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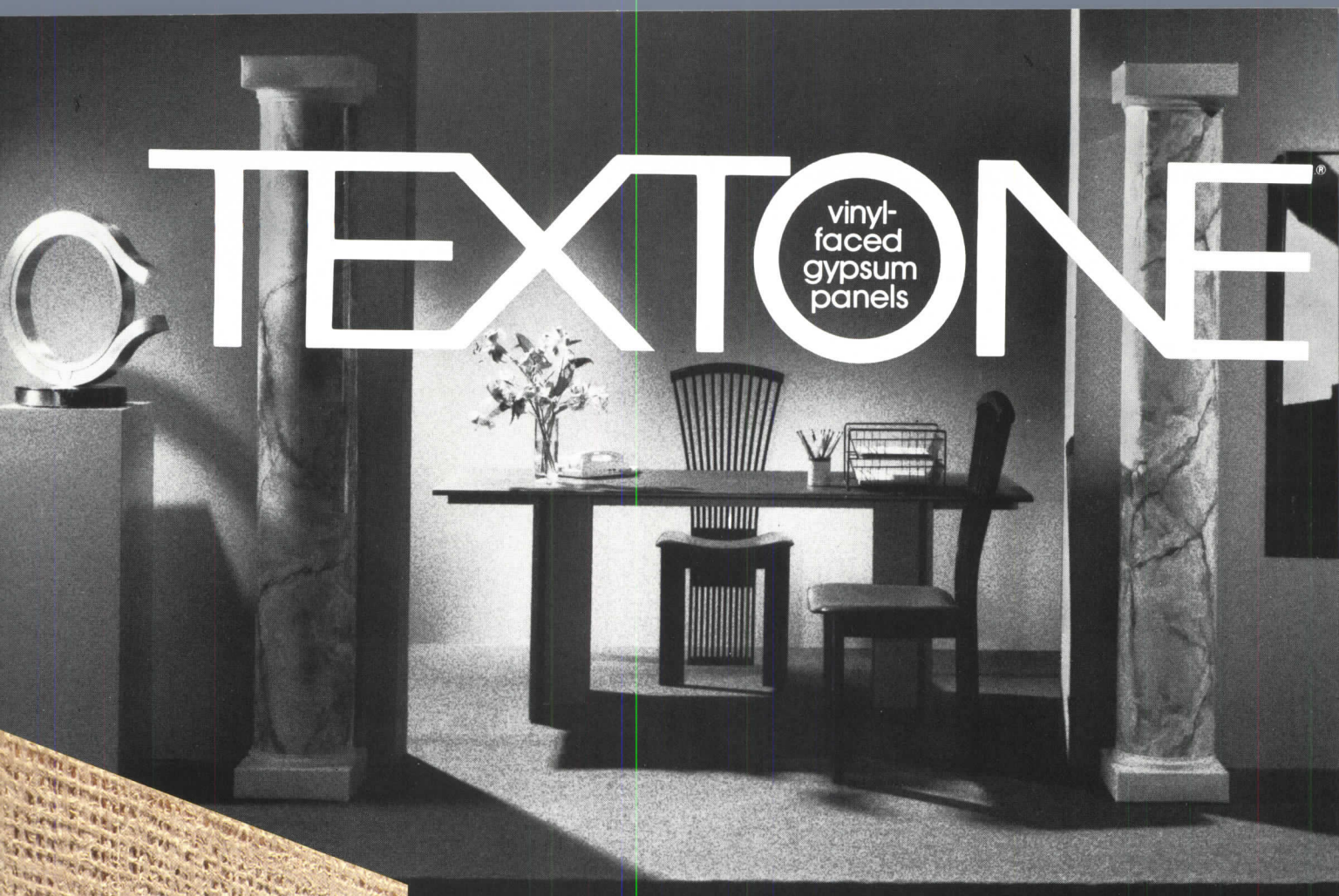

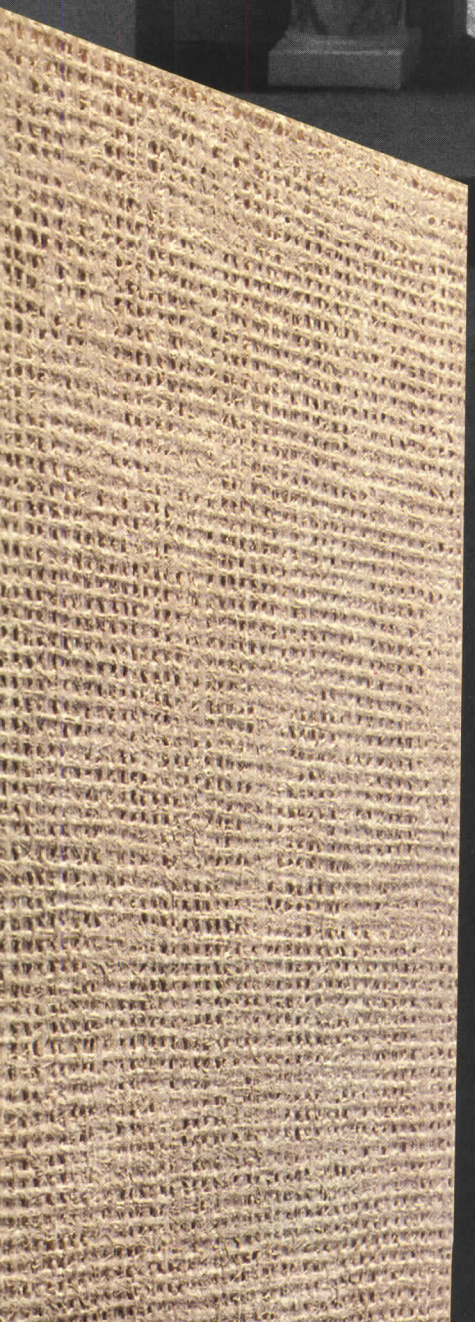

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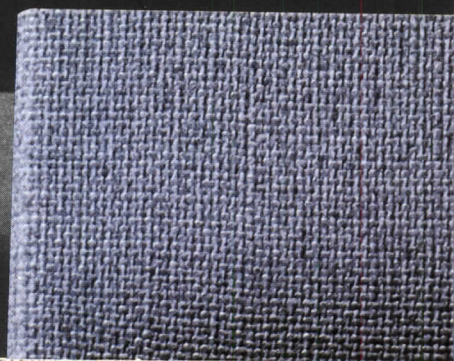

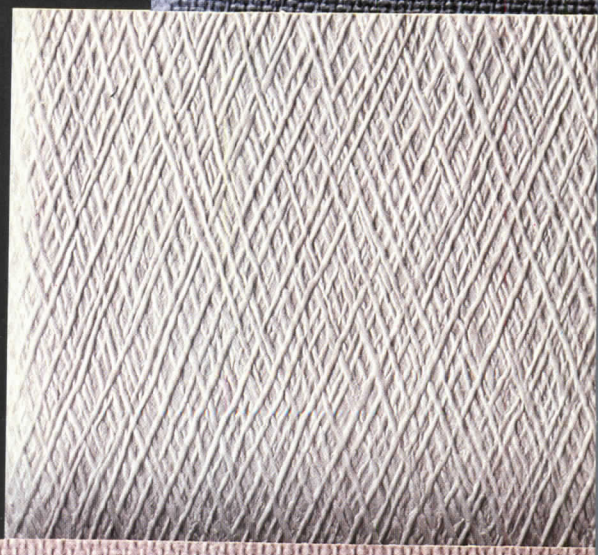

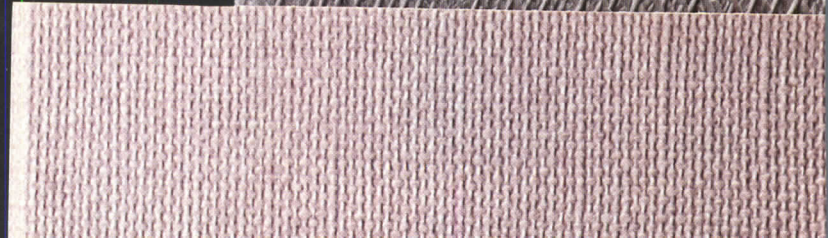

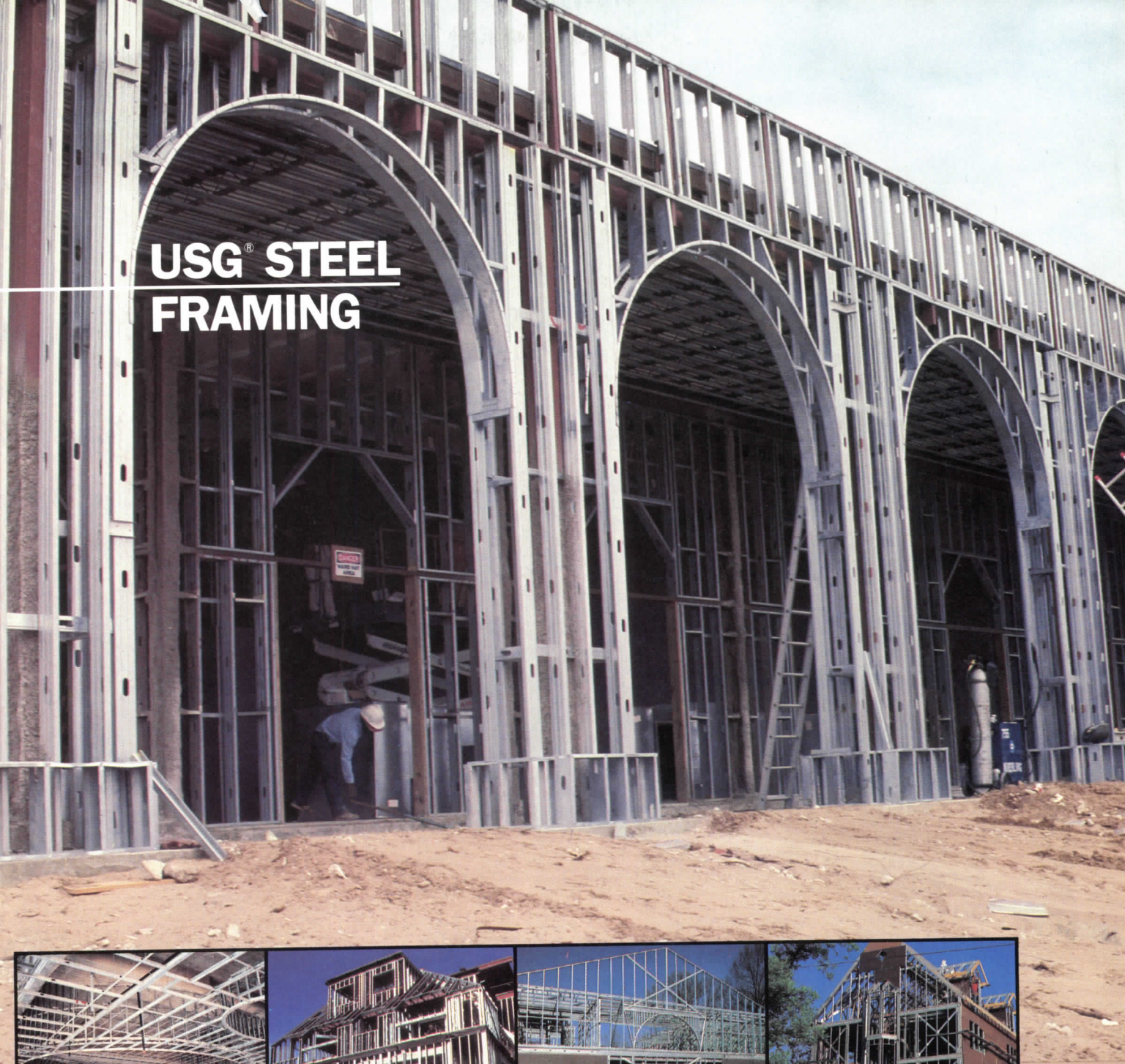

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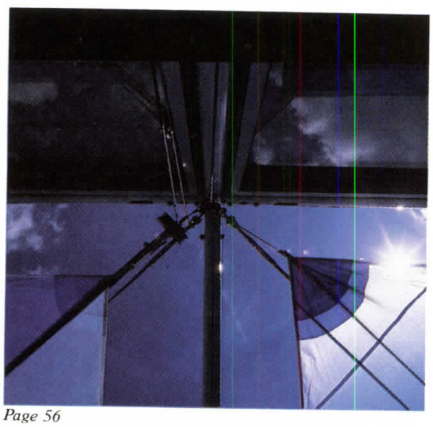

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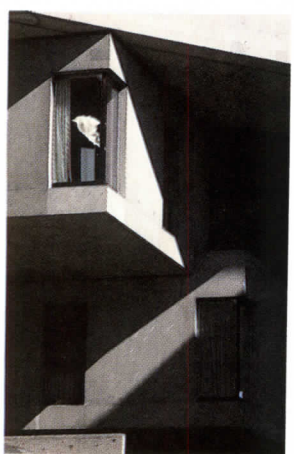

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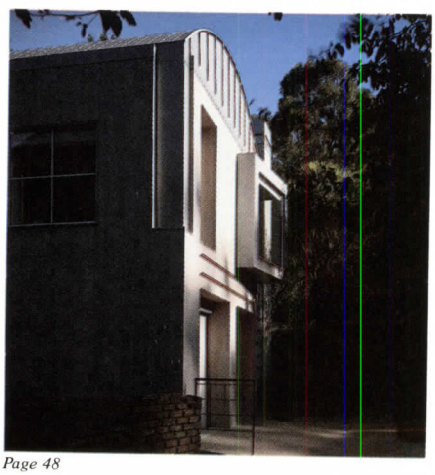

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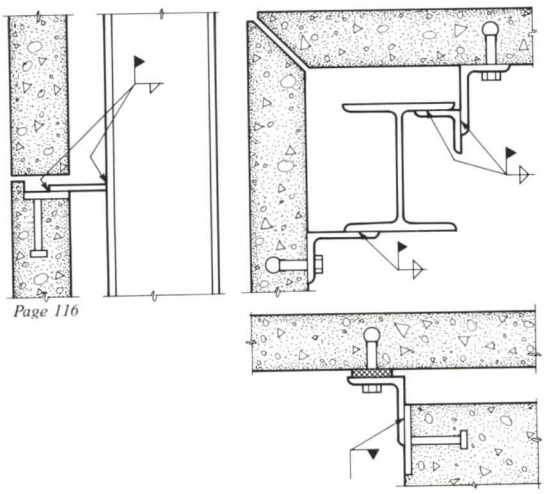

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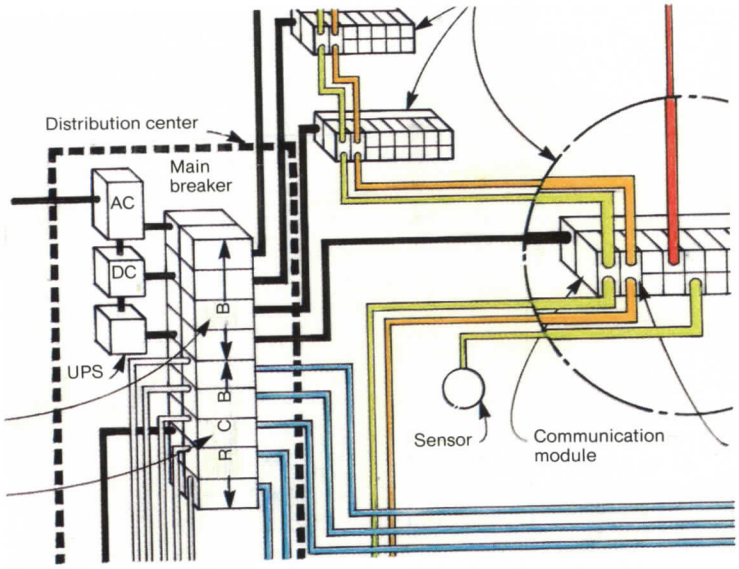

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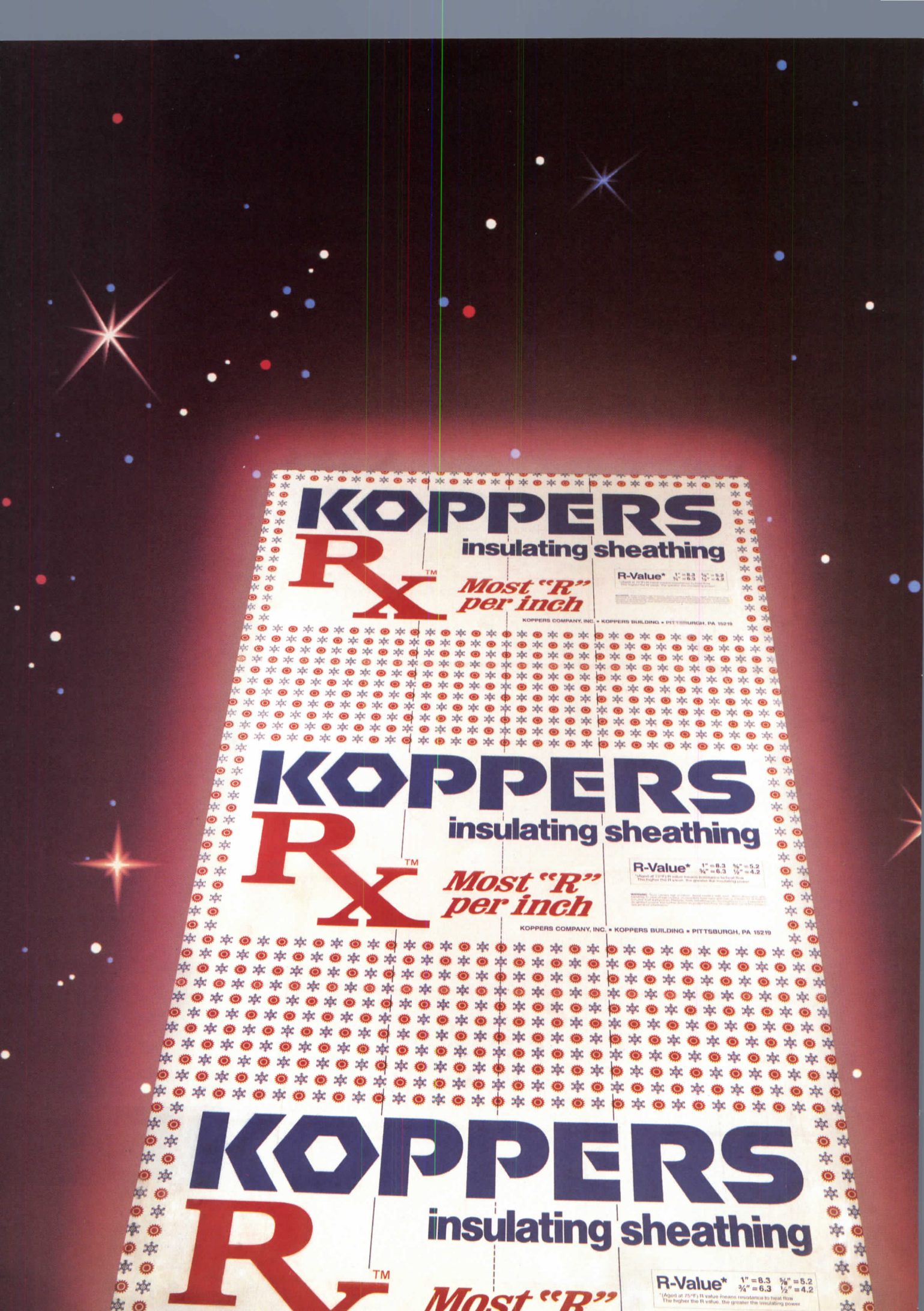
otograph by Loena Kotze of the Riviera las, designed by Ian and Lynn Bader l located in Johannesburg (see page 42).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EVENTS

Nov. 1-8: Second International Daylighting Conference, Long Beach, Calif. Contact: Marjorie Matthews, Oak Ridge National Laboratory, Building 4508, Room 216, P.O. Box X, Oak Ridge, Tenn. 37831.

Nov. 2-4: AIA Design Conference entitled "No Earth Tones: Fantasy Architecture of Miami," Miami. Contact: Ravi Waldon at Institute headquarters, (202) 626-7429.

Nov. 2-5: Ceramic Tile Distributors Association Convention and Exposition, Reno. Contact: CTDA, 15 Salt Creek Lane, Suite 422, Hinsdale, Ill. 60521.

Nov. 3-6: Automated Manufacturing Conference and Exhibition, Greenville, S.C. Contact: AM 86, P.O. Box 5616, Greenville, S.C. 29606.

Nov. 5-7: Course on Engineering for Extreme Winds—Hurricanes and Tornadoes, Lubbock, Tex. Contact: Martha Hise, Dept. of Continuing Education, Texas Tech University, P.O. Box 4110, Lubbock, Tex. 79409.

Nov. 6-7: Seminar on Design of Off-Peak Cooling Systems, Los Angeles. Contact: Jack L. McClung, Professional and Educational Programs, ASHRAE, 1791 Tullie Circle N.E., Atlanta, Ga. 30329.

Nov. 9-11: Conference on Zoning and Land-Use Control Issues, Orlando, Fla. Contact: Vicki Groat, American Institute of Certified Planners, 1313 East 60th St., Chicago, Ill. 60637.

Nov. 9-12: AIA Housing Conference on High-Tech Housing Design, Toronto. Contact: Ravi Waldon at Institute headquarters, (202) 626-7429.

Nov. 9-13: ArabBuild 86—Arabian Construction Exhibition, Bahrain. Contact: Alison Smith, Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB England.

Nov. 9-14: Institute of Business Designers Rapids Rally, Grand Rapids, Mich. Contact: Cath McGlynn-Swain, 50 Monroe Place, Grand Rapids, Mich. 49503.

Nov. 11-12: Conference on Fostering Strategic Innovation, Boston. Contact: Earl Powell, Design Management Institute, 621 Huntington Ave., Boston, Mass. 02115.

Nov. 12-14: Decorative Metalwork in Architecture Conference, Minneapolis. Contact: Jan Becker, University of Minnesota, Dept. of Professional Development and Conference Services, 131 Nolte Center, 315 Pillsbury Drive S.E., Minneapolis, Minn. 55455.

Nov. 12-16: International Innovative Housing and Components Exhibition, Toronto. Contact: IHC '86, Manumod Exhibitions, Inc., 209-77 Mowat Ave., Toronto, Ontario M6K 3E3 Canada.

Nov. 13-14: AIA Architects in Education Conference in conjunction with the California Council on Architectural Education, Santa Monica, Calif. Contact: Alan Sandler at Institute headquarters, (202) 626-7573.

Nov. 13-14: AIA Corporate Architects Conference entitled "A/E and the Corporation: Is It Good Business?" Annapolis, Md. Contact: Charlotte Yowell at Institute headquarters, (202) 626-7410.

Nov. 16-21: Seminar on Computer-Assisted Planning and Operation of Health and Hospital Care Facilities, Tel Aviv, Israel. Contact: Seminar Secretariat, P.O. Box 50006, Tel Aviv 61500, Israel.

Nov. 17-18: Course on Design and Construction of Reinforced Masonry Structures, Washington, D.C. Contact: Cliff Hopkins, George Washington University, Washington, D.C. 20052.

Nov. 18-19: Conference on Cogeneration—Making the Right Decisions, Cambridge, Mass. Contact: Larry Sherwood, Northeast Solar Energy Association, P.O. Box 541, Brattleboro, Vt. 05301.

Nov. 18-19: Northern Interior Design Exhibition, Middlesex, England. Contact: Hazel Halsey, AGB Exhibitions Ltd., Audit House, Field End Road, Eastcote, Middlesex HA4 9XE England.

Nov. 24-25: Course on Single Ply Roofing Systems, Denver. Contact: The Roofing Industry Educational Institute, 6851 S. Holly Circle, Englewood, Colo. 80112.

LETTERS

Tulane Clarification: I believe that several points of clarification are necessary in regards to my quotation in the article [page 48] on the Tulane school of architecture, which appeared in the August issue.

First, the article did not clearly state that I am a graduate of the bachelor of architecture program at Tulane, not the master of architecture program. Furthermore, my thoughts regarding the status of the graduate program were not expressed completely. The article failed to mention my belief that Tulane can and should make every effort to develop its graduate curriculum in architecture as fully as possible. I feel that the university has sufficient economic and human resources (Tulane's endowment is, in fact, quite a bit higher than the article indicated) to create a highly innovative and effective graduate architecture program. Such a program, if vigorously and enthusiastically supported, would further enhance the school's excellent undergraduate offerings. As I stated, however, in the unfortunate event that the university should fail to pursue a fully developed master's curriculum, the only sound alternative would be to eliminate the graduate program entirely, focusing all resources on the undergraduate level.

The series in ARCHITECTURE on individual architecture schools is a valuable resource for both prospective students and potential employers. I urge you to continue the series and to consider increasing the number of schools covered each year.

Gerald Martin Moeller Jr.
Washington, D.C.

Understanding MIT: I enjoyed the Aug review of schools. As an alumnus, former faculty member, and enthusiast of MIT [see page 54], I felt that Senior E tor Michael J. Crosbie did a particular good job of understanding a complex s uation and writing a sensitive piece.

Michael Underhill, A
Hous

Fifth-Year Program: The faculty and gra uates for our fifth-year program and I appreciate the positive recognition giv to our program at the University of Nor Carolina at Charlotte in your August iss [page 42].

I wish to correct, however, the erron ous statement that I have been asked t develop a similar program at any other school. Among the frequent visiting cr ics to our program are Susanna Torre c Columbia and Jerry Wells of Cornell.

The critical input from these visitors over the past six years has contributed significantly to the development of our program. Conversely, I have been told both, observation of our developing pr gram has served in the development of similar one-year thesis programs at Colu bia and Cornell.

Nelson S. Benzing Jr., A
Director, B. Arch. Degree Progra
UNC

Competition Advisers: I think it is com mendable that your magazine publishes news about recent competition winners e.g., Phoenix, ASU, Mercer Island, and others. You even dutifully report the nam of the other finalists, their associates, a the names of the jury members.

However, design competitions also re resent the work of a professional advise in most cases, an architect or planner. I think it would be both appropriate an fair to list the name of the professional adviser responsible for the administrati of the competition, along with the nam of the sponsor, jury members, and participants.

My interest is admittedly self-serving. was the professional adviser for the Pho nix municipal government center comp tition and the Mercer Island civic cente competition, both of which you reporte in your News, Awards and Competitions section.

Edward C. Wundram, AI
Portland, Or

Letters continued on page

Correction: In our coverage of the 1986 AIA convention (July, page 11), it was incorrectly reported that a resolution to create an additional seat on the AIA board, to be filled by an associate member, was tabled. The resolution was defeated.

In our news report about developmen of Philadelphia's waterfront (Aug., page 18), the firm of Rector Olson Associates one of the architects for Penn's Landing was misspelled.

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e following letters refer to articles in past ues of ARCHITECTURAL TECHNOLOGY, *w merged with* ARCHITECTURE.—Ed.

ategies for Staffing: It was with great may that I read the portion of "Charting ur Course" [ARCHITECTURAL TECHNOL-, May/June, page 52] that deals with ff recruitment and development. It ems the positive response to employee ncerns that pervades most professions s yet to be felt within ours.

In examining the article's matrix for ployees, one finds a litany of archiac itudes that seems always to have been art of architectural practice: limited security, average or below average ary, minimal benefits, less loyalty to ff, and so forth. Not one of the six iants of firm strategies contains a wholly sitive approach to the achitectural em-yee. It is alarming that, while we're ncerned about saving our own financial ns, we think nothing of shortchanging se who work for us. Apparently, it is ly the finances of the "gurus" we are rking to improve.

I suggest that we, as architects, scount this portion of the article's rec-mmendations as not being adequate to r profession and work to establish a ideline that can enhance our employees' elihoods rather than detract from them. achieve financial parity with other pro-ssions at the expense of our employees es not, in any way, further our profes-nal aims.

Walter S. Marder, AIA
Tallahassee, Fla.

sing Uniformat for Specifications: Jack artray's piece in the May/June issue ARCHITECTURAL TECHNOLOGY [page 4] was welcome reading. I am not sure at many architects, other than estima-rs, are aware of the existence or uses of e Uniformat system. For those who may t be familiar with Uniformat, the system eaks down project components into ese 12 "sections:"

1. Foundations
2. Substructures
3. Superstructure
4. Exterior Closure
5. Roofing
6. Interior Construction
7. Conveying
8. Mechanical
9. Electrical
10. General Conditions
11. Special
12. Sitework

In addition to the use of this format or estimates and outline specifications, vith some reordering and expansion Uniformat can also be used as a model or construction specifications, a further extension of outline specifications.

It may not be accidental that the Uni-ormat is organized along lines similar to construction drawings, unlike the CSI Format, which is best described as a filing system and has little relation to either building systems or construction contracting. Building systems in the Uniformat context could be defined as physical assemblies or processes that have a common design/performance criteria.

Utilizing a similar subject outline throughout the design development and documentation of a project has obvious advantages for records management, phase continuity, quality control, and historical reference. We might also see here a more friendly format for the development of "expert" architectural systems.

Here's how we adapted the Uniformat outline into a specification subject outline for a recent full service project of ours. Our version attempts to span the Uniformat and CSI words:

IDX Index of Specifications
LD List of Drawings
IBC Instructions to Bidders
PRC Proposal
GCA General Conditions, Forms
02400 Foundations & Substructure
02500 Site Improvements, Earthwork, Grading, Paving
02600 Site Utilities
02800 Landscaping
03100 Poured-in-Place Concrete
05100 Superstructure Framing
07200 Roofing & Deck Waterproofing
08300 Exterior Walls and Enclosures
08500 Doors & Finish Hardware
09100 Interior Construction and Finishes
09500 Field Painting and Coatings
11100 Building Equipment & Specialities
14100 Elevator
15100 HVAC Air Handling Systems

continued on page 11

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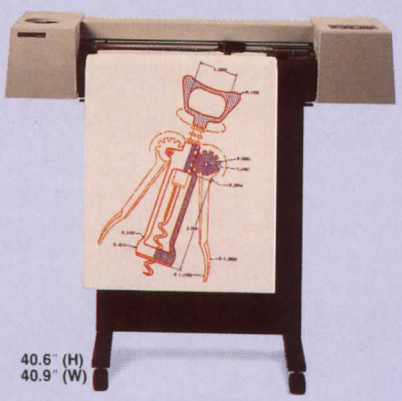
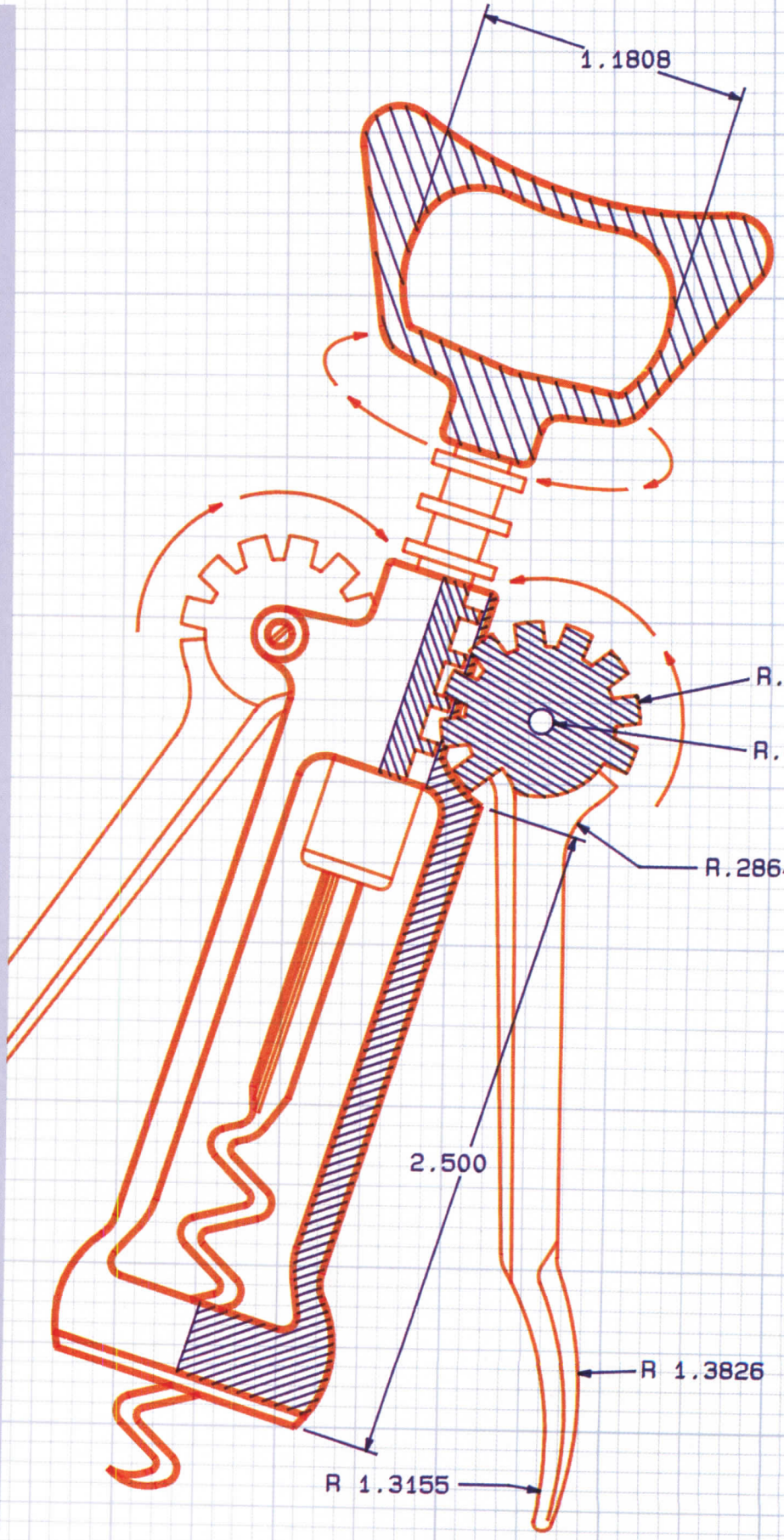


This diagram is an unretouched reproduction of a drawing produced on the HP DraftPro with VersaCAD software.

HEWLETT PACKARD



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tters *from page 9*
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500 HVAC Controls
& Instrumentation
100 Electrical Power
& Lighting Systems
200 Communication
& Control Systems

Baron V.C. Wateley, AIA, CSI
Chicago, Ill.

tting Edge: I read with interest the *edback* to William Herrin's article the "cutting edge" [ARCHITECTURAL CHNOLOGY, May/June, page 9]. One ader commented that there is a prob- n in "giving away the profession" to a of persons. In this list, engineers are ven the same billing as materials people. a registered engineer who has gone t of his way to help keep architects t of liability suits, I find that comment ore than a trifle offensive.

I have often seen architects avoid taining the services of a firm such as ne and instead go to a local contrac- r to let the contractor do the design for ee. This seems to be a fairly simple olation of ethics. With the materials ndors selling directly to the building vners, bypassing all registered profes- onals and flaunting the registration laws, castigating professional engineers is a cheap shot that is not deserved. The design and construction management of a large building project is beyond the training of any single individual; things are just too complicated and specialized. There is a fundamental truth being ignored: Designers don't get sued when the owner is satisfied. In the inter-professional sector, both architects and engineers need to get on the same team to provide satisfied clients; then the litigation will come to a screeching halt. *H.Z. Lewis*
Littleton, Colo.

Curtain Wall Details: Since our firm specializes in diagnosing and prescribing repairs to building exteriors, any article on curtain walls [ARCHITECTURAL TECHNOLOGY, May/June] is read with great interest.

I was distressed to find what I consider a fundamental error in one of the article's illustrations. The lower detail in Figure 3 on page 35 depicts a steel angle resting on the edge of a concrete slab. The caption indicates that a rubber bushing accommodates horizontal movement. This is incorrect. Relative movement in the horizontal plane would have to be accommodated by slotting the hole in the horizontal leg of the steel angle, which was not done. The bushing does not fit into this hole and so has no effect whatsoever on horizontal movement.

As drawn, the bushing would allow the angle to move upward relative to the slab, placing the bushing in compression. Since there is no resilient pad, the angle could not move downward. The connection drawn therefore allows movement only partially in the vertical axis, and not at all horizontally, as stated in the caption.

Harwood W. Loomis, AIA
Hamden, Conn.

Indoor Air Time-Bomb: My independent study into the subject of indoor air pollution [ARCHITECTURAL TECHNOLOGY, July/August, page 27] revealed that even with the best airconditioning systems, the ability to remove contaminants is limited. Unless the contaminants are removed, the recirculated air will always be contaminated. One method to reduce contaminants is to increase the amount of outside air and fresh air ventilation from five to 30 cubic feet per person.

The solution is not to recirculate chemicals such as styrene, benzene, xylene isomers, vinylidene chloride, formaldehyde, cigarette smoke, etc., but to provide direct exhaust/openable windows as needed to keep the threshold limit value no worse than the outside air. Otherwise architects, contractors, engineers, and owners will face a liability time bomb as technology gets more sophisticated. *Maurice Zorman, AIA, EDRA*
Beverly Hills, Calif.

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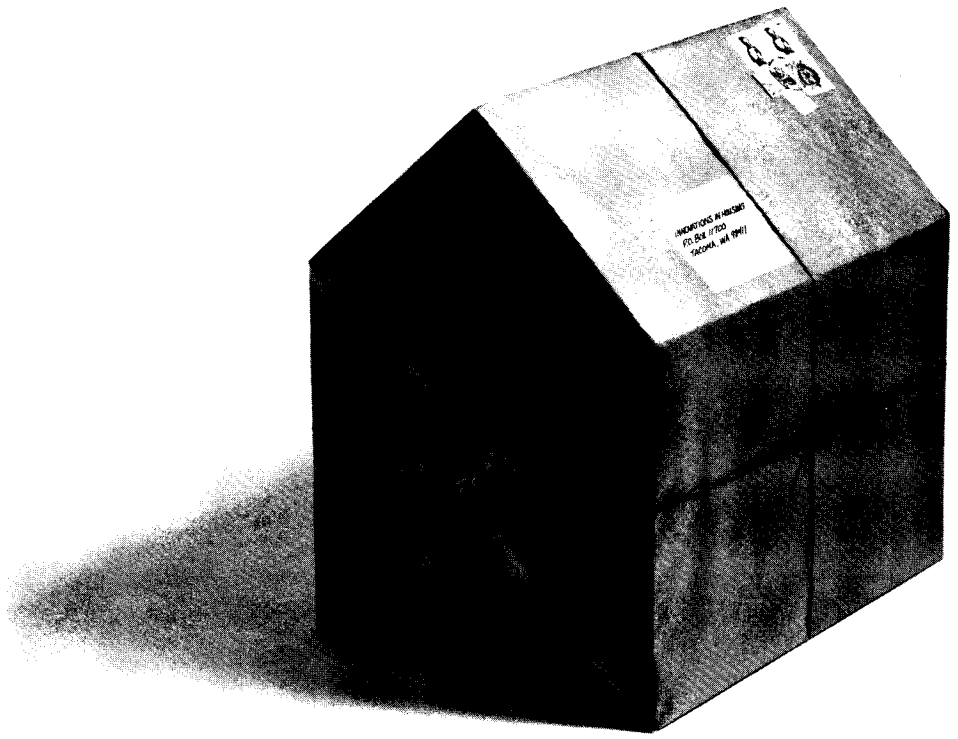

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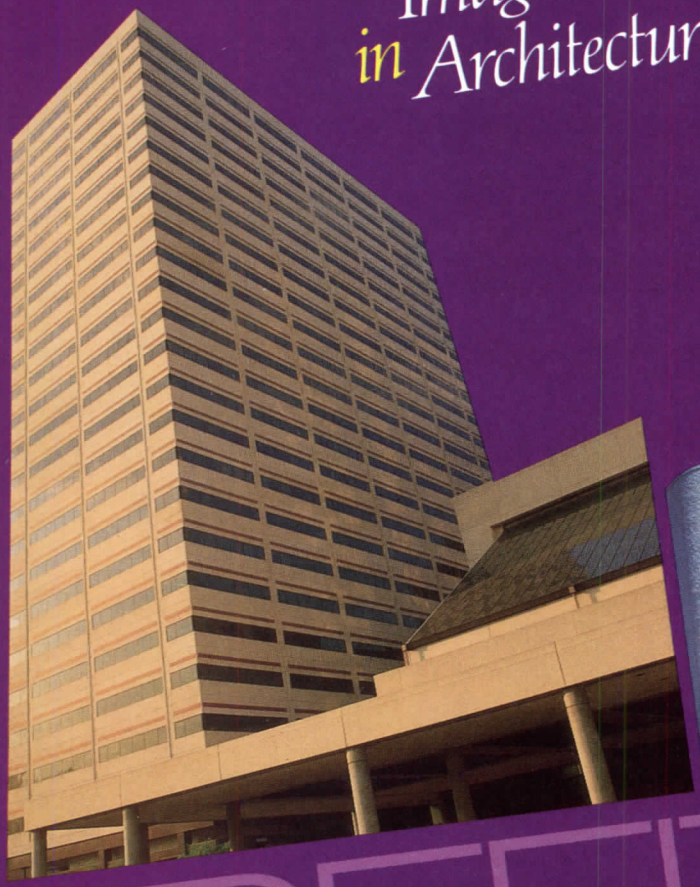

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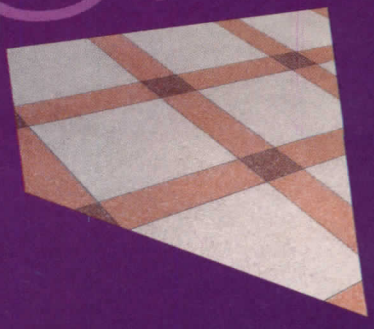

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esign

ITE Selected to Redesign os Angeles' Pershing Square

TE Projects Inc. of New York City has en selected the winner in an interna- nal design competition for the $12.5 lion reconstruction of Pershing Square downtown Los Angeles. The site is the est park in the nation's second largest and has a history as checkered as emphatically gridded winning design. Dedicated in 1866, the five-acre square borne at least five names, and the TE plan, when built, will mark its sixth ysical incarnation. Its most drastic nodeling occurred in the 1950s when vas removed to make way for a sub- ranean garage and air-raid shelter whose nps usurped much of the site area and ose half-heartedly landscaped concrete was a pale substitute for the lush old rk. Even this proved too luxuriant downtown powers who felt that the iage was harboring dangerous derelicts, d therefore the square was redone in 1960s in a mode that bore an odd emblance to the deck of an aircraft rrier. This loss of amenity discouraged ddle-class patronage even further, leav- the park largely to those whose low bility precluded an alternative.

Pershing Square lies between Los Ange- two downtowns. On the east is the y's original and architecturally rich finan- l, entertainment, and retail core, now busy Latino shopping street adjoined a National Historic District and an tive skid row. To the west is the just- modelled 62-year-old Biltmore Hotel, the rtram Goodhue-designed Central Li- ary (which sustained $24 million of dam- e in two arson fires over the summer), d the antiseptic but prosperous new ancial district whose instant skyline has come one of the many symbols of Los ngeles.

At present, the square is a forlorn place rgely tenanted by members of the city's rge homeless population. The Central ty Association, a federation of major owntown business interests, has set out revitalize the space by forming the Per- ing Square Management Association to fect its physical refurbishment as well to program activities in it. A prime al of the park redesign was to attract ffice workers and tourists without dis- acing its present users.

The design competition has been PSMA's principal effort to date, and proved to be, in comparison with recent downtown public-project competitions in other sunbelt cities, a smooth, publicly visible process yielding a satisfactory outcome. It generated 242 entries from which five were chosen for development in a second design stage. Two of these, by the SWA Group of Suasalito, Calif., and by Frank Welch & Associates of Dallas, were formal, symmetrical public square designs in the tradition of earlier Pershing Square landscaping, and, for that matter, in the tradition of most central-city plazas on this continent and in Europe. Welch's proposal was appropriately rich, well-scaled, and complex, while the less refined SWA entry was a puzzling choice, since it was outshone by several other traditional designs that were either on the runner-up list or were among the discarded entries.

The three other finalists embodied more avant-garde approaches (assuming, for convenience, that revivalism is not a strongly avant-garde phenomenon). SITE's entry was based on a bold grid of 13-and-a-half-foot squares, expressing, as did two other schemes, the 27-foot column grid of the parking structures below. Even in the anonymous first stage it was clearly identifiable as a SITE work, in that it took a familiar form (an uninflected grid) and gave it a simple yet contradictory twist by having its surface undulate freely. The Santa Monica, Calif., firm of Phelps/Son Architects presented a Venturi-like essay in cartography and history, replicating the original land survey of the city on one diagonal half of the site, and devoting the other to a thickly planted and sloping replica of nearby Bunker Hill. Bone/Levine Architecture of New York City offered the boldest of all the entries, a dramatically sweeping trellis in the form of an elevated "botanical freeway." The selection of these three schemes demonstrated the jury's willingness to consider non-standard solutions, and its ability to discriminate astutely among such proposals. Additionally, the predominance of out-of-region finalists testified to the effectiveness of program materials in describing the site and its background.

But even though the winning design is one of considerable promise, the second-stage judging left the door open for second-guessing. Thanks to further development and greater depth of presentation, the differences in quality among the schemes became more evident. The Welch and Bone/Levine proposals seemed the strongest, in part due to their clear-cut urbanity, and in part because they had the good sense to maintain the apparent flatness of the site. (There is a drop of about two feet across the site, but it is barely perceptible given its 330x600-foot dimension.) Welch's plan, richly paved and centered on a large fountain ringed

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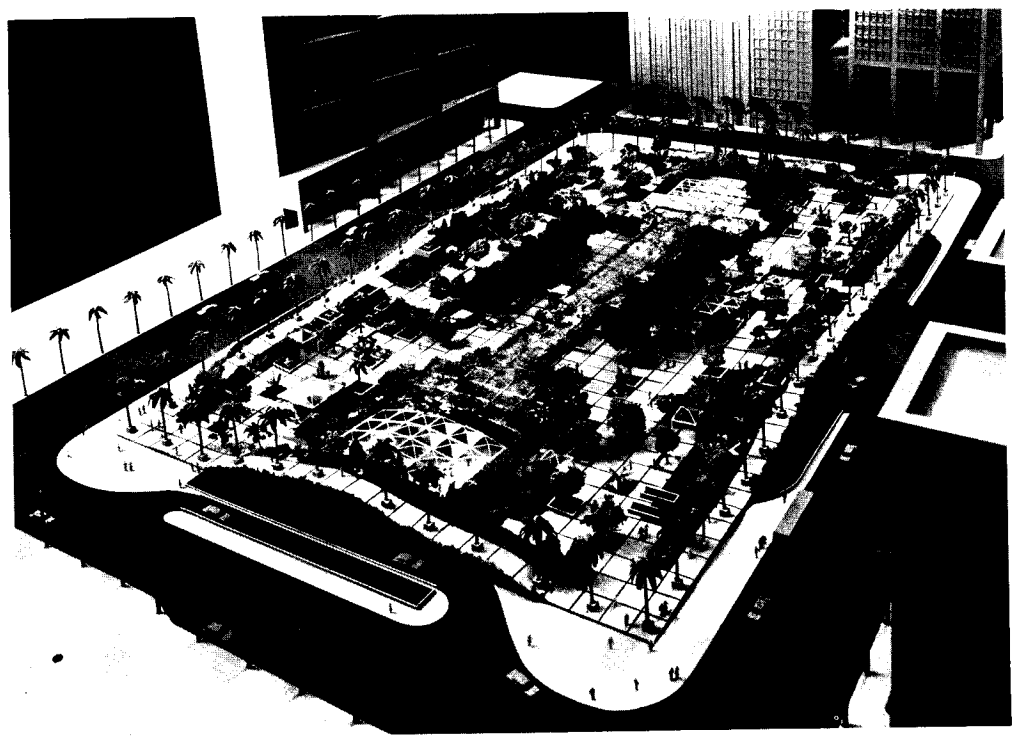

ITE Projects' winning proposal for the evitalization of Pershing Square.

Design *from page 15*
by sculpted human figures, was composed of spaces within spaces and achieved transparency without sparseness. Its screening of the garage ramps with vine covered pergolas seemed the most effective treatment of these intrusive elements. Kevin Bone's scheme improved in its second phase by setting up a counterpoint between a regular grid of trees and the freer form of the freeway/trellis, but also lost some ground when that structure lost some of its fluidity in its later version. (It was not clear, however, whether this was an abstract flaw of plan graphics or a concrete one that would be sensed in real time and space.) Bone left the garage ramps largely exposed, taming them by making their sinuous forms very much a part of his composition. Puzzlingly, these two schemes were the first to be eliminated by the jury.

The SWA Group's entry metamorphosed from a public square in phase one to a Beaux-Arts set piece in phase two, which also saw the addition of Robert A. M. Stern, FAIA, to the design team. The result looked like a portion of a larger park transplanted on another site. An extreme change of grade at the north end split the park in two, and, along with the paving and planting patterns, largely thwarted the diagonal circulation that is vital to the square's actual use. The Phelps/Son scheme, while representing a higher order of accomplishment, was also hurt by a raised north end capped by a lath house that acted as a formidable visual barrier. Its compass-rose fountain cleverly continued the map metaphor, but also seemed overscaled. Heeding first-phase jury suggestions, Barton Phelps altered the proportions of paved grid to forested "hillside" from an equal balance to a two-to-one ratio favoring the latter. The effect was more of an arboretum than that of a downtown open space.

SITE's second phase addition of a large central trellis seemed to weaken its original concept, and it became clear that the plan's undulations, by raising the edges of the square, divorced the space from its surroundings and created a decidedl awkward perimeter. Security would be problematic, and entering the park at th center of its long sides under this raised edge would be a dubious *esthetic* experience.

In SITE's own words, its design is mea "to compress virtually all of [the] Los Angeles experience into a 'metaphorica magic carpet'" with the paving grid rep resenting the flatland street system and the rolling edges symbolizing the area's hills and mountains. (The lines of the gr will be made of transluscent material ill minated from below at night, simulatin the city from the air.) This is a laudable strategy, but metaphor can be a double-edged sword. By making a uniform and non-hierarchical pattern, the plan seem to symbolize the sprawl and the lack of center that are stereotypically associated whether fairly or not, with Los Angeles. This lack of formal focus seems a symbolic contradiction to the competition's first objective to "establish Pershing Squar as [an] important symbol of the center Los Angeles. . . ."

At the same time it must be remem-

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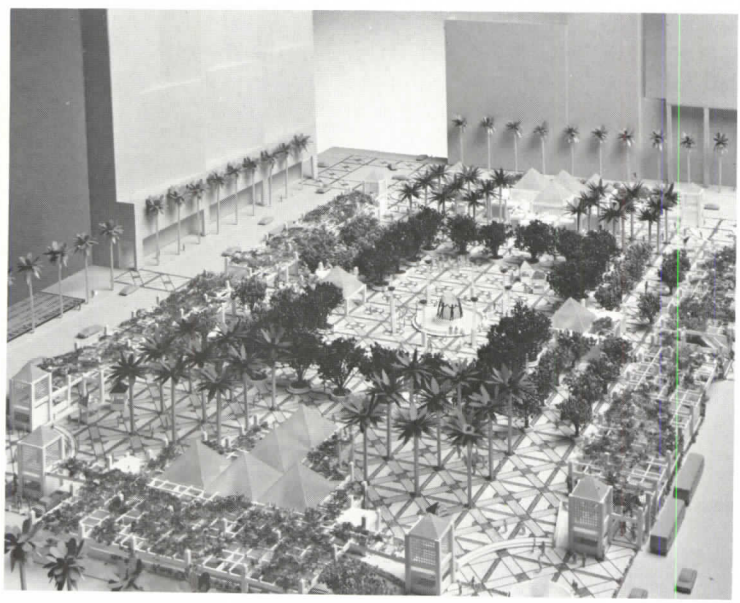
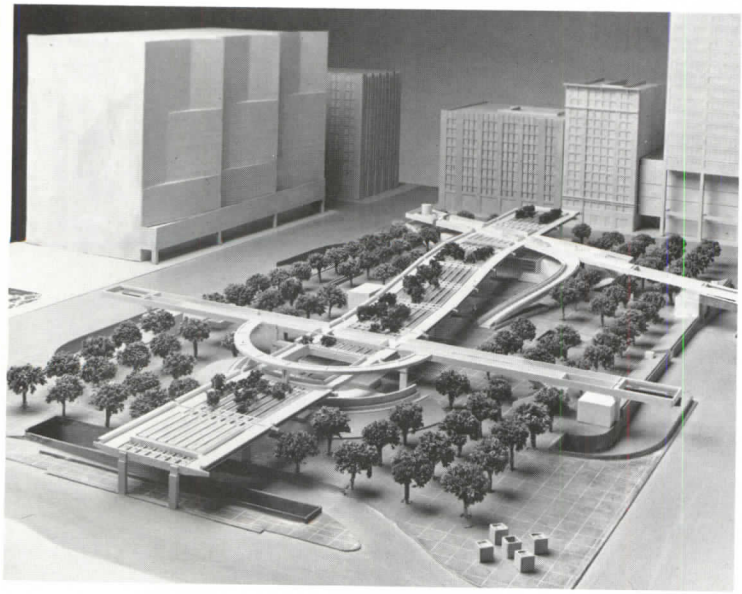
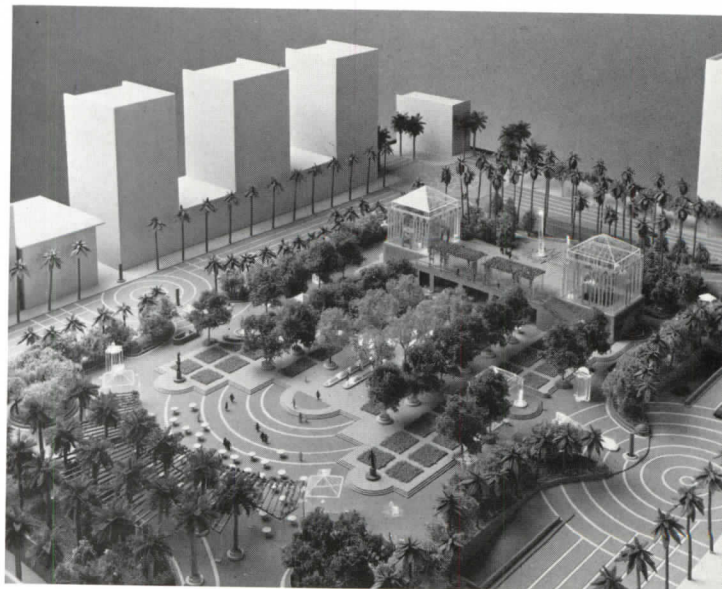
The four other finalists for the redesign of Pershing Square, clockwise from top left, Frank Welch & Associates, Phelps/Son Architects, The SWA Group, and Bone Levine Architecture.







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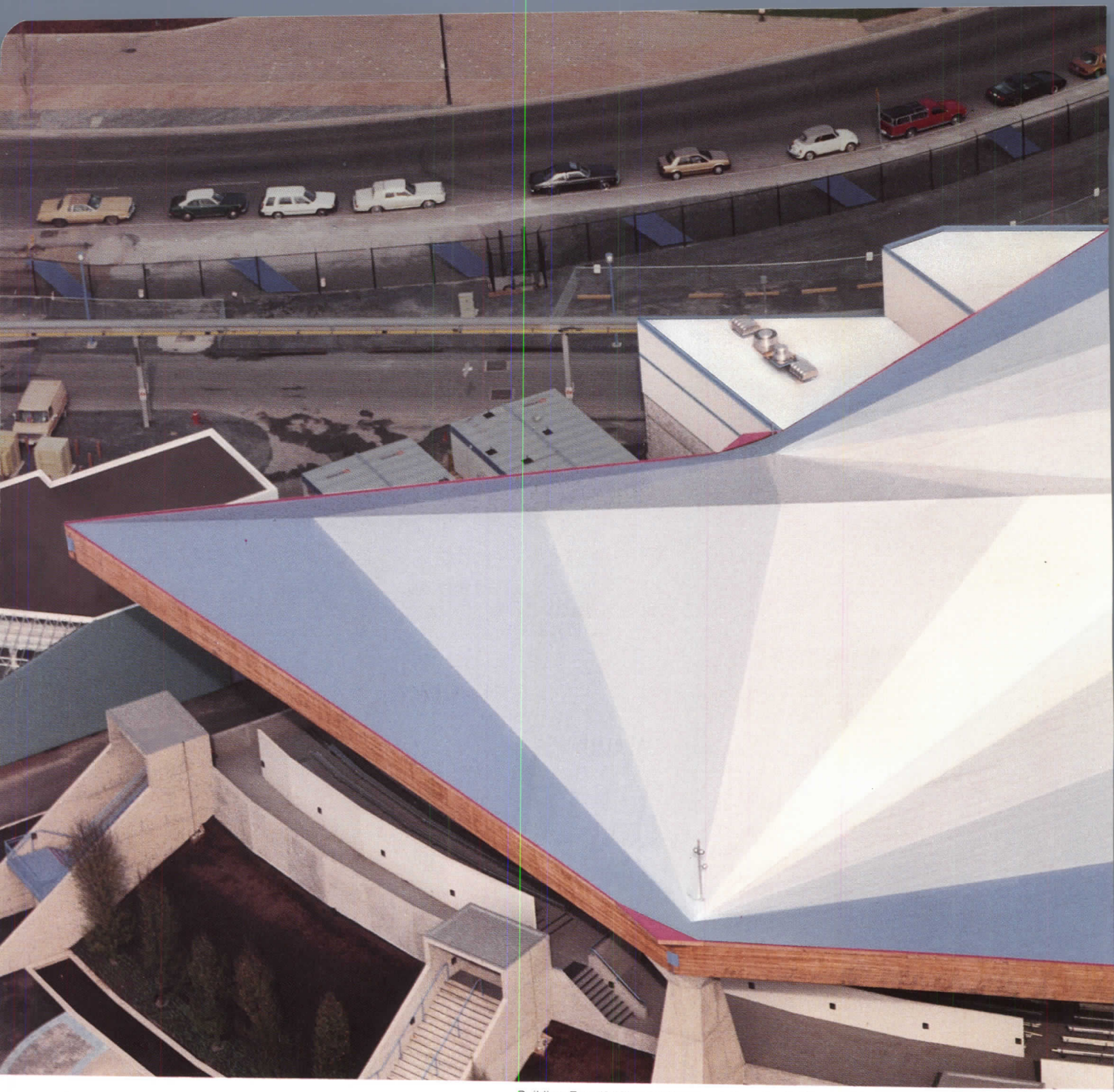

Building: Expo '86 Theater, Vancouver, Canada Architects: Aitken Smith Carter Partners; The Wade Williams

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or adhesives depending upon the system's supplier recommendation. In addition, because they're among the easiest to install, roofing systems based on HYPALON are much less likely to cause problems in the long run. And any necessary repairs can be done quickly and easily.

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Only Du Pont makes HYPALON. Specify it by name.

Du Pont manufactures HYPALON, not single-ply roofing membranes or systems.

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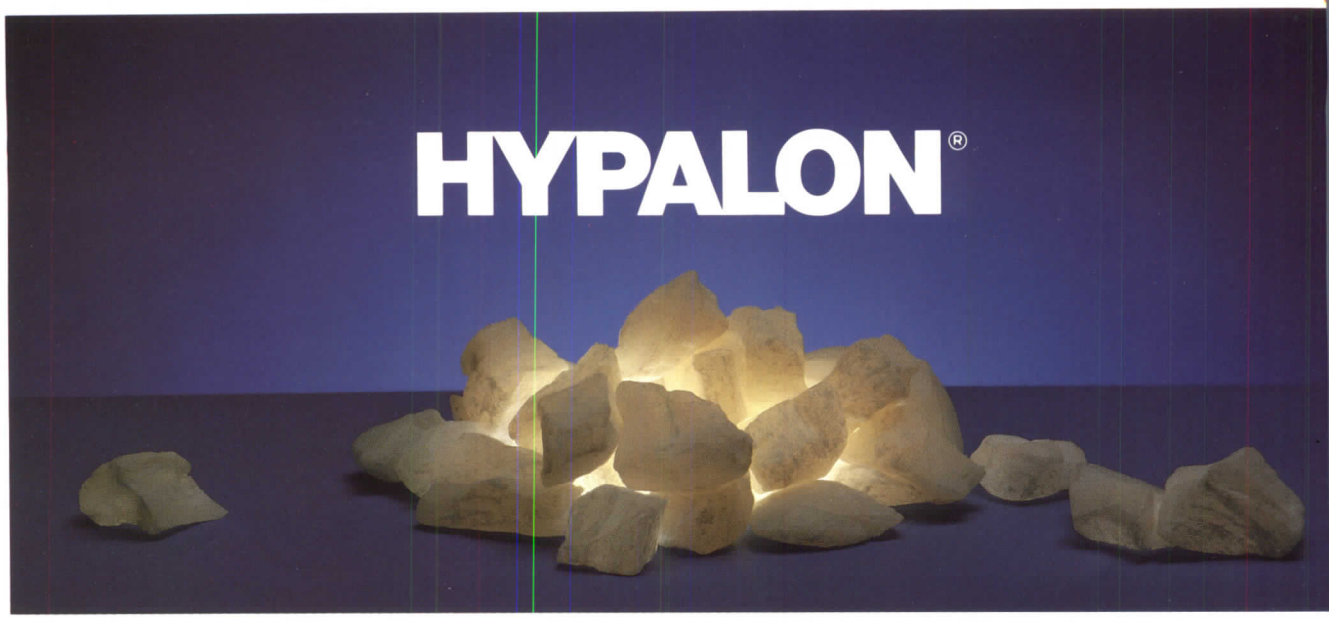

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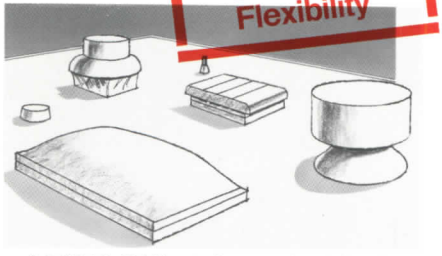
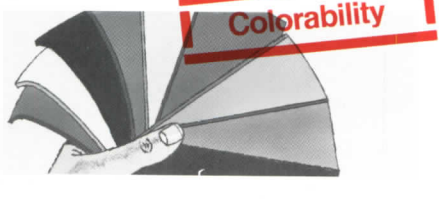
Design Flexibility



HYPALON's unique chemical and physical properties allow for design versatility rarely found in other polymer products. Membranes based on Hypalon can be easily shaped and fitted over various configurations, substrates and hard-to-fit areas of any roof, including sloped or curved designs. Whatever the building, a system based on HYPALON can be tailored to cover it with a snug, long-lasting fit.

Colorability



In comparison to other polymers used in roofing, systems based on Hypalon can be created in a broad range of colors without loss in performance. Since a variety of ultra-violet stable pigments are compatible with a properly compounded membrane of HYPALON, systems will retain their color and performance characteristics despite continual exposure to sunlight. This is significant in that masstones, pastels and even fluorescent color can be used in the manufacture of roofing systems.

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Since it vulcanizes over time, a roofing system based on HYPALON actually becomes stronger with age. And because repair and maintenance is minimal, roofing systems made of HYPALON are among the most economical on the market.

Weatherability

The combined action of ozone, oxygen and sunlight often cause the degradation of many polyme products. HYPALON, however, is both ozone and ultra-violet resistant. In fact, when properly compounded for the roofing app cation, its resistance to all these elements is actually enhanced.

The toughness of the polymer itself enables HYPALON to rema functional under some of the harshest environmental conditior Membranes based on HYPALON offer serviceability in temperature as formidable as -40°C (-40°F) and 93°C (200°F).

Environmental Resistance

Due to the chlorine in its molecular makeup, compounds c HYPALON are resistant to oil and to flame propagation. Additionall a membrane based on HYPALON is highly resistant to corrosive chemicals, ozone, pollutants, and acid rain—setting quality standard throughout the industry.

For more information about Du Pont HYPALON and the companies that manufacture roofing systems based on HYPALON, call 1-800-441-7111.

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gn *from page 16*
d that, of all the final schemes, SITE's the most conceptual and the least ific, and thus capable of evolution. chairman Charles Moore, FAIA, d that "we liked SITE's plan because dn't seem to complete the whole busi- of making a park but rather started rk that we can't really imagine the of.... This scheme, like the 'silent ies,' allows each person who uses this to make possible their own script to ve—as opposed to the 'talkies' where script and thus the imagination is ady done for you." This unfinished ity goes beyond Moore's remarks; e is still quite a bit of specific designing to be done.

TE principal James Wines acknowl- ed this in his presentation to the jury understands the importance of detail s so far generalized scheme. Pershing are is of considerably greater magni- and programmatic complexity than of SITE's executed work, and this ides an opportunity to expand upon one-dimensional brilliance that has racterized that work to date. The grid rgely a *tabula rasa* that will be filled uring the balance of the design period. es' goal is to "generate mini-environ- ts" reflecting the city's history, eth- mix, and specific culture as well as iverse vegetative domains and land- ping traditions.

ITE will be aided in the latter tasks andscape architects EDAW, Inc., and ton & Spitz. Charles Kober Associ- will be the local associated architect the project.

ix million dollars of the $12.5 million struction cost will be supplied by Los Angeles Community Redevelop- nt Agency, with private contributions king up the balance. The competition funded in part by a grant from the ign arts program of the National En- vment for the Arts. William Liskamm, A, of San Rafael, Calif., was the npetition adviser.—JOHN PASTIER

nce Charles in Limelight at rvard GSD's Anniversary

e 50th anniversary of the Harvard grad- e school of design was celebrated in tember, coinciding with the 350th anni- sary of Harvard University. It was the er, larger celebration that attracted the sence of Prince Charles, the Prince of les, who was the main speaker at its ening convocation.

Wherever the prince went, he traveled ong U.S. government security agents o all wore gray suits, red ties, and Gor- n Liddy moustaches, as if deliberately provide a foil for the prince's rosy eeks, amazing tailoring, and the golden ademic robe from the University of ales in which he rose like the sun over cloudy Harvard Yard to deliver his address. Later in the same day the prince appeared at the design school at a symposium called "The Future of the City" —the only one of Harvard's zillion anniversary symposia he attended—and stole the show from the academics with unpretentious and obviously heartfelt comments about the city of Liverpool, its devastation through loss of jobs, and people's need to live in village-like neighborhoods, whether urban or rural, the designs of which express their own style and interests.

Dean Gerald M. McCue, FAIA, took the occasion to announce a new Prince of Wales prize in urban design, funded by an anonymous donor, which will provide an award of $25,000 periodically to the designer of a completed work, anywhere in the world, that "advances traditions of humanism in urban settings."

The graduate school of design came into existence in 1936 when Dean Joseph Hudnut merged the earlier Harvard schools of architecture (1895), landscape architecture (1900), and city planning (1929). Hudnut's ideal of collaboration among the design disciplines was much debated by various symposia during the three-day celebration. Among those who spoke was Vermont landscape architect Dan Kiley, a student at the time of the 1936 merger, who argued that different disciplines shouldn't collaborate because ideally there shouldn't be different disciplines. "We should abolish all the professions," he said. "Make it all one field. The best landscape architects today are architects anyway. The GSD is like the Army, Air Force, Navy, and Marines. I hate the scrambling for turf." Boston architect Joan Goody, AIA, said that an architect can't accomplish anything without collaboration and decried the "image of the lonely designer, the lonely genius." She felt that both students and the general public were deceived by a few well-known architects who "use such an image to promote hidden well-run businesses."

Among speakers on other topics, historian William McNeill talked about cities and claimed they came into existence not for commerce but chiefly for ritual activity. He argued that people still yearn for ritual and wondered about the effect of "the audiovisual world of the future that offers vicarious participation—participation in private—depriving life of its force and effect. The effect of crowds is missing; people still want to congregate." Planner Martin Meyerson worried about the same problem, saying he thought the urban challenge to designers was "to keep the concentration of people and their face-to-face contact, not to let TV become a substitute." But he said he thought cities were getting better and praised "a new civility" and renewed confidence in leadership. Critic Ada Louise Huxtable, Hon. AIA, challenged him and questioned whether society now possesses any vision, any ideal—good or bad—about cities or about life.—ROBERT CAMPBELL

Continuing Controversy Over Kent State Memorial Design

A memorial intended to heal the wounds of the tragic events that occurred at Kent State University 16 years ago has instead resulted in a bitter controversy. More than five months after a national juried competition (see June, page 14), the design of the memorial that will be built is still uncertain. The jury's first choice was disqualified, and the university had planned to build the second place scheme. However, in early September, Ian Taberner, the disqualified first place winner, donated his design to the university.

In April, the competition jury unanimously awarded first place to Taberner, who also credited Michael G. Fahey and 10 University of Michigan students. Shortly after the announcement, Taberner informed university officials that he was a Canadian citizen. (The competition was open only to U.S. citizens.) Taberner was disqualified, and the university designated team member Fahey as the winner. Fahey subsequently refused the $20,000 cash prize and the designation, saying his involvement in the scheme was minimal.

Initially, the university sought to construct Taberner's memorial without his permission. In an article in the Detroit *News* on April 17, Kent State President Michael Schwartz was quoted as saying: "The bottom line is that we now own that design—and if nothing can be worked out on a contract with Fahey—then we'll build it ourselves with our own architects."

After Taberner threatened legal action if his design was used against his will, the university agreed to negotiate with him for a consulting role. After attempts to reach an agreement failed, the university trustees on July 2 adopted the second place scheme as the winning design.

That new winning scheme, designed by Bruno Ast and Thomas J. Rasmussen of Chicago, calls for a platform area with 13 polished black marble disks set into blue granite pavers, which represents the 13 persons that were killed or wounded.

The latest event in the controversy occurred when Taberner donated his design to the university. In giving his scheme to the school, Taberner stipulated that the memorial be built on the original site and that he serve as architect and receive an appropriate fee for its realization.

At press time Kent State officials had not yet formally responded to the donation. But whatever the reaction, it appears a cloud of controversy will continue to surround the memorial, for the prevailing sentiment, as an editorial in the Kent State student newspaper recently suggested, is: "People have waited 16 years for a long overdue memorial. The new one must be fully supported by the university, the families of the victims, and others who think about the future. . . ."

News continued on page 24

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First Geodesic Dome Built In U.S. Donated to MIT

The MIT museum received the first geodesic dome built in the United States as a gift from Zane Yost, AIA, principal of Zane Yost & Associates, Bridgeport, Conn. Yost built the dome when he was a student at MIT in 1951 out of 3½-foot-long spruce 2x2s and plywood circular disks, from Buckminster Fuller's calculations and a paper model.

Yost donated the dome to the museum because, he believes, the structure is representative of Fuller's philosophy of "offering ideas as examples, rather than a complete solution."

The dome found a home for 35 years on Yost's parents' farm in New Hampshire. Conceived originally as a potential solution to the housing crisis, the 24-foot-diameter, 450-square-foot structure served as a guest house for much of that time.

Although the underground plumbing and electric lines caused occasional problems, the structural system has survived intact. The waterproofing of neoprene topped with a fluid-applied elastomeric coating (a revolutionary idea for its time) also held up, even though the skin below (¼-inch masonite panels built on a shoestring budget and screwed into the frame), proved to be unsalvageable.

Yost reports that he dismantled the 20-sided dome in less than a day—all the galvanized bolts, attached to metal tabs at the ends of the 2x2s, unscrewed and were in good condition. He hauled the entire structure to MIT in "a box that would fit under your desk."

Michael Yeates, assistant director for collections at the museum, indicated that MIT would be willing to lend the structure out as a traveling exhibit. The address: MIT Museum, 265 Massachusetts Ave., Cambridge, Mass. 02139.

—M. Stephanie Stubbs

Losses

Henry Moore: 'The Teacher for His Monumental Sculpture Was Nature'

By the time he died this Aug. 31 at the age of 88, Henry Moore's sculpture was the preferred outdoor embellishment for many of the better known public buildings in America and Europe, and notably their shrines to art itself, including Mies' National Gallery in West Berlin, New York's Lincoln Center, and I. M. Pei's East building of the National Gallery in Washington, D.C.

Though a lifelong denizen of rural England, Moore's pre-eminence was early acknowledged in the U.S. when Alfred Barr included him in a 1936 exhibition of cubism and abstract art, and no other country now owns more of the sculptor's works. While his name is equated with the modern movement—which we associate with squared edges, the triangle, and the grid—Moore's was an art of rounded shapes, many punctuated with huge holes. The teacher for his monumental sculpture was nature as he experienced it on his unprepossessing farm in Hertfordshire, rather than modern, urban, hard-edged images. This explains in part why, as John Russell of the New York *Times* wrote, Moore's work "was loved by people the world over—and not least by those who had never looked at the work of another sculptor."

Moore's transformation from an unknown avant-garde artist to a figure of public recognition and affection was generated by his powerful and moving drawings of life in London's underground bomb shelters during World War II. In their humanity they reflected what [illegible] been described as Moore's own generously emphathetic, plain-spoken, unpretentious nature.

One of eight sons of a miner who elevated himself to mining engineer by learning mathematical and technical skills, Moore in turn raised himself to burrow and carve into rock, but as a sculptor. He began as an elementary school teacher. After being gassed in World War I, he used his free tuition as a veteran to enroll first at the then-progressive Leeds School of Art where he was exposed to original art works by Cezanne, Gauguin, Kandinsky, and African "primitives." From there he proceeded to London's Royal Colle of Art and a hungry sampling of London's art treasures. He wanted, he said "to learn all about all the sculptures th had ever been made in the world." He also began traveling, first to Paris whe he discovered Cezanne in 1923 while s at the Royal Academy, then to Italy in '25 on a traveling fellowship.

Moore had his first one-man show i London when he was 30. "The vital thin he said around that time, "is to have a subject that allows you to try out all kir of formal ideas, just as Cezanne did in his 'Bathers' series. In my case it is the reclining figure that provides those chances."

Seattle Opposes Proposed Removal of Moore Sculpture

At the time of Henry Moore's death in late August, one of his most prominen works was making front page headlines in Seattle. "Vertebrae," an eight-ton Mo bronze that has perched for 15 years o the forecourt plaza of Seafirst Bank bui ing across from the public library, had recently been sold to an unnamed Japa nese collector for "about a million dollar When installed in 1971, "Vertebrae" wa the only major Moore sculpture on the West Coast and was seen as comparabl to Chicago's Picasso and the Moore at Lincoln Center. In the years since, it ha insinuated itself into the public's affections, so it is therefore not surprising th plans to replace it with a planter have met stiff resistance.

Initially, local representatives of JMB Property Management Corporation, cu rent owner of the building, defended th sale, saying they invest in real estate, no art, and claiming no local interest in acq

continued on page

Moore's 'Vertebrae' in place at the Seafirst Bank plaza in Seattle.

New modular fixtures answer multiple remodeling needs: advanced optics mean better lighting, wide range of options gives design flexibility, four-week shipment keeps projects on schedule.

Lighting the Remodeled Space

You can insist on the look and quality of the best linear lighting —even if you're up against a tight completion deadline.

Remodeled spaces have all the lighting problems of new construction without the benefit of long lead times.

This carefully-designed space is actually the clubhouse of the Minnesota Twins baseball team—a far cry from the bare-concrete and exposed-pipe image we usually associate with a locker room.

Despite its remarkable luxury, this job suffered under the usual remodeling constraints: an existing structure (the Metrodome) and the pressure of time (the opening of baseball season).

The designers wanted the look of linear fixtures and the even lighting that only a high-quality lensed indirect fluorescent system can deliver. Unfortunately, high-quality linear systems need eight to twelve weeks for delivery—acceptable for new construction but too long for time-sensitive remodels.

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A selection of specially-designed lenses distributes light facet by facet. This up light combines wide spread with low lens brightness.

This diagram, generated by research computers at Peerless, shows how the light strikes each individually-designed lens facet, then fans out over a wide area while the lens retains a comfortable low brightness.

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Losses *from page 24*
sition of the work. Seattle area private collectors and the Seattle Art Museum denied this.

In late August, as workers prepared to remove the sculpture, the city department of construction and land use posted a stop-work order because the owners had failed to secure a demolition permit. Matters were then further complicated by the prospect that the sculpture may have allowed the bank, under a "bonusing regulation," to obtain additional street level retail space, which would require replacement of the Moore with another work of art.

As the local art community scrambled to contain this tempest, intrigue was thrown into the brew when JMB officials reversed themselves and denied that they were the sellers, claiming that the sculpture was still owned by the bank. At this point the bank's representative, Boston art consultant Wayne Anderson, confirmed that he had sold the sculpture as part of an effort to shift the corporation's collection from an international to a Northwest focus, but claimed that JMB did own the work during the sale.

Bank officials then rather sheepishly explained that they had had obligations to sell Vertebrae to two buyers at the same time—JMB and an East Coast buyer. The double sale resulted from a right of first refusal clause in an agreement between the bank and JMB. The sale by Anderson triggered the clause, giving JMB the option to buy. JMB exercised its option but immediately assigned those rights to Anderson's buyer, an East Coast art dealer, who in turn sold the piece to a Japanese dealer. The dealer has reportedly already resold the work.

Now, as lawyers for the various principals attempt to unravel the events, Vertebrae will stay put—for a while.

—John A. Galloway

Mr. Galloway is an architect and freelance writer in Seattle.

Government

Housing Bill Proposes Rehab Rather than New Construction

A housing bill passed by the U.S. House of Representatives would virtually stop construction of new public housing and instead call for the rehabilitation of existing units. Overall, the Administration's plan to eliminate a number of programs and sharply curtail others was rejected by the House as it extended for another fiscal year all housing and community development programs—including the Community Development Block Grants, the Urban Development Action Grants, and the Farmers Home Administration assisted housing programs. However, in sharp contrast to the past, specific funding levels will be left to the budget and appropriations committees.

The move toward rehabilitation of existing public housing would extend even to $860 million in fiscal year '80 funds that were originally designated for construction of new public housing units. In the future, money could only be spent to complete units already committed, to replace those demolished or sold, or when 90 percent of a public housing authority's units are in good condition.

Few housing authoritites can meet that goal, critics of the measure contend, given the "inadequate" levels of rehabilitation funding provided in recent years. And, critics maintain, in many areas of the country new units are now desperately needed as well as the rehabilitation of older ones. In New York City, where the situation is perhaps the most bleak, 200,000 families are on the waiting list for public housing, a wait that could take 30 years at current vacancy rates. During the Carter Administration, 20,000 new units were built each year; under Reagan 5,000 units have been constructed annually.

Another controversial provision allows public housing to be sold to residents at 75 percent below prevailing market value with a low interest loan from the housing authority. If the housing legislation is passed, property worth $14 billion could "immediately be transferred to public housing residents," says Rep. Jack Kemp (R.-N.Y.), who introduced the provision.

Selling public housing to low-income residents is currently being tested in a three-year government experiment that started in fiscal year '80. As of last May only one house had been sold, and critics contend that few low-income families can afford home ownership, even with generous financial aid. The Reagan Administration, however, expects the purchase of an estimated 300 low-income housing units by the end of this year. There are 2,000 units across the country scheduled for sale by 17 public housing agencies.

In other action, the House approved a program under which HUD would designate 100 enterprise zones, one-third of which would be in rural area. It seems highly unlikely, though, that tax incentives considered necessary to make the enterprise zones successful will be included in the federal tax reform package. Therefore, the only money for such a program would have to come from state or local governments.

Three new demonstration programs would be established: an emergency shelter program for the homeless; a program where tenants would be allowed to manage the public housing projects they live in; and the Nehamiah housing opportunity grant program that would create a revolving loan fund for low-income families to purchase new or substantially rehabilitated houses.

In addition, the Federal Housing Administration mortgage insurance program would be reauthorized; families would be allowed more flexibility to move within the same Standard Metropolitan Statistical Area without losing their Section 8 housing certificates; and public housing authorities would be able to phase in rent increases resulting from tenant income increases. Among the reauthorized programs would be the Section 302 rehabilitation loan program, the rental rehabilitation and housing development grants programs, Section 202 elderly and handicapped housing, 11-year-term Section 8 certificates, and five-year-term housing vouchers.

Meanwhile, the Senate Banking Committee passed housing legislation similar to the House bill, although it is uncertain at this writing if the full Senate will consider the legislation. If it does, Sen. William Armstrong (R.-Colo.) is expected to attempt to significantly strip down and/or delay action on the legislation through amendments and parliamentary maneuvers. What seems most likely to occur is a comprehensive housing and community development reauthorization bill is not passed by the full Senate is that both the House and Senate will agree on a short-term FHA extension. The rest of the housing and community development programs would most likely be continued through appropriations only.

If a housing bill is passed by Congress President Reagan has threatened to veto any legislation that preserves housing programs at their current or at higher levels. And given the new budget deficit-reducing law, the trend is clearly for less federal involvement in providing low-income housing.

Such a shift has already started to occur. As economist Kermit Baker wrote in a report for the National Association of Home Builders: "The development of assisted housing has undergone substantial changes over the past four years. Gone are the days when the federal government, a private developer, and a private financial institution could execute a simple agreement to construct low- and moderate-income housing. These three actors are now taking the back seat to community development corporations, public/private partnerships, state and local governments, and private foundations."

—Nora Richter Greer

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Initial Assessment of Tax Reform's Effect on Profession

The Tax Reform Act passed by House and Senate conferees would have a major impact on the construction industry, due to the reduction or elimination of tax incentives that have encouraged building activity.

Incentives retained by House and Senate conferees that were supported by a broad coalition of groups representing the building industry, including AIA, are the tax credits for historic rehabilitation and for the removal of architectural barriers to the handicapped and elderly. For historic rehabilitation, the existing three-tier tax credit (15, 20, and 25 percents of rehabilitation costs) would be replaced by a 20 percent credit for certified historic structures and a 10 percent credit for nonhistoric structures placed in service before 1936. For removal of architectural and transportation barriers, the tax reform bill would allow as deductible up to $35,000 of qualifying expenditures for removing such barriers.

The conferees' agreement would eliminate several forms of tax credits for low-income rental housing including preferential depreciation, five-year amortization of rehabilitation expenditures, and special treatment of construction period interest and taxes. In their place it proposed a new measure that would provide for credits for new construction and rehabilitation of low-income housing and for certain costs of acquisition of existing housing to serve low-income persons. Owners would have to retain the property as low-income rental housing for a 15-year period to be eligible for the tax credits.

Of concern to AIA was the retention of the cost method of accounting for professions. House and Senate conferees agreed to retain it only for qualified personal service corporations and other entities (other than tax shelters) with an average annual gross receipts of $5 million or less, or farming and timber businesses.

Clearly, what effect these and other tax changes will have on the architecture profession can only be conjectural at this point (this issue went to press before either the House or the Senate acted on the conferees' proposals). However, AIA president-elect Donald J. Hackl, FAIA, suggested in his first formal statement on the matter: "Under the two-fold assault of tax reform and a projected economic slowdown, investors will be increasingly hard-pressed to justify any undertaking that does not have quality written into it. It will be quality that determines not only whether or not a building is built, but how quickly it is rented and for how much a square foot. By 'quality' I have in mind such traits as energy efficiency, durability, flexibility, the skillful integration of a structure with the latest technologies, project management, among others. . . . The real winners of the proposed reform will be those who have built a solid reputation for quality and those developers who have a history of settling for nothing but the very best for their clients."

Practice

BOCA Adopts New Standards For Inclusion in Model Code

The annual meeting of the Building Officials and Code Administrators International, held this summer in St. Louis, resulted in numerous changes to the BOCA model building code that could significantly affect architectural design. The committee considered over 300 changes proposed at a public hearing in January; changes will become effective in the 1987 edition of the BOCA code.

Key issues in the new code include:

- Major reorganization of the code format. Several existing code articles will be subdivided to create new, separate articles pertaining to specific materials.
- Redefinition of assembly occupancies. Assembly occupancy A-1-A (theaters used for theatrical or operatic performances) and assembly occupancy A-1-B (motion picture theaters) are combined into one use group, meaning theaters of all types will now be required to meet the same code requirements.
- Redefinition of educational occupancies. All buildings used by more than five persons at one time for educational purposes are now defined as educational occupancies. The current code places buildings with under a 50-person occupancy load in the less stringent business occupancy classification.
- Permitted area for open space. Modifications to this section clarify that credit for open space on each side of a building must be either space on the same lot or dedicated to public use (such as a street). In addition, a builder applying for an allowable building area increase cannot take credit for open space available on an adjacent lot if that lot will be available for construction at a future date.
- Extensive revision of structural design loads for snow, wind, and earthquakes. The BOCA code will now parallel the American National Standards Institute's provisions for determining these design loads (ANSI Standard A58.1-1982).
- Consolidation of smoke control requirements. All smoke control requirements will appear in Article 17. Technical changes to this section of the code will occur in future editions, following futur study. Also appearing in the 1987 editio will be a new section on hazardous production materials use facilities that relat specifically to the semiconductor manufacturing industry, and another section on correction and detention facilities, which adopts many of the provisions of the National Fire Protection Association' Life Safety Code.

Architects interested in keeping up wit the latest model code revisions can receiv "Code Call," a free monthly newsletter, published by Rolf Jensen & Associates, Inc. Call Brenda Pedersen, (312) 948-070 for details.—M. Stephanie Stubbs

Indoor Air Quality Papers Soug

The American Society of Heating, Refrig erating and Airconditioning Engineers has issued a call for papers for "IAQ 87: Practical Control of Indoor Air Problems, a conference to be held May 20-22, 1987 in Washington, D.C. ASHRAE held the first interdisciplinary conference to improve understanding of indoor air quality problems this April.

According to ASHRAE, IAQ 87 will present demonstrated solutions to indoo air quality problems, including case histories and papers describing control applications. The majority of accepted papers will cover nonresidential applications, but ASHRAE will also accept a limited number of residential studies.

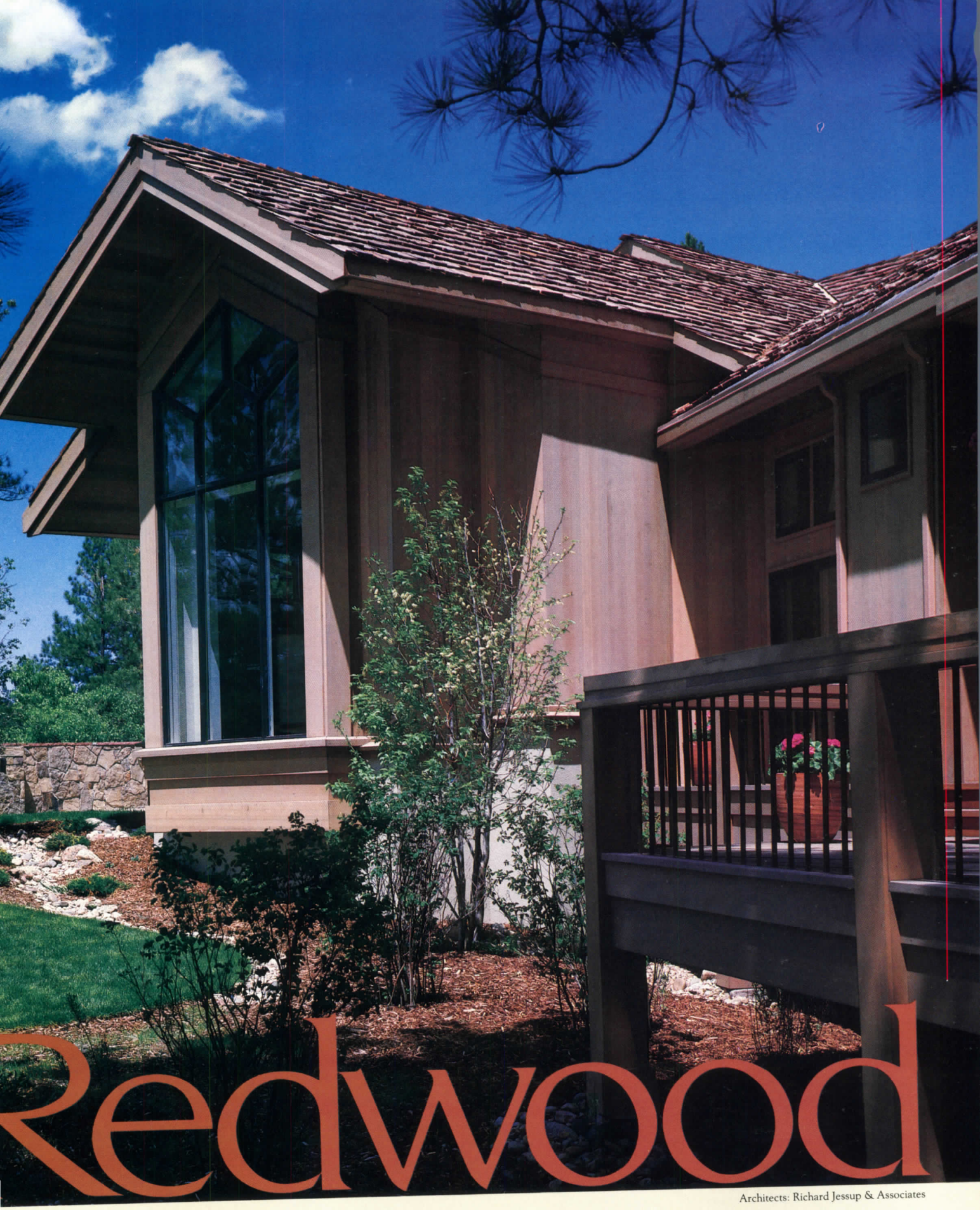
Abstracts of 300 words or less and requests for registration information may be sent to: J. Richard Wright, Director o Technology, ASHRAE, 1791 Tullie Circle N.E., Atlanta, Ga. 30329. Deadline for receipt of abstracts is Dec. 1. Full manuscripts are due April 15, 1987, for publication in the conference proceedings.

New Standards for Sidings

The American Architectural Manufacturers Association recently released its new standard specifications for aluminum siding, soffit, and fascia, completed after five years of research.

The new performance standard combines several previously separate prescriptive specifications. It permits performance-based product design by eliminating the need to meet minimum metal thickness criteria and allows alternative fastening systems that meet the performance criteria. It also differs significantly from the old standards in terms of windload resistance requirements.

The new standard, AAMA 1402-86, is available for $12 prepaid (postage and handling included), from AAMA, 2700 River Road, Suite #118, Des Plaines, Ill. 60018



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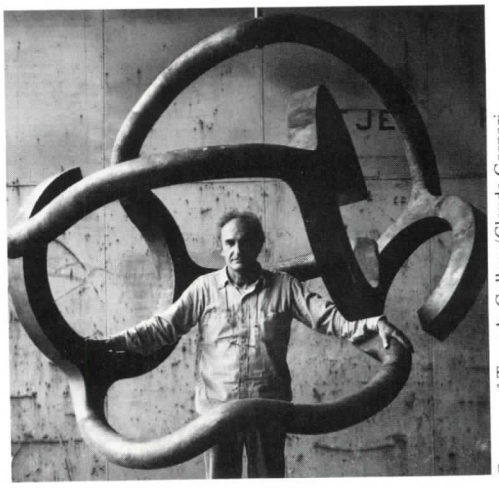
The Arts

Basque Sculptor's Public Art



Courtesy of Tasende Gallery/Claude Gaspari

Although Eduardo Chillida received ample recognition for his public sculpture in the Basque country in the '70s when it was created, little has been heard of him since. The silence is being broken this month with a many-pronged attempt to reassess the sculptor's significance. On Oct. 24, the first major U.S. exhibit of Chillida's work since a 1980 retrospective at the Guggenheim will open at the Tasende Gallery in La Jolla, Calif. In conjunction with it, the La Jolla Museum of Contemporary Art (with support from publisher Harry N. Abrams) will host a Chillida symposium on Oct. 23, which will be preceded by the showing of a new film on his work by Laurence Boutlin. Also to be promoted at La Jolla is a new book on Chillida by Peter Selz.

Chillida created "comb of the wind" (above, right and left) in collaboration with architect Pena Ganchegui for his home town of San Sebastian. It consists of three steel forms resembling giant claws or pliers anchored to the rocks and grasping the sky, plus a promenade. Before construction of the work, this area of San Sebastian was inaccessible; it is now used as an esplanade for games and performances.

Also designed in collaboration with architect Ganchegui is the 8,000-square-meter plaza (left) for Vitoria-Gasteiz, the capital of the Basque province of Araba. In the Baroque tradition, it is replete with "involutions, mazes, tangles, and surprise," in the words of a Basque government publication.—Andrea Oppenheimer Dean

What Do These Prestigious Buildings Have In Common?

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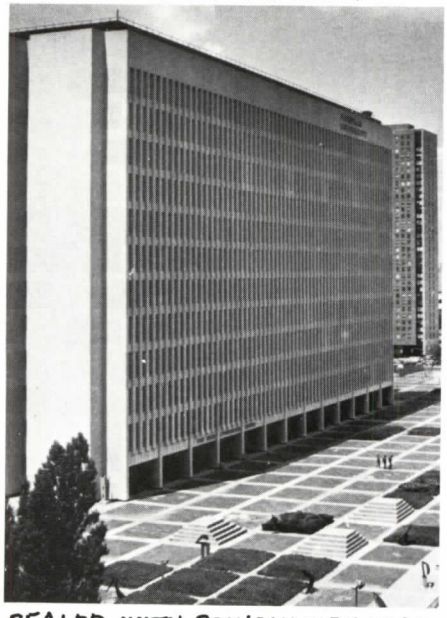

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Cambridge, Massachusetts
Architect: Le Corbusier

UNITED AIRLINES HEADQUARTERS

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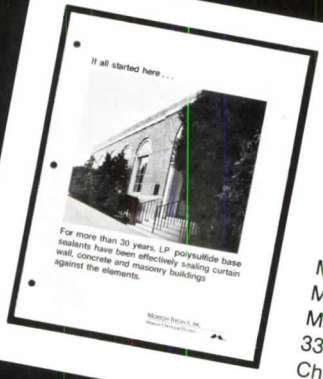

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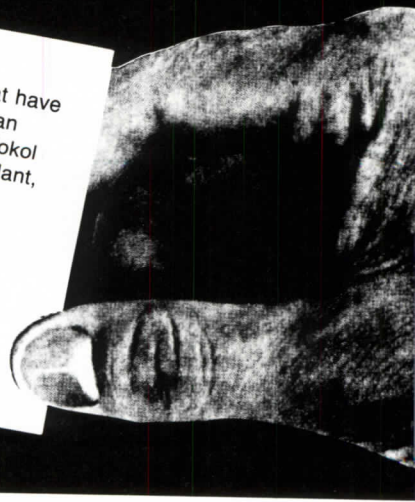

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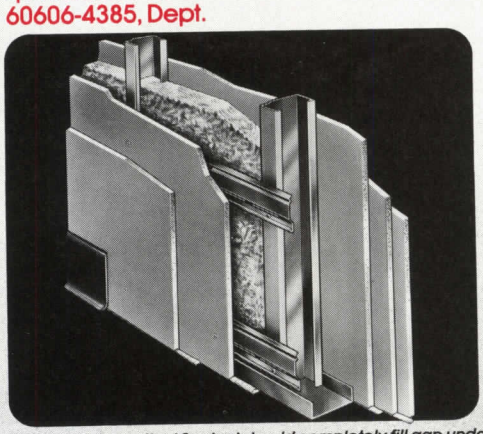

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Top: Embassy Plaza, a development of Walden Investment Corporation, Schaumburg, IL
Architect: Shaw and Associates, Chicago, IL
Glazier: MTH, Chicago, IL

Bottom: Sports Specialties-Locker Room, B.C. Enterprises, Schaumburg, IL
Architect: Warren Johnson Architects, Palatine,
Glazier: E.J. Hayes Glass and Mirror Co., Skokie

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ARCHITECTURE

One of the earliest and best decisions about the merger of ARCHITECTURE and ARCHITECTURAL TECHNOLOGY, which is effective with this issue, was that the merger should mean the thoroughgoing integration of the two magazines and their concerns into a single coherent whole. One magazine would not swallow the other, nor would it carry the other like an insert. Rather the best of both would be blended.

Thus, ARCHITECTURE's central task remains presentation and analysis of built works at scales ranging from urban design to interiors. Those on the following pages are entirely residential, and they show some of the characteristics that will continue to mark our coverage of buildings.

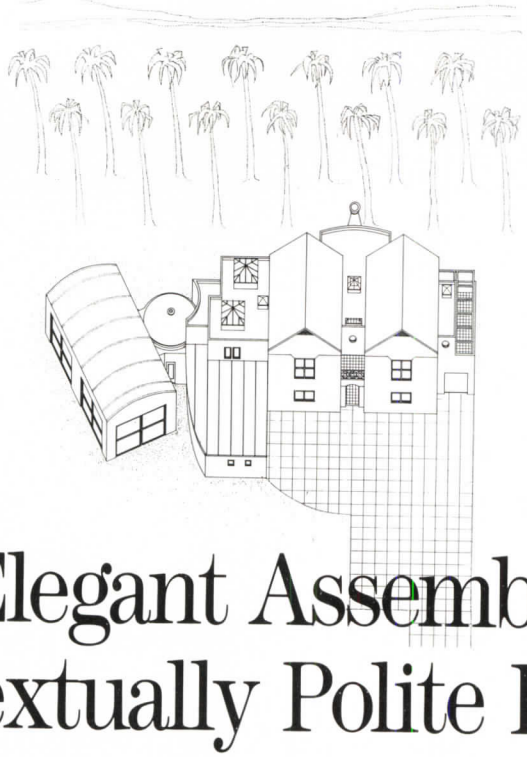
They are varied in size, style, and location (several being outside of the U.S.). Many are by small and/or young firms (several of the firms being published here for the first time). Most are new, but there is an instructive evaluation of a famous building of a generation ago and an examination of a centuries-old way of building vernacular houses in Japan.

These things represent a continuation of ARCHITECTURE's constantly evolving approach to the profession and its works. But there are things resulting from the merger that are entirely new.

Largest of these is the Technology and Practice portion of the magazine beginning on page 85, produced by Mitchell Rouda and the former ARCHITECTURAL TECHNOLOGY staff. This month it too is residential, its major element being an unusually comprehensive and penetrating treatment of housing delivery systems here and abroad.

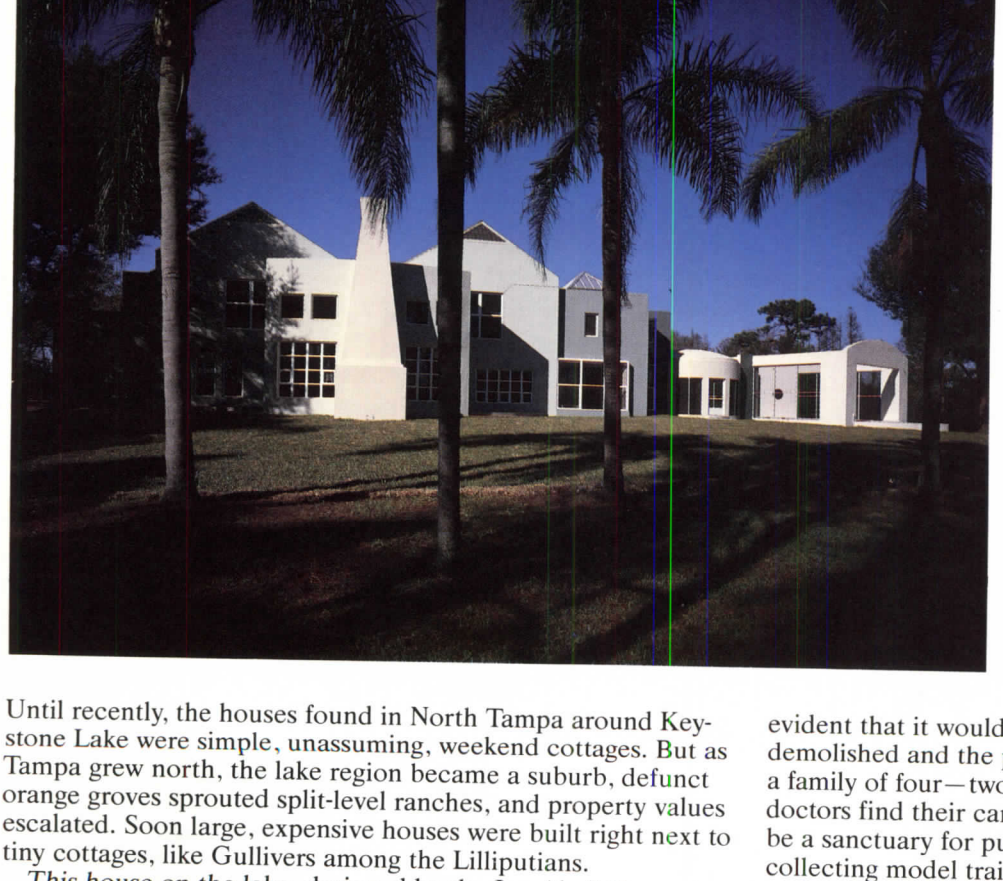
The concerns of ARCHITECTURAL TECHNOLOGY are reflected in the building content as well. Thus, the building chosen for evaluation was the very symbol of industrialized housing in the '60s and '70s; one of the new houses is made of prefabricated boat parts, and the vernacular house type is analyzed from a structural viewpoint.

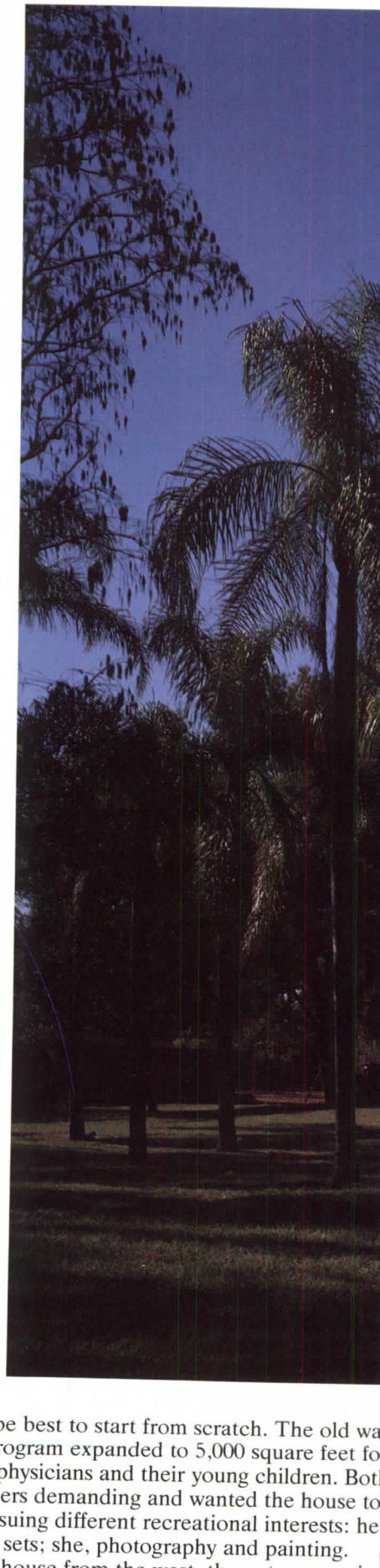
As time goes on we are certain that the merger will cause us to pay more and more attention to *how* things are built, in terms of both process and technique, along with *what* is built and how well. *D.C.*



'An Elegant Assembly of Contextually Polite Parts'

House in North Tampa, Fla.; the Jan Abell Kenneth Garcia Partnership, Architect. By Michael J. Crosbie





Until recently, the houses found in North Tampa around Keystone Lake were simple, unassuming, weekend cottages. But as Tampa grew north, the lake region became a suburb, defunct orange groves sprouted split-level ranches, and property values escalated. Soon large, expensive houses were built right next to tiny cottages, like Gullivers among the Lilliputians.

This house on the lake, designed by the Jan Abell Kenneth Garcia Partnership of Tampa, is big but doesn't appear so. Where they might have used a large version of a cracker-box cottage, Abell and Garcia have wisely related the house to the context in exterior scale, rather than detail or decoration, creating an elegant assembly of contextually polite parts.

The house started as an addition to an undistinguished existing structure on the property, but as the program grew it became evident that it would be best to start from scratch. The old wa demolished and the program expanded to 5,000 square feet fo a family of four—two physicians and their young children. Bot doctors find their careers demanding and wanted the house to be a sanctuary for pursuing different recreational interests: he collecting model train sets; she, photography and painting.

On approach to the house from the west, the entry court is dominated by two gabled "cottages," representing, explains th architect, the two distinct, adult individuals who live here although, paradoxically, the gabled elements are identical. Thes elements—a garage that helps define the court, an angled poo house, and a smaller garage to the south—are sutured togethe by a dark gray spine that extends north-south. The east side o

Photographs © Walter Smalling Jr.

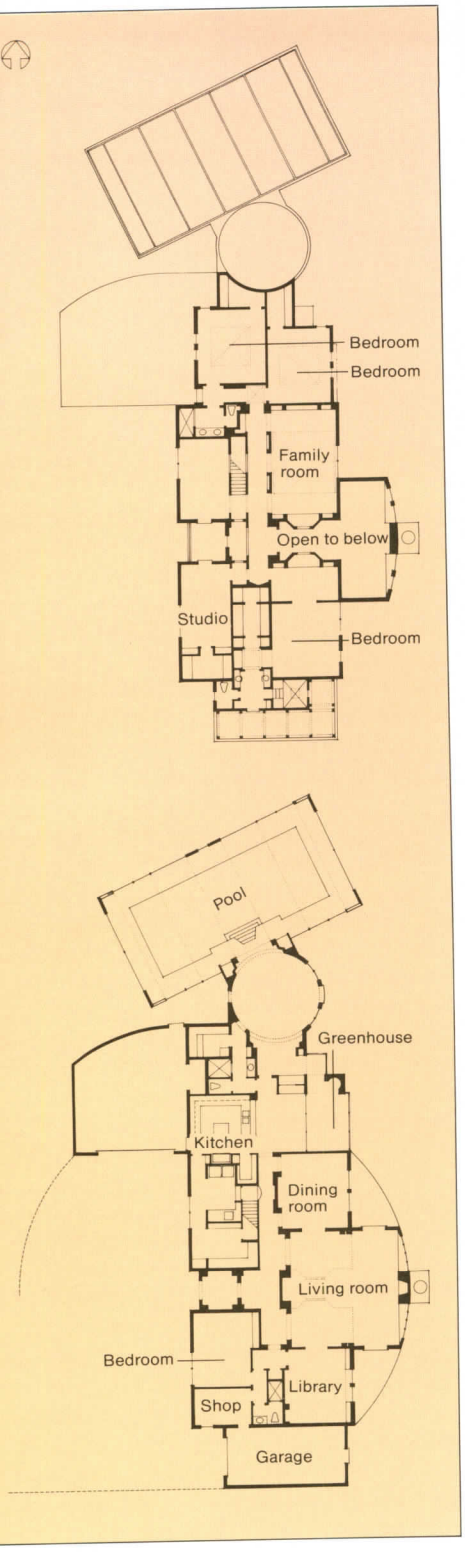
cross page top, axonometric of house from its west, entry side. bove and left, alternate views of the sculptural east elevation it faces the lake through a screen of palm trees.

ulptural elements that are gradients of gray: the lightest shades lvancing, the darkest receding. This elevation makes clear how is Spartan palette reinforces the idea of the house as a gather- g of smaller buildings by subduing their connective tissue.

As a protective sanctuary, the house is well sited. The build- g stretches out like a wall, separating the visitor from the lake. he entry side is not entirely hospitable. It's rather flat and tight, bare of windows to rebuff the west sun. One enters through an pen-air vestibule into a gallery and is, in plan, at the heart of he house, but not quite yet in. We are standing in a slot of space that runs north-south and is demarcated by the darkest gray outside. This slot is the real threshold because it splits the house (again, in plan) between its public and private realms.

On the west side are storage areas, a guest room, the kitchen, utility spaces. To the east is a study, dining room, breakfast room, greenhouse, and living room. The last is the only two-story space in the house and perhaps its most exciting. It and the spaces that adjoin open their walls to the lake and the view. The living room bows out toward the lake, stopped by a freestanding chimney. Low spaces in the living room are found under two volumes that intrude from the second floor and seem to hang from the ceiling. These are the interior remnants of the two gabled "cottages," and in the living room their separation, narrowed by facing balconies, seems near resolve as they pucker to kiss.

Above, entry side in the afternoon sun with the house appearing as an enclave of small buildings; below, round anteroom connecting pool to the house, with lake views; across page, sun rakes the floor in a corner of living room; right, two-story space in living room with sitting alcoves above.



Photographs © Walter Smalling Jr.

Down the spine to the north one finds the pool and its anteroom, a round, domed porch with a tiny oculus—a miniature Pantheon where one can relax with an iced tea and watch a circle of sunlight make its slow journey across the tile floor. The pool house is neither in nor out—basilica-like in proportion with a ceiling vault and apse of metal screening. Together, the pool house and its anteroom might be mistaken as the vestige of some ancient ruin, tilted to align with a particular constellation. But the skewed fragment serves no astrological agenda; angling it was the only way to fit it on the property.

The house is bisected in section as well, the second floor devoted entirely to private, family use. To the north are the children's rooms, which had to be *exactly* the same size. On the east side is a family room and sitting room (with their balconies) and a bedroom. And to the west, each residing in a gabled "cottage," are a train-collecting room and a studio with darkroom. Across a shared porch that overlooks the entry, these two realms for private pursuits hold hands. □

Disparate Rows Peer Across a Path

Riviera Villas, Johannesburg; Ian and Lynn Bader, Architects. By Lynn Nesmith

The Riviera Villas in the Kallarney section of Johannesburg, South Africa, is a complex project that maintains a sense of innocence. A husband and wife architect team, Ian and Lynn Bader, created an enclave of 11 town houses that provides both public scale and a sense of privacy. An assemblage of serious and ironic elements, the project manages to make an eloquent architectural statement without screaming for attention.

Johannesburg was established 100 years ago as a mining town on the country's gold reef. The earliest town planning surveys had divided the city into two parts separated by a strip of land that the Baders call the "fault line." Land on the two sides of the irregular strip followed different plans and patterns of development. Running north-south through the city, the "fault" was slow to be developed and came to be known as "land which has fallen out."

The Riviera Villas' 6,146-square-meter, slightly wedge-shaped site was part of this "fault" and over the years had been used as an informal pathway linking a residential neighborhood with a synagogue and Hebrew school.

The Baders made this pathway the project's central circulation spine that is set on the skewed orientation of the "fault line." Just as the "fault" divides the city yet provides a continuity, the spine mediates between two distinct architectural realms.

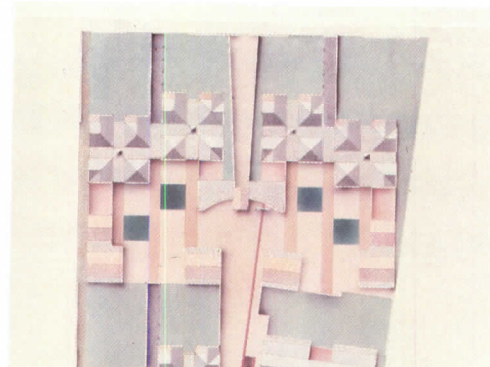
On one side, the units are elevated above the low wall that serves as the horizon line, while on the other side the units are set directly on the ground. This relationship creates, in the words of the architects, "a kind of schizophrenia."

The Baders, natives of South Africa who have lived in New York City for the last six years, drew from the vernacular buildings of the N'debele and traditional Cape Dutch architecture. They interpreted the anthropomorphic facades of the simple mud brick houses of the N'debele, which are painted as part of the ritual of habitation, as masks through which one enters. The colors (blues, greens, and earth tones) and the detailing are intended to connect the dwellings with the landscape. For the Riviera Villas, the architects designed a complex series of facades that are different on each elevation and used colors drawn from a similar palette to establish a similar relationship between the earth and sky.

The gable walls and white plaster of the traditional Cape Dutch buildings are repeatedly recalled in the Riviera Villas and similarly reinforce the project's pointed profile against the sky.

The main entrance to Riviera Villas is defined by a cylindrical gatehouse and a cantilevered hinged gate opening onto the skewed central spine. Running along the north-south axis, the spine terminates at a small pavilion that leads to a synagogue.

The 11 housing units, each approximately 220 square meters, are based on two abstracted building types, the basilica and the villa. Along the east side of the main street three basilica-type town houses seem firmly grounded with broad



large central entrances with tall centra bays flanked by smaller side entrances a framed with brick walls. Their stepped back facades and recessed bays create zig-zag pattern that is repeated in the contrasting brick pavings of the roadwa

The remaining eight units have a squa plan and cruciform circulation pattern wi four corner rooms. Grouped in pairs fa ing courtyards, these villa-like units hav more complex facades that change with each elevation, like a series of distincti masks. Along the striated brick wall of t central street, the villas are perched in pa like identical twins, each centered on a break in the wall where the upper facad extends like a leg to touch the ground, while the northern facades bear recesse balconies. Landscaped courtyards repea the geometrical theme of the villas in sma square gardens with four conifer trees ar banding in the paving defining the entrances and circulation paths.

The exterior forms of each of the hou types are recalled in the interior spaces In the basilica town houses, the entranc is a linear central space with a pitched cei ing and a balcony. At the end of this mai circulation axis is a stairway sheathed in gray marble and naturally illuminated b glass sliding doors on either side. The first floor living spaces are open in plan but defined by floor surfacing patterns—the rooms are carpeted and circulation paths are travertine. Ceiling forms based on the roofs further accentuate these rooms, which open onto gardens and patios on either side of the house Clerestory windows running the length of the house provide nat ural light for the family room and an upper-story bedroom.

In translating the square theme to the interior of the villa houses, the architects emphasized the central cross axis with a skylit, two-story volume. On the main floor, the living room fil the two squares that face the gardens to the north. The dining room has a gabled ceiling with a large window facing the entrance courtyard. Floor surfacings and ceiling patterns are again used to define the rooms and accentuate the overall grid of the projec

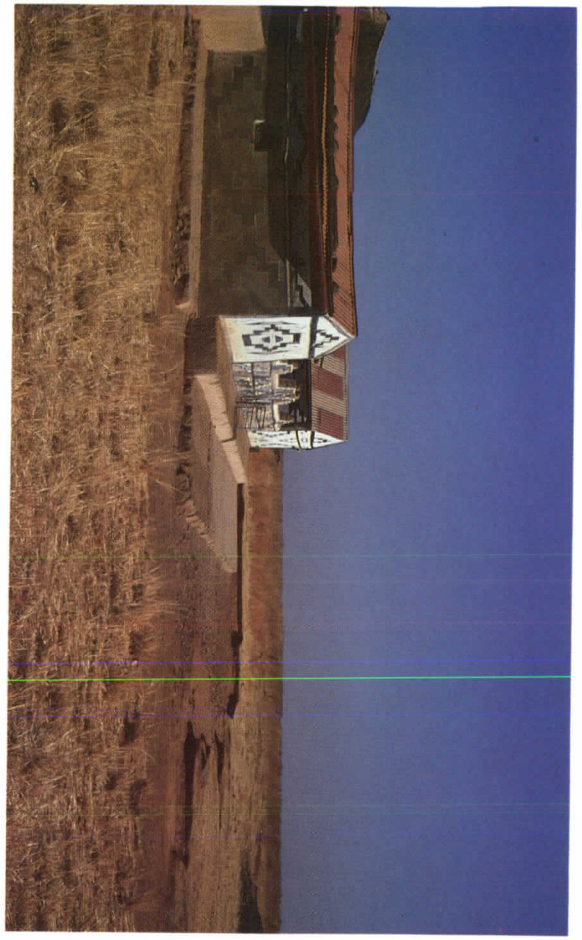
On the second floor, the three bedrooms open onto a balcony that encircles the central skylit volume. The bedroom ceilings are painted blue and have recessed pyramidal skylights.

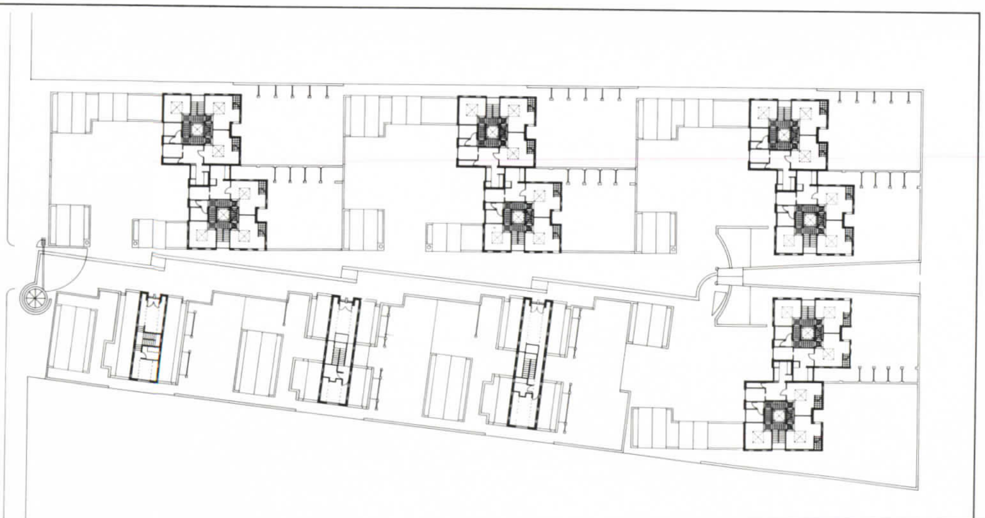
In addition to the variety of forms, the Baders used diverse building materials as well as subtle color differences in the plas ter facades of the two house types. The smooth plaster surfaces sharply contrast with the black slate and mirror glass. Along the opposite sides of the street the coloring of the brick varies. The striated walls make reference to geological formations and the gold vein that runs under the site, while the exterior light fixtures projecting from the wall are variations of mining lights.

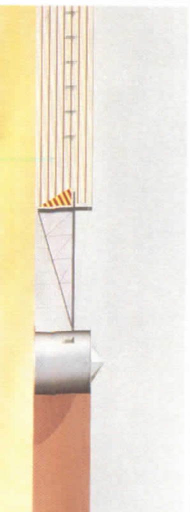
Right, view from south shows roof forms and fenestration and the hinged gate in foreground. The three basilica units are set on the skewed orientation of the road, while the villa units hav

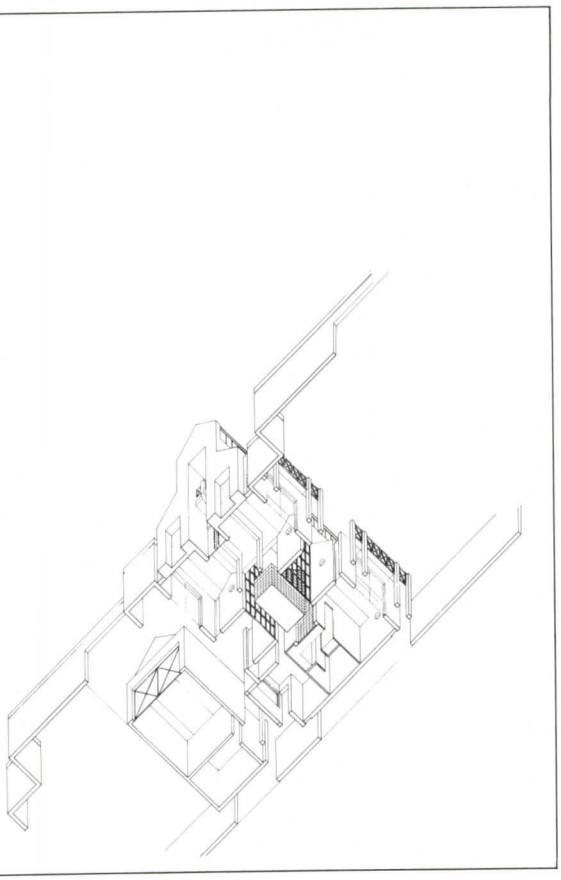
© David Goldblatt and Margaret Courtney-Clarke

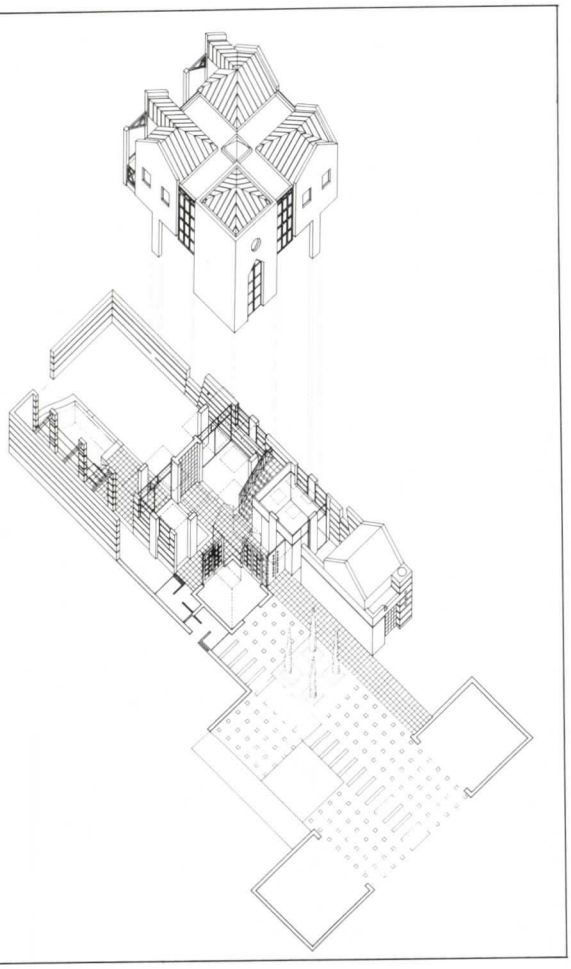
Ian Bader











Loena Kotze

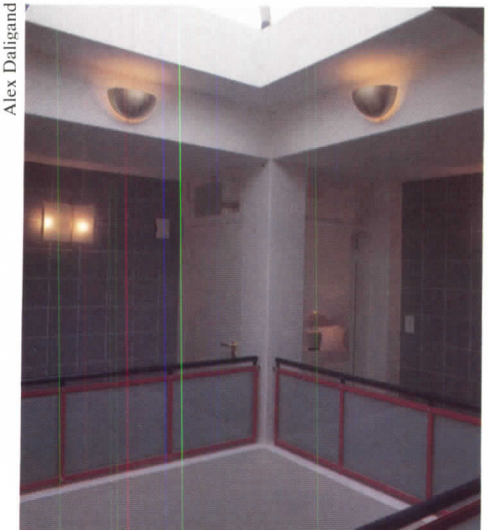
Loena Kotze

pposite page, top, central roadway looking ward the hinged gate; middle, painted facade of traditional N'debele dwelling; bottom, gable wall f Cape Dutch architecture, near left, airbrush rawing of the gate. Above right, basilica unit's est elevation, which faces the roadway. Right, orth elevation of a villa unit.

Alex Daligand

Alex Daligand

Alex Daligand



Top, main living space of the villa-type house is defined by floor treatment and recessed squares in the ceiling with coffe light fixtures. Middle, gable ceiling of th villa's dining room is recalled in the larg window that faces the landscaped entrance courtyard. Bottom, second story bedrooms open onto a central double-height, skylit atrium, which serves as the villas' main cross circulation axis. Right, detail view of large central entrance of the basilica form town house. □

Taut, Vaulted House on a Hillside

House in San Francisco; James Shay, AIA, architect and owner. By Allen Freeman

James Shay, AIA, says he appropriated the blocky massing, vertical wood siding, minimal use of trim, and high, four-pane windows from a 1951 town house on Pacific Heights by Joseph Esherick, FAIA. The barrel vault roof and crisp detailing reflect Shay's regard for Ando, Isozaki, and Maki. But this house that Shay designed for himself is characterized more than any Esherick or recent Japanese building by its close relationship to its San Francisco location: a narrow site sloping down 30 degrees from a dead-end street, Edgewood Avenue, with a panorama over a lush canyon of downtown skyscrapers and Berkeley.

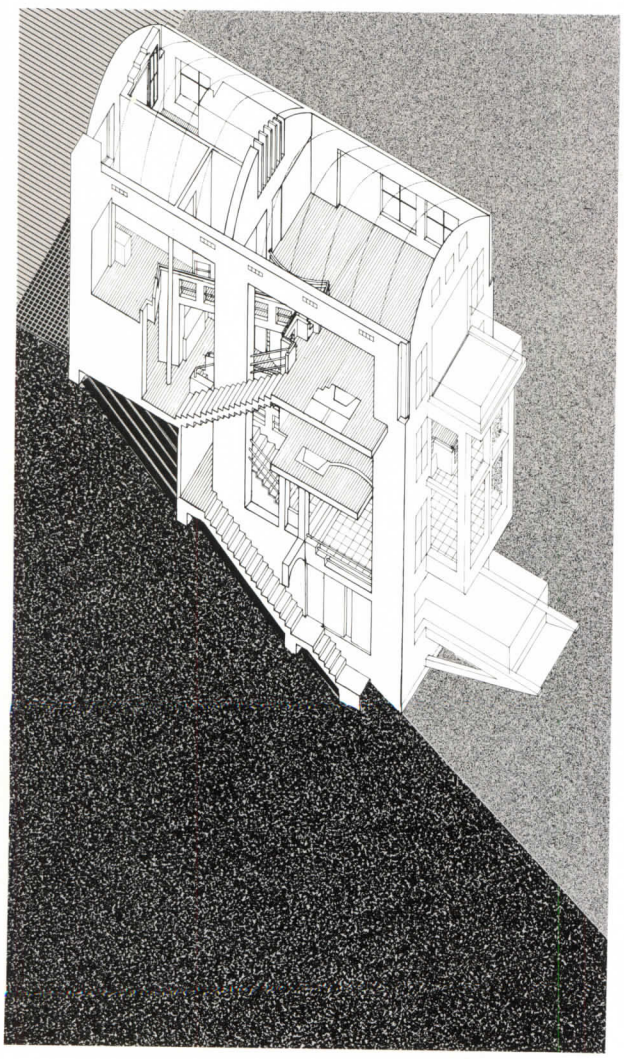
Edgewood Avenue runs a single block north-south just south of Haight-Ashbury. It is an old, tree-lined street not unlike residential Berkeley; next door is a dark-shingled, 1907 beauty by Julia Morgan. Shay scaled and articulated his house to harmonize.

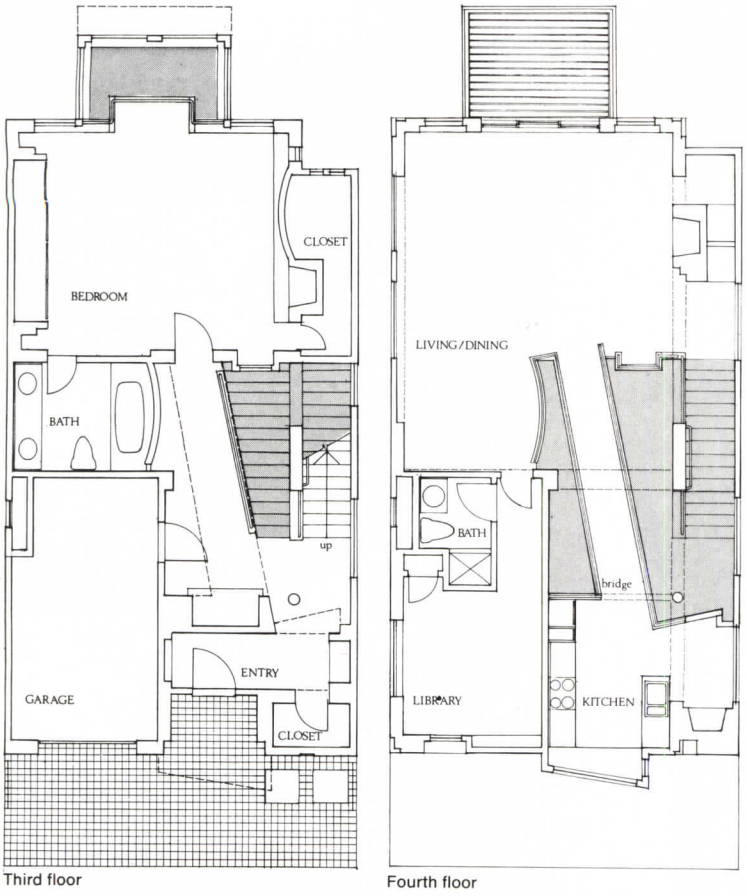
Excessive ground water compounded the problem of a steep slope. With soils engineer Don Hillebrandt, Shay designed a drain system to stabilize eroding soil; with structural engineer Carl Chan of Shapiro, Okino & Hom he devised a foundation of 15 piers, drilled 30 feet deep, with reinforced concrete grade beams. A steel frame with a 20-foot-wide span (plus five feet on one side for a stair tower) supports four levels, the top two running 47 feet front to back, the lower two progressively smaller following the descent of the hill. The backside rises 49 feet to th tip of the vault. The resulting shape is compact; materials an fenestration make it seem taut.

Dominant on the rear elevation is a wide, centered bay—a glassy, two-story box projecting at the second and third levels The box encases a third-floor balcony and supports a fourth-floor deck that projects two feet over the outside edge. Unde neath, another deck cantilevers on a double-V shaped steel fram at the first level.

A trellis-covered slit down a side elevation contains a pipe chase. Because the pipes are clustered the roof is interrupted only by a single notch at one edge for the plumbing vent. Pre

Below, the west-facing front elevation. Large kitchen window over door protrudes and turns slightly; smaller window with fo panes is a casement. The siding is vertically applied cedar, fi ished to weather to a silver patina matching the steel roof. The two chimneys on south elevation service fourth-floor fireplace Right, the backside extends toward the canyon in a double-height bay sandwiched by decks at the fourth and first levels.





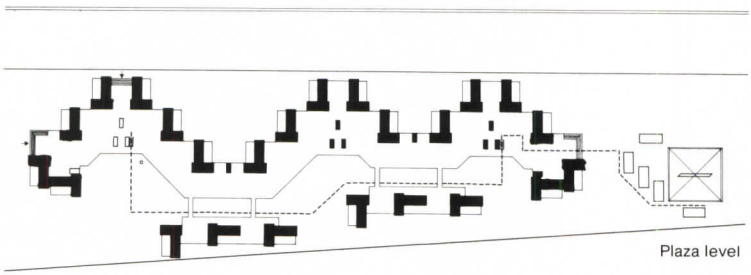
weathered, eight-inch steel strips over three layers of plywood form the vault, and the tympanums, front and back, are covered in vertical, one-foot, eight-inch strips of the same material. The steel wraps each of the four corners of the top floor and frames a big window that projects above the entrance.

Top, the living room from the rear deck, showing sofa designed by the architect, dining area at right, grille that rises to the vault, and clerestories along the south wall above the stairs. Center, the stair hall from the entry with views up to the fourth floor, through the bedroom on the third, and down into the second-floor studio. Right, the front of the stair hall on the third level. Niche was designed to accommodate sculpture, one of two pieces by Richard Bauer, a friend of the architect. Opposite page, the fourth floor from the kitchen, directly over the entry foyer at southwest corner. Railings are oak, as are floors.

riously the square window is slightly skewed, as if it is looking passersby down the street (the house is next to last). The ıer three front openings are recessed to varying degrees. The most deeply recessed opening is for the front door. The ıse of compression it creates continues into the foyer, another ht space. You can't see into the living spaces until you are the corner of the house, from which it seems to open like a . You see from right to left: stairs up to the fourth floor, a ond flight that widens as it descends to the second, and a llway angled toward the opposite corner of the third floor. cause it is a diagonal, the hall increases the apparent depth the house, and an interior casement window further opens e house, front to back. The window also brings afternoon sun ım the stair-hall, which acts as a light collector on the south vation, illuminating the third-floor bedroom, the second-floor dio, and fourth-story living spaces.

The vaulted ceiling, a deck, a skewed bridge from kitchen to living/dining room, and south-facing clerestories all contribute to making the top floor seem big and bright. Walls and ceilings are painted a yellow-white—the color of drywall mud, which Shay discovered he liked during construction—and floors and handrails are oak, the latter elegantly supported on quarter-inch steel rods. Varied wall planes, some pulled forward, some recessed, obviate applied "decoration." Except for two commissioned sculpted torsos, the walls are unadorned, although Shay says he plans to apply the wood siding used on the exterior in some of the recesses.

Like many houses that architects design for themselves, this one embodies "a few formal ideas that I wanted to try out," as Shay puts it. Nevertheless, the house was "improvised all the way through," he insists. Perhaps that is one source of its liveliness. □



Evaluation: Habitat A Generation Later

Moshe Safdie's intended housing prototype is a one-off luxury apartment building. By Andrea Oppenheimer Dean

"It manages to convince as a little scrap of tomorrow," wrote Australian critic Robin Boyd when Habitat was completed for Expo 67 in Montreal. And, Boyd continued, it was not "a lonely dream. The Habitat idea has hovered in the background of the architectural conscience all this century. Its basis is that modern architecture must become more involved in making an appropriate total environment for modern life."

Habitat was the built expression of Moshe Safdie's final thesis project at McGill University. When he started its design for Expo in 1964, Safdie was 26, three years out of school, and had designed not even a house. His intention for Habitat was to provide a prototype for middle-income, medium density, prefabricated urban housing that would have the privacy, identity, and open space of a single-family suburban house. Reminiscing recently about his first project, Safdie said, "Today, I probably wouldn't dare do it at all. I mean, it was technologically way out and unprecedented. With what I know today of the risks, I think I would have been terrified." Indeed, the controversy that accompanied Habitat reportedly resulted in Safdie being excluded for 10 years for commissions from the Quebec provincial government or other work in Montreal.

In Safdie's version of it, Utopia was based on a cluster concept comprised of 158 housing units from 600 to 1,700 square feet rising to 12 stories in places. It is made up of concrete boxes (17½x38½x10 feet) prefabricated on site and stacked on top of one another so that each unit has a garden on part of the roof of the unit beneath it. *Architectural Forum* proclaimed the scheme "spectacular, wonderful," its implications for future urban living "enormously impressive and largely convincing."

Located on Cité du Havre, a manmade peninsula in the St. Lawrence River, Habitat is approached from an expressway built in '67 for Expo. Across a channel is the old harbor of Mon-

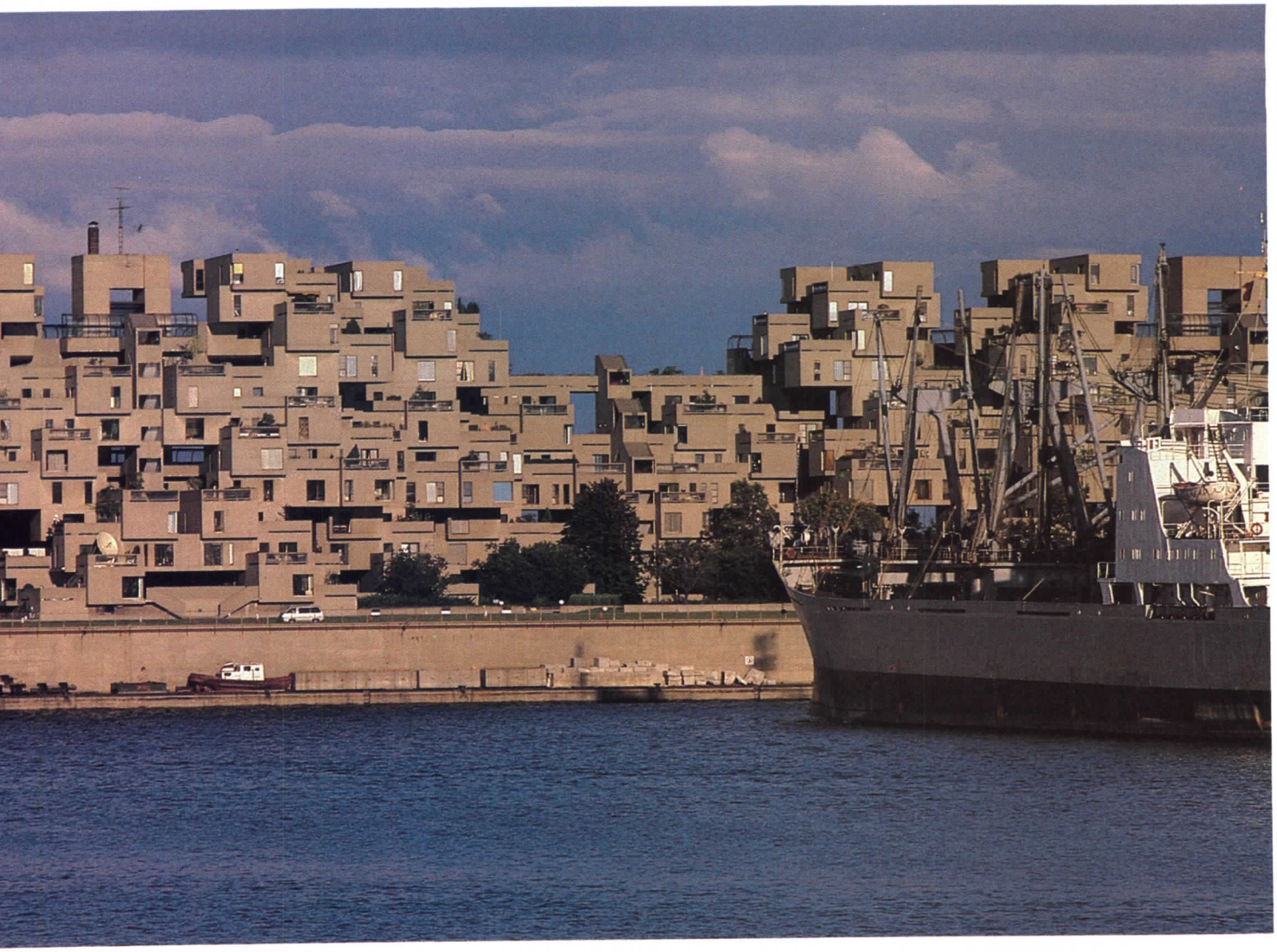
On this splendid site, standing quite alone, Habitat comes in focus as a tumble of Lego-like boxes forming an irregular py mid with great hollows left by absent boxes. Once on the groun you follow a service road through a grade-level spine over whi hover huge girders supporting walkways at the fifth and ninth levels. Even on a sparkling sunny day they shade the narrow drive.

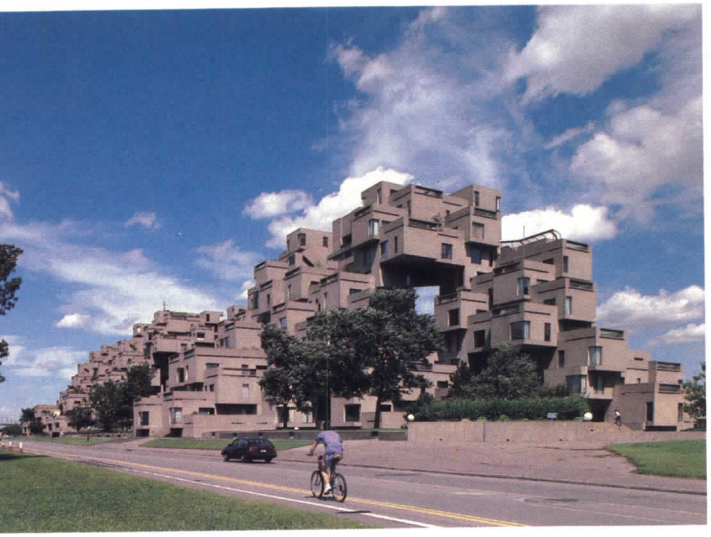
This architecture of concrete—concrete platforms, concre stairwells, elevator cores, boxes, walkways, and so on—gives t impression of what in the '60s was appreciated as "virile arch tecture." Habitat's design is relentlessly square-jawed, rough-hew muscular; there are no soft or graceful touches. The concret is scarred and discolored in many places. Exterior platforms a extensive, in shadow much of the time, and vacant, except fo a couple of planters and benches (two of each, to be precise)

If it were an urban, middle- or lower-income housing com- plex, Habitat's vast expanses of concrete—as austere as its shap are extravagant—would invite graffiti and muggers, and its wa ways and numerous platforms would be littered with bits of ju and trash. Instead you see maintenance men sweeping, removi trash bags, and generally fixing things up all over the outside the building. As a janitor remarked, "The building was not made for easy maintenance."

Habitat is, and for years has been, an exclusive, high-priced apartment building. Its tenants purchased the building last w ter from the Canadian government for the paltry sum of $10 million, or $50 a square foot. (The government was eager to unload the building since rents were fixed and maintenance take about $1.5 million a year.) There has long been a waiting list, and turnover in the building has been less than 5 percent. Its popularity is indisputable.

One begins to feel the appeal of the building while clambe





oking down on Habitat's complex, varied, and ever-changing apes and its flower-filled patios leading to apartment entrances. ne fresh breezes and river views are exhilarating, yet there's a nse of serenity. The only sounds come from wind and water. nd though you're not actually climbing at all, it feels as though u're scaling a rock face or steep riverside hill. The unfriendly ncrete becomes a background you hardly notice. The scale architectural elements is more comfortable than below where sociations are to megastructures. You realize there's nothing se quite like Habitat, nor to compare it to.

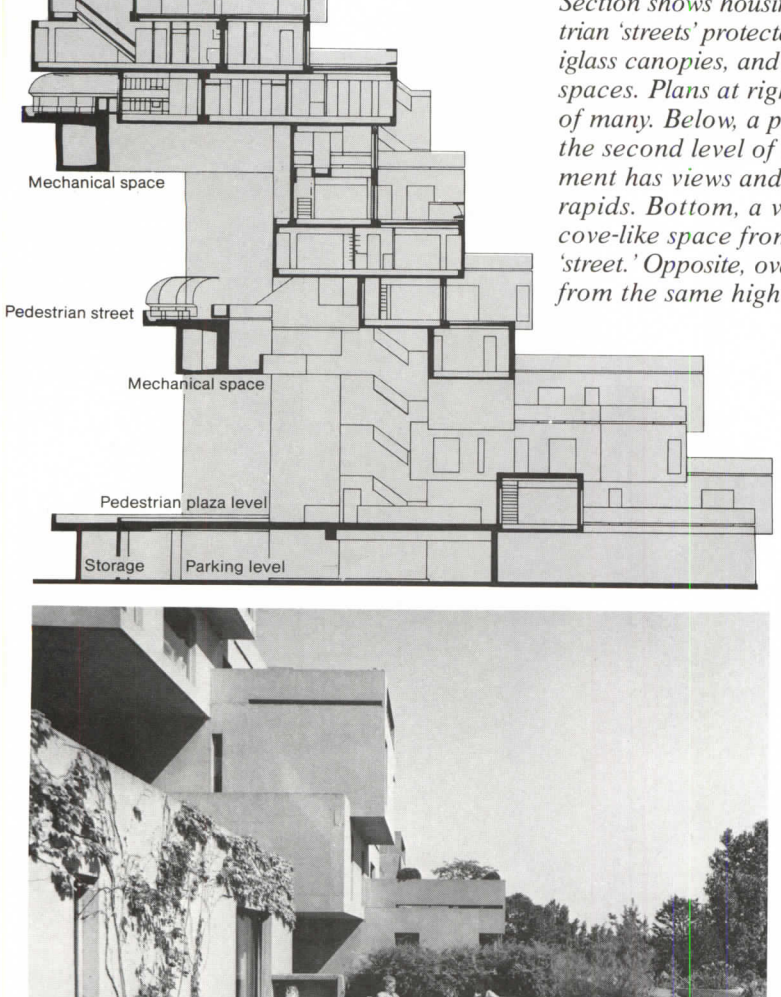
From an environmental point of view Safdie was most suc- ssful at Habitat, as attested by kudos from residents. Among actions from people who live there were the following: "It's gly outside, but there is the river, the gardens; it's like being in a huge park." "It's like a cottage rather than a high rise." "Often you feel the concrete is terrible, but once you've lived here you don't notice it and don't want to leave. It's unique." "It's like living in the country but you're five minutes away from town, without the hassles of the city or the nuisance of suburban living—the commute, the lawn mowing, maintenance, and snow shoveling." (Platforms and walkways are heated in winter.)

Residents' evaluation of the design can be summed up by the fact that they have recalled Safdie to oversee rehabbing of the building—refurbishing lobbies that look raw and frayed, weatherizing, making repairs inside and out, enclosing some patios to create solariums, and breaking through concrete boxes to enlarge some units. Since such expansion may involve structural problems, the residents have also recalled August Kommendant, who was structural engineer for Habitat. Although rooms at Habitat are relatively small and interior plans don't reflect the innovations of the exterior, each unit is oriented and glazed for splendid, ample views, and each has at least one terrace.

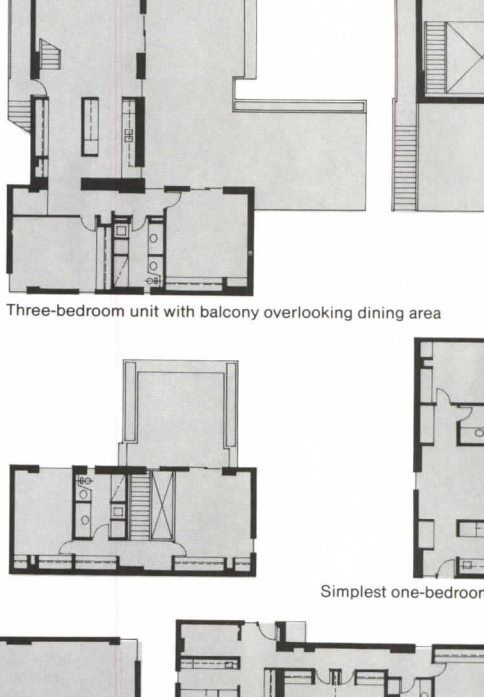
Despite enthusiasm for Habitat, *Architectural Forum* in 1967 also said that it was "in some ways, a failure." In fact, people who do not live in it are critical of the building as a piece of urban design, for its high initial cost, and for being a technological failure.

Habitat is faulted, first of all, for being anti-urban, inward-looking, making no reference to anything outside itself. As Phyllis Lambert, director of the Canadian Center for Architecture, observes, "It has nothing to do with cities; it's a suburban sort of thing." Toronto architect Jack Diamond further points out that Habitat is completely isolated out in Cité du Havre where there are neither schools nor shops, and that it countermands most of the lessons about urban life taught by Jane Jacobs, Oscar Newman, and others.

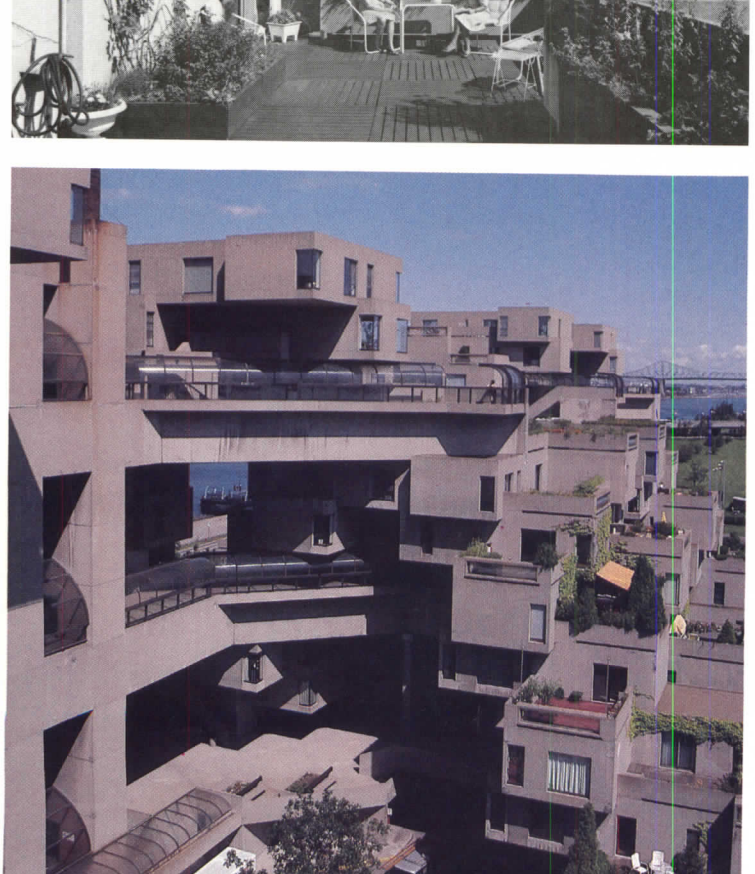
Safdie is in agreement, up to a point. "In the final analysis,"

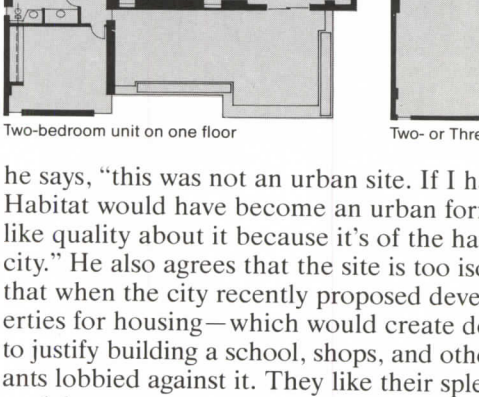


Section shows housing modules, pedestrian 'streets' protected by arching plexiglass canopies, and linear mechanical spaces. Plans at right are a sampling of many. Below, a private patio off the second level of a lower apartment has views and sounds of river rapids. Bottom, a view down into cove-like space from an upper-level 'street.' Opposite, overlooking the river from the same high vantage point.

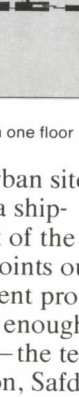


Three-bedroom unit with balcony overlooking dining area

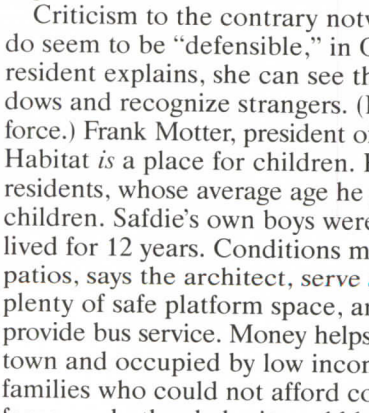




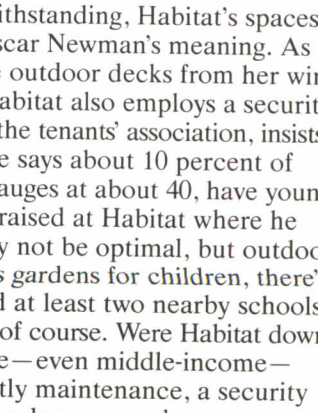
Two-bedroom unit



Simplest one-bedroom



Two-bedroom unit on one floor

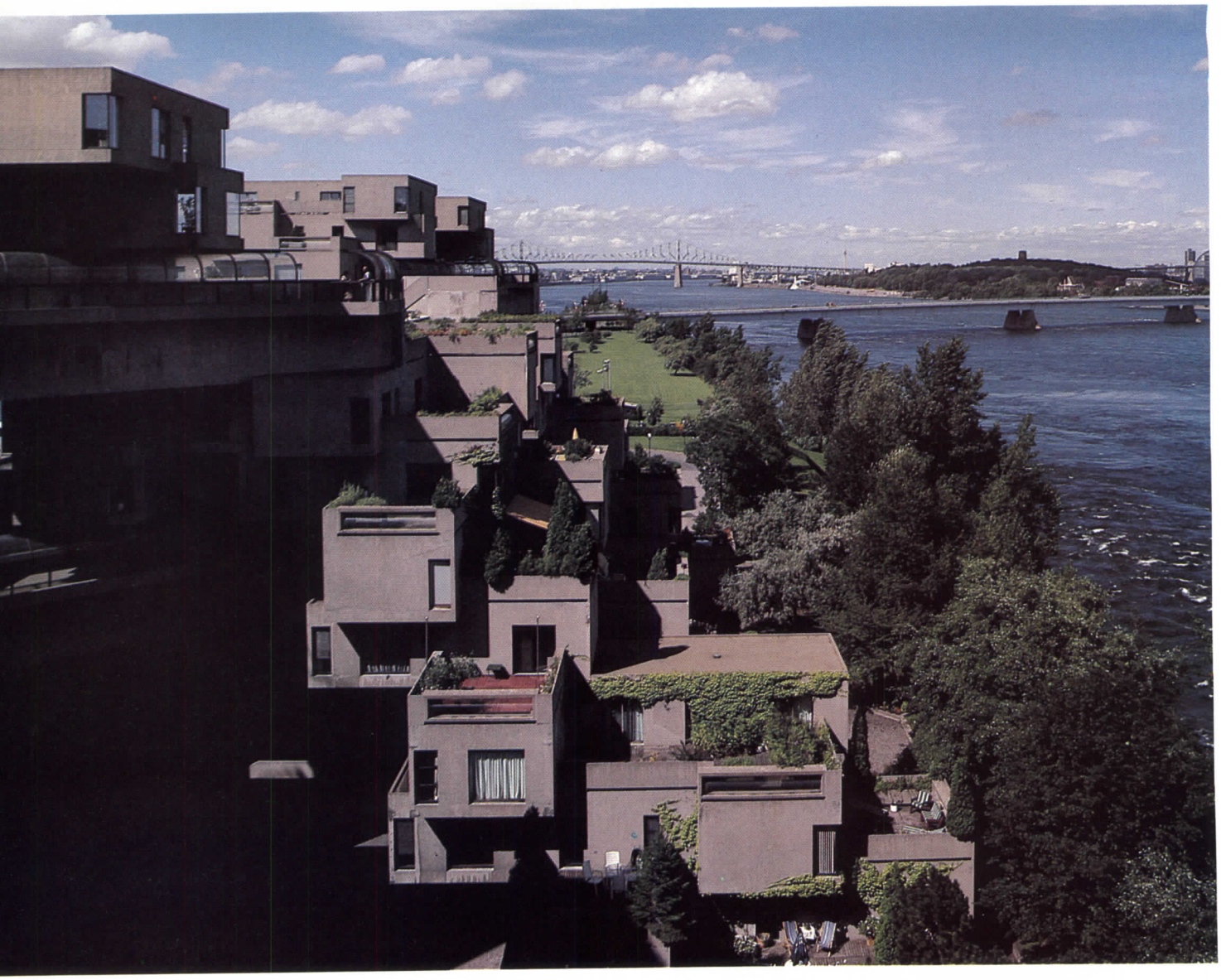


Two- or Three-bedroom unit on one floor

he says, "this was not an urban site. If I had had an urban site Habitat would have become an urban form. There is a ship-like quality about it because it's of the harbor and not of the city." He also agrees that the site is too isolated, but points ou that when the city recently proposed developing adjacent pro erties for housing—which would create densities high enough to justify building a school, shops, and other amenities—the te ants lobbied against it. They like their splendid isolation, Safd explains.

Criticism to the contrary notwithstanding, Habitat's spaces do seem to be "defensible," in Oscar Newman's meaning. As resident explains, she can see the outdoor decks from her wi dows and recognize strangers. (Habitat also employs a securit force.) Frank Motter, president of the tenants' association, insists Habitat *is* a place for children. He says about 10 percent of residents, whose average age he gauges at about 40, have youn children. Safdie's own boys were raised at Habitat where he lived for 12 years. Conditions may not be optimal, but outdoo patios, says the architect, serve as gardens for children, there' plenty of safe platform space, and at least two nearby schools provide bus service. Money helps, of course. Were Habitat dow town and occupied by low income—even middle-income—families who could not afford costly maintenance, a security force, and other help, it could be a dangerous place.

Another criticism of Habitat is that it is a "radiator building," as Toronto architect Barton Myers, FAIA, puts it. In Can ada's fiercely cold climate even Safdie agrees that exposing u to five surfaces of each concrete box is not practical. He says he would design the units more compactly today. But neither he nor Habitat residents agree with the criticism that outdoor



rk in the Arctic as well as Canada, says Safdie, he learned t northern people appreciate the outdoors far more than ople living in temperate climates. In fact, a survey of Habitat idents asking if they wanted walkways and decks enclosed ealed that 80 percent did not.

Habitat's shapes, though, are more reminiscent of Safdie's ive Haifa than of any northern architecture, and the Habi- concept has had no direct effect on housing design.

e closest offspring are unbuilt projects by Safdie in Puerto co and Singapore, plus two projects, one for Singapore, another Australia, that "await a turn in the market before starting," s Safdie.

Interestingly, Safdie sees a close relationship between Habi- and his building to be constructed at Columbus Circle in w York City. He wrote, "The building culminated in a pyram- l top, 12 stories high, accompanying terraced apartments. I lected that that top was equal in height to Habitat. Here was ew scale, perhaps 'The New City.' The constraints were great d the density was enormous, but the ideas that began to evolve Habitat were, in my own mind, clearly alive and well."

One reason Habitat wasn't duplicated was its high cost—$13.5 llion excluding land, but including almost a million for a spe- l crane to hoist the 90-ton precast components into place. Infla- n in construction costs over the last 19 years has exceeded 0 percent. The cost could, of course, be justified as research d development money had the prototype been subsequently ass produced. Apart from cost, the main reason it wasn't is that efabrication, at least in the form foreseen in the brave new orld of the '60s, hasn't proven practical.

The very complexity that makes Habitat's design so intriguing so made it impractical as a prototype. Among other things, it required that lower units support upper ones, though all the modules appear to do the same work. If he had it to do again, Safdie says, he would design Habitat more simply, in a more open-ended way, leaving tenants more options. He says such a building would probably have smaller components, which would be off-the-shelf parts, and he would organize things around mechanical cores.

"In the '60s," says Safdie, "we believed that industrialization could greatly reduce the cost of housing, improve its quality, and speed delivery. The logic seemed clear and drew on the Buckminster Fuller tradition that improving the means of production would reduce costs and make housing available to all segments of society." Unforeseen was that the cost of urban land and interest rates would soar in the '70s and early '80s to the point where construction costs became a far smaller percentage of overall building costs than in the '60s, eliminating an incentive to prefabricate. Also unforeseen was that the 20 years following Habitat would be a time of retrenchment and regression in urban housing, and that industrialization would have a far greater effect on the booming office market.

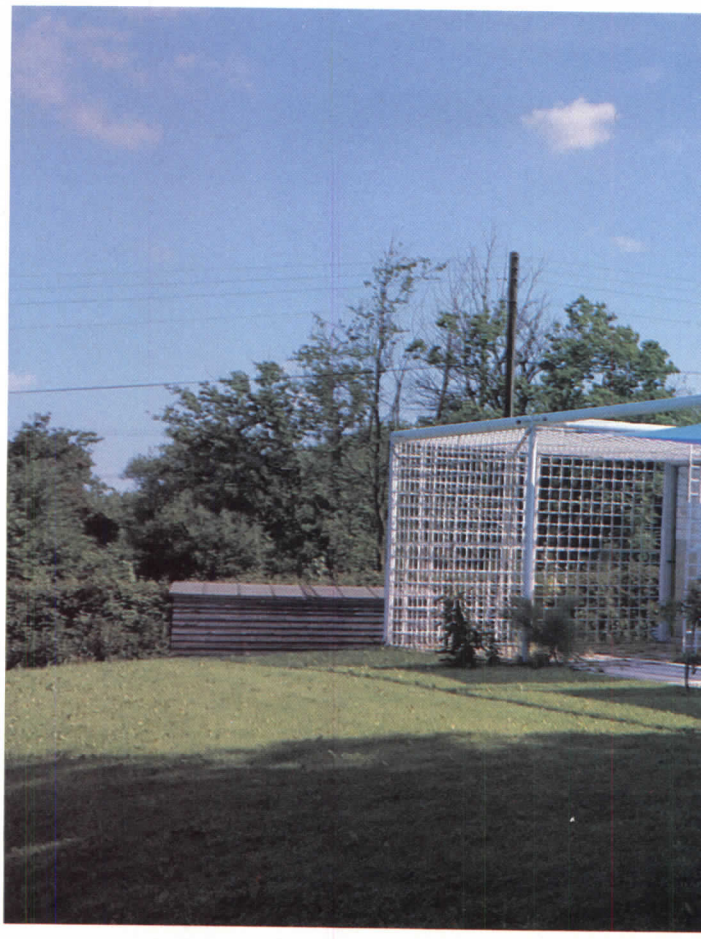
"The radical rethinking of tall buildings, which I think will come," says Safdie, "has not taken place yet. As an environmental idea Habitat hasn't happened yet."

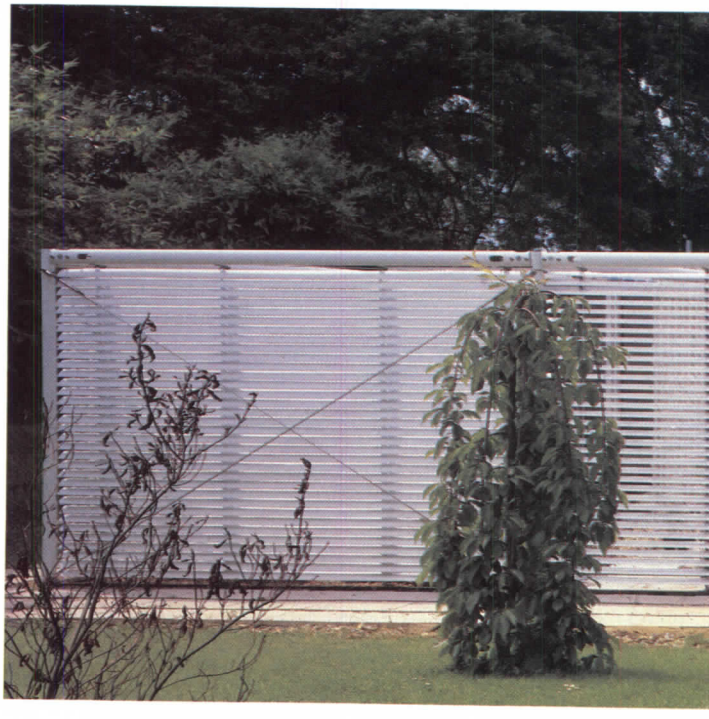
In the end, says the architect, the technology of Habitat was obsolete before the building was completed. And ultimately, he says, "the technology of Habitat is not an issue; it's not worth talking about, and I'm totally bored with people writing about it. What is worth talking about is space and amenities and hierarchy and scale and variety and repetition within variety, and fresh air and privacy, and so on and so forth."

From the point of view of these "so ons and so forths" of design, Habitat is largely a success. □

Sleek Structure Made of Boat Masts

House near Woodgreen, England; Richard Horden, Architect. By Annette LeCuyer





In Britain—with its vast stock of existing housing—custom-building a house is rare, and self-built houses almost unheard of. Architect Richard Horden has defied the odds with a house designed and built jointly with his client near Woodgreen in the New Forest on England's south coast. It is sleek and stylish, the product of a simple yet elegant structural concept complemented by sophisticated fixing and jointing details.

Horden describes the house not in terms of style but in terms of materials. In all his work, a central preoccupation is the search for new building components and an original use of familiar ones. The Woodgreen house skillfully explores the gamut—from products from the aerospace industry to yachting ironmongery to common household trellis.

The house is an idealized white box set on the crest of a wooded hill with panoramic views of the Devon countryside. The 5x5-bay structure is based on a 3.6-meter-square, 2.4-meter-high plan module. After construction of the foundations and floor slab by a general contractor, Horden and his client carried out all of the work themselves.

The structural frame is made of oval stove-enameled, lightweight aluminum yacht masts that are maintenance-free and are perforated without risk of corrosion to carry electrical services internally and various building accessories externally. The columns and beams—or spars—are joined by a stainless steel cross that slots into the hollow centers of the members and is fixed with stainless steel bolts. Tension cables provide lateral bracing in the roof plane and vertically in the corner bays to complete the wind frame. Erection of the 25-bay frame on site by five members of the architect's and client's families took just over five hours.

Twelve of the 20 bays are enclosed to make the house and garage, while the structural frame remains exposed to define an entrance courtyard to the east and garden terraces to the west. The living spaces occupy the central bays, with bedrooms and a garage to the north and a granny flat to the south.

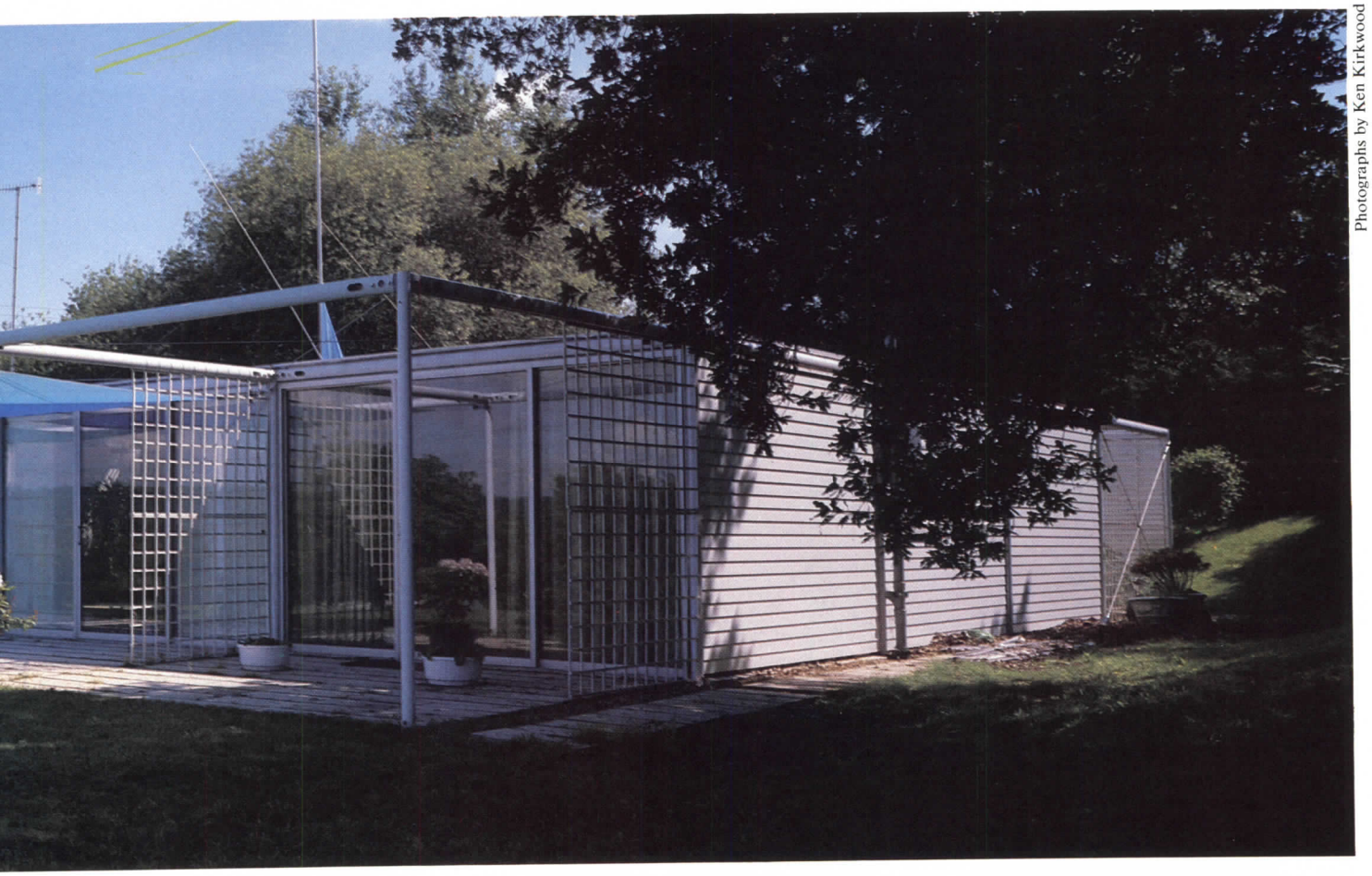
Because yacht masts are efficient in compression but are not designed to take bending stresses, the columns do more structural work than the spars. The structural frame takes wind loads and distributes services, but all loads from the roof and wall cladding panels must be carried directly to the column heads by secondary structural members. Horden is now developing a series of alternatives for prefabricated floor and roof panels—including battened canopies and options for neoprene gasketed panels in plywood, aluminium, and rigid foam. However, the Woodgreen house takes a low-key approach, using assemblages of familiar building materials. The roof panels, made up of corrugated metal decking and insulation, are framed by steel angles that carry the load to the corners of each module. The outer roof membrane is solar-shield, aluminium-faced bithuthene sheeting; spacecraft are cited as the source of the crinkled aluminum look. In the central modules of the house, yacht deck hatches provide water-tight, operable skylights.

Wall panels on the north and south elevations are made of gypsum board and insulation with aluminum cladding. The east and west elevations are fully glazed with sliding patio doors in each module. Internally, the ceiling is finished with white louvers, the blades of which can easily be removed to gain access to services in the roof. Under the deck hatches, alternate louver blades are omitted to allow access to the hatches and for ventilation. Internal partitions are framed panels of gypsum board glass, or adjustable white translucent spinnaker cloth blinds sew by a kite maker.

Adjustable louvers are also used externally, mounted in both the horizontal and vertical planes in several of the structural bays defining the garden terraces. Again, to avoid inducing bend ing stresses in the spars, the louver panels used for roof shading are fixed directly to the diagonal tension cables rather than

Ms. LeCuyer is an architect and writer living in London.

Photographs by Ken Kirkwood



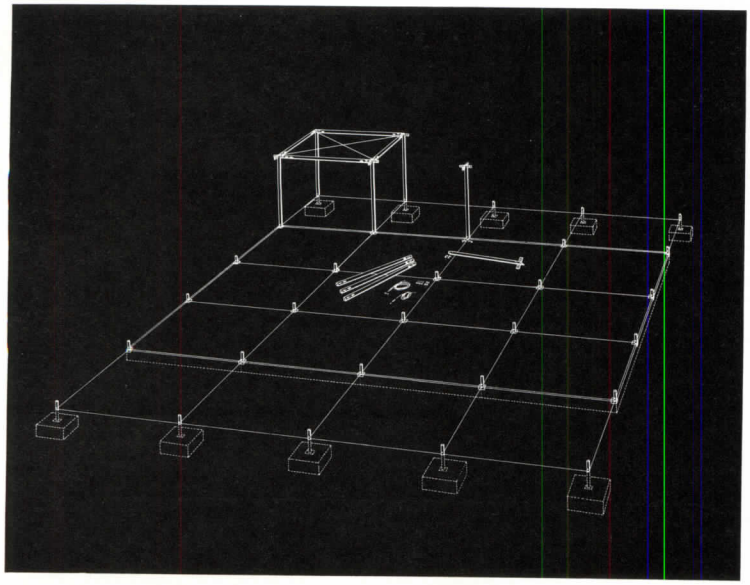
p, structure extends, in rudimentary form, one bay beyond ar window wall. White trellis defines garden areas; roll-up sail nopies provide shading. Above, entrance elevation provides ew through the house to the garden.

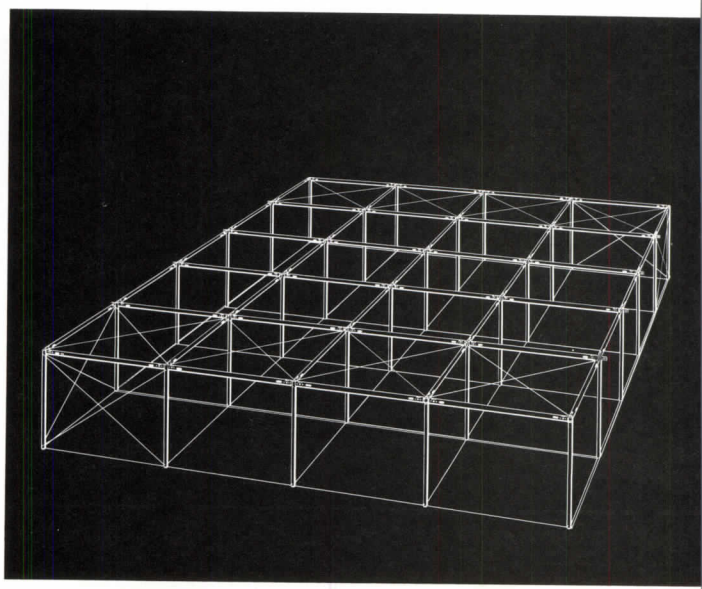
nopies in two shades of bright blue, also fixed to the diago- l bracing. The sails may be opened or furled to suit the weather nditions and/or the occupant's mood. On the west terrace, closure is made by panels of white painted wooden trellis lashed the spars.

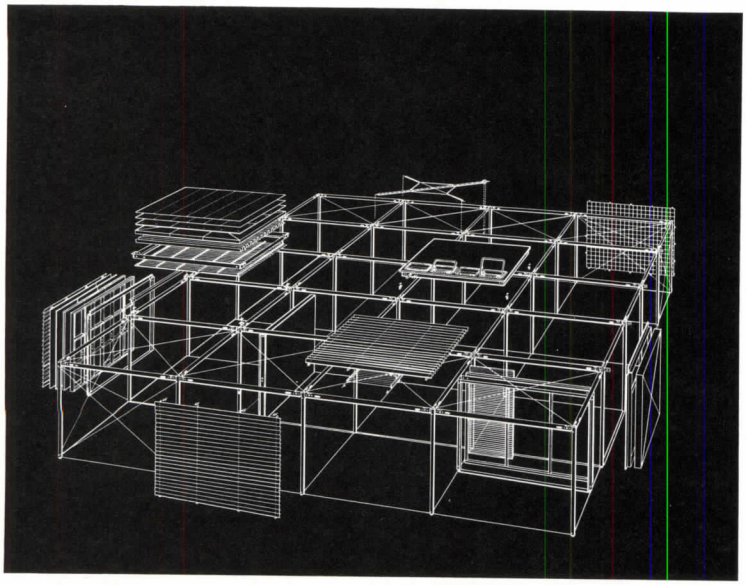
In addition to carrying the building components themselves, e mast columns carry television dishes, a small wind-powered enerator, and a solar panel and flagpole, which look very much home on the masts of the yacht house.

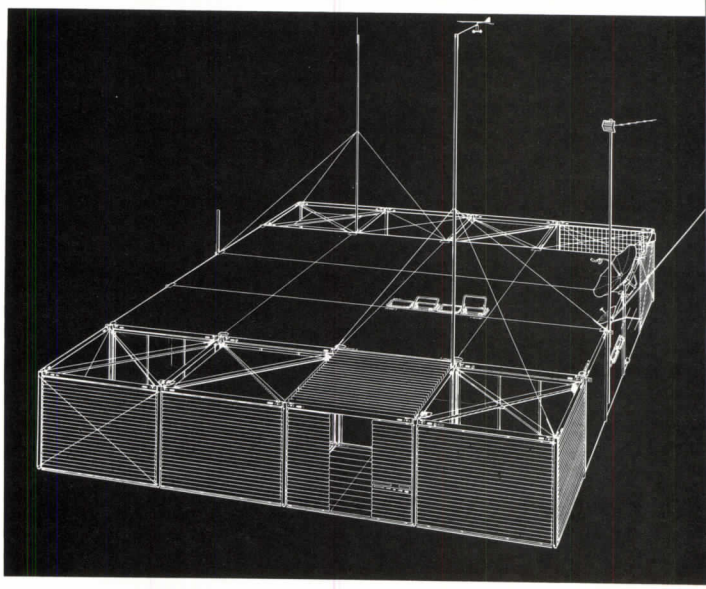
While the exterior is decidedly understated, the quality of space and light produced by the interplay of the slatted, translucent, and transparent planes make this simple house very special indeed. The many possible combinations of panels allow for rich variety unified by the discipline of the module. This, together with the interaction of interior and exterior spaces, recalls the tatami and shoji discipline of traditional Japanese domestic architecture.

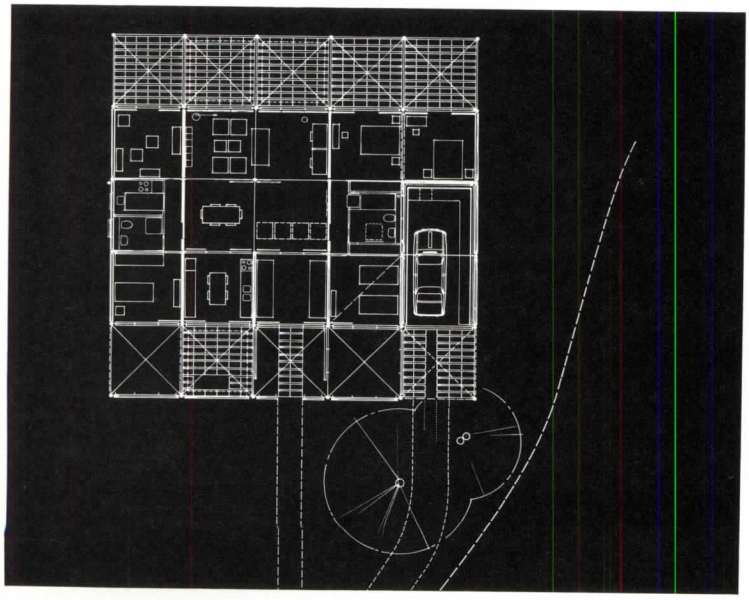
In Horden's eyes, the Woodgreen house is not a one-off product but a prototype he is developing. The system is being marketed by Britain's Design Council and will be used at an exhibition in Dallas this autumn. Their light weight allows the structural frame and infill panels to be shipped anywhere, offering a posh British alternative to the Lincoln Log.

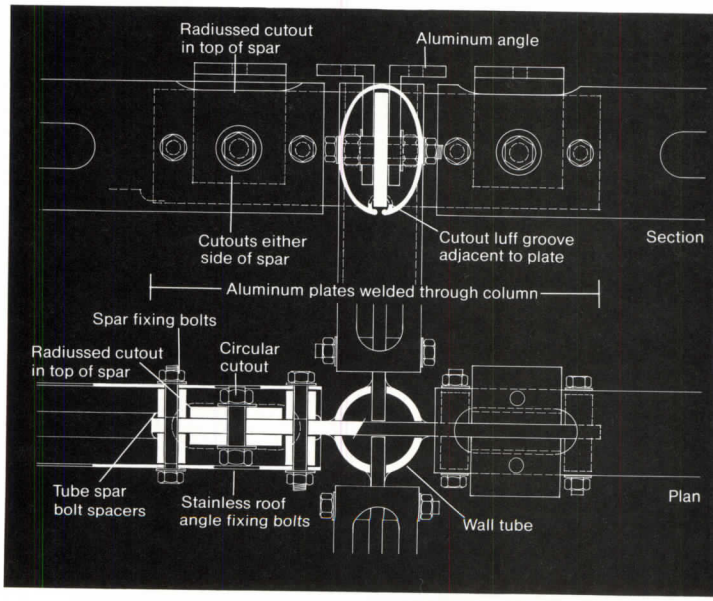












Construction sequence above: aluminum tubular columns—3. meters o.c.—rest on a laid slab with pad foundations and support tubular aluminum spars. Steel cables brace the unenclosed front and rear bays. Closed bays incorporate solid, glazed, louvered, and trellised panels. Loads transfer to the column heads so the spars are not subjected to bending. Details show column head connections in plan and section. The headpiece is a stainless steel cross which extends down the centers of eac

Guntis Plēsums

Space and Structure In a Primordial Folkhouse

The strong and sheltering minka dwellings of Japan. By Guntis Plēsums

The house is an enormous roof, and the roof is akin to a mountain. The broad eaves reach toward the earth. The earth becomes the house; the walls are made of clay, the very stuff of earth. Cracked in myriad ways and weatherworn, the mud is held together by finely chopped straw. Grass and moss grow on the miscanthus reed roof. Grass is seeded on the ridge by the farmer to keep the roof in place. Birds and wind complete his job. Abandoned, the house returns to the earth, and a mound is added to the mountains.

Not all *minka* (no English word quite represents this Japanese folkhouse type) have returned to the earth. Heavy timbers and a bit of protective care have preserved houses that retain elements of ancient pit dwellings and the flavor of ages past. To much of the world *minka* may well represent the archetypal shelter, the instinctively accepted prototype of house stored in the subconscious.

There is much in *minka* that defies the eyes, that is sensed through the bones and the nose. The earthiness of the ever-present structure gives comfort to our need for safety and endurance. No force could possibly shake such a building down—or so one feels. The wood retains the smoke from centuries past, 17th through the 20th, even the 16th. The smoke has given a patina to the heavy timber structure and the laced bamboo framing, helping to preserve the wood from insects.

The earthen floor, the dark wood boards, the open hearth, the heavy structure, and semidarkness immerse the traveler in another age. A gentle rain descends as a welcome curtain between this world and the intruding outside reality.

Much in *minka* may match the esthetics of tea houses or the refined tastes of aristocratic villas and *sukiya*-style dwellings (the dominant traditional dwellings), but these aspects of high culture are generally absorbed into a more primitive and simple construction. This simplicity exhumes an earthy vitality; most *minka* represent the labors of extremely poor people. The choicest houses are well documented and recognized as important cultural properties, but countless others are still lived in and lovingly maintained or neglected due to the economic burde of their repair. These picturesque and rustic symbols of a sir pler life entice family visits on Sunday outings, but the inhab ants of folkhouses may aspire to something other than the demanding upkeep of such museum pieces. The houses do n take gracefully to the necessities and conveniences of moder life. It would be all too easy to dismiss *minka* as anachronist remnants of another age; spaces rooted in the obscure past b little resemblance to our rooms.

The quality of materials, surfaces, and workmanship over whelms our senses and diverts our attention. It takes much wo to understand the spatial organization of these buildings. Th *minka* space-structuring principles may well be more sophist cated than any of the modern structural orders currently em ployed. Herein lie the secrets to the survival of *minka* over ma centuries. The principles are highly advanced despite the mi leadingly simple materials and, by our standards, oversized a handcrafted structure. These principles differ markedly from t well-researched prevailing Japanese house.

Minka is a direct descendant of *tate-ana,* the pit dwelling. The one-room neolithic shelters were better suited to resist the rig of Japan's winters than *taka-yuka,* the pile dwelling. *Taka-yuk* with its story-high elevated floor, was climatically attuned to hea rain, and humidity. Southeast Asian in origin, it developed fro a granary into the prototype for Shinto shrines and the palac of the aristocracy. The continental semi-nomadic pit dwelling and the high pile structure, both products of early migrations are the two primary influences on Japanese houses. *Tate-ana* developed into the rural house of common people, and *taka-yuka* became the model for the dwellings of the ruling classes

Picture scrolls and various documents present the only evidence of the houses of common people between the 7th and 14th centuries, as no dwellings survive from this period. Almo all of the extant *minka* designated as important cultural prop ties have been built between 1639 and 1853, but there are a fe survivors from an earlier age. Some refined houses, in no way different from the feudal period *minka,* were built in the early 20th century.

Minka is characterized by its anonymous initial point of ori gin, a unique structural system, transformations over time, an local differences in plan and style. Unlike Buddhist temples an the mansions of the nobility, *minka* employ a native Japanese structural system and planning process that were not influence by Chinese or other continental architecture. Due to isolation and the use of local craftsmen and materials, there is great va iation in style and construction. Response to climatic forces an topography, use of locally available materials and resources, spa tial arrangement suited for regionally prevailing means of live hood, and social patterns are particularly significant factors in this differentiation. Symbols of social status, prescriptive rules and ways of circumventing them, and the fashions at the time also contribute to the remarkable variety and beauty of *minka*

The *minka* design method begins with the construction of a general framework—the skeleton of space. The overall form an the character of the building is, to a large extent, defined by this framework, but the space thus delineated has no definite assigned functional purpose. The posts support the roof struc ture. At this time there are no walls, floors, or partitions. The framework retains a number of possible plans limited only by the established framework.

Japanese structural and construction systems are hierarchic in character, and this is particularly clear in *minka. Jikugumi,* the primary structural system or framework, carries the structu ral loads and defines the space. A secondary structural system facilitates the building of function-defining infill elements. Thi subordinate structure is an intermediary between the primary structure and all other construction. All of the remaining archi tectural elements are called *zōsaku,* and the walls, floors, ceilings, and partitions are literally equated with furnishings.

The position of posts is most important to the *minka* system

Mr. Plēsums is professor of architecture at the University of Oregon in Eugene, a practicing architect, and author of Townframe: Environments for Adaptive Housing. *Research for this article*

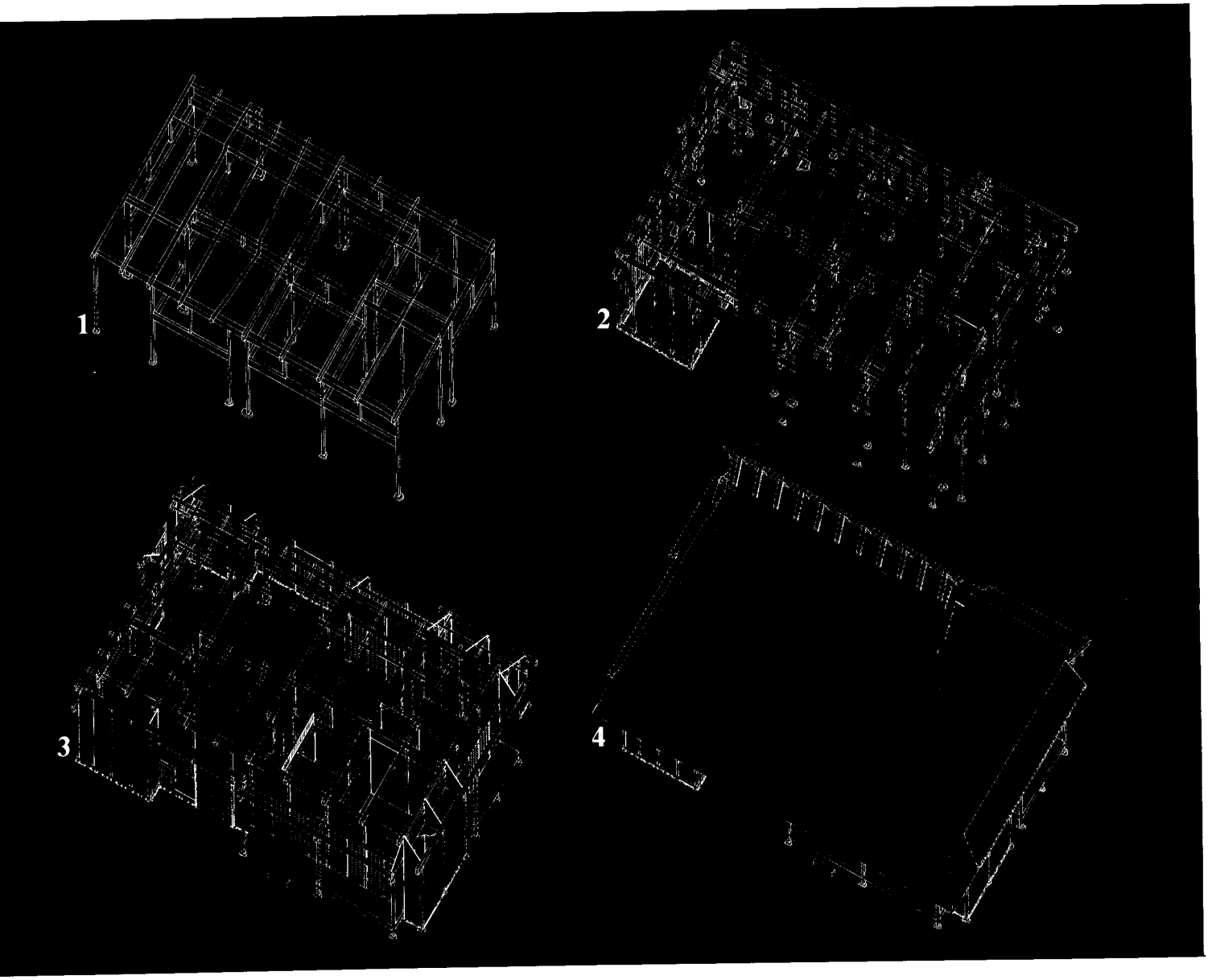
ermined by their placement. The posts have particular sig-
cance due to a unique differentiation of their role. There
two types of posts: primary and secondary. Primary posts
l beams comprise the general framework and transmit the
uctural forces. This is the basic structure that supports the
ormous roof. The secondary posts are placed according to
ctional requirements. The secondary posts may assist in load
nsmission, but the safety of the structure is not affected by
ir removal. Because of the extreme structural consequences,
erations rarely called for relocating primary posts. There
some primary posts that could be removed without resulting
an immediate collapse, but the remedy is too troublesome,
l the whole process is just not worth the effort. Some of the
ondary structure is built at the outset, and it may alter or
stitute for some part of the primary structure. Generally, how-
r, the primary posts are part of the structural framework,
l the secondary posts brace the walls and frame the openings.
Walls are placed only above the lintels to provide lateral sta-
ity against earthquakes. There are no lower walls or parti-
ns in this framework, and the partitions may not necessarily
low the pattern established by the columns. With the addi-
n of the secondary structure, the building skeleton becomes
ite complex. Once the house is completed, it is often impos-
le to identify many of the secondary columns from the primary.
Contrary to common framing practices in the West, the col-
ns, beams, and lintels serve as structural and finishing mem-
rs. This accounts for the great care that is taken in finishing
d protecting the wood during construction. Posts, smooth as
in or weatherworn, invite caress and contribute to commun-
n with the structure. Trim, the surface covering over a hid-
den material, separates construction into rough and finished, permitting or perhaps inviting expedient practices. One could argue at length over the merits of each approach. Trim, however, tends to isolate us from the construction of a dwelling. Consequently, the hidden structure gets eliminated from our consciousness. No longer does it contribute to the sense of well being and the feeling of security that comes with the presence of structure.

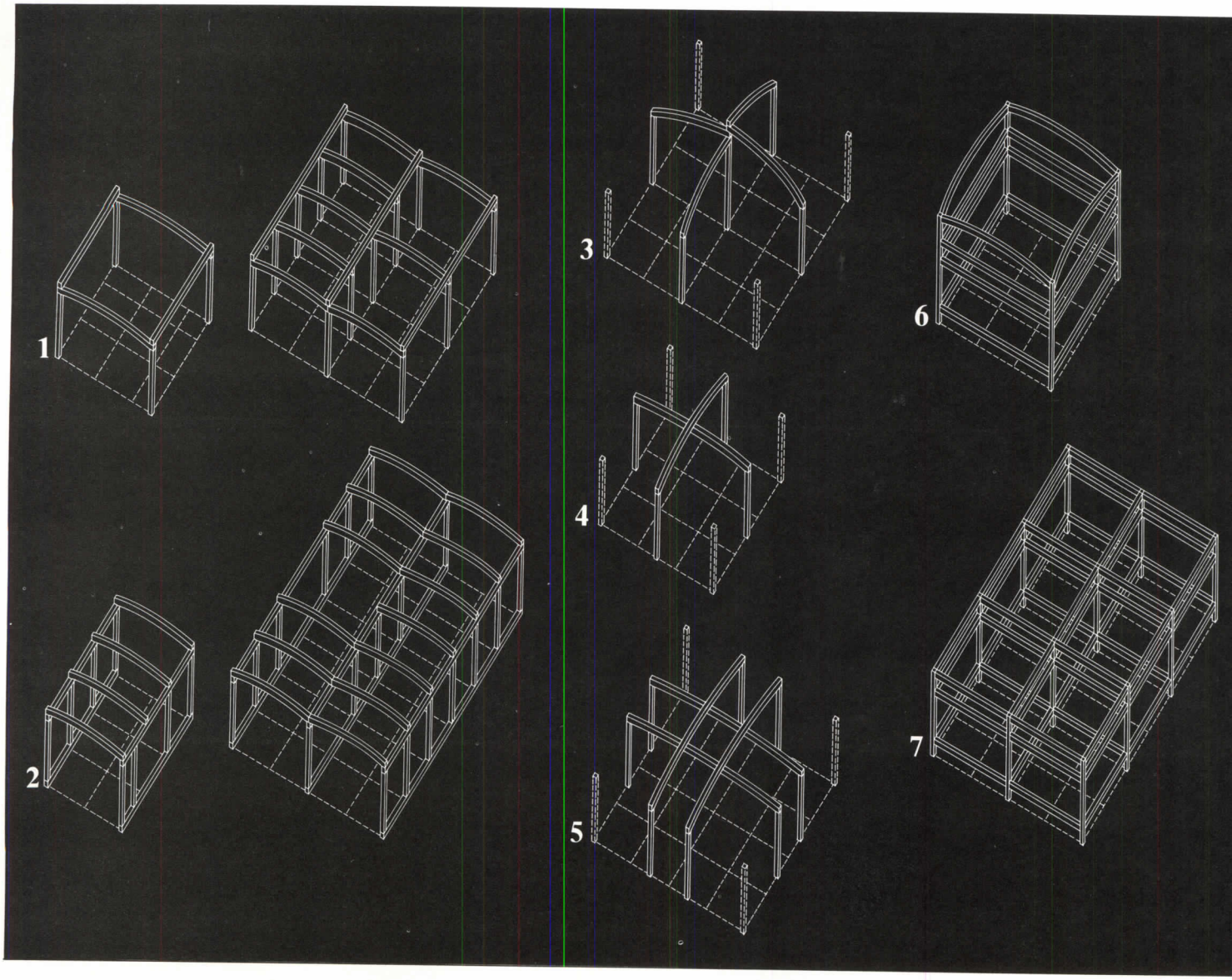
It does not follow that structure is always exposed in Japanese architecture. Structure separated by interior surfaces, such as ceilings and floors, is left in its rough-cut state as in the West. Columns are exposed on both sides of the wall except in storehouses where the outside is protected with clay.

The secondary posts, the clay walls, lintels, and minor structural elements contribute to the stiffening of the structure and the overall stability. But there is an important difference that has contributed to the longevity of these buildings. The clay walls are infill just like all the other secondary structural elements. The owner can easily knock out the wall and alter the floor plan without affecting the safety of the structure. Small wonder that the posts take on great significance.

The structure of Japanese folkhouses represents an attitude characteristic of Japanese architecture and gardens, as well as all other arts. This attitude is the Zen influence that permeates all aspects of Japanese culture. We are well aware of the fact

Across page, 18th century minka *in Kazuma, Tokyo prefecture; below, construction stages of Sasaoka's house in Fujii, Nara prefecture: (1)* jikugumi, *primary structure; (2) primary and secondary structure; (3)* zōsaku, *infill elements; (4) roof and house exterior.*





that Japanese gardens represent nature transformed, intensified, and perfected to make man aware of the essence of nature. We can also recognize the Zen in the use of structure. *Jikugumi* expresses the "structuralness" of structure, the quality and state of being structure in all its myriad ways, while fulfilling its more prosaic role of holding up the roof. Dressed by hand, the heavy timbers may be squared off or purposefully left in their natural state with bark on or with some natural deformity emphasized. The overbearing presence of structure is even more pronounced by the more modestly sized secondary posts. It is important to note that the roof structure is oversized only according to our standards. The weight and size is needed for stability and the intricate joinery. Straight timbers were difficult to obtain, but this shortage was transformed into poetic basket weave of beams. The unenviable economic state once again is the very source of esthetic expression rather than a lamentable condition of poverty. Crooked timbers become favored and highly prized; imperfection discloses the true nature of handcrafted wood structure. Beauty is recognized in the simplest and most common, and the Zen philosophy ritualized in the tea ceremony re-emerges in the use and preference in structure.

And so it is that structure, often the humble servant of architecture, takes on a range of subtle meaning. There is unity in Japanese culture and architecture that affects all material things. Precious, life-fulfilling attitudes are not the exclusive possession of the rich or the enlightened. Esthetic tastes were cultivated by noblemen, *samurai* warriors, merchants, and the lower classes of artisans, farmers, and fishermen.

The great richness and regional variations of *minka* are due to the number of primary frameworks used. Teiji Itoh, in his

Above, seven common frameworks used in minka *construction (1) inverted U; (2) ladder; (3) umbrella; (4) cross; (5) parallel crosses; (6) box; (7) jungle gym. The frameworks can be combined in a variety of ways for different spatial effects.*

eight primary framework types, although there are many modifications and adaptations, and it is difficult to find pure examples in practice. The distance between the members of the framework differs considerably, and there are many variations in details. Seven of the more common primary frameworks are listed here and shown above:

The inverted U. A beam spanning between two posts defines the inverted U-frame, and girders on each side connect the parallel U-frames. The beams are placed on top of the posts and the girders, in turn, on top of the beams. The posts are usually spaced at one *ken* (approximately six feet) intervals. This is the most widely used system as well as the oldest. Its origins date from antiquity, and the oldest remaining *minka* employed this system, yet it is still in use today. The inverted U is also used for L- or U-shaped and hollow-square house plans. There is also a long-beam variant.

The ladder. A base plate, set of posts, and girders or top plate make up the ladder-like sides. These, in turn, are connected by beams. This system was used in the urban houses of the Edo period (1615-1868) and is common today as well. Apparently it was easier to use this framework in the tightly packed urban situation where houses nestled next to each other. Although it looks similar to the inverted U-frame, outside walls were erected first, and beam placement may be independent of post location. The ladder also allows irregular post placement, thus per-

The umbrella. In this system a tall central post is connected sloping beams to four posts placed in the middle of the sides a square. Secondary posts are subsequently placed in the cor-s of the square to accommodate walls. This system was dominantly used in the Shiga prefecture.

The cross. Two criss-cross beams of equal length are joined he middle. As in the umbrella system, posts at the end of h beam fall in the middle of the sides of a square. Likewise, ondary posts are placed in the four corners. Some small farm-uses use this system for column-free space. It is also used r the earthen-floor area of large *minka* in combination with er frameworks for the raised floor areas. The cross struc-e is common in Shiga and Fukui prefectures.

The parallel crosses. This is a variation of the cross system t consists of double beams joined together and eight posts. e parallel crosses are found in the Ikawa district of Shizuoka fecture and are used to cover the area over a central sunken arth.

The box. Four corner posts are connected by mortised beams, ces, lintels, and floor beams, resulting in a rigid framework. e approximately 18 *shaku* square is used either over the earthen or in front of the house or in the house proper. The box is subdivided by a secondary structure. The box was developed ring the Edo period, and it is found in Toyama and Ishikawa fectures.

The jungle gym. This is an aggregation of the box elements ulting in a space frame of posts connected by beams, braces, tels, and floor beams. The jungle gym is a rigid structure, d lintels, normally secondary structural elements, play a pri-ry role in bracing the structure. Posts may be removed if nec-ary and longer beams substituted for the increased spans. This tem was used in the Kyoto and Osaka area.

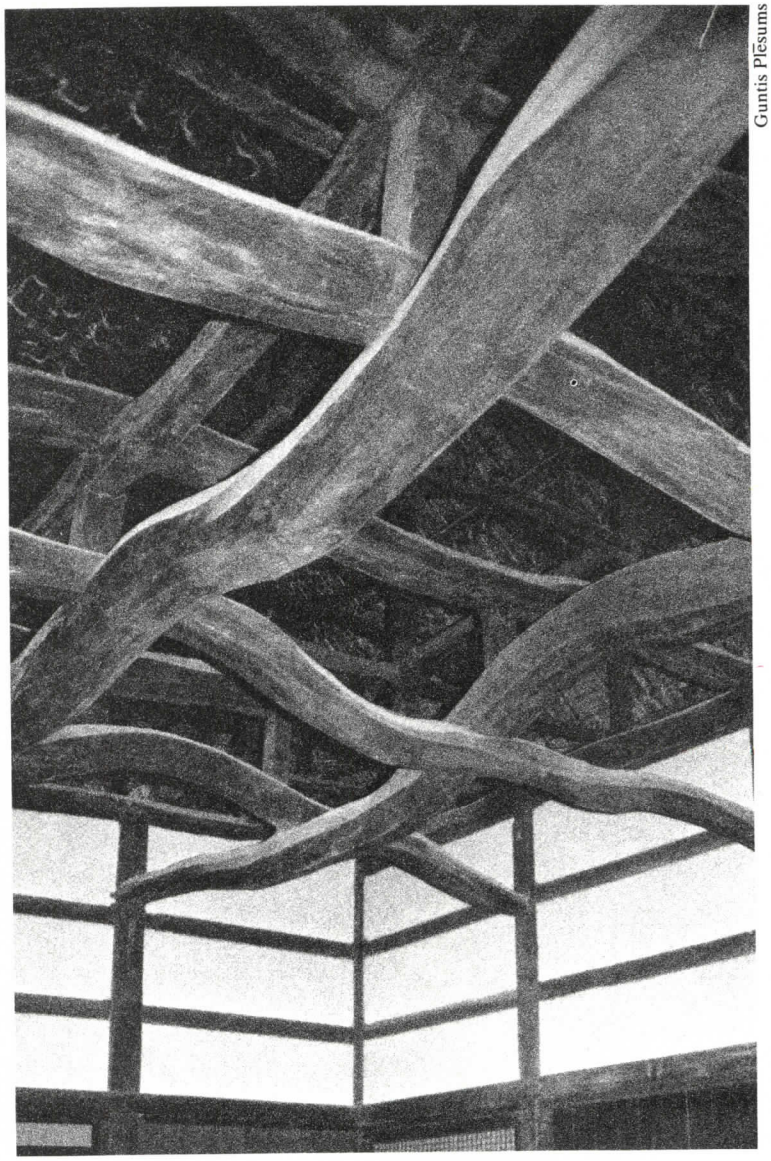
It is through the dimension of time that hierarchic space-ucturing principles in *minka* take on their significance. Hier-chy in Western architecture is generally associated with primacy certain buildings and spaces over subordinate urban fabric, oms, or service spaces. Japanese towns and buildings also ploy these universal planning principles, but Japanese build-gs extend these principles to the most minute building ele-ents, details, and materials.

Originally, the interior of *minka* was one large, open space, t over centuries rooms were divided off. Even when subdivided, ese rooms remained general purpose spaces. A ceiling is stalled over the more finished rooms, but much of the roof ucture remains exposed to the interior space. The floor of ing spaces is usually wood and raised above the earthen floor the cooking, entrance, and work areas. Use of mats varies th region, age of the dwelling, and wealth of the owner.

Design and construction are intimately associated with use, placement, renewal, and transformation. As life proceeds from rth to inevitable death and the cycle is repeated through sub-quent generations, the house likewise undergoes change and newal. This renewal has been institutionalized in the 20-year building cycle of the sacred Shinto shrines at Ise—the dwell-g place of the nation's divinities. The humblest peasant house quires some repairs and replacement of parts.

Simple materials and the prevailing state of poverty demanded udent use of resources. Consequently, some parts of *minka,* ch as the primary framework, are built to last over centuries. he infill, particularly the heavy wood board walls, may last as ng, but the course of living with its unpredictable demands ay necessitate their replacement with something more usable. he old is valued and cherished, and there is much emotional tachment to the worn and imperfect. A whole esthetic the-y, well known to the students of Japanese arts, transformed e ordinary and the imperfect into cherished, refined imper-ction.

Much in *zōsaku* is vulnerable and fragile. Wooden tracks and raw mats wear out, paper walls require patching and replace-ent. Japanese house construction anticipates renewal and trans-rmation without the messy and destructive processes that ccompany Western demolition. Usable parts are carefully



Guntis Plēsums

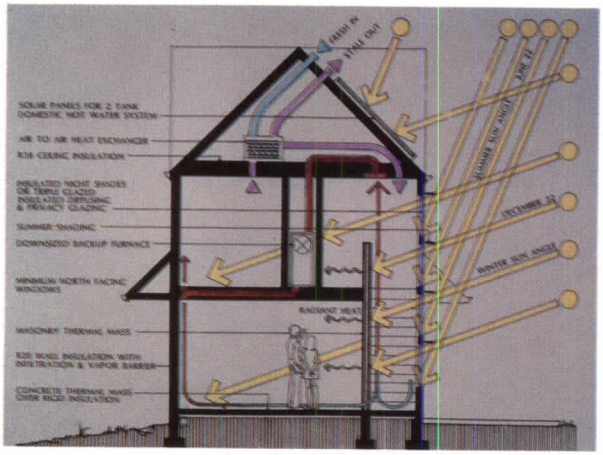
Above, timbers weave together to form minka *structure in a house originally located in a Chiba prefecture village, now reconstructed in* minka *museum in Kawasaki, Kanagawa prefecture.*

replaced in houses and temples alike; old and new coexist in a restored or new equilibrium.

Through the existence of the primary and secondary structure, *minka* provide for change in a time frame that follows the course of life over generations. It allows for individual expression, adjustments, and renewal, yet assures continuity and prudent use of limited resources. The very existence of the primary and secondary systems in *minka* turns the folkhouse into a sort of self-regulating "organism," thereby keeping the buildings useful for centuries. Consequently, reverence for what is old does not inhibit the need for change, but change is restrained by the limits inherent in the system. The liberating, two-tier structural system is far superior to the dominant traditional *sukiya*-style house and the Western modern "functional" dwelling, which subordinates the structure to the floor plan, thus losing flexibility and adaptability.

Rich in meaning, the physical systems of *minka* are accompanied by a mythological realm that is deeply ingrained in Japanese culture. Buddhist teachings hold that man is but a part of the animate and inanimate world, like a pebble in the great cosmic cycle. These teachings are compatible with the native Shinto beliefs that all nature is full of *kami,* spirits, and that all trees and rocks have a *kami.* The carpenter too works on wood respectful of the spirit within. The love and care that go into building are born out of such Shinto and Buddhist roots. The house that he builds is not only a stage for living but a dwelling of *kami.* It deserves the best. □

Kaleidoscope



ublic Housing Designed s a Jaunty Village

this era of dearth in public housing nationwide, Zervas Group chitects (formerly Johnson, Erlewine & Christensen) has signed for the Bellingham, Wash., housing authority a village jaunty, tight, simply made houses. The brief for the 24 units cluded a HUD fixed budget of $33 per square foot, energy ving measures, and solar design. In addition, the project uldn't "look like public housing."

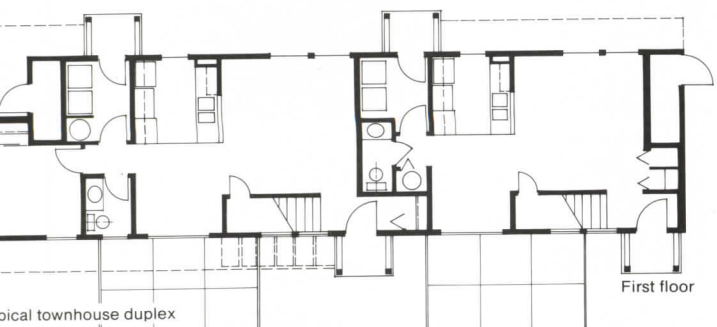
Hillside Homes' site plan achieves high density on a narrow, o-acre tract. Two single-family houses, one for the disabled, e located near the project entrance, and 11 duplexes are ggered along the crescent drive with sidewalks on both sides. ne drive terminates at the laundry, behind which is tucked the ay area.

Employing traditional wood frame forms, asymmetrical plans, ingled exteriors with simple painted trim, tiny gabled entry rches, and rough-board fences, Zervas Group effectively evoked an "everyman's house" image in duplexes that look like single dwellings. Each duplex comprises a 1,000-square-foot two-bedroom unit and a 1,200-square-foot three-bedroom unit.

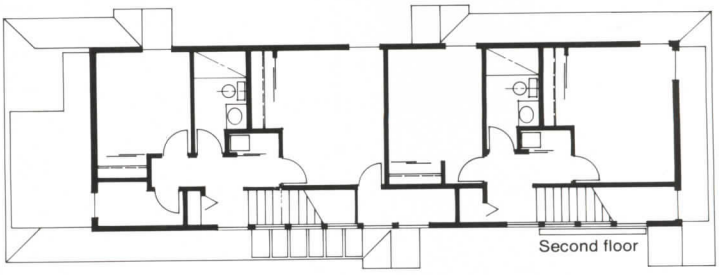
All employ passive and active solar features. South-facing, direct-gain windows are glazed with diffusing translucent panels that have higher insulation values than glass. Minimum insulation and weatherization standards are exceeded throughout, including fully insulated ground slabs. Domestic hot water is heated by a roof-mounted active system, and all units are aligned for optimum solar exposure. Back-up space and water heating is electric. Other energy strategies include night insulation, air-to-air heat exchangers, exterior shading of south-facing glazing, minimal north-facing windows, and an "operator's manual" to assist tenants in the most efficient use of these systems.

Judging by the number of inquiries from people wanting to "buy one of the condos," the housing authority has avoided the stigma of subsidized public housing and gotten low budget, low profile, low energy houses. —John A. Galloway

Mr. Galloway is an architect and freelance writer in Seattle.



pical townhouse duplex



Cheerful 'Monopoly House' On a Heavily Wooded Slope

Santa Rosa, Calif., capital of the so-called "redwood empire" north of San Francisco, is such a fresh-faced, all-American pla that it was chosen nearly a half-century ago as location for th motion picture version of Thornton Wilder's "Our Town." Th intervening years have brought growth and change, not all of for the better, but vestiges of the "Our Town" character persi as do the benignly moderate climate and lovely, wooded sur- rounding landscape.

This moderate-sized house (2,400 square feet) was inserted into that landscape in a Santa Rosa suburb with great care. Th clients wanted as much sunlight as possible but didn't want to lose a lot of trees. So architect Roland Miller Associates mad it what they call a "Monopoly house" with a small footprint.

A basic client request, in the architect's words, was that "th house should be simple and look like a house with a front an back porch and preferably a gabled roof. It should have a personality that makes it special." Personality it has, and a su ably sunny one.

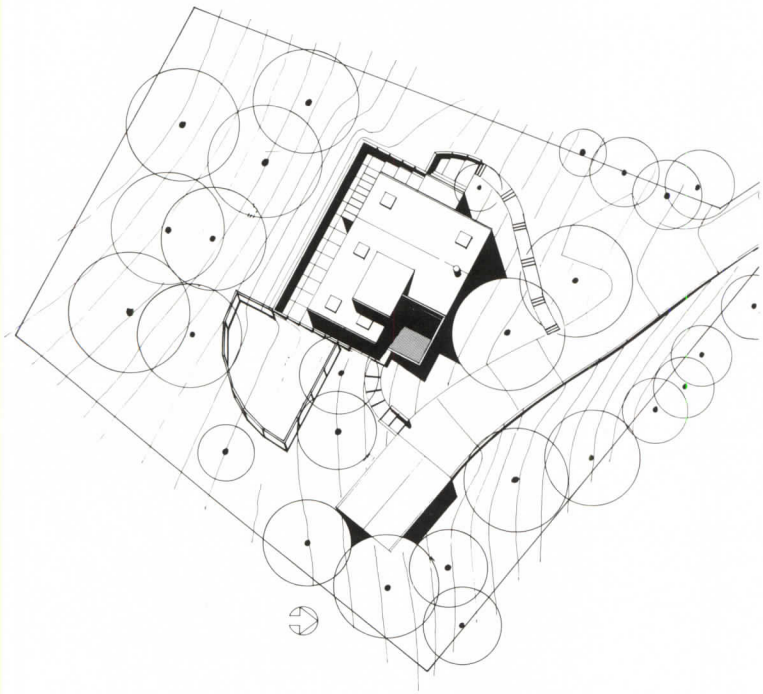
This derives in part from the use of color. On the outside 4x8-foot plywood panels are painted cocoa (with cream) and criss-crossed by teal green 2x2-inch battens. A brighter green lattice masks the porch apron and garage glazing. Real coppe metallic paint was sprayed on exposed metal in an auto body shop "to add a little flash."

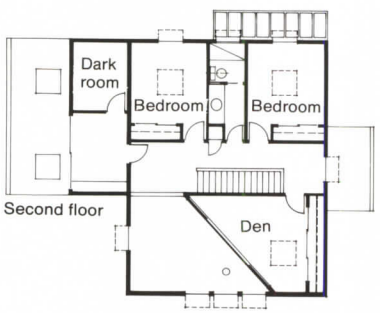
Inside, exposed rafters were painted pale yellow. Other inte rior colors are warm white and pale apricot, and cabinets are light oak. The overall effect is a pleasant glow, making the mo of the light that filters through the surrounding trees.

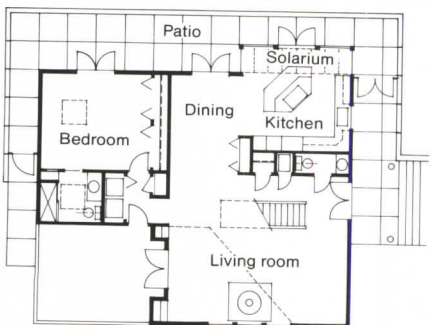
The same end is achieved by use of skylights and by a tall window at the end of the living area where the volume was tak to the roof rafters. This window is pointed squarely at the two best firs on the site, a view shared by the second-story den, peer through the upper reaches of the living area.

In plan the house has a continuous living and dining area o the first floor with the kitchen opening onto it. The master be room also is on this level. Upstairs, in addition to the den, are bedrooms for the clients' two children, their study, and a dark room. In all, it is a livable, friendly house, built on a budget as constricted as the cleared area on the sloping site.

—Donald Canty, Hon. Al







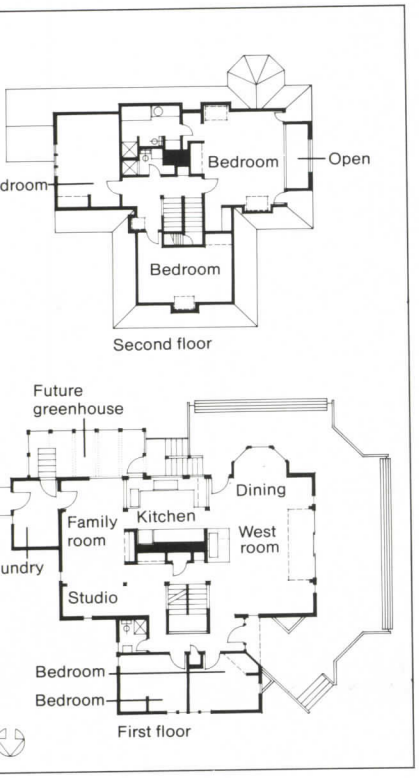
'Architecture on Vacation' In an Architect's Island House

The first settlers of Block Island, off the coast of Rhode Island went there in the early 1700s to get away from the Indians. Today the island's refugees flee contemporary irritants—traffic jams, phone calls, fast food, bills—if only for a week or two.

Located on a windswept hill overlooking an inlet, this Block Island house by Herman Hassinger, FAIA, for the architect and his family is a perfect get-away that is right at home both in its materials and sensible, comfortable interiors. While faithful to the island's weathered, cedar-shingle-clad and white-trimmed buildings, it makes no pedantic display of some architectonic profundity. Like its inhabitants and house guests, this architecture is on vacation.

The house is T-shaped in plan and a story-and-a-half in section, like many other island houses. At the base of the T rises an observation tower, growing gracefully from the shingled hip

Michael J. Crosbie



Lawrence S. Williams, Inc.

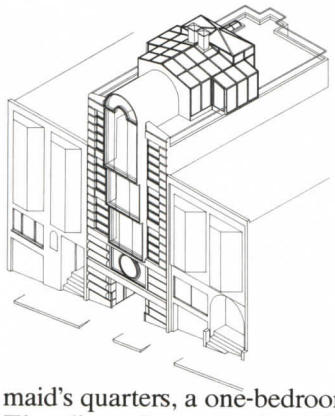
of. Hassinger says that the T-shape and the tower came early the design. Working with these two elements, he refined the oportions and profile, simplifying the form. He showed a few etches to an island neighbor who immediately recognized in e design an old lifesaving station that had once stood within ew of Hassinger's site. An old post card of the station reveals as T-shaped, a story-and-a-half, with a combination gable and o roof punctuated by a squat tower. Hassinger's tower was ler, and it lacked the gentle taper of the old one—a detail at he added during construction.

Central to the house is a utility core from which grow the encumbered living spaces on the first floor. The best views om the hill are to the west and south, and the house opens these two sides, where one finds the living and dining areas, apped with exterior decks that have windbreaks on the north- est and southwest corners. To the north and east are more ivate spaces: two guest bedrooms, a studio, and family room.

The character of the living areas is warm and comfortable, the views always commanding attention. The exposed timber construction is a good, rustic background for the artwork displayed throughout the house, most of it with a nautical or island theme, including Hassinger's extensive collection of mermaids (not real ones). The architect's fascination with these creatures can be found in the decorative fin stenciling in the dining area (above) and on the deck's columns (top), which sport finned capitals. "A little-known mermaidic order," Hassinger points out.

The second floor, totally devoted to bedrooms, is as tight and efficiently designed as a ship, no doubt nostalgic to Hassinger, who served in the U.S. Coast Guard. At the top of the second flight of stairs is a ladder that leads to the tower. One climbs straight up into this eight-foot-square perch through a hatch that, when closed, becomes the seat of a built-in bench. Close the hatch, replace the pillows, and you're in splendid isolation with the island spread out before you. —Michael J. Crosbie

Elegant Town House with the Plan of a Mini-Skyscraper



The extensive programmatic demands for this residence on the north side of San Francisco's Nob Hill led its designers, Charles Pfister Associates, to an unusual model for the firm's first venture away from interior design and into architecture. Although the lot on Pleasant Street near Jones was substandard—only 22 feet wide—owner John McInerney's specific requirements for his family included three bedrooms plus maid's quarters, a one-bedroom rental unit, as well as a roof deck. The client also wanted spacious rooms, and by collecting the service functions—stairs, elevator, and bathrooms—in a tight central core, the designers were able to leave large spaces front and rear for the other functions. The town house grew to six levels, and architect Richard Brayton, AIA, of the Pfister office says matter-of-factly, "We treated it as a mini high rise."

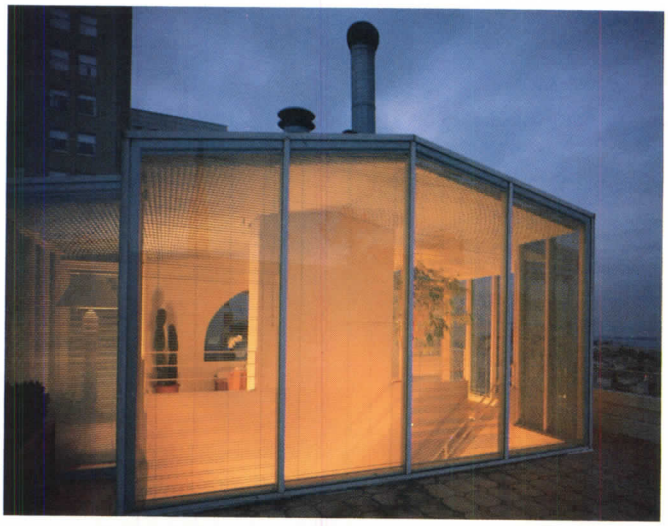
While the plan made sense easily and early, the designers struggled with the facade. After the high rise concept became apparent, however, everything came together felicitously. Brayton remembers thinking with Pfister and James Leal, "It's a high rise. Why not a glass curtain wall?" For his part, Pfister, noting, "San Francisco is facade architecture," says he saw the design as "a wonderful opportunity to create a new architectural facade in the classic mode."

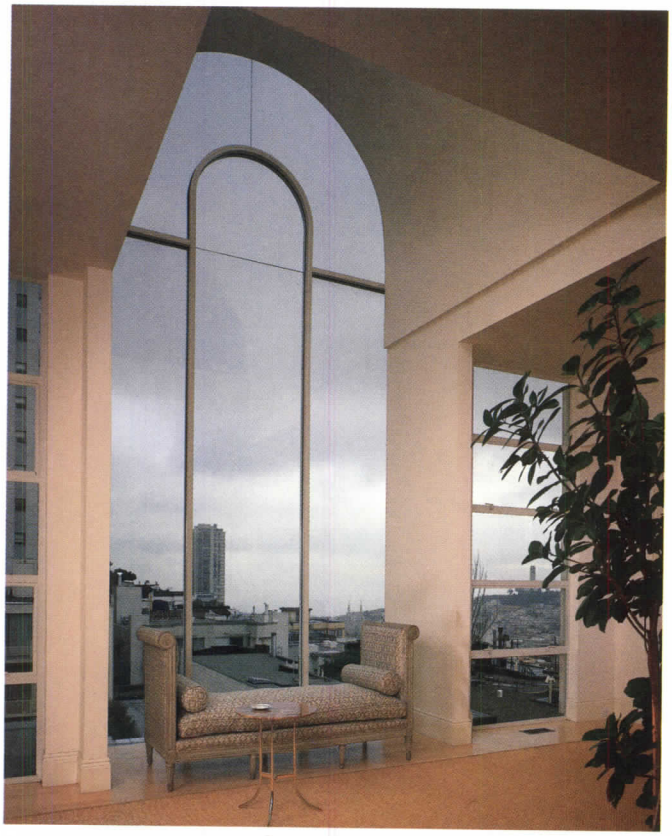
The large central window—the facade's strongest visual element—derives from the context. "San Francisco is a big bay window town," says Brayton, "but this is a reverse of the usual bay. It is an increasing projection of the skin, which makes sense programmatically." He explains that as the building rises, and the concommitant vistas improve, the window reaches out to the view. Describing it as a slightly "tongue-in-cheek symbol or icon of a bay window," Brayton adds that, accentuated by a deep reveal, it also acts as a sort of keystone to the facade, which is constructed of painted wood in a mock quoin pattern.

Toward the end of the design process, the designers realized that the facade needed a little extra punctuation. The lower level round window, inspired by similar designs in older Bay Area houses, provided the answer. "It makes an exclamation point on the front," says Brayton, who notes that all the windows except the circular one pivot horizontally (it turns vertically), thus adding liveliness to the facade.

Pfister Associates had found that while there was a 65-foot height limit to new buildings, roof structures such as greenhouses were permissible. Extending the top floor barrel vault, a form selected for its visual appeal, also created a voluminous interior space that allows the greenhouse to overlook the living room through a semicircular, glazed arch. By opening the stairway inside, the effect is that of a glass house on top.

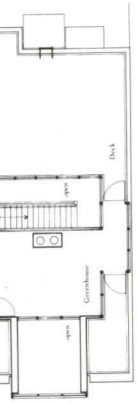
Brayton describes the view from the backside of the 4,500-square-foot residence as a "site bonus." French doors in the dining room center on the rose window of nearby Grace Cathedral. The stained glass, lighted from inside during the evening, provides a delightful backdrop for dining. The opposite view, from the living room, of San Francisco Bay and Coit Tower is no less enchanting, day or night.—Carleton Knight III



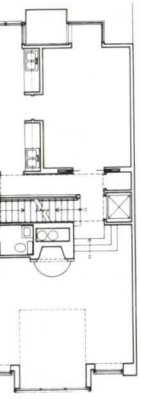


Photos right, top, and middle, greenhouse structure on roof of town house on San Francisco's Nob Hill permits extra long views and, bottom, gives spaciousness to living room. Across page, glazed and glowing central core determined skyscraper-

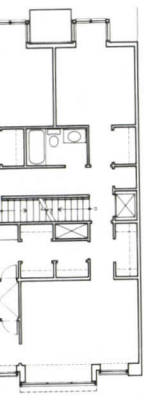
Photographs courtesy of Charles Pfister Associates



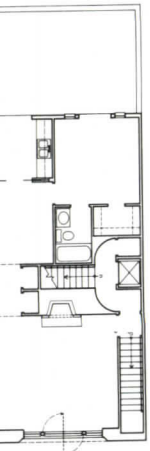
l six—greenhouse



el five—main rooms



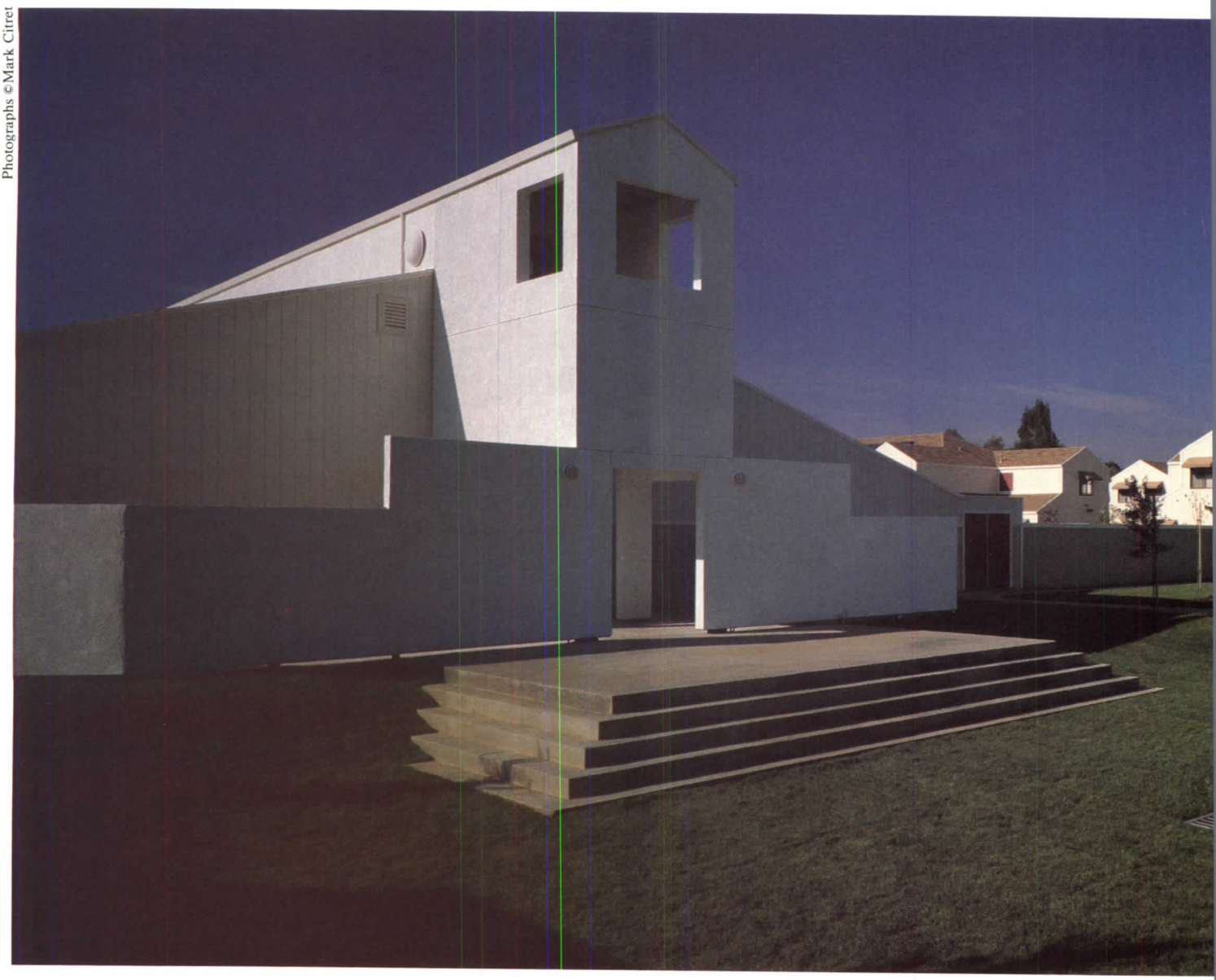
el four—bedrooms



vel two—rental

College Housing with the Feel Of a Self-Contained Community

Photographs ©Mark Citret



Russell Park student family housing at the University of California, Davis, is a suburban scaled development that gives primacy to the pedestrian. Designed by Sam Davis, FAIA, Architects and Shen/Glass Architects, both of Berkeley, it comprises 200 units on 10 acres. There is also a community center (symbolically and literally at the heart of the project), laundry facilities, and an ingenious rental storage building in the form of a wall that stretches along a major artery on the site's north boundary, serving as a traffic screen and gateway to the complex.

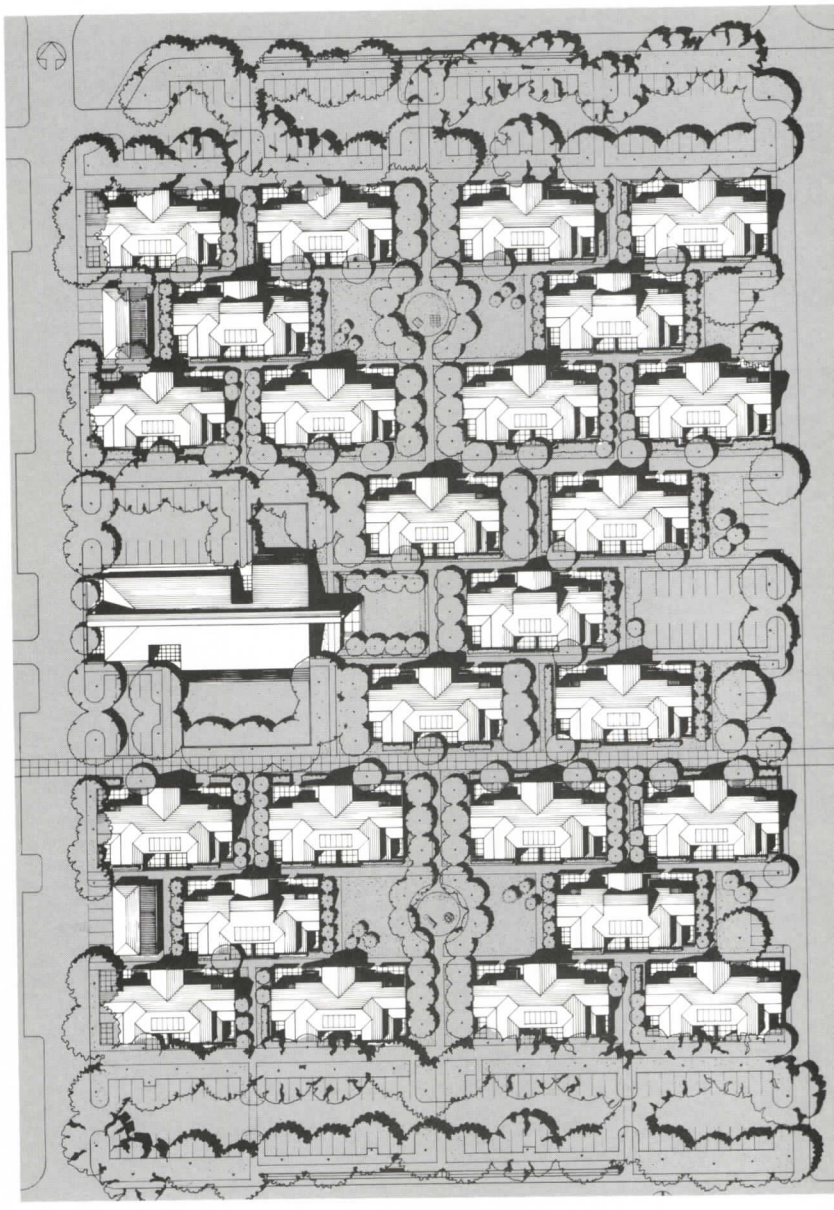
The 200 units are broken down into five clusters, each cluster containing five buildings, and each building eight units. There is a range of one-, two-, and three-bedroom units, varying in size from 670 to 1,130 square feet. Each unit has some basic amenities such as a foyer, counter dining area, and private patios. Every building has a combination of one-, two-, and three-bedroom units, which are entered through a shared courtyard on the north side, protected by privacy walls.

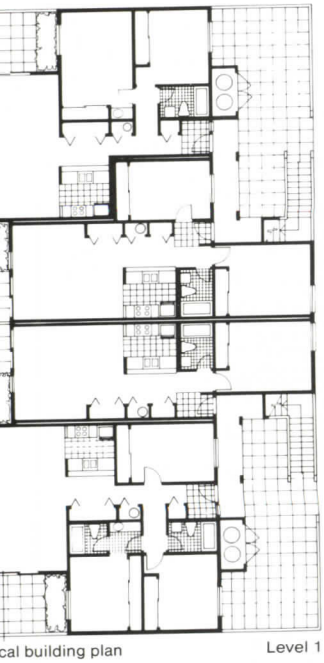
The five buildings that make up each cluster are arranged in a staggered pattern. To the north and south, two clusters are butted together creating large and welcoming communal open spaces with play structures at their center. The fifth cluster is in the middle of the site, jogged just east of center, framing an

Walkways were given careful consideration. Parking for 220 cars is confined to the perifery of the site so pedestrians, both large and small, have carefree run of its interior. The staggered arrangement of buildings and clusters makes for constantly shifting and interesting views of the buildings, whose every side has a gabled profile. This gives the entire project the feel of a small, contained community where one can wander down paths between clusters and buildings without infringing upon the privacy of the units.

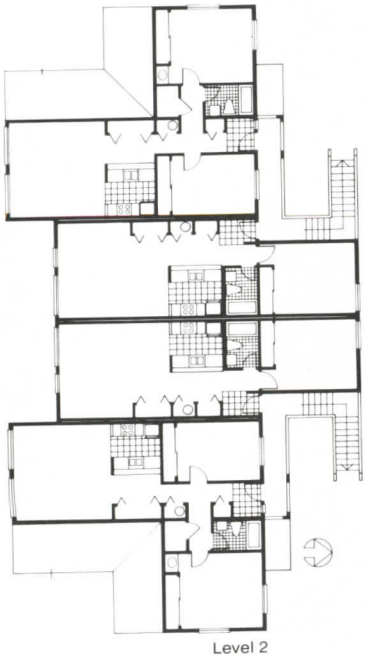
The community center on the west side of the site provides an informal link with an older student housing project (dating from the 1960s) across the street, which shares its use. At 3,600 square feet, the center, with its long, colorful spine, comfortably accommodates administration offices, meeting rooms, and child care. The latter is found on the building's sunny south side with ample exterior play areas. As the center faces the housing, it becomes a backdrop for a stage area that is used for local theatrical events.—M.J.C.

Top, storage wall/gateway into complex; above and right, units as they face community center and its amphitheater. Units are pale green, blue, and beige, with active solar panel systems con





cal building plan



Level 1

Level 2

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Top, Russell Park community center is distinguished from nearby buildings by its white and gray colors, while it serves as a stage set for amphitheater; above, center's colorful and light-filled interior, with view into glazed child-care rooms.

ur Paradigms in Four Model ouses in California

one of many long, suburban avenues in the flatlands north Sacramento a high, peak-roofed entry pavilion—like a stage-barn designed by Palladio—leads to Phoenix Place, a would-be t of luxury houses whose four models were designed by don/Buchanan Associates of Berkeley in conjunction with eloper-builder Larry Lowder and landscape architect Ed Haag. eir hope was to demonstrate how civilized and sensitive a h-cost housing development could be. In the process, the hitects incorporated ideas that they have been evolving for re than 25 years.

The 11.7 acres are bounded on the south by bluffs over the erican River, on the east by a California state park, and on west by an ecological preserve of ponds and swamps. On property were 180 blue oaks, middling-sized, occasionally awny natives offering shade and a semirural sense of place. wder and Haag devised a road that curves to leave the west ge of the property essentially native then positioned short side ds and housing plots so that they avoided all but four or five the trees. Zoning constraints pretty well determined their den- and land costs their market; the price range is $315,000 to 75,000. They reserved three acres—mostly the rough western ge of the thicker groves of trees—as common land.

For a far longer period of time than at first anticipated, the dels remained unreplicated. These four have in common chetypal elements (towers, courtyards, porches, aedicules) as uses of design; "ceremonial" front doors; variable floor els and ceiling shapes, and the roofs that create them; natural ht—filtered, layered, changing, arriving through a great variety openings in unexpected places; design elements that reveal e human shape or presence, such as vertical windows in door- e proportions, visible ledges and steps for sitting on, cosy rches, balconies, and bays, windows that climb alongside stairs, tails that remain on view as evidence of the builder's work. Other common design features may surprise those familiar th the work of Donlyn Lyndon, FAIA. Without looking dis- ctly "traditional" or even "Californian" in any easily recog- zed way, all these houses look more comfortably conservative an, say, his own Collins, Champy, Ottosen, or Mackey houses, four different states—or anything he worked on while a part- r in Moore Lyndon Turnbull & Whitaker. There are here no -degree angles, no freestanding arcades or floating interior gal- ries, no bizarre wall cuts or exotically choreographed stairs. side framing members are hidden. All rooms are rectangular. ost ceilings are flat. There are, on the other hand, trellised eezeways, redwood decks for barbecuing, and wide, shingle-roof overhangs that recall *Sunset* magazine ranch house designs of the 1950s—or even something older.

Lyndon's 1974 book (a collaboration with Charles Moore, FAIA, and Gerald Allen, AIA), *The Place of Houses,* was intended as a kind of pattern-book for contemporary house builders. Included were four ways of arranging rooms (you could link them, bunch them, set them around a core, or have them "enfront" something outside) and four ways of relating a house to its setting: merging (Taliesin), claiming (Monticello), enfronting (Mount Vernon), and surrounding (a Southwestern patio house). At Phoenix Place four types are identified by familiar house elements—roof, tower, court, and terrace—that serve as organizing principles.

The terrace house is oriented so that the 43-foot-long rear terrace that defines the house—redwood-decked and trellis-roofed—faces directly south. The living room/library, dining room, and family room open onto this terrace through a handsomely detailed series of four double French doors. The house is sliced through midway by a narrow, two-story skylit open space, partly to accommodate the stairway (which pauses at the landing for a projecting, sunlit window seat), partly to provide a "slot of light" that is meant to serve as an organizing and orienting device on the interior. The hip roof is cut back along its long south edge, where that wall rises higher than the north wall. Here is located, upstairs over the terrace, the large master bedroom with a private balcony. Two of three other private rooms upstairs, their ceilings partly shaped by the rooflines, also face south. Part of the "missing" piece of roof is pulled out to form a dramatic sunshade, on Maybeck-like props, for the high range of windows that provide light and views for these rooms (and the open sun-slot), four of them symmetrically disposed over the four French doors below.

Less successful conceptually is the court house, if only because the tiled courtyard itself loses some of its centrality and significance in so large and so spreading a California house. This house is essentially two buildings, an L-shaped social wing embracing the entry hall and court, with eaveless roofs sloping dramatically up from the perimeter, and a two-story rectangular bedroom and garage wing with a low-sloping hip roof, broad shading eaves, and a magnificently proportioned and detailed bedroom-balcony under one projecting gable end. Other than this balcony, a lovely place echoed by an adjacent entry pergola, the best design features of the court house are a wondrous series of natural light effects, achieved by a sensitive placing of large high windows, French doors, skylights, punctured walls, and two-story spaces.

The roof house has a central design concept—one vast hip roof shaping and defining a 2,800-square-foot house. The gently sloped roof itself is quite beautiful. Its long horizontals are enforced by the lines of broad steps, low porch walls, and trellises. The horizontal wood siding, which elsewhere sets up mildly jarring counter-vertical rhythms, is here part of a unified whole. A rare hint of the old MLTW days comes in two small rectangular bites taken out of the roof edges: one of them (across a ridge line) pulls light and sky into a handsome corner porch off the living and dining rooms; the other dramatizes a secret garden that cuts into the master bath. The "core" about which most of the social half of the house is built—the finest interior space in the collection—was created by popping a long gallery of clerestory windows out above the central roof ridge, from which light pours into a high central space that flows between entry hall, stairwell, library niche, living room, and dining room. Inside, this is ringed with provocatively sculpted wood columns, which support more of those red-stained and light-filtering teak grids. On the outside, this long, high light monitor further emphasizes the Wright-like lines of the house—particularly thanks to the ingenious addition of a small upstairs study (the only second floor room) tucked into a cross gable, which creates a wonderful Robie-house effect. It's the least expensive of the models.

The tower house at Phoenix Place is arguably the most interesting. From the corner tower pavilions, at or above the tops of the oaks, one has a view of treetops and rooftops, the nearby river, the green valley south, and, on clear days, the distant Sierra Nevadas. The roofs of these essentially square, tight-footprint houses slope up steeply into two directions to meet the corner tower, which encloses the main stairway below, revealed on the exterior by stepped windows. These roofs are sheared close to the wall on the two public sides of the house, and expand out (along with lower roofs) to shade windows, balconies, and porches on the two other sides. The entry hall shares the height and light of the corner stairs and leads to a central hall from which radiate indoor and outdoor social spaces. As in every house at Phoenix Place, there is an open view straight from the entry to the rear windows or terrace, modulated by various ceiling heights and falls of light.

The four houses were originally only about 85 percent designed. When prospective owners come to choose a plan, they find the ground space and orientation already fixed, along with exterior materials and the general disposition of interior spaces. But they can have the architects enlarge or erase a family room, exte a deck, add a gazebo, close in a tower. Lyndon says he want the buildings to contain things buyers would think of as "house In fact, in this speculative, expensive market, he and his par ner Marvin Buchanan, AIA, had little choice. Lowder had t try to build and sell 33 similar-looking, not really traditional hou at $300,000-plus each, in a relatively unadventurous market.

He didn't. Due to soaring interest rates and a lack of construction financing, the project came to a halt after the mod were built. Sammy Cemo, who assumed control early this ye has engaged a second firm to draft a second set of plans wit bigger family rooms and more "Sacramento-oriented" kitche for buyers resistant to what he calls "that San Francisco look

In a provocative, wide-ranging survey on "The American House" published in *The Atlantic Monthly* two years ago, Ph Langdon analyzed the need American house buyers feel for "re suringly familiar associations." Anything that looks unconve tional," he wrote, after talking to dozens of people in the house-building trade, "will be regarded as inferior.... The dev oper's first task is to innovate and then to disguise the innova tions with an atmosphere of pleasant familiarity." Many of th "disguises" he described—sheltering roofs, old-timey lattic grandiose Victorian front doors, surplus overhead space—ha been incorporated into the houses of Phoenix Place.

But he went on to cite another point of essentially unanim accord among developers, builders, and real estate people fam iar with the American housing market: Any spec-built house c even dreams of selling above the bottom of the range must b crammed with what people in the trade call "amenities."

"Amenities" are mostly, but not exclusively, machines. The have nothing to do with good architecture, little to do with go craftsmanship, and often not a great deal to do with appropri ate materials, or comfort, or convenience, or genuine needs- except insofar as people "need" currently fashionable display of their (presumed) social status and wealth.

Amenities essentially mandatory nowadays in higher price housing, according to Langdon, include security alarm and int com systems, and, if possible, 24-hour guards. Kitchens shoul have dishwashers and disposals, of course, but also trash com pactors, icemakers, combination microwave and conventiona ovens, solid (not hollow) oak cabinet doors, "luminous ceilings skylights, greenhouse windows, and butcher block islands. A ma ter bedroom no longer suffices. House salesmen insist on mas ter *suites* (sometimes two per house), each with a fireplace ar television in the carpeted sitting room, a walk-in dressing roo a private deck or patio, and a vast tiled or marble bathroom, like a Beverly hillbilly's dream of Caracalla—sunken round or oval tub, preferably with Jacuzzi; separate tiled shower room; separate chambers for WC and bidet; double basins sunk in a travertine slab; skylights; ferns; walls full of mirrors. The mas ter bed should be canopied or raised on a podium, or at the very least in a room with a coved or "cathedral" ceiling. For- mal living rooms (preferably sunken) and dining rooms are sti essential, even if all your nonintimate living is done in the fam ily room—which should have its *own* fireplace and wet bar, sep arate from those in the living room and master suite. A cosy library or study adds chic (and resale value), even if no one in the household ever reads or studies. The children's suite or wing should have a separate playroom, which can gracefully age int a guest sitting room. Wall-to-wall carpet, or (on top of) hard- wood flooring, is indispensable.

What led me to dig out Langdon's article was that virtually every amenity he had listed has been built in to the designs an model homes for Phoenix Place. They form a major part of th

Opposite, the entry pavilion. This page, from bottom to top: the terrace house with truncated hip roof; court house with bedroom-balcony under gable end; roof house with rectilinear bite out of the roof; and (above) tower house.

the resistance of the builder to anything too outré—it is remarkable that the architects were able to shape the basic spaces as well as they did. But for all their noble efforts, I came away from a tour of the models remembering not so much *architecture* as bland, oversized, cushy-carpeted rooms, a surfeit of mahogany and marble, faux-plaster walls, more fireplaces and wet bars than I could imagine most families ever using, and bathrooms big enough for small wedding receptions.

("A prime amenity is space itself," wrote Langdon, reporting on American realtors and developers. "I think they got too big," says Lyndon of his houses at Phoenix Place.)

What I am describing is a compromise between sensitive, imaginative design and the realities of the marketplace. Phoenix Place may be one of the first American attempts to sell some of the best current architectural thinking to an anonymous audience of unsophisticated *nouveaux-riches.* (The characterization of the clientele is not mine, but it may be apt.) It may work—six houses are now finished and two more under way—if the gods are favorable and interest rates hold. The American upper-middle class ("We've got the top 2 percent of the market," a salesman told me) may yet be weaned away from mini-baronial manors hedged off from their neighbors, with windows in all the wrong places.

But the price architects will have to pay to bring this about may be what Lowder's marketing expert called "more sex and sizzle": the "Dallas" and "Dynasty" image, the sunken oval tubs and marble hearths and wall-to-wall fuzz and Honduran mahogany cabinet doors. ("It's the *cream,* but still they want oak, because they've been told oak is better!" complained a salesman.) The result—outside, in the oak-shaded interstices, on the balconies, on the vine-shaded terraces, on the stair landings, under the great windows—may, one day, be a model of its kind. But in most of the rooms, American taste, and American marketing realities, will still rule.—David Littlejohn

Mr. Littlejohn, author of Architect: The Life and Work of Charles W. Moore, *is a professor of journalism at the University of California, Berkeley.*

Colorful Regional 'Landscape' Celebrates Route 66

It is not at all surprising that the Beach, a 74-unit Albuquerque apartment building by Antoine Predock, FAIA, is an act of regionalism, nor that its massing and materials recall the pueblos of northern New Mexico. But there are other kinds of regionalism at work here too. The massing also recalls land forms of the Southwest: square-shouldered mountains rising from plains and desert (here parking courts), steeply rising pinnacles. Here the pinnacles are penthouses.

And the facade facing Route 66 is colored in a pattern reminiscent of Navajo blankets, going, in Predock's words, "from a base of Rio Grande Valley olive greens through the sunset colors of the mesas and mountains to the sky blue penthouse terraces."

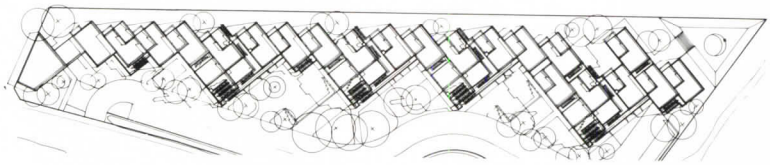
Finally there is allusion to the roadside regionalism of the modern-day West in streaks of neon tubes. These recall the site's former occupant, for which the project is named, a motel with an especially spectacular display of neon. The neon and colors reflect a certain Venturiesque intrigue in Predock with what he calls "Highway 66 iconography." They also etch and reinforce the terraced, highly sculptural form.

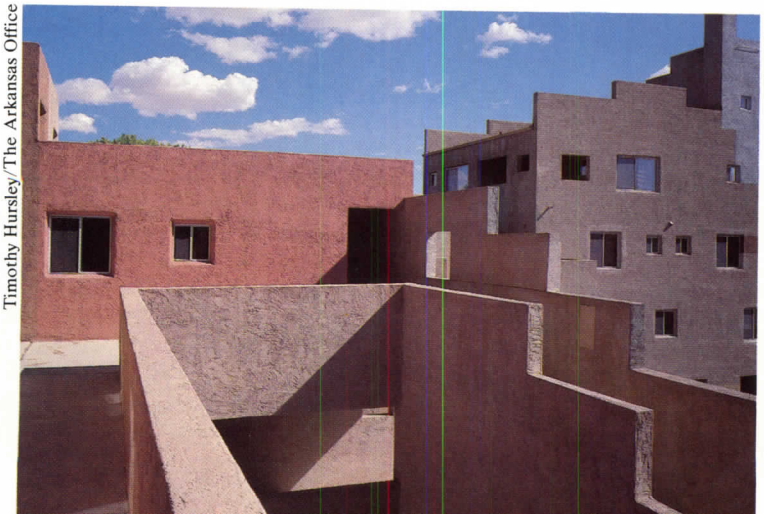
While the highway side celebrates interstate cacophony and welcomes the automobile into its forecourt, the back side is monochromatic and quiet, facing on a golf course, a park, and, glancingly, the Rio Grande River. Most units have views over this tranquil greenery to distant, dramatic mountains and mesas.

As Predock puts it, "the site straddles a cultural fault line, the habitat of the West Central Avenue, Route 66 custom cruiser meeting the white belts and white shoes of the Albuquerque Country Club."

The building contains a few offices and a wide variety of apartments, from tiny efficiencies to the generous penthouses. It also serves a variety of income groups. The city, hoping the Beach would stimulate an upgrading of the shabby strip of which the site is part, provided bond financing in return for which the developer set aside a fifth of the units for moderate-income rentals.—D.C.

Right, the Beach as seen from the highway entering Albuquerque across the Rio Grande. Predock calls it the biggest violation ever of the city's sign ordinance. Below, upper level terraces.





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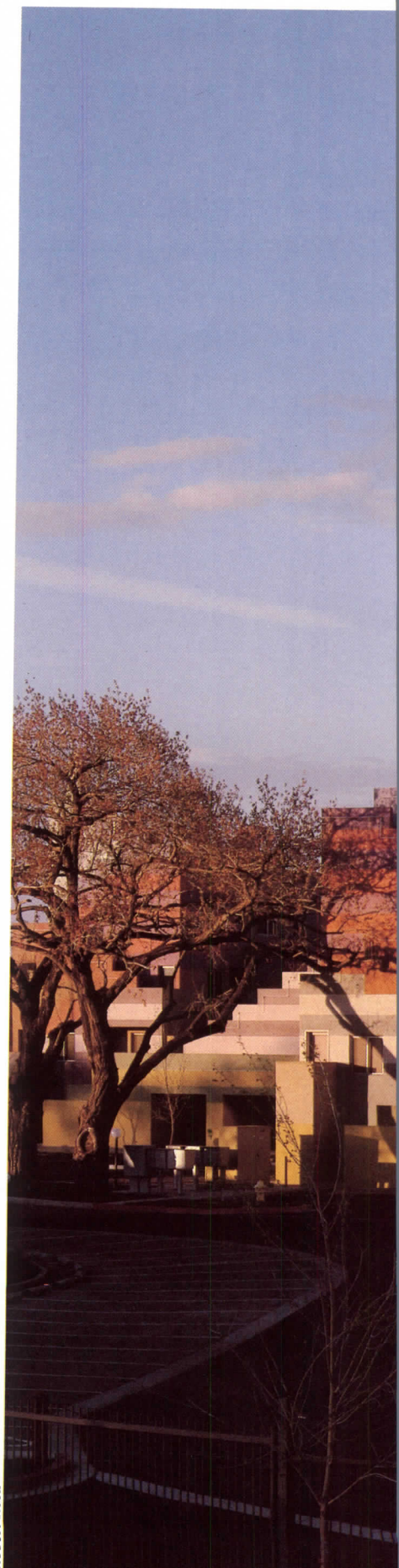

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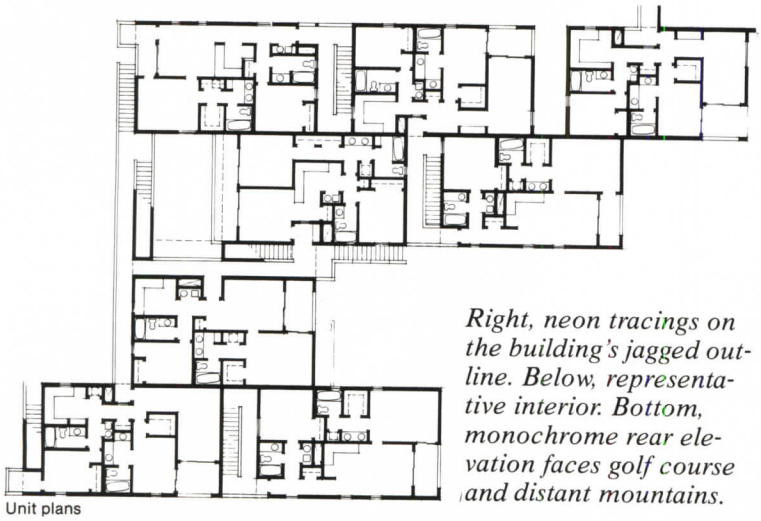

Unit plans

Right, neon tracings on the building's jagged outline. Below, representative interior. Bottom, monochrome rear elevation faces golf course and distant mountains.

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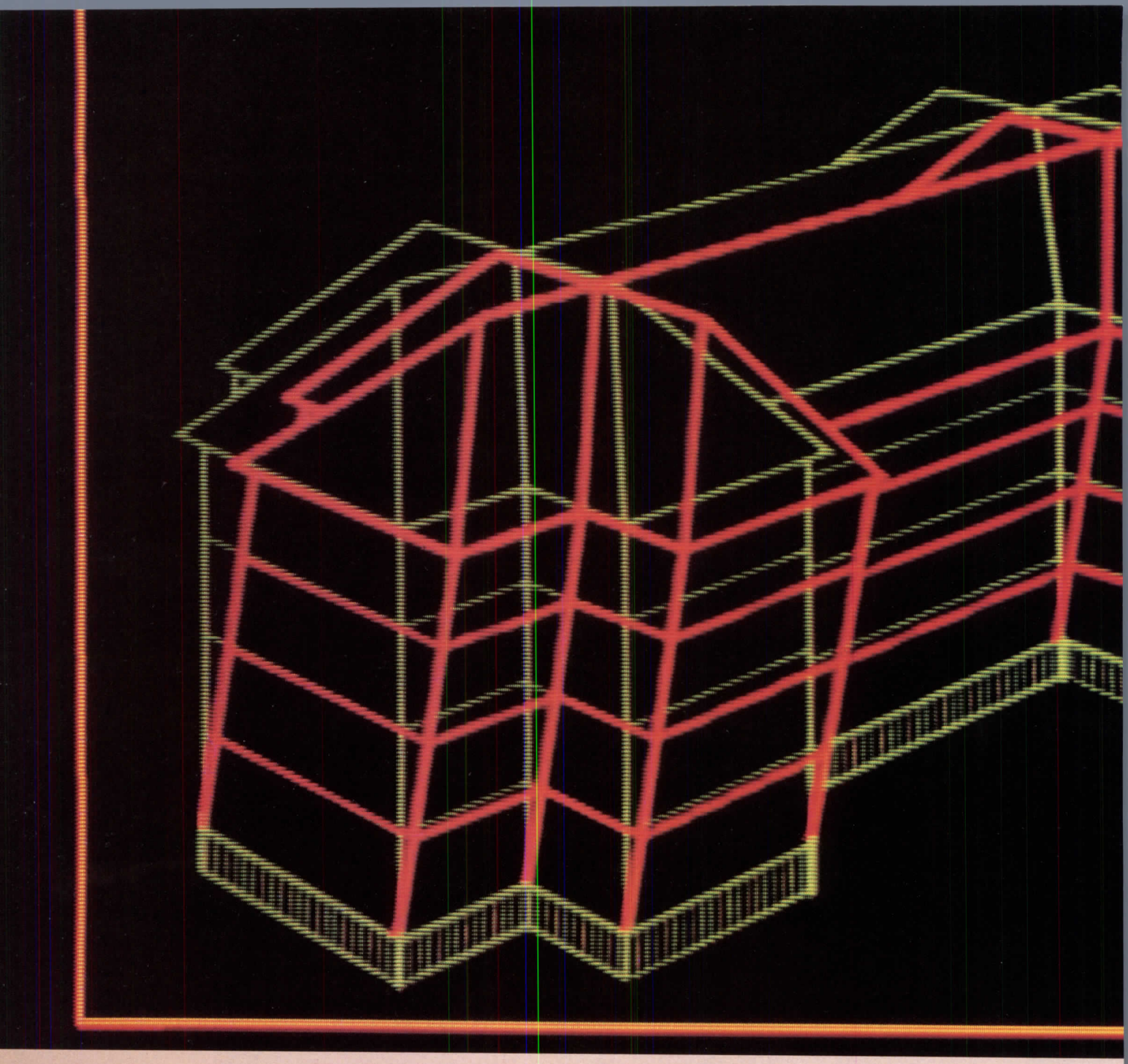

HOW TO COPE WITH EXTREME STRESS.

When the rumbling subsided on May 2, 1983, much of downtown Coalinga lay in ruins. It was the fourth largest quake to hit California during this century, jolting the Richter scale at 6.5.

Amidst the rubble of brick and concrete block, however, newer "stick-built" structures remained intact. So much, in fact, that many escaped visible signs of damage.

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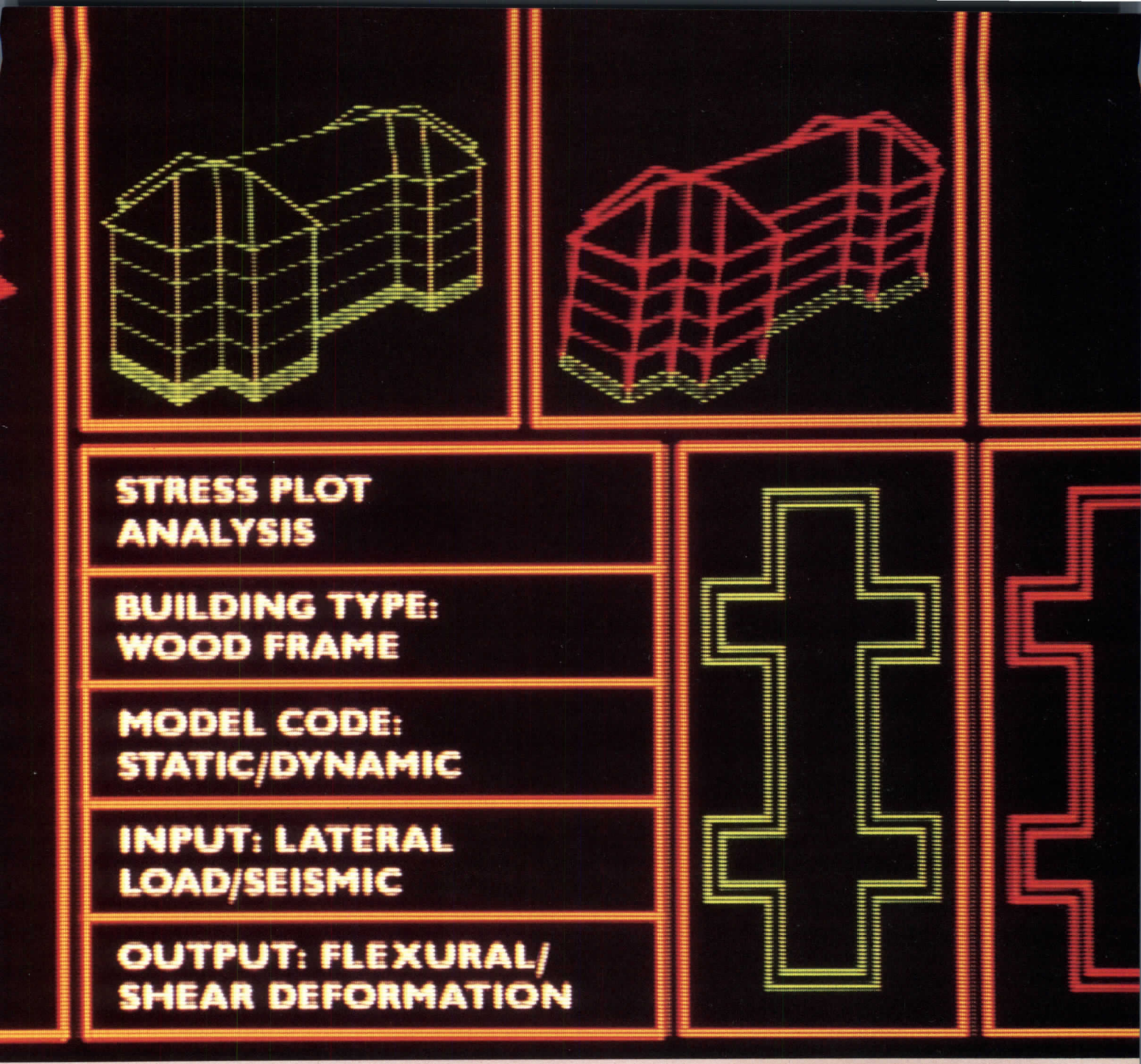

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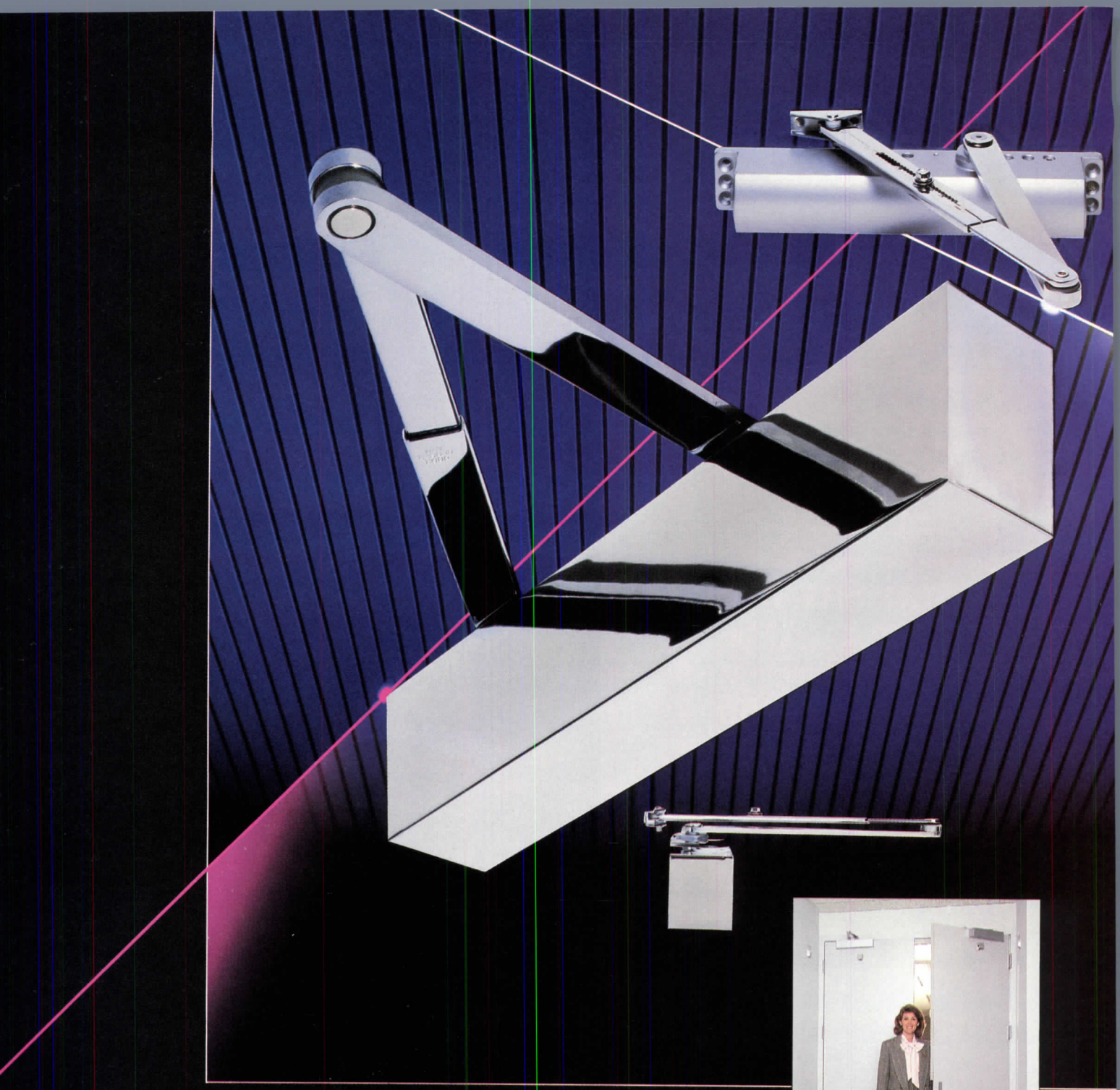

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Technology & Practice

Both the forms and methods of construction used in American housing have changed little in the last few decades. The way housing is brought to market, however, is changing in profound ways. Of most importance, housing has become more market- and price-driven than ever before. This has encouraged innovation in two complementary areas—standardization, to keep price down, and customization, to keep consumer satisfaction up.

How these two seemingly opposing objectives can be reconciled is the focus of this month's Technology and Practice section. The opening essay explains how certain technologies and materials affect cost efficiency and the ability of many parties to participate in the design, construction, and alteration of houses—a key consideration in making housing that is appropriate to all types of consumers. Following this is a series of articles on aspects of the housing market in the Netherlands, Sweden, Japan, and the United States. These case studies reinforce the message that technologies that enable broad participation in the creation of housing offer the most promise for achieving the dual goals of efficiency and diversity.

This material was originally conceived for presentation in ARCHITECTURAL TECHNOLOGY, which this month merges with ARCHITECTURE magazine. When the TECHNOLOGY staff first composed the package, we envisioned a presentation style quite apart from our usual reliance on architectural detail for illustration. Moving this material into our new format has made this departure easier than we imagined, since we now have the freedom to use photography when it is appropriate. None of this implies a change of focus from the original framework of ARCHITECTURAL TECHNOLOGY, and in the future you'll see a return to detail drawings as our primary means of graphic communication.

One change that has resulted from the merger of ARCHITECTURAL TECHNOLOGY and ARCHITECTURE is especially worthy of note: an expanded products section (which begins on page 141). Developed by the editors of ARCHITECTURAL TECHNOLOGY, the section is divided into two parts. The first introduces a variety of new and notable offerings; the second presents products related to the subject matter of the Technology and Practice section. This month, that segment of the products section (page 148) introduces nearly two dozen sophisticated electronics and control systems for housing.—MITCHELL B. ROUDA

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Who's in Charge of Housing Innovation?

rnacular construction technologies distribute control widely

y Stephen H. Kendall

very 15 years or so, a new round of hand-wringing takes place regarding what is supposedly the desultory state of American housing technology. Along with criticisms that housing industry spends too little on R&D and that too builders employ technically advanced approaches to construction, architects add the familiar lament that they are too moved from the production of housing.

t's been more than a decade since the last Operation Breakough projects were built, and the clamor for dramatic vances in housing technology is starting again. Examples of nufactured and industrialized housing from Japan, Sweden, d elsewhere are being called technically superior, of higher ality, and more efficiently constructed than stick-built or nufactured houses produced in the United States. The popr press, consultants, agencies, associations, and individuals eaking at industry roundtables (and in the halls of Congress) ce concerns of an intrusion of foreign housing and housing oducts.

Should claims of foreign technological superiority cause rm, excitement, or apathy? For that matter, is there a way discern when *any* technology might materially change the y houses are built? The answer to both questions, it seems, hat technological innovations, alone, may never yield signifnt improvements in housing quality or reductions in cost. ter all, such advancements as robotics and microcomputers ve been applied in other industries for years, but have yet to harnessed in ways useful to the full-scale production of whole uses (although some have been applied to the manufacture assemblies used in building housing).

More often, dramatic shifts in housing result from innovaons that are not strictly technical, but also involve changes in sign and production methods. To put it another way, endurg advancements in housing technology may be governed not erely by issues of technical performance but also by the issue who *controls* the various stages of designing, deploying, and odifying housing (and the subassemblies that are used to make using). Control, in this context, refers to the exclusive abil- of a person or group to change a building element or assemy (of any scale or kind) over some period of time.

Every technology can be described in terms of the initiatives different players take in controlling the technical bits and pieces of that technology. For example, to make a piece of plywood, a pipe, or even a window assembly, a company decides to take control of certain elements to make something. In these cases, the controlling party has *industrially* produced the element or assembly before any house design was known to the producer.

Prefabrication is a different kind of initiative that takes these industrially produced elements and puts them together for a particular place, design, or type of construction. The prefabricator takes control of a design and then manufactures component assemblies—for example a truss, a wall panel, or a semi-finished house module—made up of both rudimentary industrially produced elements and other prefabricated assemblies. These prefabricated assemblies can only be made after a specific design has been established in which the assembly will be placed.

Much of the widely publicized work of Japanese housing manufacturers involves sophisticated prefabrication, not industrialization. Such prefabrication of modules, panels, and various other assemblies is clearly useful and has been applied increasingly for centuries. But in itself prefabrication is less interesting than the industrialization of fundamental elements. Basic industrial production supplies a system with elements that can be employed for a wide variety of construction methods and can be used easily by many independent players. Because the elements are smaller, cheaper, and more general, they are within the economic grasp of many, including end users. Hence control of the system can be distributed widely, and efficiencies can be achieved that have broad benefit.

No housing company anywhere in the world has yet achieved, at the level of whole houses, the mass-production efficiencies we associate with the industrialization of rudimentary elements. When corporations try to expand industrialization from the realm of rudimentary elements to the realm of more complex assemblies, they require standardization at such a high level that it tends to make variation less likely—simply because it is more difficult to do.

In order to see the relationship between particular technologies and patterns of control, it is necessary to identify a series of *levels* in the decision-making process. In housing, for example, a site plan, a house type, the configuration of interior spaces, and the materials, furnishings, and finishes can each be said to represent levels in the development process. Decisions at different levels must be coordinated, but do not necessarily have to be made simultaneously or by the same party.

For example, to make a site plan, it is not necessary to deter-

ephen H. Kendall is on leave from the faculty of the College f Environmental Design at the University of Colorado, Boulr. He is currently a Ph.D. candidate in the MIT department f architecture, where he is studying with John Habraken, hose ideas are reflected in this article.

mine how the interior spaces will be configured, but it is necessary to set some constraints about where the footprint of a structure could be. Similarly, to size the main fuse box in a house, it is not necessary to know where each circuit will run, or precisely which appliances will be attached to each circuit. But it is essential to select a box with the capacity to accommodate a range of circuits, and it is essential that the circuits be wired to accommodate an appropriate number of appliances. What is considered appropriate at each level is, of course, a decision made by the party controlling the design of that level. Hopefully, that determination reflects the influence of those controlling the next lower level of decisions.

Decisions at different levels can be made by different parties at different times without disrupting design and production processes, so long as the decisions made at higher levels leave room for a fair number of options at the lower levels. Not only may the controlling parties be different for each level, but they may change hands as the life continuum of a house passes from design and construction to occupancy and change.

2x4 construction: a vernacular technology

For a system to have the capability to distribute some form of control to all parties, it must be widely shared. We call such widely shared systems vernacular. John Habraken, in his recent book *Transformations of the Site,* explains the advantages of vernacular construction technologies this way: "To the extent that [a system] is successful [in distributing control], it will become a shared property in the minds of the people and it will stay alive, growing and changing towards ever richer and more effective manifestations."

The way certain building technologies can allow control to be widely distributed, and distributed differently at various levels and stages of construction, is particularly visible in the 2x4 wooden housebuilding system, still the dominant method for housing construction in North America. This system, including platform framing and all that goes with it, has been so successful in part because the technical systems in it and the many levels of control exercised on it can operate so independently, with wide interpretation, while sharing a changing repertory of highly industrialized general elements.

Writes Habraken: "In the North American stick-built system we find the same mutual benefit between formal and informal production as we find in [another system, more commonly recognized as vernacular] the examples of the squatters in developing countries using concrete technology. On the one hand there is the world of sheet rock, the steel profiles, the aluminum foil, the siding, the insulation, the pipes, and wiring while on the other hand, the system allows the homeowner to repair his house on weekends, to discuss change with the contractor, to build indeed his own house should he find it to his advantage to do so."

In this sense, our 2x4 system is arguably the most advanced and complex industrially produced system for building houses in the world. It was not invented in a private industry R&D effort or proposed as a result of a government-supported program. Yet it has had the power to accommodate a diverse set of participants and a rapidly growing and changing market, and it has allowed technical innovation from independent sources to be brought into it. Innovations have been developed by many different parties, with a minimum of explicit coordination, a many of these innovations (laminated veneer lumber and foi faced rigid insulation board, for instance) quickly gained wic acceptance, since they accorded with an extremely pervasive and well-understood technology.

Despite architects' fascination with innovative construction technologies, few new construction methods seem capable o generating this kind of broad application, nor are many build ing strategies able to accommodate participation by as many independent parties. To wit, in Japan, where so much attention has been focused on developing new approaches to hous ing construction (usually controlled by a single company), the is a growing corporate and government interest in 2x4 techno ogy (although, typical to Japanese industrial traditions, the tec nology is largely controlled by corporate conglomerates and may never be widely available and broadly distributed in the sense that it is in North America).

Because 2x4 construction (at least as it is used in the Unite States and Canada) is a vernacular technology that can't be dominated by professional interests, the technology has been especially capable of accommodating significant changes without requiring *systemic* change to the construction metho ology. For 150 years we have seen the prefabrication—using elements of the 2x4 system—of whole houses, panels, package of pre-cut framing members, and other assemblies. Mobile dwelling units constructed within the bounds of 2x4 technology have been shipped to remote settlements around the world Whole specialized industries making general industrially produced elements and assemblies, based on the 2x4 system, hav risen and declined. So too have a variety of supply networks and trades. Perhaps of most importance, the system has allowed laypersons to become familiar with it and use it independently

The apparent lack of systemic change in 2x4 technology is in fact a sign of a living technology that has served a multifaceted set of needs and a diverse group of users very well. It indicates a resilient and dynamic interaction between the fundamental technology and producers, builders, designers, and market of millions of households, all of whom, in one way or another, exercise control of assemblies at different stages in a house's life cycle.

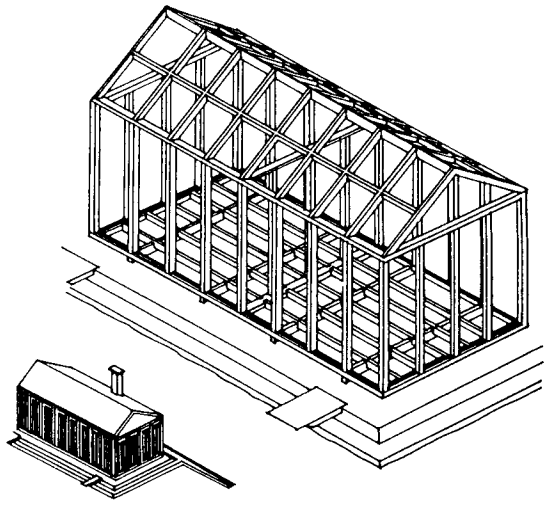
While this building strategy has been efficient, easily interpreted into many different design styles, and widely applied, it sometimes appears that 2x4 technology has reached a developmental limit as a vernacular technology, with most of the juice already squeezed from it. This may be because our building culture has taken 2x4 technology for granted and has developed such a tacit understanding of the system that it is hard to see how to leverage improvements in it that make a difference. Instead of building on its strengths, which we barely understand there is a tendency to look to proprietary technologies that either subvert the power of this widely shared system or, at best can't find a place in it.

Architects' attraction to radical advancements in building technology, fostered in part by an education that so often awards high marks for self-expression, has usually resulted in advocacy of "integrated systems" of one kind or another that reduce decision-making levels in favor of "professional expertise." Looking back into the writings of our foremost architect (Gropius, Wachsmann, Wright, Christopher Alexander, and others), whose work so often serves as ideological benchmarks

aspects of housing production.
Design professionals have not only claimed to know best how
ople should and/or will live but have asserted that dramatic
partures in ways of building offer great promise for quality
d efficiency. The problem is that in housing, unlike subma-
es, space shuttles, and automobiles (although those compar-
ns are often drawn), the withdrawal of decision points into
professional domain usually means the elimination of the
st important impulses of habitation that make living envi-
nments healthy, that is, the ability of local communities and
useholds to control their dwellings over time.
The most notable attempts by architects to revise housing
hnology (the General Panel System, Lustron House, some
eration Breakthrough proposals, etc.) referenced inappropri-
models of industrialization. They invariably linked the tech-
logy of housing production to a particular esthetic. Neither
technology nor the esthetic could change or be interpreted
lependently. And neither was free to be controlled, changed,
interpreted by those outside the design professions. The pro-
etary nature of their control patterns undoubtedly contrib-
ed to the lack of success of these proposals.
What do these failures teach architects about technical inno-
tions in housing? They tell us two things. First, that we should
velop working methods that acknowledge we do not have,
d (for the sake of efficiency if nothing else) should not have
mplete control of all the decisions and assemblies of hous-
g, nor over how these assemblies will be made into complete
vellings or altered over time. The other lesson is that while
4 technology may leave room for improvement in terms of
ore efficient methods for design and construction, no improve-
ents will be as successful as what we have now unless they
ll allow a high degree of interpretation and permit deploy-
ent by many independent parties.

uidelines for architectural innovation

iven the importance of distributed control in housing, what
n architects do to help? Most fundamentally, we could inter-
et our design responsibility as one of understanding and con-
olling change, and of enabling the distribution of authority
r making change to those who act on the built environment
ter our work is completed. We all know that houses change,
nd that they do so under the control of parties other than those
ho designed and built them. As simple as this may seem, we
ften resist this idea, hoping that the houses we design will stay
we left them.
What if we were to think of the design of housing as the proc-
ss of making plans in such a way that other people can build,
se, and change the houses that result from our plans? What if
e were to make that explicit? What if we were to think of
esign as taking place in a continuum, in which we respond to
echnical and regulatory conditions established by others act-
g before us, and create a set of conditions that constrain the
ecisions of those following us at the next lower level?
It is typical to begin the design process by examining how
ell various technical assemblies respond to functional perform-
nce requirements. We want to know, for example, if a certain
all will perform in a certain thermal environment, or whether
particular beam will support anticipated loads. Those are nec-
ssary questions, but are not sufficient. To design houses with



This early example of industrialized wooden construction comes from an advertisement that appeared in the South Australian Record *in 1837. The "portable cottage" was touted not only for its quality, but also for "the facility with which it may be taken down, removed, and refixed by the most inexperienced."*

an acknowledgement of control by other parties, it is necessary to supplement these concerns with an analysis of *capacity.*

The idea of capacity is really quite familiar. How many times do we study a space to see if furniture can be arranged (by us or someone else) in a sufficient number of different ways? How often have we studied the position of electrical outlets, trying to anticipate how their positions will affect access to power and data? How many times have we worked on a house "model" for a developer, trying to standardize the framing and the stair openings, the main plumbing, vent lines, and so on, so that as much as possible of the materials purchasing and construction can be standardized—even panelized—while enabling several plan variants to be marketed?

A capacity analysis at the level of a whole house leads to fixing certain design elements and then systematically examining the degree of freedom that remains to make various finished plans. A full capacity study entails complex issues such as technical subsystems, market forces, financing, regulatory constraints, construction processes, and so on.

Obviously, this is a design process that becomes very complex very fast. But it is one of the most critical processes in which architects can participate. Given the complex and distributed patterns of control that exist in the housing industry, and the fast moving pace of change, the process requires better concepts and methods than we now have at our disposal, including those now available with computers.

Designing in terms of both capacities and the functional performance of technical assemblies are not at odds. They are and should be complementary. Good designers move rapidly between these two ways of seeing their designs.

To make it concrete, designing for a large and changing market, where the first-time household is often unknown, requires having a clear strategy for standardizing some elements and assemblies while leaving others variable. Since technically speaking many systems interact to make houses, and many different parties take turns at control, deciding what to fix and what not to is difficult, especially if we move outside the con-

fines of particular patterns of corporate or professional control.

Precedents exist, however, most notably in the techniques for designing, constructing, and transforming speculative office buildings. It would be very useful to systematically transfer some of what we've learned regarding change and distributed control from office building design to the production of housing.

The concept of distributed control of technical assemblies and the concept of capacity help to explain what's important about particular changes in housing production. These concepts lead us to ask, as we look at innovations, who does what and when, and what do their actions mean for the freedom of the actors following.

A few examples of alternative methods for producing hou ing are presented in the articles that follow; they describe so of the market trends in the Netherlands, Japan, Sweden, and the United States. These case studies represent a wide varie of initiatives in marketing, in the development of national pr duction "standards," and in movements among participants redistribute responsibilities and improve the efficiency and responsiveness of housing design and construction.

Each experience represents a different approach to housir (and housing component) delivery. All illustrate new balance between the decisions made by individuals and those made a a collective level.

The Netherlands: Distinguishing 'Support' and 'Infill'

By Stephen H. Kendall

A series of housing projects in the Netherlands (some just completed and others on the boards) allows households to customize the layout, equipment, and interior finishes of their apartments in a way that is equally efficient for occupants, building owners, product manufacturers, and contractors. The projects—all multifamily—introduce a new logistical distinction in housing delivery, between *support* and *infill.*

Supports provide the basic building shell (including structure, exterior walls, general circulation patterns, building plumbing, and electrical systems). Designed for specific sites, supports include those elements and assemblies that are long lasting and can't be changed by occupants acting individually. Infill packages (including some partition walls, the plumbing fixtures and some piping, electrical equipment specific to each dwelling, cabinets, and finishes) are used to make dwellings within the support. Infill packages consist of those elements that each household can control without affecting other households. These elements, classified as consumer goods, change more rapidly than the support, as a result of market trends, tenant needs, maintenance, and regulatory requirements.

The support/infill concept emerged from the work of John Habraken, a Dutch architect now teaching at MIT. (Habraken was the head of MIT's school of architecture from 1975-1981.) Habraken's research, which began in the Netherlands more than 25 years ago, concentrates on how architects can participate more effectively in the design and transformation of dwellings.

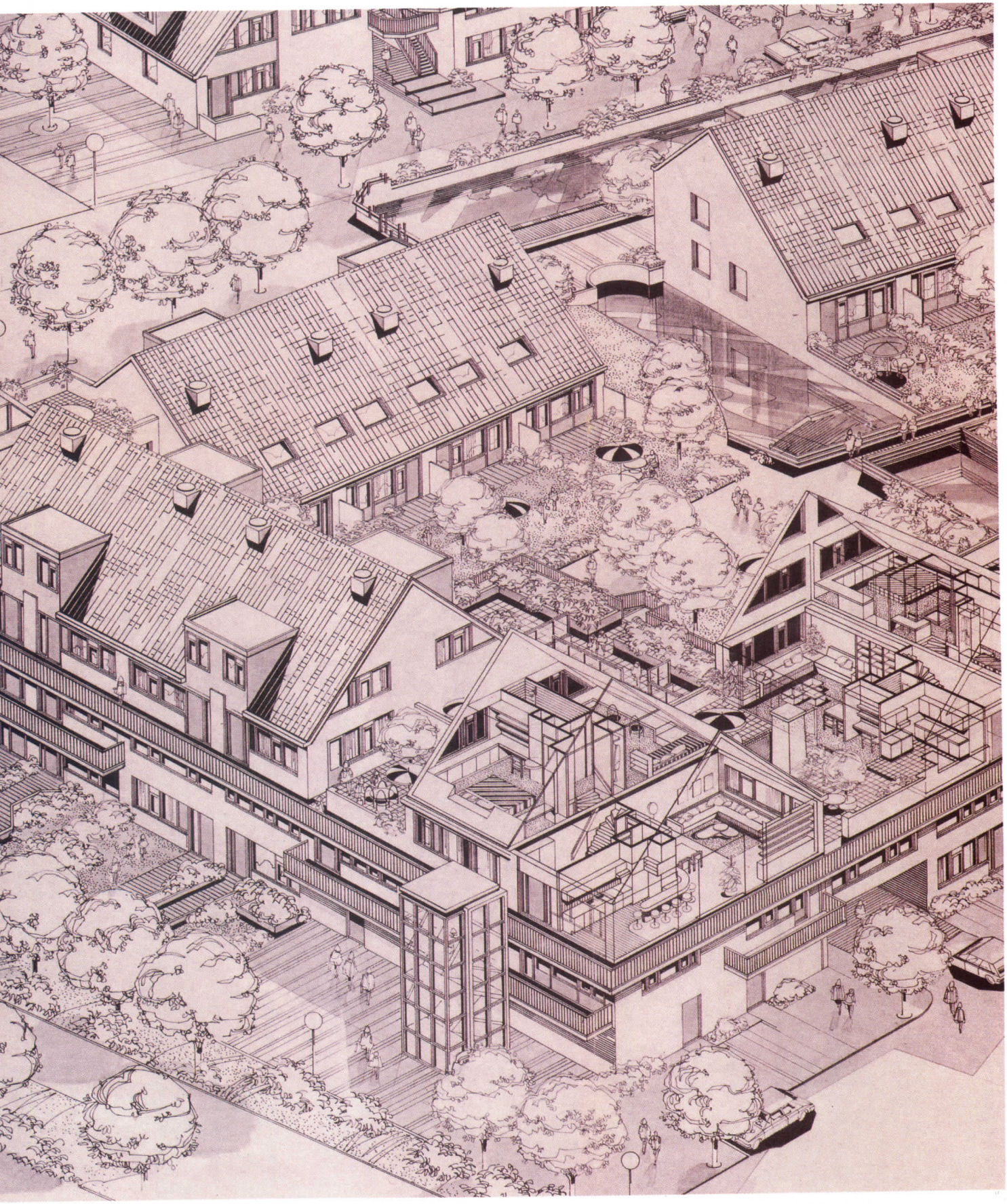
Habraken's design methods and theories stress that housing always reflects the interaction between two spheres of control—the individual household and the community. Different economies, cultures, times, and individual participants have drawn the line between these two spheres differently; and, it seems, various patterns of control can all work effectively, even while people share the same form, technologies, and typologies. But regardless of where the lines are drawn, Habraken says, professionals cannot effectively contribute to the development of healthy dwelling environments without recognizing and balancing this interaction in some way. To this end, Habraken's work has been aimed at the development of methods that allow va ous participants in housing production to negotiate which dec sions are to be made by each player.

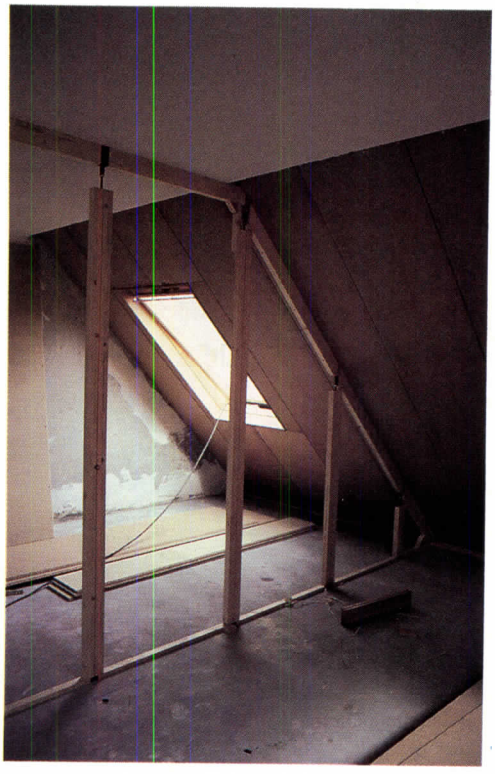
One of Habraken's key conclusions is that the ability of man ufacturers, architects, developers, households, and others to b effective in controlling their "territory" in housing production and change relates directly to the form of technical elements and their manner of assembly. By separating support and infil elements, consumers can control all of the decisions rightfully made by them without affecting decisions rightfully made at the community level.

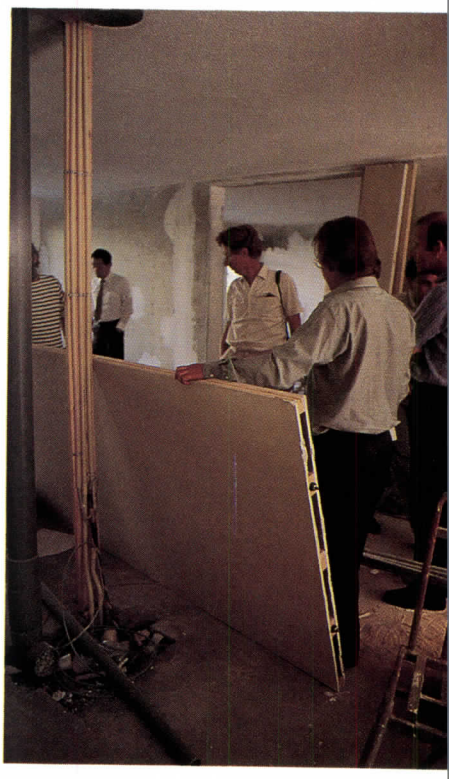
Economic and public policy forces in Dutch society as well as changes in the construction industry and in the architectur profession are helping to bring this concept into reality. The Netherlands has always been a place of experimentation in hou ing design. It also has a long tradition of democratic govern ment, commitment to the rights of individuals, and communit cohesion (public infrastructure to keep out the ocean is a dramatic expression of this unity). And unlike the United States the Netherlands has consistently had deep public sector involve ment in the production and ownership of housing.

In recent years, however, public sector support of the hous ing industry has declined, with significant consequences. Man architects have no work, and the housing industry finds itself with excess capacity, since the country is for the most part "already built."

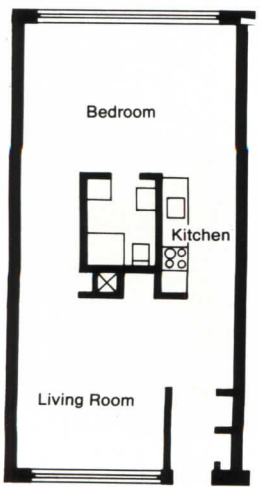
In the face of these changes, some housing industry partici pants (architects, contractors, product manufacturers, housing associations, and government ministries) have formed a new organization, called the Open Building Foundation, with joint public/private funding. The organization is dedicated to rethinking the way supply and demand in the housing industry can be balanced. It serves as a focal point for R&D and the implementation of open building concepts that are explicitly realized in the support/infill approach to housing production.

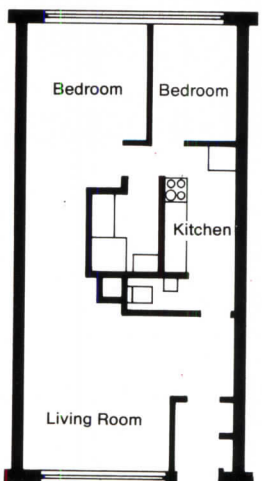






Photographs by Stephen Kendall





Top photos, construction of the concrete support of Lunetten; racks of prefabricated wall panels; finished dwellings. Bottom photos, panel colors and position of doors and windows are selected by households; infill partitions use industrialized stud assembly; some partitions are preassembled in modular sizes (note HVAC duct, which is part of support). Plans at left show different layouts

new town in Lunetten

ne most extensive support/infill project has been built in nnetten, a new mini town south of Utrecht. Under a design/ ild contract, the architect for the project was Frans van der erf, a principal of Workgroup Kokon in Rotterdam.

The project uses conventional Dutch housing patterns in its ban streetscape and courtyard form. But unlike conventional utch public-sector housing, this project untangles support and fill and uses recently enacted modular coordination standards allow a more efficient articulation of the design and con- ruction process. The goal was to produce a project, with the operation of contractors, that could

be built more quickly than through conventional strategies, save in construction financing, overhead, and other costs;

enable each apartment (and these are rentals) to be custom- ed with the tenant's participation;

make it easy to defer the design of plans and interior assem- ies to a late stage of construction;

enable changes in layouts during construction and in later ears with minimum difficulty.

These goals were met by the design of a concrete structure, ith a single repetitive span and carefully positioned openings nd cross walls, that has the capacity to accommodate dwell- g unit plans that vary in shape, size, and layout. Tenants used full-scale mockup to determine their own floor plans, equip- ent, and finish schedules within certain assigned territories. nfill packages were provided for each dwelling. These packages ere assembled from industrialized elements available to the eneral market.

The design process started with a space plan, which repre- ented a stage between conventional schematics and design evelopment. This plan, dealing with both supports and infill, stablished the position of walls, floors, stairs, mechanical ystems, and equipment. It used a grid with alternating 10- and 0-centimeter bands for the purpose of coordinating this work. he space plan, which left open the exact specifications of naterials and dimensions, allowed the contractor (already nvolved in the project) to establish preliminary budgets. The lan also provided a basis for financial negotiations with the inistry of housing (which provided typical subsidies along ith typical space standards) and, with a set of performance specifications, enabled infill packages to be developed for the different apartment layouts.

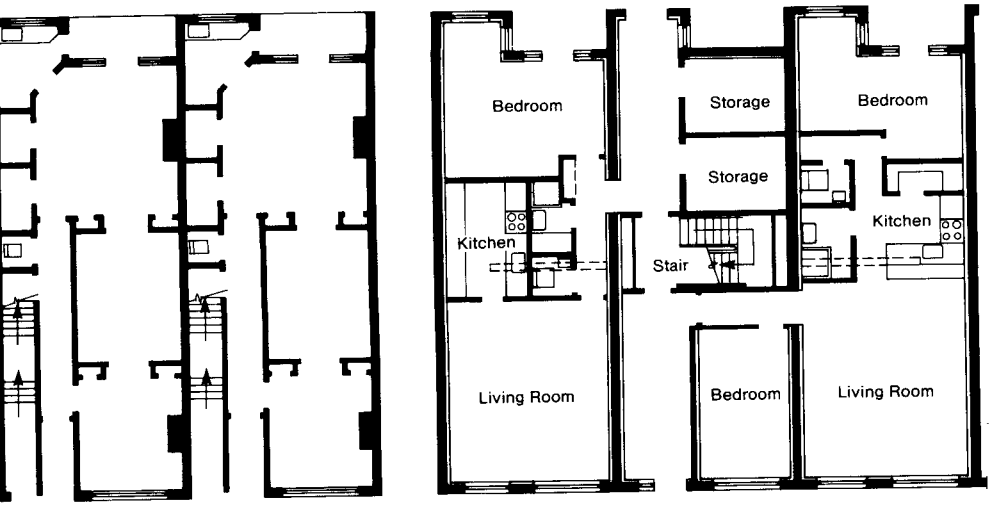
The space plan was used, together with a computer program, to enable the layouts within the support to be drawn up, estimated, and translated into rent figures, so tenants could receive immediate feedback on the financial consequences of their choices. The support was already under construction when detailed material and dimensioning plans were developed for the infill. Because of the distinction between support and infill, these final plans could be different from the "standard" plans used earlier to test the capacity of the support.

Supports and infill were bid and contracted separately. The infill was installed by a number of teams, each completing one dwelling and moving to the next at the rate of one per week.

Renovation in Riebeck

Riebeck is a district in Rotterdam built in the late 19th century. Last year, a feasibility study was undertaken by the in-house architecture staff of Tuinstad Zuidwijk, a large housing corporation, to rehabilitate a portion of the area using the support/ infill concept. The company owns 4,000 units in Riebeck and wished to establish a flexible housing stock within the existing historic fabric. The problem was to minimize loss of rent during renovation while reconfiguring the buildings in such a way that current and future household mixes could be accommodated. Although the first phase of the project has since been built with conventional construction methods, Tuinstad Zuidwijk intends to renovate other portions of its housing stock following the study's proposals.

The renovation process, as outlined in the study, requires careful capacity analysis of the existing structure to see which alternative floor plans and equipment layouts are possible, given the constraints of structure, circulation, anticipated household composition, financing, construction procedures, and so on. This analysis would determine where openings in the existing masonry walls between units could be made to enable a wide variety of floor plans (even unanticipated ones) within the regular party wall pattern. At the same time, the design shows a new configuration for vertical access, provides new horizontal access corridors, adjust ceilings so that floor heights are uniform



Plan at far left shows repetitive floor configurations typical of nineteenth century Rotterdam. A project proposed for the Riebeck district shows how varied plans can be achieved within this housing stock. In the renovated plans, right, structural bays and facade openings have been retained. By punching penetrations through the walls (a process known as 'party wall editing') adjacent bays can be combined. Levels can be configured independently, within limitations imposed by public stairs. Infill partitions line bearing walls, create interior walls, and when doubled provide fire barriers. Note bedrooms do not have closets, which are purchased as furniture.

throughout, and calls for the replacement of mechanical and electrical systems.

The study presented a plan that could provide 1,700 different dwelling units within a support that was uniform in principle. This consistency would simplify reconstruction of the old buildings into supports, even though the facades of the various buildings to be converted and integrated are quite varied, having been built by different owners at different times.

Plans called for the infill to be constructed from conventional materials and assemblies and packaged on the basis of dwelling unit "territories." The infill packages would be let to a single contractor. This arrangement would allow the exact decisions on unit plans, mix, and distribution to be deferred until well into the construction process. Single-source contracting of infill packages also reduces the need for on-site storage and reduces the time needed to finish a dwelling to approximately one week, by a work crew of five.

When the project is realized, few apartments will have the same plan, equipment, or finish specifications. The support/infill approach will have saved time as well, enabling the owner to recapture rent that would have been lost using traditional construction methods.

U.S. implications

As in the Netherlands, margins of profit are being squeezed out of the design and construction process of housing in the United States. Though our experience is to some extent different—in the Netherlands the government's role as a provide of housing has recently been reduced, and in the United State that role was never large and what there was of it has long since been withdrawn—we nevertheless find similar demands placed on housing and our methods for producing it: efficiency quality, equity, and affordability.

The normal strategy for increasing efficiency and reducing costs is to reduce variety and reduce the number of decisions made by independent parties. But our housing market is highl disaggregated, and rightfully so, given the way our political economy operates. Our housing market expects a huge range of choices.

The lesson for U.S. architects and housing producers in the Dutch experience is that both variety and efficiency are possible, if we learn how to untangle yet still coordinate technical systems—not solely on the basis of technical performance, bu also according to levels of control.

Japan: Selling Houses Like Automobiles

By Hiroshi Watanabe

In the downtown showroom of a "dealer," one of a nationwide network of franchises that market and deliver industrialized houses in Japan under a certain brand name, the "home engineer," as the salesman calls himself, punches a few computer keys after consultation with the customer. In moments half a dozen floor plans have been retrieved from the tens of thousands of plans stored. With a little adjustment one of them ought to do nicely. Nearby, the prospective homeowner is perusing a laser-disk catalog and, with a word of advice from an interior decorator, is selecting kitchen appliances.

The week before, the customer visited a show house park nearby and looked over houses by different manufacturers. The houses included a cottage touted as "Tudor," a flat-roofed, *pristinely* white throwback to the days of doctrinaire functionalism, and a dwelling in Japanese farmhouse vernacular that suggested all the joys and entailed none of the backbreaking labor of working close to the earth.

He finally settled on what was, unbeknown to him, a vaguely Wrightian structure, with features usurped from the Usonian house. The brand name is one with which he is quite familiar. He is confident of getting a reliable product and is further reassured by the manufacturer's 10-year guarantee, 20-year maintenance service available for 365 itemized building parts, and 24-hour emergency service system. And not least, he is pleased by the cost, which represents savings over a comparably finished, "custom-designed" house.

In a couple of hours the design of the house is a quarter of the way toward being finished, and the remaining three-quarters will be left to someone in the back office who will spend half a day throwing together a set of standardized details and doing the necessary contract drawings.

With the contract signed and the building permit obtained, (and financing arranged, in part through an agency associated with the housing dealer) orders for house components are placed with affiliated plants.

A final pre-construction meeting to check drawings and to make last-minute revisions is held by the client, the salesman, the construction supervisor (likewise from the dealership), and a local subcontractor who will carry out the on-site work. About two weeks later, on the morning of day one of construction, five trucks bearing two modules each arrive at the site. Each module consists of lightweight, ceramic-like panels hung on a rigid steel box frame and comes with doors, windows, interior finishings, and services. The modules have been erected on a poured-in-place concrete footing before lunch time. Two weeks later, after wiring and plumbing have been connected and some finish work has been done, the new house is ready for

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An architect working in Tokyo, Mr. Watanabe was a correspondent for Architecture Plus *and is a frequent contributor*

At its most streamlined, that is the process by which an industrialized house by one producer called Misawa Homes can get built in Japan.

Industrialized housing is big business in Japan and getting bigger. To get an idea of its scale, one need only consult figures released in July by the Japan Prefabricated Construction Suppliers and Manufacturers Association, the industry organization. Last year 199,702 prefab houses (which is what industrialized houses are called in Japan) were sold in that country, the highest figure recorded since 1973 at the peak of a housing boom that was subsequently dented by the energy crisis. In 1985 industrialized houses represented 16 percent of the total number of housing starts, the highest percentage on record.

The '60s and early '70s saw hundreds of companies enter the prefab housing industry in Japan. In recent years, the field has thinned considerably. In 1985, the top five companies sold 80 percent of all prefab, single-family houses.

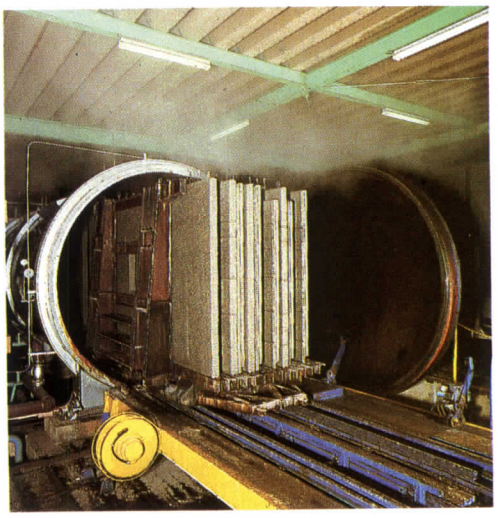
Despite their now-stable positions and the sheer size of their businesses—in volume of sales the top three or four are in the same league as the major Japanese construction companies—the prefab housing companies remain, whether out of choice or necessity, something of outsiders. They do not belong to the Building Contractors Society to which giant, established construction enterprises like Kajima and Takenaka belong, and they take part in activities sponsored by architectural academic circles. Even a band of outsiders can have the odd man out. Misawa Homes is nearly alone among successful prefab housing companies in being based in the Kanto area, the area situated around Tokyo; the others are based in the Kansai region, centered on Osaka. Misawa is also the sole prefab housing producer among the top five that is concentrated in the housing industry; the others are affiliates of large industrial organizations or of a general construction company. This commitment to housing as the primary focus of the corporation is coupled with Misawa's unique reputation for technological innovation and shrewd marketing techniques.

Misawa Homes is the largest producer of prefabricated, single-family houses in Japan, and these days that means in the world. In 1985 it sold nearly 22,000 prefabricated, single-family houses—a figure that represents more than a quarter of the market.

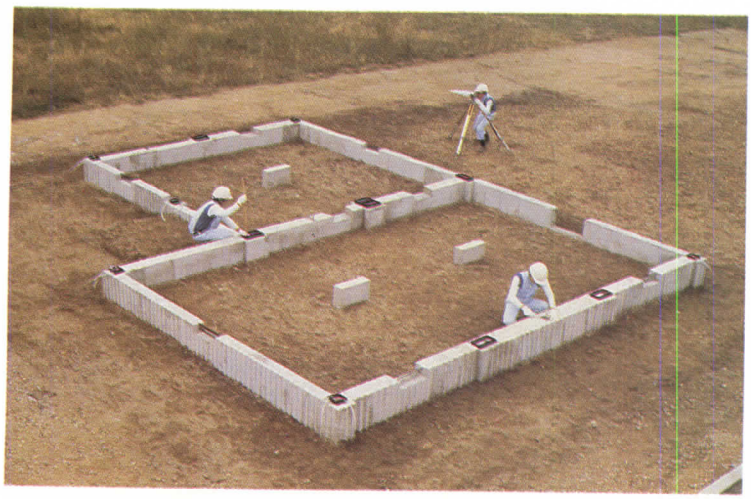
Independent companies share technologies

Misawa Homes is at the center of a network of independent companies. Misawa provides overall management, formulates general marketing strategies, trains personnel, and, through its subsidiary, the Misawa Homes Institute, undertakes research and develops new products. The factories that fabricate building components and the franchises that deliver the houses to consumers at the local or district level are independent entities, although Misawa Homes may have capital invested in them. In that sense, little of what Misawa sells can really be called proprietary—the basic construction technologies it employs are shared throughout the industry.

Misawa Homes developed from a family lumber-supply business in Matsumoto. In the '60s, under its founder, Chiyoji Misawa, it began to market houses made of stressed-skin wooden panels. Yositika Utida, professor emeritus of the University of Tokyo and perhaps the leading expert on building systems in Japan, recalls the furor that these paneled houses caused: "When Misawa began, it appeared to the architectural world as a shocking venture business. Most shocking of all was that Misawa proposed to build using glue, something experienced Japanese architects, engineers, and academics had never thought of doing. Why did Misawa? [Probably because] when



Salespersons at Misawa dealer showrooms, left, help customers adjust standard plans for local regulations and particular locations. The Misawa Expert System simplifies the process of retrieving plans and materials, in turn reducing the experience required on the part of sales staff. Factory, above, produces PALC panels for use in Misawa homes.



Above, conventional poured-in-place concrete footings support prefabricated volumes, which are transported to the site on trucks. Right, local subcontractors, affiliated with Misawa, hoist volumes from truck using a separate crane. Most houses are comprised of seven to ten volumes. The size of each volume is limited by road transportation restrictions.

it began, the average age of the people at Misawa must have been under 25. They were full of youthful energy and knew nothing about the world. They had a daring born of ignorance. That was one of the strengths that contributed to its success."

According to Utida, stressed-skin technology wasn't anything innovative in itself. "The glue for making plywood was already on the market, though it hadn't been used for building houses. In Japan there is a Building Standard Law determining, among other things, the way structural calculations ought to be made. What Misawa did was to ignore such things." By bending the rules slightly, Misawa was able to produce units that were particularly cheap and easy to construct—and they sold well as a result.

Today Misawa uses panels for exterior walls, floors, partitions, and roofing and classifies them according to structure, sheathing, connection, insulation, size, and configuration.

Changes at Misawa's largest panel plant, in Matsumoto, indicate trends in the prefab industry. At first, it was producing small panels but gradually shifted to large panels (up to 3 x 4 meters) to reduce on-site labor. More recently the plant has converted to the production of a range of panel sizes, in sequence and in small runs, to provide "free size" options and reduce inventories. Currently, there are three basic housing models with up to 300 options, requiring up to 400 panel sizes per model.

Misawa's most significant innovation has been the introduction of a noncombustible alternative to its wood panel system. Wood is cheap, but Japan has a long history of major urban fires. In April 1981 Misawa began production of what it called a "new ceramic" product—precast, autoclaved, lightweight ceramic (PALC), made of silica, limestone, water, and additives. These ingredients are mixed into a slurry that is then aerated, poured into molds and, after hardening, autoclaved at a high temperature and pressure (180 degrees centigrade and 10 atmospheres). PALC is fire- and corrosion-resistant and has great compressive strength. It can be molded into differently sized and patterned panels and, because it acquires its shape very quickly, makes production efficient. Although PALC can be used in a variety of structures, it is most economically and most often used as wall panels hung on a rigid steel box frame. Japanese road regulations determine the size of this module, which is 14.8 x 9 x 7.5 feet.

Presently there is one factory in Nagoya producing PALC panels, and PALC houses account for about 10 percent of Misawa houses sold now in Japan. Misawa sees this expanding to 25 percent in four years.

In contrast to the stressed skin panels, PALC was a true technological innovation on Misawa's part, earning the company new respectability. That Misawa spent 13 years and $35 million (of which only $6.6 million came from the Japanese government) indicates the urgency of the company's search for an alternative to wood.

The real innovations are in marketing

James McKellar, director of the Center for Real Estate Development at MIT, notes that any assessment of the Japanese prefab industry must deal with its marketing strategies as well as its innovative technology. Marketing "is every bit as sophisticated, if not more so, as the automated production lines, CAD/CAM systems, and robotic assemblies seen within the Japanese factories," he says.

Of particular interest is Misawa's system of franchises. (National, a competitor, has a limited franchise network, but

ove, workers set volume—complete h doors, windows, interior finishes, and rvices—into place. All of the volumes a house can be positioned in less than lay. Two more weeks of construction e required (for wiring, plumbing, and ish work) before a house is ready for cupancy, right.

odeled on dealers in the automobile industry—"customize" uses to meet the needs of individual consumers and consently assume some of the responsibilities of architects.

The dealers rely on several different methods to attract customers. One is the show house park, in which a number of odel houses are built cheek by jowl, often on expensive downwn sites. In the past, up to 80 percent of sales was generated these parks, but this figure has steadily declined; today the rks account for 30 to 40 percent of sales.

Introductions provided by past customers, contractors, and sociated enterprises have become more important as a means generating business, and today account for about as many es as the show house parks.

Show house parks and introductions are passive approaches that the dealers wait for customers. That sufficed in the '60s d early '70s (the "first golden age" of prefab housing) but day dealers need to be more aggressive. One approach they e taking is called the "roller strategy." Instead of building ow house parks, the dealers use occupied houses in advering campaigns. Before the construction of a house with ow potential, the dealer reaches an understanding with the stomer: In return for certain discounts, the customer allows e dealer to bring possible clients around to the house in the ture. The dealer may install extra features that will make the ouse more attractive. This roller strategy enables the dealer introduce products to a wider audience and to "localize" his pproach, and generated nearly 36 percent of sales in the Tokyo ea last year.

The salespersons at Misawa Homes go through specialized aining, and among the courses they take is one in simple planng techniques. After this, any training in design they receive on the job. In dealing with clients, Misawa's salespersons are xpected to be able to draw simple plans, but any presentation of an elaborate nature is done by the design section of the dealership.

One marketing strategy that Japanese prefab makers, though not Misawa, are initiating involves the use of name architects.

Sekisui House, Misawa Homes' main rival in the field of prefab housing, will be launching at the end of August a campaign to sell houses designed by a number of young, "avant-garde" architects, including Itsuko Hasegawa, Kunihiko Hayakawa, and Toyoo Ito. These architects have designed "general solutions" that have been described as pret-a-porter (i.e. high-class, ready-to-wear) houses, and every time one of his or her designs is used, the architect will receive a "royalty." In addition, the architects have adapted their designs to five adjacent sites in Kamakura for specific clients. (Bringing together well-known architects to do buildings on adjacent sites has been attempted several times before by real-estate developers in Japan but never by prefab housing manufacturers.) Kobori Juken, another maker, has commissioned architect Kan Izue to do a "limited edition" of houses.

Many architects welcome the chance to do prefab design. Hayakawa, for instance, sees this as an opportunity to bridge the gap between architects and the general public.

But Chiyoji Misawa, himself a former architect, takes a generally dim view of name Japanese architects. "Nothing more can be learned from them. We'd like to teach *them* a thing or two." Misawa is willing to concede, however, that there may be things still to be learned from Western architects, and indeed Adele Santos of the Department of Architecture at the University of Pennsylvania has been a consultant for Misawa for three years. Even so, architects play only a small role (as interior designers) in Misawa's vision of the future. The house will be designed by a team of specialists including engineers, sociologists, and medical experts.

According to Misawa, studies show that children who live in

rooms on lower floors are socially more adept—because they can more readily go out and mix with friends—and presumably such findings will be reflected in designs. It is also hoped that eliminating house-related causes of diseases such as respiratory ailments will enable Misawa to boast that "those who live in a Misawa house live longer." Such concerns, which might be characterized as social engineering, motivate Misawa, not avant-garde esthetics.

What role does Misawa hope to play internationally? At the moment, there are various impediments to outright expansion. To correct an egregious imbalance in international trade, Japan is being urged to stimulate its domestic economy and to rely less on exports. Moreover, a strong yen is making Japanese products more expensive abroad. Nevertheless, interest is being shown by numerous parties eager to tap Misawa's know-how. A PALC factory in South Korea will eventually produce panels not only for the Korean market but for franchises in the South Pacific, thereby circumventing the effect of the strong yen. Third-world franchises may conceivably supply Japan in the future. In China, Misawa is building an international foreign community in Beijing, the so-called Guang Ming Freshtown; everything, including PALC panels, will be imported from Japan. There is talk too of a hotel in Kunming and facilities in Tianjin.

As for the United States, many possibilities are being mulled, including licensing, extending franchises, and building factories. Misawa is aware of the differences that exist in the two countries in everything from demography to unions, and is understandably cautious. Tohru Konishi, general manager of the international development division of Misawa, is quick to emphasize that local people understand best local demands, regulations, and culture. Reputable and capable local people, he insists, should be at the center of any cooperative venture with Misawa.

Internationalization is a word in frequent use in Japan to describe the country's more activist stance on the world stage. However, that is only one of a whole set of changing conditions that is affecting Japan and Misawa. Of greater immediate concern is the question of how an industry that was originally geared to produce low-priced houses through mass production can remain competitive as it adapts to a diversifying demand for better quality homes. Misawa's answer is to innovate both its technology and its marketing techniques, and in this it is living up to its reputation.

Misawa appears eager to meet the challenge of these transitional times. In Chiyoji Misawa's view, the last time the Japanese introduced significant changes in the way they build their houses was 400 years ago. Speaking with more than a touch of impatience, quite as if he had personally been kept waiting all those centuries, he says it's about time for a change.

Sweden: Manufacturers Customize Kits of Parts

By Arnold J. Aho, AIA

The roots of Scandinavia's housing industry lie with the Vikings, who carried cargoes of essential wood and precut timbers in their migrations westward to settle the treeless islands of the Faroes, Iceland, and Greenland. By the middle of the 19th century, Swedish factories were prefabricating log houses that were shipped in pieces to distant construction sites. Today, more than 96 percent of all houses built in Sweden are of wood, and 80 percent of these are produced industrially.

The modern manufactured housing industry in Sweden blossomed in the 30 years following World War II, when the population in Scandinavia—and consequently the demand for housing—increased dramatically. Shifts in population centers due to war reparations and migrations due to change from an agrarian to an industrial economy added to housing shortages. As late as the 1970s, the Swedish government established the goal of building one million housing units within 10 years.

Long winters and limited daylight hours make the construction season in Scandinavia very short. Given the number of housing starts, methods to quicken construction became essential. Additionally, a high standard of living, high wage rates, and strong trade unions necessitated efficient labor methods and the elimination of nonproductive time caused by weather, material and supply delays, and construction scheduling.

It was not merely the need to build more units that sparked the development of the Swedish manufactured housing industry, but also the need to improve housing quality. For instance, when the energy crisis of the early 1970s underscored the petroleum dependency of this part of the world, Scandinavians began to demand greater energy efficiency in their dwellings. Energy consumption in Swedish homes was reduced by 29 percent within a 10-year period, in part because of stricter codes based on government-sponsored energy-research programs. Factory-manufactured housing offered the means to achieve quality control of components, manufacturing, and construction methods, not only from an energy-conservation standpoint but also in terms of dimensional tolerances and the quality of

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n organized team approach

rtly encouraged by the service-oriented nature of Swedish ciety, with its concerns for safety, pollution control, and orkplace quality, innovations in industrial equipment and ocesses became available to the manufactured housing indus- y. The most significant breakthrough made in recent years Swedish housing producers, however, was not in hardware fabrication systems, but rather in their recognition of the ulti-disciplinary nature of the housing industry.

The Scandinavians have evolved a procedural system for the sign of manufactured housing that accommodates equally all the parties involved in the building process: architects, searchers, manufacturers, building contractors, financiers, de authorities, and, of course, consumers. In the last 20 years, is joint participation has made new-house ownership easy and tractive for the consumer. Initial unit costs have been lowered d made more predictable by reducing the amount of labor d cutting construction time. Manufactured houses in Sweden st 25- to 40- percent less to build than their site-built con- mporaries. Moreover, most systems available today can be ilt in less than one month, one-fourth the time required for aditional construction. A single house can be fully enclosed one day, with occupancy within two weeks.

Manufactured houses have also demonstrably exceeded the ality found in comparable site-built houses by using higher quality materials and employing careful control, and consumers are assured of this by full guarantees. Financing packages to make home-buying easier, including a government-sponsored mortgage loan guarantee program, have been integrated into the home purchase. Finally, code inspections at the factory simplify building-code compliance for the set of standardized building components.

Under this systemized approach, Swedish houses come as a complete package of *components,* including all exterior and interior finishes, equipment, fixtures, appliances, and built-in furnishings. Because the houses are seen as industrial products, a name and a reputation become affixed to them by brand. In both Finland and Sweden, the general public is as familiar with the brand names of manufactured houses as Americans are with Detroit's cars.

Unlike most industrial products, however, the manufactured house accommodates considerable design flexibility to satisfy individual consumer's requirements, site-specific restrictions, and municipal concerns. The design phase for Scandinavian systems allows the customer to actively participate in developing an indi-

Panels, complete with interior and exterior finishes, can be prefabricated for virtually any style of house. When construction is complete, there is no visible difference between panelized and conventionally constructed houses. Shown is a demonstration model.

vidualized program and design. Thus, the factory produces what is essentially a custom house for a particular buyer using standardized elements and details.

Houses need not be purchased as complete, finished units. For example, the owner might purchase only the exterior shell with the intention of finishing the interior on his own. The manufactured house also allows for future replacement or upgrading of the individual subsystem components or equipment, although some limits are imposed. Small components from different sources may be interchangeable, but most large building components must be obtained from the same manufacturer.

The unit design and building process

A family interested in building a house goes to a storefront sales office featuring a particular brand name. The offices are found in nearly every moderately sized city. The family brings its own thumbnail sketch of a plan, or peruses a standard design catalog, then selects a plan that most closely approximates its needs. At the many offices equipped with CADD, it can call up the plan on a monitor. Any desired changes, such as adding a room, are plugged in, and the family sees the plan change instantly.

Design changes are welcomed and easily accommodated. Approximately 90 percent of the manufactured housing produced is customized to suit a particular family's needs, and architects often figure significantly at this stage. Many of the larger manufacturers' offices retain staff architects and engineers who help customize the house design as part of the sales package. Alternatively, the family may hire a private architect to accompany them to the sales office and act as a design adviser.

Of course, architects also participate in designing the basic plans developed by the manufacturers' offices. It is becoming common practice for architects to form partnerships with manufacturers and financiers as joint owners of manufactured housing shops.

Once the basic plan design is resolved, the computer (or a salesperson) prompts the family through a broad range of choices for the various finishes, fixtures, colors, etc. As these decisions are made, computer screens display the updated co of the house. Then the computer draws a perspective line drawing of the house; some manufacturers even produce a computer-drawn, full-color perspective rendering.

Thus, the family leaves the sales office with completely tailored plans, knowing exactly what the house will cost. The purchasers also have all the documents necessary to secure mortgage approvals, because the lender knows that the manufactured house meets all code and specification requirements based on prior approval of components.

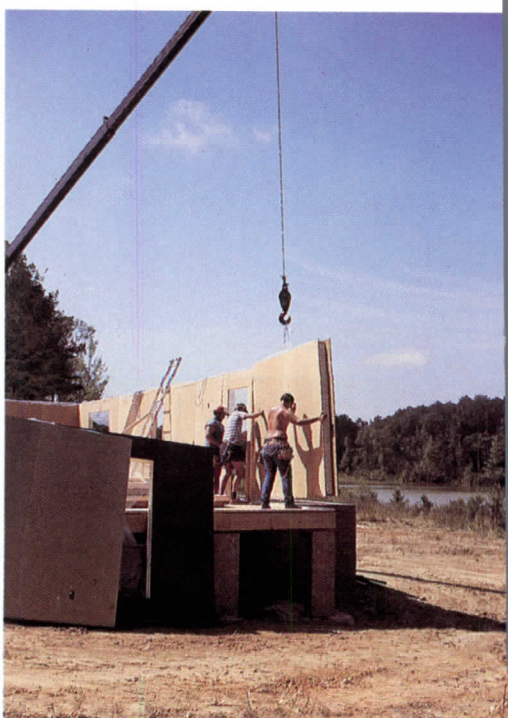
There are three basic types of housing systems used extensively in Scandinavian countries.

The *modular volume* system consists of a room, or series of rooms, completely fabricated at the factory and shipped to th construction site. The only on-site work consists of providing foundation (often quite minimal) and connecting the utility serv ices. Modular volumes make the most sense on remote sites o in areas where skilled trades are not readily available.

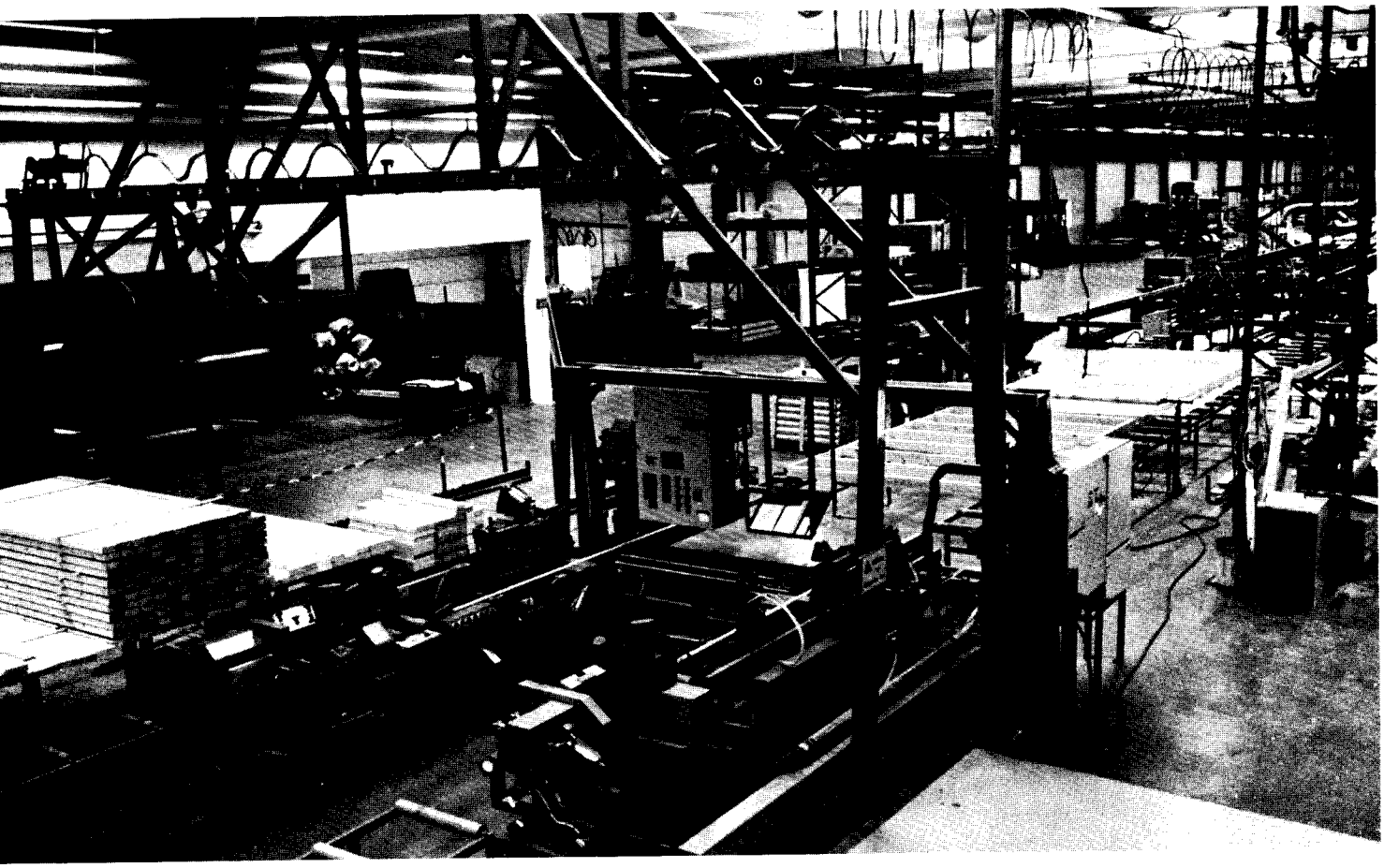
The major drawbacks to the volume system are the dimensional restrictions for transporting the units and the need for a high-capacity crane to hoist them onto their foundations. The size of the units makes long-distance shipping (such as for export) impractical.

The *large panel* system, currently the most popular system

Site erection is usually performed by a factory-licensed contrac tor, although a number of manufacturers offer their own erection crews. The house is delivered to the site in one or two crane-trucks, with the driver/crane operator unloading the sequential packages and positioning the panel elements.



Photographs by Arnold J. Aho, AIA



Scandinavia, consists of entire wall or partition-sized panels, well as composite floor and roof panels or trusses. The wall nels are full-wall height and usually exceed four feet in length. ıe panels include windows and doors already installed and terior and interior finishes.

Polyethylene film protects the interior finishes on the walls ring transportation and placing. The film is then pulled up ɔm the bottom and secured to form the vapor barrier on the ilings. Plastic electrical conduits and plumbing lines run ward through the panels; they are usually connected in the ic space. Bolts structurally integrate all the panels.

Construction of the panels is very similar to standard wood ud construction, except that the studs are equivalent to two- -sixes in size. With the addition of 2x2 horizontal furring on e outside of the studs, the exterior wall panels can accom- odate eight inches of insulation, with very little through-wall ood to serve as a thermal short-circuit.

Though wood stud construction is the most frequently nployed for panel fabrication, several Scandinavian manufac- rers are now working with urethane foam-core panels or other ɔmposite-material sandwich panels.

The advantages of the large panel system include the high lerances and precise fitting of all system components. Joints e kept to a minimum. The major drawback is the need for a ng-reach, fine-control crane. Most large-panel manufacturers eliver the house to the site on trucks equipped with this type f crane. The driver, who is also an experienced crane opera- r, then stays on the site to place the panels. The entire eather-tight shell is erected in one or two days, and the

Manufacturers say they are capable of precise methods of joinery and fabrication not attainable in the field and claim to waste less than four-tenths of 1 percent of raw material.

remaining work can be completed within approximately 11 days. Most houses exported from Scandinavia today employ the large-panel system.

The third type of system in use is the *small panel* system, consisting of modular panels approximately four feet by eight feet in size. The interchangeability of solid wall panels, window panels, door panels, and other stock units permits some modifications during construction. The panels can be erected with no specialized equipment by three people, typically a carpenter, a plumber, and an electrician. From the foundations up, the entire process can take as little as 11 days to occupancy. This system, in which the panels can be delivered prepainted, prepapered, and fully finished, clearly has potential to be owner-built. Panels are usually of wood stud construction with various sheet materials, such as plywood, laminated to the exterior and/or interior.

Similarities between Scandinavia and the United States, in terms of climate, population density, and, most importantly, the need to produce lower-cost and higher quality housing, make this country fertile ground for the seeds of a manufactured housing industry. Whether Swedish companies develop a viable market in the United States or American companies emerge to fill this need remains to be seen. But there's little reason to believe that, in one form or another, Scandinavian technologies will stay out of the United States for long.

United States: Agreements Among Competitors Could Make Houses Smart

By Karen Haas Smith

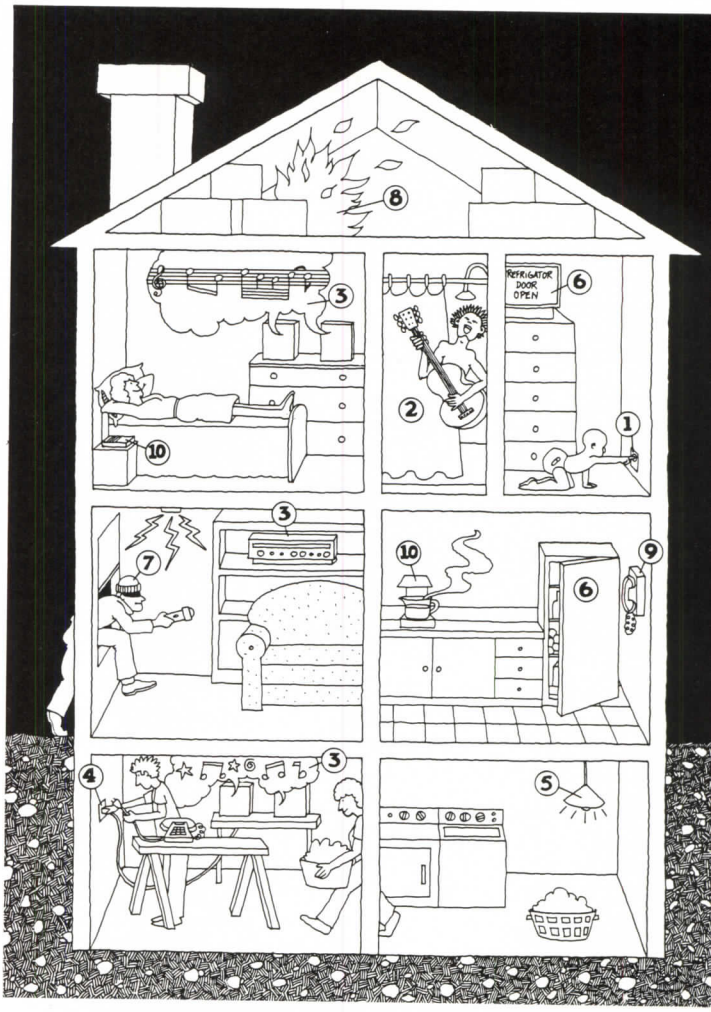
Change comes slowly to the U.S. housing market. Like television programming, most housing is designed around some market researcher's idea of what people like. The basic product hardly ever changes—few builders are willing to compound the inherent risk in the housing market by offering a truly innovative product. Instead, they offer competitive amenities: the icing on the cake. One year it's hot tubs; the next year it's decks and greenhouses.

If the National Association of Home Builders' Research Foundation has its way, within five years new American homes will feature a more fundamental improvement: a "smart-house" wiring system that provides integrated control and communication between various home appliances and equipment. To that end, NAHB/RF is encouraging American manufacturers to pool R&D efforts to establish a new standard wiring interconnection method and data communications protocol that will enable the manufacturers to create products that work together in a modularized electrical/electronic network. The concept offers the potential for coordinating the technical developments necessary for real improvement of residential wiring systems, without undermining the incentive offered by the open marketplace.

Builders think the "smart house" is a great marketing idea. Smart-house gadgets would be available only in houses specially wired for them, creating an incentive for purchase of newly constructed houses. Of course, the consumer will be captivated by the new gadgets; but more importantly, the smart house actually represents a significant improvement in home wiring—safer, more advanced, and less expensive home electrical, electronics, and communication systems. Despite the potential, however, it's not yet clear how many manufacturers will be willing to take the plunge and sign licensing and royalty agreements.

The heart of the smart house is integrated wiring, which is not a new idea. Readers may be familiar with Brand Rex Cable, which is also known by the tradename of "Tri-Con." Tri-Con is an integrated wiring product manufactured by Brintec Corporation; it combines one wire for power, a twisted pair for communications (one for digital and one for analog), and a coaxial cable for audio-visual signals into a single bundle. The benefits are a reduction in wiring clutter and labor expense—you drill one hole and string one cable. The smart-house system would use a similar integrated cable. Brintec has signed up to manufacture it.

David McFadyen, president of NAHB/RF and the inspiration behind the foundation's smart-house project, aims to take integrated wiring a step further, producing a system that connects every electrical and electronic device in the house to a local area communications network. In the smart house, the electrical outlets in each room will have both power prongs and con-



Some of the features NAHB/RF proposes as part of the ideal smart house: 1. A chip in each smart-house device identifies what is being plugged into any outlet, the amount of current needed for its operation, and whether it is "authorized" to receive current. 2. The smart-house can be instructed not to apply power to an electric guitar plugged into a bathroom outlet. 3. Stereo speakers can be plugged into any outlet without additional wiring. 4. Any smart-house device can operate in any outlet; the stereo speaker and the telephone plug into the same outlet. 5. Lights can turn off automatically when a person leaves the room. 6. A centrally located video display tells when the refrigerator is left open, the door is unlocked, etc. 7. Sensors activate alarms when intruders enter, but pets won't set them off. 8. Sensors detect smoke and fire, as well as regulate temperature. 9. The user can control the system remotely by telephone. 10. All devices receive instruction from a central pane

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s for communications. Separate gas appliance outlets will provided so that gas equipment can also be hooked into the art-house communications network.

A centralized controller will distribute electrical current as ded—to monitor energy use, control each device according pre-programmed instructions, and alert the homeowner to lfunctions (see "How the Smart House System Works," page).

The possible uses of this integrated electrical/electronic/ mmunications network are endless. In the morning, the heat- or airconditioning and hot water could be programmed to tch on automatically a half-hour before the wake-up alarm s off. Coffee would start perking, and a favorite radio or evision program would turn on. The homeowner could pro- m the clothes washer to send a message across the television een when it finishes a cycle. He or she could call home from office and tell the oven to begin cooking the roast. The nily could program the house to "act alive" while they are ay on vacation and to notify someone if something goes ong. And so on.

Of course it is already possible to custom design an integrated ring and control system to regulate the electrical and elec- nic devices in a home. Such systems can turn devices on and at preprogrammed hours. The smart-house system would fer in two important ways: First, the wiring and the inter- nnections would be standardized and modularized, eliminat- the need for custom design and enabling the homeowner add new devices to the system as needed. But the really volutionary difference is that the devices manufactured for e smart-house system will be able to "talk back" to the con- ller. For example, a smart oven will tell the controller its nperature and which stove-top burners are lit—not just ether it is turned on or off.

Silicon chips in the appliances and home equipment would linked to programmable switching devices in the controller. itially, NAHB/RF says, the switching devices may be elec- magnetic, but as soon as less expensive semiconductors are ailable, they will be used.) All of the components would be le to interact, since all would function with a uniform com- unications "protocol" (computer language).

lenty of consumer appeal

ch a system would unquestionably appeal to American con- mers, conditioned as they are to competitive consumption of e latest high-tech gadgets. The last decade alone has brought icrowave ovens, personal computers, food processors, and deo cassette recorders into most middle-class homes. The fact at the smart-house system also represents a dramatic improve- ent in the quality of home wiring and offers the potential for gnificantly improving home safety, security, and energy effi- ency are not likely to be its strongest selling points. If the ice is right, Americans will buy a refrigerator that "talks" and lighting system that "sees."

Centralized controllers can actually reduce the complexity nd cost of home appliances. For example, a smart-house wash- g machine could operate on a DC motor, which is simpler an existing AC motors and potentially less expensive. The ansmissions that put conventional washing machines through eir various speed cycles could be eliminated; so could the timer. By controlling the amount and type of current flowing to the appliance and programming timing operations, the central controller would replace the functions of many components.

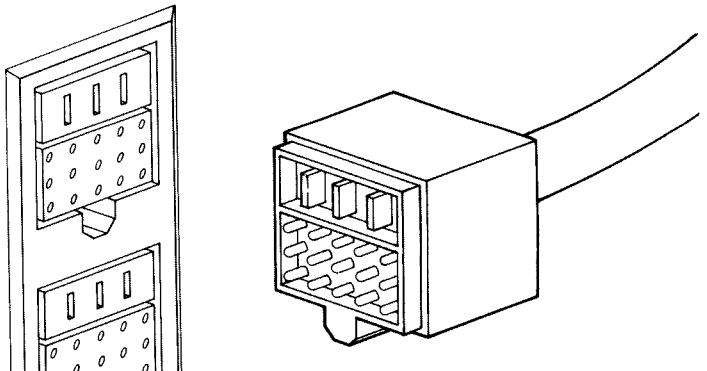
But how much would the smart house cost? NAHB/RF estimates the wiring systems and controllers would add 30 percent to the $2,000 to $5,000 cost of installing conventional wiring in a new house. That's not a prohibitive price for a technology offering appealing amenities, with the chance to save lots of money on heating, cooling, hot water, and electricity bills. The vastly improved quality of the wiring also helps minimize lightning and shock hazards, and the controllers provide a more even supply of electrical current to sensitive electronic equipment such as home computers.

What family would want to get rid of all their existing appliances just because they've bought a new house? Again, good news. Adapters would be available for conventional devices so they could be operated on the smart-house wiring system. They would operate just as they do in a conventional house but could not link into the communications system. They would not have the all-important silicon chip.

Will the smart-house concept really fly?

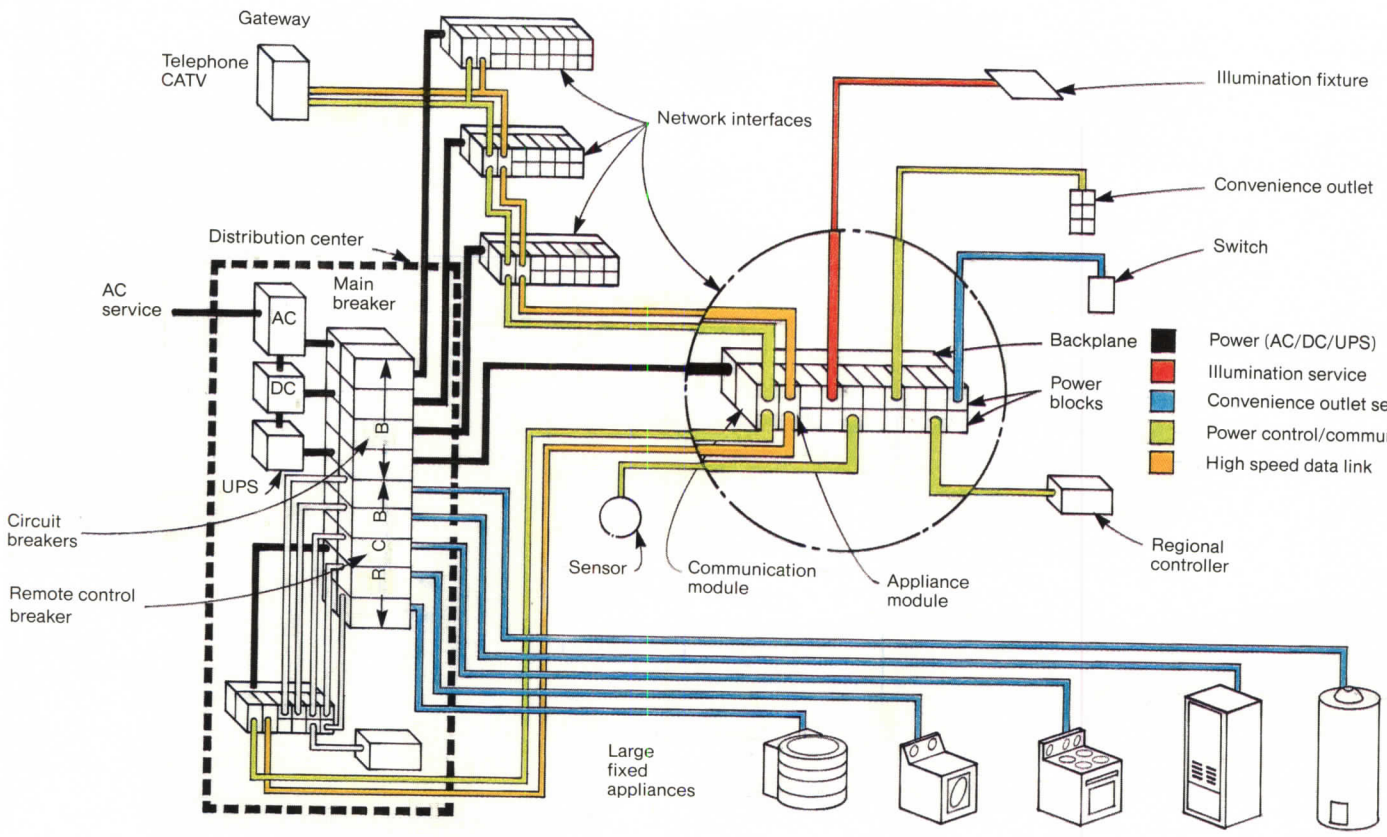
NAHB/RF plans to have smart-house products commercially available by late 1988 so that architects can begin specifying the products in houses that are on the drawing boards early that year. But even if the smart-house project doesn't fly—or doesn't fly that fast—all the concepts are based on existing technology, and clever designers can integrate the functioning of many electrical and electronic systems in the house right now. You can't yet specify kitchen appliances that "communicate," but you can integrate a variety of sensors, timers, and programming devices with existing HVAC equipment, security systems, and various appliances.

Energy efficiency is one of the potential benefits of smart-house technology. Setting back thermostats for nighttime and when the house is unoccupied is an obvious way to save energy. Programmable HVAC and lighting systems combined with occu-



A new kind of plug is the key to NAHB/RF's smart-house project. The integrated wiring system will accommodate power, interactive communications, and audiovideo signals.

How the Smart-House System Works



Smart houses will use a closed loop power distribution system. Outlets will not be energized until an appliance is plugged in and "requests" power from the controller (this feature not only saves energy but helps reduce the risk of electrical shock). Using a low (12 volt) signal, the "smart" device will tell the controller how much power is needed, specifying a minimum and a maximum rate of flow of electric current or gas (for example, 120 volts AC at 5 amperes). Conventional appliances will be equipped with adapters that request the usual amount of energy. The power will shut off automatically if the flow falls outside the nominal ranges.

Electricity entering a smart house will flow first to a power-conditioning module that will even out the voltage flow. Power will then be distributed as requested in the following forms:

• *120/240-volt alternating current (VAC).* This is conventional electrical power, except that the current flow is monitored by the closed-loop circuitry. The use of 240 VAC is limited to selected fixed appliances connected to dedicated circuits.

• *48-volt direct current (VDC or "utility power").* DC motors are becoming more popular in appliances because of their greater efficiency, resulting smaller size, greater versatility in speed control, and reduced noise. Most electronic equipment functions on DC power, which is safer at this voltage than conventional 120 VAC.

• *12-volt direct current.* This supply will be used primarily to power smart-house control electronics and sensors. It will be delivered from an uninterruptible power source.

• *Phase-fired 120-volt alternating current.* This is available primarily for controlling lighting levels.

The controller will also be able to handle signals from sensors that detect specific odors, smoke, heat, sound, light, or motion. Those applications become particularly significant when combined with the smart houses' ability to handle audio and video signals. These signals include telephone voice and data communications, sound and image distribution, as well as interactive cable TV.

Eventually, smart-house systems would include speech recognition and synthetic speech generation—so the house can talk. Although that sounds silly, it's a feature that can be of real benefit to the elderly and disabled. For example, if motion detectors sense no movements for a specified period of time, speakers could ask the occupant if he/she is all right. If there were no response, the system could call for help.

Though participants have agreed on this overall system design, the component details have not yet been worked out, according to Tim Ballard, an architect and engineer working on the NAHB/RI staff. For example, the controller hasn't been designed: the decision whether to use electromechanical relays or semiconductors is yet to be made. "A lot of people are going to have to spend a lot of time hashing out the details of the interconnections," Ballard says. "Coordinating the designs of products from a lot of different companies is difficult."

Everyone agrees that it's imperative that the programming devices be "user friendly," so that even the computer-shy will feel comfortable using the smart

ıcy sensors make zoned heating and cooling an attractive ion. Space conditioning would be provided only to the areas ere it is needed, and only when needed. Photosensors and ımable ballasts would make it possible to reduce lighting lev- in occupied rooms to the exact levels needed to supplement ural daylight. Combining other energy-saving technologies h as passive solar design with automatically controlled con- ıtional HVAC back-up would further increase energy savings. Business, not technology, is the major practical barrier to de- opment of NAHB/RF's smart house. One major hurdle was ercome in October 1984 when the National Cooperative search Act was passed, eliminating possible antitrust barri- to the cooperative development efforts necessary to bring smart house to life.

Another big problem was solved in December 1985 with proval of changes in the National Electrical Code (NEC). The 87 editing of the NEC will permit home use of these innova- e wiring systems.

But the big question is whether large-volume home appliance d home equipment manufacturers will commit the necessary sources to development and production of smart-house prod- ts. NAHB/RF's smart-house project was the first consortium rmed under the 1984 legislation. Current lists indicate 38 com- nies are participating in the smart-house project, including ch major firms as AT&T, Carrier, General Electric, Honey- ll, Lennox, North American Philips, and Whirlpool. These mpanies paid a fee to join the project and have contributed gineering and management talent to a series of meetings over e last two years that has hammered out the basic design of e smart-house system.

But now it's time for commitment. This fall, NAHB/RF is king companies to join a limited partnership, Smart House evelopment Venture, and to sign product licensing agreements bligating them to develop specific products on a stated sched- e. Each company will fund its own development costs, and ust pay royalties back to the limited partnership, which will nd overall system design and coordination by NAHB/RF. The al is to have the system components available by late 1988.

At this writing, only two companies have signed up: Lennox, hich will manufacture gas and electric furnaces and electric eat pumps; and Brintec, the integrated-cable manufacturer. ennox president John W. Norris Jr. says, "We envision the vailability of smart-house heating and cooling systems provid- ıg not only the ultimate in house comfort but also in energy ıanagement. They will require less maintenance, offer remote nd automatic diagnostic capabilities, and will accommodate ıultiple-zone installations easily and affordably."

But a more typical viewpoint is expressed by Whirlpool spokes- oman Carol Sizer, who said the appliance manufacturer was eriously considering signing on, but the decision would depend n the results of market research currently under way. "We an't tell whether there is a market for this, or for which prod- cts, until the research is completed," Sizer says. Whirlpool's esults are not expected until early 1987.

"There is a lot of opposition to this," admits George Graeber, resident of the Electronic and Industrial Cable Group at the Brand Rex Cable Division of Brintec. "The opposition is related o the form of the licensing documents.... Some big companies ıave policies against technology licensing and royalties. If this loesn't fly it will be because there were too many lawyers in- olved—not because it wasn't a good idea." □

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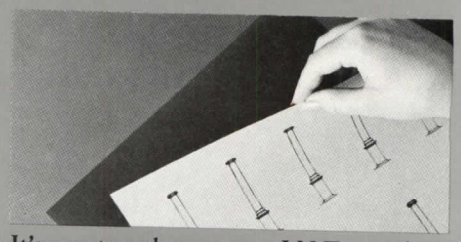

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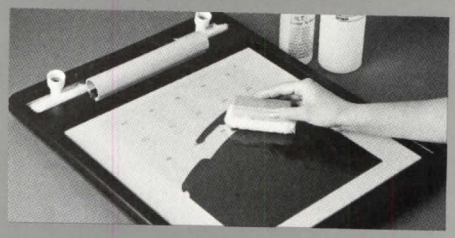

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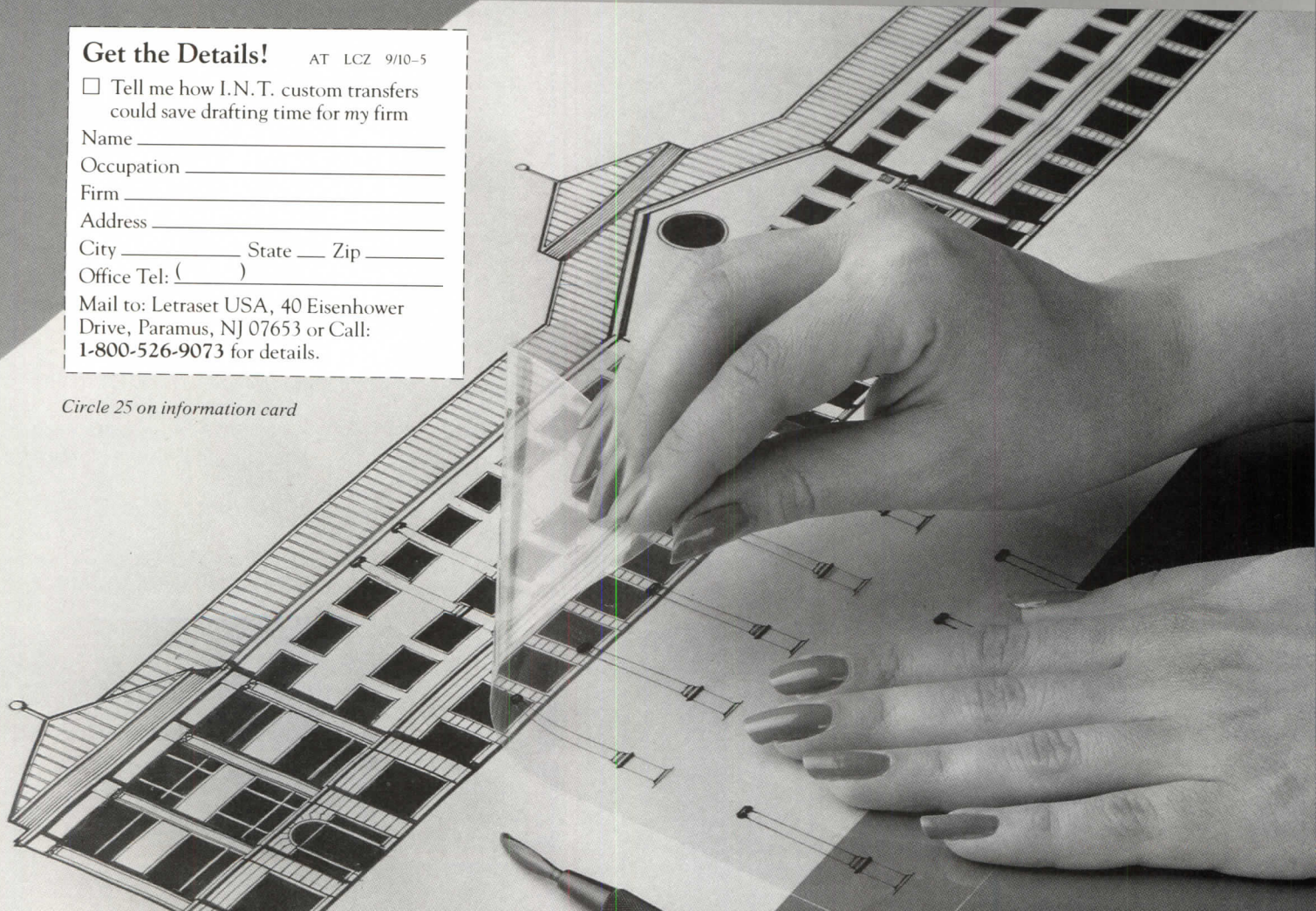

Design/Build Methods Mature

lease of new AIA documents reflects steady rise in the use of this delivery process

Christopher Wist

Despite its increasing acceptance in recent years, design/build still sparks heated debate among architects. Advocates claim that it helps control costs, increases efficiency, d promotes accountability within the construction industry. tractors maintain that it raises serious and as yet unresolved al and ethical problems. Both sides agree, however, that sign/build as a project delivery method represents a signifint departure from the way in which American architects, ners, and contractors have structured their legal relationships most of this century.

In the conventional project delivery method, an owner ters into two separate contracts: a design contract with the chitect and a construction contract with the contractor. For ners, the alternative concept of "single-point responsibility" hiring one entity to be responsible for both design and conuction—holds great appeal in terms of perceived economies, eed, and flexibility.

From the architect's standpoint, the design/build debate volves around the question of whether anyone with a ancial stake in the construction of a project can serve the terest of the owner above his or her own. The roots of this scussion predate the founding of AIA when, in the early 19th ntury, architects were engaged in fierce competition for ents with design/builders who called themselves "package alers." Like their modern-day counterparts, package dealers ovided both design and construction services to owners.

To create a legitimate distinction between themselves and ckage dealers, architects adopted a system of professional hical principles that, among other things, placed the client's terests above those of the architect. Not surprisingly, the andards also prohibited architects from acting or holding emselves out as design/builders. This prohibition was carried er into AIA's mandatory code of ethics and was not seriously uestioned for more than a century thereafter.

By the 1970s, however, dissenting voices from both inside and utside the profession began to argue that the ethical prohibion against design/build was an anachronism. AIA in 1978 uthorized a three-year trial period during which members ould be permitted to engage in design/build work. Before the xperiment was completed, however, antitrust questions encourged AIA to drop its mandatory code of ethics (including its rohibition of design/build) in favor of a purely voluntary statent of ethical principles. In 1986, the AIA again adopted a andatory code of ethics. The new code does not prohibit esign/build, but nonetheless targets it as a *potential* conflict f interest. Many insist design/build violates professional ethics.

"We think that [design/build] is bad for [AIA] and for the public," says Barbara Rodriguez, executive director for the New York State Association of Architects. "I just read an editorial in the New York *Times* expressing concern over the fact that so many physicians in America are now employees of health-care organizations rather than independent professionals. The author was worried that these doctors might put their employers' interests above those of their patients. Substitute the word 'architect' for 'doctor' and 'client' for 'patient,' and you have the principal argument against design/build in a nutshell."

Norman Coplan, legal counsel to the New York State Association of Architects, agrees. "Design/build is conducive to a diminution of the architect's obligation to the public," he says. "Architects can no longer exercise their unfettered judgment to promote the public's safety, but must keep within the economic confines imposed by their employers."

Design/build's proponents, on the other hand, deny this charge. "The quality of materials specified depends on whether or not it's a 'high-image' building," says Thomas W. McInerney, chief of architectural productions for the Mt. Pleasant, Ill., office of the Opus Corporation, an 800-person design/build firm headquartered in Minneapolis with $200,000,000 worth of construction to its credit in 1985. "The owner is given a range of choices that fit within his budget, and he will often make the final decision." McInerney adds, "Design/build has opened up new opportunities for architects [and] added a different dimension to my career growth. I've really been enjoying myself."

Perhaps the most attractive (and most controversial) claim made about design/build is that it is a less expensive process than the conventional project delivery method. According to Richard Wilberg, marketing director for Opus, a given project can almost always be built at a lower cost using design/build.

Even some of design/build's detractors, such as Rodriguez, concede that design/build "may possibly" offer some savings in cost. Other critics, however, are not as charitable. In testimony before an Indiana state construction committee, Jesse Jones, president of Glenroy Construction, a 400-person company based in Indianapolis, stated that design/build is not less expensive than the conventional approach to construction. According to Jones, "There's no free lunch, and if you've got five [architects] out there doing designs, sooner or later, they're going to get paid for it, or they're not going to participate."

As to the question of time savings, however, few will deny that the streamlined, single-point-of-responsibility organizational structure of design/build gives the design/builder far greater control over the entire design and construction process, therefore increasing the potential for completing the project in less time than the conventional approach.

Christopher Wist is director of legal research for AIA's documents program.

Contracts define the architect's role

As far as owners are concerned, ultimate responsibility for *all* aspects of a design/build project rest with only *one* entity. However, within the design/build team, players may divide responsibility in a number of ways. Different contract agreements define the role that architects play in the process. Many variations within the basic framework are possible, for example:

- The design/builder may be an individual or corporation that obtains design and construction services from architects and contractors who are in its direct employ;
- Design/build arrangements may take the form of partnerships or joint ventures, such as between an architect and a builder;
- The design/builder may be an autonomous entity that parcels out the tasks of design and construction to independent architects and contractors, much as an owner does under the traditional project delivery method;
- Architects or contractors may act as the design/builders, and obtain from other sources those services they cannot personally provide.

A variation on the basic design/build process is called design/build/bid. Design/build/bid involves several design/builders competing for the contract to build a single project. Competitors typically prepare proposals based on a set of preliminary criteria prepared by the owner, who normally employs a separate architect to develop scope drawings and outline specifications. Insofar as several design/builders are in direct bid competition, design/build/bid closely resembles the conventional method of project delivery.

To help architects structure these various agreements, regardless of the form, AIA in 1978 initiated an intensive effort to develop standard contract forms for design/build. This effort culminated in the publication of AIA's family of design/build documents (AIA documents A191, A491, and B901) in 1985.

The basic AIA design/build document, A191, is intended for use between the owner and the design/builder. The other two documents are intended for use by the design/builder and third parties: A491 is for construction services, and B901 is for architectural services.

Robert Paul Dean, AIA, a member of the Institute's documents committee who helped write the trio of documents, explains: "Each of the three design/build documents comprises two agreements, intended for sequential execution. The part one agreement in each case roughly encompasses the traditional phases of programming, schematic design, and design development. The part two agreement generally parallels the traditional phases of construction document preparation and actual construction. The two agreements acknowledge that preliminary services might result in a decision not to proceed. In that event, the parties might conclude their contractual relationship without executing Part Two. In other circumstances, the parties might use Part Two without ever having entered into Part One."

A key feature of AIA's design/build documents is that they do *not* create any professional relationship between the owner and architect, unless the architect is a principal of the design/build organization. Both documents A191 and B901 provide that: "Nothing contained in the design/build contract documents shall create a professional obligation or contractual relationship between the owner and any third party."

This feature represents a dramatic departure from the architect's fiduciary duties of loyalty, trust, and openness inherent in the conventional project delivery method, through which th architect constantly advises the owner concerning the projec In purely legal terms, the owner-architect relationship in design build can best be characterized as an "arm's-length business re tionship," similar to that existing between a merchant and his or her customer. Architects involved in design/build, howeve flatly deny that their relationship with owners is more distant. Stephan Bricker, AIA, vice president of the design/build firm Arbor Health Care Inc., states that "the relationship between architect and client is, if anything, closer in design/build than in a traditional practice. You're more involved with the client in all aspects of the project, from site preparation to providing furnishings."

Others believe that owners involved in design/build project are less interested in specifics than those working with conven tional project delivery methods. According to Richard Wilberg owners in simpler design/build projects often play a minimal role in the process, at least after the construction has begun i earnest. Norman Coplan speculates that this may be because the design/build owner is primarily interested in purchasing a usable "finished product" and is not particularly concerned wit the interim steps needed to create it.

Will design/build work for you?

In the final analysis, the question of whether design/build is the right approach for a given firm or project depends upon a multiplicity of factors. In addition to choosing among the various contractual agreements that a design/build project may take, individual architects and firms should consider the following:

- *Insurance:* Ten years ago there was a serious question about whether the insurance industry would be able to underwrite pol icies for architects practicing design/build. In part, these fears have proved to be unfounded. Professional liability coverage is generally available for architects who work on design/build projects. This insurance, however, is typically limited by exclusionary language stating that coverage does not extend to an "equity interest" that the architect may have in the design/build entity. Thus, all things being equal, an independent architect who is hired by a design/builder as a consultant (but not as an employee) should have no more trouble obtaining insurance than an architect practicing in the traditional manner. An architect who enters into a design/build contract in a role other than consultant, however, faces the potential loss of any investment made in the design/build entity, even though he or she will still be insured for professional liability. Architects contemplating entry into the design/build field should first consult with a reputable insurance counselor.
- *Internal Practice Management:* Some architects involved in design/build have noted that a "natural division" exists between the design and construction departments of their firms. Often, such departments will keep their own separate books and records. In some cases, it has even been found desirable to maintain separate payrolls within the same firm. Some architects in design/build firms have experienced difficulty in working with a partner who is not a design professional and who does not fully appreciate the intricacies and demands of the design function.

ilders from using certain business arrangements, although the ohibition is not usually phrased in explicit terms. For exam-e, certain states bar some forms of corporations from prac-cing architecture. In those states, a design/build corporation ust hire an independent architect-consultant to provide design rvices, even if it has several registered architects on its pay-ll. Other considerations, such as partnership liability, may also fluence the choice of business format.

Licensing: Design services under a design/build contract ould be provided by a registered design professional licensed the state of the project. Moreover, some states, including ew York, prohibit architects from rendering services to an wner through an intermediary. (Of course, when the architect a principal of the design/build entity, there is no intermedi-y between the architect and the owner.) On the other hand, ecause of business and insurance reasons, architects may want shield their practice by creating a separate design/build rganization.

Warranties: The design/builder usually makes warranty-like epresentations concerning the overall quality of the completed uilding. Generally, such warranties are not made by archi-cts or contractors in the traditional project delivery method; he *owner* is responsible for the sufficiency of the drawings and design to suit his or her particular purposes. In design/build, however, the owner will often provide the design/builder with little more than a basic program, and then will rely upon the design/build firm to come up with a project that meets it. In effect, as a design/builder an architect sells a "finished product"—and a promise that the product will meet the owner's stated purposes.

In the end, design/build, responsibly performed, offers three major benefits to architects: greater control of the execution of the design; fewer cash flow fluctuation problems; and, according to Bricker, a greater incidence of repeat customers. Two major disadvantages are greater liability as the result of greater control and a greater amount of up-front capital needed to acquire heavy construction equipment and to sustain a work force, unless a design/build firm is formed by an architecture firm and a contractor joining forces.

Only time will tell if design/build is just a passing phenomenon or a permanent addition to the American construction industry scene. What is certain, however, is that design/build is finally attracting the interest that its proponents have long argued it deserves. Its future development merits the continued attention of individuals with a serious interest in the evolution of architectural practice. □

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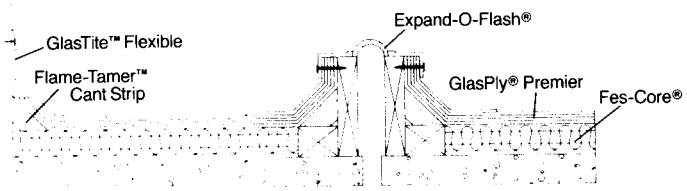

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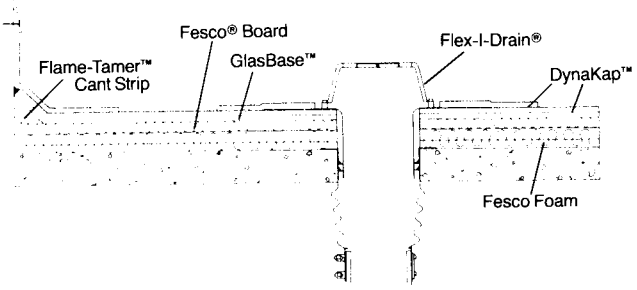

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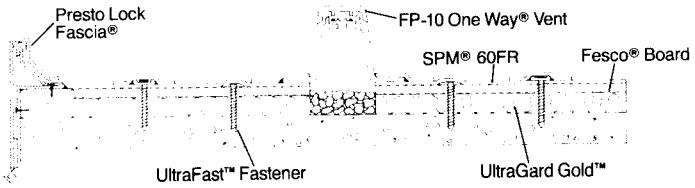
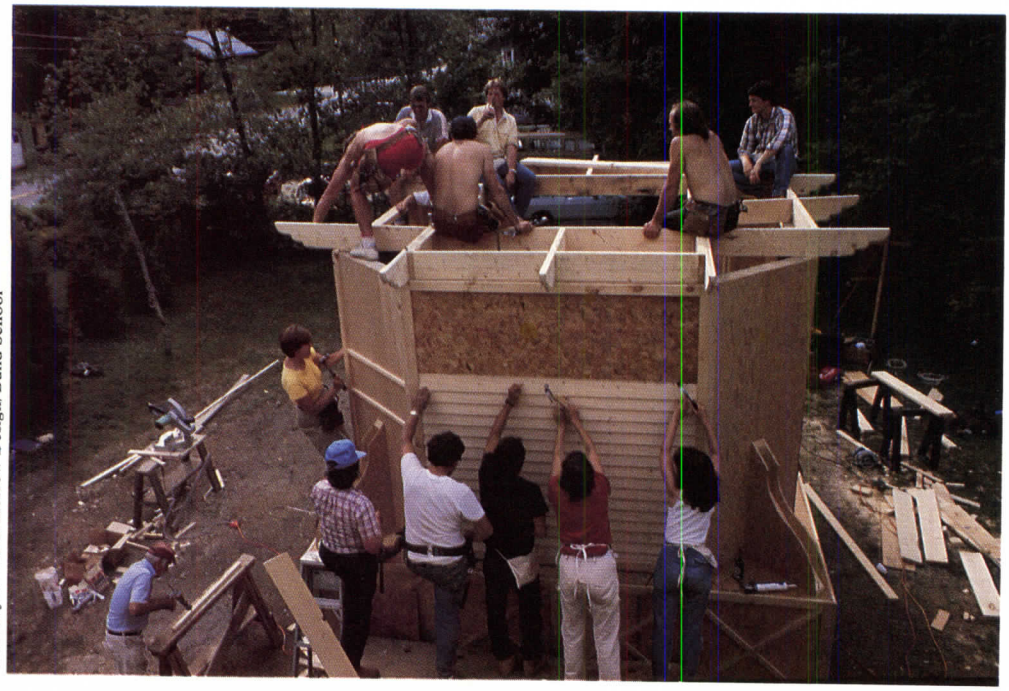


Home is Where the Art Is

Architects turn owner-homebuilders on to architecture
By Michael J. Crosbie



Courtesy of Yestermorrow Design/Build School

In 1985, according to the U.S. Census Bureau, approximately 168,000 single-family houses were built by their owners—enough dwellings to house the population of Pittsburgh. Each year, owner-builders produce between 15 and 20 percent of all the single-family houses built. Economy motivates most owner-builders, who can save as much as a fifth of the cost of a new house by purchasing materials and coordinating construction. Those who swing their own hammers can save even more.

Whether they personally build or act as contractor, most owner-builders want to design their own houses. In comparison to the information available for learning how to build a house (which can be found in books, magazines, and on television), information on designing a house is scant and most owner-builders resort to stock plans. Owner-builders thus represent a segment of housing producers who could benefit from the services of architects, and through which architects could have a greater impact on housing design. Fees for conventional design services, however, are beyond the economic reach of owner-builders who are looking to cut housing costs.

A unique and illuminating resource for owner-builders hoping for a more personalized design than a stock plan, and an

design of houses for middle America, is the Yestermorrow design/build school in Warren, Vt. The school, which was started by John Connell, a practicing architect interested in building, began instruction in 1980. Currently there are about 40 owner-builder schools around the country where people can learn hands-on building construction. Connell explains that most schools concentrate on a specific construction method—such as platform framing or post-and-beam—with little or no emphasis on the design of the house. In contrast, Yestermorrow's instruction, in the form of a two-week course, focuses on design, guiding the student in producing a workable floor plan that responds to his or her life style. Concurrent with design studio instruction is hands-on experience with building, so that students can begin to make some connections between how the design of a house affects its construction and the quality of its finishes.

Typically, there are 15 students in a class, which is taught by a licensed architect. The students are from a variety of backgrounds and age groups. Many are initially drawn to the school to learn about building rather than design. "I wasn't anticipating a strong emphasis on design," says Byrne DeGrandpre, a college instructor from Plattsburgh, N.Y., who took the course this summer. "Design and architecture were pretty much outside my realm of experience, and I didn't know what the point of it was." DeGrandpre came to the school with a stock plan, which he proceeded to redesign during studio. "I learned about designing a house as a way of self expression. The course prompted us to think more about the way we want to live and how we use space, and less about how others people think spaces in houses should be used."

With an understanding of the importance of design generally comes an awareness that, through design, a house and one's way of living can dovetail. Says Kathy Meyer, an architect who has taught at the school for six years, "Most people don't realize that they can have control over the quality of the spaces they live in. They don't know their options. I'm there to give them an idea of what their options might be." Connell points out that "for a lot of people it's a luxury to ask, 'How do I want

xt question that pops up is 'Who am I?' You begin to realize o you are through the design of your house."

Although each course (there were five offered last summer) ies according to the instructor, usually there are introduc- y exercises on visualizing spaces, how to represent and plore design ideas in models and drawings, and how plans, ctions, and elevations interrelate. "Drawing and model mak- was definitely scary," explains DeGrandpre. "As with y new piece of information you feel uncomfortable with because it's new." Sylvia Smith, a New York City architect o has taught the course for two years, says that a lot of time devoted to helping students become familiar with the repre- ntational tools of architecture. "They all come in and say they n't draw," comments Smith, "and they're trying to draw with ball-point pen on rough paper. You have to put soft pencils their hands and some tracing paper and tell them to take risks d have fun with it. We give them a set of skills that they can e and reuse and try to get them over their fear of making stakes." For some students models are the best tools for visu- zing the spaces they are designing. Martin Gehner, associate an of architecture at Yale who has taught a class for two years, ys that "the most important thing is that a student starts build- g a model. In some cases models are faster than drawings cause they can show a lot of things that it would take many etches to reveal."

anslating the architect's language

nother hurdle for both students and teachers to clear is chitectural language—the way architects talk about their dis- pline that is not readily understood by lay people. "The first ar, I think, I was being too abstract and using a lot of archi- ctural jargon," says Smith. "If an abstract word comes into y mind, I try to shift gears quickly and think, 'How would I xplain this to my mother?'" Several students remark that the structor's ability to translate design ideas into simple Eng- h makes them feel that architecture is accessible to them; ey aren't intimidated by it. "Sometimes Martin would get into esign theory or structure that for some was a bit over their eads," says student Edward Bunce, a manufacturing supervi- or from Rochester, N.Y., and an engineer by training. "He was ery willing to stop and go back, or slow down, or work indi- dually with people."

As the students become familiar with architectural conven- ons and modes of expression, instructors attempt to under- and the ways in which the students think about their living nvironments in an effort to broaden their ideas about design. try not to use words like 'kitchen' and 'living room,'" explains mith, "because I want students to think of those spaces in rms of activity. Maybe a giant bathroom is a status symbol, ut it might not be appropriate for the way they want to live." leyer adds that most students' attitudes about architecture are rounded in what they've been brought up with. "They have a ard time visualizing the spaces that they live in."

Some instructors present slide shows of work by architects uch as Venturi, Graves, or Gehry to show a range of ways of esigning a house. Students usually bridle at such unconven- onal houses as Gehry's, or dismiss them because of budget. his year Gehner showed examples of domestic vernacular archi- tecture from different cultures. "The class commented that they got quite a bit out of it from the standpoint that it was always within their reach in terms of scale and cost, yet it had as much variation as the houses designed by name architects," says Gehner. "It opened up their thinking about materials, color, textures, solar applications, etc."

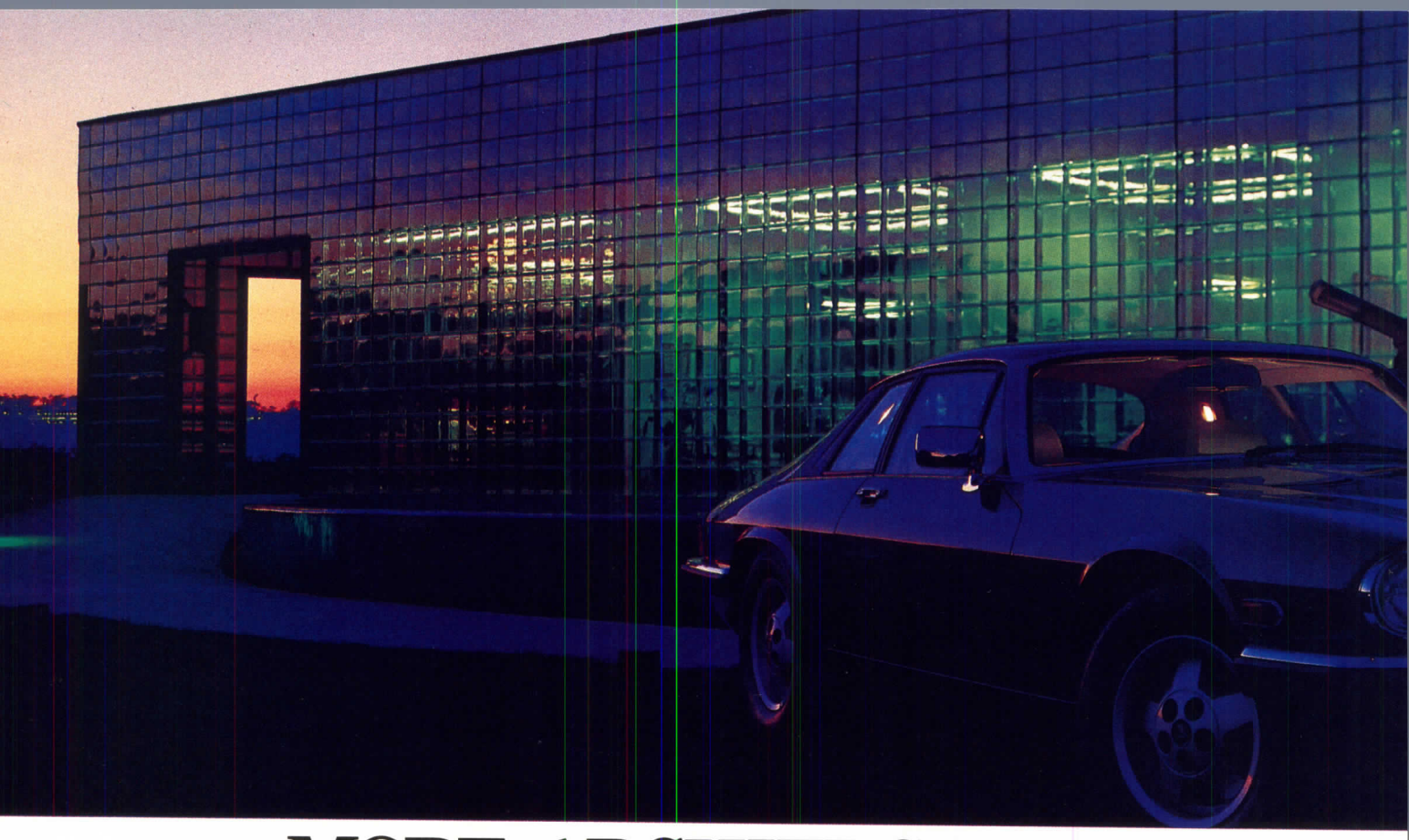
Following their mornings in design studio, the students spend the afternoon on building sites working on construction projects. Students and instructors agree that the connection between designing and building is weak because students do not usually see a construction project in its entirety. This summer a class constructed a gazebo, a building small enough to include all the aspects of construction within the scope of two weeks. Apparently this project gave the students a breadth of hands-on experience that the course usually lacks.

The culmination of the course is a day-long design review where students present their projects to visiting jurors. The review I was invited to attend this summer included a range of projects—from refined stock plans and renovations and additions, to houses designed from scratch. One of the most interesting was a Long Island house designed by a writer interested in astronomy for him and his wife, who is a painter. The house included images of seaside cottages and lighthouses and was distinguished by a tower where the designer could retreat to write or star gaze. "I had no concrete connection between my fantasy of a house and how you make it a reality," says Val Schaffner, the designer. "The course got me excited about the process of design. It made me consider how a building functions and how that relates to its appearance." Schaffner adds that he continues to develop his design, and other students report that since completing the course they have reconsidered their plans, further refining them or starting over.

Besides raising the consciousness of lay people about architecture and the importance of design, the course has occasionally proven a stimulus for a change in profession. "I think the course has a powerful effect as a career discovery program," says Gehner. "Last year a student decided to start his own construction business." Others have been awakened to architecture. "I would seriously consider architecture instead of engineering," says student Bunce, "because I think it would be more fun and enjoyable, challenging you to be creative."

Martin Gehner

For the architects, the course offers an alternative pattern of practice and a chance to be more directly involved in the design of houses for the not-so-wealthy. "Teaching the course keeps me thinking," explains Kathy Meyer. "Looking over a student's shoulder gives me more ideas. I get the satisfaction of knowing that they've got the design they want, but it works better." Sylvia Smith adds that in refining their designs, the students develop "a positive attitude about what an architect does. We're helping them to make their dreams come true." □



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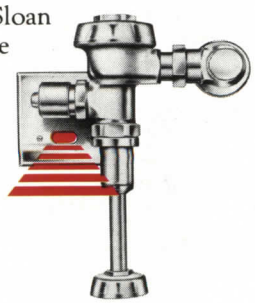

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Curtain Call for Curtain Walls

Sidney Freedman, director of architectural precast concrete services for the Prestressed Concrete Institute, supplied the following information and details for precast-concrete panels to supplement the "Curtain-Wall Connections" article that appeared in the May/June 1986 issue of ARCHITECTURAL TECHNOLOGY.

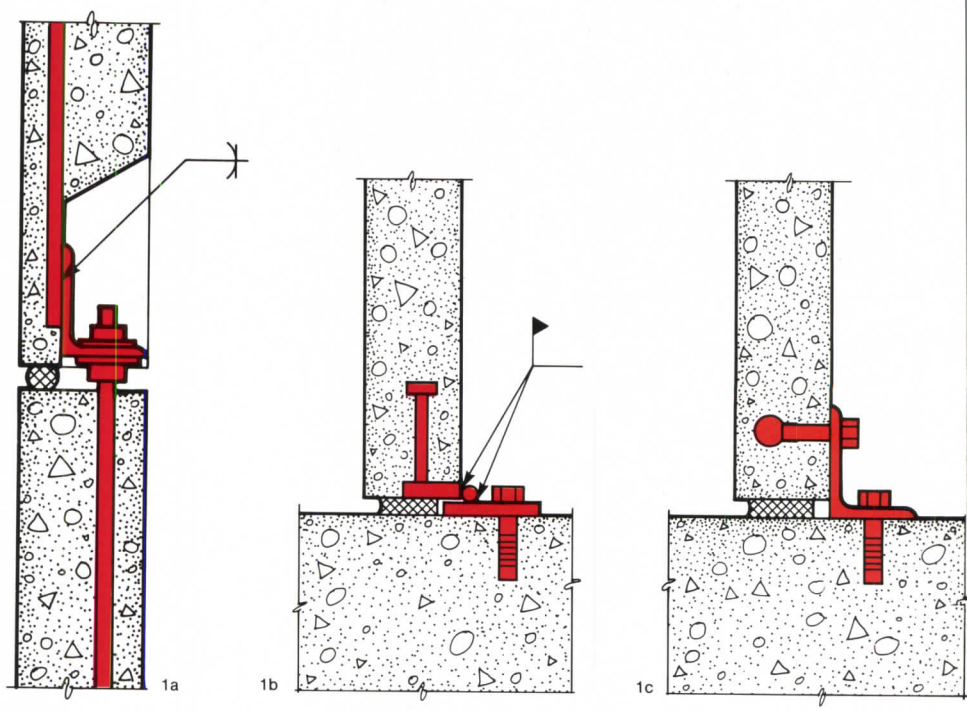
Connection details for precast-concrete panels include a wide range of hardware combinations, including reinforcing bars, studs, coil inserts, structural steel shapes, bolts, and threaded rods. Load transfer from the concrete panels occurs either through anchorage of the hardware to the concrete by bond, or through hardware connected through the concrete (to prevent shear cone-type failure). When possible, it is preferable to have steel failure govern the connection strength because steel is more ductile than concrete and its failures are more predictable.

Selection of the proper details requires considering the size and shape of the panel, as well as the production and construction sequence. Types of connection details for attachment of precast panels to structural steel frames do not differ greatly from connections for attachment to concrete frames. However, when the connection is to steel, bearing points should be closer to the center line of the steel beams in order to minimize torsional forces. Alternatively, supporting steel beams may be gusseted or stiffened to increase their torsional capacity and avoid undesirable rotation.

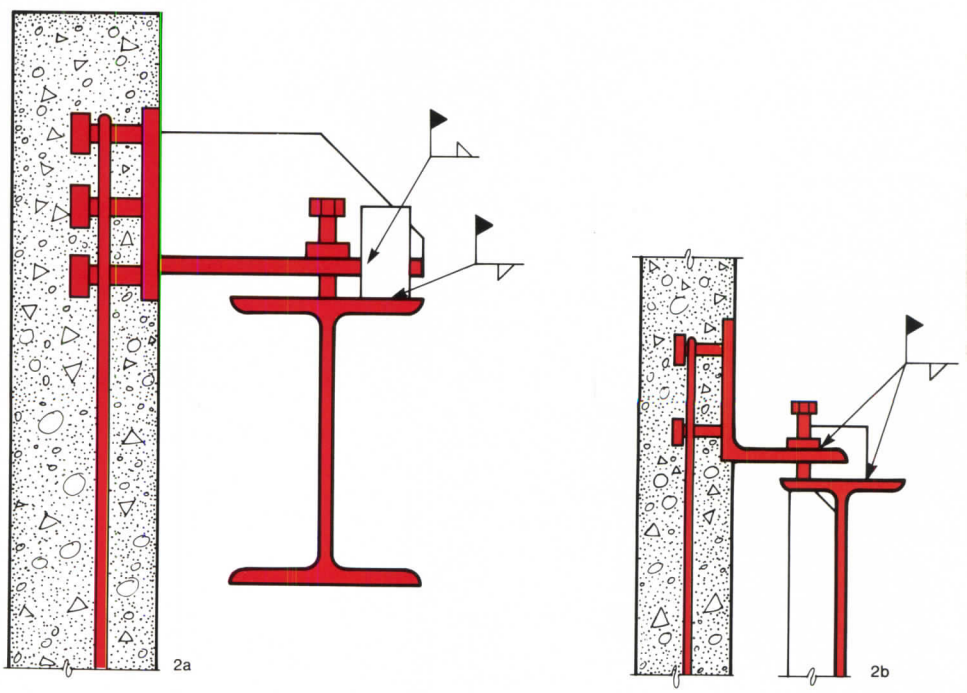
Details illustrated are not "standard;" they show a range of possible hardware combinations.

Selection criteria

The most common problems encountered with panel connections are improper protection from the elements and inadequate allowance for movement. However, precast-concrete panel connections must be selected on a project-by-project basis—different criteria are important in different jobs. Among the criteria that may



Direct bearing connections may utilize anchor bolts projecting from the supporting member (1a), welded connections (1b), or drilled-in expansion anchors (1c).



Haunch bearing connections fasten to concrete or to a supporting tee (2a). Angle se

rength to resist anticipated forces, n as accommodating volume change raint (the stress in the connection n the panel undergoes creep, shrink- and strain due to temperature), as as the strength required to maintain ility.

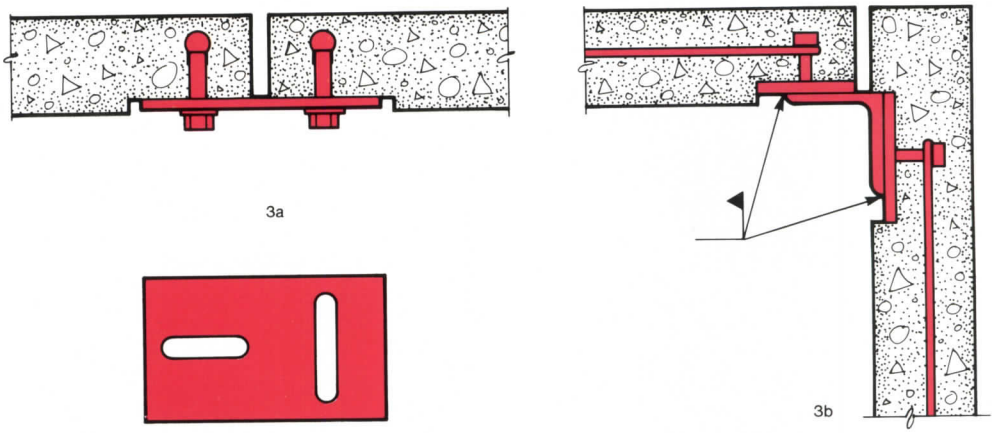
ctility to accommodate relatively e deformations without failure. Duc- y is achieved when the steel devices d before the concrete fails.

olume change accommodation to w movement, thus relieving the sses of creep, shrinkage, and temper- re change strains on the precast pan- and their supports.

urability requirements, which depend the amount of exposure the connec- will receive. Fully exposed connec- s subject to regular inspection and ntenance need only protective paint- , as do most other connections. arding against condensation, from nidity in the interior of the building rom thermal bridges, may require litional corrosion protection. The hitect may wish to consider the fol- ing methods, presented in order of reasing cost: paint with shop primer, ting with zinc-rich paint, zinc metal- ng, cadmium plating, hot dip galvaniz- , and use of stainless steel.

re resistance, required in those con- tions where weakening by fire would pardize the structure's stability. The gree of fire protection should equal the gree required for the members that connected. For example, if the steel me of the building has a two-hour fire ing, so should the connections.

onstructability, which refers to the ease of both construction and maintenance. This concern covers a gamut of topics, including standardized products, enough clearance to allow the workers to provide reasonable tolerances, accessibility of connections, and provision for field adjustment.



Above: Alignment connections attach panel to panel side-by-side (3a) or at corners (3b). Below: Tie-back connections use welded plates (4a), bolts (4b), or a combination of welds and bolts (4c).

Precast cladding panels normally require *bearing* connections and *tie-back* (tension or compression) connections. *Alignment* connections are used to align two panels in relation to each other.

Bearing connections

Bearing connections usually transfer the load from the panels to the support system either directly (via panel edge, corbel, or cast-in structural sections) or indirectly (with bolted or welded clip angles, plates, or other sections). The designer may include plumbing or leveling devices with bearing connections for alignment.

Direct bearing connections accomplish the actual load transfer through shims; the joint is then caulked or dry-packed. The various connections include anchor bolts projecting from the supporting member (figure 1a), welded connections (figure 1b), and drilled-in expansion anchors (figure 1c). The use of expansion-type inserts for stress-reversal load conditions should be considered, especially in seismic zones or other situations where misalignment is likely to occur.

Haunch bearing connections use a projecting haunch for support. A haunch bearing connection is typically a concrete corbel cast with a cladding panel, but it may also be a rolled steel section such as

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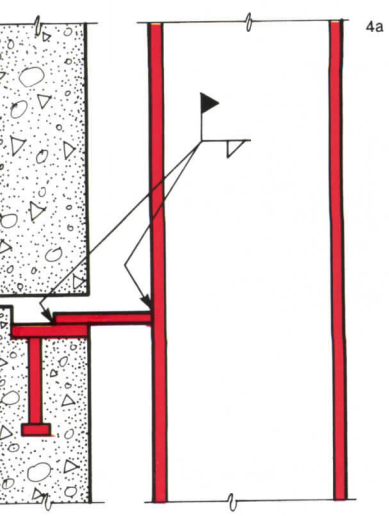

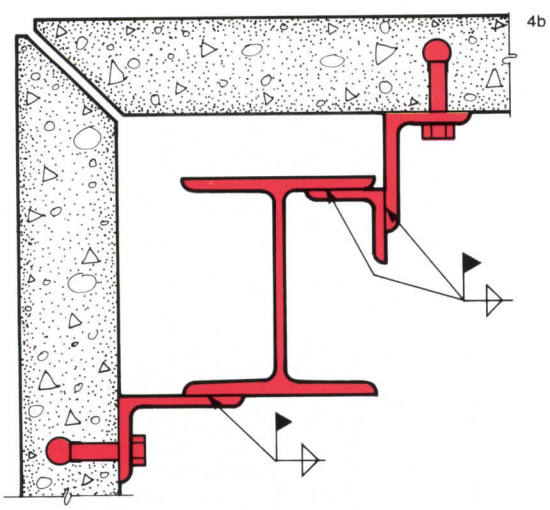

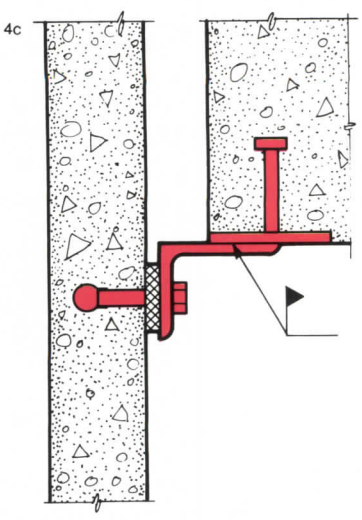

Technical Tips *from page 117*

a tube, an angle, wide-flange, a solid bar, or a structural tee (figure 2a). "Back-up" bars may be welded to the haunch to maintain alignment.

Angle seat bearing connections are constructed of steel angles, the type of hardware most commonly used to support precast panels. This type of connection (figure 2b) is often accompanied by confinement reinforcement, placed around the embedded studs, to add ductility to the connection. This practice is highly recommended in earthquake-prone areas, where ductility of the connections can significantly reduce the chance of building failure due to seismic movement.

Tie-back connections

Nearly every precast panel requires tie-back connections *in addition to* bearing connections. Tie-back connections are tension or compression connections. They are designed to resist forces normal (perpendicular) to the panel and are flexible or movable in other directions. Like bearing connections, tie-back connections are often combined with leveling or plumbing devices.

The simplest form of tie-back connection uses a welded plate or flat bar (figure 4a). Some connections may require angles instead of plates. Other types of tie-backs employ a bolt or a threaded rod placed in an insert. This practice is common when connection is in a location where welding would be difficult, or if a greater amount of adjustment is needed (figure 4b).

Combinations of welding and bolting often supply tie-back support (figure 4c). When bolts are used, slots or oversized holes should be provided to permit adjustments and allow movement. A minimum thickness of clip angle or a long threaded rod are other ways of allowing movement by reducing flexural rigidity.

Alignment connections

Alignment connections fasten panel to panel (figures 3a and 3b), and may be either welded or bolted. As with other types of connections, slotted holes should be used in conjunction with bolts to permit adjustment during erection and to allow panel movement after the building is in place.

Further information

The Prestressed Concrete Institute produces a number of useful publications showing details for many more precast-concrete panel connections. These can be obtained from Sidney Freedman, Prestressed Concrete Institute, 201 North Wells Street, Chicago, Ill. 60606. Freedman's telephone number is

MOVEABLE FEAST.

The assignment: Redesign a decades-old Pullman sleeper into a rolling hotel for business travel.

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The designer: Thomas J. Bolin, ASID, Planning & Design, Inc., Minneapolis.

Bolin comments: "WILSONART surfacing products offered me both the color and surfacing finish choices and the easy-care, hard-wearing characteristics I had to have to pull off this assignment.

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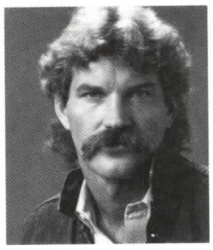

Thomas J. Bolin, ASID
Planning & Design, Inc., Minneapolis

The dining/conference area (photo below) set the Art Deco design referent used throughout the car. The visual expansion is created with a color progression of Mauve Mist to Wildrose to Amethyst gloss decorative laminates on the inset ceiling.

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BOOKS

located in the Philadelphia Museum of Art with its violent purples and blues has raised cries of "Pomo" or "Miami Vice," though the research going into the repainting seems impeccably accurate. And recent on-site investigations in England indicate that the brothers Adam did use such explosive color schemes. Color, though, is not all. The appliqued decorative moldings help to create a spatial structure and give coherence. The nobility of the room comes not through mere size—it is big—but through design.

The Adam style was particularly the creation of Robert Adam (1728-1792), though he was assisted by his brothers—principally James, but also John and William, his father William (also an architect), and a number of sisters. Beginning in Edinburgh in the 1740s, Robert spent some time in Italy in the 1750s—became friendly with, and was influenced by Piranesi—and returned to London to become the leading English architect by the 1760s.

What Robert and his London partner James accomplished has both obvious and hidden dimensions. On one level they became totally concerned with the design, not just a plan and shell as did most of their contemporaries, but with all the interior fittings and furniture. With the exception of their predecessor, William Kent, such involvement was unknown in English architecture. They set up a building company for the London work and rigorously controlled the production of all their furniture, moldings, paintings, and other accessories. On another level, they brought to England a discipline of geometry, but then invested it with a lightness and transparency of parts that was altogether foreign to the ponderous mathematical mind.

continued on page 122

The Decorative Designs of the Adam Family

Robert and James Adam: Birth of a Style. Joseph and Anne Rykwert. (Rizzoli, $25.)
Designs for Castles and Country Villas by Robert and James Adam. Alistair Rowan. Rizzoli, $65.)

Surely the height of architectural compliment is for an architect to become so closely identified with a style that his name becomes that of the style. This the brothers —James, John, William, and particularly Robert Adam—saw during their lifetimes as the Adam, or Adamesque style became the reigning idiom in England during the later 18th century. In the succeeding 200 years their style has been imitated and copied: It survived as interior decoration and in furniture design through the "babel of styles" of the 19th century, and then it was revived in the 20th century, again a sign of supreme homage. Wherever the British flag flew or British influence was strong, the impact of the Adams can be found. Yet so well known has become the Adam style that sometimes one has to ask why all the fuss.

Certainly on one level the Adam style seems to lack much relevance, a sort of over-wrought, over-refined classicism appropriate for decorator show houses. The recently reopened Lansdowne House drawing room (originally designed and built as part of a London house from the 1760s)

Above, Robert Adam's Lansdowne House drawing room, now at the Philadelphia Museum of Art; right, ceiling detail.

Books *from page 121*

On yet a different level, the studies of Robert, and later James, in Italy provided them with a fertility of sources, from Pompeii to Spalato, that significantly widened the architectural palette of the age. They were not looking for the "true source" or to correct Serilo or Palladio, as much as to stimulate and refine. Alistair Rowan writes: "Adam lived in an age that had brought to perfection qualities of refinement and variation as cornerstones in the creative arts." But Rowan and also the Rykwerts note the tremendous interest the Adams had in Gothic and castle architecture, and the role landscape began to play in the selection of building styles.

Yet the accomplishment of the Adams goes beyond any enumeration of specific qualities to a totality. An Adam building was a unity, but a unity different from what we think of today. It is instructive that in the preface to their *Works in Architecture* (three volumes, 1773-1822) Robert and James Adam list as the individuality and novelty of their accomplishment: "A great diversity of ceilings, friezes, and decorated pilasters," to which they had "added grace and beauty by a mixture or grotesque, stucco, and painted ornaments, together with flowing *rainceau,* with its fanciful figure and winding foliage."

In the 20th century there has been invented the concept of "architectural space"; most of us have been taught that space is the essence or first principle of architecture. Color and decorated surfaces are subsidiary to the space. The Adams did create spaces exciting in themselves. At Kenwood, Hampstead, the library with its barrel vault, apsial ends, and columnar screens is brilliant, and at Kedleston, Derbyshire, the spatial sequence from the great rectangular marble hall to the cylindrical saloon is exciting. In some Adam buildings it appears as if no two adjoining spaces should be a similar shape. But the spaces become rooms only with the introduction of the Adam decorative treatment, and only with that decoration do they become truly memorable. At Mellerstain, Berwickshire, the spatial sequence is from one rectangular room to another, and yet the view between them with the different pediments, moldings, and colors is exciting. Essentially the Adams saw space creation as but one aspect of architecture, and the complete room would be not only the moldings, color, furniture, floor, and walls, but the ceiling as well. No two rooms are the same in any Adam building. The drama and interest is not just shape, but the complete fittings. A well handled ceiling could provide more interest than a complex shape.

Of great importance in understanding the Adams' accomplishment is that they essentially worked from an esthetic point of view. While appreciation of their architecture can be enhanced by an understanding of its context, the patron, and the allegories and references in the various decorative schemes, these are ultimately subsidiary to the actual creation of beauty and harmony. They appear not to have been hampered by the associative myths that would grow to dominate 19th century architecture. Beauty was their major goal.

Joseph and Anne Rykwert's *Robert and James Adam* provides a comprehensive introduction to their work. Containing 216 illustrations with a number of interiors and drawings reproduced in color, the book is based upon the more thorough contributions of other scholars such as John Fleming, Alistair Rowan, and Damie Sti man. The book offers no new interpreta tions or information, but its virtue is its completeness and attention that is paid to rooms and facades and their parts. Son of the writing is pedestrian, several cap tions are reversed, and several errors ex such as having Robert Adam die in 179 rather than the generally accepted date of 1792.

Alistair Rowan's book is very differen being more specialized, and yet of grea interest. Basically an archeological recon struction, Rowan has discovered evidenc that Robert and James Adam intended publish a book of their later designs for modest villas and castles. From the ove 8,500 drawings in the Soane museum, Rowan, a respected Adam scholar, has assembled—or reconstructed—a book builder's manual such as they might hav intended. Rowan reproduces 64 plates elevations, sections, and plans, plus com mentary. The designs are fascinating and while not containing the interior detail we expect, indicate the tremendous fertility of creation from thatched cottages to large castles. The castles will be unfa miliar to most people, and yet the awesome size, the creative diagonal axes, an the site adjustments add a new dimension to the Adam reputation. If it had been published during their lifetime, ou view of what is the Adam style might be very different.

Interest in the work of the Adams ma seem somewhat obscure and lacking in pressing immediacy, but the renewal of interest in ornament, decoration, and th styles should call them back to center stage. They illustrate the possibility of refinement and of totality of design that one can only hunger after. If they could have just a small impact—200 years later upon our dismal ceilings, architecture would be considerably improved.

—Richard Guy Wilso

Dr. Wilson teaches architectural history at the University of Virginia.

Victorious Victorians: A Guide to the Major Architectural Styles. Text by Peg B. Sinclair; photographs by Taylor B. Lewis. (Holt, Rinehart & Winston, $15.95.) This paperback is largely a handsome picture book, portraying the major American Victorian cottage styles—Gothic revival, Italianate, second empire, octagon, exotic revival, stick, Queen Anne, and shingle. The brief text presents identifying features of each style and tells in what part of the country examples are most likely to be found. The illustrations, all in the glorious colors beloved by the Victorians, show exteriors and interiors and such fanciful details as turrets and balconies, cupolas, friezes, trim work, and ornate embellishments. Shown above, like a receiving line of gracious *grande dames,* is a row of restored Victorian vacation houses in Ocean Grove, N.J.

Modest Mansions. Donald Prowler. (Rodale Press, $19.95.) **The Small House: An Artful Guide to Affordable Residential Design.** Duo Dickinson. (McGraw Hill, $34.95.)

New houses built in the U.S. are getting smaller because of rising costs and decreasing family size. Smaller houses are also cheaper to heat and maintain. These two books take note of these facts, with an eye toward aiding the design of better small houses.

For Donald Prowler, the small house is a welcomed development. "American houses—like too many Americans themselves—are bloated," Prowler observes, adding that we too often equate bigness with comfort and confuse quality of space with quantity. How big is a small house? Prowler is more interested in the use of space than its amount. He is curious, and

mes the reader is too, about why one se *might* appear more spacious than ther of the exact same square footage. rowler examines the history of small se design, such as "trinity" row houses hiladelphia (so named because each heir three stories contains a single m), traditional Japanese houses, igloos, rtyard houses, Charleston single ses, and mobile homes.

he core of the book covers small house ign and construction, including issues h as lighting, storage, heating and cool- and furnishings. There is also a sec- on modest additions and improve- nts. As examples of many of these prin- les in use, the last part of the book sents 10 modest mansions (a mixture primary and vacation houses, none over 00 square feet) by architects such as er Bohlin, Turner Brooks, and Rob- Venturi. The plans for these houses drawn at the same scale so they can ily be compared.

n his book on the same subject, Duo ckinson takes the position that the small use has never made a lasting or signifi- nt impact on house design because it s traditionally been the province of ung architects trying out wild, usually inhabitable ideas, or of developers such Levitt who plunk down uninspired xes. He concludes that "the architect- signed small house is rapidly becom- g the only uncompromising solution to e coming crisis in housing as the baby om babies have babies."

Thus, Dickinson identifies his small use clients in the growing wave of ppies who seek smaller and better built rs, refined and classically cut cloth- g, and unpretentious designer furnish- gs. To this list he would add small t finely appointed houses for all those or upwardly mobile types who have en "forced into the condominium com- omise." And, Dickinson proffers, it "only by using knowledgeable archi- cts that people can make sense of eir homes in a world of shrinking expec- tions." Willing to pay two bucks for scoop of Häagen-Dazs, Dickinson's otential clients have anything but rinking expectations.

Dickinson points out, as does Prowler, e obvious advantages of building small nd sets down his philosophy of the small ouse: It shouldn't appear or feel small; s "working parts" should have maximum fficiency to liberate its "living parts"; anipulation of scale is essential. The resentations of 30 house designs that ake up the bulk of the book are to how "the state of the art in small-house esign."

Dickinson defines "small" as fewer han 2,000 square feet for one- and two- edroom houses, 2,500 for three and four edrooms, and 3,500 for five or more. hese are pretty good sized houses, con- dering that the average American house

continued on page 124

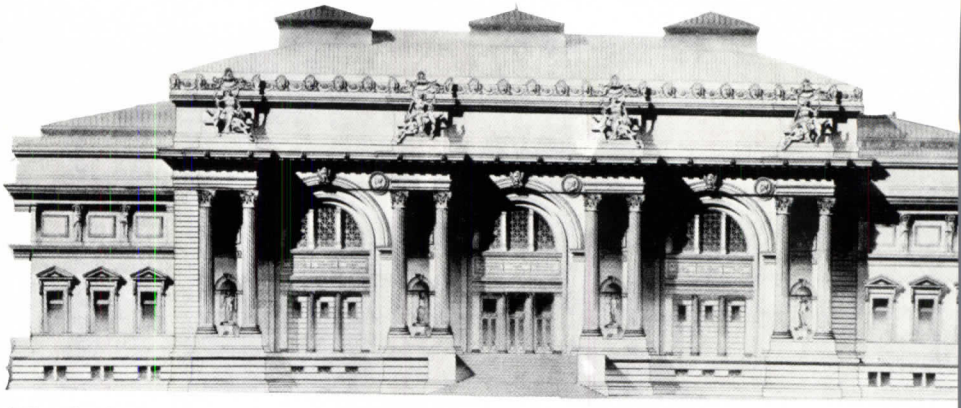
Books *from page 123*

since 1963 has never been more than 2,000 square feet, and is getting smaller.

The author has also constructed an elaborate system for determining "perceived space" in comparison to actual square footage. It's based on reading the volume of double-height spaces and that beyond glazed walls. Percevied space lies somewhere between volume and area.

But Dickinson does not discuss what he means by "affordable." Of the 30 primary and vacation homes presented, ranging in size from 570 to 3,500 square feet, less than half have cost data. Those mentioned run from $40,000 to $242,000, but these costs are not given in constant dollars and cannot be compared.

Nonetheless both of these books, especially Prowler's, are valuable resources for information about getting more from less.—Michael J. Crosbie



The Architecture of Richard Morris Hunt. Edited by Susan R. Stein. (University of Chicago Press, $16.95.)

This volume accompanies an exhibition of Richard Morris Hunt's drawings, (which opened at the Octagon last month) but it is far more than we expect of the best of exhibition catalogs. While heralded by Paul R. Baker's 1980 biography of Hu (and his introductory essay is one of th best in this volume) it really can be sai to have begun in 1926 when Hunt's son responding to their mother's wishes an an earlier suggestion by AIA Secretary Glenn Brown, gave to the Institute "son 8,000 original drawings, 15,000 collecte photographs, and over 700 architectura books." This magnificent gift remained undisturbed (much of it in the very offi furniture where Hunt had stored it) un 1978 when cataloging began. Buoyed b rising interest in architectural drawing the École des Beaux-Arts, eclecticism, a more recent periods of architectural hi tory, the AIA Foundation saw that the time was ripe for the present effort, unde taken in association with the Metropol tan Museum of Art (Hunt's design for which is shown above).

Even after the efforts of the superb team that Susan Stein has assembled her you will still find it difficult to make up your mind about Hunt, one of the four ing fathers of AIA and an undeniably i lustrious figure in the pantheon of our national architecture. Born in 1827 in B tleboro, Vt., Hunt spent his youth in Ne England and Washington, D.C. At 16 he moved with his family to Europe. In 184 he became the first American architect to be admitted to the École des Beaux-Arts, never thereafter losing the French connection. When he returned to the U —a confirmed Francophile—it was to practice in New York City. His clients were the Vanderbilts and other new ric for whom he built Fifth Avenue chatea and Newport "cottages"—the most cele brated of which was Biltmore, not in Rhode Island but North Carolina. His architectural hallmark was the florid, ov decorated style in François Premier. He was AIA's third president, a founder of New York's Municipal Art Society, and an outstanding exponent of the "city bea tiful" movement.

From the penetrating essays included in this volume on well chosen aspects o Hunt's career, we can see how its early achievements stopped as a dead end th did not lead on to the later work. It becomes clear that Hunt's interest in scul ture and promotion of the allied arts wa an inevitable and necessary accompani ment to his Beaux-Arts stylistic orienta-

ssionalism, including his philosophy of rchitectural education, to which he made uch significant contributions, was part nd parcel of the same outlook and xperience.

Apart from a generalized belief in the iscipline associated with the École and s competition system, and an ultimate ppeal to "good taste," Hunt's philoso- hy of architecture was rooted in the con- iction of its importance to the developing .S. While his career was characterized nore by large private residences than pub- c buildings, he believed the ultimate des- ny of the former—as with European alaces—would be as some form of pub- c use. He was firmly convinced of the mportance of the architectural past, the ltimate source of inspiration and guid- nce. He thought architecture should be haracterized by harmony, dignity, and epose.—FREDERICK GUTHEIM, HON. AIA

Mr. Gutheim is a Washington, D.C., author, ritic, and educator.

Wood, Brick & Stone: The North Ameri- an Settlement Landscape. Volume 1: Houses; Volume 2: Barns and Farm Struc- ures. Allen G. Noble. (University of Mas- achusetts Press, $30 per volume.)

This two-volume tome is encyclopedic nd scholarly, tracing the evolution of the American house and its allied farm struc- ures from the first colonists' imported styles and the pioneers' survivalist forms hrough decades of borrowing, mixing, and nvention to the edges of the turbulence hat became World War II. Scholars may ind gaps in the scholarship, as scholars are destined to do, but the study is a heroic effort worthy of space in every aca- demic and public library in America.

The author, who is a professor of geog- raphy at the University of Akron, has directed his work to folklorists and histo- rians as well as architects and geographers. He writes in language that is direct and refreshing, although not free of the jar- gon of his own profession.

Great attention is paid to the social, economic, ethnic, cultural, and environ- mental factors that resulted in architec- tural forms, including the polarities of "sta- tus" and "defense." The broad and hu- manistic view is coupled with coverage of the materials, connections, and build- ing techniques that made the architecture possible. There are encounters with curi- ous construction terms such as "tabby," "jacal," "bousillage," and "nogging," con- firming the depth of the author's investi- gations. Any study that traces material usage from hewn logs and mud to plastic sheets and used rubber tires should fasci- nate even the most pragmatic practitioner.

The first volume on houses is a detailed journey along the decades of American house design. Although "North America" certainly does include Canada and Mexico,

continued on page 127

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oks *from page 125*

st of the coverage is centered in the ., inevitably beginning in the North-tern region, then gradually drifting ard the Midwest and South, and finally ling tidbits of Western development for sert. English, French, Dutch, German, d Spanish cultural influences are iewed with enthusiasm, and Fenno-andinavian, Haitian, and other contri-tions are mentioned.

Early dwellings in Western America are esented out of chronological order, luding those of the native Americans ose stewardship of the land preceded rs. The Plains Indian tipi, the Navajo gan, and the Indian pueblo are among ose included, but the lowland middle nerican house does not appear, the minole house warrants one sentence, d the Mandan house isn't mentioned, en in an enchanting review of the Mid-stern soddy, that ancestor of the earth-eltered architecture of today.

Considerable attention is given to the olution of the plans of the houses that d European derivation and to their met-norphosis under the pressures of social, onomic, and environmental influences. st the names of some of the house forms e a feast for the imagination: the catslide ttage, the shotgun house, the dog-trot use, and the cornbelt cube. Postmod-nists whose reservoirs are running low ll find more than sufficient stimulus here sustain them into the next fashion.

Even then, says Noble, styles were "arti-cially created and fated to last only a w decades, to be succeeded by some ew fashion." He comments that "one of e psychological characteristics most often oticed by foreign observers of the North merican personality is the tendency to nore whatever is not current or modern progressive," perhaps helping explain ur profession's relentless search for inven-on, sometimes in spite of the determi-ants of the task at hand. The author's alking of styles ends with the Wrightian rairie style and the bungalow. It would ave been interesting had he pressed on the present, but we can understand that e might shrink from analysis of our cur-ent omnidirectional frolics in the urban nd suburban environmental maelstroms.

Volume two, on barns and farm struc-ures, proves to be just as scholarly but is onsiderably more entertaining. Here forms volve from the demands of function and ne characteristics of the environment, exe-uted with economy in the materials of he region. "Styles" appear only in response o changes in those factors, and fashion s seldom seen. Farm buildings of increas-ng complexity remain honest and forth-ight, always seeming to rest comfortably n their particular landscapes. Borrowing he words of another, the author observes hat "the architectural qualities of cathe-dral-like barns and elegant granaries are often superior to those of the farmhouses

continued on page 129

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ooks *from page 127*

ey served." The barns and other farm ildings also are related to their cultural arths and ethnic origins, and here the n-Northeastern regions of North America t their recognition. In addition to those eady mentioned, the Belgian, Ukranian, rwegian, Amish, Mennonite, and Mor- on contributions are recorded.

The most interesting forms may be the bacco barns of the Southeast, the silos the Midwest, and the windmills, hay rricks, fences, and other minor utilitar- n forms that gave character to the farm- ead and filled the rural landscape with eir lean functionalism. The barns, of urse, were the masterpieces of passive vironmental control: designed to con- rve the heat generated by the animals ring winter nights, to ventilate through ep steamy summers, and to provide tural light where needed.

Several visual deficiencies must be ported, for they affect the communica- on of concepts so elegantly stated in e text. All too many of the 560 floor ans, drawings, and photographs are sappointing. The photographs are pre- med to be Noble's own work, and what chitect wouldn't envy his odyssey across merica, a pilgrimage that took nearly o decades, according to the picture cap- ons. Sadly, the reproductions of the pho- graphs picture a gray continent. Whether ken in crisp frozen winter or sunny sum- er, too many of these handsome archi- ctural artifacts seem to have been viewed rough smoked glass and are rarely re- orded in the full sweep of their land- ape context. And, in the fashion of some our stylish architectural journals, the ouses and farms appear to be uninhabited age sets, with lively exceptions.

It is the original sketches that nearly ndermine the work. They are amateurish, ften flat, and certainly not equal to the uality of Noble's research and writing. he author, and all architects, are directed Lester Walker's *American Shelter* (Over- ook Press, 1981), which is the model for nchanting drawings that illustrate the story of the American house.

In compensation, a special treasure of nselfish professorial statesmanship is ound in the last chapter of the second olume. Noble lists 23 "unanswered ques- ons" and a 45-item "research agenda for ne future." This gift, at a minimum, pro- des any serious investigator with a broad noice of topics for a doctoral thesis and ne prospect of several lifetimes of adven- re in researching the unexpected aspects f North America's settlement landscape. his is but the last of many reasons to ank the author for his significant con- ibution to our understanding of this con- nent's architectural heritage.

—Robert E. McConnell, FAIA

Mr. McConnell is professor of architec- ure and former dean of the college of rchitecture, University of Arizona.

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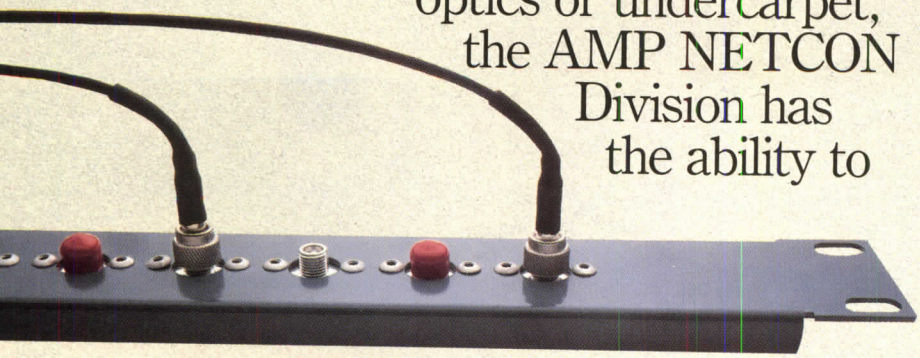

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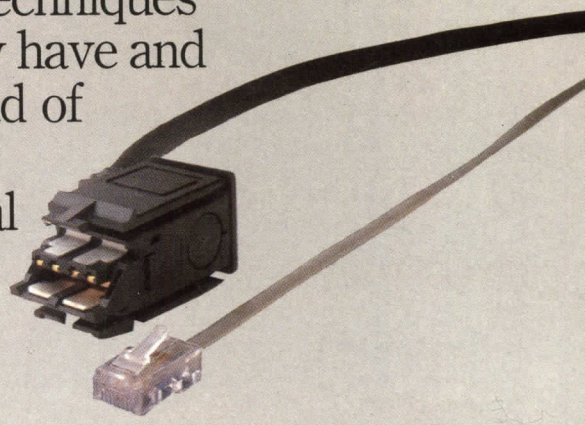

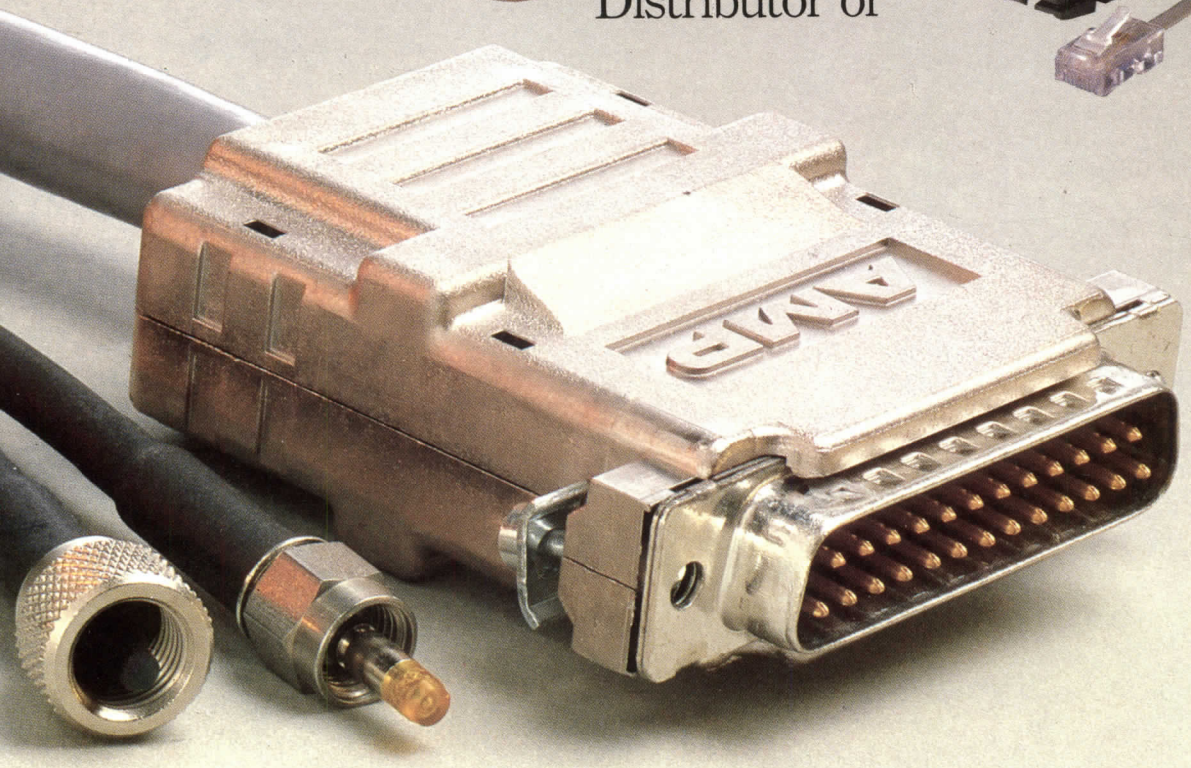

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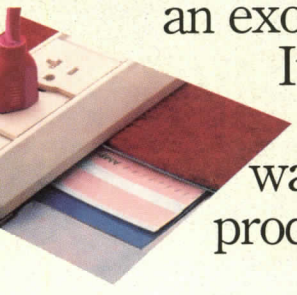

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Historic Building Course and Workshop
The New York Landmarks Conservancy and the Friends of Terra Cotta/New York State are sponsoring a workshop, "Historic Facades: Restoration and Local Law 10," to be held on Nov. 1. The workshop will focus on the significance of the facade as a valuable part of the building: historic, esthetic, and functional. For further information, contact Jane Seymour, New York Landmarks Conservancy, 330 W. 42nd St., New York, N.Y. 10036.

Remodeling Awards Program
Nominations are being accepted for the Harold Hammerman award sponsored by the National Association of the Remodeling Industry. The award will recognize excellence in training and education in the remodeling industry. Nominations may be made by anyone, and the nominee may or may not be a member of NARI. For more information, contact NARI, 1901 N. Moore St., Suite 808, Arlington, Va. 22209, Attention: Awards Program. The award will be given in late February.

Richard Morris Hunt Exhibition
An exhibition of original drawings, watercolors, and 19th century photographs of Richard Morris Hunt will be exhibited until Dec. 28 at the Octagon Museum. Hunt's original model of the Biltmore is on display in the AIA headquarters lobby. Hours are 8:30 A.M. to 5 P.M. Monday-Friday, and 1 to 4 P.M. weekends.

Design Competition Winner
Schwartz-Kinnard Architects, Princeton, N.J., received the $20,000 first prize in the Coldspring/Cylburn Arboretum design competition. The winning design represented an innovative approach to the development of undeveloped, residential acreage in the Coldspring New Town community in Baltimore.

CREDITS

House in North Tampa, Fla. (page 38). *Architect: The Jan Abell Kenneth Garcia Partnership Architects, Tampa.* General contractor: Royalwood Enterprises Inc., John Ballinger. Rear door: Peachtree. Floor surfacing: Astra Tile, Dan's Trading Company, Floors by Mike, Pat Craft. Lighting: Lightolier. Plumbing fittings and showerheads: Kohler. Saunas: John Ballinger. Water fountains: Kohler. Security and fire detection: Diversified Electronic Systems. Windows: Winco Ventilator. Skylights: Arrow Sheet Metal. Paint and stain: Benjamin Moore. Bathroom tile: American Olean.

Shay Residence, San Francisco (page 48). *Architect: James Shay, AIA, Architect, San Francisco.* General contractor: Jones and Kiefer; Claude Kennedy, foreman. Hom. Soils engineer: Don Hillebrandt, Associate. Mechanical engineer: Cho Ng. Inspection engineer for compliance with structural: Testing Engineers Inc. Environmental control systems: Rheem. Flooring surfacing: Tracy Floors. Foundation: Malcolm Drilling. Handrails: Cherry Heat Welding. Lighting: Lightolier, Rambusch. Roofing: Berridge. Plumbing fittings and showerheads: American Standard. Tubs and lavatories: American Standard. Water closets: American Standard. Kitchen: Gagganau, AEG. Security and fire detection: Northwest Security. Signage: Adcraft. Wall surfacing: K&D Cedar, U.S. Gypsum, Bovenzi Drywall. Windows: Bonelli, Torrance Steel. Hinges: Baldwin. Paint and stain: Cabot, Fuller-O'Brien. Integral color stucco: James Goodwin, Peerless, Countertops: Corian. Ceramic tile: American Olean. Kitchen cabinets: Plus Kitchens. Fireplace tile: Terra Bella, Donna Billick. Floor and roof joists: Standard Structures. Steel frame: Crown Iron Works. Glass block: PPG.

Yacht House, New Forest, Hampshire, England (page 56). *Architect: Richard Horden, London.* Ceiling surfacing system: Technical Blinds Ltd. Doors: Rawneer UK Ltd. Environmental control systems: D.A. East Ltd. Structural wind frame: Ian Proctor Masts. Interior floors: Habitat. Exterior paving: Hilliers. Foundation: Anton & Manston. Lighting: Habitat, Bailey Electrical. Waterproofing and sealants: Servicise, Kwickstick, Adshead Ratcliffe. Wall surfacing: Technical Blinds, British Alcan. Windows: Rawneer UK Ltd. Skylights: Essex Aluminum Systems. Paint: Powder Coating. Partitions: D.H. Ridout, The Kite Store. Plumbing: Alpha Dorset. Tubs and lavatories: Armitage Shanks. Communication and intercom: Megasat and Communications Systems. Computer room: Wang. Kitchen: D.H. Ridout. Signage: Lawrence Bagette

Hillside Homes, Bellingham, Wash. (page 64). *Architect: Zervas Group Architects, Seattle.* Doors: Peachtree, Vancore. Environmental control systems: Wesco, E-Z Vent. Floor surfacing: American Olean, Armstrong. Exterior lighting: Lightcraft. Interior lighting: Lightolier. Roofing: Certainteed. Plumbing fittings and showerheads: Delta. Toilet stalls: Lay-American Standard. Tubs: Tub-Hytec. Washroom and bathroom accessories: Nutone, Hallmack. Water closets: American Standard. Kitchen appliances: Hotpoint. Security and fire detection: BRK. Solar panels: Grumman, Sunstream. Stairs: RCA, Munson. Skylights: Milgard. Hardware: Stanley, Best.

Bodenhamer House, Santa Rosa, Calif. (page 66). *Architect: Roland/Miller Associates, Santa Rosa, Calif.* Ceiling surfacing system: U.S. Gypsum. Doors: Therma-Tru, Cal Wood. Floor surfacing: Custom Waterproofing and sealants: Johns-Manville. Flush valves: Moen. Toilet stalls: Kohler. Kitchen: Whirlpool. Wall surfacing: U.S. Plywood, U.S. Gypsum. Windows: Milgard. Hardware: Schlage. Paint and stain: Fuller O'Brien.

Block Island House, Block Island, R.I. (page 68). *Architect: Herman Hassinger Architects, Moorestown, N.J.* Doors: Brosco, U.I.L. Interior floors: Bruce Oak Flooring. Ceiling surfacing system: Drywall. Lighting: Lightolier. Roofing: Red Cedar. Plumbing fittings and showerheads: American Standard. Prefab showers: Fiat. Kitchen: J-Wood. Wall surfacing: U.S. Gypsum. Windows: Andersen. Skylights: Velux. Locksets: Schlage.

McInerney Residence, San Francisco (page 70). *Architect: Charles Pfister Associates, San Francisco.* Elevators: Waupaca Elevator Co. Foundation: Villeroy & Boch. Lighting: Pfister, Boyd Lighting. Kitchen appliances: Thermador, Subzero. Allmilmo, Clervi Marble.

Russell Park Student Housing, Davis, Calif. (page 72). *Architect: Sam Davis, FAIA, Architects, Shen/Glass Architects, Berkeley, Calif.* Doors: Sacramento A1 Doors. Environmental control systems: Lanco. Floor surfacing: Armstrong, Kentile World Carpets. Lighting: Wellmade, Hubbell. Roofing: Johns-Manville. Flush valves: Sloan. Plumbing fittings and showerheads: Delta. Toilet stalls: American Sheetmetal. Tubs and lavatories: Kimstock. Water closets: Briggs. Kitchen: Whirlpool. Laundry: Whirlpool. Stairs: Valley Stairways. Wall surfacing: T1-11. Windows: Blomberg. Locksets: Kwickset. Paint: Mason. Movable partitions: Air Acoustic.

Phoenix Place, Sacramento, Calif. (page 75). *Architect: Lyndon/Buchanan Associates, Berkeley, Calif.* Plumbing fittings and showerheads: Jado. Tubs and lavatories: Kohler. Water closets: Kohler. Wall surfacing: Pacific Coast Builders. Windows: Pozzi. Locksets: Jado. Paint: Dunn-Edwards.

The Beach Apartments, Albuquerque, N.M. (page 78). *Architect: Antoine Predock, FAIA, Albuquerque.* Doors: Valient Door. Environmental control systems: First Company. Handrails: B&D Steel Fabricators. Lighting: Southwest Outdoor Electric Co., Progress. Kitchen: Westinghouse. Laundry: Westinghouse. Signage: Southwest Outdoor Electric Co. Stairs: B&D Steel Fabricators. Wall surfacing: El-Rey Color Coat. Windows: General Aluminum. Skylights: Skyview. Paint: Wellborn Paint. Plumbing fittings and showerheads: Sterling Faucet. Saunas and whirlpool baths: Owens-Corning. Tubs and lavatories: Kilgore, Owens-Corning. Water

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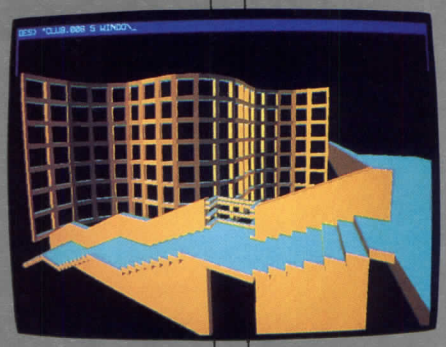

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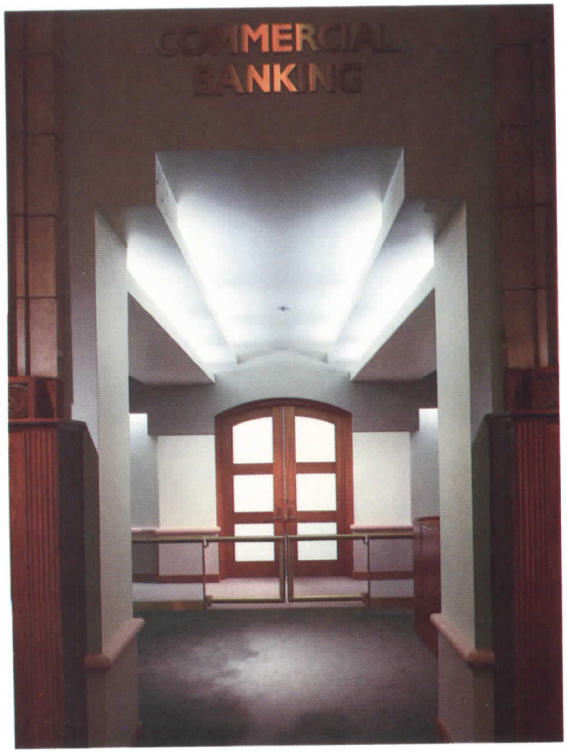

In heart of downtown Quincy, Mass., is the headquarters of the South Shore Bank, an opulent art deco treasure that was severely tarnished by the early '80s. Now through its renovation by the Newton Center, Mass., architecture firm Pierce Lamb Associates the splendor has returned. In addition, new offices have been created in a delightful reinterruption of the deco style.

The most resplendent portions of the building were renovated as close to the original as possible, with the help of local craftsmen: for example, in the great hall (above), the barrel vaulted stained glass skylight; limestone arches on side walls; two rows of brass and opalescent glass chandeliers; nine carved wood teller stations with brass and stained glass accents (far left); colored marble inlays in a travertine floor; and ornate brass and marble check writing desks with florid lamps. Office spaces next to, but previously inaccessible to, the great hall were connected to the hall by new deco-inspired archways (left).—Nora Richter Greer

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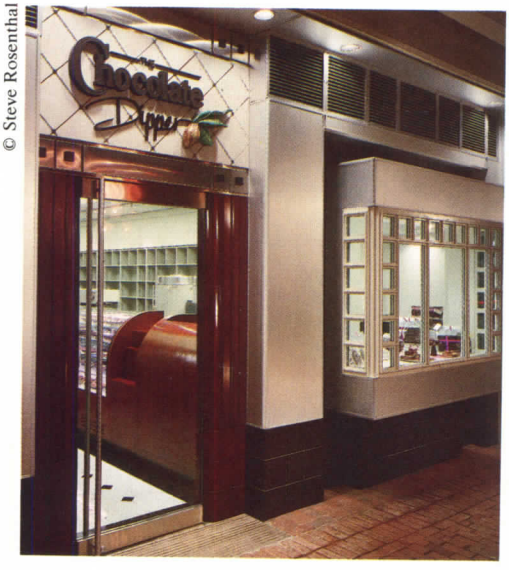

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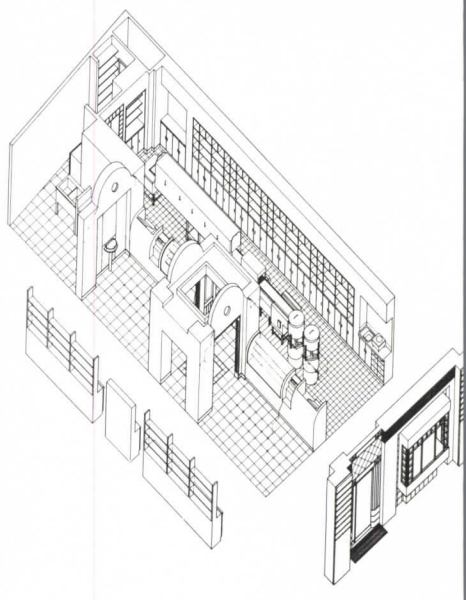

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Willy Wonka's chocolate factory has turned chic! The Chocolate Dipper in Marketplace Center in Boston was designed to visually celebrate the production as well as the marketing of chocolate candy in a space of 850 square feet. The image of the production area is high-tech efficiency; that of the sales space is sophisticated elegance.

Stephen L. Faulk & Associates of Boston began by splitting the rectangular shop lengthwise. At the front of the production half is a marble slab cradled in a projecting bay window where solid sheet chocolate is made. Candy centers move down the enrobing line, into a 12-foot cooling tunnel, and then are packaged. Materials are gray plastic laminate, painted metal ceiling, three colors of floor tiles. On the exterior is a projecting steel framed window, metal panels, and black tile walls.

The marketing portion of the shop is as rich as the chocolate itself; polished marble and granite floor, mahogany veneered casework, vaulted ceilings. The center is meant as a "shrine," says the architect, alluding to "the almost religious attraction people have toward chocolates." The exterior is marked by mahogany, stainless steel, and etched glass.—N.R.G.

The Michael G. Abrams Co. in New York City designs and manufactures ır women's shoe lines—Palizzio, Proxy, rry Ellis, and Perry Ellis Portfolio. It ems appropriate, then, that its showom consists of discrete spaces for each oe line, but like the company there are mmon elements binding the spaces gether.

The design by Janusz Gottwald & Assotes of New York City (Janusz Gottwald th David Hoggatt, Laura Gottwald, and ary Meuer) places a long arcade down e center of the showroom (bottom). On s arcade are "storefronts"—some pushed ck, others forward to create a gentle ythm to the space. Each brand name s a suite of small offices (located behind e protruding facades) and a larger execive office (behind the pushed back onts) that doubles as a showroom dur- g design week. It is during that week at the arcade scheme seems most fective—when hundreds of people pass rough. There is a kitchen/dining room at can be closed off by folding doors can be totally opened up (right). It located directly across from the recepon desk, a protruding element with a rge window cut into it (right).—N.R.G.

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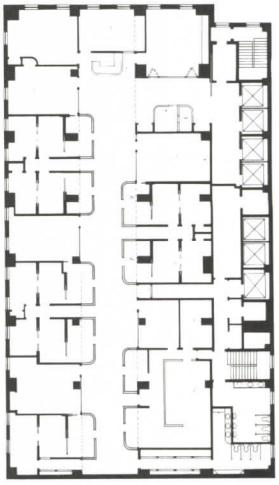


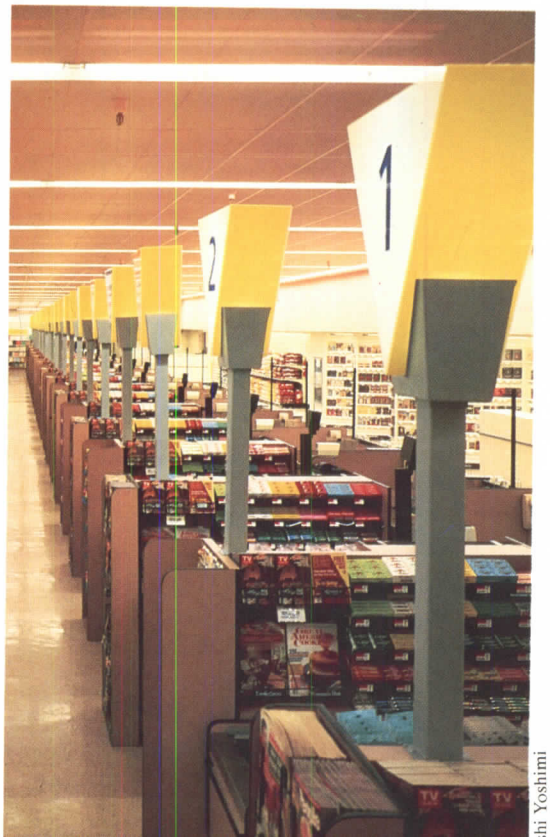
Langdon Clay

Toshi Yoshimi

Often discount stores are virtually undecorated warehouses crammed with merchandise. One exception to the rule is the prototype design for Gemco by the New York City firm of Walker Group/CNI, where clearly designed circulation paths draw the customers through a dazzling display of objects ranging from fine jewelry and family apparel to supermarket items.

Located in Rowland Heights, Calif., the square-shaped store is entered at one corner that is cut away. From there, the widest aisle leads diagonally toward the back of the store, past non-food items to the supermarket. Narrower paths veer off this central aisle encouraging the shopper to stop and browse. All paths lead to the produce section, which is marked by supergraphic images hung overhead (above).

Throughout, graphics and merchandise are intermingled to create a crisp, clean, and orderly environment. Sometimes the images can be more enticing than the products being sold, as in the case with an aisle of beverages. Other times the store's furniture itself creates an intriguing visual image, as the row of 26 checkout stands, with three-dimensional "V" signs number-



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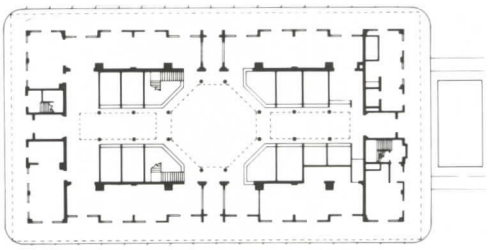

The Roanoke Market is the centerpiece in that Virginia city's revitalization plan for downtown (see Nov. '84, page 54). For much of the past decade, the neo-Georgian brick building was either abandoned or marginally occupied. Today it pulsates with new life, its interior aglow with breathtaking neon and cool colors.

"The market building has symbolic value as the heart of downtown, so we wanted it to be a beehive of activity, with a sense of excitement," explains Chad Floyd, AIA, of Centerbrook, Essex, Conn., who designed the renovation with graphic designer Brenda Huffman of Ivoryton, Conn., Timm Jamieson, AIA, of Roanoke's Hayes, Seay, Mattern, & Mattern, and Mills, Oliver & Webb of Blacksburg, Va.

In plan, the building is a long promenade with a crossing at its center. Its interior is rendered in dark hues of blue, providing a subdued background for illuminated signs, neon, and shops. Food stalls with earth tone interiors are found on the ground floor, while the mezzanine holds clothing, antique, and gift shops. The sign for each shop is a simple graphic image, alternating with countrified stars—the symbol of Roanoke.

Dark blue neon zips along the edge of the mezzanine, racing toward the market's center where it explodes in a display of frozen fireworks. Here a suspended, stylized star of blue, green, and orange neon floats like a holographic dome over the crossing.—Michael J. Crosbie

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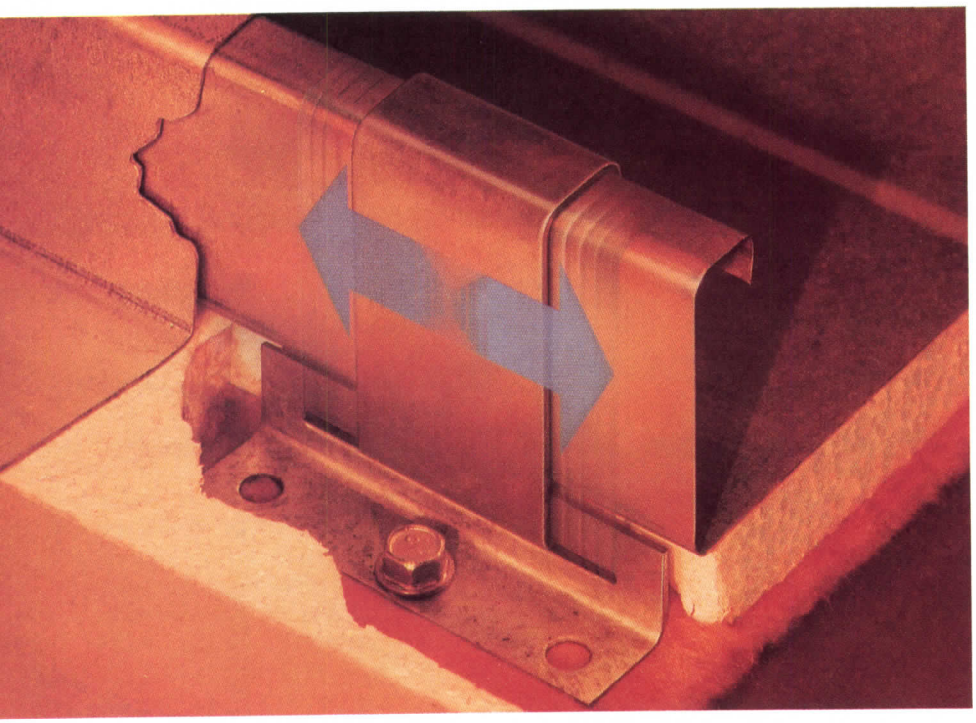
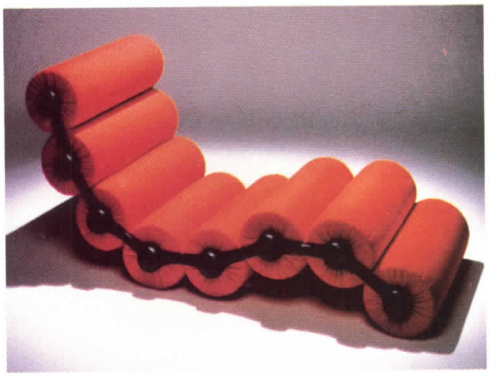
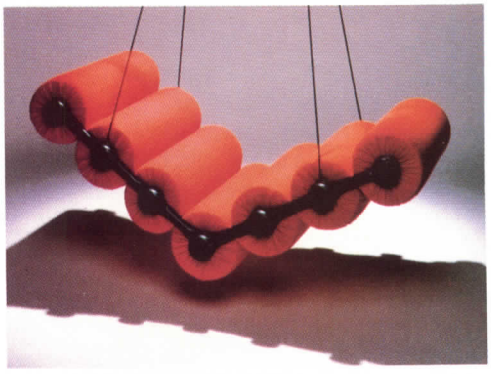
PRODUCTS



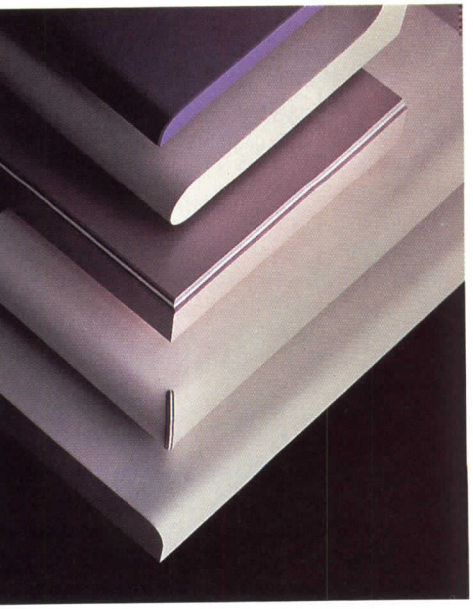




This **standing seam roof** by Sonoco Buildings (above), works over existing pitched or flat built-up roofs. The Sonoco seam eliminates rib-closures by lining up flush with the eave. The one-piece rib panel comes in any length; and machine-seamed ribs produce a single continuous membrane.

A sliding clip designed for one thickness of spacer block allows the roof to expand and contract with temperature fluctuations. Back-up plates, used at all standing seam endlaps, act as a positive fastening surface and help assure a flat endlap connection. The 24-gauge roof panel comes in white or bronze aluminized steel or galvanized painted color finishes. *Circle 202 on information card.*

The European-designed **"High Roller" chair** (right), available from Benton Brothers Systems, adjusts to any position by interlocking the frame position to fit body contours. The chair comes in one- or two-person widths, with the upholstered fabric foam rollers in red, yellow, medium gray, black, or the customer's own material. Coordinating annodized aluminum frames come in red, medium gray, and black.
Circle 203 on information card.



Wilsonart has introduced an expanded line of interior-use **Solicor colorthrough laminates** (left) that can be fabricated to create surfacing seams without the "dark line" normally apparent with regular laminates. Because color extends through the core, nicks and heavy scratches on the surface don't show as readily. Solicor, designed to handle and fabricate easier than earlier versions of this product type, bends to a professionally postformed, 9/16-inch radius.

Solicor's flexibility allows it to be stacked in multi-color layers, wrapped in tight curves, routed, beveled, radiused or engraved. Specially ordered edge banding strips measure 2½-inches x 10 feet. *Circle 204 on information card.*

—Amy Light

NEW AND NOTEWORTHY

Computerized Fee Calculator
An easily modifiable fee calculator/project manager program ensures data entry of all the necessary information needed to prepare complete fee proposals.

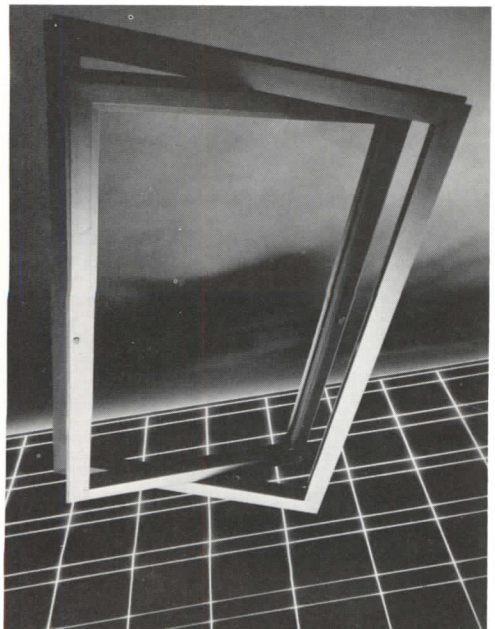
The user calculates fee proposals, budgets billable hours, estimates construction costs, edits projects from an archival library, manages project progress, and produces presentation reports guided by the program's menus, reminder prompts, and fill-in-the-blank screens.

Each of the major architectural service areas—predesign, schematic design, design development, construction documents, negotiation/bidding, construction administration, and supplemental services—contains a list of 16 tasks. The user can modify a Means database to generate construction costs for percentage fee calculations. Once the data is entered, the user chooses either summary fee proposal reports or a full report with comprehensive detail for each project phase.
Designers Research
Circle 233 on information card

Upgraded Thermal Windows
A new line of thermal windows designed and engineered to meet AAMA performance specifications and energy efficiency requirements features a redesigned thermal break with an indented thermal cavity for higher thermal and improved structural performance.

Sealair offers systems for vertically and horizontally pivoted windows; out-swing and in-swing casements; and projected, top-hinged, and fixed windows.

An upgraded version of window hardware includes locking hardware, roto operators, and hinges and pivots; standard hardware is white bronze available with a variety of frame finishes to match window selection.
Kawneer
Circle 225 on information card

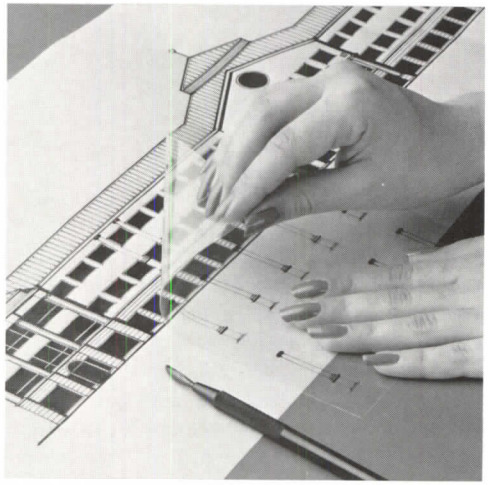


Micro Workstation Table
A 30-inch split surface, adjustable micro workstation table holds a CRT, keyboard, CPU/disc drive and printer on one footprint. The table comprises a sliding VDT surface, a sliding front surface for the keyboard, wire management, and a swiveling side surface on a heavy-duty arm to hold a printer. An accessory CPU holder attaches to the outside of the leg frame.

The user may select the base table in tan, brown, white, black, or gray; and the table top in light or dark oak, beach, tan, or gray.
Human Factor Technologies
Circle 226 on information card

Bronze Sun Control Film
3M claims RE35BRARL Scotchtint Sun Control window film with increased abrasion resistance cuts ultraviolet light by 98 percent, glare by 90 percent and heat gain by 40 percent on ¼-inch clear glass while remaining transparent.

Guaranteed for five years against cracking, crazing, or peeling, a warranty protects against thermal glass fracture for one year after installation.
3M
Circle 227 on information card



Custom Transfers
I.N.T. Custom transfers allow designers to rub down dry transfers of their own construction details, title blocks, and logos as needed—the transfers don't ghost and are eraseable.

Mylar, vellum, or CAD/CAM output original drawings are used to create the ink-quality transfers, which are available in a variety of sizes and in black, white, and selected colors. Designers make up sheets in-house or order them from a Letraset Color Imaging Center.
Letraset USA, division of
Essette Pendaflex
Circle 228 on information card

Drafting/Graphics Catalog
Products for drawing, drafting and planning, as well as a complete selection of plotter points and accessories for CAD and automated plotting systems, are listed in the 52-page Fall/Winter Saga catalog. Drafting film, drafting machines, furniture, lamps, design grids and othe products.
Saga, division of Dade, Inc.
Circle 229 on information card

Low-Profile Solar System
The Sunbank thermosyphon solar hot water system deploys a black chrome absorber with ⅜-inch risers and ¾-inch manifolds to provide quick heat recovery. A 40-gallon tank, insulated with ca polyurethane insulation, provides low he cost efficiency and superior tank stratif cation. Flexible connectors between th tank and the collector make installatio easy and quick. Sunbank comes with a full five-year warranty.
The Amcor Group, Ltd.
Circle 230 on information card

Blueprint Machine
A low cost, compact blueprint machine is so versatile the user can place it on a 24 x 36-inch flat file or a 12-inch-deep bookshelf, hang it on a wall, or transpo it to a job site—ready to operate from the back of a station wagon or truck. The Diazit Dart XL 80 has the capacity to produce the total reproduction require ments of a small manufacturing plant.

The Dart Diazit XL 80 produces sepi or polyester film intermediates as well a blue or black line professional quality prints, up to 30 x 42 inches. To operate, the machine, with a one gallon bottle o reproduction ammonia attached, connects to a standard 110 volt electrical power supply. The user can choose fron a complete line of accessories for the Dart XL 80, including a Diazit Ammoni Arrestor System that is said to reduce ammonia odor up to 90 percent, or the Econo-Arrestor System for low-volume ammonia odor reduction.
Diazit
Circle 231 on information card

Roofing Manual
A new manual on roofing applications and installation specifications features a two-page artist's rendering illustrating how and where four flexible connection products can be placed on commercial buildings to seal against leaks at roof perimeters, roof splits, and roof penetrations. The seven-page, full-color catalog *Expansion Joint Cover and Flexible Connections,* also graphically depicts vertical wall joint closure details, abutment and exterior facade closures, factory-fabricated vertical to horizontal transitions, and perimeter flashing details.
Manville
Circle 232 on information card

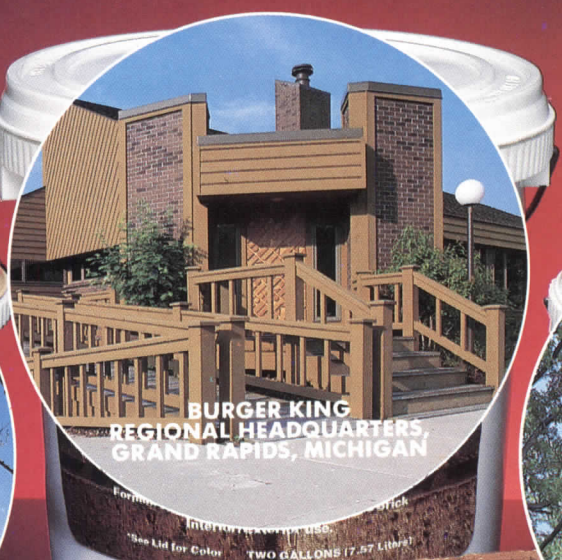
Masterkey Cabinet Locks
The Best Lock 5P cabinet lock masterkeys into any existing or new Best lock system so that one customized key operates office doors, desk, equipment, file

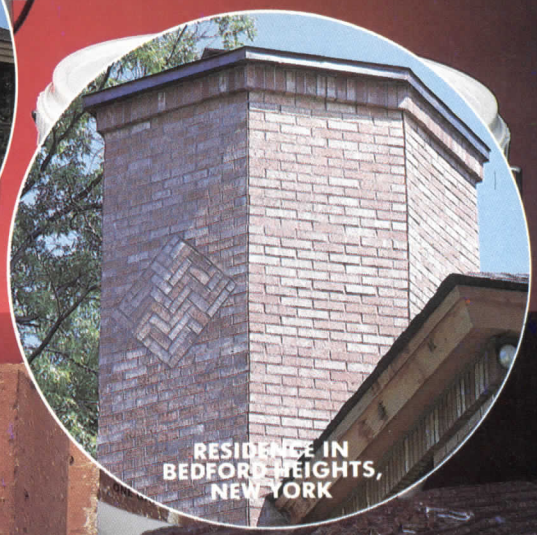
US BRICK SYSTEMS

Insulated 1/2-inch Panelized Kiln-Fired Clay Brick

Maintenance free exterior
nomical and easy installation
Durable and fire-resistant

Enhances property values
Versatile product and systems
Higher insulating "R" factors





Antique Red

(1) Trowel Mortar (2) Apply Brick

Adhesive/
Mortar

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Brick, Inc., Real Brick Products Group,
Vest Main St., Owosso, MI 48867
e information about U.S. Brick Systems call toll-free at
447-7440. In Michigan call 517-723-8380.

The revolution has begun...

Products *from page 142*
cabinets, and other locks. Four mounting types make the 5P adaptable for all standard file cabinets.

Best Lock machines their Lock housings and key plugs in solid brass and finishes them in satin chrome. Precision-machined internal working parts provide maximum security and long service life.
Best Lock
Circle 234 on information card

Thermostat Measures Conditions Inside and Out
Team Perimeter Energy Control uses direct BTU measurements through the skin of commercial office buildings for control of perimeter make up heat in fan-powered boxes.

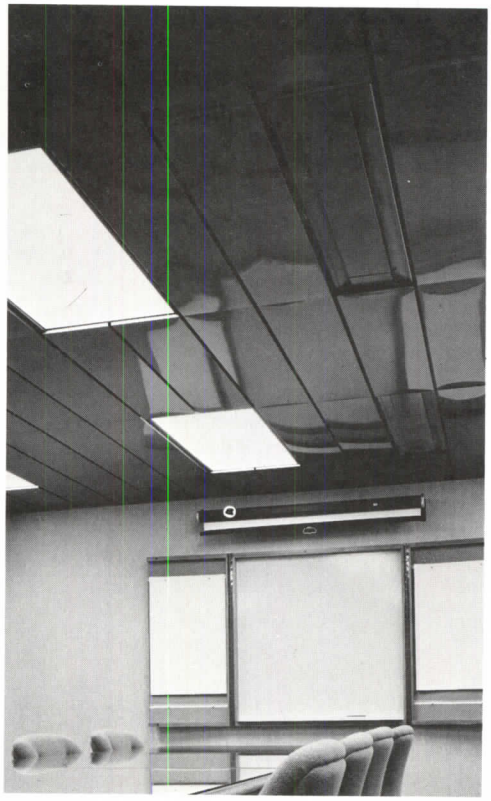
The system responds on a real-time basis to all outside weather conditions, such as solar gain, wind, and rain.
TransMet Engineering
Circle 235 on information card

Air Conditioning Brochure
A brochure describing the Uni-Pak compact, ready-to-install central airconditioning system contains diagrams illustrating the system's components and details of the system's different features. Flexible, pre-insulated ducts allow the Uni-Pak to adapt to any type of structure without major carpentry work.
UniCo
Circle 236 on information card

Free Structural Glazing Brochure
A comprehensive, full-color brochure describing the "Pilkington Wall" all-glass structural glazing system provides pictures of projects installed throughout the world and also contains information on Patch Plate assemblies and the new Planar assembly, which may incorporate reflective and insulating glass.
Pilkington Sales (North America) Ltd.
Circle 237 on information card

New Grout Admix
Laticrete Grout Admix Plus was formulated to allow fast, easy-to-clean addition of grout admixtures without damaging or affecting grout color. The admix resists staining, locks in grout color, and prevents cracking, powdering, and color fading of joints. It produces frost- shock-, and chemical-resistant grouts and joint fillers, which can be used for both interior and exterior applications of ceramic tile, pavers, brick, marble, and natural stone. The Admix forms part of a complete grout system that includes sanded and unsanded grout powders.
Laticrete International
Circle 238 on information card

Ceiling Panels
An aluminum ceiling panel system for use in both new construction or renovation projects features smooth-surfaced or



rier system. Without modification, the Panorama ceiling panels may be incorporated into most standard ceiling grid configurations without removing the existing system. Alcan provides two standard panel sizes: a 2 x 2-foot flush-fitting profile or a 1 x 4-foot profile with a reveal along the four-foot side. The system's options include supplied light and air systems, acoustic treatments, and wall and light trim accessories, but it can also be used in conjunction with existing light and air systems. The user can choose among three standard colors or opt for custom color matching.
Alcan Building Products
Circle 239 on information card

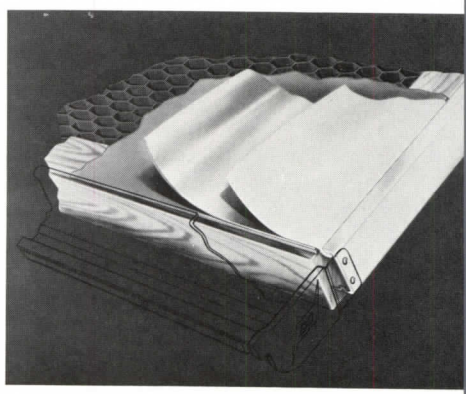
CRSI Guide
A free pamphlet offered by the Concrete Reinforcing Steel Institute (CRSI) gives a comprehensive listing of institute publications and software available on reinforced concrete design and construction. The panel also contains an illustrated outline of each publication's content and function and a complete schedule of indexed bulletins and reports. A supplementary insert describes publication pricing and ordering information, book ordering codes and descriptions for all CRSI literature, and detailed information about order forms, terms of payment, and delivery.
Concrete Reinforcing Steel Institute
Circle 240 on information card

Multi-Use Door Sills
Perma-Door offers three new types of door sills/thresholds for use with a complete insulated steel entry system. When used with extensions, each sill accommodates a number of common jamb depths

conditions. The adjustable and non-adjustable sills, both with effective thermal breaks, feature a nailable polystyrene base designed to reduce door unit assembly time by allowing quick alignment and fastening with either nails or staples.
Perma-Door
Circle 199 on information card

Spray Adhesive
Type 07 spray adhesive, used specifically for wallcoverings, also covers switchplates, outlet covers, and A/C vents. The user can apply wallcovering to metal or plastic fixtures by simply spraying the object, adhering the wallcovering directly to it, and trimming off the excess.
Custom Building Products
Circle 200 on information card

Drawing Table
"Stratasteel" drafting table comprises a cellular core sandwiched between two layers of hardboard and two layers of steel set within a kiln-dried hardwood frame. A light green resilient vinyl with recessed aluminum edge banding covers the top surface. A reversible plastic edge guard on the anodized full-length pencil trough serves as a retainer for drawing tools and can be set flush with the drawing surface to accommodate a drafting machine. The user can recover the table with replacement vinyl surfaces, available with pre-applied adhesives.
Hamilton Industries
Circle 198 on information card



Ceiling Panels
Ceiling panels of woven color fabrics with either square or routed reveal edge detail fit a number of different ceiling plans. Constructed of mineral board and glass fiber substrates, the panels provide sound absorption through mineral board and glass fiber substrate construction. Panels measure 1⅛-inches thick and come in two sizes to fit standard and narrow flange ceiling grids.
Capaul
Circle 197 on information card

Roofing System
A.A.T. 432 Sure-Seal lightweight, adhered roofing system works for both new construction and renovations. The system uses a bonding adhesive that is applied

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People Protecting People

NFPA®

Circle 48 on information card

Products *from page 144*
to the substrate and requires no ballast. The talc-free undersurface is designed to adhere quickly and easily; talc on the upper surface acts as a lubricant to enable the membrane to slide into place. The roofer uses splice tape to make permanent field seams, pressing the membrane edge into place and rolling it with a two-inch steel roller.
Carlisle SynTec Systems
Circle 196 on information card

Insulation Panels
The thermastructure building system uses interlocking load-bearing insulation panels made of a solid composite of expanded polystyrene and galvanized steel. Each standard 4 x 8-foot panel weighs approximately 45 pounds and is assembled with ship lap joints and self-tapping metal screws. The manufacturer presizes the moisture- and mildew-resistant panels. The user can specify most standard siding, roofing, or interior finishes to finish the panels.
RADVA
Circle 194 on information card

Mobile Terminal Stand
AnthroCart deluxe modular computer stand comes equipped with two shelves, three legs, a tubular base with four castors, document holder, six outlet surge protectors, and three cord management

clips. Carts measure 30 or 36 inches in depth, and holes in one-inch increments along the legs allow shelves to be adjusted. Optional components include paper feed and catch, printer basket, sidecar, and rover. The cart is available in gray or tan.
Anthro
Circle 195 on information card

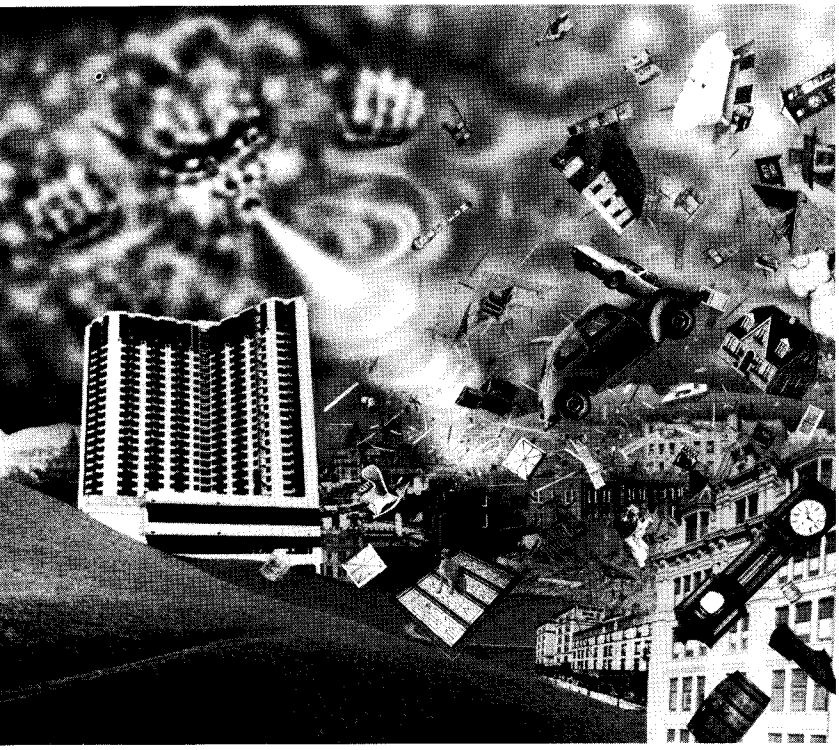
Door Controls
Sentronic closers/holders for fire and smoke barrier doors automatically close designated doors when smoke is sensed by a built-in or remote detector. The SED model contains an adjustable single poin control and a low friction track and rolle Single lever arm adjusts to locate hold o open positions at points from 85 to 110 degrees in three degree increments. The unit works for either push or pull opera tion.
LCN
Circle 193 on information card

Roof Window System
Sunrise roof window system consists of ⅛-inch dual panel insulating glass with a low "E" tempered glass coating assembled in a lightweight extruded aluminun frame.

A baked acrylic polymer coating on the exterior and a white vinyl finish on the interior make up the aluminum fram profile. "Silglaze N" silicone sealant triple-seals the insulated glass. The unit operates by hand-cranked, pole-cranked or motorized control.
Roto Frank of America
Circle 192 on information card

Work Table
Rectangular work table has 1¾-inch tubu lar steel legs and a 1¼-inch thick table top with a composite wood core and a surface of veneer or plastic laminate. Solid beech forms the edge. The buyers can choose legs with an epoxy coating i maroon, black, white, or gray, and the

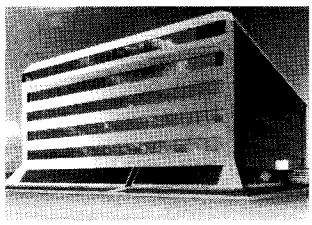
continued on page 1



PLEKO'S THERM SYSTEM STANDS UP TO JUST ABOUT ANYTHING THAT BLOWS YOUR WAY.

With Pleko's mechanical fastener, our Therm System is designed to withstand even the most serious of wind loading conditions. And unlike conventional glue-on applications that are too often gone with the wind, the Pleko fastener holds the insulation board securely to the substrate. And Pleko's insulating exterior wall coating system is built to take the heat or the cold that can crack, chip and fade many finishes.

Pleko's unique fastener provides building owners with long-term security.

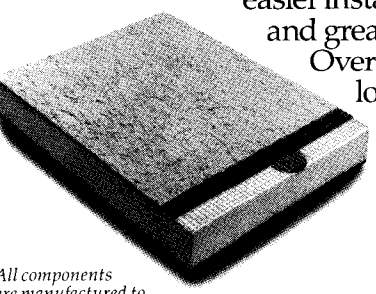


A wide range of finish textures and colors offer many design possibilities.

For new construction or retrofit projects, Pleko's Therm System saves time and money. Pleko means faster and easier installations, less material waste, and greater job site efficiency.

Over the long run, energy savings and low-cost upkeep save even more.

Talk to the Pleko distributor in your area. They can show you why the winds of change are moving towards Pleko.



All components are manufactured to achieve excellent R-values and meet ICBO fire requirements.

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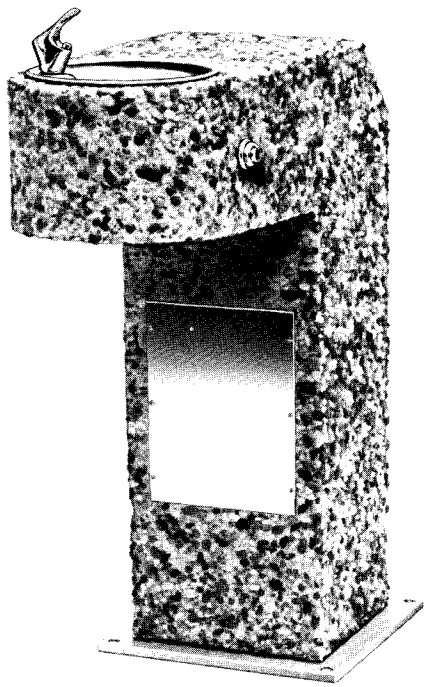
e 50 on information card

When your client says "High traffic location," this is the one. It's the Survivor.

Stern-Williams rugged outdoor drinking fountain reduces work for maintenance departments, frustrates vandals, and serves wheelchair users as well as the general public. And it's better looking than the competition. We designed it that way. PROOF: outdoor drinking fountains can be rugged and beautiful, too.



Model APF-3501

STERN-WILLIAMS, INC.
P.O. Box 8004 • Shawnee Mission, Kansas 66208

We make drinking fountains. We deliver dependability.

Circle 51 on information card

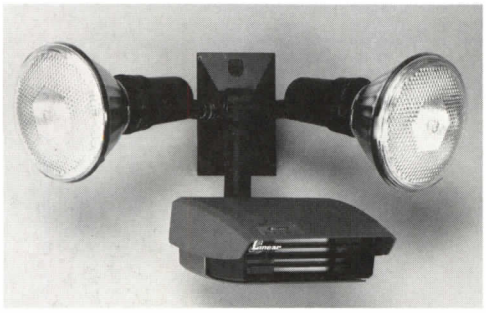
Products *from page 146*
lacquered top comes in natural beech or black stained mahogany.
Kroin
Circle 191 on information card

SMART-HOUSE PRODUCTS

Outdoor Light Detector
LightWatch II, an outdoor automatic light control, uses a sensor to turn lights on whenever it is dark and a person or vehicle enters its 40-feet detection area. The lights remain on as long as activity is detected within this radius. When the activity stops, the control waits for a preset, adjustable delay and then turns lights off. The LightWatch II's light sensor disables the control during daylight hours.

External accessible adjustments include a sensitivity adjustment to vary the detection area and a delay adjustment to vary the reset (turn off) delay.

The LightWatch II can be purchased as a 120 VAC or a 220 VAC model. Either is sold as a control alone (to use with existing lighting), or with one or two preassembled 150-watt lamp holders.
Linear
Circle 205 on information card



Computerized Management System
The HomeBrain monitors security, energy management, lighting, appliance control, vacation, and home maintenance through the use of a complete, stand-alone package. The HomeBrain runs by itself once programmed through a personal computer. Once programmed, the system can be linked to a PC to accommodate individual specifications.

The homeowner can access the standard system by telephone. Standard commands include: to turn lights on and off as a person enters or exits a room, to turn on outside lights when a car pulls into the drive, and to make all lights in the house flash while an automatic dial out is made to police in the event of a break-in.

A battery inside the system's clock keeps accurate time and date even during leap year and allows operation in the event of a power failure.

An optional color touchscreen allows control by touch through only one monitor. Voice output that responds whenever the screen is touched to activate a command is also available.
Hypertek
Circle 206 on information card

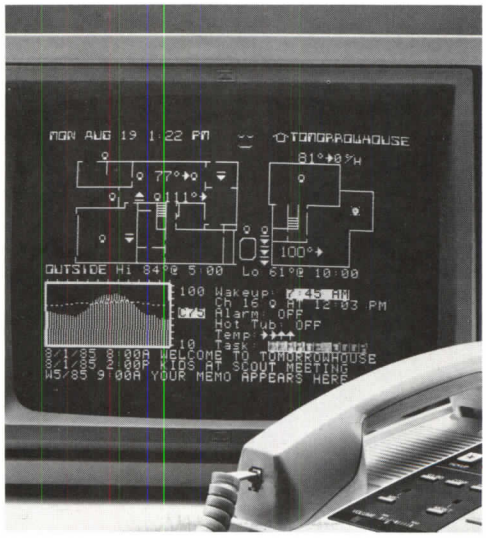
Automatic Motion Detection System
The Litronic RF and Litronic RF2 motion detection systems are two of a series of security lighting devices designed for residential, commercial, and industrial use.

The Litronic RF provides security and energy management control of lighting through automatic light switching when motion is detected, utilizing a preset time delay feature that switches off the power once motion is no longer detected. The user can adjust detection and time delay patterns. The unit contains a built-in photodetector for night operation, and operates in one of three modes: manual, automatic, and darkness-only.

The Litronic RF2 automatic light motion detector can be activated within three adjustable light patterns, with adjustable sensitivity and time delays. Additional detectors extend coverage to larger or unusually shaped areas.
Lithonia Control Systems
Circle 207 on information card

Presence-Sensing Light Switch
The new Ultralight 800 presence-sensing automatic light switch turns on lights automatically when a person enters the room and switches them off if no presence is detected for a pre-programmed period of time ranging from five to 25 minutes.

Ultralight 800 controls up to 800 watts (incandescent or fluorescent) and operates on any voltage from 125-277 VAC. The control directly replaces a standard light switch, or can be installed in single- or double-gang boxes. The unit features a switch enabling the user to turn lights off manually.
International Conservation Systems
Circle 208 on information card



Programmable Home Control System
Household "basics" such as lighting, the HVAC system, appliances, waterflow and security are the objects of control by the TomorrowHouse control system. Designed to accommodate the user's preferred groupings of instructions with respect to time of day, date, temperature, light level, moisture level, smoke, motion, pressure, and sound, TomorrowHouse adjusts appliances to the constantly changing home environment. The modular system can control up to eight HVAC systems simultaneously.

Designed for the non-technical user with optional user-specific programming, the menu-oriented program contains help screens to assist in its setup and use. The IBM version offers the use of color graphics.
CompuHome Systems International
Circle 209 on information card

Digital Control Home Security System
The Magnum Alert-850 (MA-850) allows eight individual zones to be programmed as burglary zones with entry/exit delays and also as fire zones. The control panel enables these zones to be shunted in a variety of ways. The control panel also provides a built-in "priority with bypass" as well as a "fault-find" feature for trouble shooting.

The digital display keypad identifies zones in alarm, alarm memory, trouble, or shunted condition. The keys have a second (hold down) function to permit siren test, cancel entry delay, display shunted zones, program user codes, display alarm history, chime mode, as well as panic and ambush and AC power failure indicators.

The MA-850's integral communicator is compatible with all major receivers. It can transmit door openings and closings with user identification, has outputs for long-range radio transmitters, and offers a confidence test to check phone lines.

The system, housed in a large cabinet, comes with a built-in dual-tone siren driver and rechargeable battery.
Napco Security Systems
Circle 210 on information card

Comprehensive Management System
The Home Manager's 14-inch, wall-mounted touchscreen displays the house floor plan and step-by-step commands, enabling the user to manage security, heating and cooling, appliances, lighting and outdoor equipment.

The system's comprehensive energy management component regulates heating and cooling in up to 20 zones. Each zone can be maintained at a different temperature, and each can change up to six times daily. The homeowner can preset varied schedules for weekdays, weekends and vacations, or other special conditions.

The system accepts all types of standard security input devices and can monitor up to 24 zones. The system also detects smoke and fire and can provide alarm service with a relay output, as well as a siren driver attached to a speaker. Authorized people can gain access to specified zones at particular times with passcodes.

The Home Manager also controls appl

continued on page

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IFRAA is an affiliate of the American Institute of Architects.

Increase your knowledge concerning the need of today's Liturgist, Clergy, Artist and Building Committees. Better understand the acting contemporary influences on modern design parameters.

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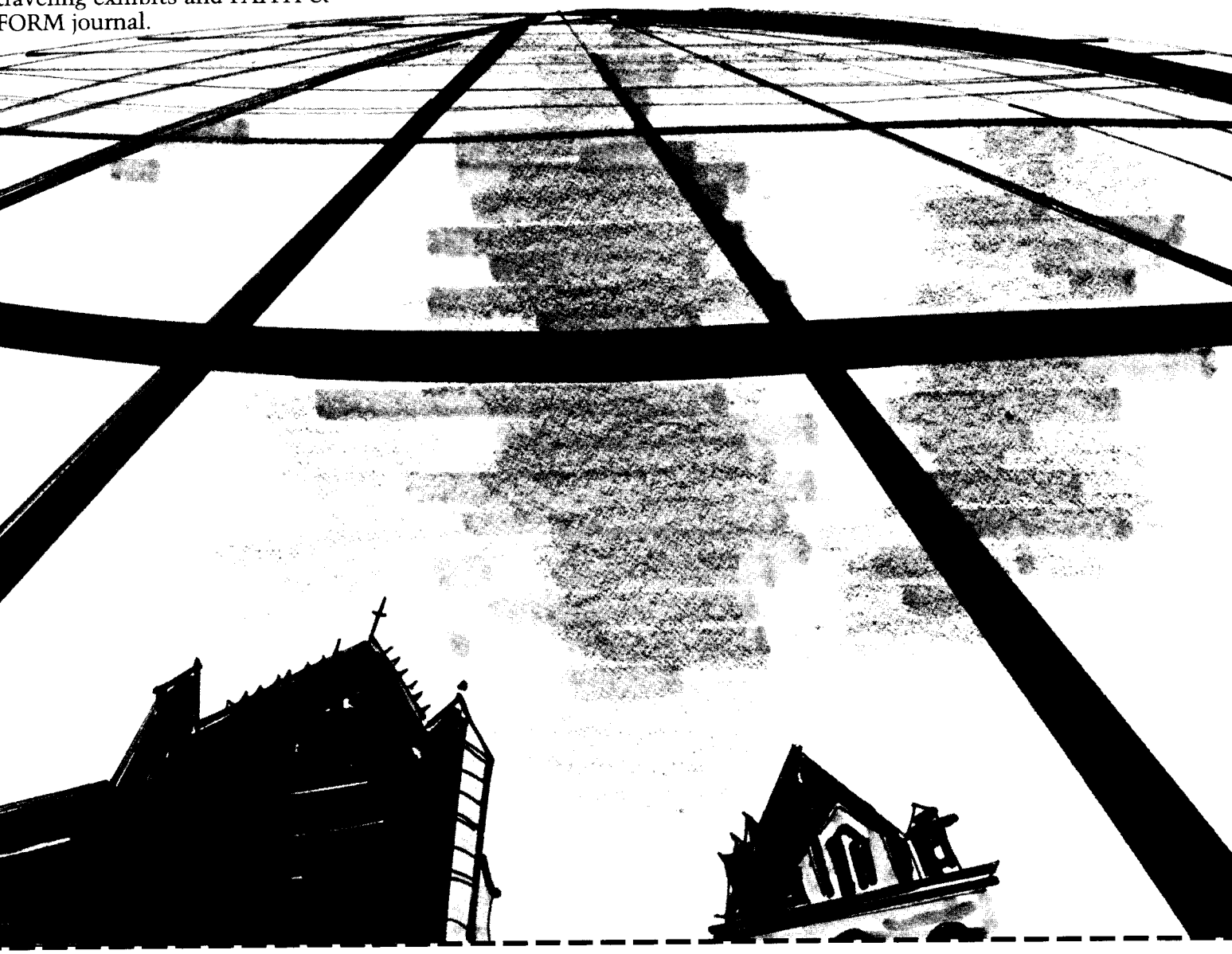

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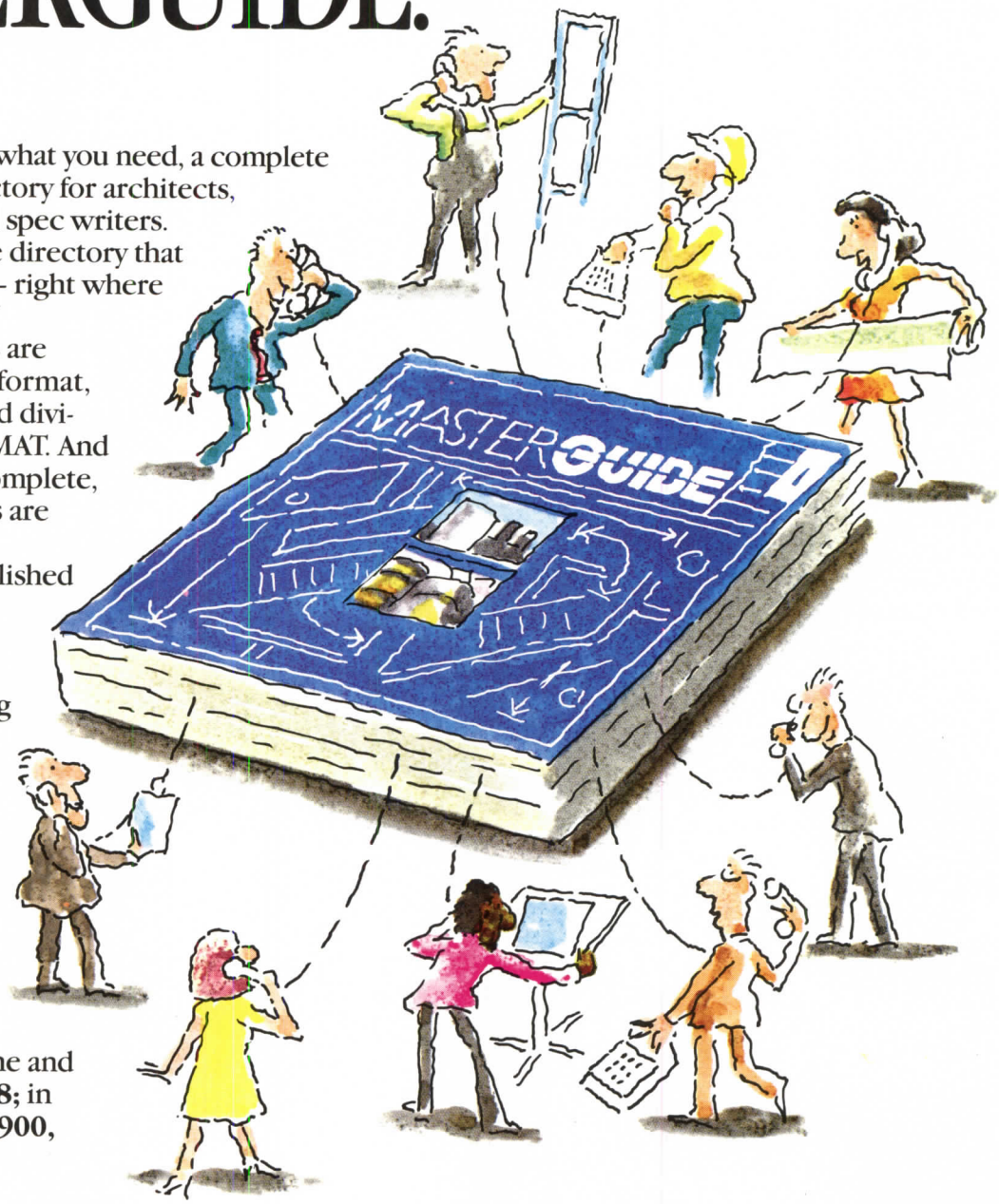

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oducts *from page 148*

ces, indoor and outdoor lighting, pool uipment, automatic sprinkler systems, unas, jacuzzis, and greenhouse climate stems. Systems connected to the Home anager operate directly through low-ltage wires, or without wires using mple control modules plugged into up 64 standard AC circuits, controlled gether or on independent schedules. The system's central control unit, stalled in a utility closet or basement, mprises: electronic hardwire; a 24-hour ock that automatically adjusts for day-ht savings time and leap years; non-latile memory, which remembers the er's settings for up to 1,000 hours dur-g extended power failures; optional bat-ry back-up for uninterrupted security ring power failures; and manual over-de. Built-in circuitry and software allow e homeowner to expand the system's pabilities.

nity Systems
ircle 212 on information card

ontrol System Utilizes Television Set

ne HomeMinder electronic control sys-m works through existing house wiring control up to 100 lights and appliances side and outside the home.

The system runs as a free-standing unit at works through a standard television as a feature built into a 25-inch GE omponent television. By using graphic splays on the television monitor, the ser programs the heating and cooling well as lights and appliances. Each omeMinder system comes equipped ith one light module and one appliance odule.

The system contains a remote control nit, telephone cable to connect the sys-m to any modular telephone jack for perating the system outside the house, nd connecting cable and video connec-rs for the standard television hook-up. ppliance and lighting modules are sold eparately. An optional MiniMinder ontroller installed elsewhere in the ouse can control up to eight lights and ppliances.

General Electric
Circle 213 on information card

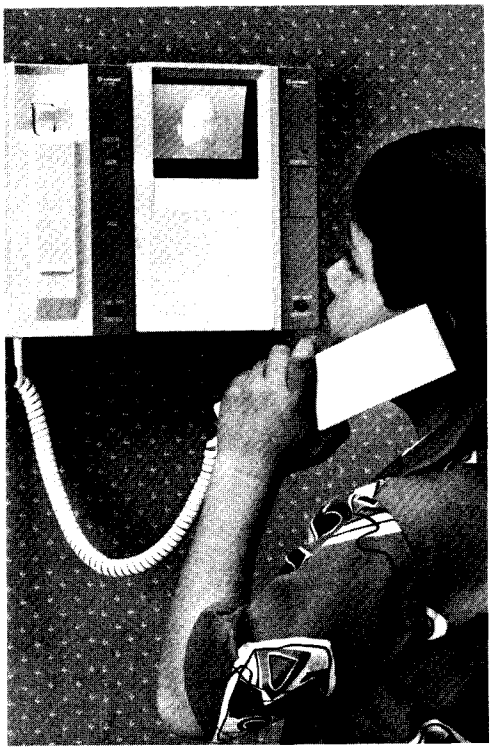
Enhanced Clock Thermostat

An enhanced version of the T8200 micro-electric clock thermostat makes interface with the thermostat and heating/cooling system easier than with previous models.

The T8200 features include an energy-saving light indicating when the thermostat is in offset mode (either setup or setback), a system light indicating when heating/cooling equipment is operating and offset adjustments in 2.5 degree increments, enlarged graphics, and a continuous digital clock readout.

The thermostat runs on a schedule at two energy-saving and two comfort periods a day. The user may skip the daylight offset period on weekends, while maintaining a nightly schedule seven days a week. The thermostat can also skip the next programmed energy-saving period.

Honeywell
Circle 214 on information card



Residential Video Intercom

The Aiphone video intercom allows residents to see and talk with visitors before opening the door. When the outside call button is pushed, a lamp automatically illuminates the caller in a soft, unobtrusive light. An inside monitor displays the caller's image immediately after the call tone sounds. The outside intercom enables the caller to talk completely hands-free.

Each station contains an instant-on television screen, handset, volume control, contrast/brightness adjustment, door release button, and a monitor button for audio and visual surveillance of the entry area. Each room station is less than seven inches wide, projects 2 5/8-inches from the wall and is 1 9/16-inches deep.

The outside heavy-aluminum door station, designed to be vandal-proof, houses a wide-angle camera lens with a 50-degree coverage. A high impact-resistant shield protects the camera lens, and a beam sensor protects against excessive light.

continued on page 152

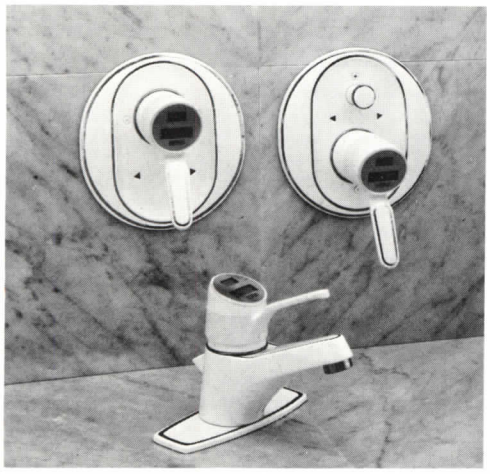
Products *from page 151*

The intercom's single coaxial cable between stations handles sound, video, and power.
Aiphone
Circle 215 on information card

Autofill Bath System

The Autofill bath system, available on five foot and six-foot Infinity Bath Whirlpool bathtubs, features an advanced, time-based microprocessor control with two operating modes—"on command" or "programmed." The user determines the time, water level, and temperature of the bath.

Using the "on command" control at a touch of a button, the bath fills to the previously determined water depth and temperature. The "programmed" mode fills the bath automatically to specifications set up to 24 hours in advance.



The bath drain closes automatically, and a level sensor prevents over-the-rim filling. The wall-mounted system control module encases a digital clock. A battery backup system supplements the low-voltage power systems to maintain settings in the event of a power failure.

The Autofill Bath System also permits manual filling using a conventional two-valve system and integral fill. The Infinity bathtub features a body-contoured design, integral fill and overflow with no protruding spout, a master console to group controls together, and fully adjustable brass whirlpool jets.
Kohler
Circle 216 on information card

Off-the-shelf Plumbing System

Ultraflow plumbing system replaces the traditional system of hot and cold water faucets and regulates water flow and temperature at a central unit through the use of remote control buttons. In other applications it can serve as toilet fill tubes and timed urinal flushes.

Pushbuttons located at each water flow outlet provide automatic preset temperature control and pressure selection. Blending of hot and cold water can be preset at eight different temperatures and delivered automatically to the user without prolonged running of water. Th system, designed to be both water and energy-efficient, provides equalized pre sures and a controlled flow of water, ope ating at 12 volts or less. Control switche are insulated and waterproofed.

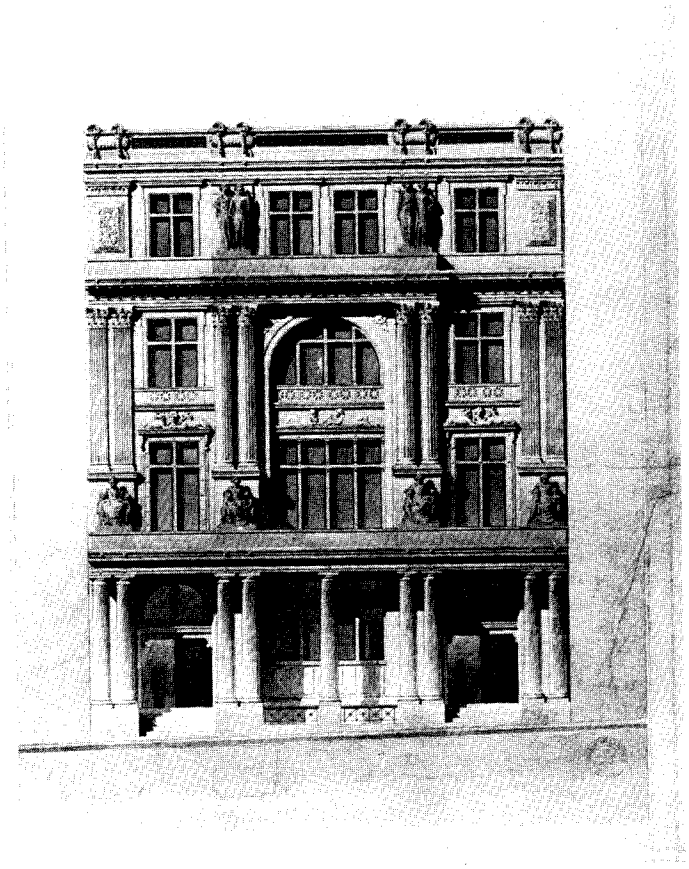
The flexible copper and plastic lines fit from the remote valve unit directly without elbows, T's and other fittings. The system is approved by the three model codes and is listed by Underwriter Laboratories for electrical safety.
Ultraflow
Circle 217 on information card

Remote Controlled Home Security

Amgard II, a six-zone, wireless, remote controlled home security system comes equipped with a programmable feature allowing users to customize the installation.

Standard features include: electronic monitoring of door and window transmitters; a portable keyboard to control system functions within 100 feet of the console; a personal security code; and a household lighting control that automat cally turns on lights if the alarm is triggered or operates the lights by remot control without sounding an alarm. An optional dialer and monitoring center pr gram communicates with a monitoring station in case of burglary, fire, medical

continued on page 15



RICHARD MORRIS HUNT
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owing its premier at the Metropolitan eum of Art, a major exhibition, "The itecture of Richard Morris Hunt," opened at Octagon Museum, Washington, D.C., ember 12, 1986, and will continue through ember 28. Organized by the American tute of Architects Foundation and the ropolitan Museum, New York, the exhibition tains 200 original drawings and historic tographs, documenting Hunt's career. The ibition will travel to the Art Institute of cago and the Tacoma, Washington, Museum Art in 1987.

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Products *from page 152*

or other emergencies.

The system distinguishes among the four types of alarms. If an alarm reaches the monitoring center and a verifying telephone call made to the premises goes unanswered (or is answered without a prearranged code), the system relays an alarm to the selected emergency personnel. Other options include a smoke detector interface.

Amway
Circle 211 on information card

Liquid Crystal Display Faucet

The Ceramix Electronix line of bath and kitchen faucets now offers a built-in sensor to measure water temperature in degrees Fahrenheit and gives a continuous solar-powered digital readout on the handle.

One handle controls both volume and temperature. The unit automatically compensates for water pressure changes to maintain constant water pressure. A long-life lithium battery provides auxiliary power to compensate for low light conditions. Special circuitry preserves the battery by shutting off the display when the room is completely dark.

Faucets for both four-inch center and single hole lavatory, one hole over-rim bidets, and wall-mounted showers complete the Ceramix Electronix line. Finishes include chrome, brass, bone, white, gold, and white with gold trim.

American Standard
Circle 219 on information card

Computerized Irrigation Controller

A 12-station micro-computer irrigation controller from Weather-matic features a high-intensity LED display for improved daytime visibility and a program display showing current time and program values.

Options include dual watering programs to provide two separate watering schedules with four daily start times, as well as a six- or seven-day calendar to indicate the days selected by LED display.

Several troubleshooting features come into play when a problem occurs. A start-up/back-up program provides 10 minutes of daily watering on each station when the controller has been without power for an extended period of time, and a self-charging battery back-up retains program schedules and the time if a power failure occurs. A "short sensor" detects shorted valves and skips watering on that station until the problem is fixed.

All Mark Series controllers are available in UL-listed rainproof aluminum, plastic, or heavy-gauge, industrial-grade steel.

Weather-matic
Circle 221 on information card

Electronic Thermostat

Five different preset programs in memory and an override switch providing constant control or setback are features of the Tybox thermostat.

Preset programs include providing minimum heating, lowering of night temperature and reducing temperature day and night except during pre-scheduled breakfast and dinner times.

The Tybox features a 24-hour digital clock, an economy setback selector, a program selector for one of the five preset programs, and a baseplate that replaces existing thermostats and connects the central heating system using the same wires. The thermostat operates for over a year on three penlight batteries.

Delta-Dore Electronics
Circle 222 on information card

Lighting Control Systems

A control system specifically designed for custom residential and commercial application utilizes low-voltage signals to control lights from different locations.

LiteTouch switches lights on and off, and offers full range and preset memory dimming. Its remote control interfaces with other, larger capacity dimmers.

Decorator switch stations come in a wide variety of finishes, including chrome, brass, bronze, copper, or prime coat (to allow the user to paint or wallcover the switch plates.) A single LiteTouch wall station replaces up to nine conventional wall switch plates. Individual LEDs enable the switches to glow when the corresponding light fixture is on.

LiteTouch
Circle 224 on information card

Technologically Oriented Bathrooms

Using Ambience multi-function electronic computer controls and a Sensorium whirlpool tub, a user programs the tub to fill to the desired depth and temperature up to 24 hours in advance. A code enables the user to program the whirlpool from a touch phone. Remote control permits lights to be dimmed or turned on and off, music to be turned on or off and volume-adjusted, and locked doors to be monitored and opened.

The wall-mounted Ambience computer and a waterproof, portable remote control allow users to operate the tub from across the room or from another part of the house. Ambience controls up to five appliances throughout the house. In addition, the Ambience package contains a remote-controlled stereo system, as well as a compact disc player, radio, tape player and record player. An optional television controller allows the user to change channels, adjust volume, and turn equipment on and off.

The Sensorium bathtub has six water jets that operate at high and low speeds. A champagne air pump blows extra air through the jets, creating frothiness. The bathwater is maintained at a constant temperature, and a pool light illuminates the bath water.

American Standard
Circle 220 on information card □

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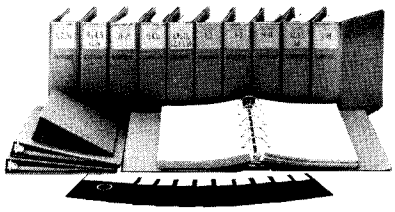

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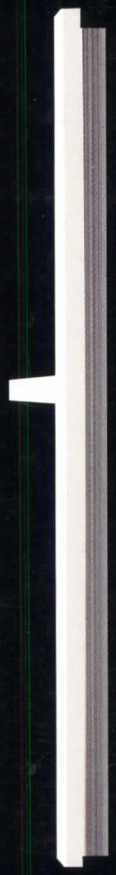

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