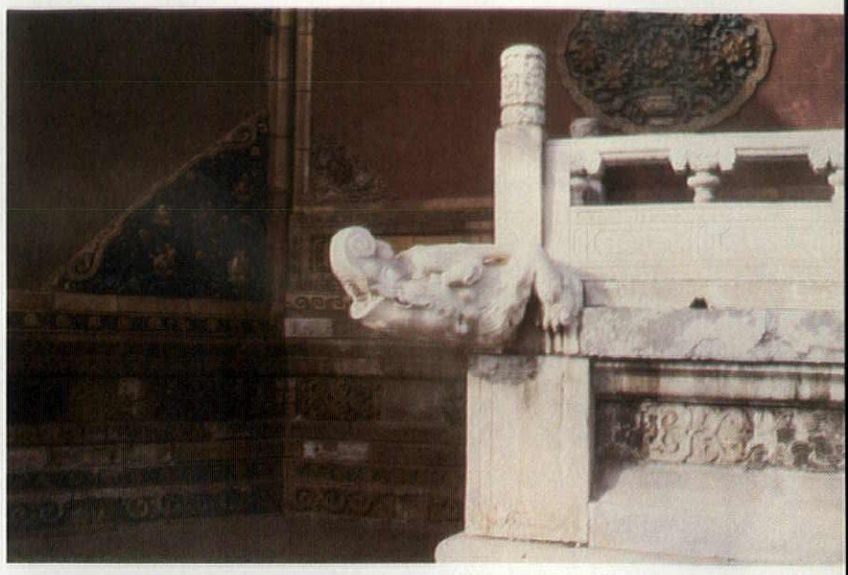
Until recently, Mr. Shan Shi-yuan was curator of the Palace Museum. He is an expert in ancient Chinese architecture and Director of Research at the Peking Institute. An elderly gentleman, and thus a very esteemed person, Mr. Shan has seen the



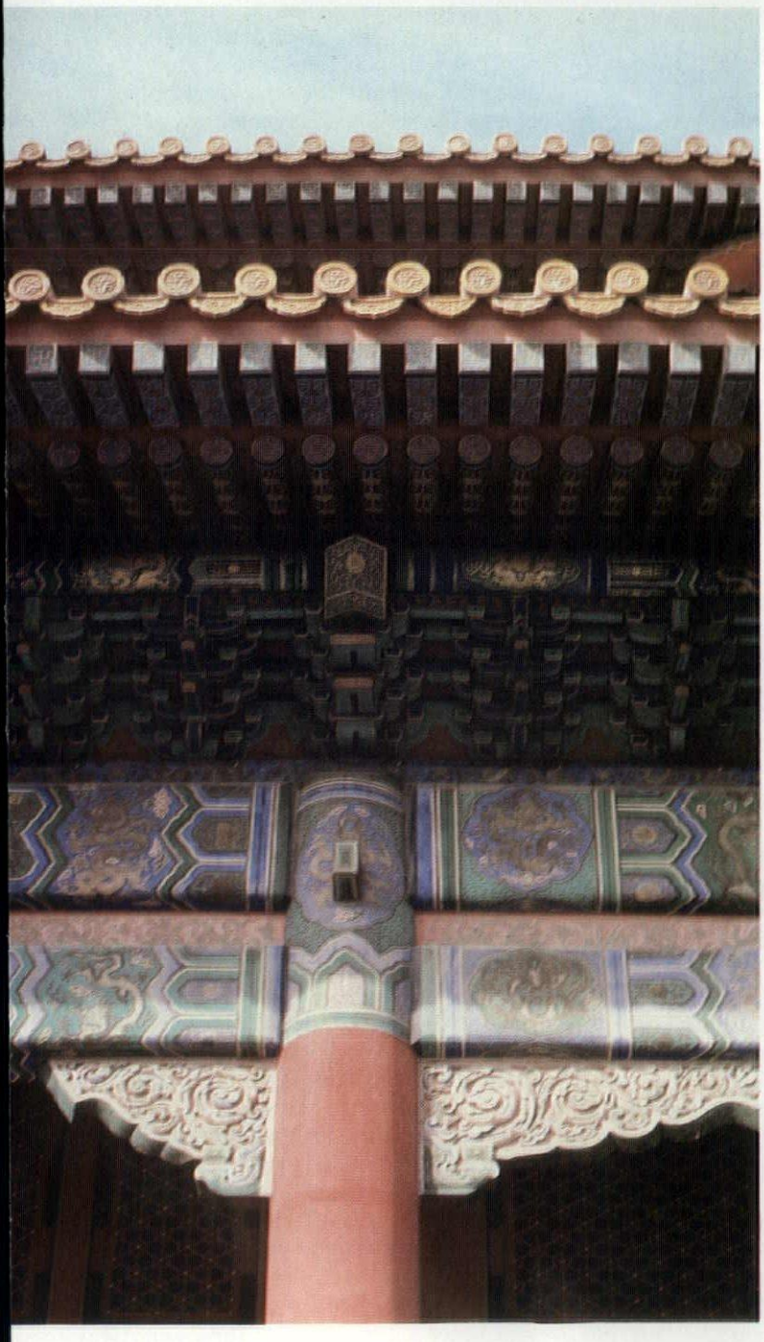
Photos: Roz Li

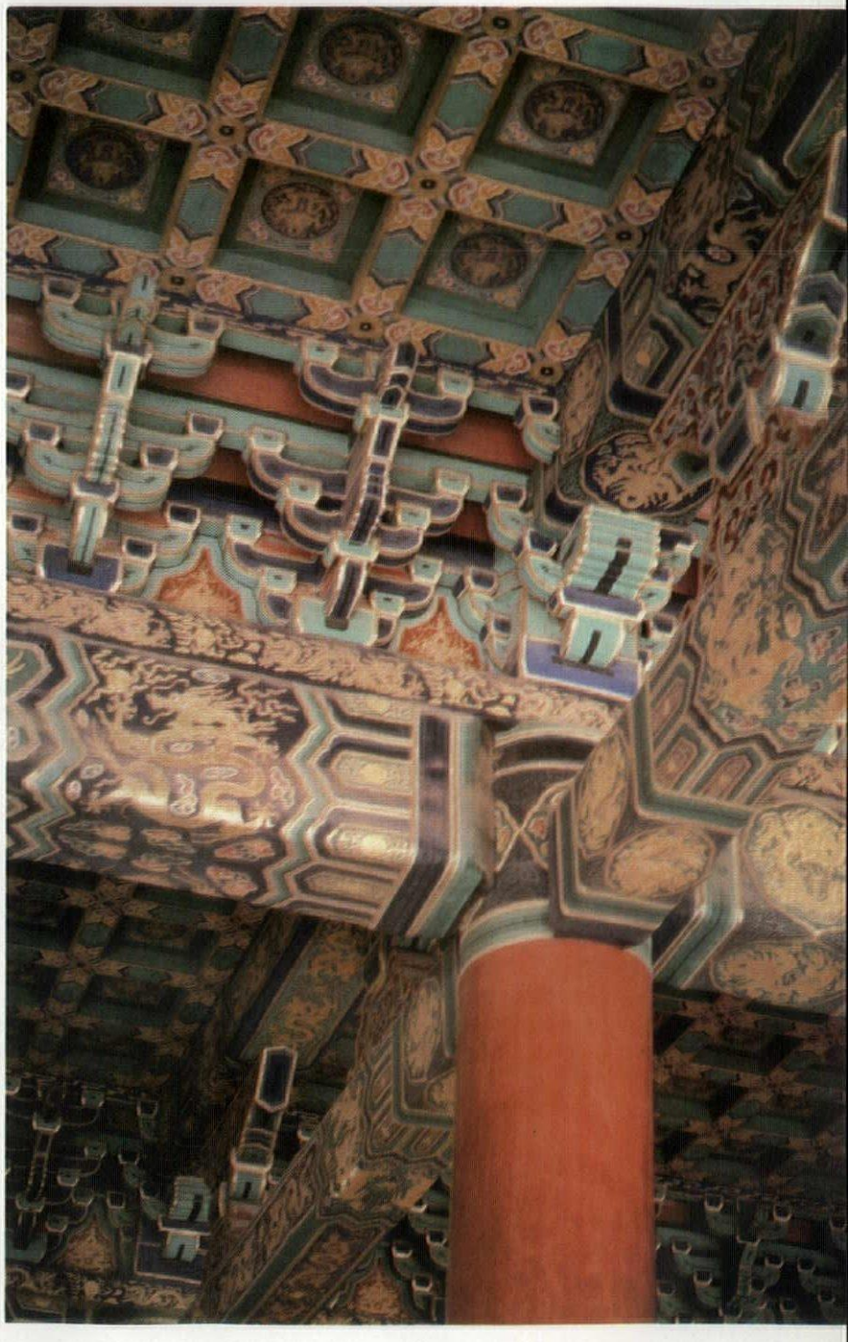
Ceremonial spaces at the Palace Museum rely on similar decorative and ornamental motifs.





Photos: Jean Mah





Museum through many administrations beginning with the last stages of the Imperial regime, then the wars, and now the Period of the Republic. He and the other technicians and administrators have been there "many dozens of years."

The umbrella organization for the national preservation administration, the State Bureau of Cultural Relics, comprises the Research Institute of Ancient Architecture, the Museum of Chinese History, the Peking Library, the Division of Historic Relics, and the Palace Museum. Provincial governments, municipalities, and autonomous regions have cultural bureaus of their own, including Divisions of Historic Relics, and these agencies have a working relationship with the authorities in Peking.

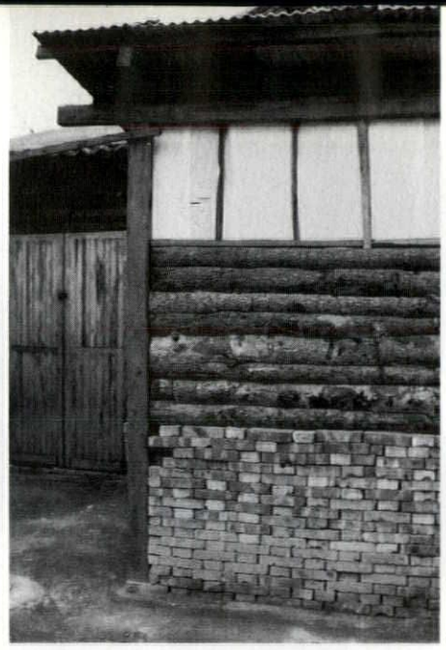
However, localities make their own judgments about what to do with local landmarks and apply to the central preservation agency only when the monument is of national importance. Plaques and markers describe the rank of any designated landmark—the list seems much like the U.S. National Register of Historic Places including properties of national, regional, and local significance.

The criteria are similar as well. Structures must have architectural, historical, artistic, or scientific value. (The only one of these without a specific U.S. counterpart is the last one; it is typically Chinese not to dispose of something—no matter what its aesthetic merits or demerits—if it can teach future generations a useful scientific lesson.)

Besides having unsurpassable esthetic merits, the Imperial Palaces withstood the 1976 earthquake with such distinction that scientists are studying their ancient attributes with renewed enthusiasm and additional respect. More modern buildings did not fare as well, and a large portion of the Peking population was forced to repair to temporary earthquake shelters, thousands of which are still in evidence along the roads years after the last tremors have subsided.

The value of the Imperial Palaces is clear—as a landmark both to the Chinese and to the rest of the world. It is clear why the Chinese elected to preserve it and reveal it to anyone able to pay the few pennies admission charge.

But it is too soon to tell what the preservation policy will be for the rest of the country, or if there will be any masterplan at all. To the Chinese what seems to be valuable is in some cases the artifact and in other cases the symbol of the artifact. And thus there are many options for preservation, ranging from complete restoration to substitute fabrication. All of it will be interesting to study as China becomes accessible. □



Photos: Marjorie Hoog

Peking neighborhood: bricks and vegetables (left), wood addition to old housing (right).

Urban neighborhoods: Socialist renovation

Marjorie Hoog and Marie Kennedy

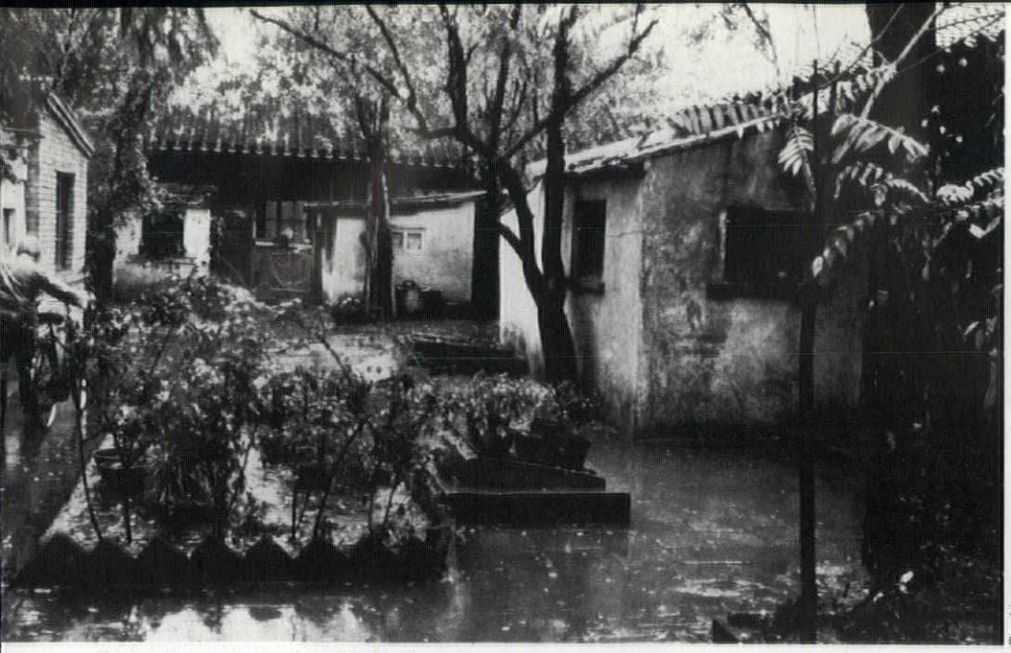
The old neighborhoods in China are threatened, not by real-estate speculation and profiteering, as they doubtless would be in a capitalist country, but by a sincere desire to upgrade the living and working accommodations of Chinese urban dwellers. With typical Chinese pragmatism and straightforwardness, this may mean the eventual replacement of all the old quarters with land-conserving, modern, multistoried complexes.

Meandering through the maze of small streets and back alleys which make up the neighborhood of Liu Li Chang, one treads carefully. With construction bricks stacked here, piles of cabbages there, the streets serve as the loading docks of this heavily populated area. Construction activity is visible everywhere, more than one would expect from normal maintenance. Stacks of building materials lie ready for use on the side of every block, forcing pedestrians to fight their way down the middle of the alley through the flow of numerous bicycles and hand carts. Here and there, small groups of construction workers—men and women—are building bamboo scaffolding, buttressing old stone buildings with new brick piers, or clearing away the remains of a tumble-down masonry wall with nothing but hand-shovels and small baskets.

At first glance, one barely notices the well-integrated extensions and repairs to the old one- and two-story buildings. Upon more careful study, simpler-fashioned roof tiles, masonry rather than mud bricks, and metal window frames stand out. The new bricks are of a crisper mold, the joints larger, the gables no longer turn upward, and every so often a surprisingly innovative—if sometimes crude—detail will catch the eye: a piece of left-over stamped metal will serve as a window screen, a Grecian-looking cornice becomes an improvised doorstep, a wall projects oddly to bypass a tree.

In August of 1976, an earthquake—8 on the Richter scale—destroyed the city of Tangshan, only a hundred miles to the east of Peking. Less publicized was the extensive damage done to the centuries-old residential neighborhoods of Peking, which still form 80 percent of Peking's housing stock and from which most people had to be temporarily relocated. The unusual level of construction activity evident in the fall of 1977 was in response to this destruction and was being carried out by "mobilizing the masses," an effective method of organizing work forces for emergency efforts. The mechanics of this procedure are quite simple: workplaces are asked to give up a certain quota of workers to perform special projects. These workers continue to be paid by their normal productive unit while devoting full or part time to the special task. Other unit members work especially hard in order to make up for the absence of their colleagues. These workers are not trained, however, for this activity, and some of the more inventive details may spring from this lack of self-consciousness.

Most rehabilitation of old Chinese neighborhoods has been accomplished in less dramatic fashion. Yet, to some extent, since 1949 the upgrading of Chinese life in all areas—from food production to education and housing—has taken place within the context of a state of emergency. In 1949 the new Socialist government declared safe and decent housing to be the right of every Chinese. China's urban housing stock was devastated—deteriorated from neglect or destroyed by war. In the South, whole cities had been essentially destroyed—for example, a reported 97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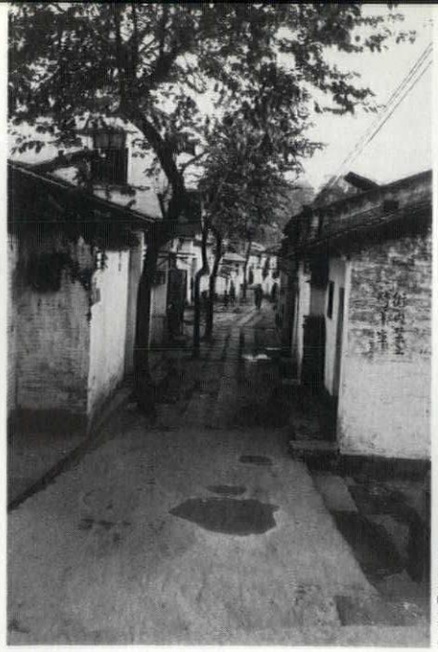

Judith Edelman

Peking housing: courtyard (left), Canton neighborhood lane (right).

percent of Kweilin's housing stock was demolished by Chiang Kai-shek's retreating forces. Between 1949 and 1958, peasant immigration increased urban populations by 40 percent, adding dramatically to the already severe housing shortage. Most cities had no paved roads, few gas and electrical lines, and minimal sewage systems. Peking, a city then of several million, had only 200 km of sewers in 1949, of which only 22 km were operative; two-thirds of Peking's population had no access to running water, relying instead on often polluted wells.

The housing crisis was only one of many overwhelming problems confronting the Chinese at Liberation: an economy ravaged by wars, perennial floods, or droughts with ensuing famines (killing millions of people yearly), and an almost total lack of anything resembling modern industry. Investment priorities necessarily had to focus on large-scale land improvement projects—protecting or reclaiming productive acreage—and on developing an industrial base. It was against this background, and using very little of the economic resources of the country, that China still moved to make good on the promise of safe and decent housing for all.

The Chinese Government chose to spread its limited resources among all cities and all neighborhoods as equally as possible. The living standard of all Chinese would be equalized and raised uniformly.

Chinese planners, with Haussman-like aggressiveness, carved major avenues and thoroughfares through the dense system of clustered houses and courtyards. The worst of the dilapidated housing was demolished. In addition, marshlands were drained and roads paved. Given limited technology and monies available for this task, along with the necessity—largely for compelling health reasons—of rapidly providing basic amenities, the result may appear modest to the untutored Western visitor. One spigot for water might serve a courtyard of five families or a block of apartments. Toilets and bathhouses were built and located to be shared. Pipes and wiring were generally surface mounted and often, in the more congested areas of the old cities, manually (and frequently) drained septic tanks were used as a substitute for sewers.

Along with these across-the-board improvements, the introduction of small industry plus recreational, educational, health, and retail facilities allowed for each "Residential Area" (a neighborhood of about 30,000 to 50,000 inhabitants) to emerge as a viable and mostly self-sufficient economic unit.

Immigration into urban areas was severely restricted in 1958 and, simultaneously with restructuring the old neighborhoods, population redistribution was effected in two ways. First, satellite cities were built and new self-contained neighborhoods were developed on formerly unusable urban land. Second, all urban high school graduates were sent for three years to small towns or the countryside to work and were encouraged to settle there after their required stay.

The old courtyard housing lends itself extremely well to socialist organization. The basic module of five to ten families in each courtyard is well suited as the basic building block for a many-tiered representative governing and service delivery system. The physical configuration of the primarily one-story housing provides almost a literal diagram for social and political interaction. However, the Chinese planner finds it difficult, in these crowded streets, to achieve the ideal ratio and physical relationship between heavy industry, light industry, commercial, housing, cultural, and service facilities. This, combined with the inefficient use of land by predominantly one-story buildings in a land-poor country and the difficulty of installing a modern infrastructure in ancient and congested neighborhoods, has led the Chinese planner to turn more and more towards the building of entirely new multi-story communities and suburban "new towns."

The charm of the traditional courtyard housing is not lost on the Chinese. Families living in these houses for generations admit privately to a preference for them. As a Western critic, one might ask: How much of our delight in the old neighborhoods is a reflection of a hollow romanticism? Or, does our interest in their preservation come perhaps from a sense that the scale and configuration are appropriate to the decentralized and peculiarly Chinese form of Socialism? The quality and spirit of traditional housing, reflecting and reinforcing as it does the communal patterns, should be extended into new residential construction. One would hope the Chinese will not overlook the value of conserving this housing type, which is a unique element of their vernacular heritage. □

Authors: Adele Chatfield-Taylor is with the New York City Landmarks Preservation Commission staff.
Marjorie Hoog is an architect with her own practice in New York City.
Marie Kennedy teaches community planning and design at U. Mass–Boston.

Credits:
The Women's China Study Group on Environmental Issues, a group consisting of 19 members practicing architecture or working in related fields, traveled in China in the fall of 1977. Some of the data used in the articles were gathered collectively, although the views in the articles do not necessarily represent the opinions of other members in the group. The graphic material, from which these photographs were taken, is being incorporated into a film illustrating the relationship between the architecture of China and its political systems.

John F. Otto Service Cntr., Sacramento, Ca

Little material change

In Sacramento, Ca, a contractor builds with recycled materials to create an image for the company's activities.

The John F. Otto construction company of Sacramento has worked for several years now with San Francisco architects Wudtke Watson Davis in the restoration and reuse of Old Sacramento. As key movers in the revitalization of the part of town urban renewal left stranded between the river and a freeway, they were among the first to recognize the potential that was there. When the Otto company decided to build new office and warehouse facilities for itself (with some rental space), the officers and the architects felt they should not build just any building, but that they should do something that could serve both as an image for the company and as a sign of the kinds of activities it is involved in.

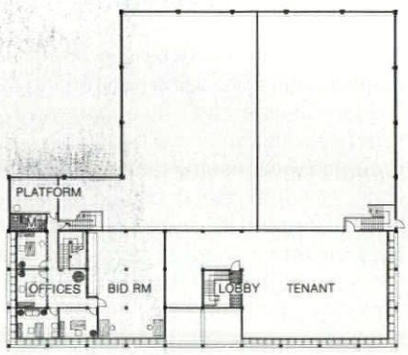
In the industrial section of the riverfront, not far from Old Sacramento, the company found a dilapidated corrugated-metal and timber-frame railway warehouse that looked more like a prime candidate for demolition than for what actually happened to it. The client and architects decided to dismantle the building and use as much of it as possible in the construction of a new 14,000-sq-ft building.

The new building is composed of about 40 percent reused materials. The original heavy 12" x 12" framing timbers have been reused as a structural frame, but on the exterior of the building, and they have been left exposed and pulled away from the enclosing shell. In the space between the structure and the wall, a system of wooden louvers has been added to reduce heat gain. The skeletal system rests on original concrete pedestals—originally under-floor supports—which were fork-lifted into new positions. The original metal roof x-bracing has been reused to stabilize the exterior frame, and the original corrugated-metal siding and some wood siding and flooring have been used to clad the new shell. Original wood sheathing and beams have been used for second-floor framing and roof framing and sheathing, and the yellow brick in the entry court and reception areas comes from the old warehouse vault. The old wooden window sash is incorporated as a system of interior dividers that brings daylight from the skylit stairwell into the conference and bid rooms. Wood siding not used on the exterior has been sandblasted and used as paneling in the reception area, executive offices, and conference room.

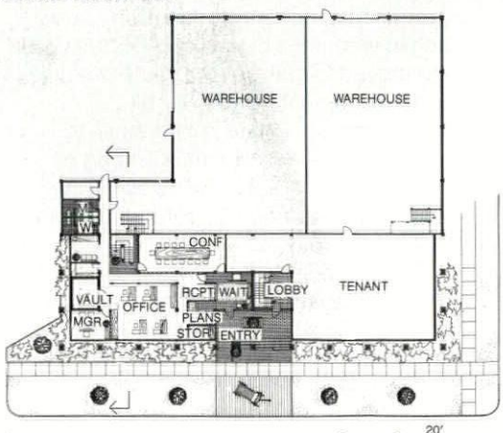
In this age of reducing material consumption, or at least of trying to be environmentally responsible about the uses of resources, the Otto building must surely stand as a wholly admirable endeavor, praiseworthy both in its material frugality and in the pioneering effect it has had in encouraging surrounding owners into some upgrading activities. But, from a purely economic point of view, there was no real saving here. Even though little new furniture was purchased and most of the decoration is composed of found or otherwise noncostly objects, the building ended up costing about the same as a completely new structure.

Savings were achieved by the client being its own contractor; however, that in itself caused other complications that affected costs. As the founder's son Carl Otto explained, "We behaved just like other owners on this one. If something didn't look just like we wanted it to, down it came and we did it over." Another cost problem concerned the use of the recycled materials themselves. The dismantling of the old building had to be done carefully to preserve the materials, and this was time-consuming. Since the materials already existed, they could not be ordered in exact sizes and amounts needed, which caused general problems of fitting things together. In addition, the use of some of the materials, such as some of the corrugated metal that needed straightening and the wood siding that needed sandblasting, brought additional costs. In other words, as Otto explained, "Money saved by using recycled materials was spent on labor."

In the long run, however, it seems pretty clear that the Otto company came out ahead. It wanted a building that would in itself graphically illustrate the building trades, and here the open beams and raft-

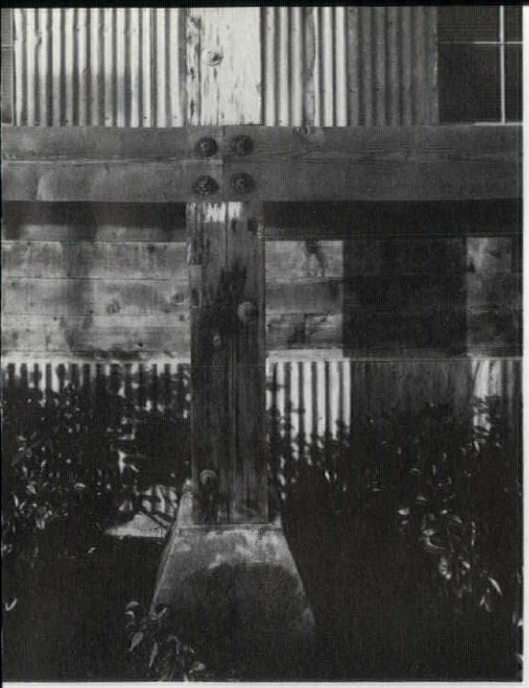


SECOND FLOOR PLAN



FIRST FLOOR PLAN

The Otto warehouse and offices are built of about 40 percent reused materials, which came from an old, dilapidated railway warehouse that occupied the same site until quite recently.



Original framing timbers are reused, in the same use, but now exposed. Paving in entry (below) is made from bricks that once formed a vault.

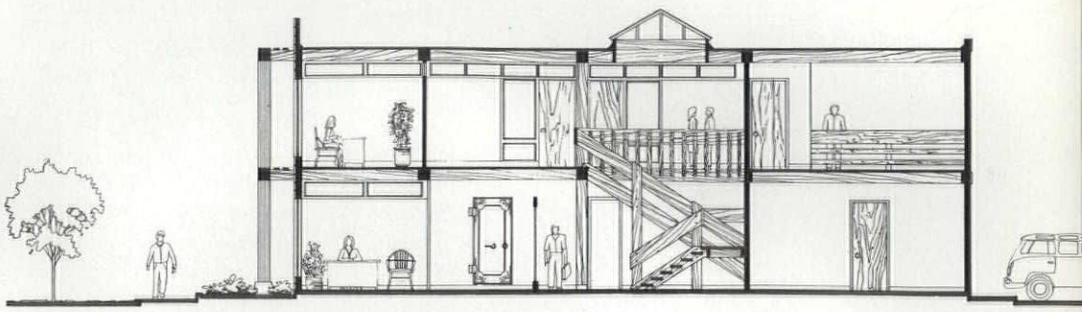
ers, exposed and unpainted HVAC ducting, the exposed bolts and metal connectors, and open-tread staircase with hand-hewn railings would be explicit even to the most naïve. In addition, since most of the construction was done by the company's own employees, the building serves its intended purpose as a clear representation of the contractor's workmanship. It also, however, does something no new building could do, and that is to give a sense of age and patina that can come only with time. What is most pleasing about this building is that both the architects and the client were sensitive to such things, and were able to deal with them without becoming cloying or overly cute, which is so often the case. They knew how to evoke an aura without revolting the senses. [David Morton]

Data

Project: John F. Otto Service Cntr., Sacramento, Ca.
Architects: Wudtke Watson Davis Inc., Rodman O. Davis, project architect.
Site: urban industrial, near historic Old Sacramento, in a Redevelopment Agency project.
Program: to use recycled materials for a 14,000-sq-ft office/warehouse for a client who is a general contractor with activities in building reuse and preservation.
Structural system: concrete slab on grade; office of wood frame, warehouse of concrete tilt-up; wood frame roof.
Major materials: forty percent recycled materials from railroad warehouse previously on site include corrugated metal, wood timbers, beams, siding, wood sash windows and interior paneling. New materials include concrete, gypsum wallboard, doors, exterior industrial steel sash (see Building materials, p. 142).
Mechanical system: rooftop package unit air conditioning with duct furnaces and exposed interior duct distribution.
Consultants: Dennis Tsuboi & Assocs., landscape; Wudtke Watson Davis Inc., interiors; John C. Turley, mechanical; Kenneth Venolia, structural; Louis Stein, electrical.
Client: John F. Otto, Inc.
General contractor: John F. Otto, Inc.
Costs: $315,000, including landscaping; office, $39 per sq ft; warehouse, $12 per sq ft.
Photography: Dan Whitney.

Wooden sash from the original warehouse has been reused on the interior, where it now brings natural light from a skylit stairwell to the bid room (below) and many of the offices. The stairwell itself (left), which is made of unfinished wood with articulated joints, recalls the California craft style.

In the conference room, wood siding from the original warehouse building has been sand-blasted and reused as new paneling (see facing page).



SECTION

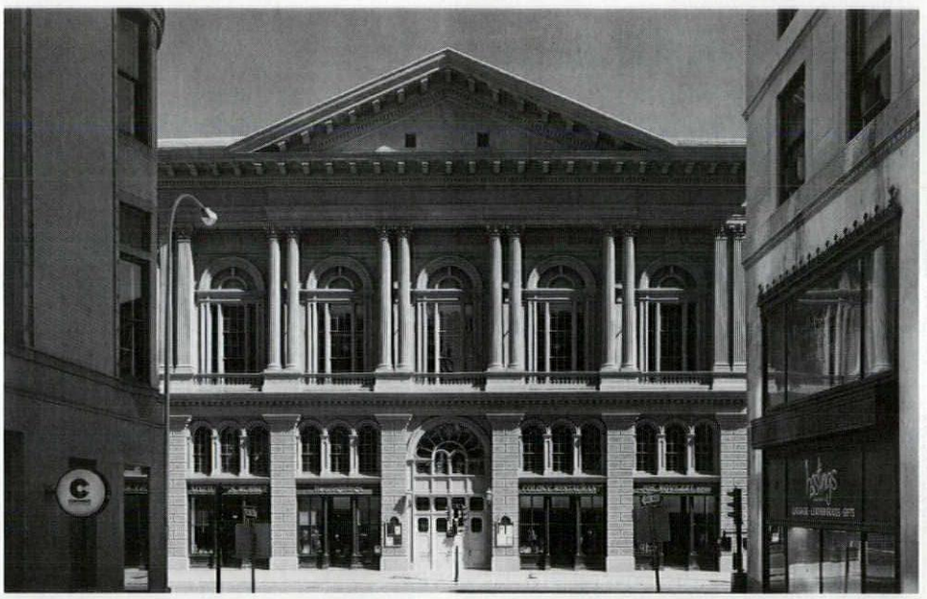
10'
3m

Mechanics Hall, Worcester, Ma

Beauty and the box

Carleton Knight III

While carefully restoring an 1850s hall, the architects added an unsympathetic modern rear addition containing the requisite elevator and stair wells.



The Hall's cast-iron façade, returned to its proper elegance, graces Worcester's Main St..

Twelve years ago in Worcester, Ma, Mechanics Hall hosted professional wrestling. The final card pitted four strong men vs Candy, a juvenile elephant.

Both image and structure of the superb classical pastiche of a building, constructed in 1857 to the designs of local architect Elbridge Boyden, had so deteriorated that the owners, the Worcester County Mechanics Association, were thinking of selling the property, a prime downtown site on Main St., with or without the building. Shortly thereafter, the hall was closed as a fire hazard.

Alarmed, the Worcester Heritage Preservation Society commissioned a study by Denys Peter Myers, chief architectural historian for the Historic American Buildings Survey of the Department of the Interior, to determine the architectural value of the building. His January 1972 report called Mechanics Hall "a national asset . . . unquestionably the finest hall, as distinct from theater, remaining in the United States from the pre-Civil War decade." He added that the hall's superb acoustics could be matched by few others.

That started public attitudes changing. Preservationists succeeded in placing the building in the National Register of Historic Places, over the objections of the Mechanics Association. Faced with new interest in their building, the Association began to consider restoration. They chose Boston architects Anderson Notter Finegold to prepare a report on the building. That study, completed in February 1975, said the building was structurally sound but needed to be brought up to code.

Funding was the key problem. Worcester (an industrial city of 200,000) had never before undertaken a major restoration project and few could see the potential beauty and future use of the drab old lady with tattered clothes on Main St. The amount required—$3.2 million (including a small endowment)—made the project one of the largest privately funded preservation projects in the country.

The city council voted $200,000 of its community development funds to the project. The Massachusetts Historical Commission gave the project nearly $250,000 of its historic preservation grant-in-aid funds from the U.S. Department of the Interior. But it was the people and businesses of Worcester who raised the bulk of the funds; to date the total is approximately $3 million.

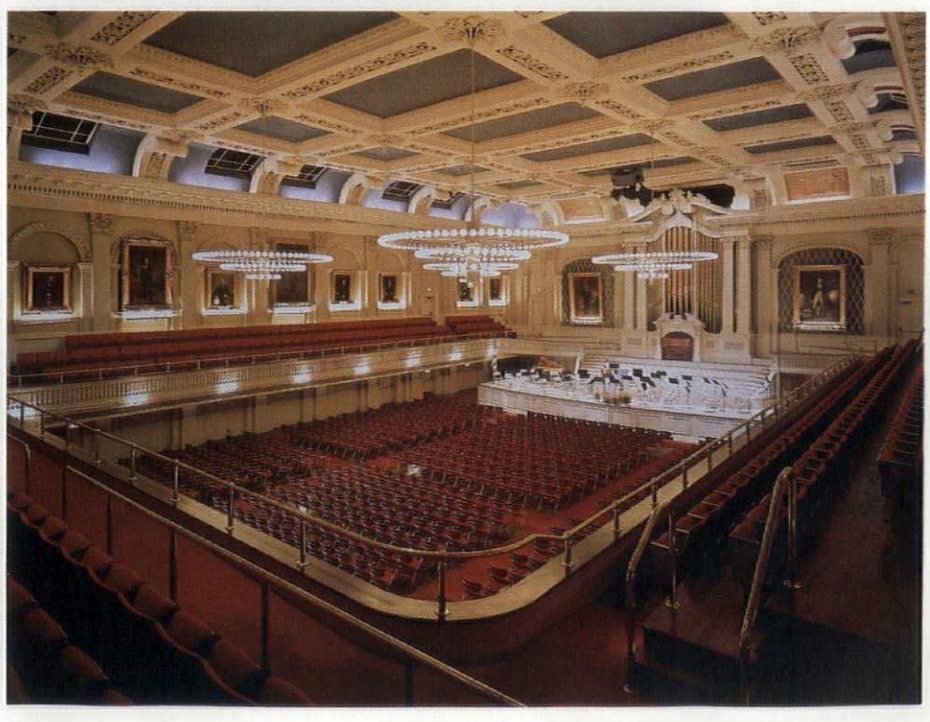
The main task faced by the architects, according to Notter, was to bring the building up to the various life safety codes, which primarily meant creating a new horizontal egress (stairs and elevators for handicapped access) from the third floor main hall that seats 1500 persons. The building is wood-frame construction with a cast iron front and brick sides and rear.

The code requires a separate structure for this egress, but permits people to pass through openings in the wall of the building to get to it. Any insertion of stairs or elevators within the main body of the building could, the architects felt, have threatened not only the design integrity but the acoustics as well. The rear of the building seemed the most logical place, said Notter, and allowed complete freedom of placement.

Since the rear façade had such a pleasant character, the addition was made

Author: Carleton Knight III, Washington correspondent for P/A, was raised in Worcester and has watched the near death and rebirth of Mechanics Hall.

The rich interior has been restored to opulence. New mechanical systems have been inserted without affecting aesthetics or acoustics; only the lighting seems obtrusive.



"transparent." Flanking a glass curtain wall, brick towers hold the needed stairs and elevators.

The "back porch" as Notter calls it, is most successful at night, when the original rear façade is lighted and thus more easily visible. In the daytime, however, the addition appears as a box stuck aggressively on the back of the old building. The blank walls of the unsympathetic triangular form, which follows the contours of the site (the other corner is occupied by a parking lot), contrast sharply with the articulated graciousness of the original block.

The sheltered center entrance to the addition leads to a public arcade through the building's first floor to the main staircase at the front. The rear entrance faces the city's new civic center, under construction a

couple of blocks away.

It was desired that the restoration of the front of the building be as accurate as possible. Lost details, such as the cast iron columns flanking the entrance, were remade in fiberglass. The original wooden storefronts were recreated. The façade was repainted in its original brown color and then the paint, while still wet, was sprayed under low pressure with fine beach sand to achieve the original look of imitation New Jersey sandstone.

Some changes were necessary. The stores originally had double doors, but the code today requires that they be single and open out. A spandrel, added when a steel beam was inserted over the entrance during an enlargement years ago, could not be removed for structural and cost reasons, but to the average viewer, it looks as though it always belonged there.

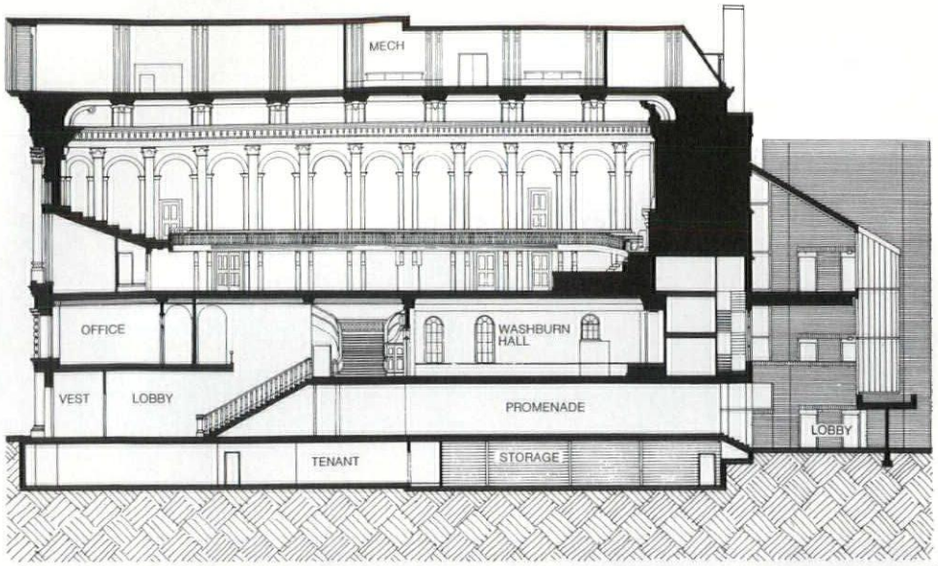
Work on the inside was made somewhat easier by the fact that there had been few major changes over the years, though in one area 18 coats of paint had to be removed to find the original color.

In the lobby, the stair design had been altered to create a single, wide set of steps to the second floor. The original paired design was restored, and the open space between them made part of the public arcade through to the rear. The discovery of a section of original balustrade and newel post beneath a sheet of plywood permitted the reconstruction of the original railing.

Two magnificent black walnut, five-sided ticket kiosks greet patrons at the top of the stairs on the second floor. Much of the original etched glass remained in place as did the brass railings. These kiosks were simply varnished.

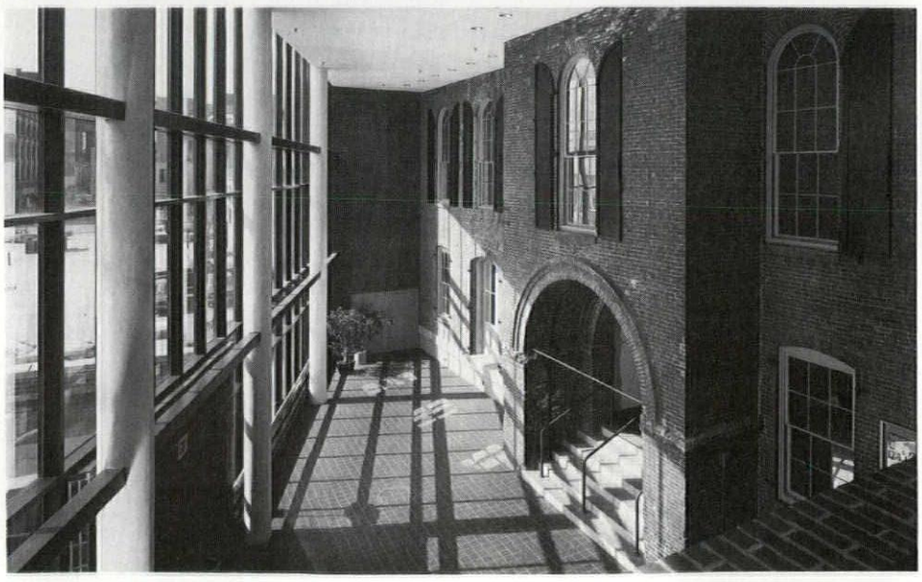
A second set of grand stairs leads from the second floor to the breathtaking main space, Mechanics Hall proper. A balcony, resting on magnificent 7-ft-long plaster brackets (two were recast from molds of the originals; several others were repaired), runs around three sides of the hall. Pilasters line the walls, framing 19 oil portraits of early Worcester industrialists. An ornate cornice surrounds an equally rich, deeply coffered ceiling. The centerpiece of the stage is a rare 1864 Hook pipe organ that is to be restored by the American Guild of Organists.

The difficulty was to add the necessary mechanical and electrical systems without damaging the richly detailed fabric or altering the acoustics. The balcony had to be rebuilt to meet safety and ventilation standards. The air-conditioning ducts feed into barely noticeable strip grille at the front edge of the balcony. The new mechanical equipment is located above the hall in the previously unused attic. The



SECTION

Between the stairs to Mechanics Hall (above) opens the pedestrian arcade to the rear entrance. The interior of the rear addition (below) shows the rear façade in its original state.



wood trusses were strengthened with steel, and a concrete slab poured for the enclosed room that holds the equipment.

Movable seating was chosen for the flat floor of the hall in order to keep the space flexible for a variety of events. The original oak floor was cleaned and polished. The former roller-skate sales booth was converted into the sound room.

Notter said that the selection of colors for the ornate plasterwork was one of the hardest tasks. Eight different colors from beige to blue to gold were chosen to match the original.

The lighting is the only aspect of the interior renovation that seems questionable. Four contemporary fixtures, circular in form with three rows of bulbs, replaced 28 smaller fixtures that hung from the ceiling. One would have hoped that a lighting design more sympathetic to the painstaking interior restoration could have been created. The electric fixtures on the lower level of the hall, however, are reminiscent of the original gas fixtures.

The necessary funds having been raised, work on Phase I (restoration of the interior and front) began in the fall of 1976, and Mechanics Hall was rededicated in November 1977. That showed nonbelievers Mechanics Hall could be brought back to life, and resulted in additional donations so that Phase II (construction of the new lobby at the rear) could proceed. It was finished in September 1978. Work on Washburn Hall, a smaller, second-floor space, is underway. Yet to come is restoration of the second-floor offices.

The Association reports that the hall, whose redesign won an AIA Honor Award this year, is now booked through 1980 with a variety of concerts, exhibitions, dances, graduations and dinners—all in a space that some thought would be unused even if restored. The city is using the project as a catalyst for other preservation efforts. But the credit for this success goes primarily to the people of Worcester.

Julie Fuller, president of the Mechanics Association and the Hall's director, quoted the building's original architect, Elbridge Boyden, at a seminar on restoration during the 1979 AIA convention in Kansas City. "Show me the architecture and buildings of your city," Boyden said in 1857, "and I'll tell you the nature of its people." It's too bad he is not around today to see the civic pride engendered by the restoration of Mechanics Hall. □

These magnificent black walnut Victorian ticket kiosks needed only a varnishing.


In daylight, the rear addition, with its blank walls, sharply angled aggressive forms and glass-and-steel skin, covers and disturbingly contrasts with the rear façade of the original structure.

Data

Project: Mechanics Hall, Worcester, Ma.
Architects: Anderson Notter Finegold, Inc.
Original architect: Elbridge Boyden.
Program: restore 19th-Century hall and bring structure up to present safety codes; new rear lobby including staff and elevator wells.
Structure: masonry bearing walls, wood frame. **New:** reinforced-concrete foundation, steel frame.
Major materials: brick, steel, gypsum board, glass, aluminum, copper, fiberglass, plaster, paint, brass rails (Building materials, p. 142).
Consultants: structural, Brown, Rona Inc.; mechanical, Environmental Design Engineers, Inc.; lighting, Don Bliss; acoustical, William Cavanaugh; preservation, Society for the Preservation of New England Antiquities.
Contractor: R.H. Whipple Co.
Client: Worcester County Mechanics Assn.
Costs: $2,600,000.
Photography: Steve Rosenthal.

State Capitol, Sacramento, Ca

To California with love

Restoration of the California Capitol is the largest such effort in U.S. history. Its unique construction procedures are a product of a team effort and devotion.

Twelve years after the Gold Rush of 1848, the State of California sought new, permanent legislative space through an open architectural competition. Architect Miner Frederick Butler won it with an "E" shaped plan punctuated by a 220-ft-tall central rotunda, $500,000 was appropriated for the construction, and work began in 1860. Another architect, Reuben Clark, was chosen over Butler as supervising architect and held the post from the building's inception until the end of the Civil War, but construction was only eight ft out of the ground when he died. A third architect, Gordon P. Cummings, continued the work, and the building was occupied by the legislature in 1869. By this time the cost had doubled. The outer dome, the colonnade, and the upper dome of the rotunda were still incomplete as were the surrounding parklands. Since the legislature met for only two months every two years, work could continue practically without interruption, but by the time the building and parks were completed in 1874, the cost had risen to $2.5 million.

The 30-in.-thick unreinforced brick walls of the structure supported wrought iron flanged beams which were in turn bridged by single-wythe brick vaults to support the floors. The floor materials expressed the grandeur of the spaces: wooden floors for ancillary spaces, ceramic tile and marble mosaic for corridors, and marble tile for the grand rotunda space. Two-story spaces for the senate and assembly were spanned by wooden trusses. The upper dome was formed by 24 wrought iron bowstring trusses and was sheathed in copper. The colonnades and porticos were granite-faced brick with cast iron classical ornamentation bolted in place. The State of California received a home for its legislature, its supreme court, and its governor, complete with 40 fireplaces, floor-to-ceiling wooden doors and windows, and interior classical ornamentation. Queen Victoria herself would have crowned it a splendid work. California also received a monument to the culture, frozen in time, which it left for posterity to use and preserve.

John Worsley

The above plaster decoration was revealed as workers removed ad hoc air-conditioning ducts during the early stages of reconstruction.

For 20 years, the building endured as built. A major redecoration of the judges' chambers occurred in 1893. Thirteen years later, the roofs and chambers were gutted and redesigned. The senate and assembly spaces received new balconies and column placement. New steel roof trusses allowed a suspended fourth floor to be added over the legislative chambers and work space to be expanded. More space problems in the 1930s and 1940s brought new mezzanine levels in the large, two-story spaces.

World War II had changed California. After servicemen viewed the state on the way to the Pacific front, population mushroomed, and the state was converted from agriculture to urbanism. The legislature now met full time.

By 1952, the building burst its 19th-Century confines, gave up its eastern apse, and sprouted a new six-story annex to house 80 percent of the legislative space as well as the governor's office. (The new building bore about as much resemblance to the old building as a box of frozen fish does to the live and wiggly kind.) But it was clean and comfy and better suited to Sacramento's scorching summers. The historic building, meanwhile, began its decline. As former state architect John Worsley describes, "It was even hard to obtain the money for paint." The end was in sight, after 100 years.

In 1969, the state legislature requested that a structural analysis be conducted to evaluate the building's seismic safety. The report, published in 1972 by Fred Hummel, the state architect at that time, pronounced the building unsafe. Legislators encouraged the demolition of the old building and the construction of a new capitol in the four-block area to the east. The new 1,250,000-sq-ft plan would have more than quadrupled the space provided by the historic building, and would have housed an additional 7000 employees. A bill in 1974 appropriated $42,000,000 for a new capitol. This was precisely the same price tag given in the 1972 study for the upgrading and preservation of the old building.

Somehow, eventually, the mood changed. The effects of the oil embargo and the influence of the Bicentennial began to show. The 1974 elections brought a second wind and new eyes to look at old beauty. Leon Ralph was the author of Bill AB 2170 to reappropriate the $42 million and give the California State Capitol another century to live.

Cast of characters

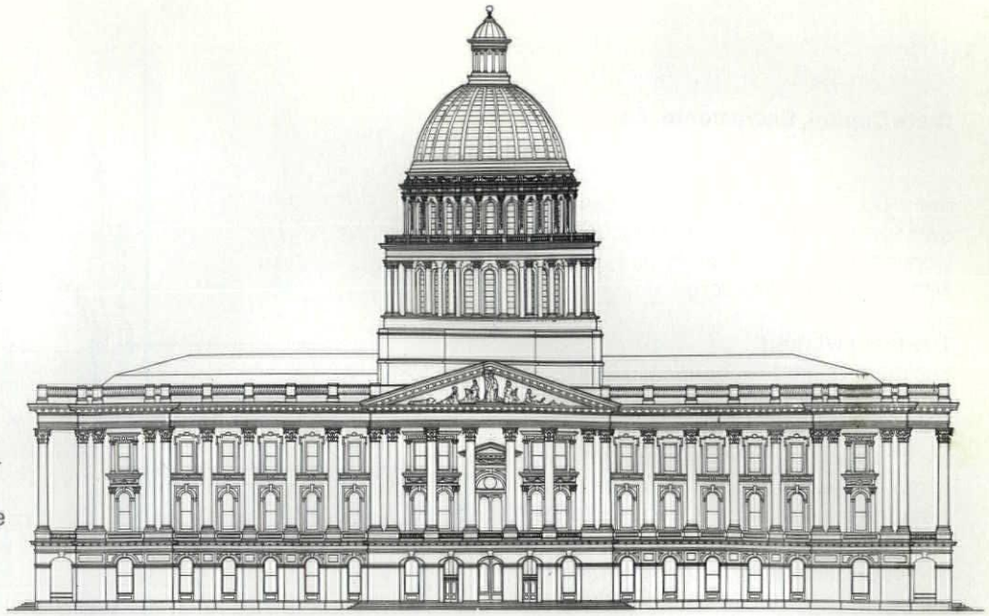
The contractors for the annex built in 1952 were Continental-Heller and Swinerton & Walberg. The chairman of the board of Continental-Heller, Michael Heller, vividly recalls the day that the old east apse was felled to make way for the new building. As he puts it now in retrospect: "We've all hated ourselves ever since because, as part of our function as contractor, we tore down the east apse."

The architect of the new restoration is Welton Becket Associates. They were chosen from a group of California firms interviewed by the Joint Rules Committee of the state legislature. The Becket firm was first asked for a complete study of what the state should do in Sacramento for legislative space. The firm hired URS/John A. Blume & Associates as consultants because of their previous experience with the seismic investigation. (URS/Blume engineers produced the earlier 1972 seismic report which condemned the building.) The project engineer was Lloyd Lee.

The Welton Becket team produced a two-volume report. Volume one dealt with several concepts of expansion. The second volume dealt primarily with the restoration of the historic building. The principal design team at that time consisted of Lloyd Lee from the Blume office, with Louis Naidorf and Robert Mathews from the Becket firm. As Mathews explains: "There was not a lot of design to do. It was interpretation of design. Becket had done the Palace of Fine Arts in San Francisco but had none of the headaches that this project had." Architect Raymond Garvigian was also hired by Becket at that time as historical consultant to do the research on the history of the building.

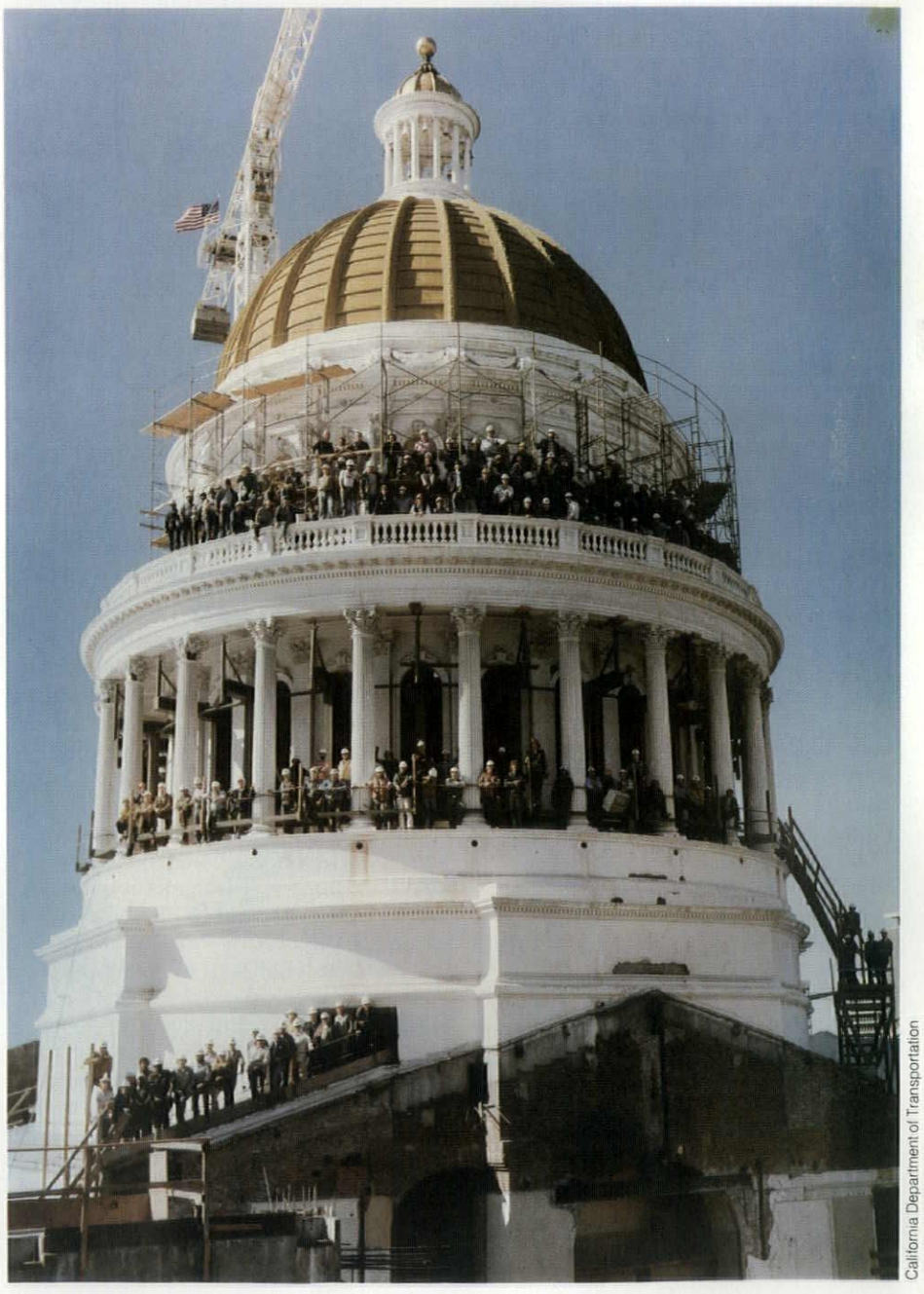
Once the report was completed and presented, the Becket office was hired as the architect for the building. John Worsley, who had previously been state architect, also joined the team. Eugene Mansfield served as chief administrative officer of the Joint Rules Committee and staff liaison to the committee. Worsley, working through Mansfield to the committee, served as the client's representative. The present chairman of the committee is Assemblyman Louis J. Papan.

The architects were very conscious of the construction complexity of the job. The bracing and shoring systems used during demolition were an important integral part of the work. The architects therefore requested in Bill AB 2170 that the project be exempted from the state contract act. This exemption permitted the contractor to act as a member of the design team rather than entering the project upon completion of its design. The general contractor was selected in the fall of 1975 in competition with a small group of national contractors. It was not to be a construction manage-



WEST ELEVATION: CALIFORNIA STATE CAPITOL, SACRAMENTO

The "barn raising" photograph below expresses the identification workers feel with the work.



California Department of Transportation

ment job. The contractor was to use his own forces. The contractor selected was Continental-Heller, again in joint venture with Swinerton & Walberg.

The team worked

The team worked exceptionally well together. Says John Worsley: "Many times during the project the method of placing the structure changed the structure itself. For example, the original structural design included taking down the dome colonnade completely and removing the building's porticos. The total design team worked together to devise an ingenious shoring system that would allow the dome and porticos to stay in place. We all decided what it was going to be and how to do it."

For the contractor this process helped make an economical job. Says Heller: "We are in a constant posture of analyzing all of the alternate methods of doing things to arrive at the most economical concept for exactly comparable quality."

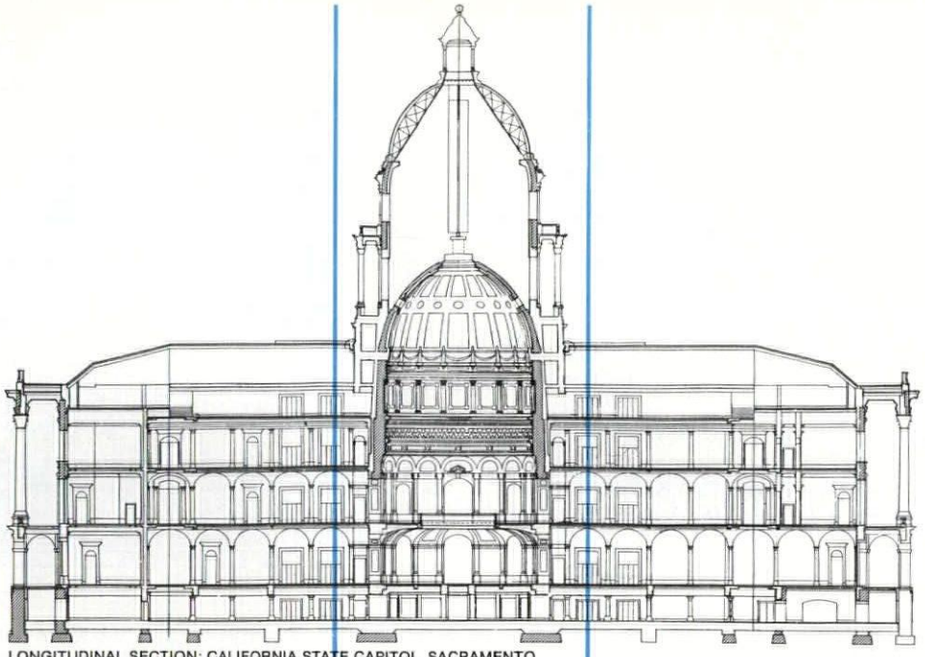
Heller as contractor and principal owner of his company had more clout on the job than many contractors. Says Lloyd Lee: "You would tell any other contractor to do it as the drawings show or submit your own scheme."

For project architect Mathews, the team was a key element to the project's success. "Sometimes I wonder how we ever got any decisions when there was such a disparity of viewpoints. When you felt strongly about something, you fought like the devil for it. When it was not very important, you let somebody else have it. We would prevail on a given day and we would not prevail on another day. In our weekly meetings, everything was thrashed out. It was unique to have an informal committee sitting to decide what the program would be."

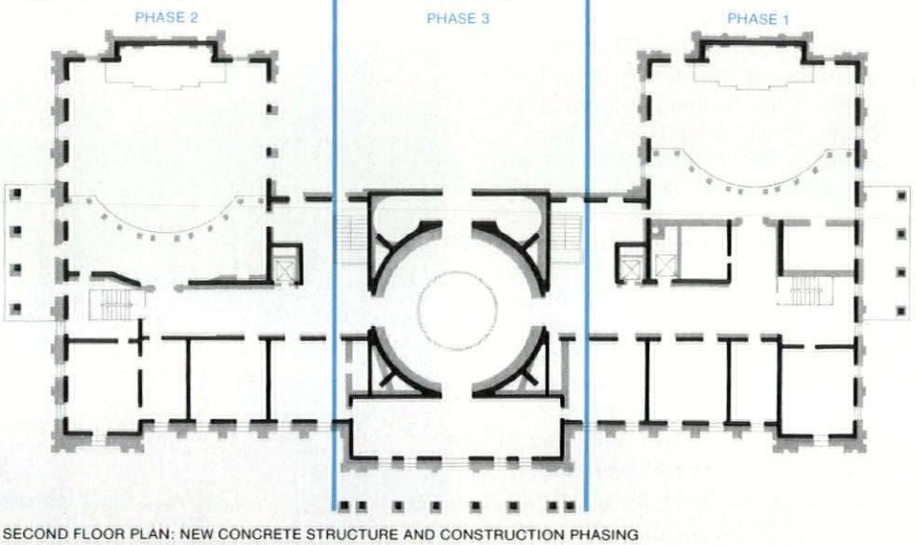
One obvious advantage of the team approach was the speed with which the design was initially accomplished. The bill was signed by Govenor Brown in August of 1975. The architect was hired in September. The contractor was hired in October. Planning began in December. Removal of historic materials was actually underway by March of 1976. The structural design was completed by July, and the structural work began by October 1976. It is expected to be complete by the publication date of this article.

The beginning

The first step after Becket received the contract was to completely measure the building. Eight people spent three months making a record set of drawings. The early investigations of the structure involved numerous structural corings to explain clearly the existing situation. These early stages also included recordation, measurements, mold-taking, and a computer printout record of the thousands of items that were taken from the building. Strategies were mapped about what and how to restore and renovate.



LONGITUDINAL SECTION: CALIFORNIA STATE CAPITOL, SACRAMENTO



SECOND FLOOR PLAN: NEW CONCRETE STRUCTURE AND CONSTRUCTION PHASING

The reconstruction of the Capitol building is being accomplished in three phases. The south wing is first, followed by the north wing and rotunda. The interior work will follow in the same order.

John Worsley explains: "The period being preserved is a combination of remodeled periods. The monumental stairs, which were present in 1900 and were removed in the 1906 remodeling, will be replaced. The fourth floor will be rebuilt as per the remodeling; it did not exist in 1900. Otherwise the building will be preserved basically as it was in 1900. The fourth floor was kept as a functional working space. This was a practical decision made by the legislature."

Between 1908 and 1940, extensive efforts were made to redecorate the rotunda. A mural painted on the rotunda walls by Arthur F. Mathews in 1919 was completely covered by 1940. This mural has been retrieved by the renovation and will occupy its own round "basement rotunda." The original niches in the rotunda, which were bricked up on the first floor to provide wall space for the mural, will be reopened to return the rotunda to its 1900 appearance.

Mathews, the project architect, elaborates the philosophy behind the restoration. "Our first charge was to restore the capitol, but to make it definitely an operating center of state government. This building was not to be a museum. It is to be a center of government." Since the original function of the building did include executive officers of the state, there were such offices in the building. A traditional governor's office will therefore be laid out in the character of the times (late 1890 or early 1900s). There are just six such museum spaces on the ground floor.

Structure

According to Mathews: "Our main thrust initially was to complete the structural work-

Welton Becket & Assoc.

Photos: URS/Blume

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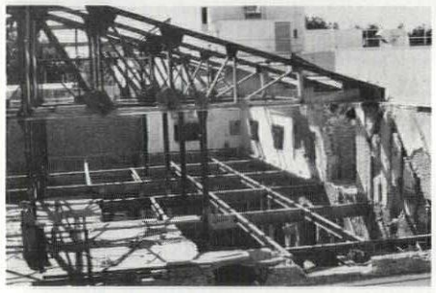

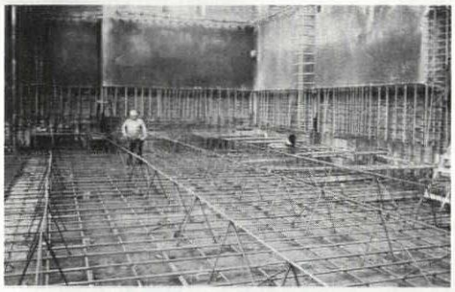

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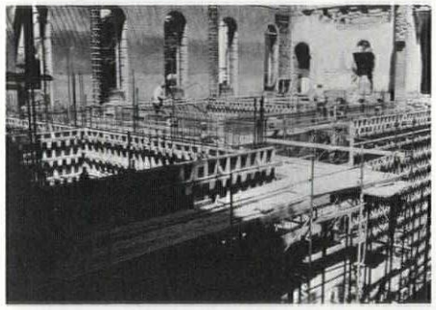
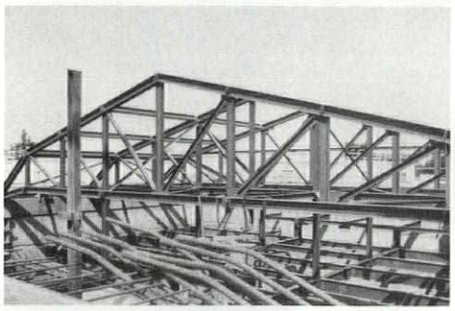




1) Exterior wall shoring during demolition and reconstruction. 3) The old roof and 2) interior walls are removed and the exterior walls are reinforced by peeling a layer of brick from the inside face and shotcreting. Working down to the basement 4) needle beams penetrate walls and integrate with foundation slab. 5) Interior walls and floor are poured 6) and new roof added.

ing drawings. The basic reason for the restoration was structural. We felt we had to have the finest seismic analysts available."

The original brick was the major influence upon the new structure chosen. The mass and rigidity of the masonry dictated the use of concrete rather than a steel frame. As Lloyd Lee explains: "A new masonry structure would not have allowed the structure to maintain its initial thickness. Too much steel would be needed within the walls to resist seismic forces. Another important consideration was being able to tie the old and new structures together. We are essentially carrying the brick." Concrete also allowed for irregularity of surface geometry and dimension. It permitted the forces to be spread rather than concentrated.

Lee continues: "Our computer run for the structure actually modeled the seismic behavior from 250 ft below ground to the top of the cupola, 220 ft above it. Including the soil and modeling down to bedrock more accurately portrays what actually takes place in a quake. This procedure also helps eliminate overdesign."

The key to making a monolithic whole of the old structure and the new is wet-process shotcrete. Dry process shotcrete, or gunite, is a cement mortar that is mixed with water and sprayed from the nozzle of a hose. The result is a thin, even application. In the wet process, concrete is mixed prior to shooting and can include 3/8-in. aggregate. The concrete itself is then pumped up to a hopper, pressure-injected into the line, and blown out at the nozzle as a wet mix. Because of the aggregate, the application by wet process allows more deposition of concrete per day. Says Lloyd Lee: "The achievable strengths of both wet and dry processes are approximately the same. In the wet process you are pumping concrete as opposed to pumping mortar." The advantage of spraying in general of course is that no formwork is necessary. The particular advantage in the case of the State Capitol was the ability to work the building from the top down. Working from the bottom up might have meant having to remove a 12-in. layer of brick the full height of the wall, leaving a relatively weak wall unsupported. Shotcrete also does not entail the weight and removal problems which accompany formwork.

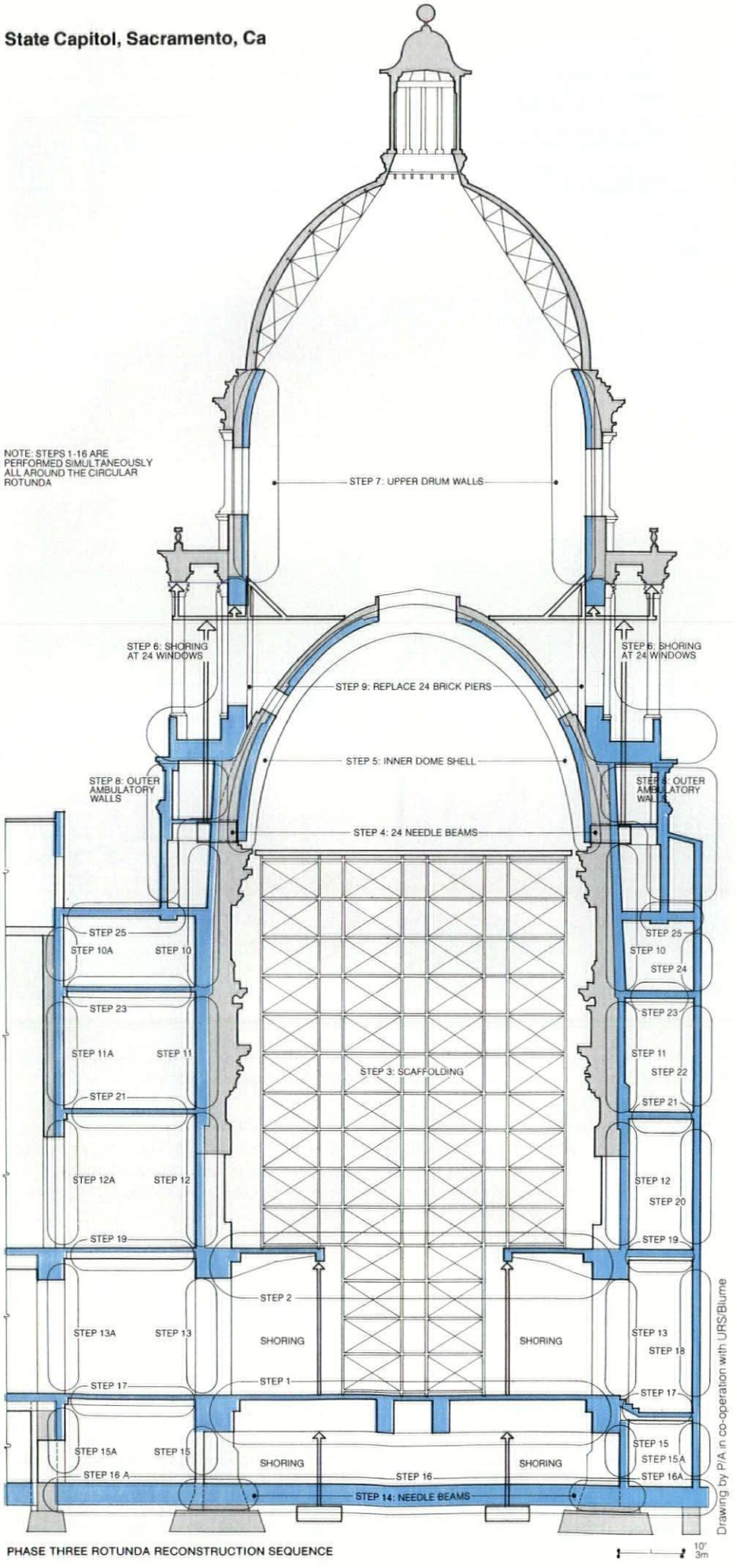
Another basic decision which helped to determine the structure was the decision to use the original foundations. They had settled some 16 in. over the 100 years of use and were found to be perfectly adequate to support both the old and the new load. The replacement of the brick with concrete did not significantly alter the weight of the building.

The construction

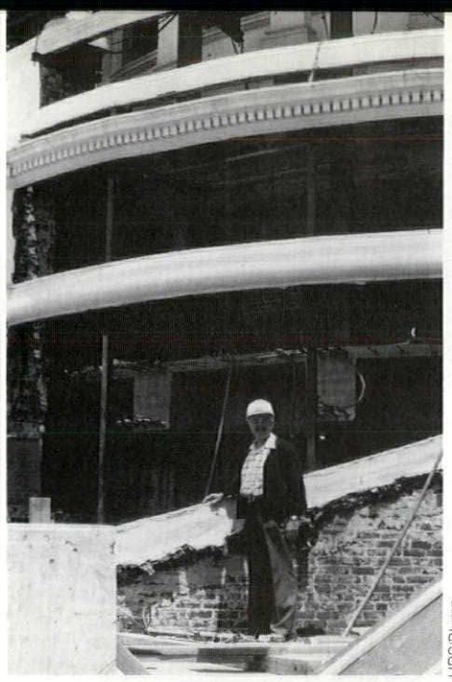
The Capitol building is nearly symmetrical and has three natural subdivisions. The senate occupies the south wing, the state assembly occupies the north wing, and the rotunda joins the two. The construction procedure profited from these natural divisions. Phase one was the south wing, phase two the north wing, and the rotunda, the most difficult task, was saved for last.

The shoring system that was devised for the south wing was also used on the north and was eventually modified for use on the rotunda. The contractor and his engineer, Jay Daly of Jacobs & Associates of San Francisco, had the responsibility of providing lateral and vertical support to the existing structure while it was being modified. The wall, porticos, colonnade, and dome

State Capitol, Sacramento, Ca



PHASE THREE ROTUNDA RECONSTRUCTION SEQUENCE



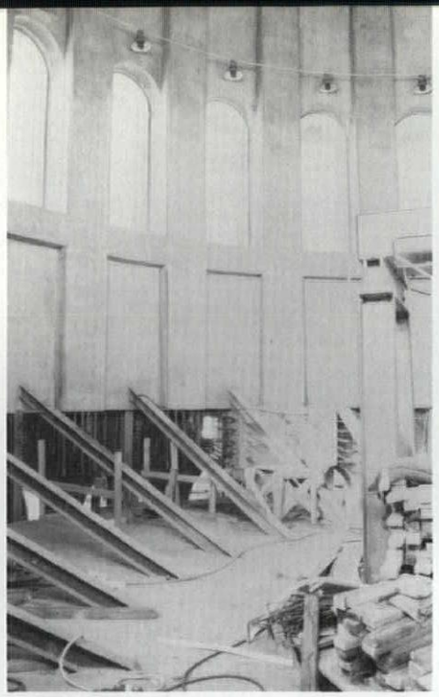
URS/Blume

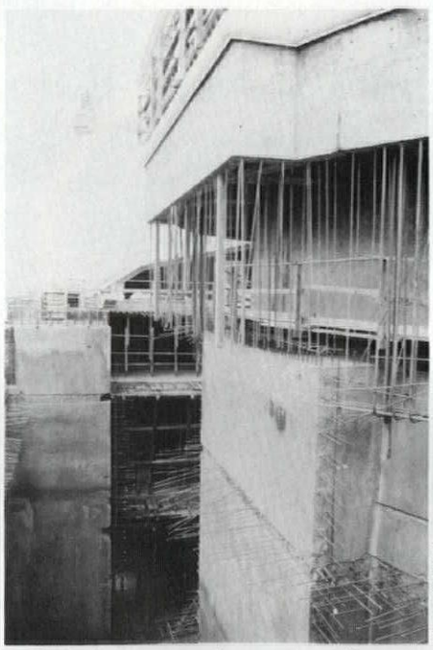
Decorative iron with ambulatory wall removed.

were all artificially supported during construction for dead load, wind, and seismic load. Above-ground use of conventional building shoring techniques proved too large and impractical. Instead, caissonlike anchors were driven 40 to 50 ft into the ground at the base of shoring members. These "tie-backs" were then stressed and the shoring footing poured. Tie-backs remain in the ground when shoring is moved.

Once the shoring was in place around the perimeter of phase one, the old roof and fourth floor were removed. A 12-in. to 15-in. layer of brick was then "peeled" from the interior face of the existing brick wall above the third floor to the roof. A stoppage form was set about 3½ ft above the third-floor level to terminate the first band of concrete. Holes were drilled in the walls 3 ft on centers and #6 steel bars were secured with epoxy resin cartridges. The new wall reinforcing was then hung in a double curtain. Shotcrete was used to restore the wall to its original thickness, up to a level just below the roof. When this layer was cured and thoroughly bonded to both the reinforcing and the old brick, the third floor was removed, and the process was repeated down to the second floor—eventually to the basement.

The wall was again stopped 3½ ft above the foundations. The basement was then prepared for a 3-ft-thick concrete basement slab designed to incorporate the existing building foundations. Needle beams threaded through the base of the exterior walls established continuity between the foundation slab and the walls. Although the masonry walls certainly increase the overturning resistance of the walls, there is no composite structural action calculated between the existing and the new shotcreted wall. The anchors in the walls begin in the new wall and extend to within six inches of the exterior face. Explains Lloyd Lee: "They keep the brick from popping off the face under load and





Photos: URS/Blume

Key stages of the rotunda reconstruction are shown above. Top) Pilasters and shotcrete are added to upper drum wall. Note the drum is resting on shoring. Middle) Inner dome is stripped and awaiting shotcrete. Note anchors placed to hold old brick to concrete. Lower) Ambulatory wall awaits construction of new fifth floor.

prevent shear movement between the old and new wall."

Once the foundation cured, the new interior walls and floors were conventionally poured and tied into the structure's exterior walls. A concrete two-way waffle slab was used for typical floor structure up to the fourth floor. A new steel roof truss system was installed at the roof level, which allowed the fourth floor to be hung below it.

Two new concrete elevator cores were poured as part of phase one. The phase one roof was installed before the work began on phase two. The construction procedures for phase one and two are practically identical. It was phase three that posed the problems.

The rotunda

The construction modification of the rotunda began at its base. The basement floor beneath the rotunda was removed down to the earth itself. Concrete footings were then installed to support pipe columns for the new concrete first-floor slab. Upon completion of the first floor, the second floor of the rotunda was removed; this floor is essentially a circular balcony and therefore doughnut shaped. The new second floor was poured resting on pipe shoring supported from the new first floor. As Lloyd Lee explains: "These two floors then permitted the contractor to rest his pipe scaffolding on solid new construction, and work on the lower dome could begin."

The lower or inner dome was constructed of unreinforced brick and needed to be shotcreted as in the walls of phases one and two. The new concrete shell, however, required new support. Twenty-four 2' x 3' concrete needle beams were poured to transfer the weight of the dome to the rotunda walls. The layer of plaster was then removed and the inner dome shotcreted.

The existing structure above the lower dome was all unreinforced brick. The brick piers supporting the drum for the upper dome were in particularly poor shape. This was the impossible part. How could the piers be replaced without replacing the dome? This is how they did it.

First, the upper drum wall was shored from the new concrete work and needle beams below. The upper drum wall was then itself rebuilt with concrete pilasters integrated onto the walls by shotcreting. Next, the lower drum had to be prepared.

A ring of columns and an ambulatory encircle the base of the rotunda visible above the roof. Large iron ornamental rings were imbedded in the brick drum below it. The design team decided to replace the ambulatory wall with poured concrete, leaving these rings in place. The new wall was then tied back into the needle beams, reforming the lower drum and base for the new concrete piers. At this point, the new ambulatory wall was supported only from above, as the fifth floor below it was yet to be replaced.

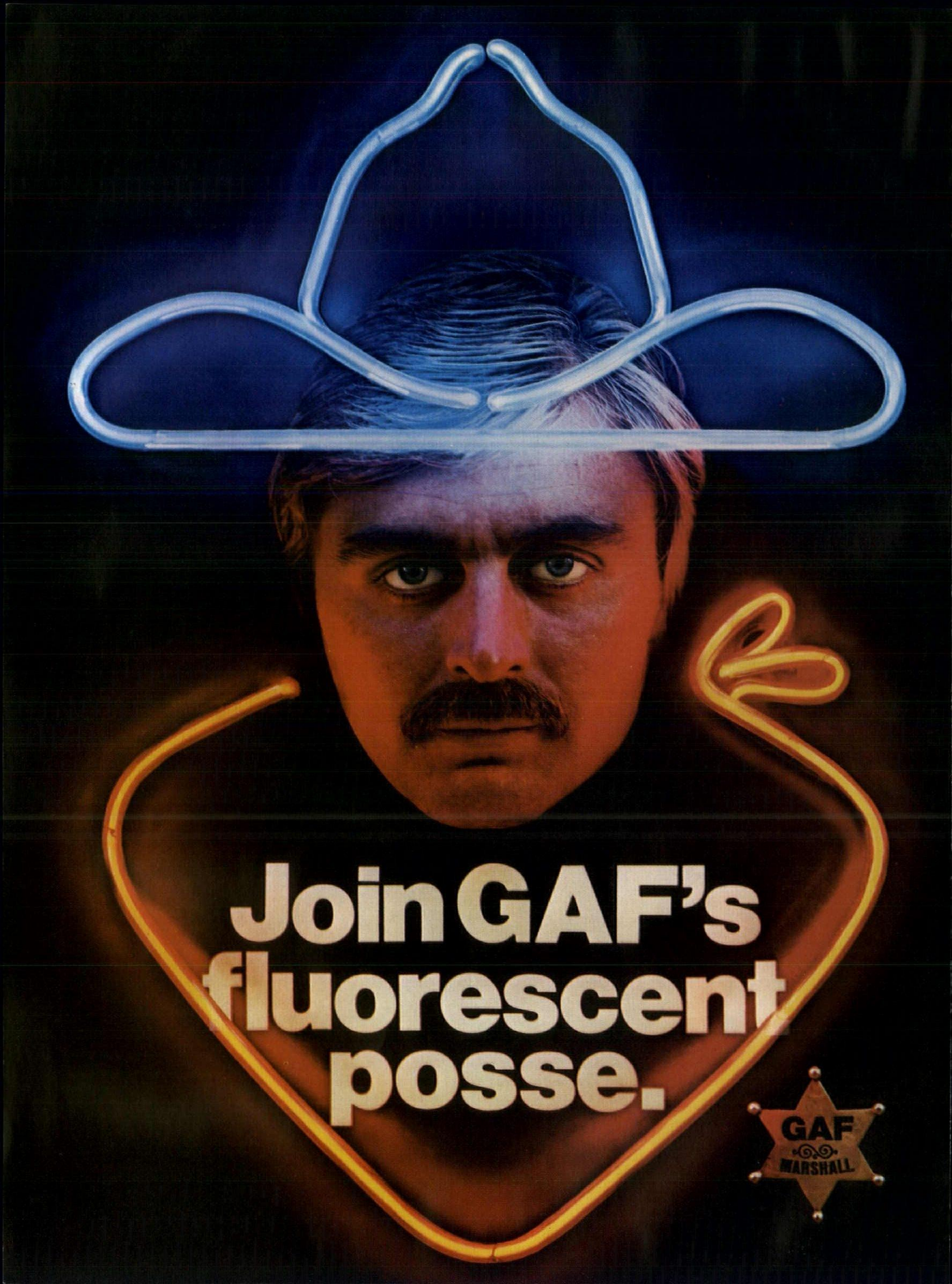
The outer dome was therefore resting on its rebuilt upper drum. The ambulatory and new inner dome were integrated below. Shoring still supported the one on the other. Starting slowly, the first two brick piers were replaced 180 degrees apart. Thirty-six #11 bars were installed connecting the upper and lower drums, and the new concrete piers were carefully poured. As Lloyd Lee recalls, the space around rebar was tight: "You couldn't shove a hummingbird through there." The next two piers replaced were on line 90 degrees around the dome from the first two. Work then proceeded by doubles and continued until all of the 24 piers were successfully replaced. The wedding of upper and lower drum was complete.

While the upper rotunda and domes were now integrated into a single structure, the entire new construction was resting on the old walls of the brick rotunda. The crews proceeded therefore to work down the rotunda walls, trimming and shotcreting, working off the existing floors until walls were cured and then removing the floors around the dome. When the process reached the level just above the existing foundation, all of the excess brick from the old dome walls could be removed, and needle beams at their base were placed as in phases one and two. A new 3-ft matt foundation completed the building's basement floor and restored continuity of wall and floor. Once the foundation was complete, the new floors outside the rotunda were conventionally formed and poured sequentially back up to the top.

To be continued

The restoration of the capitol building continues. The structural construction is now completed, with the replacement and redecoration of the building to follow. The new mechanical and electrical systems will be threaded into place. In another year or two we most likely will relate the other incredible half of the task.

In addition to the amazing feat which has now been accomplished structurally, there is another important less physical characteristic of the building. The people who work on it love it. Part of that emotion to be sure comes from breathing new life into a nearly lifeless cause. Part of it is the limitless care with which it is being accomplished. The affection no doubt is also due in part to the certainty that the task performed will most likely be walked into and loved by the grandchildren of those who work on it. Many of these traits are common to all restoration projects. In this case, the restoration is so large and so complete that it can truly be said that it is not just the building being saved, it is the idea. [Richard Rush]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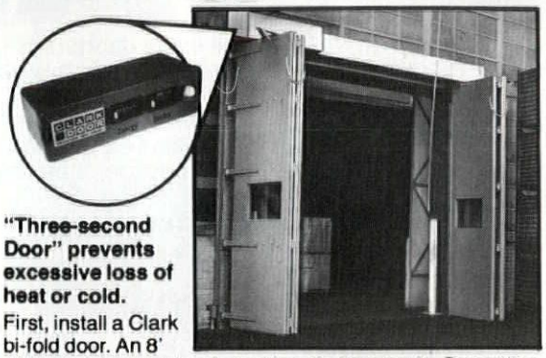

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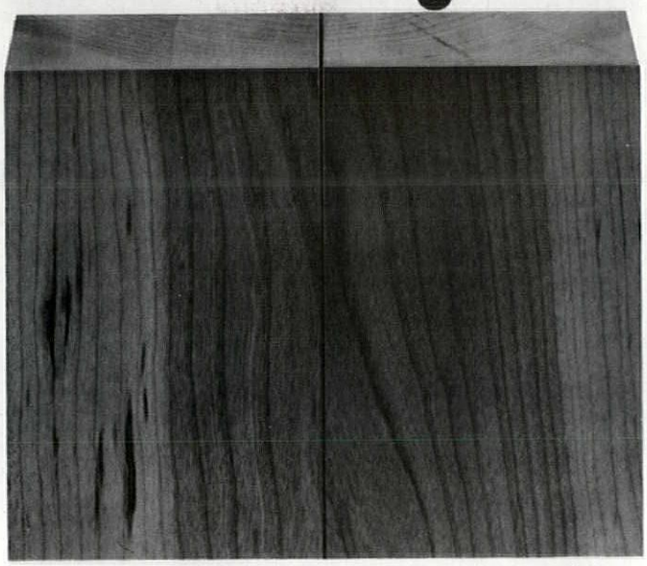

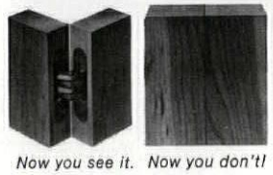

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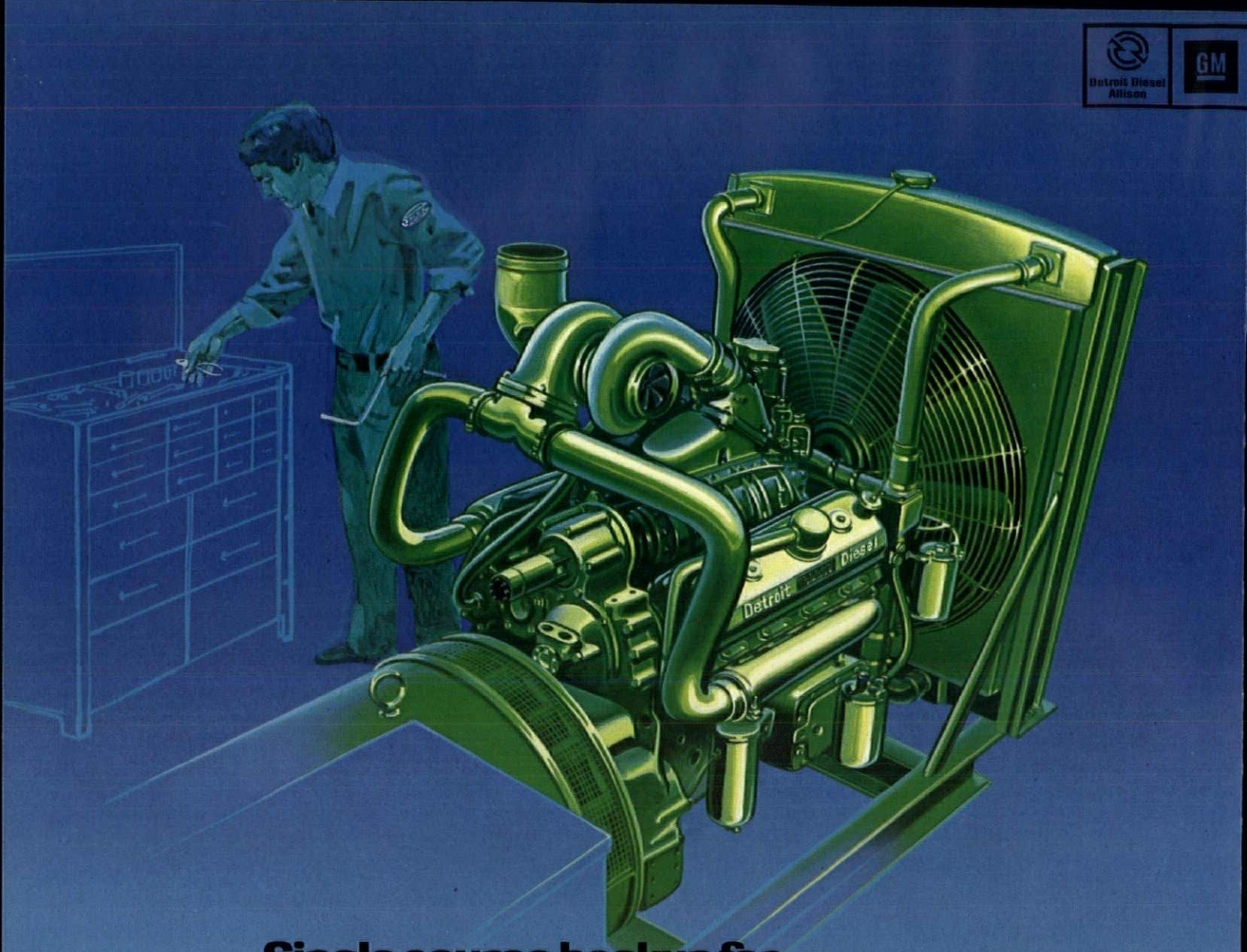

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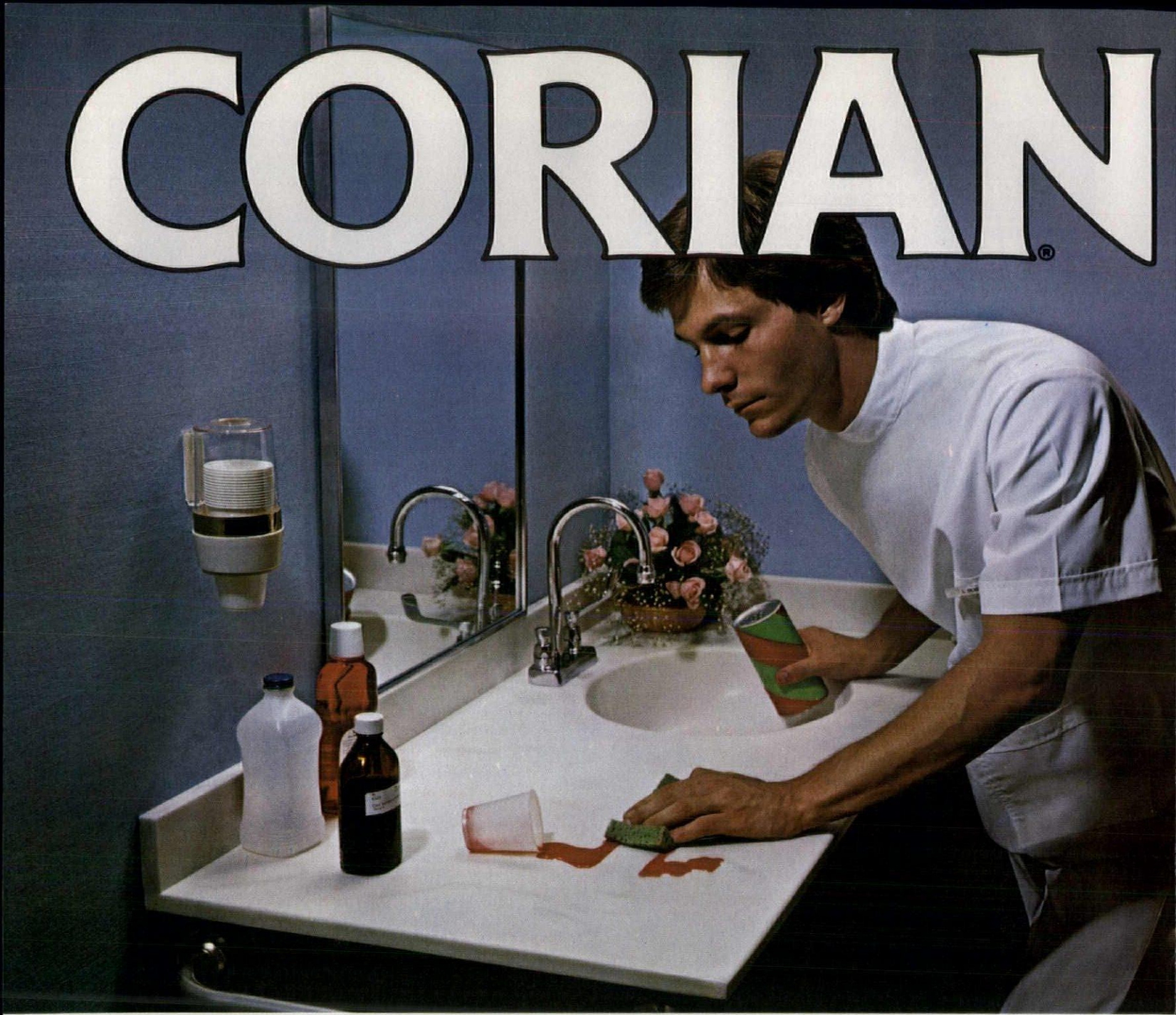

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Interior demolition

William T. Lohmann

Demolition is no place for sloppy specification writing. Specify what to remove, how, when and where to put remains.

Demolition is a necessary element of remodeling and restoration work, and must be documented with the same detail which we know is essential for new construction. Bidding of demolition work is difficult at best—and the legal ramifications of destroying work that is intended to remain are disconcerting.

Perhaps the most critical function of the demolition documents is to define the scope of work. For interior demolition, its extent is most clearly shown on separate demolition plans and sections, indicating construction to be removed and construction to be left in place. Revised sepia prints of original drawings are ideal for this purpose, if they are available. Locate equipment to be removed, such as tanks, boilers, and fans, and perhaps describe them further in the specifications. New openings, partial removals, and unusual structural conditions should be detailed. The need for further clarification should be determined at a prebid conference and walk-through of the work areas by potential bidders and contractors.

Most demolition operations are governed by local ordinances aimed at protecting the public and limiting nuisance factors. They may restrict work to daytime, weekday hours. Chutes may have to be sound-deadened with dust-reducing canvas trunks. Blasting may be prohibited. Reputable demolition contractors will be familiar with such requirements.

Some safety and protection requirements must be amplified in the specifications, however. Safe access to occupied portions of the building and exit stairs must be maintained. Bracing and shoring may be necessary. If the work is in an old building and is relatively extensive, coordinate a separate pest-control program with the owner's regular treatments. Daily removal of accumulated rubbish is mandatory.

Make available to the bidders all reliable known information about existing utilities. Describe and locate major items of mechanical and electrical equipment in demolition areas. Show points of electrical service and utility entrance into the building. Also indicate location of disconnect switches, panelboards, and cutoff valves. Specify removal of inactive piping and conduit or capping and abandoning them. Describe support and other means of protection for utilities to remain.

Remembering that portions of the existing building may be occupied during demolition operations, require close coordination with the owner in scheduling the work and protecting the occupants. Barricades, signs, temporary lighting, and fire extinguishers may be necessary. Also specify strict dust-control methods. Temporary wood stud partitions covered with minimum 6-mil vinyl sheeting are a good start. Openings in the partitions must be closed with weatherstripped doors. Doors to existing stairwells should be taped, and penetrations from one floor to the next caulked or stuffed. Protect flooring in occupied areas from dust on wheeled equipment and workmen's shoes. Describe limitations on the contractor's use of elevators and loading dock.

What happens to the materials that are removed? Normally the contractor is required to remove all materials from the premises and legally dispose of them. Unless otherwise stipulated, he also has salvage rights to reusable materials and equipment—and will include the value of salvage in his bid. Hidden "surprises" belong to the demolition contractor.

If the owner desires to retain some items in the building for sale or reuse, those items must be clearly identified. They may be shown on the drawings or listed in the specifications. More directly, the owner may physically "tag" each item in a permanent manner. The specifications should then describe disposition of the items—to be left in place, moved to storage in the building, or delivered to some remote place for the owner.

When the work involves demolition in a historic structure, special handling and coordination is important. Identify architectural elements to be preserved (moldings, column capitals, railings), and specify their protection. Some will be reused in the restoration work, others may be used to make molds. Require cooperation with preservationists and photographers. It may be necessary to analyze old paint and stencil patterns on exposed surfaces before they are demolished. Special layered removal of earlier remodeling should be done on a time and material basis.

Prepare your demolition documents thoughtfully—as though you were demolishing part of your own building.

Author: William T. Lohmann, AIA, FCSI, is Chief Specifier for C.F. Murphy Associates, Chicago, Illinois.

Reading and writing history with x-rays

High technology of today and tomorrow is applied to the buildings of yesterday. Architect David Hart uses x-ray photos to probe the past of historic buildings.

Until about a decade ago, x-ray technology had not been extensively applied to building restoration or preservation. Buildings had, however, been x-rayed. A portable x-ray device was developed in the 1960s for the military use of locating hidden bombs. Researchers at Bendix had developed a portable unit, and by the early 1970s Bendix was marketing it for police work. Simultaneous with this effort, interest in conservation and renovation of buildings was reawakening in this country. The x-ray machine and architecture first met at a product marketing demonstration. Among the gunmetal gray suits and the steely gray eyes, "a roomful of policemen with boxes of bombs," sat one slightly intimidated but open-minded architect.

Early in 1971, David McLaren Hart was in the process of historic documentation of 25 houses in Ipswich, Ma. The Ipswich job was helping to finance his new career in architecture. After junking a first career in business administration, Hart was attending architectural school. After much thumping of walls and guesswork in locating hidden structural members, Hart sought greater documentation speed and accuracy. His first thought was infrared photography. Perhaps the thermal differential between studded and open sections in a wall would yield improved results. He tracked down the film manufacturer for ideas and someone at Kodak suggested x-rays. This source led him to the roomful of policemen.

David Hart returned from his meeting full of enthusiasm. After fruitless attempts to interest others in his project, he succeeded in renting his first machine for $300 per month. His first x-ray shot passed through the "flesh" of the wall and yielded the "bones." The Polaroid photograph which resulted bore the previously invisible image of the wall structure. Any ballistics expert could see that. What Hart saw was not a slice of wall, but a slice of time. Behind the plaster were lath and nails which told the story of the wall.

Both Paul Revere and Abraham Lincoln have now had their houses x-rayed by Hart. Add Faneuil Hall, the House of the Seven Gables, and a couple dozen of America's most prestigious historic buildings, and we begin to comprehend the impact that Hart and the x-ray are making on preservation technology. In fact, the art of Hart's exploration is not the x-ray itself but what he shoots and what he sees. He did not invent the wheel; he was just the first to take a ride.

What is the tool? The x-ray machine being used in preservation is basically the same in principle as the large, stationary machines used to x-ray baggage at airports. Instead of illuminating a viewing screen, the x-rays are beamed from a portable camera through the building member to a Polaroid film-loaded target on the other side. An x-ray-sensitive screen within the target fluoresces on impact which exposes the Polaroid film. The tool is ideal for wood construction. As long as the target can be placed and retrieved and the camera can be supported on the other side, walls, roofs, ceilings, and floors can be shot. Masonry and metal materials are opaque to the x-rays and therefore black to the film. Plaster, however, is translucent to rays and wood appears in varying shades of gray, depending on density and thickness. As a result, the x-ray of an old wooden building will yield size of members used, their geometry and location, and show nails and lath configurations. In the past, this kind of information was available only after partial or complete destructive investigation.

What will the tool tell us? X-ray technology will do several chores for us. It will locate and size members for documentation purposes, tell us whether the members are structurally sound, or give us information to help date the building. The first two uses are analogous to the medical or dental uses of x-rays. Buildings which have shifted from age, impact, or weather can be accurately analyzed to make the appropriate remedial response.

Dating: There are many ways to "surface" date a building. Doors, windows, cornices, roofs, and siding are just a few tips available to the historian. What is most difficult in very old buildings is determining sequence of repairs and additions. "Modernization" of buildings over a 200-year period spreads layers of paint and plaster as well as changes of fenestration and exterior surfaces. The true story of an old house may be locked between two layers of building skin.

Lath: The support structure for plaster has changed significantly during the history of this country. Hart explains that prior to 1725 lath was fabricated by splitting the tree. These early members, therefore, were of varying widths and thicknesses and were commonly left irregular from the tree contour. Beginning in 1725, mechanical sawing produced thin boards which were then split into narrower strips or partially split and pulled open like an accordion. Hence the name "accordion" lath. The lath of the period was therefore of uniform thickness, an advance over the earlier method. This manner of producing lath was dominant for about 100 years. Eventually it gave way to the straighter, uniformly sized and cut wood lath which most renovators have seen; and finally to the metal lath and plaster or gypsum board we use commonly today.

Differentiating between the various early styles of lath is a breeze with x-rays. If lath type changes within the same wall, we are

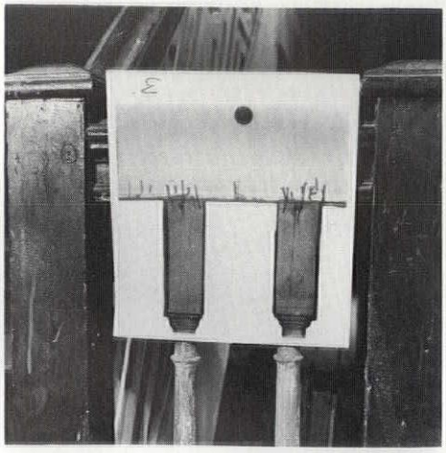
alerted to a possible addition or alteration. Exploration of the Deshler-Morris House by Hart revealed that what was thought to be the "addition" to the house was actually the original. Another valuable clue can come from the nails used not only for the lath but for the structural members.

Mechanical connection: The connections of wood members in old New England houses offer a wealth of diverse possibilities. Houses, and furniture as well, used ingenious notching and wood pegs which will forever draw our admiration. X-rays, of course, will tell whether a connection has been made with wood alone or aided with metal fasteners.

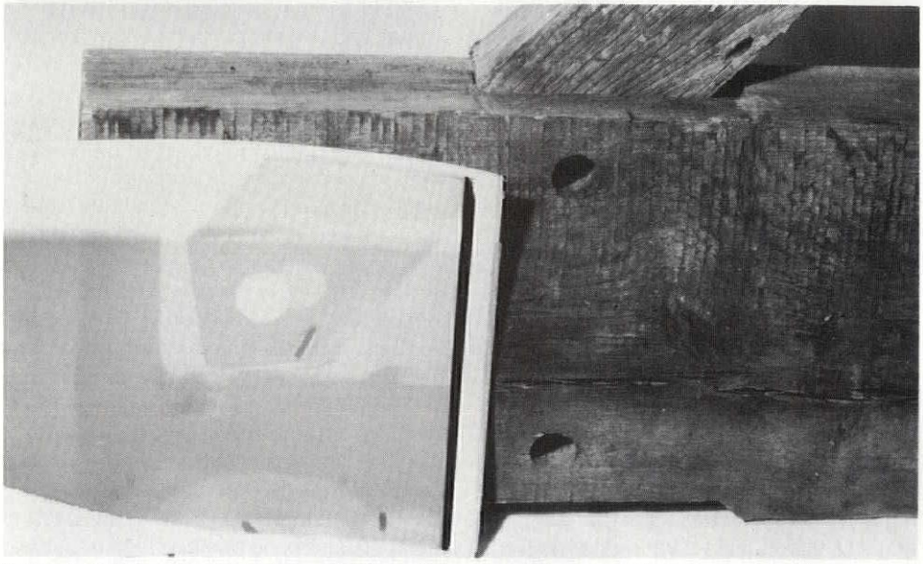
David Hart explains that nails used prior to the 1790s were hand wrought. A carpenter who needed nails went to the blacksmith. He received a quantity of roughly similar wrought-iron nails, flattened and pointed on four sides, with a hand-formed head. No two blacksmiths made precisely the same nails. By the mid-1790s, nail-cutting machines were fabricating cheaper nails by slicing tapered shapes from a flat iron plate. These nails were therefore also rectangular in section, but tapered on only two sides. They required the head to be formed by hand as before. By 1830, head and body were mechanically made, although odd sizes of nails continued to be hand wrought. In the mid-19th Century, spurred no doubt by the increased use of steel in larger buildings, the nail industry began to experiment with steel wire as a possible cheaper and stronger source of nails. The process was perfected during the last quarter of the 19th Century and began to dominate the nail markets from the turn of this century.

Using x-ray technology, Hart can come within 10 or 20 years of the precise date of construction. The x-ray, of course, is only one of the tools which he uses in historical analysis of a building. He is following closely the work of Canadian and West German researchers who are trying to perfect the use of infrared technology for applications similar to those of the x-ray. Other developments in the field of ultrasonics may reveal the secrets of masonry and concrete walls as well. X-ray technology is itself moving ahead. The potential of color x-rays and the use of stereoscopic photography will continue to enhance our comprehension of the building envelope.

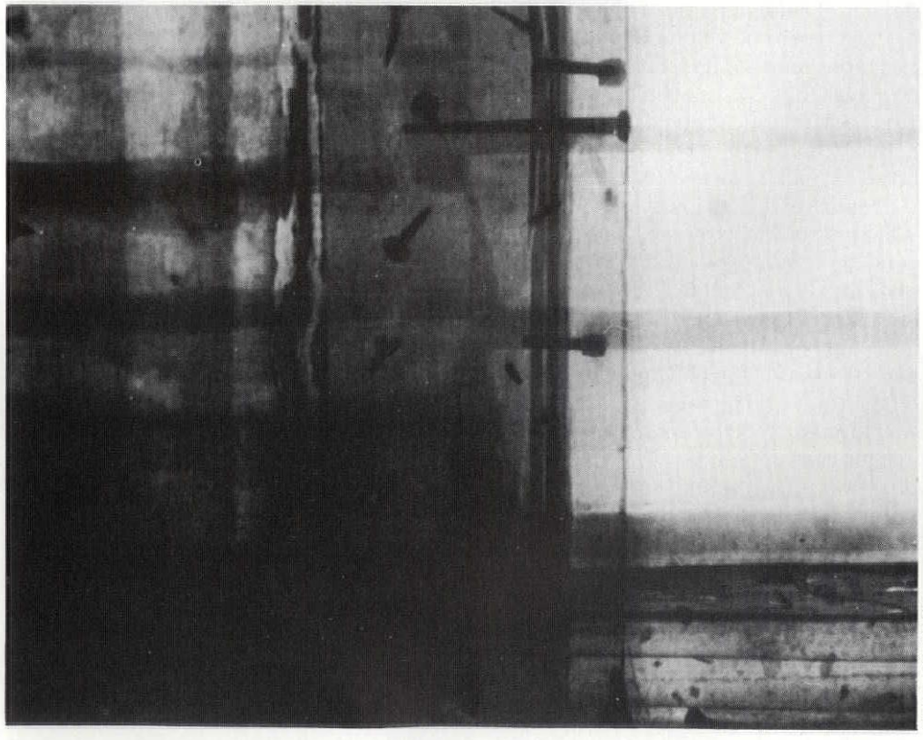
Limited resources have so far kept Hart from pursuing the full potential of animation or even tape recording, capabilities which are available on larger machines. Tapes would add the dimension of movement and time to the studies, giving new life to old bones. With the use of ultrasonics, they may even emit sounds and tell their own story. [Richard Rush]



A portable x-ray device (left) is used by David Hart. Members become translucent (above). Such photos reveal hidden structure as well as historic lath and nails for dating (below).



X-ray photo below reveals earlier split lath, uniform sawn lath, cut and hand wrought nails.



Photos: David Hart

Insolutions

Donald Watson

In the past five years the author's work has evolved through solar design tenets, allowing him to overview the next steps.

Six years ago, on a cold but sunny day, I watched solar collectors being assembled and installed on a house that our office had designed. At that time, there were no U.S. companies that supplied solar equipment. The house, completed in 1973, turned out to be one of the first of the 1970s generation of solar buildings. Many of the problems that I experienced then, as architect for this early solar effort, can be avoided now. Everett Barber, Jr., who was mechanical engineer and subsequently mechanical contractor for the project, went on to receive patents for the collector design that was used, and a solar equipment company that he founded became one of dozens of manufacturers who now supply solar equipment components and packages for buildings. Solar equipment is now available, only waiting to be selected among the many products found in catalogs and solar building product data books.

In other respects, however, solar design is still as much in its infancy as it was five years ago. Solar heating is still conceived of as a luxury, particularly if thought of only as solar equipment such as building-mounted collectors. Even if architect and client are willing to consider solar energy, a basic question remains: what is the best way to integrate solar energy concepts into the design process? This question, still unanswered five years after the first widespread efforts began to build practical solar buildings in the U.S., is fundamental to whether solar building design will ultimately make an important contribution to the urgent energy and resource needs in the U.S. and the world.

A confident answer of how best to integrate solar energy into the design process may require another five years of experience. But already, many architects have become skilled solar designers and have developed special expertise that is rewarded by new work for which they would not otherwise be considered. All of these practitioners, whether involved in residential or commercial work, have some common approaches to solar design, learned from hard-earned successes or disappointments. A general summary, though hardly exhaustive, might be as follows:
1) *The solar potential is identified at the earliest schematic design stage and conceived of as a form-giving basis of the architectural solution.* The designer must know the general criteria imposed by solar design, in terms of required orientation, size and placement of solar collectors (including windows), storage, and distribution. These design criteria are easily learned from available texts and manuals. The skilled solar designer will know the advantages and disadvantages of both "passive" and "active" systems and consider them both in the schematic design, delaying system-type selection to later phases in design. The selection of passive and active elements depends upon specific opportunities available with each project, as a function of climate, building type, construction method, and financing method (Reference 1).
2) *In order to develop various solar (and other climate design) options, methods of evaluating relative cost and performance are used early in the design process.* Although each design firm has its favorite methods, all use one or more of the calculation methods available to estimate the potential solar contribution of a design alternative. Construction costs are calculated to see if one or several alternatives are worth pursuing. Here previous solar project experience is invaluable and distinguishes those firms that have succeeded in making solar design affordable. All have taken the time to learn firsthand the step-by-step construction details of the particular solar concept that they are proposing. This appears to be the only way that the solar designer can presently become confident of the accuracy of construction cost estimates that are provided.
3) *Because solar design involves questions of comfort, climate control, and energy conversion equipment as basic to the design concept, the mechanical engineer is consulted early in the design phase.* Solar design, in this sense, requires close coordination of architectural and mechanical engineering concepts. Some larger firms have developed in-house mechanical engineering skills. Some leading solar architects have become extremely conversant with engineering concepts at both a conceptual and a technical level. It is not necessary that architects become technical experts. They do, nonetheless, have to initiate a collaborative working relationship with the engineer responsible for the mechanical design.
4) *The final construction and installation costs related to the solar design are kept in line by understanding and using established project cost control methods.* Here, as with cost estimates at the schematic stage, those architectural firms that are rigorous in validating construction cost proposals are "bringing solar projects in" under budget. The solar-heated Armory in Norwich, Ct, by the firm of Moore, Grover, Harper was built for $30.75 per sq ft, including its large solar mechanical system, which is in line with comparable building types with conventional construction and heating plants. This example and others like it show that passive and active sys-

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tems can be combined into a pleasing design, on a budget and without special government funding.

5) *Before being finalized, construction details are reviewed with the builder.* Contractor involvement during the design process is important, not only in validating costs and details, but also in lowering the fear of the "unknown" that is present if a builder is unfamiliar with a proposed design. Construction sequence is an important issue when many different trades are involved, as is typically the case with passive or active systems. The construction documents must make the trade and/or manufacturer-supplier responsibilities particularly clear.

These factors that characterize the work of firms involved with solar design are, perhaps, part of any successful practice involving new building concepts. In this respect, firms that are open to innovation in design and practice will do well with new solar design and engineering concepts.

The next five years

For many architectural firms, the experience with solar design has been salutary. They have found ways to avoid the usual pitfalls by developing their solar projects as described above. But even after completing one or more solar buildings, many designers will say that only then are they beginning to understand solar design.

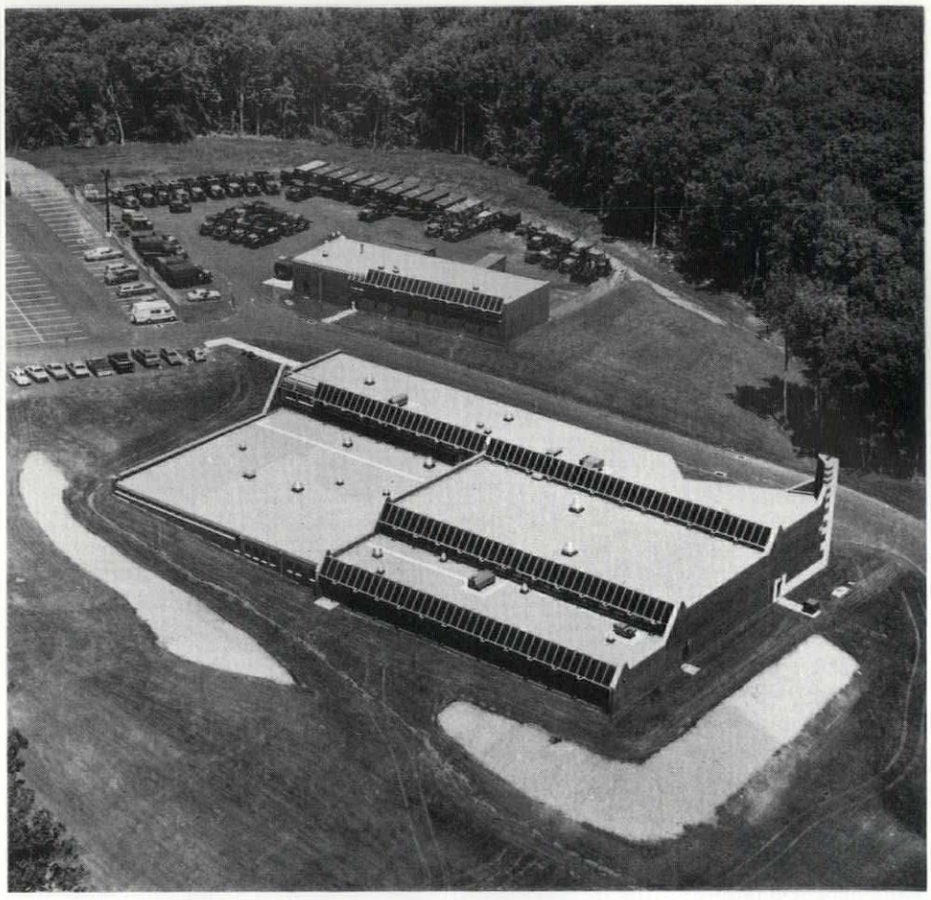
There are several explanations for this sentiment, both related to the fact that solar energy design should not be seen as the application of new equipment to old building concepts, but instead as the basis for rethinking about those old building concepts in the first place. The design methods and concepts that make this rethinking easier are only now becoming apparent.

Energy concerns are a particularly powerful determinant of architecture, just as they have been responsible for changes in current economic and political life. In this section, I would like to discuss three ways in which solar design might be developed from where it is now—as a bit of an oddity that is often thought of simply as putting solar collectors on buildings—to a point where all architects might consider themselves solar designers because they have become knowledgeable about three related concepts of solar energy use: *climate, efficient energy conversion in buildings,* and *conservation of limited natural resources.* Each of these has quantifiable terms that relate to the design process.

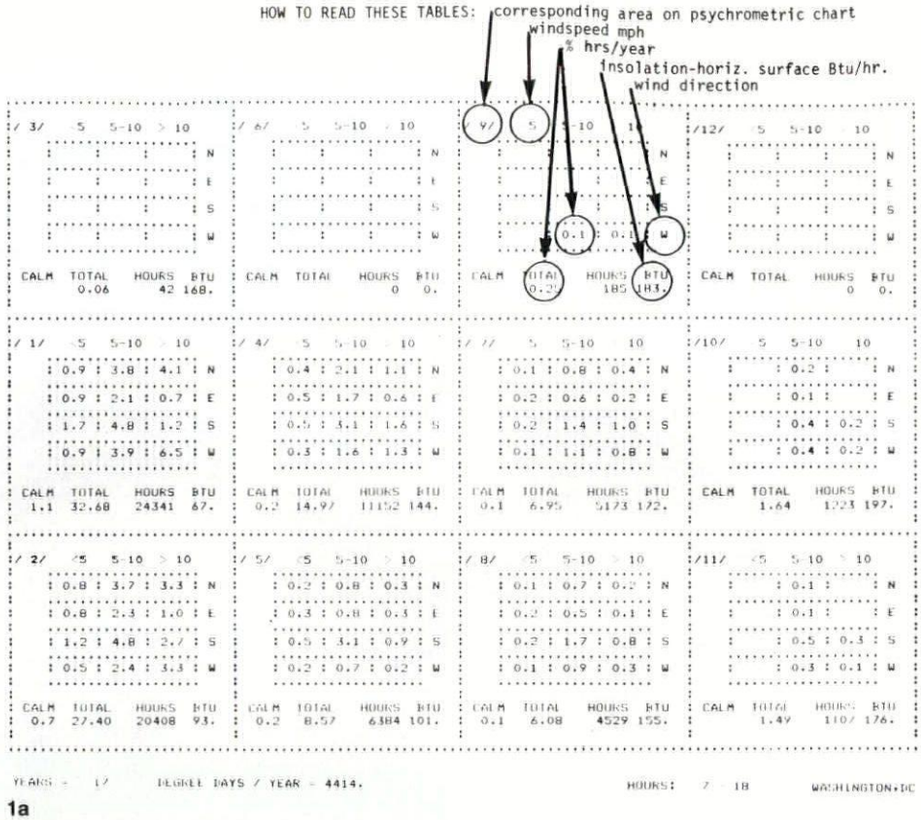
It is essential that the designer understand the issue of quantification of energy. National building energy performance standards and regulations will require that the projected energy performance of every new building design be quantified. Just as an architect has been traditionally responsible for the structure of a building, or the durability of its materials, or its construction cost, an additional charge is imposed upon the architect: to be responsible for the energy cost of a building. The federally mandated energy budget estimate, if passed into law as currently proposed, will be based on the final construction drawings. The process of accurately calculating annual energy performance of a complete design is not simple. There are "long-hand" calculation methods that have been traditionally used for sizing mechanical equipment, but only dynamic simulation, using computer programs such as NBS-LD and DOE-2, together with hourly climatic data available on NOAA weather tapes, gives a reasonably accurate simulation of energy performance. Up to now, this level of quantification has been used in mechanical engineering design for only a small percentage of buildings built each year, usually large commercial structures.

Quantification after the building is designed is too late to be useful for the designer. Unless the designer uses methods by which energy implications are considered early in the design phase, meeting the energy budget as a measure of minimally acceptable energy performance might simply become a burdensome exercise, rather than an incentive to maximize energy savings. The designer chould calculate energy implications during design, before one alternative is selected over another. Moreover, if an architect is to use solar design elements that are most practical for a given climate and building type, the interrelationship between climate, building design, and mechanical system has to be quite precisely understood. Otherwise a glass-covered masonry wall, so effective as thermal storage when exposed to the sun in winter, might impose a penalty on the cooling system in summer (by being slower to cool than a light structure and thus unable to benefit from small but otherwise comforting temperature drops on summer nights). Or a solar-assisted mechanical system might be duplicating the solar heat collection capacity of a large, south-facing window area. These instances illustrate two basic design questions: first, to select design elements that are appropriate year-round, matched to the annual climate profile and, second, to apportion architectural and mechanical strategies so that they complement one another.

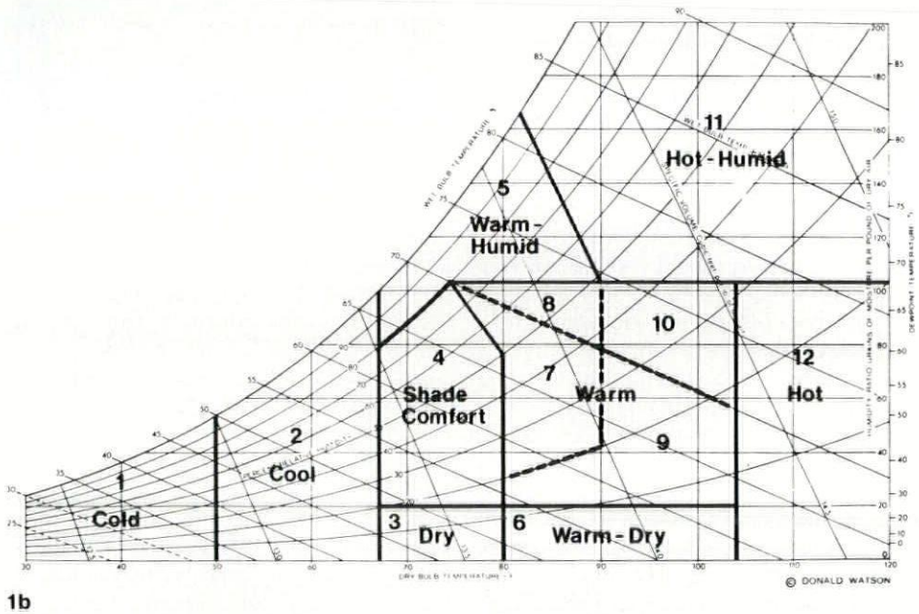
Some quantitative methods and tools that might be used to help make these choices are illustrated in the remaining sections of this article, in order to respond to this question: *at what points in the design process is it possible to be precise about the energy implications of design choices?* The earlier in the design process that solar energy concepts are consid-



Armory in Norwich, Ct by Moore, Grover, Harper shows solar buildings can be "on budget."



1a



1b

ered, the easier the design integration will be—and the better the result.

1) *Climate: the natural resources available at the building site.* Designing buildings to suit the particular exigencies of regional climate is an honored, though recently neglected, subject in architecture. Before the advent of air conditioning and other small-sized energy conversion equipment, building climatology was the subject of architectural research and of frequent articles in professional and popular journals. But beyond following general "rule-of-thumb" guidelines, it has not been possible to validate how any particular climate design element will work year-round as one component in an integrated design, such as a solar-oriented window for winter heating or partly underground placement of the building for earth-sheltering, or an open building plan for summer ventilation. Each of these elements might meet a climate design requirement at a particular time of the year, but the design questions are how they might work together and how they work year-round.

Illustration 1 shows how a site-specific climate design profile can be developed using several computation methods. The first is the NOAA (National Oceanographic and Aeronautical Administration) weather tapes available for over 300 US locations, from which simultaneous temperature, humidity, and wind data can be retrieved, as measured hour by hour for more than 17 years. Solar irradiation available at the location can be added to NOAA data by computation.

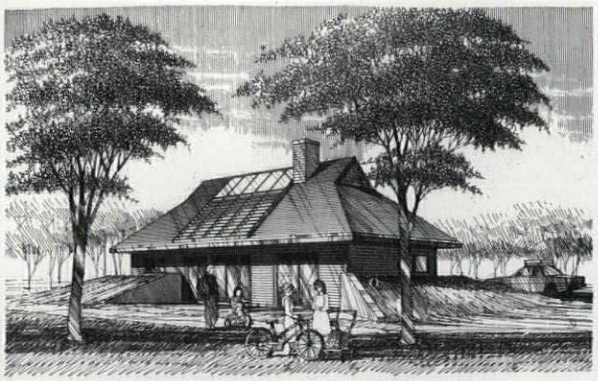
By analyzing simultaneous climatic data for a given site, it is possible to determine the percentage of hours per year that the ambient climate conditions are outside the comfort zone (with respect to the psychrometric chart), together with wind speed and direction and solar irradiation available at each point in time to help solve a given condition. The designer can thus determine the specific solar-related design strategies that are best matched to the local climate for natural heating and cooling. The second computation tool used in the climate design project shown in Illustration 1 is a rewritten version of NBS-LD, by which the effects of the most promising climate design elements are simulated on a "base building" (which could be described for design purposes as the schematic design). This provides a quantified measure of energy-saving effectiveness of specific elements, alone or in combination. The value of the dynamic calculation is that the designer is able to assess thermal time-lag, mean radiant temperature, and other corresponding energy transfer effects in a specific build-

Three steps of climate design

Step 1: Analyze local climatic data. 1a) shows a summary of hourly climatic data for Washington, DC during the daytime. Each "bin" corresponds to a distinct set of drybulb and wetbulb data indicated on the psychrometric chart 1b), which defines the limits of specific passive design strategies (reference 2).

Step 2: Select overall passive design objectives. 1d) is a summary tabulated from 1a), indicating the percent hours per year that particular climate design strategies might be considered. The data in 1a) also indicate the wind speed and direction, and solar radiation available for each objective.

Step 3: Quantify the relative effectiveness of various climate design options. Although not all design choices can be accurately quantified, many can be modeled in a computer simulation using hourly weather data. 1e) shows a summary of various heating season options identified as appropriate to Washington, DC from the previous steps. Each option is simulated on a "base case" (in this example, a typical builder's house). The percent improvement in energy savings during a winter design week is tabulated in the righthand column. ("B" indicates that the option is included in the base case.) Option #29 is a Trombe Wall, insulated at night, which shows a 21 percent improvement over the base house. The most dramatic results are obtained by combining options 11, 19, 28, 40, and 42, achieving a 43 percent saving. These options were then selected for the proposed design, shown in 1c). (Reference 3.)



1c

identify strategies

WINTER	% hours/yr. day	night	SUMMER		
1,2 MINIMIZE CONDUCTIVE HEAT FLOW	60	73	12 MINIMIZE CONDUCTIVE HEAT FLOW		
PROMOTE SOLAR GAIN			5–12 MINIMIZE SOLAR GAIN	25	
MINIMIZE EXTERNAL AIR FLOW			5,7,8 PROMOTE VENTILATION	22	18
MINIMIZE INFILTRATION			6,7,9 PROMOTE EVAPORATIVE COOLING	07	01
DELAY PERIODIC HEAT FLOW			7–10 PROMOTE RADIANT COOLING	15	04
			7–10 DELAY PERIODIC HEAT FLOW	15	04
USE MECHANICAL HEATING			11,12 USE MECHANICAL COOLING	02	
3 USE MECHANICAL HUMIDIFICATION			11 USE MECHANICAL DEHUMIDIFICATION	02	

1d

Winter Strategies | **Summer Strategies**

% hrs/year	MINIMIZE CONDUCTIVE HEAT FLOW	PROMOTE SOLAR GAIN	MINIMIZE EXTERNAL AIR FLOW	MINIMIZE INFILTRATION	DELAY PERIODIC HEAT FLOW	USE MECHANICAL HEATING	USE MECHANICAL HUMIDIFICATION	MINIMIZE CONDUCTIVE HEAT FLOW	MINIMIZE SOLAR GAIN	PROMOTE VENTILATION	PROMOTE EVAPORATIVE COOLING	PROMOTE RADIANT COOLING	DELAY PERIODIC HEAT FLOW	USE MECHANICAL COOLING	USE MECHANCIAL DEHUMIDIFICATION		
DAYS	60								25	22	07	15	15	02	02		
NIGHTS	73									18	01	04	04				WINTER
	●			●												8 Minimize the outside wall and roof areas (ratio of exterior surface to enclosed volume).	02
		●														9 Shape and orient the building shell to maximize exposure to winter sun.	B
	●		●	●	●			●	●				●			11 Recess structure below grade or raise existing grade for earth-sheltering effect.	05
	●															15 Use attic space as buffer zone between interior and ambient climate.	B
	●				●											16 Use basement or crawl space as buffer zone between interior and ground.	B
		●														19 Place high capacitance materials to receive direct or reflected irradiation (interior floors, walls, ceilings).	04
		●														20 Provide solar-oriented interior zone for maximum solar heat gain (sun room, atrium, greenhouse).	05
				●												22 Use vestibule "air-locks" at entryways.	0
	●			●												23 Place low use spaces, storage, utility and garage areas to provide climatic buffers.	04
					●								●			24 Use slab-on-grade construction without ground insulation for ground temperature heat exchange (perimeter insulation only).	06
	●															28 Select insulating materials for resistance to heat flow through building envelope.	12
		●														29 Use solar walls and roof collectors on south-oriented surfaces.	21
		●														30 Use heat retaining and absorbtant surface materials on surfaces oriented to winter sun.	0
		●										●	●			32 Select high capacitance materials to control the timing of heat flow through the building envelope.	0
									●			●				35 Provide shading overhangs for walls exposed to summer sun.	/
	●															40 Provide insulating controls at glazing.	10
	●															41 Minimize window and door openings on north, east, and/or west.	10
		●														42 Maximize south-facing glazing (windows, patio doors, skylights).	18
									●							47 Provide shading for glazing exposed to summer sun.	/
																Add #11, 19, 28, 40 & 42	43

1e

ing design in a specific climate.

The relative effectiveness, or "rank order" of merit, of various climate design elements can thus be compared, using representative "design weeks." The important results shown by dynamic calculation are that any number of different design options can yield similar energy savings, and moreover, the effect of combining elements is greater than the sum of each part. This is why solar buildings require an integration design process.

2) *Efficient energy conversion in buildings.* By optimizing the climate design strategies described in the preceding section, mechanical system requirements are reduced. A solar building might be defined as an energy converter that uses efficiently all its available on-site energy (wind, sun, water, and ground temperatures). Before one can design the building for good energy efficiency, it is necessary to ask in conceptual terms what in fact is the purpose of the equipment we use to supply energy to buildings.

For buildings, the principal requirement of energy is for space-conditioning energy for heating, cooling, and humidity control to create comfort conditions. These are "low temperature" requirements. Like many other related building and service energy demands in the agricultural and industrial sector (greenhouse heating, crop drying, lumber drying, materials storage), heat at temperatures sufficient for space heating, humidity control, and absorption chilling can be supplied by on-site solar systems. A preliminary solar design task of architect and engineer is to arrange spaces and the means of energy exchange to use the lowest possible delivery temperatures for space conditioning. This affects the entire process of heat exchange in a building, in particular the method of heating individual surfaces and spaces.

Solar equipment cannot be "plugged in" to replace an oil-fired boiler or efficiently meet the high delivery temperatures for which current heating distribution systems are engineered. An example of this is the hydronic baseboard heater, on which the fin tubes are designed for temperatures in the range of 180 F. While some solar collectors do supply heat at higher temperatures, overall solar system efficiency is greatly improved if, instead, the heat distribution system is designed for *lower* delivery temperatures. This is the reason current solar mechanical systems work best with forced warm-air systems, sized to move air at temperatures as low as 90 F. This can be accomplished when duct runs are small, such as in houses and small commercial buildings. But for large buildings with long runs of pipes or ducts, higher delivery temperatures are needed. There are many ways of overcoming these constraints: radiant heating systems work well with low temperatures; heat pumps can utilize heat in solar thermal storage as low as 32 F, efficiently raising it to usable space heating temperatures; baseboard radiator surfaces can be increased to be efficient at lower delivery temperatures, but this requires larger heating elements in each space.

Thus the architect needs to deal with mechanical system concepts at the earliest phase of the design. In turn, the mechanical engineer should be able to offer conceptual design solutions that address the generic problem of climate control.

In solar design, a major decision required in the conceptual stage is the extent to which solar heating (passive or active) can be used. Current calculation methods for both passive and active solar heating permit the architect and engineer to obtain a rough estimate of the "solar fraction"; that is, the percent of annual heating energy that might be obtained from a given collector area and collector type. However, the dynamic interaction between active, passive, and other energy conservation methods is complex and not amenable to accurate prediction using currently available calculation methods. The efficiency of total heat collected from solar collectors, stored, and ultimately used for heating is directly dependent upon the temperatures in solar storage. The cooler that the storage is at the beginning of a sunny morning, for example, the more heat the collectors can capture during that day. If the temperature in storage has not been "drawn down" the previous night by the building heating requirement, the temperature differential to be picked up from the collectors may not justify collection. These are factors that directly influence the "efficiency of utilization," which is as important as the collector efficiency itself.

Up to this point, the dynamic simulation of the interaction between active and passive design alternatives, as a function of climate and building load, has been what one researcher calles the "holy grail" problem of solar design calculation. But the computation is possible, as demonstrated by the work shown in *Illustration 2,* in which an active solar collector system is added as a design element on the "base building" described in Illustration 1. In Illustration 2, the active system is compared to a "base building" without large passive gains and then to the same building with a large south-facing window area for maximum passive gain. It shows that just as the building design elements can be optimized as in Illustration 1, the combination of passive and active systems can be optimized, again yielding results that are greater than obtained by using one approach to the exclusion of the other.

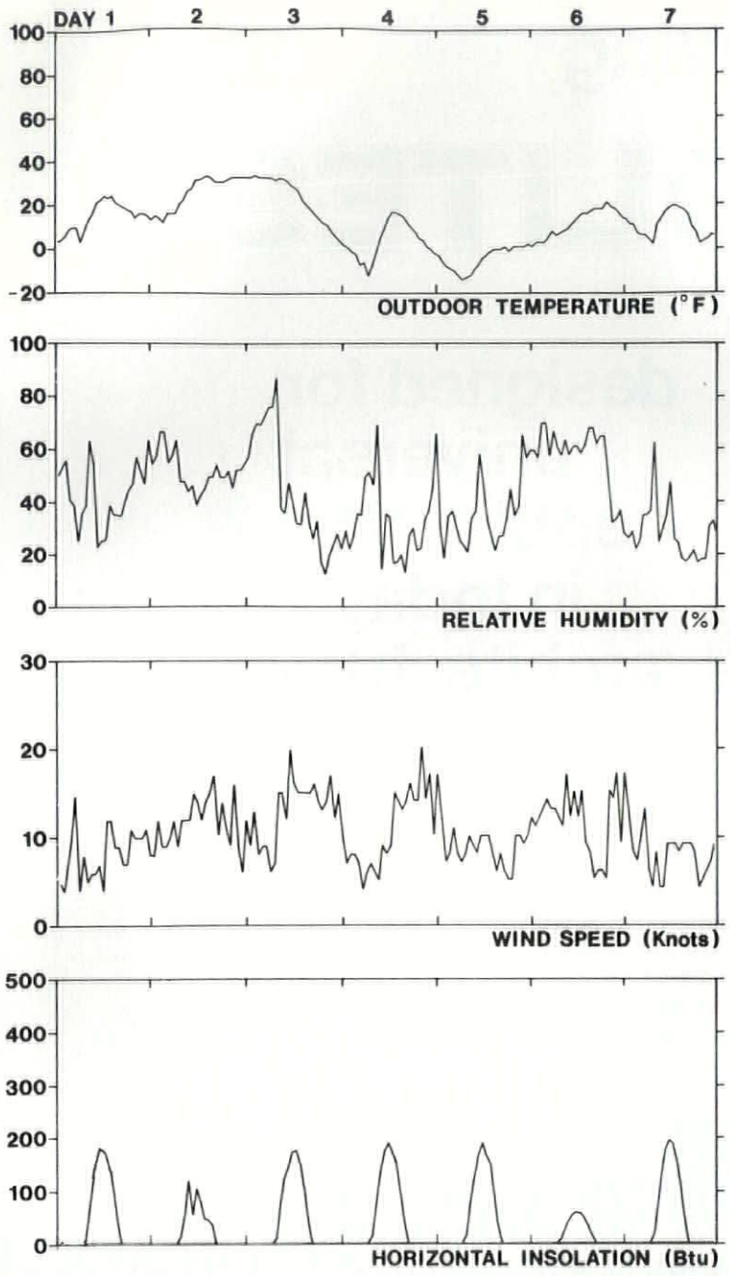
Thus, computation tools are available by which to integrate passive and active solar elements in ways specific to each site and building configuration. It is clear that as research proceeds, solar design rules can be derived that will break down the now artificial distinction between passive and active elements, and that we can use computer simulation rather than full-scale buildings for our learning experience.

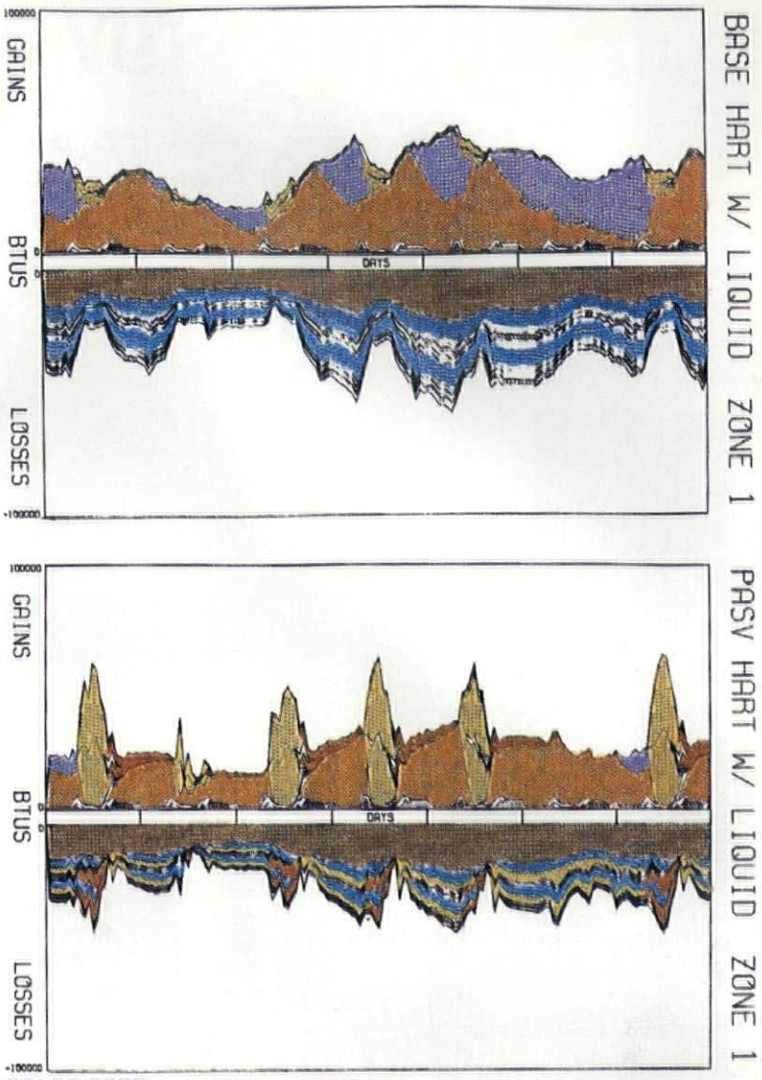
3) *Conservation of limited natural resources.* Up to this point, solar design has been discussed in technical terms. But a solar design system is not simply a "technical fix," which once in place will permit us to continue to disregard constraints imposed by limited natural resources.

Solar energy is an untapped resource available at every building site in many usable forms: sunlight in the visible spectrum for natural illumination; sunshine for photovoltaic power generation and solar thermal heating; wind for natural ventilation and evaporative cooling effects; and the diurnal and seasonal effects of solar-driven temperature changes, which in turn make possible the climate design strategies of radiant cooling, thermal time-lag, and earth-sheltering. The glass cover on the solar-oriented building and on the solar collector traps the sun's heat by the greenhouse effect and raises the temperature of the enclosed space and materials to serve a useful purpose. Solar building designs, like the water wheel or windmill, take a diffuse form of energy (sun, rain, wind) and raise its work potential.

Because energy waste is minimized when energy is supplied at a temperature close to its end-use requirement, solar building designs and collector equipment are more efficient in Second Law terms than the distant power plant which produces energy at thousand-degree temperatures for the same end use, much of which is subsequently lost in conversion and transmission. The cost of the total energy infrastructure that supplies building energy should be included in any cost-effectiveness evaluation of energy alternatives at the building scale. A building whose design is matched to its climate, whose walls are matched to each orientation, whose windows admit natural light, solar heat and/or ventilation, is already reducing fossil-fuel energy requirements. Their cost savings pyramid beyond the building site by savings in the energy infrastructure and in natural resources that would otherwise be expended in the transmission network, power plant size, energy supply and storage transport, and land cost.

Energy—in Btu, in kWh, in calories, or





COLOR CODE:

yellow	windows
blue	ceilings
orange	active solar system
purple	auxiliary heating system
rust	mass on interior
brown	infiltration losses

whatever units one wishes to use—is a measure of the exchanges in resource potential that are made in allocating human and natural resources. Except for solar energy, the global environment has only a limited energy supply. In Howard Odum's words, earth is a "closed system."

The sun provides our only energy income. Economic costing methods based on currently subsidized conventional fuel costs do not adequately account for real energy costs, particularly for the future replacement of scarce resources. Eventually, true energy costs will have to be reflected in monetary costs, which are after all intended to represent resource values. Any building that is exposed to sun and wind (and earth temperatures) can maximize an existing energy resource, the sun, and its many impacts on earth climate. By proper design, solar buildings reduce our inflationary consumption of limited energy and resources. The architect thus has the primary responsibility, together with unprecedented opportunities, in applying current energy concerns and measures to buildings. In terms of energy economics, solar energy is not a new element to add to the equation of design. It is the equation. □

Acknowledgements: The research reported in this article was made possible through a Fellowship in Environmental Affairs from the Rockefeller Foundation, whose support is gratefully acknowledged. The computations for the illustrations were performed on two proprietary computer programs, EQUINOX (ARGA Associates, New Haven), and SUNSYM (Sunsearch, Inc., Guilford, Ct), with the invaluable assistance of the following at Yale School of Architecture: Everett Barber, Jr., Robert Frew, Keith Harrington, Tom Lydon, and Carleton Williams.

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Combining passive and active solar design. To test effectiveness of passive and active solar systems together, the base case house described in 1a) was simulated in a winter design week using Hartford, Ct weather data 2a). Illustration 2b) shows the performance of the base house with an active system attached; 2c) shows an identical active solar system, but added to the "preferred passive" option identified in 1d). The benefit derived from combining active and passive systems is dramatic, resulting in a tenfold reduction in energy:

Base house with active system (liquid):	
Auxiliary energy required	3.4 MBtu
Supplied by active solar system	3.1 MBtu
Total energy required	6.5 MBtu
Passive house with active system:	
Auxiliary energy required	.3 MBtu
Supplied by active system	2.1 MBtu
Total energy required	2.4 MBtu

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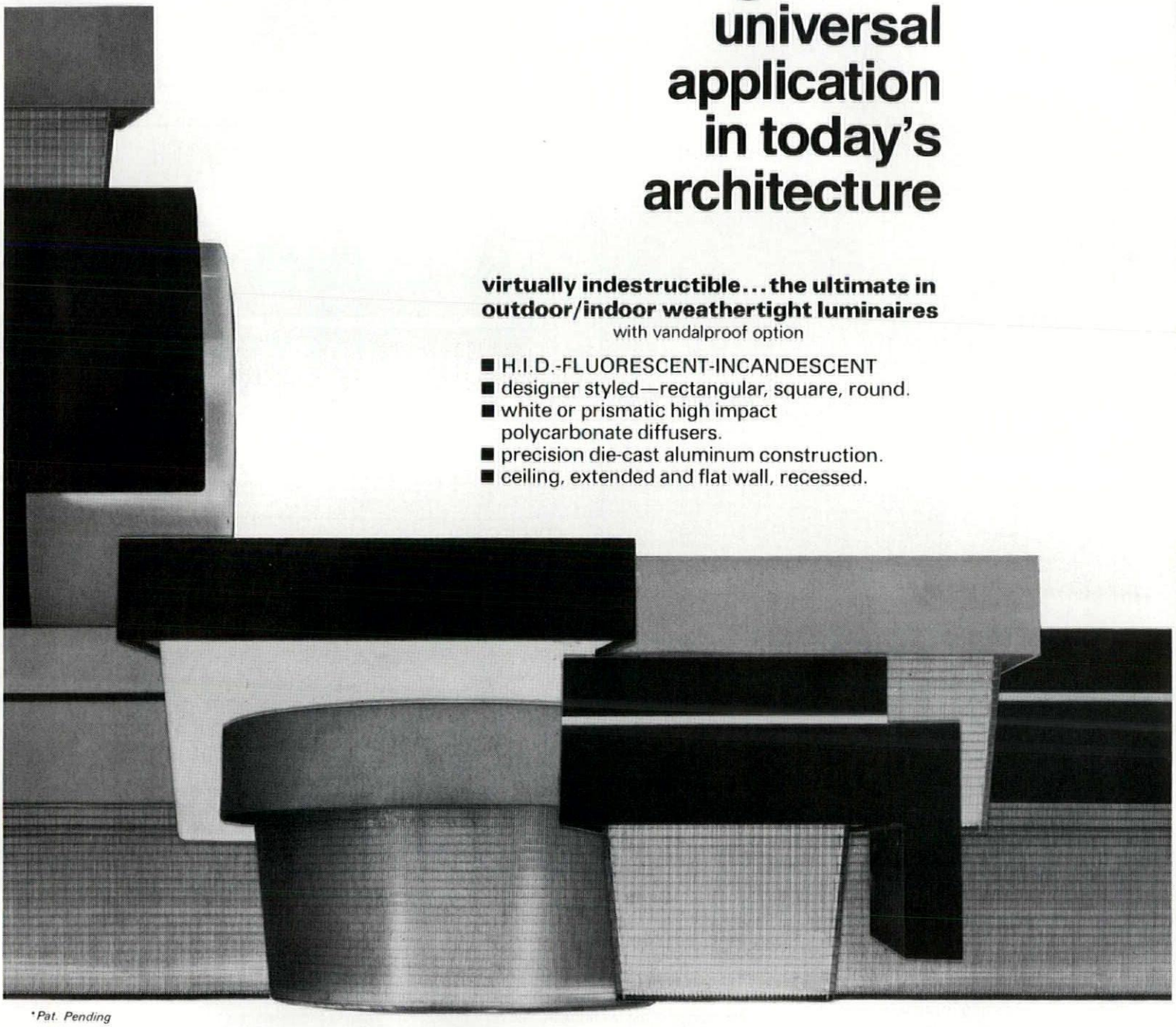

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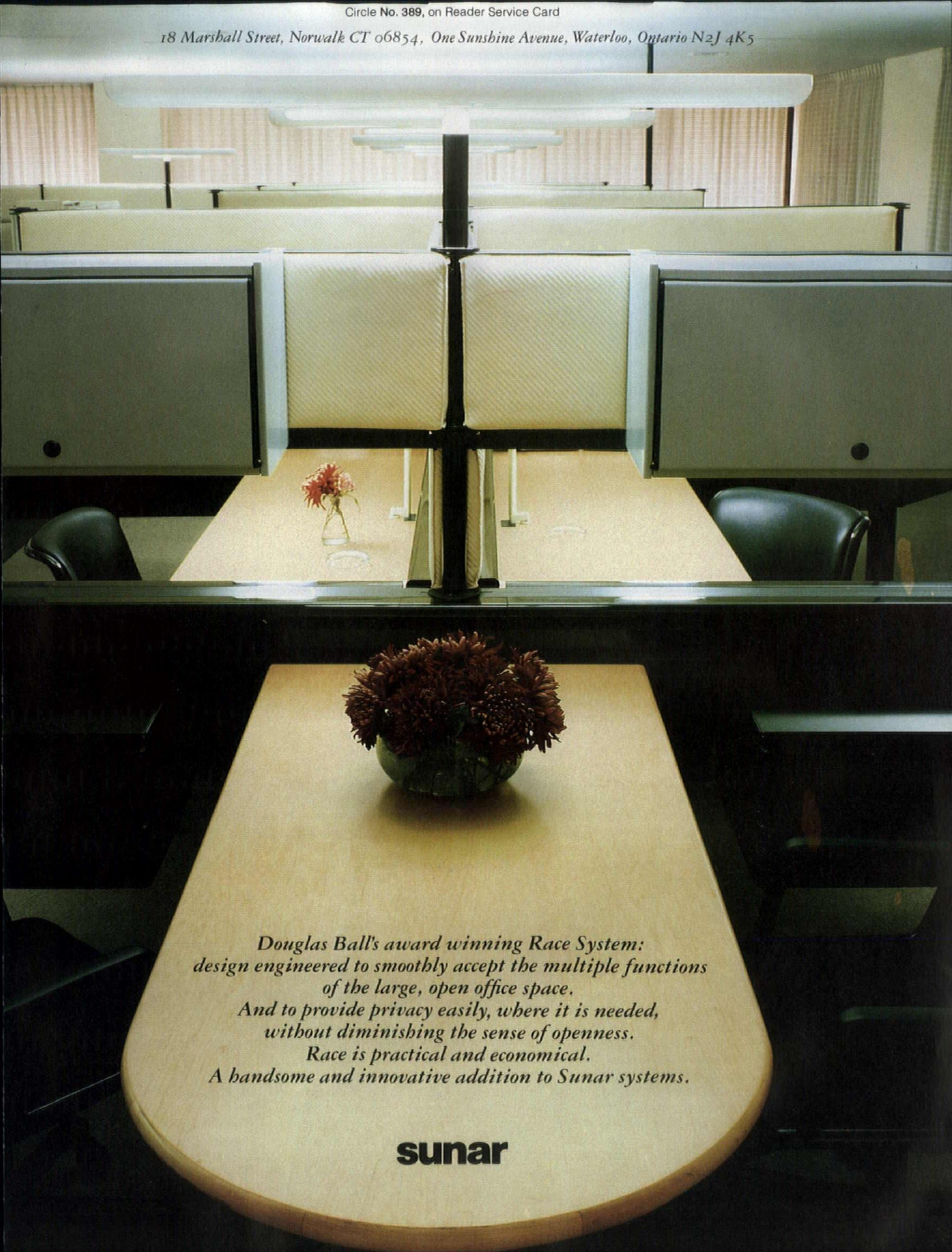

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Similarly, if the contractor-subcontractor agreement provides for the arbitration of disputes and the owner-contractor agreement does not, the general contractor may be subject to conflicting decisions in respect to his rights or liabilities insofar as they relate to the performance of the subcontractor. To circumvent this problem, construction contracts may contain provisions addressed to protect the general contractor from being "caught in the middle." Such provisions, however, unless artfully worded, can engender additional litigation calling for their interpretation. For example, the Court of Appeals of New York has recently been required to interpret the provisions of a contractor-subcontractor agreement as they related to the arbitration of disputes in the context of a pending litigation instituted by the owner against the general contractor involving the subcontractor's work (*In the Matter of the Arbitration Between HRH Construction Corporation and Bethlehem Steel Corporation,* 45 N.Y. 2d 675).

The facts in this case involved a claim by the subcontractor, a steel fabricator, against the general contractor for Citicorp Center, a commercial complex in the City of New York, which claim was for the contract balance, extra work, and damages for breach of contract. The subcontractor demanded arbitration of his claim under the provision in the contractor-subcontractor agreement which provided that all disputes were to be determined by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. Nine days after the subcontractor's demand for arbitration had been made, the owner commenced a court action against the general contractor for damages allegedly resulting from delays in the project caused by the subcontractor. The general contractor then sought a stay of the arbitration between himself and the subcontractor.

It was the contention of the general contractor that any judicial determination in respect to a dispute between the owner and himself involving the subcontractor's work was binding upon the subcontractor and that arbitration with the subcontractor was precluded. The general contractor relied upon the provision of the subcontract which provided that "any determination reached by any Court or any Board of Arbitration duly constituted and appointed under and by virtue of the terms and provisions of the Contract between the Contractor and the Owner in any wise involving . . . the manner or sufficiency of the performance of the work . . . undertaken to be done and performed by the Subcontractor, shall, with like force and effect, be determinative and conclusive of any controversy or dispute with reference thereto between the parties" to such agreement.

The Court of Appeals concluded that the general contractor's position was too broad, stating:

"So to interpret the proviso would produce clumsy consequences which we cannot conclude that the draftsmen intended. Thus, what would initially be arbitrable in consequence of the institution of judicial or arbitration proceedings by a third party, the owner, producing an aberrational result–arbitrability would then hinge on the act of one not a party to the controversy between the general contractor and the subcontractor. Beyond that, the timing of the third-party act might become significant, even determinative. Thus, what would be the consequence if the proceeding brought by the owner were not begun until after the expiration of the statutory 20 days within which an application for a stay of arbitration must be made or, even later, after the arbitration hearings had begun? In another perspective would it be open to the general contractor to defeat the subcontractor's right to arbitration by itself instituting an action against the owner? Had the parties intended such apparently bizarre results they could have chosen unmistakable language to prescribe it."

The Court concluded that the more reasonable analysis of the contract between owner and subcontractor was that although all disputes were to be arbitrated, in the event of a parallel proceeding between owner and general contractor, the decision in such proceeding would be determinative and conclusive in the arbitration proceedings. The Court said:

"In other words the exception phrase and the proviso are to be read together as meaning that all disputes are to be submitted to arbitration in the normal manner except that as to disputes which are also raised in proceedings between the owner and the general contractor, the results in the latter shall also determine the outcome in arbitration between the general contractor and the subcontractor. Perhaps to counter possible claims of unfairness, express provision was made for the general contractor to bring the subcontractor into the owner's action or proceeding. Viewed in this light, the proviso clause establishes a reasonable means for bringing about a practical consistency in the results of two associated but otherwise potentially independent proceedings."

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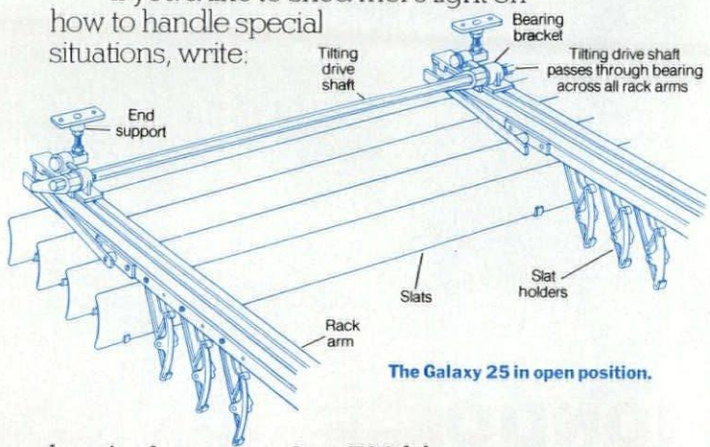

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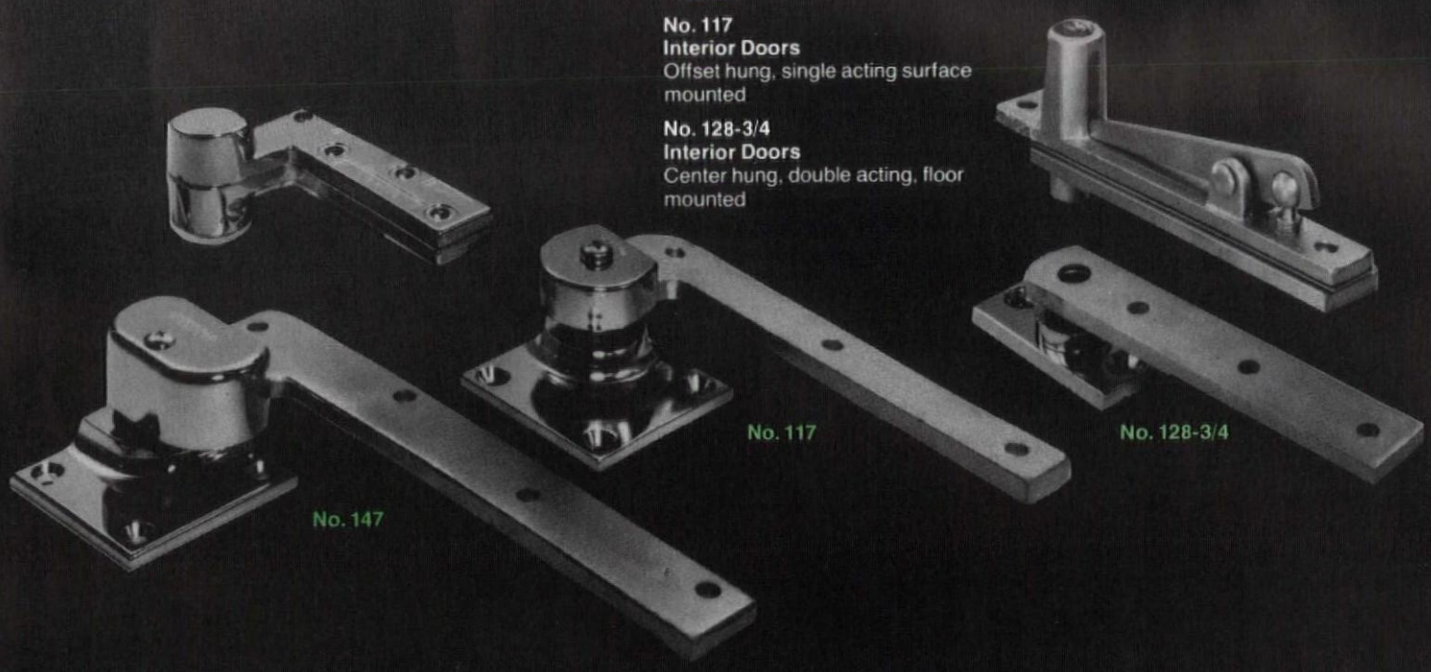

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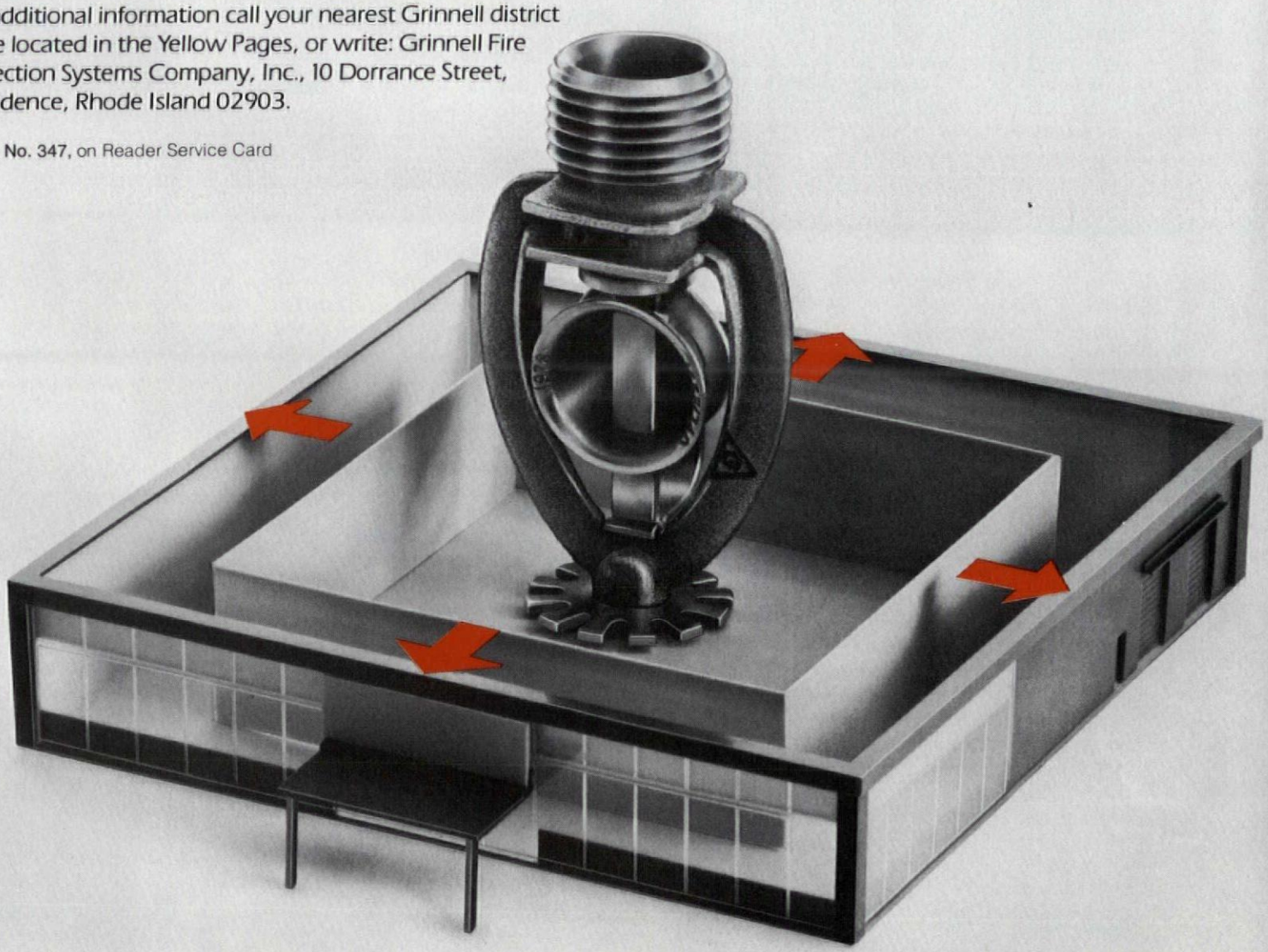

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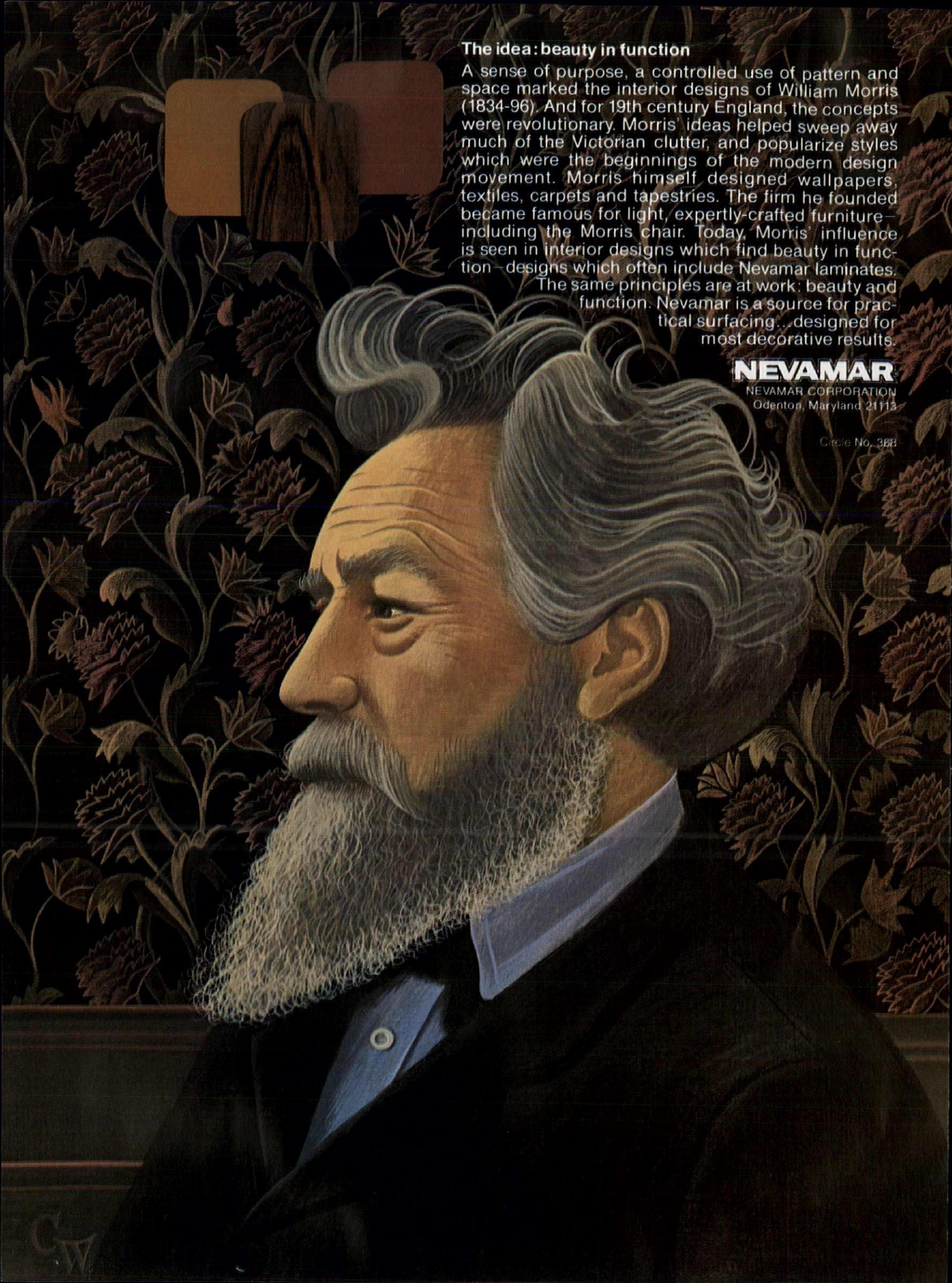

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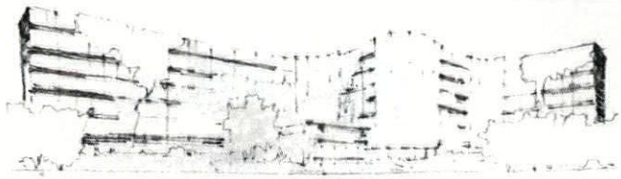
Aalto's sketches



Baker House, MIT, Cambridge, Ma, 1947.

Alvar Aalto/Sketches, *edited by Goran Schildt, translated from the Swedish by Stuart Wrede, MIT Press, Cambridge, Ma, 1978, 181 pp., $25.*

Reviewed by Leonard K. Eaton, professor of architecture, University of Michigan, Ann Arbor.

For many years students of the work of the late Alvar Aalto have regretted the scarcity of statements by the Finnish master about his approach to architecture. Indeed, during his lifetime Aalto was known as perhaps the least verbal of architects. More than once he turned aside queries with the simple statement "I build." It was known that he had made a few public addresses, as when he went to Vienna to receive a medal in 1955, but these were generally buried in rather inaccessible periodicals. Now, MIT Press has done us all a service by publishing a substantial selection of Aalto's writings in a translation from the Swedish by Stuart Wrede. It is accompanied by a few strictly architectural drawings and a number of sketches made by Aalto on journeys in the Mediterranean countries and North Africa. Of the drawings, the perspectives of the Baker dormitory in Cambridge (1947) and the church and town hall at Seinajoki (1961) are probably the most significant, though the "Fan shaped joint for a chair" (1964) will interest all who perceive a close relationship between Aalto's furniture designs and his architecture. Between the writings and the drawings there is often an extremely close connection. It is this connection that makes the book so valuable.

The writings fall into two general classifications. First, there are articles or brief notes written for architectural periodicals and, in one or two cases, for newspapers. These are essentially commentaries on the important issues which agitated the world of Aalto. Hence we find two spirited defenses of the Stockholm Exhibition of 1930, which was so important for the development of contemporary architecture in Scandinavia. There is also a fine piece, "E.G. Asplund in Memoriam," which suggests the depth of friendship between Aalto and the organizer of the Exhibition. There is also a fine tribute to Henri Van de Velde, which indicates the depth of Van de Velde's impact on Finnish architecture through Sigurd Frosterus and Gustaf Strengell. In the other classification are the formal addresses to professional organizations such as the R.I.B.A. discourse of 1957 and the previously mentioned Vienna lecture, "Between Humanism and Materialism." Taken all together, these essays provide us with the most extensive insight which we have yet been able to secure into the design processes of the Finnish master. Reading them is a bit like placer mining for gold. The nuggets are of incredible quality.

Consider, for example, Aalto's description of his thinking during the design of the famous tuberculosis sanatorium at Paimio:

When I received the assignment, I was myself ill and therefore had the opportunity to make a few experiments and find out what it really felt like to be sick. I became irritated at having to lie horizontal all the time, and my first observation was that the rooms were designed for people who are upright and not for those who

[Books continued on page 122]

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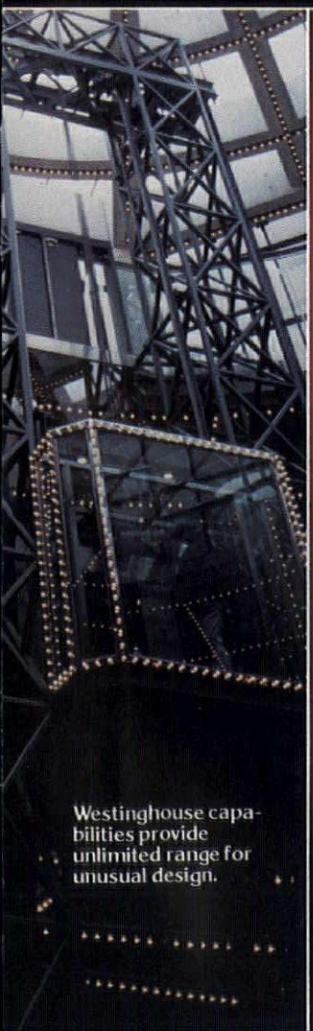

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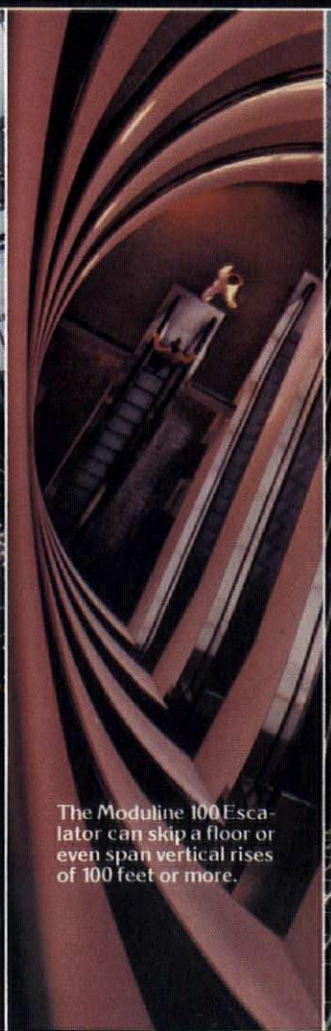

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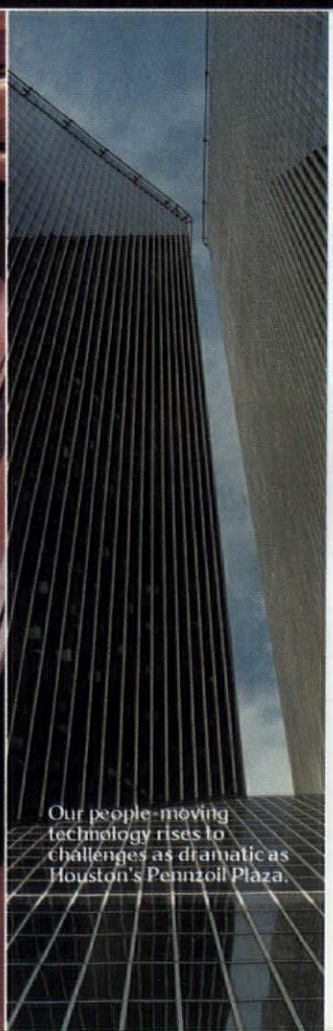

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Books continued from page 120

lie in bed day in and day out. Like moths to a lamp my eyes were constantly drawn to the electric light in the room, which was absolutely not designed for bedridden patients. The room conveyed neither balance nor calm. I therefore decided to plan the patients' rooms in such a manner as to provide a restful atmosphere for the bedridden patient. I did not use, for example, artificial ventilation, which causes a disturbing draft about the head, but designed a system that draws warmed air from the double paned windows.

This is just one example of how we can do our bit to alleviate people's suffering. Another example is the washbasin. I tried to design a washbasin where the running water makes no noise. The water hits the porcelain at an acute angle and therefore doesn't disturb the patient lying nearby.

This passage is of extraordinary interest in view of the large amount of money now being lavished upon problems of hospital design. It shows the approach of a great architect with an uncommon degree of good sense. Aalto may not have had all the tools of behavioral research, but he got amazing results.

Equally interesting is his more generalized description of the design process in an article in *Domus* of 1947:

When I designed the city library at Viipuri (I had plenty of time at my disposal, five whole years) for long periods I pursued the problem with the help of primitive sketches. From some kind of fantastic mountain landscapes with cliffs lit up by suns in different positions, I gradually arrived at the concept of the library building. The library's architectural core consists of reading and lending areas at different levels and plateaus, while the center and control area forms the high point above the different levels. The childish sketches have only an indirect connection with the architectural conception, but they tied together the section and the plan and created a kind of unity of horizontal and vertical structures.

Now these passages can be dismissed as studio philosophizing, but I do not think so. The evidence of the buildings themselves controverts any such belief. In my view they should be placed in the same category as Frank Lloyd Wright's famous description "Designing Unity Temple" in his *Autobiography*. Such thoughts are key items in the literature of the Modern Movement.

The drawings provide additional corroboration for this. They show that Aalto loved to draw, that he was extremely good at it, and that he often found on his travels the inspiration for forms which he later used in buildings. Thus the Windmill on Mykonos (No. 21) is full of the fan-shaped forms which are so characteristic of his architecture. Most of the drawings are done in a soft lead pencil, but for many he must have used a conte crayon. A few may have been done in pen and ink; it is sometimes difficult to tell from the reproductions. Others have the distinct quality of a study for a painting. Obviously Aalto was an architect for whom drawing was an essential activity. His commitment to the art should be a pointed lesson for all those students who go to Europe every summer armed only with a camera. His works are also, of course, of great importance in view of the emphasis American architects are now giving to the medium of drawing.

Three years after his death, the literature on Aalto is already extensive, and it may be expected to grow. Goran Schildt, who was Aalto's favorite critic and who edited this volume, notes some of the important items in his introduction: *Alvar Aalto: Complete Works*, published in Zurich in 1967, and the study by Paul David Pearson, *Alvar Aalto and the International Style*, which appeared last year. This small volume should certainly be read with these larger works, and it is not too much to say that it makes as great a contribution as any of them. There was always about Aalto something of the magician Kullervo, who plays such a leading role in the Finnish epic poem *The Kalevala*. Now we are beginning to see something of the emotional and intellectual processes behind the achievement of the seemingly magical results. □

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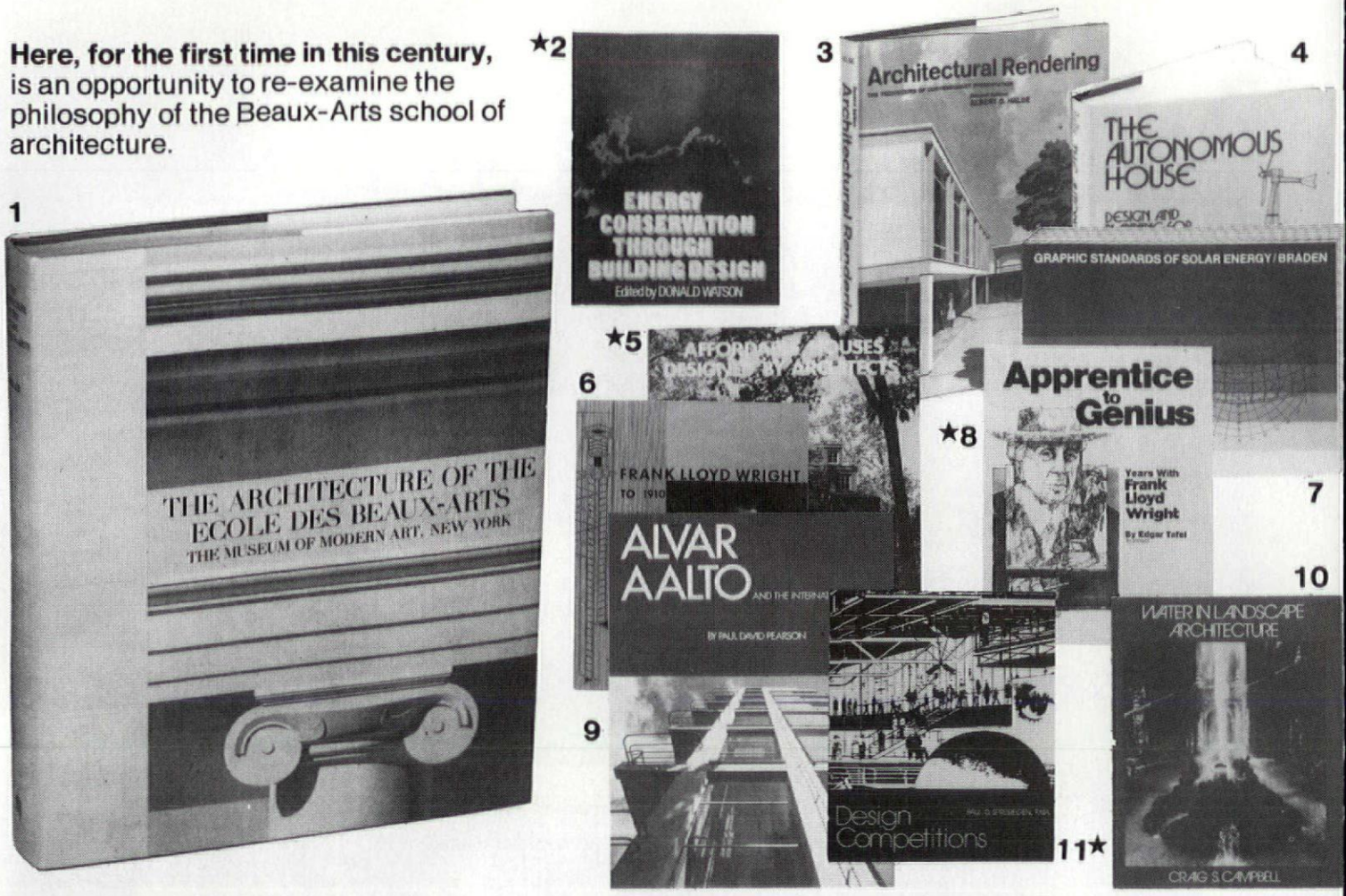

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288 pp., illus. . . . $34.50

In this copiously illustrated, clearly organized explanation of his value delineation system, the author presents a detailed description of the process which has resulted in these award-winning delineations that show realistically how a designed structure will appear when built.
Circle B614 under Books.

15 Structure in Nature is a Strategy for Design

By Peter Pearce,
245 pp., illus. . . . $45.00

An innovative and completely illustrated approach to architectural and environmental design, based on a study of responsive and adaptive structures in nature (molecules, crystals, living cells) that conserve energy and materials.
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16 Earth Sheltered Housing Design Guidelines, Examples, References

Prepared by the
Underground Space Center,
University of Minnesota
318 pp., illus. . . . $17.95

This comprehensive and timely study offers a comfortable and economic approach to underground housing based on modern construction techniques. Provides plans, details and photographs of existing examples, and shows how to design homes using such low-cost natural resources- and energy-saving systems as layers of soil insulation and passive solar heating.
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17 Drawing File for Architects, Illustrators and Designers

By Marc Szabo
251 pp., illus. . . . $13.95

This book provides over 200 pages of figures — in the most common and natural positions, activities, and types of wearing apparel, as well as dozens of drawings of boats and cars, all of which can be copied freely — by direct tracing, photostats, or photocopying machine. The pages tear out easily to form an easily accessible fingertip scrap file.
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18 Living by Design

By the Partners of Pentragram
300 pp., illus $15.00

Introduction: Using Design is by Peter Gourd. This informative book on the use of design covers product design, environment design, identity design, interior design, graphic design, living by design, exhibition design. (Soft bound)
Circle B618 under Books.

NEW★

19 Architectural Stained Glass

Edited by Brian Clarke
234 pp., illus. . . . $29.50

The contributors to this book (through their stunning designs) emphasize stained glass as a constructivist art form, taking it out of its medieval ecclesiastical context and putting it into a contemporary framework, both secular and architectonic.
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20 Working Drawing Handbok A Guide for Architects & Builders

By Robert C. McHugh,
166 pp., . . . $13.95

This guide is a step-by-step presentation on how to produce working drawings as an integral aspect of communication between designer and builder. Includes convenient check-lists, budgeting information, and data on dimensioning that helps minimize chances of error.
Circle B620 under Books.

21 The Architecture of Frank Lloyd Wright A Complete Catalog Second Edition

By William Allin Storrer,
456 pp., illus. . . . $15.00

This second edition, which documents all of the buildings designed by Wright, replaced a number of photographs with new ones that show the buildings to better effect, changed some copy in the text, and incorporated factual information that has come to light since the original publication in 1974.
Circle B621 under Books.

NEW★

22 New Profits from Old Buildings

By R.M. Warner, S.M. Groff,
and R.P. Warner
291 pp., illus. . . . $22.50

This first business-oriented guide to building preservation is based on 71 case studies of actual preservation projects of old structures, industrial facilities, neighborhoods and commercial districts. Explains how these companies became involved, what problems they faced, how they financed the projects, what benefits they reaped.
Circle B622 under Books.

23 Architectural Presentation Techniques

By William W. Atkin,
196 pp., illus $16.95

This book includes presentations ranging from simple sketches in pencil and pen-and-ink to elaborate drawings, photographs, slide presentations and various combinations of media achieved with overlays, camera techniques and modern reproduction methods.
Circle B623 under Books.

24 Rendering With Pen and Ink

By Robert W. Gill,
368 pp., illus. . . . $8.50

This paper-back edition is a copiously illustrated guide to the techniques and methods of rendering, including sections on perspective, projection, shadow, reflections, and how to draw cars, ships, aircraft, trees, and human figures. The author also describes the very wide range of instruments and equipment currently in use.
Circle B624 under Books.

NEW★

25 Trees for Architecture and the Landscape Condensed Edition

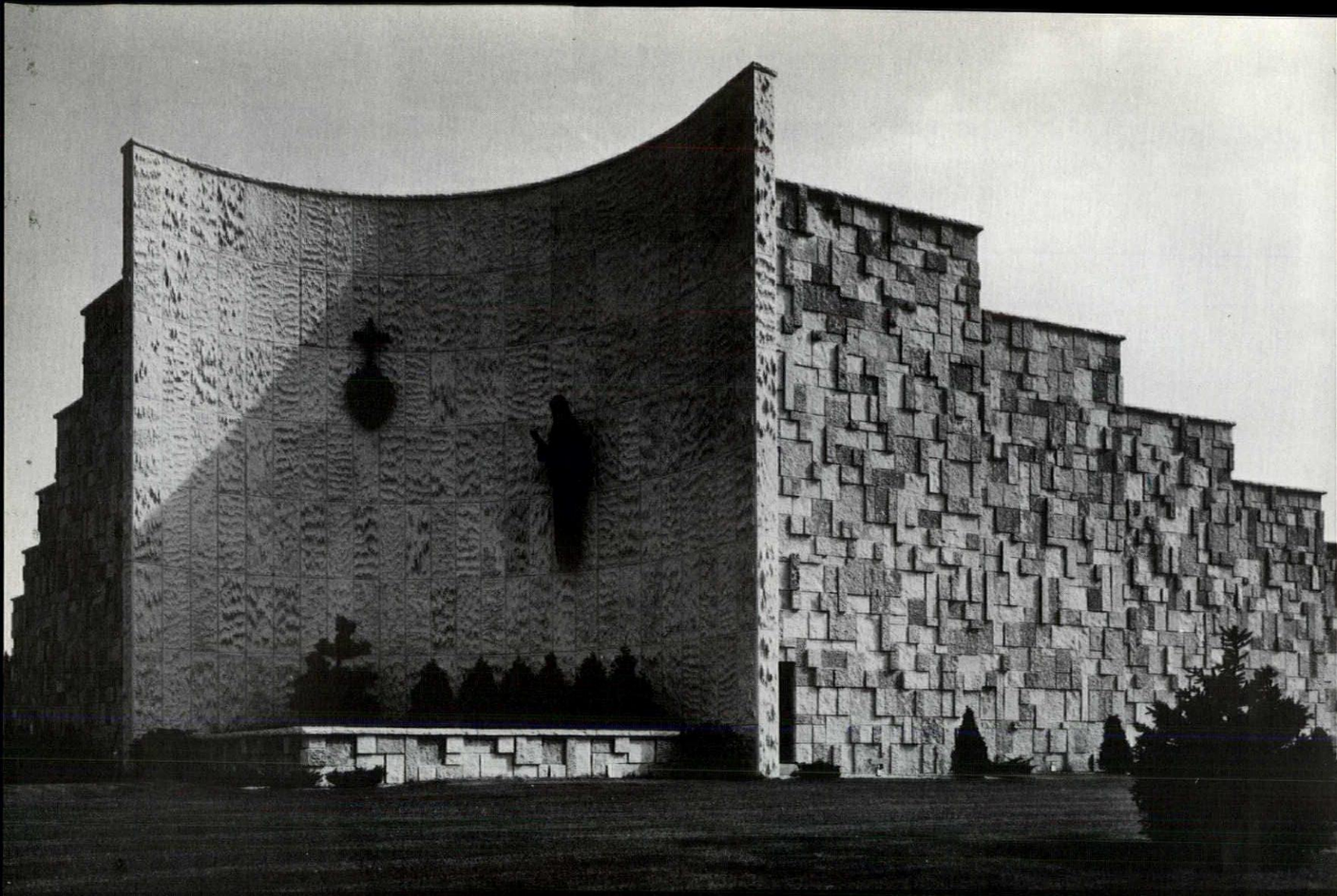
by Robert L. Zion
208 pp., illus. . . . $10.95

This attractive book will aid communication between landscape architect, architect and layman with a comprehensive collection of photographic portraits of trees whose structure, habit and other characteristics make them especially useful in relation to buildings and outdoor spaces.
Circle B625 under Books.

26 Downtown USA Urban Design in Nine American Cities

By Kenneth Halpern,
Forward by Edward Koch,
Mayor of the City of New York
256 pp., illus. . . . $27.50

The author, newly appointed Director of the Mayor's Office of Midtown Planning & Development in New York City, shows the different approaches taken, or deliberately not taken, to give a sense of order to the unpredictable, constantly changing organism of the City.
Circle B626 under Books.



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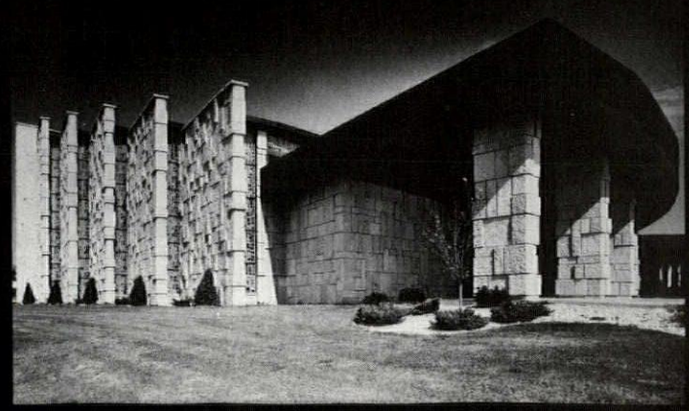

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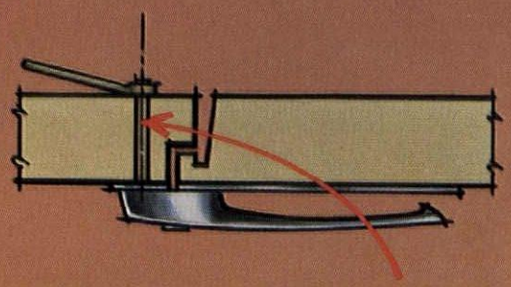

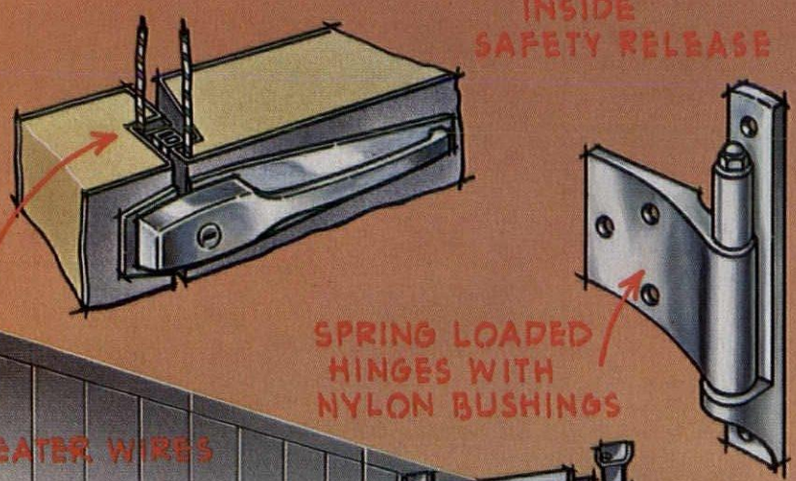

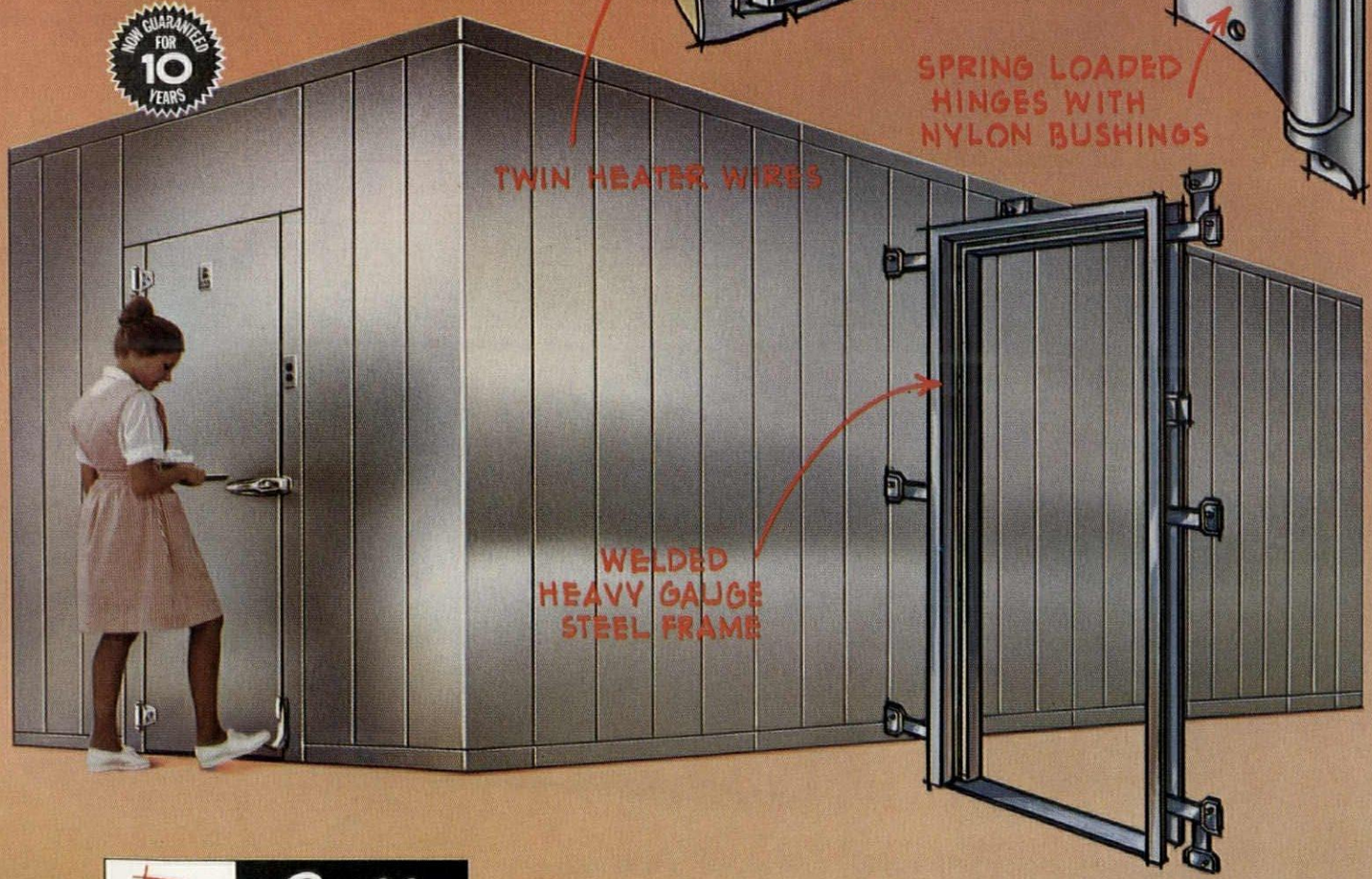

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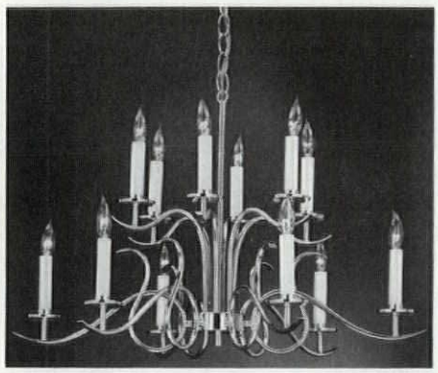
Products and literature

The following items are related to the theme of this issue, restoration and reuse. They are grouped here for the reader's convenience.

Products

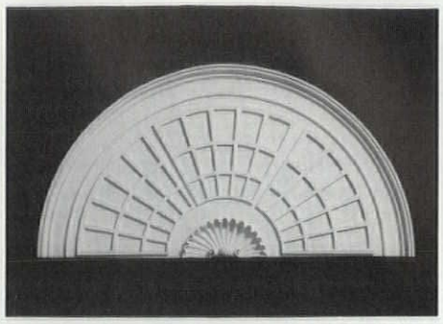


Signature '60' lighting fixtures, marking the company's 60 years of manufacturing lighting fixtures, include chandeliers of polished brass and crystal. Other designs are also available. The Feldman Company.
Circle 100 on reader service card

The Crystal Palace collection of lighting fixtures features hand-cut beveled glass panels set into antique brass frames, with candle-style lamps. Panels are clear or bronze-tone smoked glass. Halo Lighting Div., McGraw Edison Co.
Circle 101 on reader service card

Longleaf Heart Pine, retrieved from buildings constructed before the 1900s, has been re-milled and fabricated into a variety of items. Included are doors, folding screens, tables, and chests. Custom designs can also be produced. Legacy Pine Ltd.
Circle 102 on reader service card

A six-light chandelier, in a design reminiscent of gaslights, is finished in antique brass with smoked, lustre glass chimneys. It is one of the Savoy series which includes a 12-light chandelier, a wall bracket, a pendant hall ceiling light, and a close-to-the-ceiling hall light. Thomas Industries, Inc.
Circle 103 on reader service card



Fan-shaped overdoor replica of a piece from the Brighton Pavilion, with trellis and shell detailing, is one of many pieces of architectural trim offered. Others are ceiling medallions, niche caps, domes, and cornice moldings. Custom molding service is also available. Focal Point.
Circle 104 on reader service card

Street lights with the look of gas lamps have a fiber optics module that diffuses the light, but consumes no electricity. Light is provided by a variety of high intensity discharge sources, with recessed reflectors to provide maximum lighting without glare. Mounting can be either post or bracket. There are designs suitable for restoration of period architecture and for modern installations. Welsbach Lighting, Inc.
Circle 105 on reader service card

Literature

The Old-House Journal catalog is an 80-page directory of sources for things to restore houses built prior to 1920. Products listed by category show companies providing them, with addresses and phone numbers given in the directory section. The descriptions indicate products and services available, how they are distributed, and whether the company offers literature. Copies at $6.95 plus $1 postage can be ordered from: Old-House Journal, 69A Seventh Ave., Brooklyn, NY 11217.

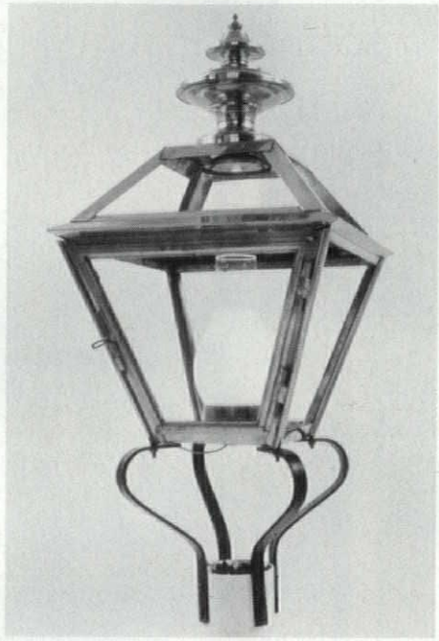
Historic preservation literature guide. Publications concerned with historic preservation are listed and described briefly in this bibliography. Among subjects included are architectural history, preservation and restoration of buildings, gardens, historic districts, real estate, law, journals, and surveys. Copies are free to HHAA members; $1 to nonmembers. Write to: Historic House Association of America, Decatur House, 1600 H St., NW, Washington, DC 20006.

Reproductions in polyester for restoration work are made from a mold of the piece to be duplicated. The original part is not harmed by the process. The company says it can reproduce virtually any three-dimensional shape, ranging from a few inches to as much as six feet, in large or small quantities. There is a one-time mold charge and relatively low unit cost. The company also has its own designs available. Flex Moulding Sales Inc.
Circle 200 on reader service card

Rhenofol roofing membranes for large-area flat roofs come in three types: "C" for loose application, covered with gravel or tiles; "CV," without ballast, to be mechanically fastened; and "D" for vapor barrier on conventional roofs. The system is described in a full-color, ten-page brochure which also illustrates finishing details. Braas Systems, Inc., Roofing Div.
Circle 201 on reader service card

'Zerodec' fireproof gypsum can be custom molded into a wide range of sizes or designs. The fiberglass-reinforced product is suitable for coffers, vaults, baffles, domes, and restoration of decorative plaster. An eight-page, full-color brochure illustrates its many uses for ceilings, walls, and decorative parts. A table of physical properties is included. Inservac, Ltd.
Circle 202 on reader service card

Reproductions of Victorian lighting, in solid brass, are shown in a six-page brochure. Included are wall sconces, chandeliers, and a 1910-style desk lamp of brass with a green-encased glass shade. The Classic Illumination.
Circle 203 on reader service card



Handcrafted lanterns of brass and copper in hanging and post styles are illustrated in color in an eight-page brochure. Descriptions are provided, along with diagrams showing dimensions. Included are descriptions of several post styles available finished in black, white, or primed only. Metalcraft Div., D.L. Frisch Co.
Circle 204 on reader service card

Other products

Fabric vertical blinds are available in extra-heavy fabrics, varied textures, solid and patterned colors. The panels are controlled easily by turning a rod. They are suitable for residential, office, institutional, and hotel use. Panel-drape Vertical Blind Co.
Circle 106 on reader service card

Modular seating consists of arm and armless sections, a corner unit, and an ottoman, each 30" x 30". The 572 series can be combined in a variety of configurations to suit design requirements. Metropolitan Furniture Corp.
Circle 107 on reader service card
[Products continued on page 133]

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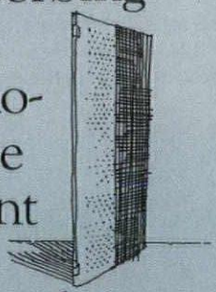

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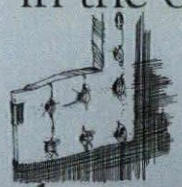

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Products continued from page 131

Large photographs and photomurals, taken from company's stock or produced from originals, are available as prints, mounted on hardboard, or installed directly on the wall. Landscapes, seascapes, "Tall Ships," country scenes, and many other collections are available. Meisel Photochrome Corp., Photographic Design Div.
Circle 108 on reader service card

Aqua-Pure AP600 central water filter, designed for installation on main cold water lines, filters water through charcoal granules to remove unpleasant tastes and odors, and through cellulose fibers to trap dirt and rust particles in the incoming water. In addition, the manufacturer says, it inhibits build-up of hard water scale, protecting pipes, valves, and faucets from corrosion. The unit is designed to be installed during new construction or renovation. AMF, Cuno Div.
Circle 109 on reader service card

Ceramic tiles in five earth-tones, with non-directional patterns, come in two sizes: 4¼" x 4¼" and 6" x 6". Variations in design and veining create a hand-crafted look. Tiles are suitable for use on countertops, walls, shower stalls, bathtubs, and backsplashes. Trim shapes are also available. Huntington/Pacific Ceramics.
Circle 110 on reader service card

Hail Ragnar chair and matching Eric ottoman, designed by Richard Arnesen, combine casual design and lounge-chair comfort. Hardwood frames are easily assembled, and backs adjust to reclining or more upright angles. Cushions have cotton duck covers, removable for easy cleaning, which come in four colors: blue, beige, brown, and butterscotch. Gold Medal Inc.
Circle 111 on reader service card

The riding chair, for handicapped people who work in a seated position, has a pneumatic height adjustment controlled by a single lever within easy reach of the seated person. Adjustments permit the worker to use the chair at the proper height for the job being done. Seat angle is 135 degrees instead of 90 degrees for more comfortable posture. Five-point pedestal reduces the chance of tipping. Seat and back are padded and covered in a choice of colors; exposed metal parts are nickel/chromium plated. Rajowalt Co.
Circle 112 on reader service card

Sound level meter CS 192B has a dynamic range from 20–40 dB, on a 30 dB linearly scaled meter. It has interchangeable 1-in. and ¼-in. microphones and 60-hour battery life. Accessories available include octave band filter, LEQ plug-in, and digital maximum hold. The meter can be purchased separately or in a kit, which includes calibrator, windshield, tripod, extra batteries, and carrying case. Castle Associates.
Circle 113 on reader service card

Supercore metal doors are energy-efficient and reduce sound transmission. A rigid polystyrene core is thermally bonded to steel sheets, then welded at 2-in. intervals around the door to prevent twisting. According to the company, the polystyrene core provides up to 25 percent energy cost savings over paper honeycomb cores. Amweld Building Products.
Circle 114 on reader service card

Carousel shampoo lavatory in The Gallery Collection has swingaway spout and spray head with retractable hose, making it well suited for shampooing. All surfaces slope toward the
[Products continued on page 134]

Products continued from page 133

basin so that splashed water drains back in. The lavatory is made of porcelain enamel on cast iron and is available with four styles of fittings and in a choice of colors or white. Eljer Plumbingware, Wallace Murray Corp.
Circle 115 on reader service card

Thermasheath is a urethane-core panel with an aluminum foil skin, which provides insulation. Thicknesses range from ½ to 3 in., with R-values from 3.6 to 21.6. It is designed for use primarily over wood framing areas on exterior walls. Rmax.
Circle 116 on reader service card

Swimming pool heaters use polypropylene flat-plate collectors with high thermal absorption to heat water to 80–90 F. They connect to existing pool filter pumps, which provide the necessary circulation. The collectors are designed to absorb 250–270 Btu per sq ft per hour, with a two- to three-year payback, according to the company. Solex, Inc.
Circle 117 on reader service card

Strut Hugger is a method of insulating at the eave strut of pre-engineered metal buildings. Since it is locked to the inside of the eave, the manufacturer says that it eliminates leaks caused by water wicking into the building, makes a better finished appearance, and blocks a potential thermal problem. Royal Mark Laminates.
Circle 118 on reader service card

Rolladen™ rolling shades for exterior use block out summer sun, insulate against cold, provide security, and reduce noise levels, says the manufacturer. Slats have an internal air space or insulation and also create an air space between window and shade. Shades roll up for storage when not in use. They can be operated by manual crank, pulley strap, or electric motor. American-German Industries, Inc.
Circle 119 on reader service card

Climaster IV gas-fired residential furnace has a spark ignition that eliminates wastefulness of continuously burning pilot light. Used with automatic flue damper to cut heat loss when it is not running, the furnace operates up to 12 percent more efficiently than furnaces without these features. Available heating capacities range from 80,000 to 120,000 Btu. York Div., Borg-Warner Corp.
Circle 120 on reader service card

Sun Check solar screens have a cam lock to keep them firmly in place. Mounted on the frame below the window, the lock provides proper tensioning, yet is easily released for access to the window for cleaning. The screens block solar heat gain in summer. In winter, they slow air movement to reduce chill on the exterior of the glass while reflecting interior heat back into the room. Sun Check.
Circle 121 on reader service card

Lighting calculation programs to assist in life-cycle analysis of lighting and integrated ceiling systems enable the specifier to compare anticipated results in terms of present worth, return on investment, and return on additional initial investment. He can also analyze the results of anticipated escalation of power costs for the working life of the system. Several programs are available to designers and specifiers, with printouts in digital or graphic form. Holophane Div., Johns-Manville Sales Corp.
Circle 122 on reader service card

Flexigard multiple-layer protective film is transparent and can be used as a replacement for plastic or glass on solar collectors. It is flexible, resistant to weather and discoloration, and extremely durable, according to the manufacturer, and has self-cleaning characteristics. It can be used as storm-window glazing and as glass replacement in greenhouses. It comes in 50-yd rolls, 4 ft wide. 3M Company, Special Enterprises Dept.
Circle 123 on reader service card

Lighting Control System 50 integrated energy management reduces lighting costs up to 50 percent, according to the manufacturer, by saving on energy and maintenance. It offers easy installation, operation, and maintenance. Data instruments include light sensors, time clock controllers, and peak power controller. Lutron Electronics Co., Inc.
Circle 124 on reader service card

Building management. Delta 1000 computer-based building management provides centralized control of boilers, chillers, pumps, air
[Products continued on page 136]

The Otis® LR-MR-HR elevator systems for low-, mid- and high-rise buildings represent an advancement in elevator technology created through the application of elevonics engineering. Whisper-quiet door operators, thoughtful engineering for the handicapped and new electronic and hydraulic controls are some of the new developments.

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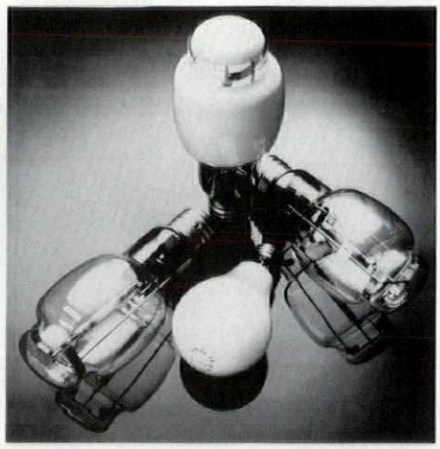
Products continued from page 134

handlers, lighting, fire and other security, and card readers. Operator terminals in convenient locations provide means of remote control, information retrieval, and automatic alarm reporting. The system and its flexibility to meet specific needs are described in a 20-page brochure entitled "Making Control of Your Building Pay Off." Honeywell, Inc.
Circle 125 on reader service card

Other literature

Shingle-base insulation is a urethane composition to which shingles, shakes, or tiles can be nailed. The Permalite insulation is factory-foamed between a structural, nailable board top and an asphalt-saturated felt base. Grefco, Inc.
Circle 205 on reader service card

Waterproofing system components are described in a 12-page brochure, which also has information about surface preparation, application, advantages, limitations, and colors. A table of technical data is included for each product. Products include sealants, coatings, roofing material, and water-repellant clear coatings. An application guide, in tabular form, covers products, method of application, coverage, coats, and average cost per square foot. VIP Enterprises, Inc.
Circle 206 on reader service card



Lumalux high-pressure sodium lamps use only 50 watts of power, yet are said to provide the same light output as 200-watt long-life incandescent lamps. They are available clear (3300 lumens) or phosphor-coated (3150 lumens), with an average rated life of 24,000 hours. Typical uses are offices, factories, warehouses, and garages with low ceilings and outdoor walkway and security lighting. GTE Sylvania.
Circle 207 on reader service card

Reroofing systems that can be applied over existing roofs are described in a four-page brochure. The rubber membrane comes in large sections—up to 45' x 150'. It is rolled out, cold-sealed at seams, flashing, and perimeters, then covered with ballast. A table of physical properties is included. Carlisle Tire & Rubber Co.
Circle 208 on reader service card

YOCA™ Stud Wall System combines a slotted standard and metal stud in one unit for installing gypsum board for in-store merchandise display. Four-page brochure illustrates installation methods and describes advantages of its use. Also shown are bracket styles available. Crown Metal Manufacturing Co.
Circle 209 on reader service card

Rattan furniture in several styles and finishes is shown in a 64-page, full-color catalog. Included are sofas, lounge seating, tables, dining chairs, mirrors, stands, planters, and other accessories. Finishes are natural, stained, or painted. Tropi-Cal.
Circle 210 on reader service card

'Taskline' fluorescent task lighting provides controlled lighting for work surfaces, allowing a reduced level of ambient lighting. Eight-page brochure shows sizes, styles, and mounting accessories available. There is also a discussion of task lighting related to improved visibility and energy savings. Lightolier.
Circle 211 on reader service card

Private Space flexible offices are arranged to meet specific needs of work flow, traffic, and communication among employees. Sound-absorbent panels are installed with simple tools
[Literature continued on page 139]

DesignTex takes a front seat with COM.

Major contract furniture manufacturers tell us that more DesignTex upholsteries are specified as COM than those from any other fabric source, including the manufacturers' own stock fabric lines.

The reason:
DesignTex offers what specifiers are searching for...upholstery groups of sturdy nylons, wools and cottons with incredibly broad color ranges and textures that work in any environment.

We speak your language.
In a recent survey by an important trade publication, more than 62% of specifiers polled listed DesignTex as their No. 1 source. And 33% noted that DesignTex was easier to use than any other fabric supplier.

Call DesignTex when ordering COM. You and your clients will be sitting pretty!

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DUPONT ZEPEL
SOIL / STAIN REPELLER

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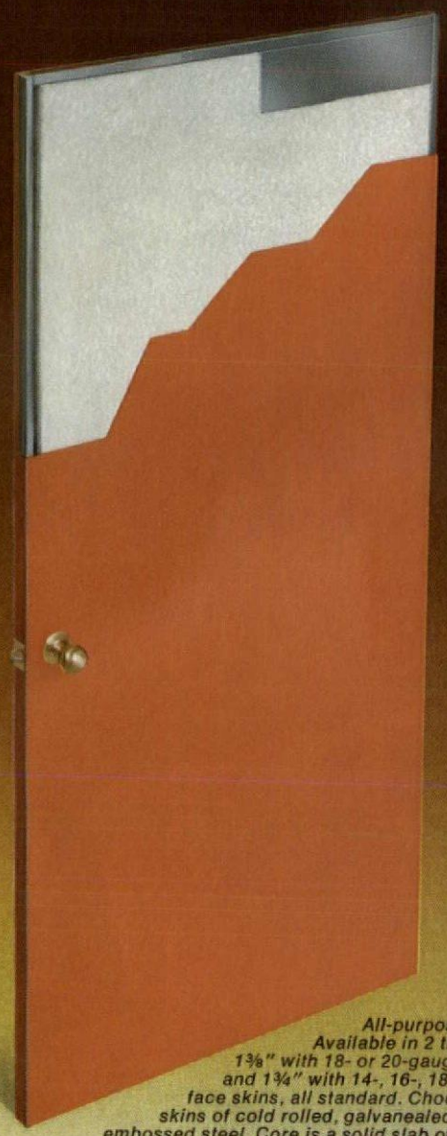
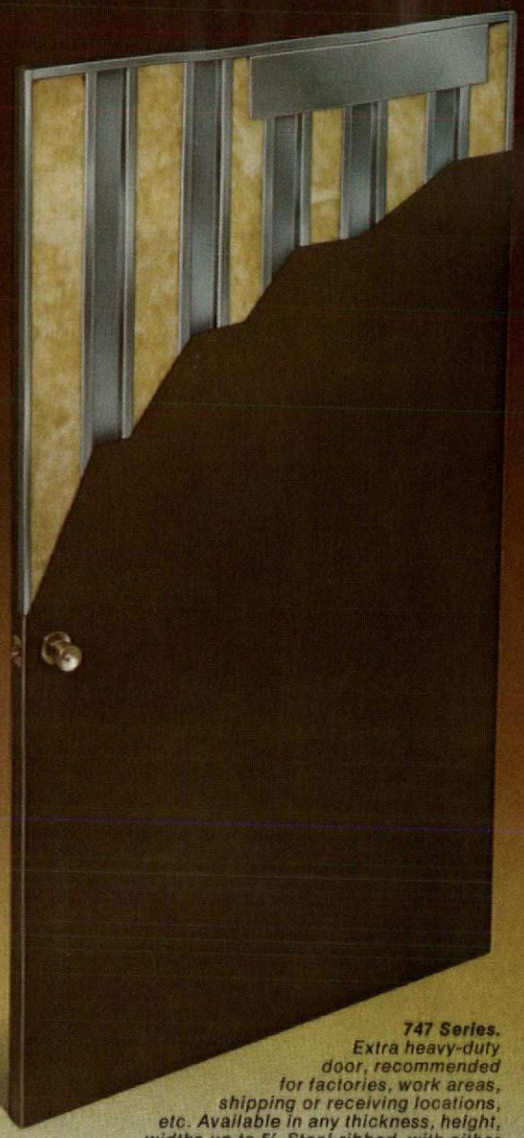


707 Series.
All-purpose steel door. Available in 2 thicknesses — 1⅜" with 18- or 20-gauge face skins; and 1¾" with 14-, 16-, 18- or 20-gauge face skins, all standard. Choose from face skins of cold rolled, galvanealed, stainless or embossed steel. Core is a solid slab of polystyrene, continuously bonded to skin. Wide choice of sizes, metals, louvers, lite arrangements, colors, fire protection and hardware preparations.



747 Series.
Extra heavy-duty door, recommended for factories, work areas, shipping or receiving locations, etc. Available in any thickness, height, widths up to 5'. Steel-ribbed, with either cold rolled or galvanealed 14-, 16- or 18-gauge face skins. Like 707 Series, utilizes U-shaped, hinged reinforcing channel and a continuous, beveled ⅛-inch in 2-inch lock edge channel.

Curries means more freedom of choice.

More freedom of choice means offering you more standard ways to close a doorspace than any other manufacturer of steel doors and frames.

More standard face widths: 1", 1¼", 1½", 1¾" and 2".

More skin gauges (see above).

More flush and drywall frame depths: 3½"-12", in ⅛" increments.

In short, more ways to satisfy your needs without having to get into custom manufacturing.

Of course, when a project demands standard *and* custom sizes and configurations, Curries can supply you with both. And eliminate the delivery, service and hardware-coordination problems that arise when working with two suppliers who many times are from different parts of the country.

Standard, or custom-made. Either way, your local Curries distributor can help. Using his own inventory and fabricating capability to deliver quickly, inexpensively.

For more details, call him. (He's in the Yellow Pages.) Or see Sweet's 8.2/Cur.

Curries Manufacturing Inc., 251 9th St. SE, Mason City, Iowa 50401. (515) 423-1334.

CURRIES
THE METAL DOORMEN

Circle **No. 327**, on Reader Service Card

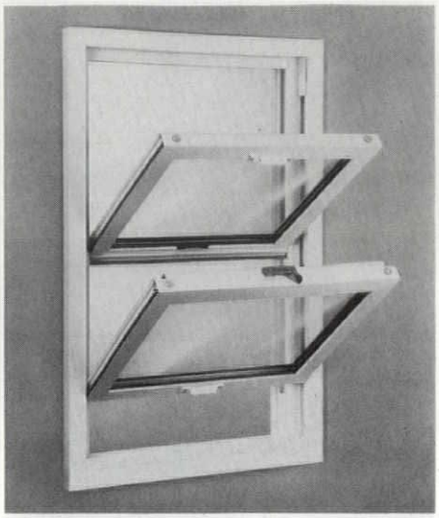
Literature continued from page 136

and can be moved easily to adapt to changing needs. Components of the system, in addition to panels, include worktops, drawers, open file bins, cabinets, and tables. Full-color 16-page brochure illustrates several possible office configurations, installation method, and components. Rosemount Office Systems Inc.
Circle 212 on reader service card

Architectural doors, including wood-faced fire doors with 45-, 60-, and 90-minute UL ratings, are described in a 12-page brochure. Specifications and fire data are provided for several types of doors, two of which are acoustical. Algoma Hardwoods, Inc.
Circle 213 on reader service card

Resilient sheet flooring catalog for 1979 has over 100 pages showing patterns and typical installations of flooring in color. Information is provided on features of each product group, installation, technical data, adhesives, and maintenance. Mannington Mills, Inc.
Circle 214 on reader service card

Ceiling Systems of redwood, oak, white fir, mahogany, and chrome steel are included in a 16-page catalog. General information is provided about material, finishes, suspension, plenum, illumination, air distribution, sprinklers, and acoustical qualities. Forms & Surfaces.
Circle 215 on reader service card



Rigid vinyl double-hung windows, sliders, and patio doors can be used in new construction or renovations. The solid vinyl frame does not conduct heat or cold. Upper and lower window sash tilt in for easy cleaning. Six-page brochure discusses construction and special features, and shows typical installation details. Trocal Div., Dynamit Nobel of America.
Circle 216 on reader service card

Ceramic floor and wall tiles, imported from Italy, include textured and smooth finishes in solid colors, geometrics, and patterns. Floor tiles range from those suitable for very light use to grades that can take the heavier use of public areas, such as shops, schools, hospitals, and hotels. Full-color, 48-page brochure illustrates the various designs and colors, along with typical installations, and provides technical information. Italian Ceramic Tile Corp.
Circle 217 on reader service card

Contract carpet brochure describes and illustrates in color commercial carpeting of both wool and man-made fibers. Sixteen-page brochure includes a selector guide, in tabular form, that provides data on construction, wear, flammability, and special features. Milliken Contract Carpets.
Circle 218 on reader service card

A solar sizing guide for residential water heating systems can be used to determine system size needed for families anywhere in the U.S. The water heater and collector panels required are estimated based on family size, percent of annual sunshine, and location. A.O. Smith Corp.
Circle 219 on reader service card

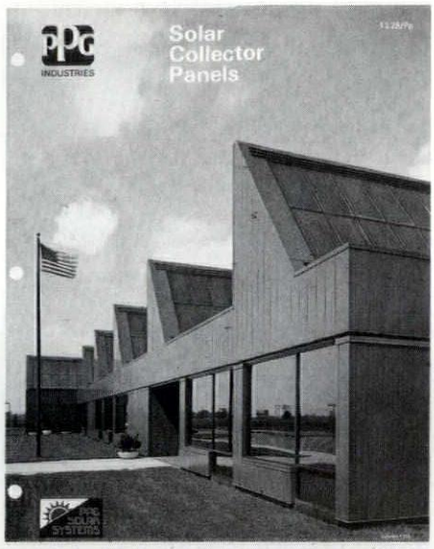
'Energy Conservation Through Retrofitting' discusses the potential for fuel conservation and energy cost saving when existing buildings are insulated. Included is a retrofitting questionnaire to be filled out and returned to the company for computer analysis. H.H. Robertson Co., U.S. Building Products Div.
Circle 220 on reader service card
[Literature continued on page 140]

Literature continued from page 139

'Windows for Energy Efficient Buildings.' To be published periodically by Lawrence Berkeley Laboratory for the U.S. Department of Energy, the purpose of this publication is to: bring together inventors and manufacturers; bring new products and research results to the attention of architects and engineers; and bring grass-roots communications to the attention of government energy programs. As the title indicates, it will cover the contribution of windows to energy efficiency in building design. For a free copy, send request to: Energy Efficient Windows Program, % Stephen Selkowitz, Bldg. 90, Rm. 3111, Lawrence Berkeley Laboratory, 1 Cyclotron Rd., Berkeley, Ca 94720.

Solar energy publications catalog lists booklets available on a wide range of solar-energy related subjects. They include such topics as design manuals for water heaters; estimating solar energy available depending on location, slant, and direction; and pool heaters. Horizon Industries.
Circle 221 on reader service card

Skew/Wall, a slope wall system, features secondary and condensation drainage and low horizontal profiles. It accommodates insulated glass units. Four-page brochure shows details of the wall and provides specifications. The Alumiline Corp.
Circle 222 on reader service card



'Solar Collector Panels' discusses solar energy as a heating resource and collector panel design. Frequently asked questions about solar energy are answered. Tells how collectors work and how solar systems work, with diagrams of space-heating and water-heating systems included. PPG Solar Products Dept.
Circle 223 on reader service card

Insulated wall panel. Construction costs are said to be reduced substantially when KOR/MET I insulated panels are used. The panels, with a U-value of .05, are made of a polyurethane core sandwiched between interior and exterior surfaces of 26-gauge steel, eliminating field insulation. Wall units, with tongue-and-groove joints and factory-applied sealant, are described in an eight-page brochure. Armco Steel, Armco Building Systems.
Circle 224 on reader service card

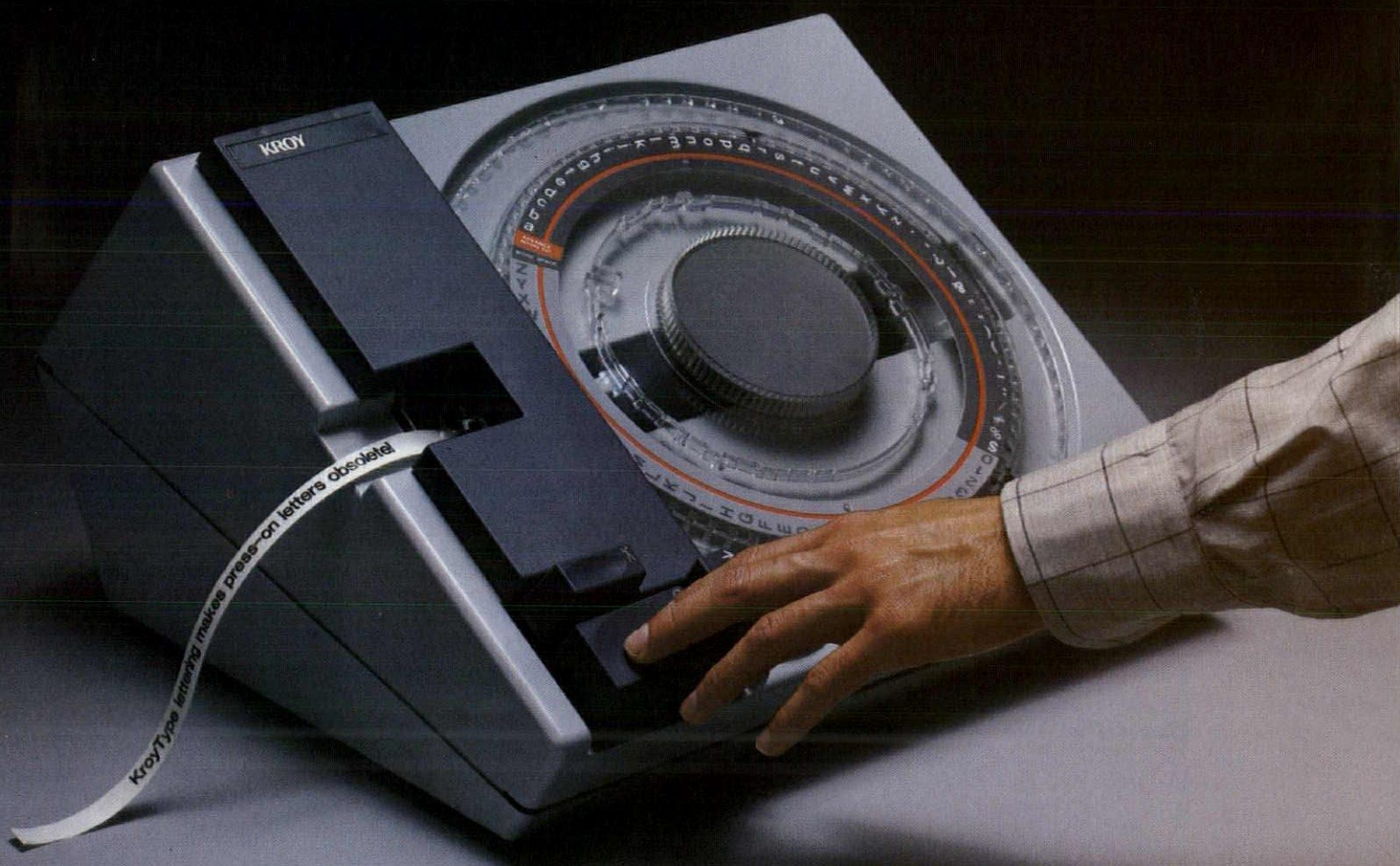
'Simplified Thermal Design of Building Envelope.' This is an engineering bulletin to assist in the application of ASHRAE Standard 90-75. It presents step-by-step design procedures to meet this performance-oriented standard and includes benefits of thermal storage. Example problems demonstrate recommended design procedures for applying criteria of the Standard. Weather data and design aids in the form of tables, figures, and charts are included. Request Engineering Bulletin EB089.018, at $2.50 a copy, from: Portland Cement Association, 5420 Old Orchard Rd., Skokie, Il 60076

Mailroom planning service kit contains a detailed questionnaire, floor-planning grid chart, and a template for drawing an existing mailroom to scale. Information provided to the company will be analyzed, and suggestions will be offered for more efficient flow patterns, as well as for specific furniture needed for sorting, storage, and mail-handling equipment. The kit is available free to architects, specifiers, and interior designers. Kwik File.
Circle 225 on reader service card
[Literature continued on page 142]

Press-on letters are now obsolete.

No waiting or processing. KroyType lettering is ready for use by simply removing the firm backing.

The adhesive backed tape is incredibly easy to position. And reposition. Sticks to any surface.



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The KroyType 80 Lettering Machine. Five times faster than press-on letters. Saves time. Saves money. Makes press-on letters obsolete. For more information... or, for the machine itself, (only $645) call Toll Free:

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For complete information, fill out and send this coupon to the address below:

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City _____ State _____ Zip _____

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Literature continued from page 140

'The Concrete Approach to Energy Conservation.' Report discusses concrete construction for energy conservation. Design comparisons of various masonry building types show reduced heat loss when glass area is reduced. Cross-section diagrams illustrate wall and roof constructions, and tables provide a list of components and their heat transmission values. Copies of this 52-page report, SP014.01B, are available at $2.40 each from: Portland Cement Association, 5420 Old Orchard Rd., Skokie, Il 60076.

Insulated flat and profiled walls, Formawall and Varawall, have insulation of varying thicknesses and a choice of finishes to meet specific needs. Full-color, 24-page brochure shows buildings in which the various types of walls were used. Technical information includes diagrams of construction, materials and finishes, thermal and acoustical values, and fire ratings. H.H. Robertson, U.S. Building Products.
Circle 226 on reader service card

Structural acoustical tile absorbs sound, entering through random surface perforations, by means of fiberglass pads set in the tile core. The pads are chemically inert, vermin-resistant, and moistureproof. According to the manufacturer, tiles have a high fire-safety level, and the permanently glazed surface is virtually maintenance-free. Data sheet provides information about sound absorption, sound transmission, and other features. Stark Ceramics, Inc.
Circle 227 on reader service card

Roof-mounted HVAC systems of high efficiency and minimum new energy use are applicable for installations requiring 20-ton or greater capacity. Information in a 40-page brochure about AF-135 (air volume 5000–13,500 cfm) and AF-155 (air volume 9000–15,500 cfm) includes design features, performance data, control systems, capacity, and electrical data. Diagrams show installation dimensions and details. Suggested specifications are also provided. American Air Filter Co., Inc.
Circle 228 on reader service card

'Energy Conservation with Comfort' provides recommendations for conserving energy through temperature control modifications. Workbook section helps to find the answers to cutting costs, with technical information provided to assist in computing amounts. Examples illustrate how to calculate potential savings. Honeywell, Inc.
Circle 229 on reader service card

Building materials

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

Grand Concourse Restaurant and Gandy Dancer Saloon, Pittsburgh, Pa (p. 66). *Architects: Pittsburgh History and Landmarks Foundation; Roger Sherman Associates, Dearborn, Mi.* Paint: Pittsburgh Paint. Wall covering: Raintree Designs. Carpeting: Templeton Grays Ltd., Stratton Industries, Brintons, Ltd. Lighting: Silver Dollar Trading Co., Elysian, Lightolier, Nowell's, Perfectlite. Furniture: Shelby Williams, Falcon Products, H. Krug, Empire State Chair Co., Inc. Fabric: B. Berger Co., F. Schumacher. Kitchen equipment: Goldstar Products.

John F. Otto Service Center, Sacramento, Ca (p. 80). *Architects: Wudtke Watson Davis, Inc., San Francisco, Ca.* Concrete slab: Lone Star Industries. Gypsum wallboard: U.S. Gypsum. Carpet: Walters Carpet. Roof surfacing: Flintkote. Insulation: Owens-Corning. Industrial steel sash: American Building Materials. Doors: Burnett & Sons, Overhead Doors. Hardware: Schlage, Norton, Hager, Von Duprin. Paint: Fuller-O'Brien. Lighting: General Electric. Plumbing fixtures: American Standard. Heating/air conditioning: Carrier.

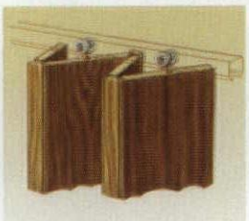
Mechanics Hall, Worcester, Ma (p. 84). *Architects: Anderson Notter Finegold, Inc., Boston, Ma.* Reinforced concrete foundation: Lehigh. Structural steel: Bethlehem Steel. Copper roof: Revere. Brick: K and F. Gypsum board wall: National Gypsum. Aluminum curtain wall: Alumiline, Solar Seal Co. Glass doors: PPG. Storefront columns: Schwerd Co. Quarry tile: American Olean. Roofing: Johns-Manville, Guardian Industrial Products. Masonry cleaner: Pro So Co. Inc., Sureclean. Interior Paint, gold: M.A. Bruder & Sons Inc., Kemp. Carpet: Mohawk, Mohasco Industries.

Pella designs wood folding doors with a distinctive difference.

Pella changes the image of folding doors with attention to detail that is the hallmark of excellence in design. The result is a series of exceedingly attractive folding doors of superior wood construction and mechanical precision that will be an asset in almost any interior environment. For distinctly elegant flair, choose the handsome Designer series shown here. Or choose plain panels, 3⅝" or 5⅝" wide, with genuine wood veneers finished in clear lacquer, or unfinished to allow custom painting, varnishing or staining. An attractive but economical alternative is Vinylwood in a variety of wood grains and white. All in all, Pella has more to offer than other wood windows and doors.

Durable wood construction. High quality veneers or vinyls are bonded to strong, stabilized wood cores with water-resistant plastic glues. This solid construction resists warping even in humid areas.

Smooth operating hinging system. Pella wood folding doors open and close quietly, evenly and easily thanks to individual, special steel-alloy springs which run horizontally through each panel to serve as hinges.



Quiet, dependable track and roller system. Free-riding hangers, attached to every other panel, allow doors to glide easily, while double rollers maintain proper balance and minimize sway. Nylon-tire construction eliminates noisy metal-to-metal contact.

Only Pella offers it all.

FREE CATALOG. For more detailed information, send for your free copy of our full-color catalog on Pella Wood Folding Doors. See us in Sweet's General Building or Light Residential Construction File. Or look in the Yellow Pages under "doors" for the phone number of your Pella Distributor.

Please send me your catalog on Pella Wood Folding Doors. I would also like information on: ☐ Sliding Glass Doors, ☐ Casement Windows, ☐ Double-Hung Windows, ☐ Awning Windows.

Name

Firm

Address

City

State Zip

Telephone

Mail to: Pella Windows & Doors, Dept. T35K9
100 Main St., Pella, Iowa 50219.

Also available throughout Canada.
This coupon answered within 24 hours.

Pella

THE ONLY DOOR THAT'S EASY ON THE FINGERS IS NOW EASY ON THE EYES.

Admittedly, looks were not the first consideration in designing our Safetyline Door.

Safety was. So we gave it a flexible rubber guard to save fingers. And perhaps even save you a lawsuit.

We gave it a cylindrical stile and a 2-point flush-mounted locking mechanism. And a push-pull that fits snugly so it doesn't snag clothing.

It was the only door of its kind. And it still is.

Now come the looks. A variety of looks, including the textured panel above, to dovetail with any design.

And if you don't find exactly what you want, we'll custom make it.

Either way, you get a door that doesn't give up aesthetics for safety. Or vice-versa.

Your Amarlite Representative will be happy to show you all the ways we've dressed up the Safetyline Door.

For more information, write to Amarlite Anaconda, P.O. Box 1719, Atlanta, Ga. 30301. Or you can call us at (404) 691-5750.

AMARLITE
ANACONDA Aluminum Division

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Job mart

Situations Opened

Architects/Planners: Partnership and investment opportunity with small, established firm. Municipal and private contracts in New Jersey and eastern Pennsylvania. Box 1361-302, *Progressive Architecture*.

Architectural Designer/Draftsman: Progressive architectural firm needs graduate oriented to design, presentation work, working drawings, minimum two years experience. Send resume, expected salary, *examples* of design and working drawings (which are to be non-returnable): Frank Blaydon & Assoc., AIA Architect, 5 Company St., Christiansted, St. Croix, VI 00820.

Design/Project/Production Architects: Important new commissions from prestigious clients have generated unusual opportunities for creative and talented architects in all phases of architectural design. Positions require outstanding academic achievement and five or more years comprehensive experience in the design of commercial, industrial, airport, high-rise office or institutional structures. Must have proven ability in programming, design, working drawings or specifications. A consuming interest and concentration in one or more of these areas is essential. Consideration will also be given for contributions to award-winning designs. Send qualifications to: Director of Human Resources, Heery & Heery, 880 W. Peachtree St., N.W., Atlanta, Ga 30309.

Director of Planning and Urban Design: Individual to lead portion of architectural/planning firm engaged in writing and organizing EIS, development consulting, transportation planning and city government urban design projects. Individual must continue and expand these activities and possess exemplary writing and presentation skills as promotion and client contact are major responsibilities. Applicant must have a master's degree and minimum seven years experience demonstrating solid theoretical and practical base in design and planning with sensitivity to the role of architecture in urban environment. Contact Charles G. Hilgenhurst & Associates, 148 State Street, Boston, Ma 02109. An Equal Opportunity Employer.

Engineers and Estimators: Challenging positions available with an aggressive growing interdisciplinary Consulting Engineering Firm specializing in mechanical and electrical design, cost control and estimating, energy analysis, and computer services. Positions are immediately available in St. Louis and Houston at all levels of experience. Excellent salary, benefits and growth potential. Send complete resume with salary requirements in confidence to William Harry Munyon, Principal, John F. Steffen Associates, Inc., 2333 Grissom Drive, St. Louis, Mo 63141. We are an Equal Opportunity Employer, M/F.

Faculty Positions: Beginning January, 1980, a 10-month position will be filled in the School of Art and Architecture, Architecture Section, at the University of Southwestern Louisiana. Application deadline is December 1, 1979. Position includes teaching architectural design and related communication courses. Master's degree and practical experience required. Assistant professor rank at competitive salary. Contact: Dan P. Branch, AIA, Chairman, Architecture Section, Box 4-3850, USL, Lafayette, La 70504.

Faculty Positions: The College of Architecture of King Faisal University in Dammam, Saudi Arabia, has just created new faculty positions for the academic year 1980–1981. Positions available at all levels in the following areas: Architecture, Urban and Regional Planning, Landscape Architecture, Engineering Sciences, Building Technology and Mathematics/Physics. Candidates should have Ph.D., M.A. or equivalent degree; practical and/or teaching experience preferred. Language of instruction is English. Positions start in September 1980. Salary is competitive. Benefits include free furnished accommodation, air tickets to and from Saudi Arabia once a year for husband, wife and 2 children, 60-day summer holiday. Please submit complete resume (including daytime telephone numbers) and a listing of three references to Dean Ahmed Farid Moustapha, College of Architecture, King Faisal University, c/o Saudi Arabian Educational Mission, 2221 West Loop South, Houston, Tx 77027.

[continued on page 146]

Job mart continued from page 145

Faculty Position: University of Maryland. Interior Design/Interior Environments. Effective August 17, 1980. Teach/Research in program leading to B.S. in Interior Design and proposed M.S. in Interior Environments. Qualifications: Ph.D. or other terminal degree, demonstrated ability to conduct research, contribute to literature and attract external funds; commitment to interdisciplinary work; understanding of, and contacts with, professional practice. Rank and salary open. Send vita to Guido Francescato, Chairperson, Department of Housing & Applied Design, University of Maryland, College Park, Md 20742. Equal Opportunity/Affirmative Action Employer. Deadline: November 15, 1979, or until suitable candidate is found.

Harvard University: Graduate School of Design Faculty Position Available Beginning Academic Year 1980–81: *Architecture:* Full-time Assistant Professor position available for person qualified to offer graduate-level architectural design studio and courses in one area of curriculum such as visual studies, programming, architectural technology, etc. *Application:* Applications will only be accepted on form available from Appointments Committee, Department of Architecture, Gund Hall, Harvard University, Cambridge, Ma 02138, USA. Applicants should not send dossiers; exhibit materials may be requested after initial screening of applications. Applications should be received by November 15, 1979.

Harvard University: Graduate School of Design Faculty Position Available Beginning Academic Year 1980–81: *Urban Design and Architecture or Urban Design and Landscape Architecture:* Full-time position available for person qualified to offer graduate-level instruction in both Urban Design and Architecture or Urban Design and Landscape Architecture. Position may be filled at the Assistant, Associate, or Full Professor level. Duties include teaching design studio and courses in each program. *Application:* Applications will only be accepted on form available from the Appointments Committee of the appropriate department, Gund Hall, Harvard University, Cambridge, Ma 02138, USA. Applicants should not send dossiers; exhibit materials may be requested after initial screening of applications. Applications should be received by November 15, 1979.

Job Captain: Position available with Calif. consulting Architect offering excellent prof. growth oppor. for person with 2–4 yrs. comprehensive exp. in design and/or prod. document supv. involving diverse comm., office and inst. bldg. projects. Qualified person should also have some exposure to specs prep., client liaison and other aspects of complete practice; plus ability to effectively grow in design oriented atmosphere. Contact our reps in confidence at: G. Marshall Assoc., P.O. Box 66083, Chicago, Il 60666.

Lead Architect: An immediate career opportunity exists in our downtown Pittsburgh regional office for a Lead Architect. The selected candidate will have a minimum of 10 years total professional experience, 5 years in a responsible position, 3 years minimum in rail transit station design. Professional registration required. We offer competitive salary commensurate with your qualifications, a comprehensive benefits plan, and a unique opportunity for professional growth and development. Forward resume with salary history, in confidence, to: Mr. Ernie Maiden. Parsons Brinckerhoff, 441 Smithfield St., Pittsburgh, Pa 15222. An Equal Opportunity Employer M/F.

Mechanical Engineers: Electrical Engineers and Designer-Drafters for design work on commercial, industrial and institutional buildings and projects. Minimum five years experience required. Box 1361-303, *Progressive Architecture.*

N.C. State University: Three full-time, tenure track, positions—Asst. or Assoc. level—to teach in the Architecture Program beginning Fall 1980. Rank and salary commensurate with experience. *Requirements:* Experience in teaching; professional practice; professional degree. Desirable: research and registration. Candidates will teach an architectural studio and a support course. Send resume, three reference letters, statement of teaching interest, and portfolio to Martin Harms, School of Design, NCSU, P.O. Box 5398, Raleigh, NC 27650. Deadline for completed applications is Jan. 15, 1980. NCSU is an Equal Opportunity/Affirmative Action Employer.

Project Architect: Position avail. with prominent, growth oriented firm located in the Upper MW. Person should possess degree and reg. along with 4–6 yrs. comp. exp. in bldg. design and prod. document prep.; the ability to interact effectively with clients and assoc. professionals in a positive atmosphere. Position offers excellent growth oppor. and pleasant location along with competitive salary. Contact our reps. in confidence at; G. Marshall Assoc., P.O. Box 66083, Chicago, Il 60666.

[continued on page 148]

Manufactured in the U.S.A. under license from **Drabert** West Germany

How Mercedes Benz and Cuyahoga Vocational High School solved their parking problems.

Nova, an exceptionally comfortable, stacking chair, can cater to the upscale image of corporate dining rooms, or stand up to the pandemonium of teen agers in cafeterias and classrooms.

Nova. A three-year guarantee.

Nova's unique cross-frame design eliminates the need for easily-breakable welded connections found in many other systems.

So after successfully testing it in over 250,000 sittings, each up to 220 pounds, without any damage, we offer a three-year structural guarantee on each chair.

The shell, molded in either nylon or polypropylene, is light enough to move, yet heavy enough to provide extra strength and durability. And unlike painted metal shells, the color is integral, so a scratch on the surface only reveals the same color underneath.

Nova. Unlimited options.

When Gerd Lange designed the Nova system in 1970, winning one of Germany's leading design awards, he planned for almost every option.

You can order upholstered pads that can be replaced right on the premises, chair-stacking dollies, ganging frames, tandem units with or without tables, tandem riser mounts (for theater riser steps), fixed pedestal bases (that bolt into the floor), book racks, glide feet, tablet arms, removeable-top tables, tabletop dollies, even a variety of ashtrays.

But if you're ingenious enough to think of something more, we can probably make it on special order.

Nova. It's parked everywhere.

Since its invention in 1970, Nova has sold by the tens of thousands all over the world.

Mt. Sinai Hospital, The University of Alaska, the Guggenheim Museum and the Largo Library use it.

When Pan Am flies into J.F.K., Nova is waiting.

Prudential Life, Bell Telephone, Holiday Inn, and Zip'z ice cream parlors use it.

And, of course, Cuyahoga Vocational High School.

So whether your clients include the carriage trade or the galloping herds, Nova is the best parking place you'll find.

For more information about Nova write or visit Atelier International, 595 Madison Avenue, N.Y., N.Y. 10022. Or phone us at (212) 644-0400. Our complete catalog of furniture, lighting, art and accessories is available upon request. Some major credit cards accepted.

For your convenience, we have additional showrooms in Chicago, Dallas, Los Angeles, Atlanta and Seattle; sales offices in Boston, Cincinnati, Detroit, Houston, Miami, Philadelphia, Pittsburgh, San Francisco, Washington, D.C. and selected furniture dealers nationally. Member ASID, IBD, BIFMA.

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Circle No. 305, on Reader Service Card

Job mart continued from page 146

Project Architect: Position open with Central Calif. firm. Qualified person should be design and production oriented with 3–6 yrs. comprehensive exp.; possess degree and/or prof. reg. along with ability to function effectively with clients and assume ever increasing respon. Firm offers excellent growth oppor., competitive salary and attractive location. Please contact our reps. in confidence at: G. Marshall Assoc., P.O. Box 66083, Chicago, Il 60666.

Project Architect: Position open with stable Architect in desirable So. Calif. location. Design oriented firm has stable history and offers excellent growth prospects for person with degree and prof. reg. plus 4–6 yrs. progressive exp. in the design of diverse inst., comm. and office bldg. projects. Qualified person should also have the ability to see projects to successful completion, provide full client liaison, etc. Please contact our reps. in confidence at: G. Marshall Assoc., P.O. Box 66083, Chicago, Il 60666.

Project Landscape Architect: Opportunity in Houston with progressive design—build firm of Landscape Architects. Minimum 3 years experience in general landscape design practice. Must have strong planting design, graphic and communication skills. The George Hederhorst Company, 1830 Kirkwood, Suite 206, Houston, Tx 77077, (713) 496-1442.

Project Manager/Designer: Ohio based architectural/engineering firm with expanding practice in Ohio, Indiana, Illinois and Kentucky has immediate positions available for experienced personnel with registration. Positions also available for persons with 3–5 years experience. Corporate fringe benefits package is outstanding with salary commensurate with experience. Box 1361-304, *Progressive Architecture*.

Sr. Architect: Required by prominent A/E firm in the Midwest. Position requires 8+ yrs. comprehensive exp. in the design and project mgmt. of major inst., comm. and office bldg. projects; along with the ability to supv. subordinates, maintain effective client liaison and assist in business dev. efforts. Qualified professional must have degree and reg. and be results oriented. Firm offers excellent future growth poss. and compensation. Contact our reps. in confidence at: G. Marshall Assoc., P.O. Box 66083, Chicago, Il 60666.

Technical Director: Small St. Louis firm with high standards wants registered architect, 10 years experience, strong capabilities in directing others and project administration, plus preparing specifications and working drawings. 10% travel. A rewarding opportunity for a self-motivated person who wants to step up. Send resume in confidence to Box 1361-305, *Progressive Architecture*.

Texas A&M University: Seeking applications and nominations for positions on the Environmental Design faculty available 16 January 1980 and 1 September 1980. *Job Description:* To instruct at the undergraduate level (beginning and advanced classes) in the subject areas of architectural and environmental design and graphics. A Master's degree from an accredited school is required as well as a professional license or intent to obtain professional registration. Candidates should have office practice experience. Salaries are commensurate with full-time, nine-month employment at Instructor, Assistant Professor or Associate Professor ranks. *Application:* Applications should include a resume, academic credentials and letters of reference. A portfolio, or slides, should be available if called for. These would be promptly returned. Applications or nominations should be sent to: John O. Greer, AIA, Head, Department of Environmental Design, College of Architecture and Environmental Design, Texas A&M University, College Station, Tx 77843.

Theatre Designer: Roger Morgan Studio Inc., designers and consultants for performing arts facilities, has an opening for a designer with extensive background in the professional theatre and architecture. Backstage experience and ability in planning, design, client relations and project management are important. Submit resume to: Roger Morgan Studio Inc., 160 West 87th St., New York, NY 10024, (212) 799-3291.

Situations Wanted

Architect/Interior Designer: Male, 28; registered Pennsylvania, Maryland; desires position with small progressive architectectural/interior design firm, Manhattan. Architecture degree; industrial design study Florence, Italy; six years experience with firm involved all phases of design, client contact, period restoration, site supervision; residential and commercial. Familiar New York market. Box No. 1361-306, *Progressive Architecture*.

Architect/Planner: M. Arch., M. Planning (U. of M.). Registered in Minnesota, NCARB pending. Four years professional design, planning, project management and research experience. Desire responsible, challenging position with urban design oriented architectural/planning firm or government agency. Will relocate. Resume upon request. Con-

tact Kevin Dougherty, 660 North Chatsworth, St. Paul, Mn 55104.

Architect: Registration, NCARB Certificate, MBA. Solid experience including production, design, project administration and coordination, construction administration, personnel management, office financial management and administration, marketing, and accounting. Seeking position in management area to include project or office administrative and financial responsibilities. Reply to Box 1361-297, *Progressive Architecture*.

Managing Design Architect: Managing design architect with medium-sized firm seeks management position with progressive firm. Extensive background in marketing, design and project development. Portfolio contains several design awards. Diversified projects ranging to $60 million. Proven abilities in administration and office management. Reply Box 1361-307, *Progressive Architecture*.

Marketing Director/Middle East: Highly qualified architect with international career, interested in marketing professional services of quality AE firms in the Middle East. Strong in design, management and technical ability. Proficient in English and Arabic. Familiar with cultures of Middle East. For more details write Edmund Khouri, 5795 Stevens Forest Road, Columbia, Md 21045.

Mechanical Engineer: P.E., with ten years, plus, experience in plumbing, heating and cooling systems; management trained, including CPM. Will relocate. Box 1361-292, *Progressive Architecture*.

Motivated Architect: NCARB, Principal. Fifteen years solid experience in design, urban planning, production, field, specifications, interiors, marketing, and management. Seeking highly responsible and challenging position with dynamic and quality oriented organization where I can associate with a motivated and demanding staff. Box 1361-308, *Progressive Architecture*.

Student: Age 22, seeks full-time job as a Draftsman with an Interior Design firm in downtown Chicago loop area. Call 337-5800, ask for Jay, if not there please leave message or write to: J.S. Hester Jr., 845 N. Mich. Ave., Room 804, Chicago Il 60611.

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NCARB Professional Exam Candidates: Get concise, indispensable insights into test-taking tactics, study strategies, spotting misleading questions, judgment skills, etc. Includes exam question list and valuable tips from dozens of former examinees. Request a descriptive brochure from: Bonus Pointers, 2328 Webster, Berkeley, Ca 94705.

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RitaSue Siegel Agency: An international search and placement organization serving the design professions. Ms. Woody Gibson directs architecture and interior assignments. Our clients include every important corporate design group, consultant office and institution. Please inquire about our screening procedure and the range of services we

[continued on page 151]

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Job mart continued from page 149

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'ENTERTAINING'

Amphitheater shade structure, Busch Gardens, "The Old Country," Williamsburg, Virginia. Architect: Peckham, Guyton, Alveres & Viets, Inc., St. Louis, Mo.

Tension Structure By Helios Provides Unobstructed View

This sleek tensioned membrane structure provides shade for the performing area of the amphitheater at Busch Gardens, "The Old Country," Williamsburg, Virginia. Artfully designed to sweep outward from steel supports on either side of the stage area, the structure fits under an existing sunshade for the audience so that there are no intervening posts to block anyone's view. It's a design solution as economical as it is attractive.

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