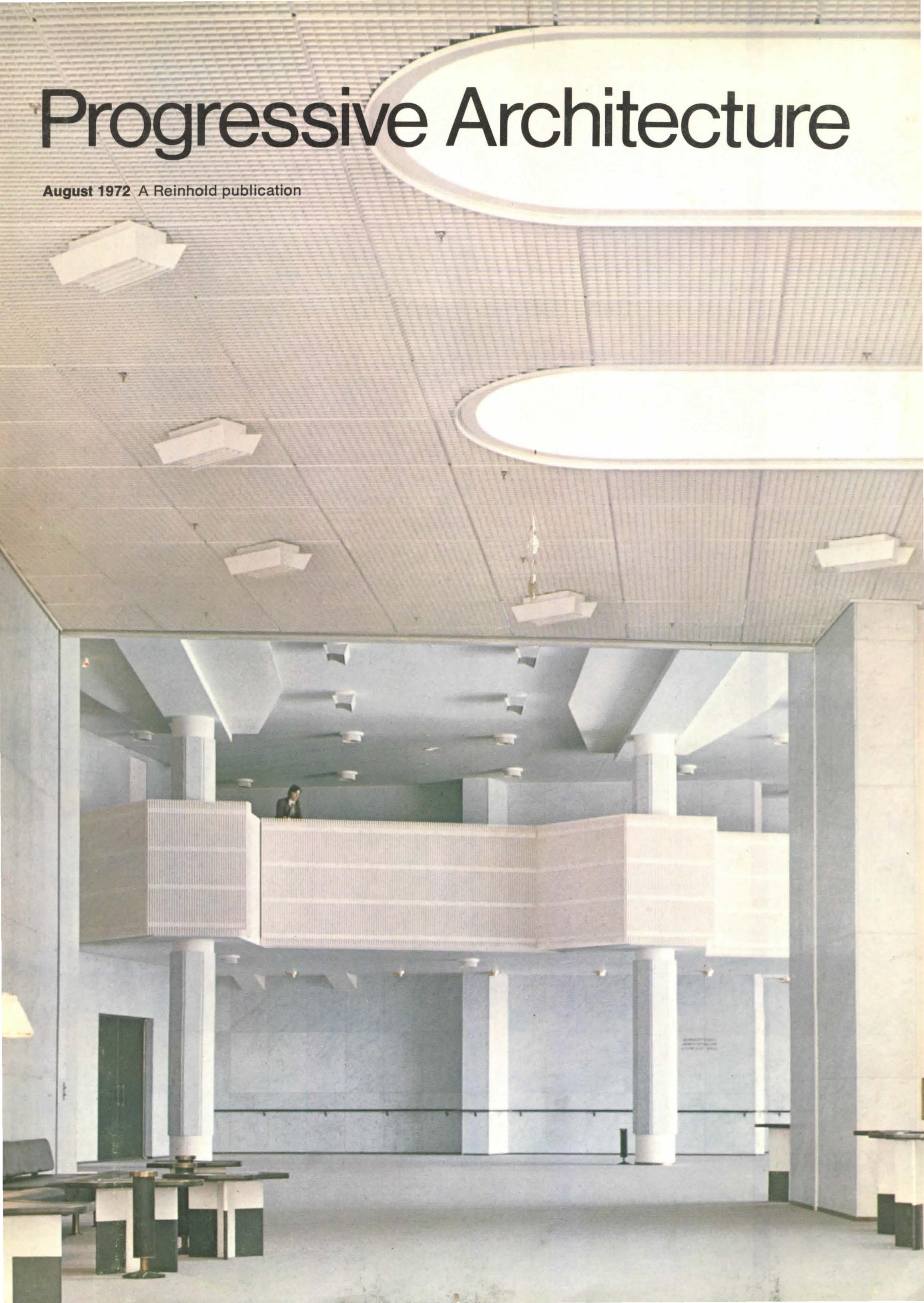
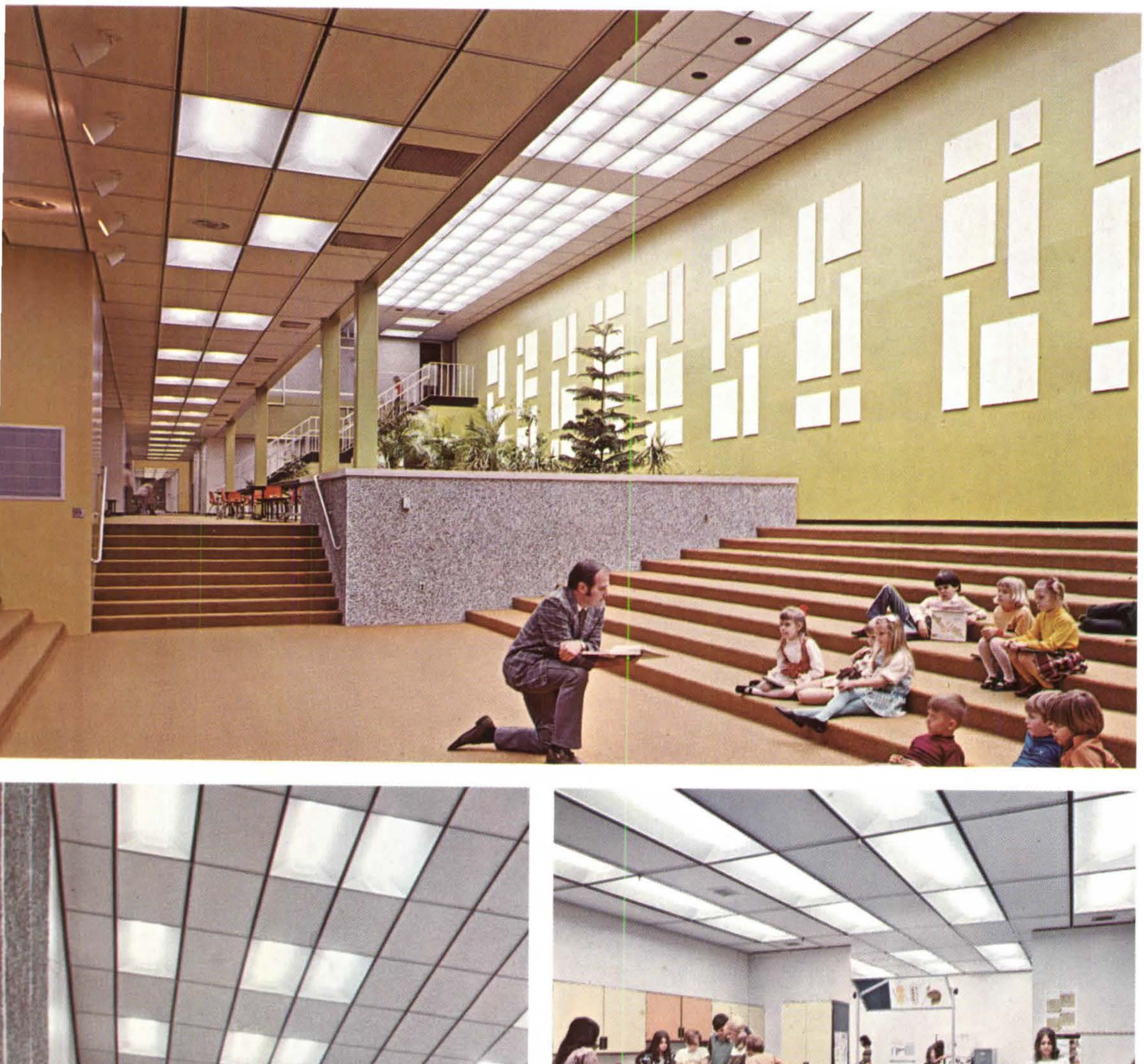
Progressive Architecture

August 1972 A Reinhold publication



What makes this ceiling right for this job?

It's a flexible system for a flexible school.



The school you see here is two schools in o
A ceiling system with great flexibility and versatility was needed to make the combination work.

In Newark, Delaware, the Ramon C. Cobbs Lower School and the Martin J. Gauger Midd School were combined in one new building for students from kindergarten age to 15 yea old. The building had to be flexible to handle this wide range of student ages. Contributing to the flexibility is the Armstrong C-60/30 Luminaire Ceiling System.

A changing enrollment meant areas allocated to the Lower School one year might become part of the Middle School next year. So partitions had to be moveable and lighting, flexible. With an Armstrong Luminaire Ceiling System, wall panels can be removed, relocat and reattached to the C-60 grid. Lights can b moved to any module.

Because the floor plan provided large open areas with no doors on most classrooms, an acoustically efficient ceiling was a must. Arm strong C-60/30 Luminaire met this requireme

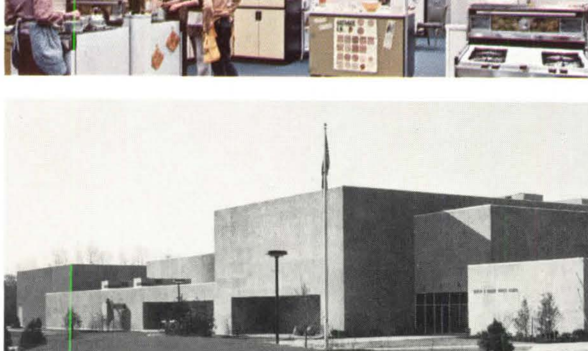
Conditioned air is handled through the ceilin system, diffused via Supply-Air Linear Diffuse and returned through tees and light fixtures. Sprinklers and speakers are neatly incorpora into the ceiling, too. Yet with all this integration of services, there's little exposed hardware to detract from the ceiling's good looks

For full information on C-Series Luminaire and other Armstrong Ceiling Systems, write Armstrong, 4208 Watson Street, Lancaster, Pa. 17604.

OWNER: Newark School District, Newark, Delaware
ARCHITECT: Richard Phillips Fox, A.I.A., Inc., Newark, Delawa
GENERAL CONTRACTOR: Wm. C. Ehret, Inc., Wilmington, Delaware
MECHANICAL/ELECTRICAL ENGINEER: Furlow Associates, I Philadelphia, Pennsylvania
CEILING SYSTEMS CONTRACTOR: Union Wholesale Compar Wilmington, Delaware

Circle No. 328, on Reader Service Card

Armstrong CEILI SYSTE THAT WO



The DURCON® work surface, uniquely economical because almost nothing affects it!

DURCON lab tabletops, troughs and *formed sinks* offer an unparalleled combination of toughness, heat and shock resistance, and chemical resistance. The result is virtually permanent, replacement-free service life.

Neither chemical action nor thermal shock will destroy a DURCON surface. Example: DURCON sinks will withstand the disposal of boiling corrosives. And even after several minutes exposure to the flame of an overturned burner, a DURCON tabletop remains undamaged.

DURCON surfaces are also impermeable to moisture. Since they will not absorb dyes nor similar reagents, they remain contamination-free and germ-free.

DURCON equipment is economical because of its permanence. The first cost is the last cost.

DURCON sinks, troughs and worktops are available in a wide range of sizes and types. Write for information.

DURCON STANDS UP TO:

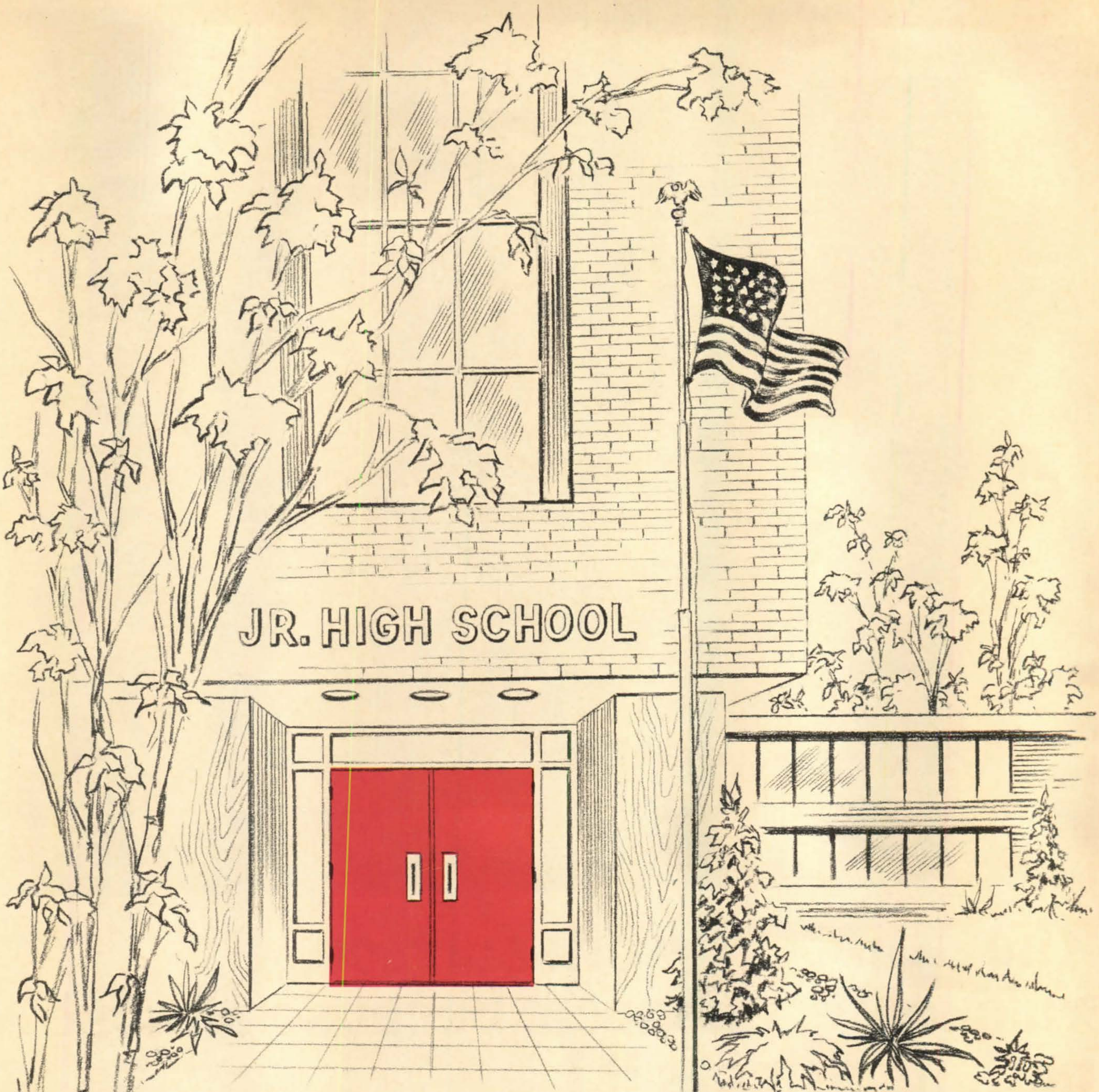
- **Heat**
- **Shock**
- **Chemical Reagents**
- **Solvents**
- **Dyes**
- **Moisture**
- **Bacterial Contamination**

DURCO

CRAFTED TO LAST, FOR THE LONG RUN

THE DURIRON COMPANY, INC., DAYTON, OHIO 45401

Circle No. 338, on Reader Service Card



Remodeling or expanding...there are Steelcraft doors and frames to fill every opening.

Take out the old and the weak . . . put in a new Steelcraft steel door and frame entrance system. Steelcraft doors can be easily installed in any type of existing frame or they can be installed by replacing the existing one with a new steel frame. Modification to fit existing conditions can be made instantly by your local Steelcraft distributor. He is ready to serve your remodeling requirements.

Steelcraft® Manufacturing Company

9017 Blue Ash Road, Cincinnati, Ohio 45242 U.S.A.
Phone (513) 791-8800

An American-Standard Company

Circle No. 398, on Reader Service Card

Editor
John Morris Dixon, AIA

Executive Editor
Burton H. Holmes, AIA

Managing Editor
Rita Robison, AIA

Associate Editors
David A. Morton, Features
James A. Murphy, AIA, Features
Clinton A. Page, News Report
Sharon Lee Ryder, Interior Design
Joyce Reback, Products, Book Reviews

Copy Editor
Charlotte Van Voorhis

Editorial Assistants
Rose Calomino
Barbara McCarthy

Graphics
Joel Petrower, Art Director
George Coderre, Assistant Art Director
Anne Marie Sapione, Art & Production
Nicholas R. Loscalzo, Architectural Drawings
Bradbury Thompson, Graphics Consultant

Contributing Editors
Esther McCoy, Architecture west
Norman Coplan, It's the law
Bernard Tomson, Hon. AIA, It's the law
E. E. Halmos, Jr., Washington report
Harold J. Rosen, PE, FCSI, Specifications clinic
Syska & Hennessy, Inc., Environmental engineering

Publisher
Harrington A. Rose

William F. Bondlow, Jr., Adv. Sales Manager
Burchard M. Day, Promotion Director
Joseph M. Scanlon, Production Director
Daniel H. Desimone, Production Manager
Janice Carmichael, Assistant Production Manager
Frank Voskovitch, Circulation Director
Marc Ross, Fulfillment Manager
Walter L. Benz, Research Director
E. M. Wolfe, Reader Service Manager

Litton

Progressive Architecture, published monthly by Reinhold Publishing Company, Inc., Division of Litton Publications, a subsidiary of Litton Industries. Philip H. Hubbard, Jr., President; Harry I. Martin, Vice-President; Charles O. Bennewitz, Treasurer; Kathleen A. Starke, Secretary; Robert W. Roose, Vice-President. Executive and editorial offices, 600 Summer Street, Stamford, Conn. 06904.

For subscription or change of address write Progressive Architecture, 25 Sullivan St., Westwood, N.J. 07695, giving former as well as new address, zip codes, recent address label if possible. Allow two months for change.

Subscriptions payable in advance. Publisher reserves right to refuse unqualified subscriptions. Subscription prices to those who, by title, are architects, engineers, specifications writers, estimators, designers, or draftsmen, and to government departments, trade associations, above title groups on temporary military service, architectural schools, architectural students, advertisers and their employees; $6 for one year; $9 for two years; $12 for three years. Professionals outside the U.S., U.S. Possessions and Canada: $18 for one year; $24 for two years; $30 for three years. U.S., U.S. Possessions and Canadian nonprofessionals: $12 for one year. Foreign nonprofessionals: $30 for one year. Single copy $3, payable in advance. Indexed in Art Index, Architectural Index, Engineering Index. Second-class postage paid at Stamford, Conn. and additional offices. Volume LIII, No. 7. Printed in U.S.A.

August 1972

Progressive Architecture

50 **Helskinki's cause célèbre**
Aalto's latest work, Finlandia Hall, is a concert and congress center that provokes strong opinions about monumentality, costs and acoustics

58 **Olympic site designed for the future**
Planners and architects for the Munich Olympic Games site deserve a gold medal for providing instant re-use as a college, housing and park

70 **Interior design: Process planning**
Interior planning for an as-yet-not-determined office space yielded a framework to be used as a set of tools rather than as a static design

74 **Materials and methods: Acoustical misconceptions in open planning**
Acoustical problems need not always be the price paid for use of open planning in interiors; author Rein Pirn suggests ways of taming them

76 **Air fare**
David H. Geiger contributes a structural analysis to P/A's look at the latest developments in air structures, from new fabrics to new uses

Departments

9 Views
25 News report
38 Products and literature
49 Editorial
90 Specifications clinic
92 It's the law
98 Books
132 Job mart
136 Directory of advertisers
139 Reader service card

Cover: In the concert hall foyer of Alvar Aalto's Finlandia Hall (p. 56), sparse accents of blue-black furniture and natural wood paneling (not shown in photo) enhance the subtlety of the all-white space. Photo: Richard Einzig.

Dover delivers

the right combination of elevators

Three types of elevators were required for this residential complex at the University of Wisconsin-Milwaukee. Characterized as a micro-cosmic city with facilities for relaxation, food service, socializing, and parking, it has living-study accomodations for 2,000 students.

The 28-story tower is the tallest building in Wisconsin as well as the tallest poured-in-place concrete structure in the state. High-speed Dover gearless traction elevators were specified for it and for the adjoining 20-story unit. In the 16-story facility, where medium elevator speed was sufficient, less expensive geared traction equipment was used to provide efficient service.

The third type of Dover elevator, Oildraulic® powered, is used in the two-story commons building for freight service. Because it is pushed up by an oil-hydraulic cylinder, no penthouse is required and roof line can be clean and uncluttered.

Dover control systems match Dover hoisting equipment in versatility and flexibility, assuring maximum carrying capacity of the elevators under varying traffic conditions.

With this wide range of elevator systems, Dover has the capability for providing the best combination of hoisting machines and controls for almost any building. Let us work with you at the planning stage. For literature, write Dover Corporation, Elevator Division, Dept. B-4, P. O. Box 2177, Memphis, Tenn. 38102. In Canada, Dover/Turnbull, Toronto, Ont.

DOVER

dependable elevators

CARL SANDBURG HALLS OF RESIDENCE, UNIVERSITY OF WISCONSIN–MILWAUKEE. *Architects:* Schutte, Mochon, Inc., AIA, Architects • Planners • Engineers • Construction Managers, Wisconsin, Ohio, Florida. *General Contractor:* Orville E. Madsen & Son, Inc., Minneapolis, Minn., Madison, Wis. Dover Elevators installed by Northwestern Elevator Co., Inc., Milwaukee, franchised distributor.

Circle No. 337, on Reader Service Card

for a living-learning center

In contract, specify the Wilson-Art look

there's <u>more</u> than meets the eye!

Specify a simple change in color schemes. You have two (or two hundred!) uniquely distinctive rooms from the same basic design.

With Wilson-Art laminated plastic you can coordinate the furniture and fixtures, wall panels, vanity tops. And with Wilson-Art Dor-Surf you can achieve exceptional impact and damage resistant doors.

Client benefits are initial and long range economy. Maintenance and refinishing problems are almost eliminated. Hotel and motel rooms retain a neat, inviting appearance for years.

You, as the specifier, have exceptional esthetic latitude with more than 140 woodgrains, solids, and Wilson-Art laminated plastic patterns to select from. And a variety of finishes including a new, subtle, eye catching dimensional finish, Cuero.

Wilson Wall Panel Systems: three laminated plastic systems to select from; a tongue and groove, a reveal, and a Class I fire hazard rated system. All look good. All look different. And all are from one manufacturer making specifying easier . . . and color integrity assured.

DOR-SURF—a tough new face, from Wilson-Art! Doors surfaced with 1/8" thick Wilson-Art laminated plastic DOR-SURF are highly impact and abrasion-resistant—really take abuse in high traffic, heavy use. And cost compares favorably with conventionally finished birch veneer doors.

When the chips are down, you can depend on Wilson-Art.

Wilson Art®
LAMINATED PLASTICS

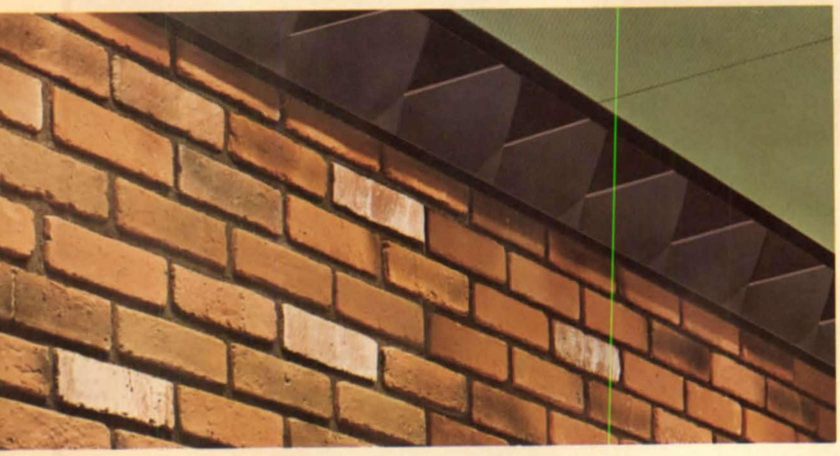
RALPH WILSON PLASTICS COMPANY — TEMPLE, TEXAS
ARCHITECTURAL PRODUCTS DIVISION — DART INDUSTRIES INC

contract, contact the helpful ones—Wilson-Art Architectural Design Representatives!

anta	Chicago	Los Angeles	Miami	New Jersey	New York	San Francisco	Seattle	Temple, Texas
4 373-2223	312 437-1500	213 914-1219	305 822-5140	215 923-5542	914 268-6892	415 782-6055	206 228-1300	817 778-2711

cle No. 379, on Reader Service Card

Society National Bank Bond Court/Architects Flynn Dalton van Dijk and Partners



PERIMETER . . . lighting for today's interiors.

Upon entering an interior, walls are the viewer's first visual encounter with the space . . . defining its limits and establishing a mood or atmosphere which immediately surrounds him and determines his relationship with the environment.

Perimeter lighting adds a dramatic effect to vertical surfaces or can serve as the total illumination. Recognizing the need for standard troughlites at reasonable cost and delivery time, OMEGA has developed three PERIMETER Series . . . recessed, semi-recessed and surface mounted, with optically engineered shields and a wide range of wattages. A unique lamp tilt device permits fine field adjustment of light beam to achieve the desired uniform illumination.

PERIMETER lighting by OMEGA is today's lighting for today's interiors.

OMEGA

LIGHTING

EMERSON ELECTRIC CO.

270 LONG ISLAND EXPRESSWAY/ MELVILLE, N.Y. 11746
CANADA: 2275 MIDLAND AVE., SCARBOROUGH, ONTARIO

Circle No. 397, on Reader Service Card

Views

Disappearance

n your June issue (p. 41) you made a brief note of Washington's Transpo '72, mentioning that a set of modular exhibit buildings was being constructed there by General Exhibits Inc. Your description of them was quite attractive, but I was at Transpo and where were they?

It would seem that plans would have been pretty well finalized at Transpo by June, and for as extensive a part of the exposition as you described these modular buildings to be to suddenly not show up seems a bit strange. What happened to them? I hope you can clear this up for me.

Michael Kreski
Providence, R.I.

You're right—they weren't there. They had been, though. They were put up alongside a runway that was supposedly out of service. Somebody didn't get the message, however, and a Boeing 747 lumbering down the runway neatly removed the roofs of the buildings with one wing. After the initial row between the government and General Exhibits, and some negotiation, the whole contract was cancelled. CP]

reat housing

ıst read through your May issue on housing—great. Especially liked the "Closer to home" article (p. 106)—right on!

T. Yamamoto
onolulu, Hawaii

aise for system house

ongratulations on the excellent presentation given to the Rogers "system" residence in your May Issue (p. 116). The juxtaposition of the text and the layout all ded to the refreshingly clear and direct sign.

Hope you will show more work by this ard-winning group of architects.

rl Abbott
asota, Fla.

edit due

he June issue of P/A, p. 32, the architects for the NCHP Rock Creek Terrace ject were Abel & Weinstein, Washing-, D.C.

four good reasons for the growing popularity of Inryco™/Milcor® steel studs for exterior walls.

① Fast enclosure. Framing assemblies can be prefabricated, in the shop or on the job site, for production line speed and economy. Panelization, with facing materials applied before installation, can afford further savings.

② Design freedom. Light gage steel framing adapts to any building contour . . . flat planes, angles, curves, recesses, reliefs . . . and serves both load bearing and non-load bearing conditions.

③ Economy. Initial cost is lower than many other types of construction. Light weight walls reduce footings, foundation and structural requirements. This ornamental fascia eliminated over $170,000 of additional structural framing that pre-cast concrete panels would have required.

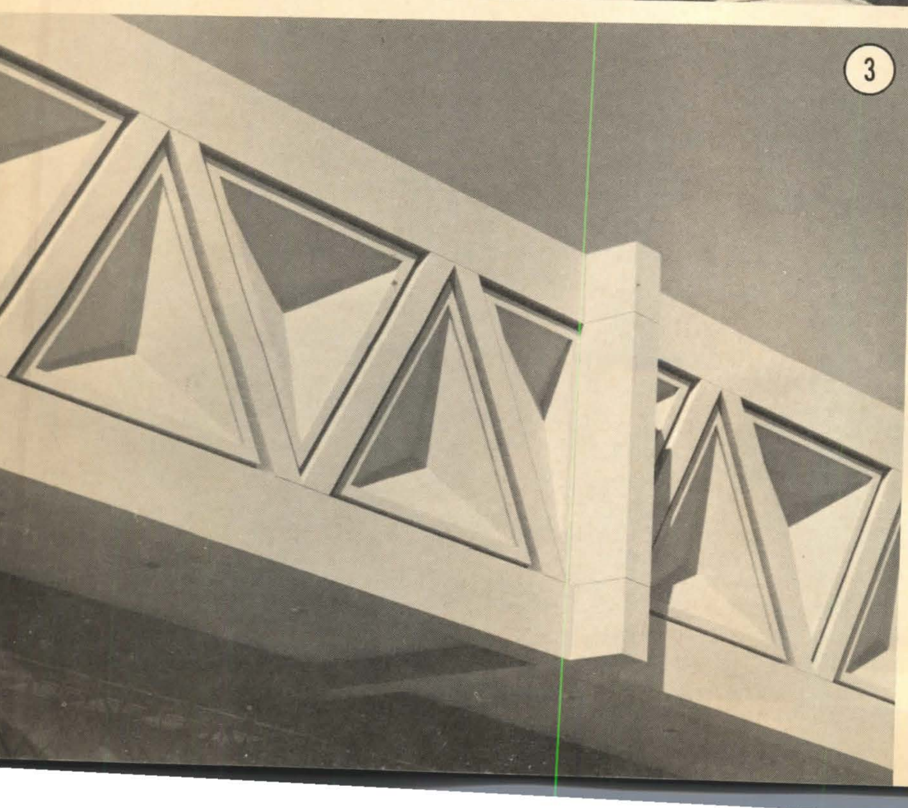
④ Versatility. Almost any facing material may be used. This building had metal panels and glass insets. The steel studs also provided structural support for the top three stories and a heliport.

For detailed information, see Sweet's Section 5.3/In. Or write for Catalog 31-2 to Inland-Ryerson Construction Products Company, Dept. H, 4069 W. Burnham St., Milwaukee, Wis. 53201.

Circle No. 346, on Reader Service Card

INLAND RYERSON

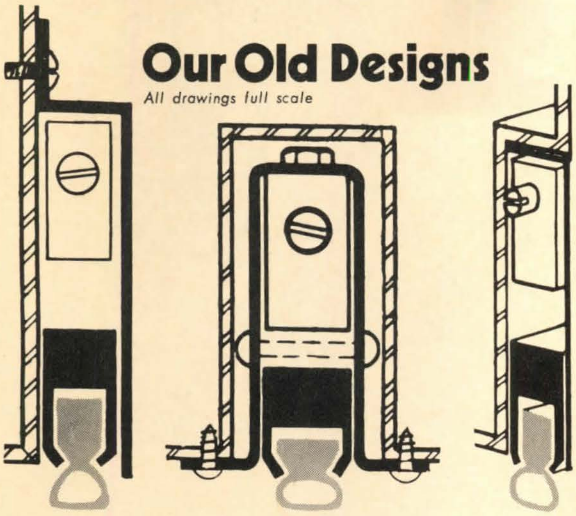
General Offices: Chicago, Illinois
Milcor Division: Milwaukee, Wis.
A member of the INLAND steel family



The only thing that can top Zero's automatic door bottoms are our revolutionary new, improved models.

Our Old Designs

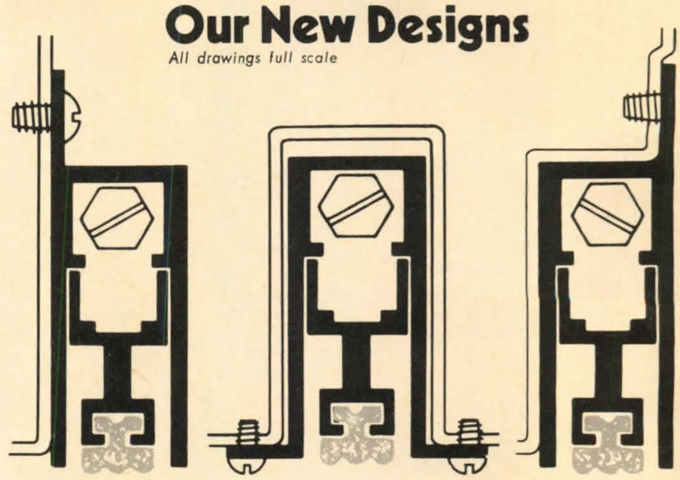
All drawings full scale



36S 36H 36SM

Our New Designs

All drawings full scale



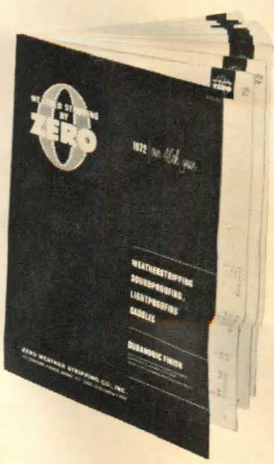
351 350 352

Our Old Specifications

1. Solid Neoprene insert; dropped only ⅝"
2. Available in stock sizes: 24"-48", special sizes 48"-60". Allowed for a cutting adjustment of 2" maximum.
3. Open back on surface and semi-mortise types.
4. Quick-drop often resulted in catching on carpets and saddles.
5. Surface and semi-mortise models difficult to reverse from left to right.
6. If damaged or destroyed, solid Neoprene insert not replaceable.
7. Available in anodized aluminum, stainless steel and bronze.

Our New Specifications

1. Close cell sponge Neoprene insert; drops as much as 1" (1½" for surface type).
2. Sizes available: 24", 30", 36", 42" and 48". New spring-design permits a cutting adjustment of up to 6".
3. Closed back on surface and semi-mortise types for better protection against weather, light and sound.
4. Delayed-action drop safeguards carpets and saddles.
5. Surface and semi-mortise models easily reverse from left to right with a slight adjustment — and in a fraction of the time it took to replace old units.
6. Close cell sponge Neoprene insert may be easily replaced without removing door.
7. Available in anodized aluminum and Duranodic 313.



Now, for the first time in 20 years, Zero introduces 3, new automatic door bottoms. Their designs are so superior, they replace what, until now, have been the standards of the industry — ours!

Please write us and we will send you a special, new specification sheet on bottoms that are tops — along with our 1972 Catalog.

Zero Weather Stripping Co., Inc.
415 Concord Avenue, Bronx, N.Y. 10455 / (212) LUdlow 5-3230

Circle No. 381, on Reader Service

What's better than love?

© Robert Indiana 1970

ETERNAL LOVE.

The *three tons* of beautifully arranged "LOVE" at the Indianapolis Museum of Art is the expressive work of sculptor Robert Indiana. We won't pretend to be able to improve on it.

But our USS COR-TEN Steel will make it a lasting "Love." Eternal? Eternity is a pretty long time, yet after 23 years of testing fully exposed bare COR-TEN steel in various atmospheres, we remain unable to project even distant future failure except where extremely corrosive conditions exist.

For artistic or practical purposes, USS COR-TEN Steel is a great design material. It comes in all popular forms, shapes and sizes. It is very strong (50,000 and 60,000 psi min. yield points). If not painted, it develops a dense, protective patina which grows more beautiful with age. If the coating is scratched, it heals itself. If you prefer to paint COR-TEN steel, the paint will last up to twice as long.

With these impressive properties, COR-TEN steel can be readily fabricated, and it costs only about 11¢ a pound.

If you want your structure to be self-maintaining, and to grow more beautiful with age, design it in COR-TEN steel. You'll love it. United States Steel, Pittsburgh, Pa. 15230. USS and COR-TEN are registered trademarks.

USS Cor-Ten Steel

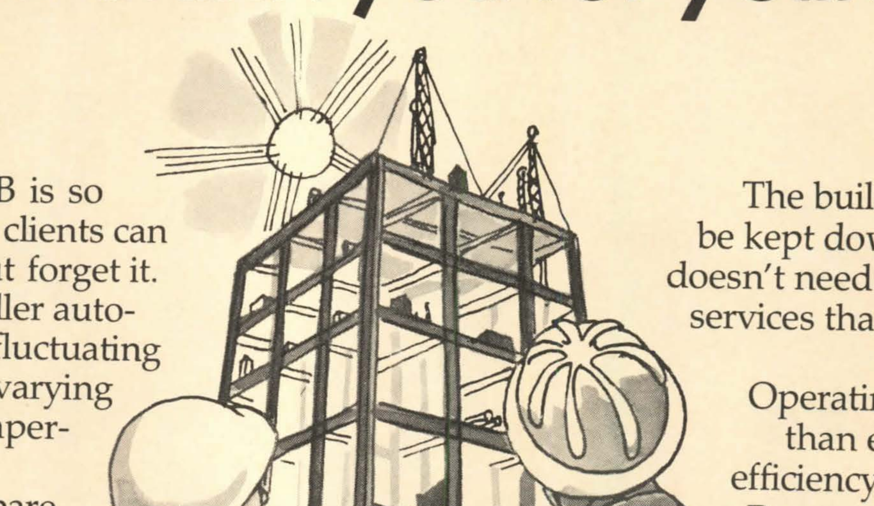
Recommend the Carrier 16JB gas absorption machine. Your clien
will thank you for years.

The Carrier 16JB is so trouble-free that your clients can put it in and just about forget it.

This unique chiller automatically adjusts to fluctuating steam pressure and varying condensing water temperatures.

It needs only a bare minimum of maintenance. Your clients can even get a planned maintenance contract from the factory.

You can put the machine just about anywhere. There's no vibration and very, very little noise.



The building's first costs ca
be kept down because the 16J
doesn't need the heavy electrica
services that mechanical equip
ment need

Operating costs are lowe
than ever, too. The 16JB'
efficiency actually saves ga
Recommending the Carri
16JB gas absorption chill
makes for a satisfie
client. And that'
good busines

For the details, co
tact Carrier A
Conditioning C
Carrier Parkwa
Syracuse, N.Y.
13201.

AMERICAN GAS ASSOCIATI

Conserve natural g
It's pure ener

Carrier®

Circle No. 322, on Reader Service

The Unspoiler:

T.M.

A new look in automatic sprinklers

It's out of sight. The only truly concealed automatic sprinkler around. Perfect for the interiors you really care about.

Hidden up there behind a ceiling-flush cover plate . . . THE UNSPOILER is ready to pop out—then spray away when fire threatens. It's Factory Mutual Approved; approved by New York City Board of Standards and Appeals; U.L. listed for bright and satin chrome finish.

So fit out your best looking interiors to snuff out fires—beautifully. Write for our complete, fact-packed, full color brochure on THE UNSPOILER.

Star Sprinkler Corporation, 4545 Tacony Street, Philadelphia, Pa. 19124

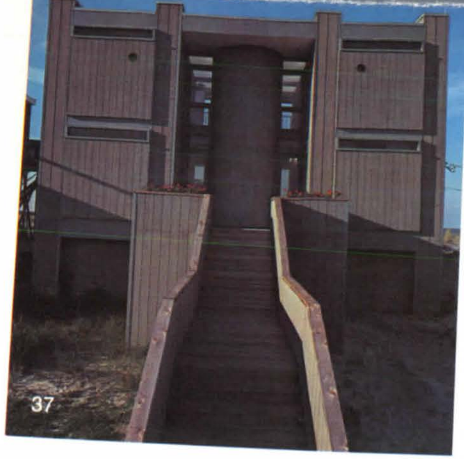
PAT. PENDING

Circle No. 367, on Reader Service Card

PLYWOOD SAVINGS PLAN

#48

48 design ideas in Textured Plywood


37

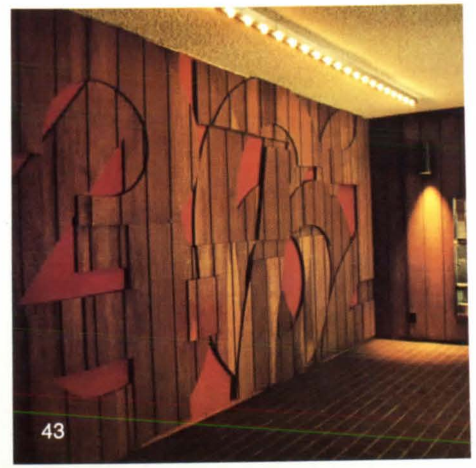

38


39


40


41


42


43


44

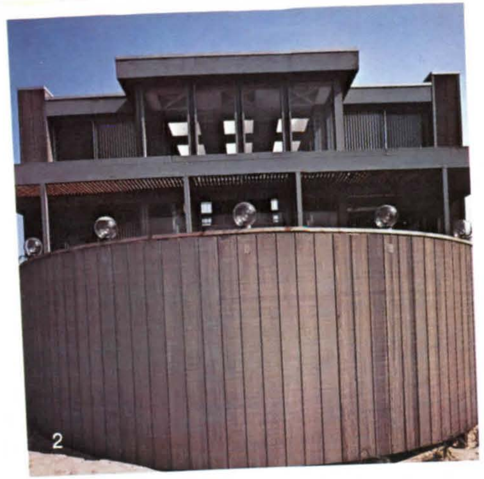

45

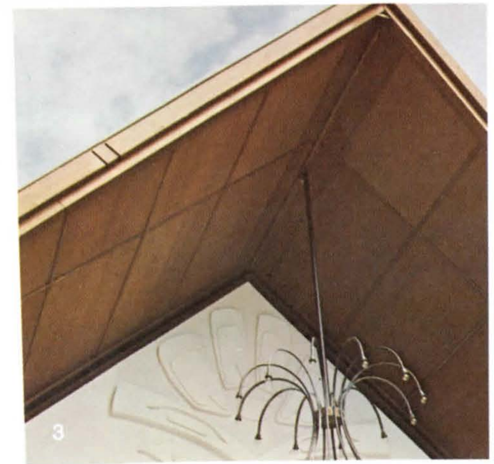

46


47

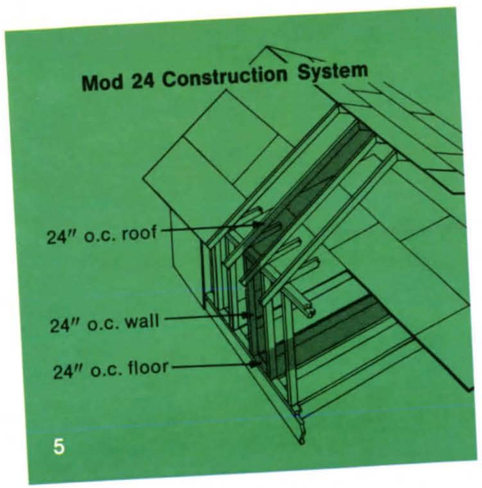

48


1


2


3

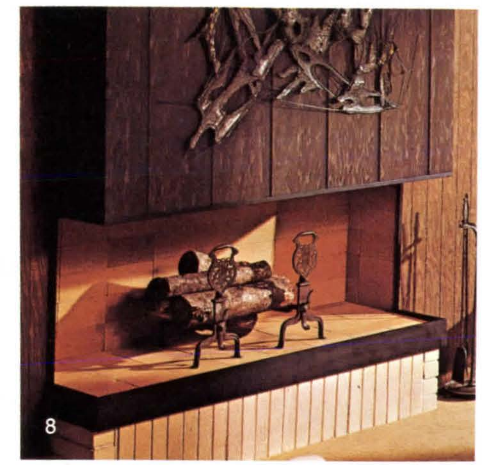

4



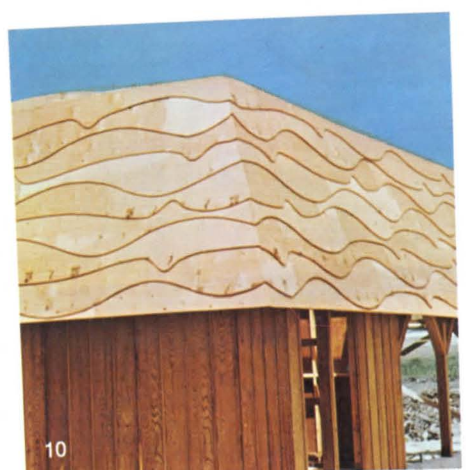
5


6


7


8


9


10


11


12

Interior Specifications.
For interiors, be sure to specify your supplier's top-of-the-line grade if you want clear paneling with a minimum of knot-holes.

25 Not just another pretty face. Textured plywood.

26 Texture 1-11 ceiling. Don Duckham, architect.

Species
Douglas fir, cedar, redwood, southern pine, lauan, others. Sizes: 4x8 to 4x12.

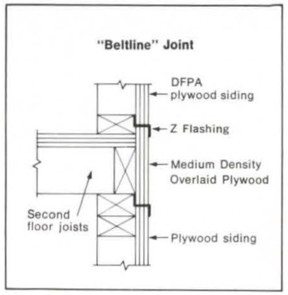
27 Kerfed rough-sawn.

28 Texture 1-11 in prefab panelized components. Peter L. Gluck, designer.

40 Natural Surfaces
Rough-sawn, sanded, unsanded, brushed, scratch-sanded, circular-sawn, fine-line, striated, machine-hewn, corrugated. Many grooving patterns, coatings, overlays.

29 Reverse board and batten.

30 Disguising panel joints.

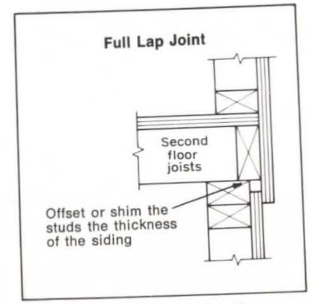


31 Typical plywood siding/ MDO joint detail.

APA Single Wall
Combines siding and sheathing in one panel. Cuts costs 30-40%. Extra tight construction. Stronger than many forms of double wall construction. Most codes okay it.

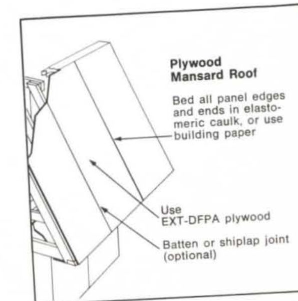
32 APA Single Wall. One layer saves time and money.

33 Decorative panel—battens over rough-sawn.

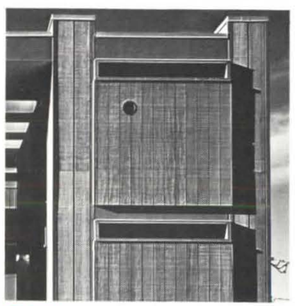


34 Typical joint detail.

35 Low-cost plywood graphics. Medium Density Overlaid plywood, textured, etc.



36 Nine-foot-high mansard, of ⅜-in. rough-sawn plywood.



37 Unique windows, textured siding.

38 Textured plywood carried from outside to inside. Earl Combs, architect.

39 Mechanical equipment enclosures.

40 Textured siding creates an "indigenous mood." Callister & Payne, architects.

41 Residential stained-glass window, wide rough-sawn frame.

42 Rural apartments, simulated board and batten. Louis Sauer, architect.

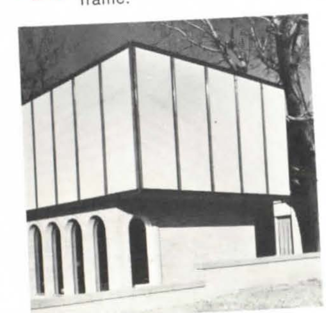
43 Wall sculpture of textured siding. Peters & Clayberg & Associates, architects.

44 Dairy barns converted to offices and shops. Louis Sauer, architect.

The APA Story
American Plywood Association is a nonprofit organization devoted to research, promotion, quality testing and inspection for more than 30 years. When you specify plywood, make sure it bears the Association's DFPA trademark.

45 Winner APA 1972 Plywood Designs. California Home. William Logan, architect.

46 Stucco-like coating on plywood. Site applied.



47 Aggregate coated plywood, office building.

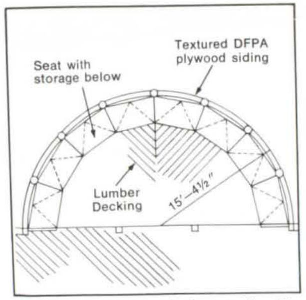
For good ideas, there's nothing like the real thing.

Textured Plywood.

48 Construction fence.

One of a series presented by members of the American Wood Council.

1 Plywood chimney enclosure. Fisher-Friedman Associates, architects.



2 Circular deck fronted with textured siding. Earl Burns Combs, architect.

3 Big overhang, textured soffit (matches siding and paneling).

4 Good combination. Battens, rough-sawn and shingles.

Mod 24 Construction System

Plywood over lumber framing spaced on a 24-inch module. You can save about $200 per 2,100-sq.-ft. house. Less material. Less labor.

5 A universal 24-inch module for floors, walls and roofs.

6 "Like toys blown up to super scale," Claude Samton, architect.

APA Now House.

All plywood mobile-modular by APA and Family Circle. 1,500 sq. ft. in 3 transportable modules, traveled over 1,000 miles without damage. Systems: APA® Single Wall and APA Glued Floor.

7 Mobile homes can be beautiful. Walter Brown, architect.

8 Textured walls. Textured fireplace.

9 Texture 1-11 ceiling, children's clinic. Jack C. Irwin, architect.

10 Sculptured plywood roof, zoo shelter.

Finishing

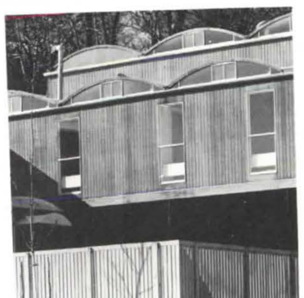
Textured plywood siding and paneling take staining beautifully. Or acrylic latex paint, without sacrificing the textured effect. Pre-stained panels are available, too.

11 Texture 1-11, one of 40 different surface styles.

Mod 24 House

Modular home by APA and Better Homes & Gardens. Based on Mod 24 concept (all joists and studs on 24-inch centers). Other systems: production line APA Single Wall and Glued Floor. Textured plywood inside and out.

12 APA Mod 24 House. Donald MacDonald, architect.



13 Clustered and stacked modules. Paul Rudolph, architect.

14 Stairway, textured plywood on 3 surfaces.

15 Textured plywood used as lap-siding and screen. William Morgan, architect.

16 Marina, rough-sawn used as accent panels. Irwin Luckman, architect.

17 Grooved plywood applied horizontally. Leroy Frederick Van Lent, architect.

18 Textured plywood makes an attractive fence — also screens and dividers.

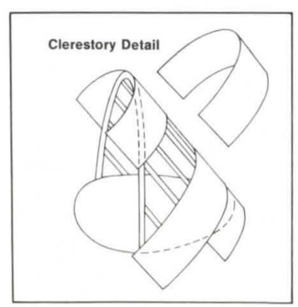
12-ft. Cube

Variations of a 12-ft. cube in a sculptural arrangement. Cost of enclosed spaces (6,292 sq. ft.) is $12.50 per sq. ft.

19 Day Camp. Walls are rough-sawn kerfed. Roofs are silicone coated.

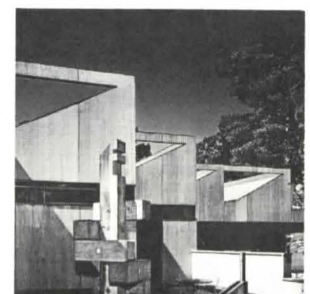
20 Chimney with textured plywood applied horizontally. Hal Weiss, designer.

21 Winner APA 1972 Plywood Designs. California Home. William Logan, architect.

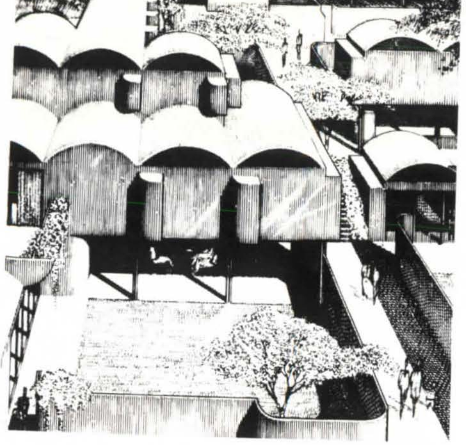


22 Home of Living Light, Seattle World's Fair.

23 Winner APA 1972 Plywood Design Award. Library by Douglas Barker, architect.



24 Clerestory roof on APA award winning library in Corte Madera, Calif.




14


15


16

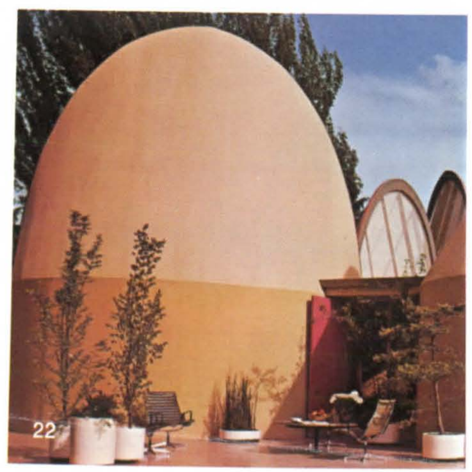

17

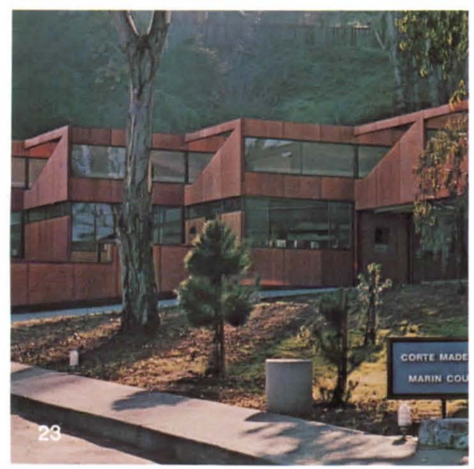

18

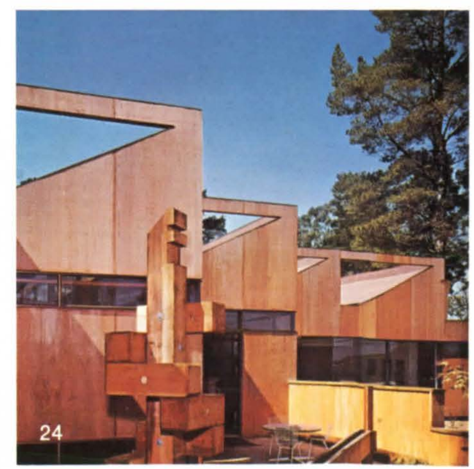

9


20


21

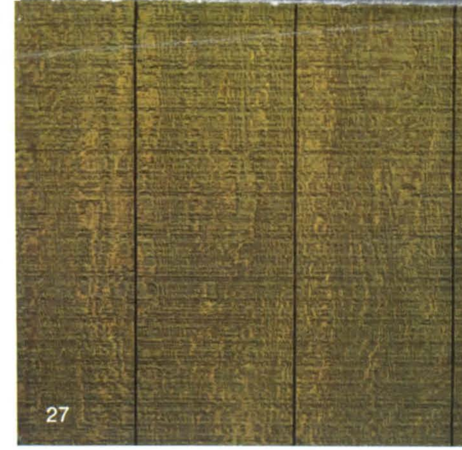

22

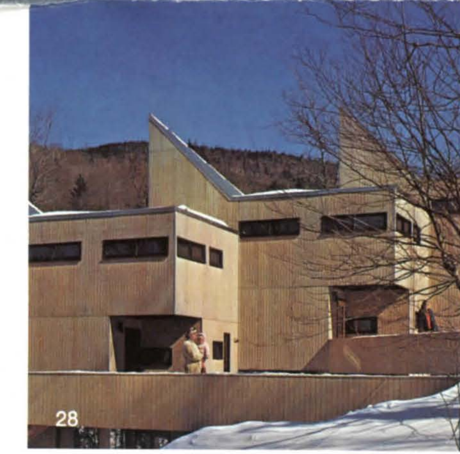

CORTE MADE
MARIN COU
23


24

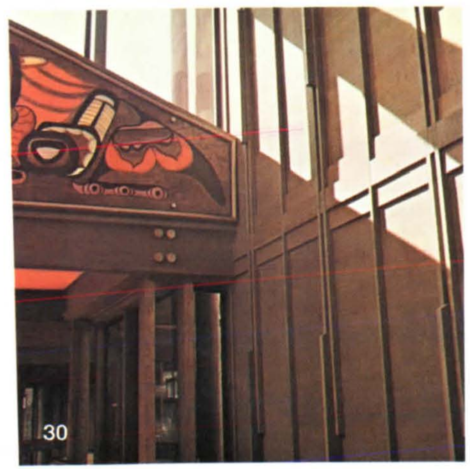

25


26

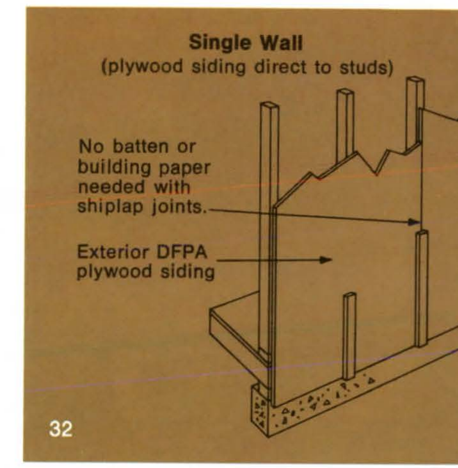

27


28


29

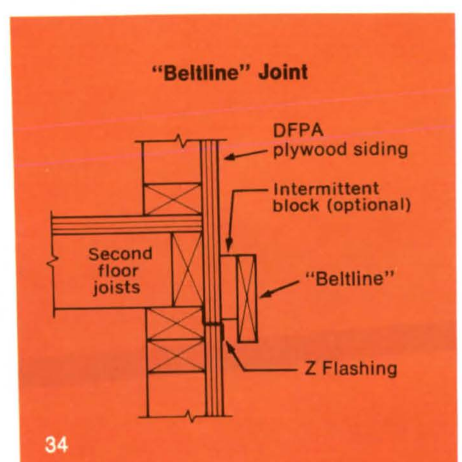

30


31



32


33



34


35


36

More good ideas are using textured plywood than ever before.

You know why. We know why.

Textured plywood is natural looking. Warm and touchable. And takes stains beautifully.

You get to choose from 40 different styles and textures. For outside, inside, anywhere.

Textured plywood saves money. The APA® Single Wall cuts siding-sheathing costs 30-40% compared to most double wall construction. That's a lot of money.

It's tough like plywood. Resists wind loads and impact. Looks great year after year.

Textured plywood is a good answer to a common or uncommon design problem—and that's why we're here.

48 ideas just to get you thinking.

AMERICAN PLYWOOD ASSOCIATION

Plywood quality-tested by the Division for Product Approval DFPA

For more information on DFPA textured plywood, use the reader service card or write American Plywood Association, Dept. 1 2 3 4 Tacoma, Washington 98401.

Contents

Calendar 34
Washington report 34
Products 38
Literature 40
Notices 122

News report

Student-designed diplomas? Why not?

As befits such a school, the Rhode Island School of Design has taken what seems to be a very logical step in student involvement—student diploma design. For some time, students at RISD have been given the choice of how they will appear in the annual yearbook, but the diploma remained the province of the administration. This year students were told that provided the right wording were retained, a vote among the graduating seniors could direct the form of the diploma.

The scheme chosen, by graduating senior Peter Stamberg, is an 8-ft sign, 6-ft high, with 5 colors of neon spelling, indeed, the right words. With an interchangeable line for the degree and a light board capable of spelling any name, the sign was set up and photographed for each of the 390 graduates. The resulting color photo *is* the diploma.

"The design is really a very traditional one," Stamberg said. "It is only the fact that it is in neon that is different. Neon is the all-American art form. It has helped make this country great. I think students identify with that, and will feel the importance of having a neon diploma."

RISD's neon diploma

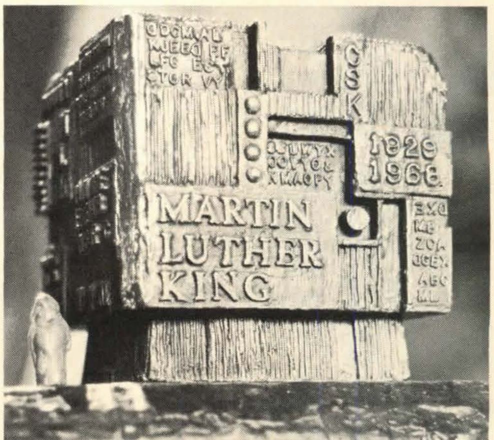
Memorial sculpture hides air intakes, exhausts

Sculptor Bill Tarr had already been commissioned to do a sculptural fountain for P.S. 136 in New York City, when Martin Luther King, Jr., was shot and the school renamed in his honor. The commission changed a bit at that point, and Tarr, who did the Sopwith Camel on the roof of 77 Water Street (P/A, March 1971), started work on a memorial sculpture.

That was about four years ago, and the resulting piece of sculpture is now being fabricated. It's roughly cubical in form, about 30 ft on an edge and covered with quotations and dates from Dr. King's life. Made of weathering steel, it will weigh about 100,000 lbs when completed.

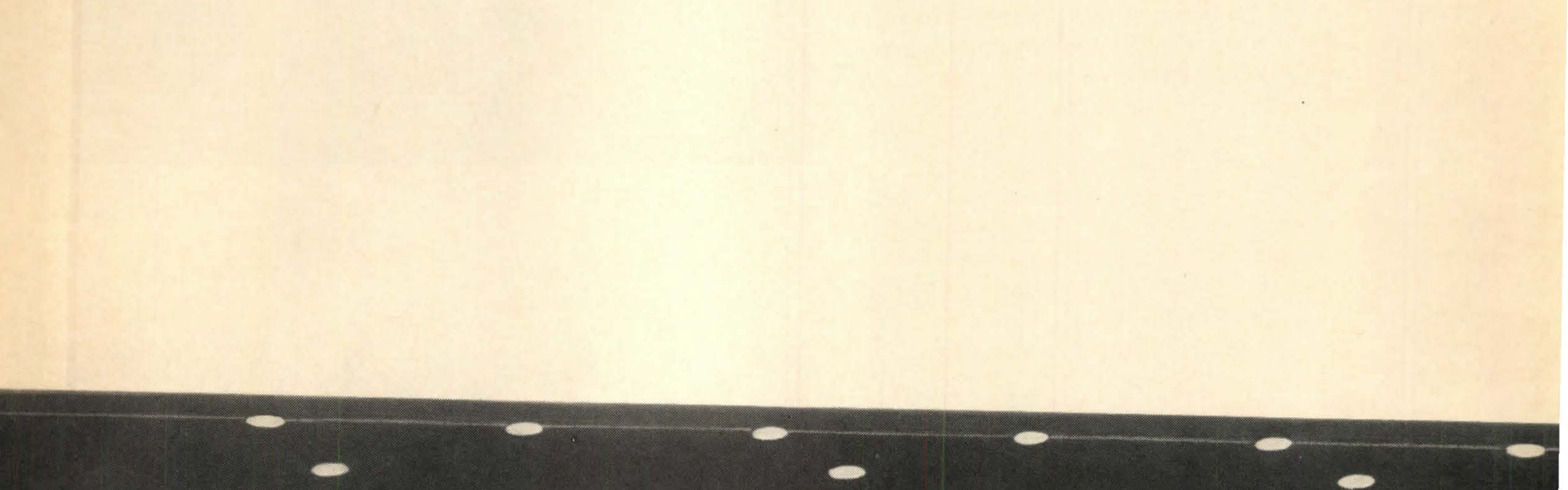
"It's usually difficult to get these things through," Tarr told P/A, "but the architects, Frederick Frost & Associates, were a great aid. They fought for it all the way along." The first difficulty was getting the proposed sculpture past the city's arts commission, which rejected the first version as not being specific enough. The second one was, and that is the sculpture being fabricated now.

Besides being a memorial to Dr. King, the sculpture is func-
[continued on page 28]



King memorial sculpture

Here are 12 ways that ZONOLITE ROOF DECKS help you- now and in the long run.



A roof must do its job.

The objective is to protect the building and its contents. A roof design which does not give the required protection is a potential problem for everyone.

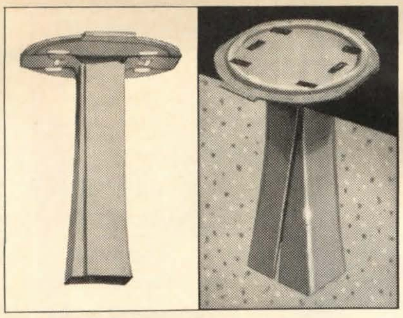
Properly designed ZONOLITE ROOF DECKS meet this objective in 12 ways:

1. EASILY SLOPED FOR DRAINAGE. Water won't form ponds on a sloped ZONOLITE deck. Ponding damages roofing, causing leaks that lead to roof failures.

2. FREE OF SEAMS AND JOINTS. Smooth continuous slabs with no network of joints, ridges, or seams to weaken roofing and allow water penetration.

3. STRONG. Less susceptible to damage. Compressive strengths of 100 to over 350 psi, compared to rigid board's 5 to 40 psi.

4. LONGER ROOFING LIFE. Higher density reduces thermal fluctuations which tend to shorten roofing membrane life.



5. NAILABLE. Positive attachment obtainable with easily-nailed ZONOLITE® Base Ply Fasteners shown here. Important in resisting hurricane-force winds.

6. WON'T DETERIORATE. Unlike rigid boards, ZONOLITE decks contain only inert materials.

7. WIDE RANGE OF INSULATION VALUES. "U" values from .05 to .20. Meets any design or climatic need.

8. CONTINUOUS THERMAL BARRIER. No heat-leaking seams, common to jointed rigid insulation.

9. FIRE-SAFE. Non-combustible, under Factory Mutual design classifications. Many ZONOLITE deck assemblies are UL fire-tested. This often results in lower insurance costs.

10. WIND-RESISTIVE. Meets Factory Mutual wind-resistance standards. Further improves possible insurance premium reductions, while serving to reduce costly maintenance and replacement.

11. EARTHQUAKE-RESISTANT. Properly designed ZONOLITE ROOF DECKS resist lateral loads caused by earthquakes or wind forces.

12. CERTIFIED CONTROLLED APPLICATION. National network of skilled approved applicators and competent ZONOLITE field personnel provide certified application and job-site quality control.

ZONOLITE ROOF DECKS are less expensive to install than comparable quality systems. Almost anywhere. And they're certainly a lot more economical to maintain and repair (if ever necessary).

There are many more reasons why you should consider ZONOLITE ROOF DECKS. For details, just call us. We'll be glad to send an expert who can furnish facts and figures.

Or write for literature to W. R. Grace & Co., Construction Products Division, 62 Whittemore Avenue, Cambridge, Mass. 02140.

GRACE ZONOLITE

Circle No. 380, on Reader Service Card

News report continued from page 25

tional. "There are a lot of air intakes and exhausts on the plaza of the school," Tarr said, "and the sculpture will hide them. Exhaust air will go out through the top, and new air will come in through the sides."

UDC announces Niagara Falls competition

Seeking what he hopes will be "one of the great public spaces in America," Niagara Falls, N.Y. Mayor E. Dent Lackey announced a design competition for a plaza in front of the city's new convention center, now under construction. The Rainbow Center Plaza competition poses an interesting design challenge: there's a master plan by Gruen Associates, a convention center by Philip Johnson and John Burgee, and the Carborundum Center by Skidmore, Owings & Merrill to deal with.

Architects and landscape architects in the U.S. and Canada are eligible. First prize is the contract for design, construction drawings and supervision of the work; second and third prizes are $10,000 and $7500, respectively. Programs for the competition were mailed around the first of this month, and registration closes September 15; program material and registration information are still available from Charles Hilgenhurst, Professional Advisor, c/o New York State Urban Development Corporation, 1345 Avenue of the Americas, New York, N.Y. 10019. UDC is sponsoring the competition, and there is a $35 entry fee.

GSA switches to purchase contracts

By buying buildings instead of building them, the General Services Administration expects to save money and time, create new jobs, boost the gross national product and increase local tax revenues. All are claimed as benefits of a recently signed Public Buildings Amendment of 1972, which gives GSA the authority for three years to have federal buildings financed and built by private enterprise under purchase contracts.

GSA will contract, on the basis of competitive bids, with private firms or groups who will build and finance projects over periods up to 30 years. At the end of the contract term, GSA will own the building, but until the building becomes federal property it will remain on local real estate tax rolls. GSA is ready and waiting with a list of 32 projects, with an estimated constructions cost of half a billion dollars.

The new law also sets up a Federal Buildings Fund, into which all agencies will pay rents or users fees, based on the space they occupy and the local rental rates. The fund will be used to pay for new construction and for maintenance and repair costs.

Acting GSA Administrator Arthur F. Sampson outlined some other benefits of the program. For fiscal 1973 the program will increase construction activity by some $750 million, which when coupled with an equal amount in economic stimulation, means an increase in gross national product of about $1.5 billion. This boost in GNP means more jobs, Sampson says, about 192,000 of them, in construction and nonconstruction industries, in small towns as well as large cities.

Local tax revenues will go up more than $22 million in the first year, according to Sampson, because the buildings will remain on local tax rolls until owned by the government. And

← Circle No. 325, on Reader Service Card

reforming the financing of federal buildings will reduce the construction time, thus saving money; and, notes Sampson, the program will allow for time and money saving new construction techniques.

GSA has been active in other areas, too. Their performance specifications for office buildings were completed more than a year ago and are being used as the basis for the construction of three social security administration payment centers. A performance spec for integrated ceilings is in the works, and GSA and other federal construction agencies are going to develop performance specs for a total of six major building subsystems.

On the environmental front, GSA is putting all its environmental protection knowledge into a federal building planned for Saginaw, Mich. Efficient heating and cooling systems, perhaps one that equalizes heat within the building by moving it from warmer to cooler areas through a closed loop water system, will be used. Under consideration also is a fuel cell power plant producing electricity and heat; other innovations would include plumbing fixtures requiring a minimum amount of water and exterior materials chosen for insulating properties as well as cost.

New York's Manhattan Landing project gets first okay

Manhattan Landing, the mammoth ($1.2 billion) development project planned for the Lower Manhattan area of New York's East River made it over the first hurdle, winning approval by the City's Planning Commission.

Planning Commission approval makes the area an urban renewal area, but everyone is careful to point out that it is only the first step. Each individual project, plus the required zoning and street changes, must get approval, and firm financial arrangements have yet to be made.

CSI meets in Minneapolis, looks at performance specs

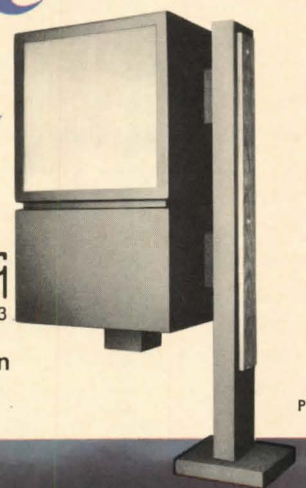
Performance specifications are here to stay, but don't be in too much of a hurry to toss out the masters of your descriptive specs. That was the recurring theme during three days of speeches and technical discussions at the annual convention of the Construction Specifications Institute held in Minneapolis June 19–21. All speakers and seminar panelists agreed that performance specifications will "expand the specifier's role in research, evaluation and analysis" although the problems of developing the concept are "enormous."

The General Services Administration (GSA) was well represented as leaders in the performance spec field. The keynote speech by Arthur F. Sampson, Commissioner of the Public Buildings Service, GSA (actually read by his administrative assistant Larry Roush because Sampson had been summoned to the White House) outlined the PBS "commitment to the environment and to social change." In addition to actively developing performance specs, PBS, he said, is extending the scope of specifications to include site, drainage, noise reduction and "more aesthetic construction site enclosures." In a later session, PBS Assistant Commissioner for Construction Management, Walter A. Meisen, spoke as an owner and user of construction. He stressed that performance specs "give all bidders a fair shake, stimulate competition and therefore reduce costs." The old, high prescriptive standard details, on the other hand, "stifle innovation." He also called for a data bank to be set up by CSI, AIA and other such orga-

[continued on page 31]

Spaulding brings Area Lighting down to earth

The MONARCH, a high intensity area light mounted less than 4' above grade. Yet it can illuminate a 1200 sq. ft. area with a horizontal footcandle brightness ratio of 10 to 1. And it's brought to you in an architecturally appealing package. ■ Spaulding's MONARCH was created for areas where poles aren't desired. Areas such as plazas, town squares, campuses, drives and entrances/exits. For people's sake, the MONARCH has a safe operating surface temperature. ■ Glare? Nothing to speak of . . . it's virtually eliminated by a system of reflected, redirected light through a prismatic refractor. ■ Durable? You bet . . . as durable as practicality will allow. Its high strength, impact resistant polycarbonate refractor is permanently sealed in the MONARCH's all aluminum housing. The housing is mounted to an extruded aluminum post. Together they'll support up to 785 pounds without permanent deflection. The entire assembly has a factory finish that's guaranteed for five years. ■ One catalog number gets you a complete MONARCH assembly . . . luminaire, post and base cover, all with a matching factory finish plus a pre-set anchoring system.



Spaulding

3731 Dirr St., Cincinnati, Ohio 45223

Division of LCA Corporation

Pat. Pending

Circle No. 370, on Reader Service Card

News report continued from page 29

nizations for the purpose of evaluating buildings to furnish input for better performance specs.

Technical sessions, all extremely well attended, dealt with education of the specifier, interprofessional relationships, the manufacturer's role, the constructor's role and the establishment of guides for performance specs. The institute's two newly published Manual of Practice documents on the subject were introduced (p. 90).

CSI has refined its convention format into three distinct parts—meetings, exhibit viewing and socializing—so that there is no overlap or conflict of times. Exhibitors reported large numbers of "very interested" specifiers visiting their booths, and "mobbed" is the best description of all three major social events.

Michigan students develop disaster housing

Dropped from a plane, along with a payload of food and medical supplies, an emergency shelter developed by architecture students at the University of Michigan opens like a parachute on its way down and lands fully erected. When not in use, the shelter system can be rolled up in a 12-ft-long cylinder for storage; total weight is 25 lbs.

The unit, in the shape of an ellipsoid dome, can provide shelter for as many as six adults, or it can be linked with other domes to provide space for larger groups. Shaun Jackson, one of the students working on the project says it is a "strong, sophisticated structure," pointing out that there are no interior poles and that there is good ventilation. The exterior is rip-proof nylon with a heat reflecting aluminized coating; it is supported by flexible fiberglass ribs. Interior partitions and a floor are detachable. On top is an umbrellalike hood that can be raised to let in light and air.

So far the students have built a prototype model, 16 ft in diameter, which they have shown at several conferences including the 1972 AIA Convention in Houston, and a miniature model 3 ft in diameter. They have spent about $250 for materials, but estimate that full-sized (20 ft diameter) version could be mass-produced for less than $100.

Louisville looks to its river

The Louisville, Ky. riverfront, like the proverbial girl next door, went unnoticed for a long time; recently, however, a flurry of downtown redevelopment has focused attention on the city's waterfront. A 40-story bank building, a 23-story hotel, a 5-story office building and 16 acres of public plaza are already under construction, and the city has approved a $37.5 million multi-use complex for an adjacent site.

Called Shippingport Square, the new complex was one of two under consideration for the site. It includes a 37-story apartment tower, an 11-story office tower and a 450-room hotel, all to be built above an 800-car underground garage. Two levels of shops and restaurants are also planned. The hotel, office building and some of the shops will overlook a landscaped plaza that will serve as a public amphitheater.

Along Main Street (the side of the site farthest from the Ohio River), the new construction will rise only as high as the cornice of the existing Board of Trade Building; at 75'-4", it is the common height for most of the 19th Century buildings

[continued on page 33]

News report continued from page 31

along Main Street. The upper floors of the hotel and office structures will be set back to provide a planted roofgarden. The façade of the Board of Trade Building will be preserved as part of the project.

Architect for the project is K. Norman Berry; associated with him is Finch Alexander Barnes Rothschild & Paschal, Inc.

Goodbye to Venice in the Snow

If it ever really snowed in Venice, Calif., the storm went unrecorded, but that didn't stop the Los Angeles Fine Arts Squad. One of their series of street paintings, on a 72-ft-long wall, shows what the town's beach-front street would look like after a snowfall; the figures in the painting were real residents of Venice at the time.

That was about two years ago in the happy, hippie days of Venice, before the real estate developers moved in (see this month's Architecture west). Today, the town may be in for its last look at its only recorded fictional snow storm, as construction has started on an apartment building that will block out the painting.

There has been some community outcry, according to Victor Henderson, who along with Terry Schoonoven and James Frazin, did the painting. A petition to stop construction collected 1800 signatures, and work halted temporarily; a permanent stop is the goal, with the site to be turned into a park.

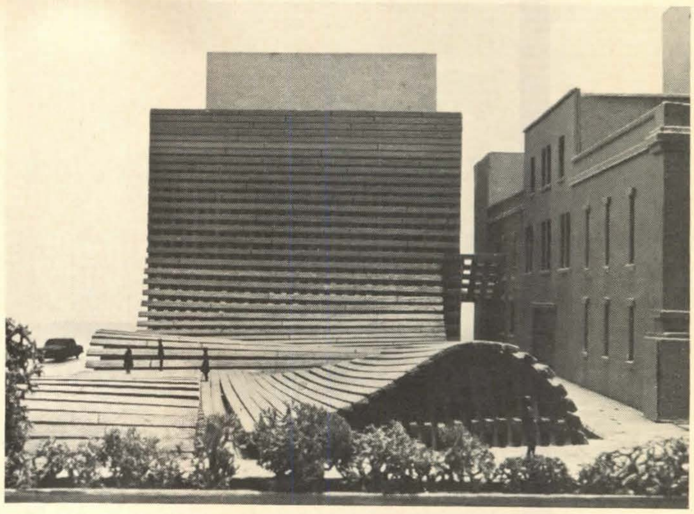
The apartment building came as no surprise, Henderson told P/A's Esther McCoy. "We knew it was bound to happen. People suggest we paint it again on another wall. But you can't go back. That period is past." The artists, Henderson said, have scattered: Frazin to New Mexico, Schoonoven to Wisconsin where he is looking for clients with good big walls. "We change," said Henderson about the painting, "but it doesn't. One of the people in the painting is now in medical school, another is in jail. We captured a period that is gone, just as Rockwell did, or Remington."

Snow scene

Large-scale sculpture proposed for Binghamton, N.Y.

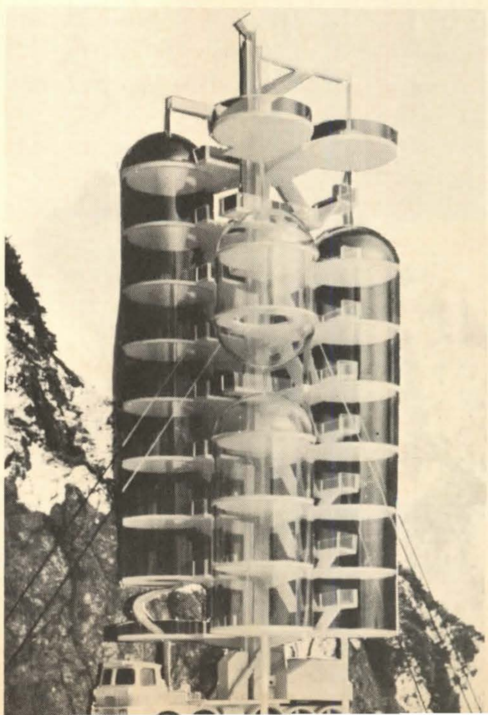
One of the extraordinary things that a group known as SITE (Sculpture in the Environment) has proposed for ordinary spaces is an undulating wooden sculpture, much like a dock, for a three-block space in downtown Binghamton, N.Y. The space is now a parking lot and small lawn squeezed in behind the city hall; SITE's dock would turn it into a sculpture for pedestrians.

Planks 20 ft long, 14 in. wide and 4 in. thick would be set about a foot apart with more beams forming a grid underneath; sloping sections would become benches without being benches, and where the planks formed a walking surface they would be set closer together. They would be left unfinished, and in one spot would provide a roof for an alleyway. The design, says SITE's James Wines, is intended to retain the character of a riverfront town, and, he says, is "probably the only sculpture in the world that covers three blocks of a city."


Binghamton dock

Mobile hotel can follow the crowds

A truck-mounted crane pulls into place, followed by another truck carrying two containers. The crane's vertical boom is extended, guy wires are rigged, and the crane starts [continued on page 34]


Mobile hotel

News report *continued from page 33*

lifting parts out of the containers. In a matter of hours an 80-bed hotel has been erected, using the crane as the structure from which the hotel rooms are hung. That is the scenario as *Prof. Gernot* Nalbach, an architect from Berlin, Germany, sees it; so far the hotel exists only in drawings and a model.

Nalbach's design calls for four rooms of 12 sq meters each to a floor and a total height of 32 m., giving 80 single rooms or 40 doubles. The exterior walls of the rooms would be transparent from the inside, opaque from the outside. To comply with fire safety requirements, Nalbach says, the building elements could be sprayed with an asbestos fireproofing.

The mobile hotel would have particular use for special events or in peak tourist seasons, says the designer. The entire structure, he says, can be erected and dismounted in a day's time.

Calendar

Aug. 6–9. Seventh annual conference of the Society for College and University Planning, Sheraton-Biltmore Hotel, Atlanta, Ga.
Aug. 7–10. American Health Congress, Chicago-McCormick Place, Chicago, Ill.
Aug. 9–10. Outdoor lighting conference for landscape planners, sponsored by General Electric Lighting Institute, Nela Park, Cleveland, Ohio.
Aug. 10–11. Architectonics '72 Exposition, Oakland Auditorium, Oakland, Calif., preview for building design and construction team professionals and officials. (Aug. 12 the exposition is open to the general public.)
Aug. 21–26. International Conferance on Tall Buildings, Lehigh University, Bethlehem, Pa.
Aug. 26–28. Northwest regional conference and meeting of student council of the American Institute of Interior Designers, Seattle, Wash.
Aug. 29–Sept. 1. Twenty-first annual northwest regional conference, Alaska Chapter AIA, Anchorage Westward Hotel.
Aug. 31. Deadline for mailing P/A Design Award entries.
Aug. 31. Deadline for entries to Energy Conservation Award Program sponsored by Owens-Corning Fiberglas Corporation, Toledo, Ohio.
Sept. 14–16. Annual meeting of Architects Society of Ohio, Sheraton Columbus Motor Hotel, Columbus.
Sept. 20–23. Western Mountain Region, AIA, twenty-first convention, the Four Seasons Hotel, Albuquerque, N.M.
Sept. 24–27. Annual apartment conference of the National Association of Home Builders, Las Vegas, Nev.
Sept. 25–30. Eleventh World Congress of the International Union of Architects, Varna, Bulgaria.
Sept. 27–29. Annual fall meeting of the Electrical Generating Systems Marketing Association, Hotel Bonaventure, Montreal.
Sept. 27–30. North Carolina Chapter, AIA, South Atlantic Regional Convention, Carolina Hotel, Pinehurst, N.C.
Sept. 28–30. New Jersey Society of Architects annual convention, the Playboy Club, Great Gorge, N.J.
Oct. 11–13. Iowa Chapter, AIA, Central States Regional Conference, Hotel Fort Des Moines.
Oct. 14–17. Annual convention and exhibit of National Office Products Association, Chicago.
Oct. 15–18. Fifty-fourth annual convention of the American Gas Association, Cincinnati, Ohio.
Oct. 16–20. Business Equipment Show, McCormick Place, Chicago, Ill.
Oct. 19–22. New York State Association of Architects/AIA annual conference and convention, Flagship Hotel, Rochester, N.Y.
Oct. 25–27. Annual convention of Architectural Woodwork Institute, Regency-Hyatt House, Atlanta, Ga.

Washington report

Labor problems

Professional concerns with labor were very much in the forefront of Washington's thinking, as Congress took most of July off for vacation, fence-mending and politicking. Of direct interest, for professionals, were growing debates over "right of control" at the construction site; pension programs; "free engineering" services offered by manufacturers and others; amendments to existing safety and health laws affecting construction (particularly in housing).

Probably most important, for their wide ramifications, were hearings both in Congress and before the National Labor Relations Board over whether architect/engineers or labor unions can dictate materials, methods or assemblies that will be used in construction projects.

The trouble is that NLRB has been consistently on the side of the A/E's (and thus the contractors), in making decisions affirming the right of these professionals both to specify and insist on the use of whatever materials or methods they feel are proper. Just as consistently, federal courts have reversed NLRB (as in the famous "Philadelphia door" case a couple of years ago), virtually giving unions the right to dictate what shall go into a building.

So NLRB—using the vehicle of two disputes now before it—invited "friends of the court" to come in and testify on the subject. The result was a happy, and very unusual, gaggle of witnesses that included architects, engineers, contractors, homebuilders and others, all on the same side for once, testifying in favor of control by the professionals. Only the labor unions argued against the idea, saying (along with the effect of court decisions) that such insistence is only an insidious way of getting around union agreements.

At the same time, on Capitol Hill, professional societies were testifying before a Senate Housing subcommittee in favor of a bill (S.3373) that would outlaw union boycotts of cost-saving, prefabricated materials or components, at least on federally assisted housing projects. (Coincidentally, the small but powerful National Constructors Association announced a new two-year agreement with electricians and plumbers, permitting the use of prefabricated, or skid mounted equipment, so long as it was purchased by the owner and supplied to the contractor.)

The professionals also testified in favor of another Senate bill (S.1457)—as long as it contained a suggested amendment to cover the below-cost sale of "services" by a manufacturer, supplier, wholesaler, distributor or retailer. As originally introduced, the bill is aimed at preventing sale of equipment and material below cost "with the intent of depriving another company of business." The contention is that unless "services" are also included, "free" or "below cost" engineering services will be offered to take away work normally provided by independent consultants.

[continued on page 37]

Architectual color...

as durable as its namesake.

GIBRALTAR by-the Sea

The Gibraltar Bronze selected for the exterior panels of Gibraltar Towers in Fort Lauderdale, Florida is only one of 110 standard architectural colors offered by AllianceWall. No other finish provides the long-lasting beauty of AllianceWall porcelain-on-steel. These self-cleaning panels never require painting or other expensive maintenance. They are impervious to sea, sun, salt and smog. The colors never fade. . . stay bright and new-looking year after year.

AllianceWall porcelain-on-steel panels are both graffiti-and vandal-proof. They cannot be scratched or marred. Get the facts on AllianceWall porcelain-on-steel panels for your next project. . . An ideal finish for both exterior and interior walls.

For additional information, write

AllianceWall® CORPORATION

Box 247, Alliance, Ohio 44601

European Plant:
Alliance Europe, N.V., Box 19,
3600 Genk, Belgium

Don Schaaf, Owner

N. Hosking III, Architect, .auderdale, Fla.

'PG Industries, Miami, Florida Curtain Wall Contractor & Panel Supplier

You can build a better bank on Bigelow carpet.

If you think of Bigelow as a building material, more architectural innovations are possible. Bigelow carpet keeps rooms warmer when it's cold, cooler when it's hot, and reduces glare. That means you can be a lot more innovative when it comes to things like windows and lighting.

And because Bigelow carpet absorbs noise, you can keep soundproofing at a minimum, make walls lighter, and design more open space. You save over the cost of maintenance of hard-surface floors, too.

Specify Bigelow, and a staff of top field specialists, engineers and designers is at your command. You choose from carpet manufactured under 57 trend-setting patents, in an almost endless variety of fibers, grades, patterns and colors. We'll even custom-make carpet to your specifications.

In the drawing board stage? Now's the time to specify Bigelow carpet. For more information send in the coupon.

A+ ACRILAN PLUS THE NEW EXCELLENCE IN CARPET FIBER BY Monsanto

PEOPLE WHO KNOW BUY Bigelow®
RUGS & CARPETS SINCE 1825

W-8-2
Bigelow-Sanford, Inc. Dept. A
140 Madison Avenue New York, N.Y. 10016

Please send me your booklet on how to build a better bank on Bigelow Carpet.

NAME ____________________
(PRINT CLEARLY)
TITLE ____________________
FIRM ____________________
ADDRESS ____________________
CITY ____________________
STATE ____________ ZIP ________

Circle **No. 330**, on Reader Service Card

News report continued from page 34

Of direct personal concern were House Ways and Means Committee deliberations on a bill (HR 12272) which would, in effect, increase the "portability" of pensions for professionals. Along with somewhat similar legislation introduced in the Senate, the bill would aid highly mobile professionals by: 1) requiring participation in pension plans after no more than one year of service, and at no greater than age 25; 2) making immediate "vesting" the rule—so that employees would have immediate and irrevocable rights to payment of benefits at retirement age, even though they might have served many employers during a working lifetime; 3) requiring minimum funding by employers to guarantee availability of payments. An added feature, backed by professional societies: Raising present tax deductibility limits on retirement savings plans on the self-employed (now $2500 per year).

Other labor aspects of interest included: Senate hearings on bills (S.3654) which would eliminate Davis-Bacon Act wage requirements for housing construction sponsored or funded by federal agencies; another bill (S.3630) which would remove the restrictions of the Occupational Safety and Health Act (OSHA) from homebuilding; increasing congressional concern over "violence, intimidation, vandalism and coercion" in the building trades—a situation that caused the 5000-member Associated Builders and Contractors to call for a statement of policy condemning such labor irresponsibility by all major construction trade associations.

Congress also tacked an amendment onto the huge Labor-HEW appropriations bill in the Senate that exempts "small business" with 15 or less employees from provisions of OSHA. There was no doubt that the Senate had the construction industry in mind in approving this exemption, but there was some doubt whether executive agencies would so interpret it, since they have long insisted that construction is something separate in this regard.

Elsewhere in Washington, things were moving at their usual somewhat tardy pace: Congress finally began to move some of the major construction-oriented appropriations bills. Among them were $5.5 billion for Public Works (including $1.8 billion for the Army Corps of Engineers' civil works programs, $463 million for the Bureau of Reclamation; $19 billion for Housing-Urban Development, Veterans Administration and other programs; $8.4 billion for the Department of Transportation (including $4.9 billion for federal-aid highway work). Most of these measures were emerging from Congress with little appreciable change, up or down, from administration requests.

Of very great interest, in regard to "money" bills, was House passage of HR 996—an amended version of Mr. Nixon's "revenue sharing" package that would send some $30 billion of federally collected taxes to states and municipalities over a five-year period. Senate reception of the bill was dubious, particularly in view of the objections of state governors, who don't like the idea of passing this money directly to local governments without some state control.

And finally, the renewed controversy over plans to extend the "West Front" of the Capitol building apparently ended for this year, when the House defied its leadership and voted to forbid any further planning on the extension for at least one more year. [E. E. Halmos]

News report

Products and literature

Continuous seating/shelving. Designed by Bo Armstrong for Bejra of Sweden, this continuous seating group combines such materials as anodized extruded aluminum, woven polypropolene, steel, nylon, leather and vinyl. The shelving system was designed by Antonello Mosca, comes in mirror chrome and black, is also available in red, yellow and white. Vecta Contract Co.
Circle 101 on reader service card

Swivel sofas. Sofa, bed, table and shelves—all in one unit. Shelving is built into the molded plastic sofa frame and combined with telescoping plastic end tables for several arrangements. A swivel mechanism makes it possible to swing one leather-cushioned sofa 180 degrees to face another, creating a double bed. Knoll International.
Circle 102 on reader service card

Handcrafted in Plexiglas. According to the designer of this furniture, art is combined with function; designs are simple, structures are minimal. Included in collection are an etagere, dining table, coffee and end tables. Michael Klosek, Steven Weiss Designs.
Circle 103 on reader service card

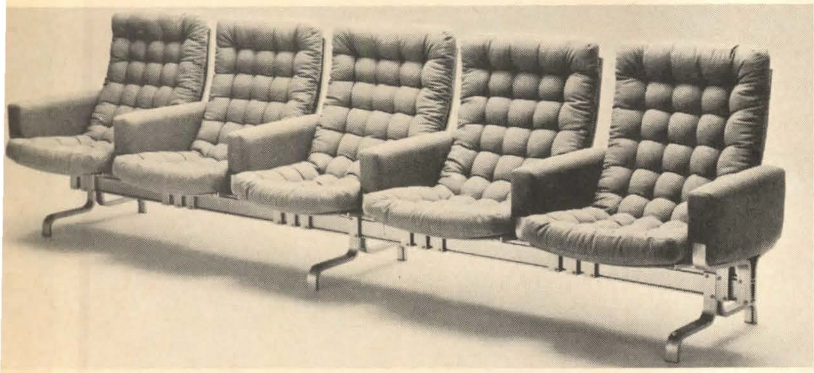
Sculptured letters. Solidly cast polyester sculptured letters come in 22 styles ranging from renaissance to contemporary. Sizes run from ¾ in. up to 12 in.; letters are bone white, can accept any paint or stain. Acme Plastics.
Circle 104 on reader service card

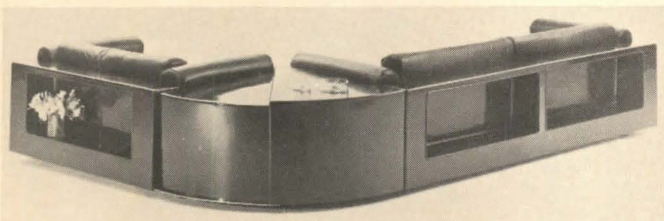
New from Israel. Adaptations of classical oriental rug designs, these rugs are power-loomed in Israel; most are virgin wool spun by the makers, a few are part wool and nylon. Colors are both brilliant and subtle; sizes range from 9'x12' to 5'-6"x8'. Carpet Showrooms Inc.
Circle 105 on reader service card

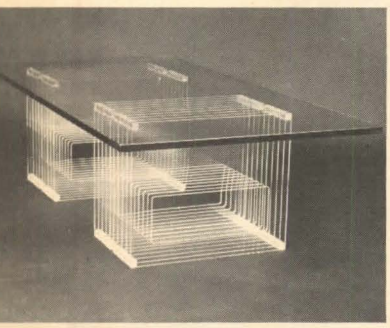
When up is down. Although these lighting fixtures look interesting and useful either way, they did appear upside down in our May issue (p. 58). Herewith, as they were designed—ceiling or wall fixtures made of polished chrome that mirror-reflects each ball of light. An adjustable design feature permits the close fit of different size decorative G lamps; socket hides the neck of the lamp. Lightolier.
Circle 106 on reader service card

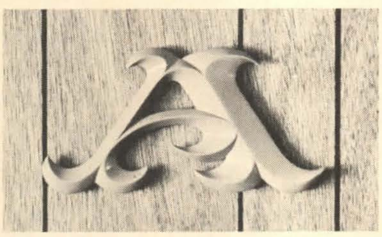
Cooling/heating. This compact unit, 28 in. wide, 20 in. high and 22 in. deep, is available in three cooling capacities. Dial thermostat and pushbutton control for adjustment; two-speed fan motor allows for quick cooling or heating. The compressor is hermetically sealed and isolation mounted for quiet operation. Friedrich Refrigerators Inc.
Circle 107 on reader service card

Earthstone. A ½-in. glazed, *semi-vitreous*, hand-molded tile made of natural, redburning shale is suggested for indoor/outdoor use in commercial and residential applications on both floors and walls. High-strength and low-moisture absorption permits exterior wall installations. Glaze colors have been formulated to produce natural earth tones; hand-molding offers natural variations. Florida Tile Industries.
Circle 108 on reader service card
[continued on page 40]

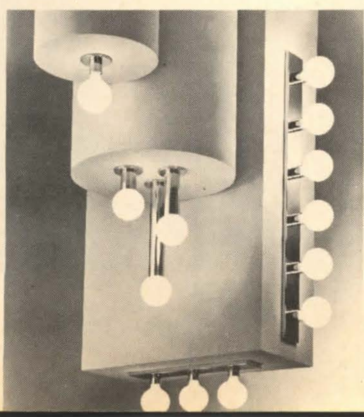

Continuous seating


Swivel sofas

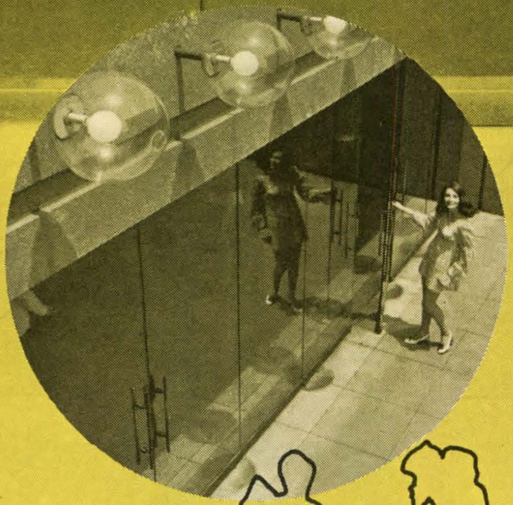
Handcrafted in Plexiglas



Sculptured letters

News from Israel


When up is down


Twelve of more than 150 Rixson concealed floor closers: L'Enfant Plaza, Washington, D. C.



Architect: I. M. Pei and Partners, New York City
Hardware: Rudolph and West Co., Washington, D. C.

silhouettes

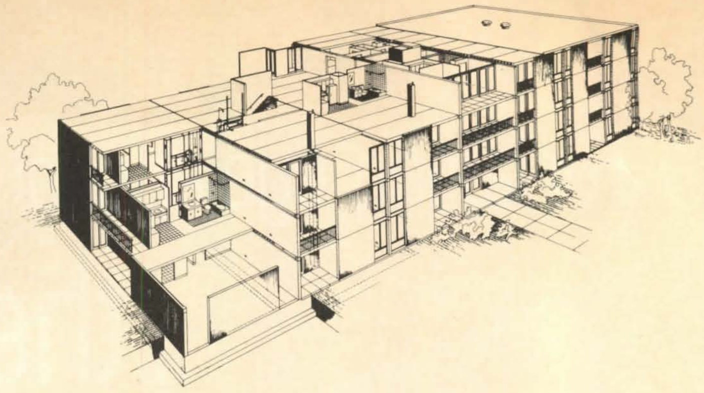
No visible door closer or hinge mars the contemporary lines of these entrances. Yet, the great glass doors of this exciting underground mall are reliably controlled under any condition. No compromise was made. Concealed beneath the plaza's gleaming terrazzo – fully accessible and adjustable – Rixson's No. 28 Series closers.

RIXSON CLOSERS

A Division of Rixson Inc.
9100 W. Belmont Ave., Franklin Park, Ill. 60131
In Canada: Rixson of Canada, Ltd.

Circle No. 384, on Reader Service Card

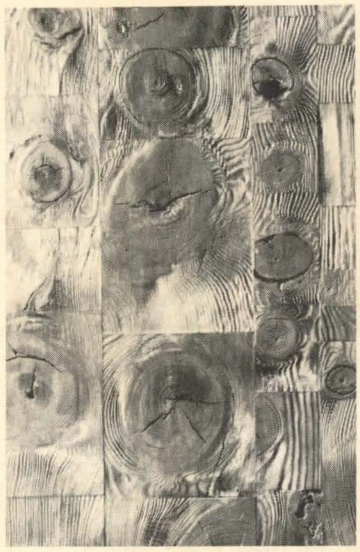
Products continued from page 38



Precast concrete building system

Precast concrete building system. Designed for multiunit housing this system includes subassemblies for low rise, walkup or multistory elevator buildings. Units range in size from 400-sq-ft studios to 1500-sq-ft three-bedroom apartments. Also suitable as hotels, dormitory and nursing home designs. Precast Systems Inc.
Circle 109 on reader service card

Knotty door. Reversible handmade doors are made of 1¾"-thick kiln dried Ponderosa Pine lumber. Available with a weathered texture or smooth sanded surface. Customwood.
Circle 110 on reader service card



Knotty door

Aquamix. Single-lever kitchen fitting is designed for low-cost apartments, developments and homes. Spout swivels 360 degrees and turns 45 degrees left or right. Ceramic disc cartridge controls water without metal-to-metal or metal-to-rubber contact. In bone and chrome. American Standard.
Circle 111 on reader service card

Aquamix

Literature

Cabinets. Booklet illustrates varied cabinets and components for nurses stations, patient rooms, pharmacies, and such other hospital areas as central supply, laboratory, dietetic, pharmacy, radiology and administration. Cabinets include file, door, drawer, storage and pass-through versions; plastic laminate tops, steel frames. Monitor Cabinets.
Circle 112 on reader service card

Aluminum ice belt. Said to resist snow and ice formation on roof eaves and to prevent water damage due to melting, this ice belt is designed like a low pyramid, allowing for expansion and contraction. The panels measure 30" x 34" deep and are installed with 4" to 6" shingle overlap at top. A built-in drip edge seals the eave, retarding ice formation and the damming effect of melting ice and snow along the roof edge. Fabron Products, Inc.
Circle 113 on reader service card

Acrylic mirrors. Brochure offers application suggestions for Plexiglas acrylic mirrors including display, signs and sign letters, mirror walls, ceiling panels, dividers and building façades. Said to have 20 percent more brilliant image than other mirror materials, Plexi-view is available in 4'x8' sheets in thickness of ⅛-, 3/16- and ¼-in. Decora-lite textured mirrors give an iridescent effect from any light source without backlighting; gold-vein finish also available. Ram Products.
Circle 114 on reader service card

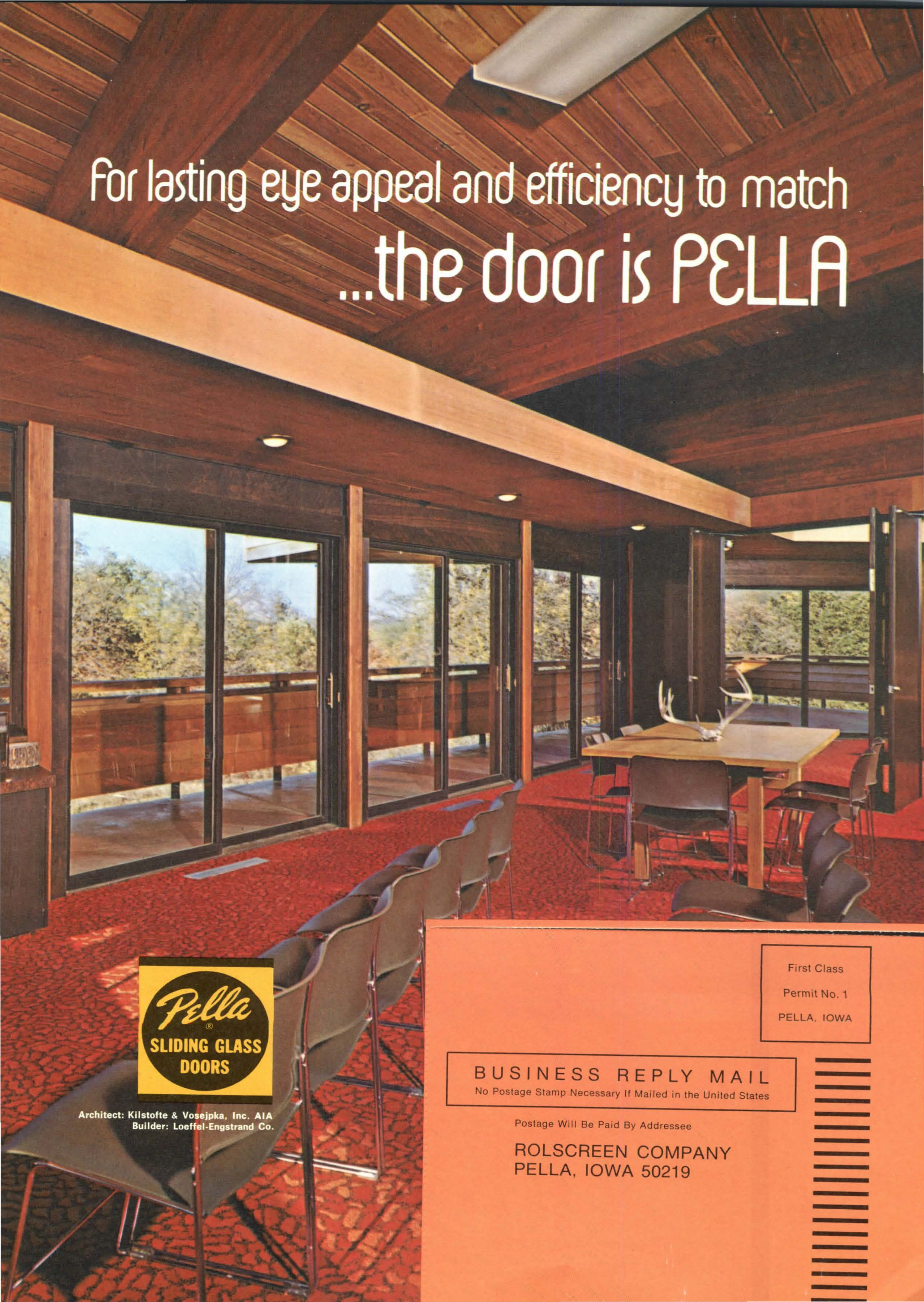
Grease extractor. By utilizing centrifugal force, this GT extractor pulls hot, grease-laden air through its slots and causes grease particles to adhere to its internal baffles and sidewalls. Reportedly it removes more grease than mesh-type filters due to its larger impingement area. Constructed of polished stainless steel, it is accidental-fire retardant and easily cleaned. Vent Master, Industrial Industries Inc.
Circle 115 on reader service card

Cedar panel shakes and shingles. Booklet on Western Red cedar panels for sidewall use including barn, handsplit shakes, rough sawn shingles and others. Available in panels from 46¾-in. long for double wall construction, or 8-ft long for either single or double wall application. In natural cedar or factory-finished in up to nine colors. Shakertown Corp.
Circle 116 on reader service card

Sun-conditioning. Windows are protected against solar heat and glare by the use of KoolShade, installed outside sun-exposed windows. Tiny, fixed horizontal louvers held in position within aluminum frames create a barrier against solar rays before they reach the glass, without impairing outward visibility. Units can be made to fit any installation up to 72½ in. wide; standard color is black with other colors available. Brochure from KoolShade Corp.
Circle 117 on reader service card

Insulation. Brochure describes Foamedge, a vinyl-clad polyurethane insulation said to lock out noise, vibrations, heat or cold, dirt or dust and light. Suggestions are given for such varied applications as steel partitions, swinging and sliding doors, exhaust fans and hoods or covers. Available in 14 diameters, with standard foam density 4 lb per cu ft. Can be used up to 250 F; remains flexible down to 20 F. Sterling Alderfer.
Circle 118 on reader service card

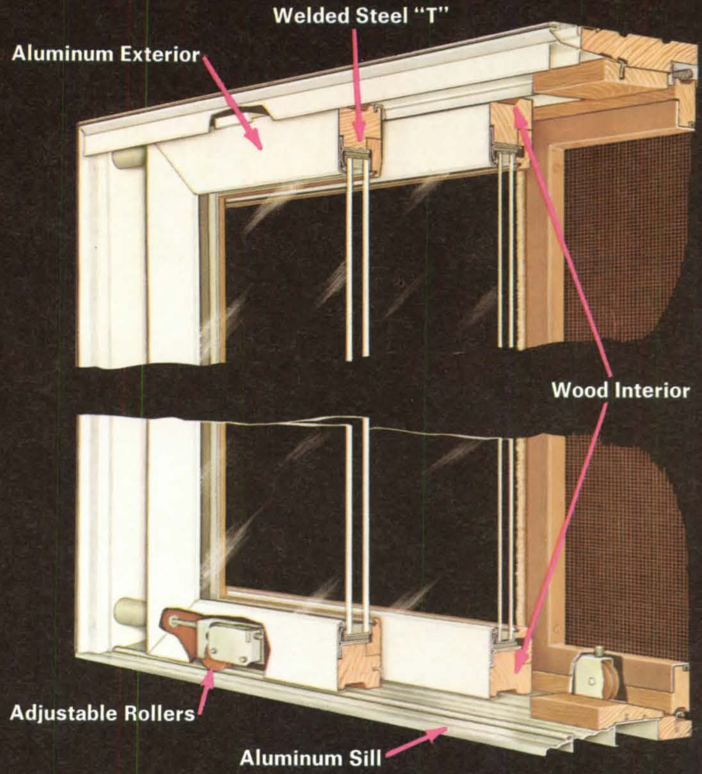
Circle No. 360, on Reader Service Card →


For lasting eye appeal and efficiency to match
...the door is PELLA
Pella
SLIDING GLASS DOORS
Architect: Kilstofte & Vosejpka, Inc. AIA
Builder: Loeffel-Engstrand Co.
First Class
Permit No. 1
PELLA, IOWA
BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States
Postage Will Be Paid By Addressee
ROLSCREEN COMPANY
PELLA, IOWA 50219

PELLA CLAD

combines insulating qualities of wood with acrylic color coated aluminum

PELLA CLAD sliding glass doors offer superior qualities of aluminum exterior — wood interior construction. Quality begins inside where carefully-crafted wood frame delivers maximum insulating value, warmth and beauty. Heat-cold transmission and condensation are minimized. Interior can be finished in natural wood tones or painted.
On the outside durable aluminum shields the wood from the weather. Factory-finished with baked-on acrylics, this low maintenance finish assures many years of carefree attractiveness. Available in standard dark bronze or white plus a wide selection of special colors.




Architect: Lawrence E. Bray, AIA
Builder: Earl's Construction Co.


Designer: Joseph D. Travis, Jr.
Builder: Joseph D. Travis & Sons Co.


Designer & Builder: Joseph D. Travis, Jr.
Decorator: Joseph D. Travis & Sons Co.

MAIL CARD TODAY • Answered within 24 hours

Yes, via first class mail, rush me more color photos and information about the following PELLA products:

☐ Sliding Glass Doors
☐ Folding Doors
Windows: ☐ Casement ☐ Double-Hung ☐ Awning

Name ____________________

Firm ____________________

Address ____________________

City __________ State __________ Zip __________

Telephone: __________

Also Available throughout Canada

H12

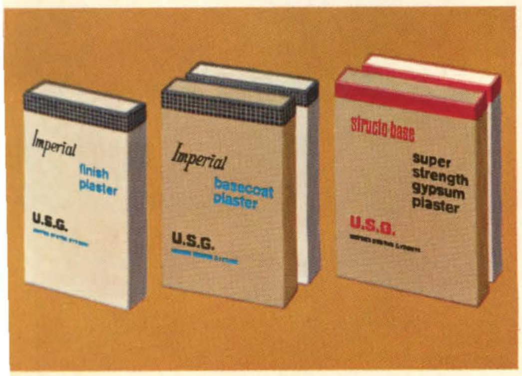
Printed in U.S.A.

Welded steel reinforces the slender wood frames to keep panels warp-free and operating smoothly. Complete weather-stripping seals tightly against drafts and moisture. For additional weather protection and safety, all doors glazed at the factory come with tempered insulating glass.
PELLA doors glide smoothly on sealed ball bearings. Self-closing screens are removable, yet never jump the track accidentally. For distinctive appearance select removable muntins in rectangular or diamond patterns.
Two standard glass widths are offered or you can specify custom sizes. Frames adapt to 1/4" plate, 5/8" or 1" insulating glass. Unit types are O, OX, XO, OXO, and OXXO.
For more information, mail this card, or phone your PELLA Distributor — look under "Doors" in the Yellow Pages — or see SWEET'S Architectural File.
ROLSCREEN COMPANY, PELLA, IOWA 50219

PELLA MAKES QUALITY WINDOWS, FOLDING DOORS AND SLIDING GLASS DOORS

All 3 walls are alike. All 3 are different.

You have a "hard" choice.



USG® Hard Wall Systems are all built to take abuse. Each finish tests at 3,000 psi compressive strength. All have withstood abrader tests far beyond normal requirements. And all provide high fire and sound transmission ratings, too. Yet, each is different to fulfill the different needs of your building's functions.

For living areas, IMPERIAL* One-Coat Veneer provides the low-cost lasting beauty of plaster walls. In commercial structures, where the ultimate in appearance is desired, owners can profit from Two-Coat Veneer. And in the high-traffic areas of institutions, the practical answer is STRUCTO-BASE* Base Coat, STRUCTO-GAUGE* Plaster and lime finish.

Building functions, continuing cost, use and maintenance are just some of the variables to consider when choosing your partition systems. We try to make this "hard" choice easy by offering you three systems. For details, see your U.S.G. representative, or write to: 101 S. Wacker Drive, Chicago, Illinois 60606, Dept. **PA-82**.

*Reg. U.S. Pat. Off.

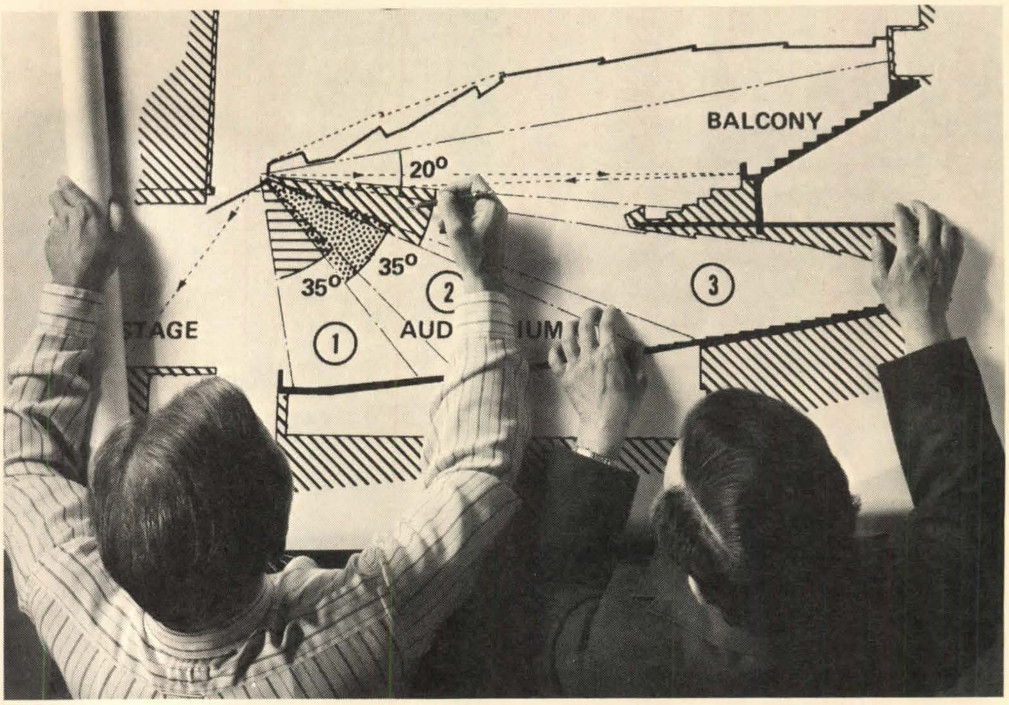
UNITED STATES GYPSUM
BUILDING AMERICA

ircle No. 386, on Reader Service Card

The Fine Art of Sound Reinforcement

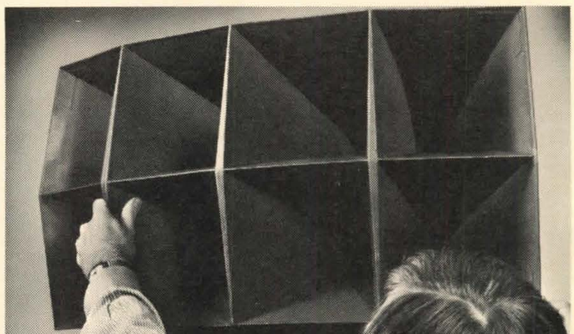
It has now advanced to a rather exacting science

When sound is natural and there is no awareness of the sound system... it's an acoustical achievement. It follows an exacting Altec procedure proven in more than 1000 installations. It verifies that the equipment is right for the specific environment, indoor or outdoor. And it shapes the sound to provide a uniform level throughout the audible spectrum.



1. The Altec Acousta-Voicing Sound Contractor works with the architect or consulting engineer in planning sound coverage and speaker location during initial design stages. Such early planning helps coordinate and blend the speaker array into the design of the room.

2. A Hewlett-Packard computer at the Altec factory verifies the type of equipment selected, its power requirements and location; and finalizes sound system design.



3. Loudspeaker placement and adjustment are critical in getting proper sound coverage. This is carried out by skilled sound technicians, conforming to the computer guidelines.

Bally belongs.

In mass feeding

for student bodies

Bally Prefabs set the standard

for Walk-In Refrigeration

Bally Walk-In Coolers and Freezers belong everywhere mass feeding takes place. They can be assembled in any size for indoor or outdoor use from standard panels insulated with four inches of foamed-in-place urethane, UL 25 low flame spread rated. Choice of stainless steel, aluminum or galvanized. Easy to enlarge . . . easy to relocate. Refrigeration system from 35°F. cooling to minus 40°F. freezing. Subject to fast depreciation and investment tax credit. (Ask your accountant.) Write for 28-page book and urethane sample. **Bally Case and Cooler, Inc., Bally, Pennsylvania 19503.**

Bally®

Address all correspondence to Dept. PA-8

Circle No. 329, on Reader Service Card

Exit devices. Outwardly, their design reflects an inner strength and reliability. □ Now look beneath the cover for the real Sargent quality. Built for service through simple design; a *smooth*, positive interaction of all moving parts. □ And look at the completeness of the line . . . all functions in all finishes, including a full line of Fire Exit Hardware. □ Sargent exit devices . . . well worth another look.

SARGENT®

A complete line of advanced architectural hardware, including the Sargent Maximum Security System
New Haven, Connecticut □ Ontario, Canada

Editorial

Progressive Architecture

August 1972

Photo: Richard Nickel

Richard Nickel was not an architect, but he died for the sake of architecture. Known to few people outside of Chicago, Nickel was a photographer who devoted his life to recording—and saving—the legacy of the Chicago School. He was a gentle activist, and his weapon was the persuasive photograph. His poignant views of Adler & Sullivan's Garrick Theater, mutilated by wreckers, helped rally support back in 1961 for the newly established Chicago Heritage Committee. His superb photographs of other Chicago School masterworks—for the collections of the National Trust, the Historic American Buildings Survey, and other organizations—have contributed to the few victories in the fight to save these buildings.

Neither Nickel's photographs nor any other argument could save Adler & Sullivan's magnificent Stock Exchange (above) from demolition. On April 13, while New York's Metropolitan Museum was competing with the City of Chicago for the choicest portions of the façade, Nickel was making one of his daily forays inside to photograph—and occasionally to remove—details that were not slated for salvage. His own movements apparently triggered a structural collapse, and it was not until May 9 that his body was finally located in the debris.

Dick Nickel had no intention of becoming a martyr, and his death at the age of 43 served no purpose. We can only wish that he had been more cautious and lived to continue his efforts. But the reminder of his dedication could give his fellow Chicagoans—and their allies the world over—more determination to challenge the economic and political conditions that are destroying so many serviceable Chicago landmarks.

The characteristic office structures of the Chicago Loop were put up between 1885 and 1900 by truly forward-looking businessmen. For the so-called developers who wrecked the Stock Exchange, business is merely tabulated greed; they lack the imagination to market office space with virtues other than the standard ceiling and the inevitable "plaza." They could never convince their backers that a landmark in the history of architecture—and commerce, too, in this case—has great intangible assets.

Today, more than a decade after Nickel and others sounded the alarm, hardly any landmarks in the Loop are assured of preservation; the refurbishing of Adler & Sullivan's Auditorium has been the one great achievement. Other irreplaceable structures, including the three great Burnham & Root office buildings—Rookery, Reliance and Monadnock—will be threatened in time.

A fund has been established in Nickel's name to continue the documentation of doomed landmarks, the salvaging of ornament and similar efforts. (Donations will be accepted by the Committee for the Richard Nickel Fund, Chicago School of Architecture Foundation, 1800 South Prairie Avenue, Chicago, Ill. 60616.) But photographs and fragments, valuable as they are, are not enough. They cannot reproduce the visual character of streets in the Loop—the same kind of balance between variation and overall order that we see in the streets of Florence, with comparable refinement in detail. This character has been maintained and reinforced in buildings constructed as recently as the 1960s, notable the Harris Trust and Connecticut Mutual buildings by S.O.M. It is time to realize that the streets of the Chicago Loop deserve as much protection as the hills of San Francisco. A way must be sought—an economically workable way—to save this national legacy.

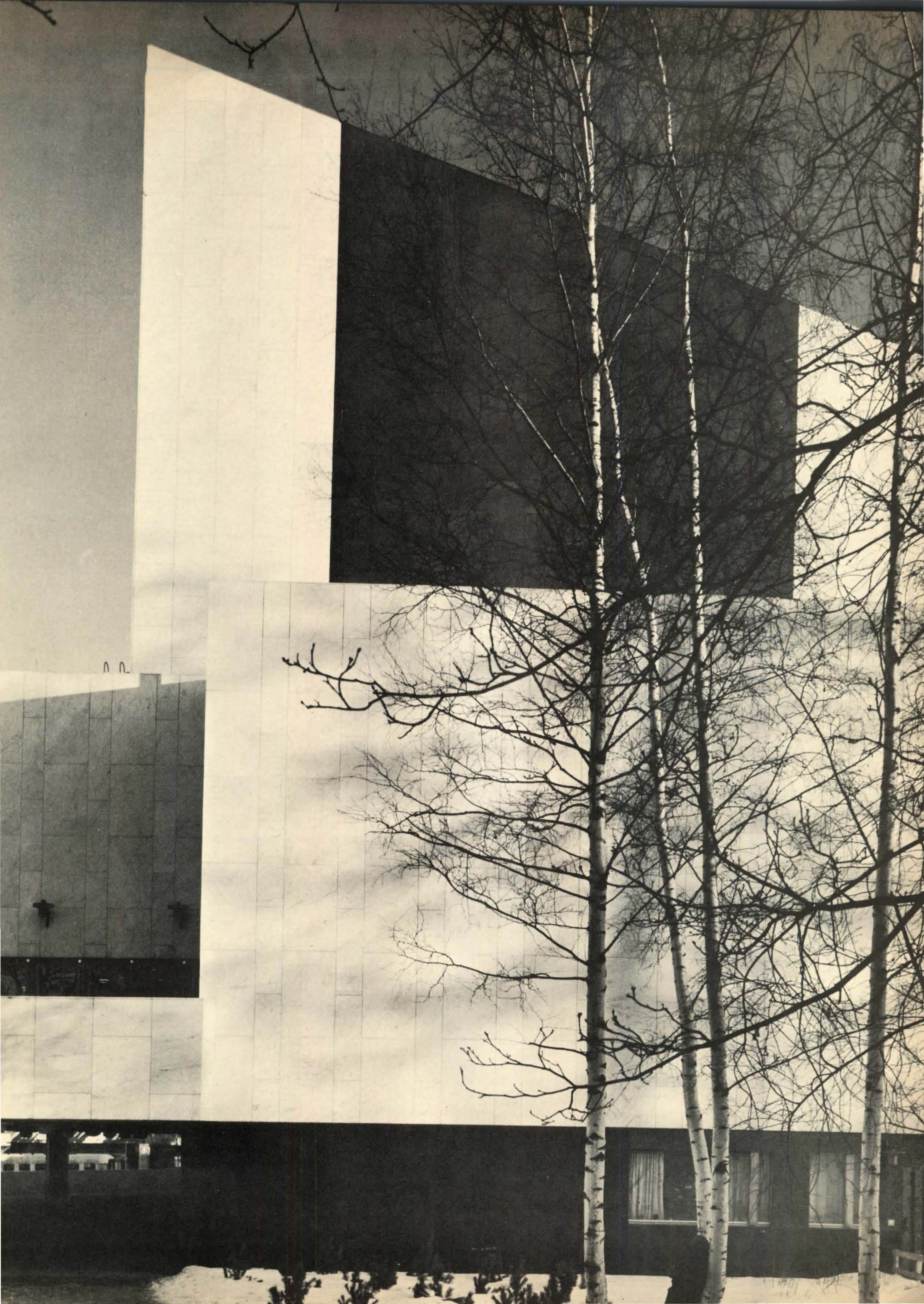
John Morris Dixon

Finlandia Hall

Helsinki's cause célèbre

The last great master of the modern movement, Alvar Aalto at 74 continues to excite the imagination, *as shown by* his controversial concert and congress center in Helsinki

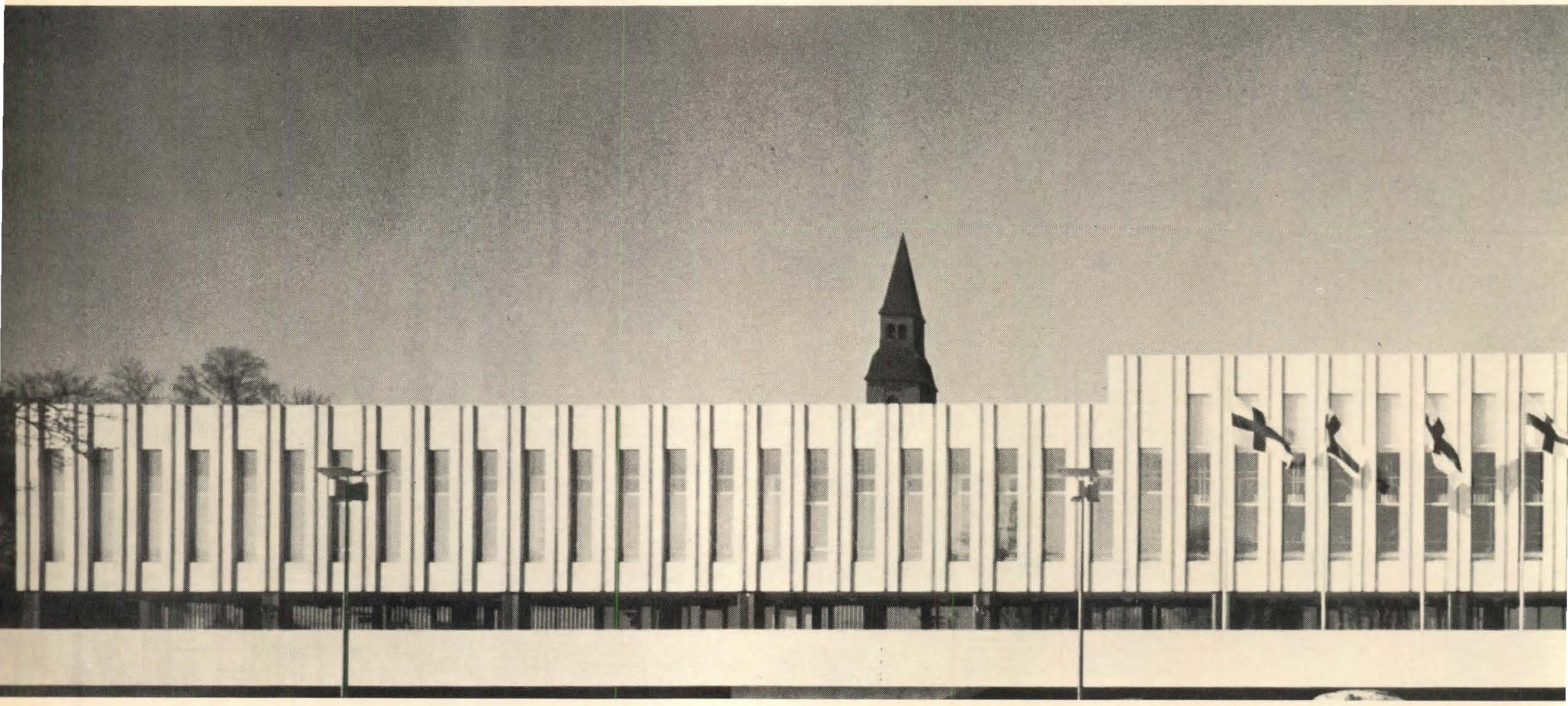
In Helsinki, it seems that almost everyone is talking about Alvar Aalto's most recently completed work, a concert and congress center near the heart of town that has become somewhat of a cause célèbre. Most of the people P/A talked with have strong opinions about Finlandia Hall's location, its mass, its cost or its acoustics. Some say the hall is too far from the center of town, it is too monumental, it cost too much, or the acoustics in its main concert hall are somewhere between unfortunate and downright scandalous. In contrast, others like the park setting and the simplicity of its exterior mass and form; they wish funds had been available to complete a planned annex of additional meeting rooms; and many think



the acoustical quality of the main hall could not be improved.

Finlandia Hall sits in Hesperia Park on the southernmost edge of Toolo Bay. It is only a short walk or a very quick tram ride from Eliel Saarinen's famous railway station, the real hub of Helsinki's commercial and business center. In one direction it faces unsightly freight yards, but this will change when Aalto's master plan for the new town center, which has been approved in principle, is finally realized. The huge model in Aalto's office reveals the scope of his plan; it calls for replacing the freight yards with an enormous, fan-shaped esplanade that will radiate from the center of the city to the edge of the bay to connect directly to Finlandia Hall. Under the esplanade will be a parking garage that will serve not only the train station and town center, but also Finlandia Hall and the other cultural facilities planned for the western shore of Toolo Bay. This northwestern section of the city is already showing signs of vigorous growth in anticipation of the town center expansion; new hotels, restaurants and shops seem to spring up overnight. As Helsinki's growth continues in its planned pattern, Finlandia Hall will be much more in the center of things than it seems to be now.

The charge that the building is too monumental seems unjustified. It is, by Helsinki standards, quite a massive structure, with no other buildings around it to ameliorate its scale. From the street side, however, one could drive past and almost miss the building since it is practically hidden from view; most of its volume is below street level because the site slopes down to the water's edge. A certain amount of monumentality

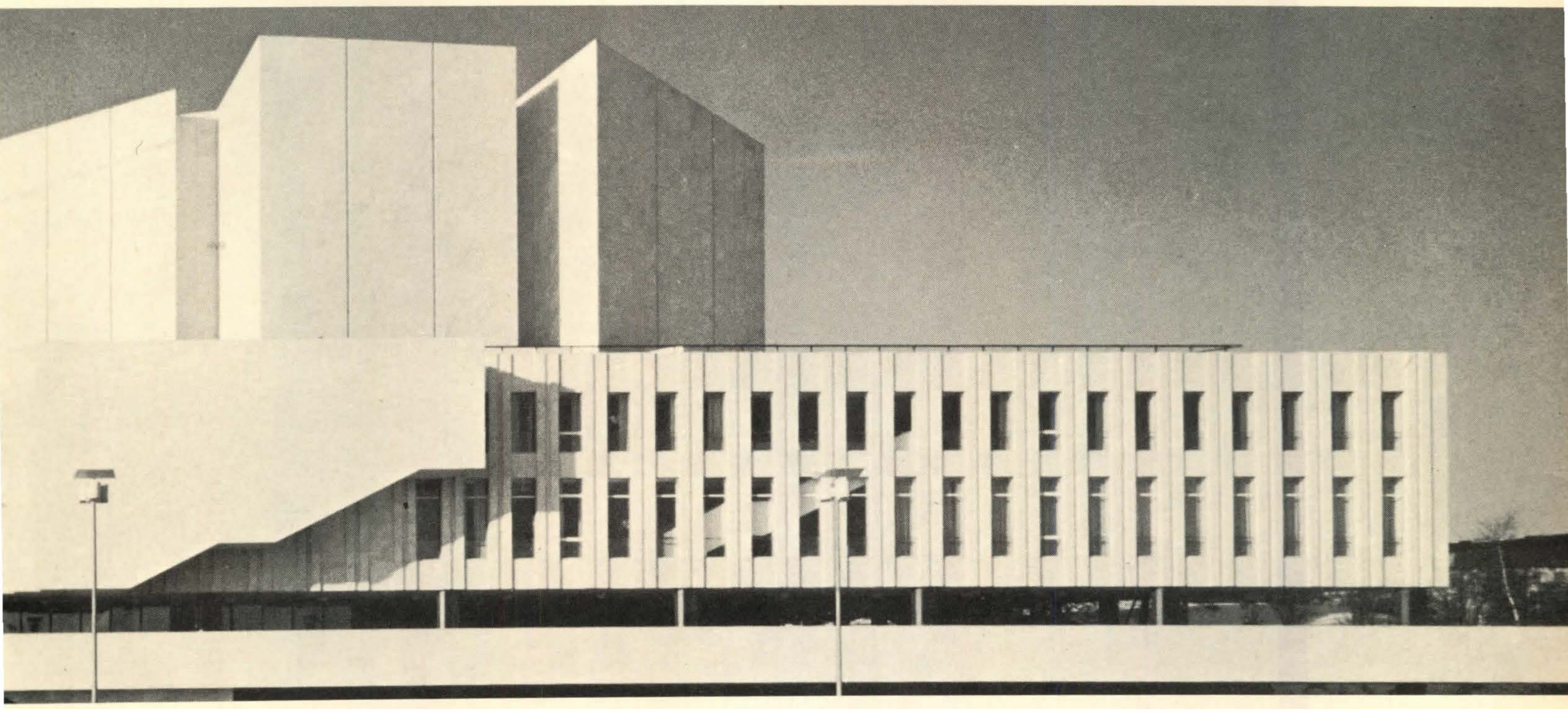


As one descends from the street side, only three levels can be seen of the 500-ft-long building; street entrance, right.

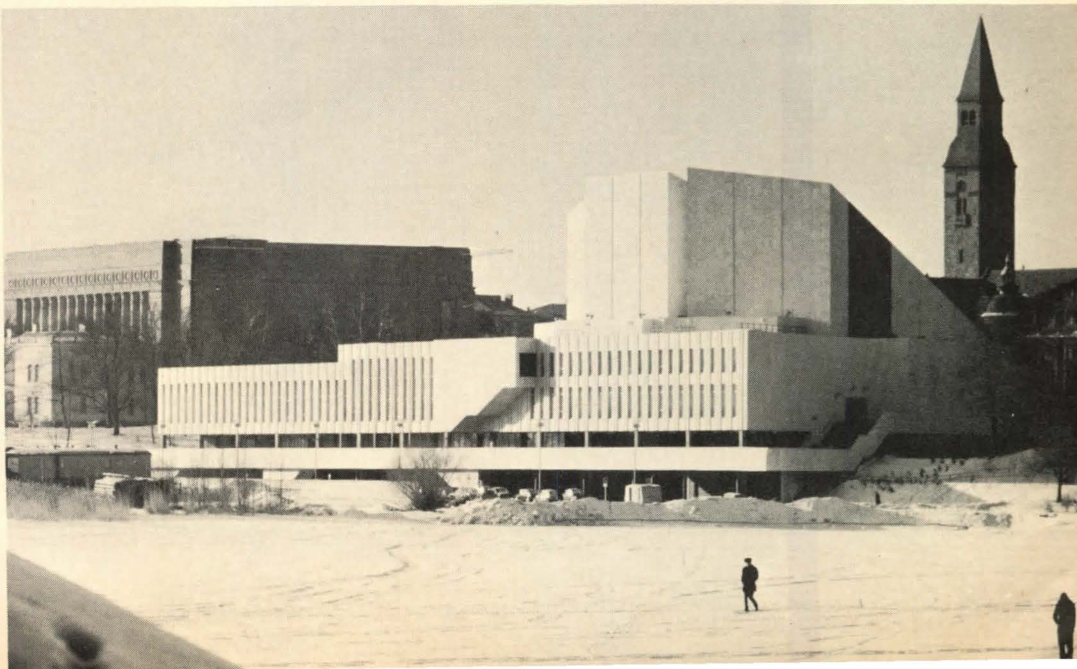
was implicit in the commission, but Aalto did not abuse this by over-articulating forms or faking emphasis to make it "too" monumental.

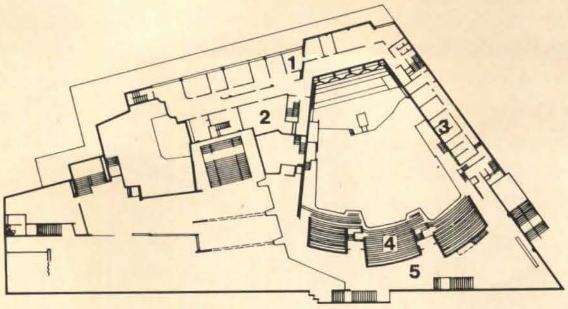
Within the 3,350,000 cu ft of space, which is divided into four levels totaling 150,000 sq ft of floor area, Aalto has brilliantly organized a large concert/congress hall seating 1750 people, a smaller chamber music hall for 350, three 100-seat conference rooms, and 20 smaller committee and meeting rooms of varying sizes that double as rehearsal, practice and study rooms for musicians. In addition, there is a 400-seat restaurant, an artists' cafeteria, an information center, ticket offices, administrative offices, a VIP foyer and elaborate, hidden facilities for television and radio broadcasting. All functional areas of the building are situated around three massive foyers on the entrance, auditorium and balcony levels, which order the space in such a way that the visitor always knows precisely where he is (something not often true in concert halls). Because the foyers are so ample, there is no crowding during intermission or at the end of a concert or meeting, even if both halls let out at the same time. The great number of entrances to the building allow visitors to go quickly and easily to their destinations whether they arrive at the drive-in or at the entrance level. In reverse, this permits very easy egress.

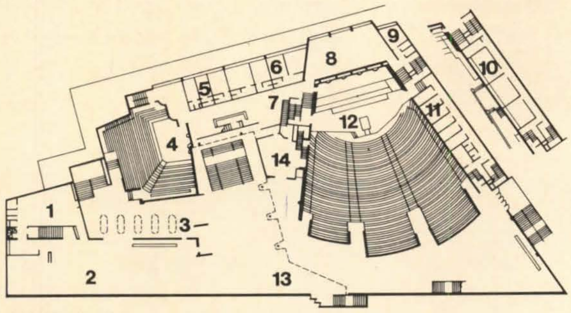
Compared to similar projects throughout the world, Finlandia Hall's $10 million cost (all inclusive from site work to fees) does not seem exorbitant. Nor does its $66 per sq ft, in view of its large cu ft to sq ft ratio, and the fact that it was built

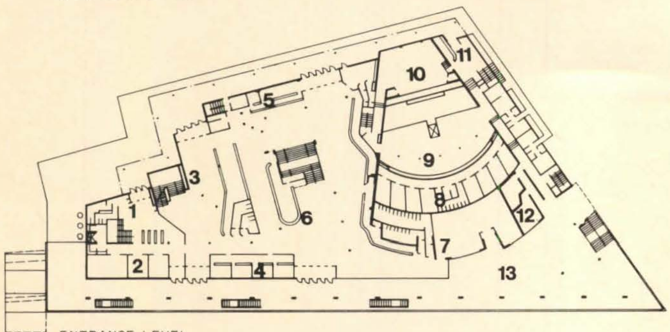


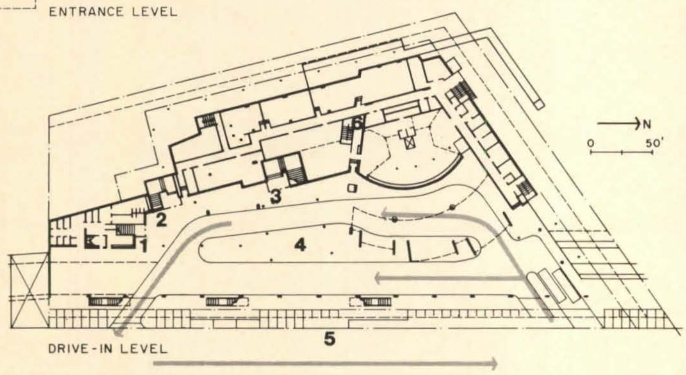
From the rear, Finlandia Hall overlooks frozen Toolo Bay; it is framed (below) by the House of Parliament on the left, and Saarinen's National Museum on the right.




BALCONY LEVEL


AUDITORIUM LEVEL


ENTRANCE LEVEL



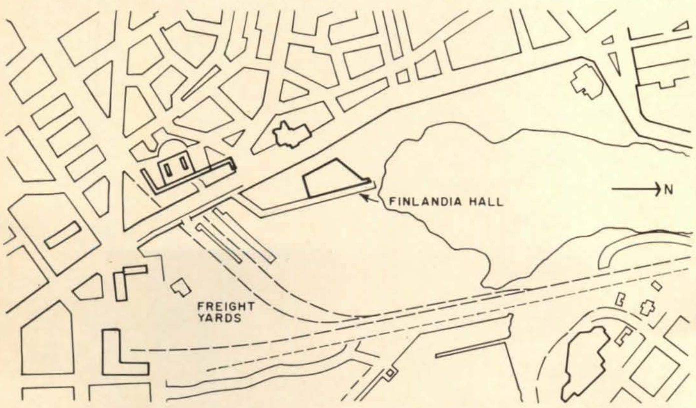
DRIVE-IN LEVEL

Balcony level
1 administration
2 sheet music store
3 light and sound control, interpreter's rooms
4 concert hall balcony
5 balcony foyer

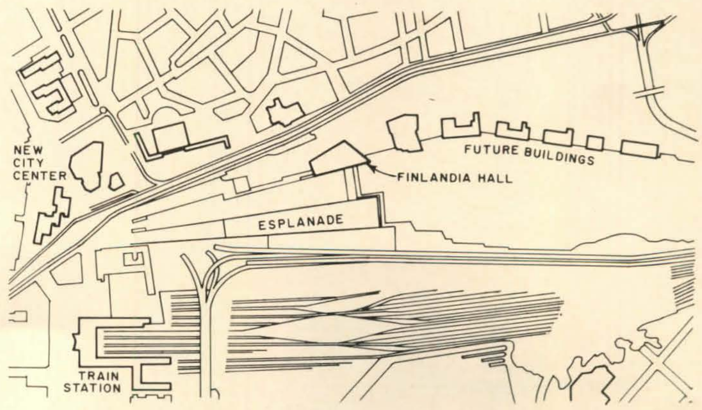
Auditorium level
1 restaurant kitchen
2 restaurant
3 chamber music hall foyer
4 chamber music hall
5 offices
6 conductor's and soloists' rooms
7 artists' cafeteria
8 orchestra foyer
9 ladies' foyer
10 radio and TV studios
11 radio and TV commentators
12 concert hall
13 concert hall foyer
14 VIP foyer

Entrance level
1 restaurant entrance lobby
2 committee rooms
3 chamber music hall entrance lobby
4 information center
5 box offices
6 concert hall entrance lobby
7 conference hall
8 orchestra changing rooms
9 instrument store
10 rehearsal hall
11 staff entrance
12 rehearsal rooms
13 open-air terrace

Drive-in level
1 restaurant entrance
2 chamber music hall entrance
3 concert hall entrance
4 unloading bay area
5 parking lot
6 mechanical



SITE AT PRESENT



Finlandia Hall overlooks freight yards, but in Aalto's master plan for the area, which has been approved in principle, the hall will be connected to a new city center by a radiating esplanade with underground parking.

to last. In addition, the building has a certain symbolic value, representing Helsinki's awareness of itself as a potentially important conference and cultural center in Europe. Consequently, only the finest materials, furnishings and equipment have been used.

The exterior is Carrara marble, accented with both polished and unpolished native black granite. On the interior, surface materials depend on the use of each area. The heavily used entrance level foyer, for instance, is treated with hard materials: travertine floors and stairs, marble-faced walls, and columns protected with easily maintained ceramic tile. Coming up into the main foyer, the materials become softer. Here the floors are carpeted, some walls and columns are marble-clad while others are simply white-painted plaster. The chamber music foyer has wood paneling. In the main concert hall, wooden floors are carpeted only in the aisles; the walls are basically white-painted plaster offset by the dynamic forms of dark blue wood acoustical paneling and marble-clad balconies. In the smaller chamber music hall, the walls are partially covered with painted wood baffles, while naturally finished, redwood-faced acoustical clouds hang from the ceiling. Most of the smaller meeting and conference rooms and other nonpublic areas are carpeted and have white plaster walls with some wood paneling.

Throughout the building one's attention is continually drawn to the hardware, which was all designed by Aalto. Such simple things as handrails (brass wrapped in leather), light fixtures, door-pulls, and the numerous grilles of metal and wood take on a wholly new significance when seen as part of a carefully thought-out repertory of design ideas. In Finlandia Hall, Aalto has designed everything, including all of the furniture and even the specialized organ installation in the main concert hall. This overall synthesis of form and idea produces an extraordinary architectural cohesiveness that results only when a single mind, such as Aalto's, is in complete control of every aspect of a building.

Some highly sophisticated technical equipment is included in the overall cost of $10 million. An extensive public address system covers all parts of the building, and a three-channel, closed-circuit television system allows various functions to be monitored in other parts of the building. In addition, activities in the main concert hall can be simultaneously projected on a mammoth screen in the chamber music hall, increasing the audience capacity by 350. Both music halls and all conference rooms are equipped with simultaneous interpreting equipment for six languages, broadcast to participants over wireless interpreting receivers. And in the main concert hall, sections of the stage can be hydraulically raised or lowered into various configurations.

It's the music that matters

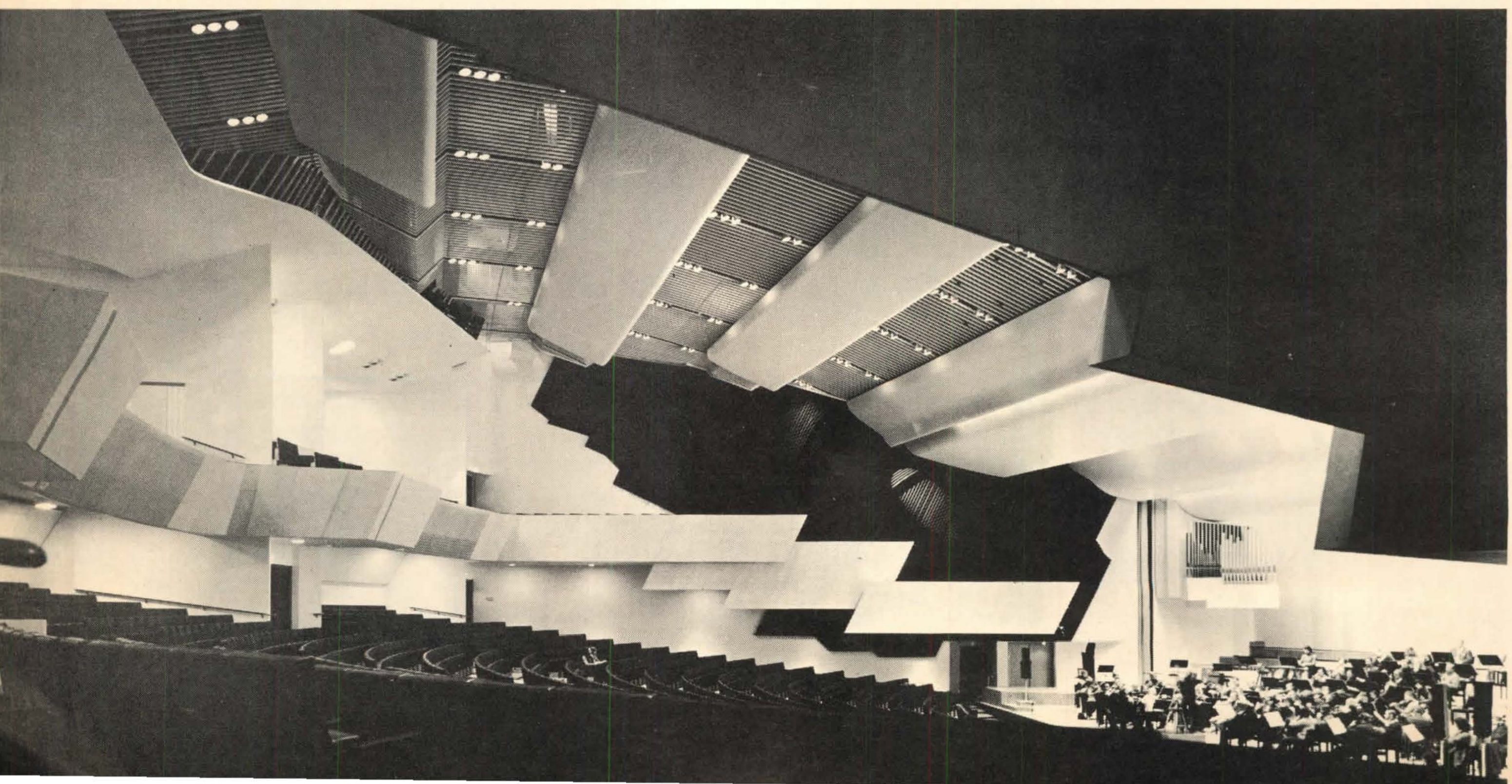
The true test of any concert hall, though, is the way it conditions the quality of sound produced in it. This has not been a problem in the small chamber music hall where the sound is crisp and clear. Speakers are easily heard from any part of the room and the hall produces a clearness of sound that is usually sought after for solo instrument or small ensemble playing. In a room seating only 350 it is difficult to go wrong, but if a music hall goes much over a 1000-seat capacity there can be, and often are, serious sound problems. It is Finlandia Hall's main, 1750-seat concert hall that has come in for the most vigorous criticism, and on this count it depends pretty much upon where your acoustical tastes lie. This, in turn, may have something to do with how old you are.

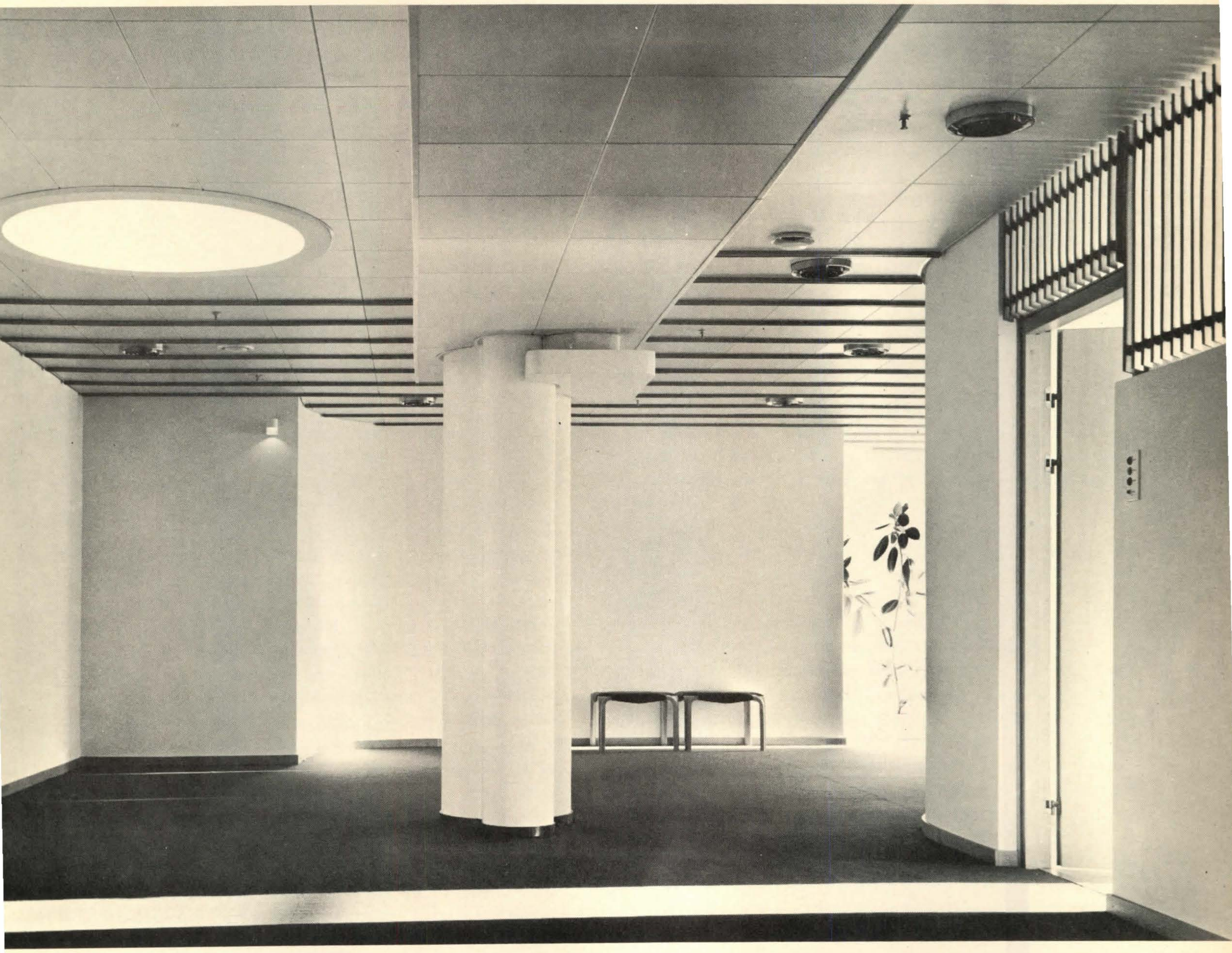
A younger generation brought up on high fidelity recordings, who go to the hall for pop concerts, seem to think the quality of sound is nothing short of fantastic. The sound is, in fact, extremely clarified, that is, the separation between sounds produced by each instrument or vocalist is quite apparent, and because of this crispness and clarity the decibel level can quite easily rise to ear-shattering levels. What more could you ask? A lot more, say those who come to the hall for classical concerts. This group neither likes what is called a dry sound nor the separation between instruments. Part of the criticism may be justified, for it is true that for classical concerts the hall seems to lack the ability to produce an adequately developed bass response, and this is coupled with a somewhat over-developed brass. But strings, percussions and woodwinds, although clearly separated, sound rich and strong. It must be remembered, however, that acoustics, in music halls at least, is not an exact science, and any hall requires a period of use and experimentation before the right sound results. Fortunately, this may not be such a problem at Finlandia Hall because behind the ceiling grilles—in a huge walk-through, steel-trussed interstitial space—there are sliding steel hatches that can be opened or closed individually to tune the hall below. With time, acoustical problems will be worked out, although the hall will probably retain its clarified, fresh sound.

This poses another question. Most large concert halls throughout the world were constructed during the 19th Century to accommodate the new symphonic literature for orchestras that were constantly increasing to the proportions of today's full symphony orchestra. Accompanying this was, of course, the growth of a large middle class that could support the large orchestras in their enormous performance halls. Attending a concert became, and in many respects remains today, an act of considerable cultural importance. Consequently, ample funds were usually available for the construction of ever larger concert halls that were lavishly decorated and appointed in the taste of the day. Because the halls were so elaborately articulated inside, they almost always produced a rich, warm, mellow sound, which, although sometimes "mushy" and not acoustically clear, is the kind of sound most of us expect of classical music.

In Helsinki the only place large enough for symphonic concerts, until Finlandia Hall was completed, was the beautiful, neo-Classical auditorium at the university. Concert-goers were used to that sound, and now they have a new hall they are not used to, which is not yet quite right. In time, though, as the proper mechanical adjustments are made and as the orchestra learns to use the hall to best advantage, it will be. It will never be the old sound of the university auditorium; it will be a new, clean and vibrant sound that will require some adjustment from the listeners. But even as it is now, the younger generation seems to like the sound. And they, after all, are the ones who will have to live with this hall. It is just possible that Aalto has been right all along. [DM]

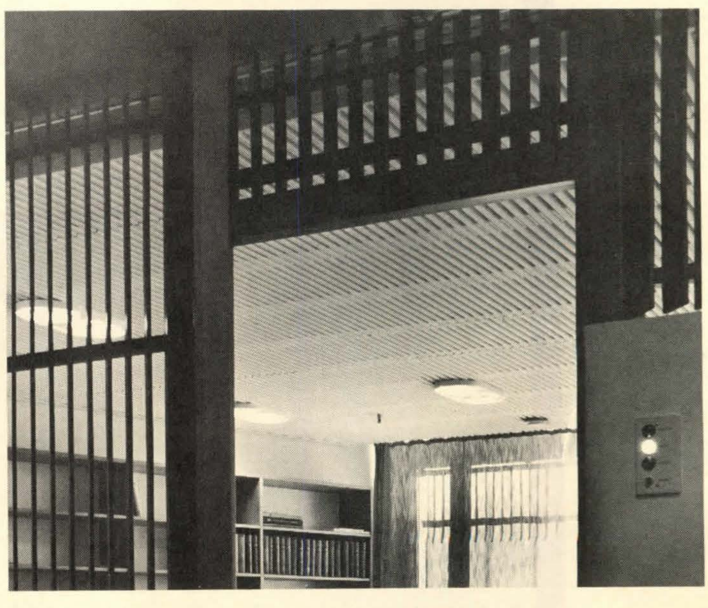
Except for metals and natural woods, the only color used is blue-black, which can be seen in the chamber music hall chairs (above) and in the acoustical paneling and upholstery in the main concert hall (below). In the foyers (right and far right) wood and metal grilles contribute to spaciousness.





Data

Project: Finlandia Hall, Helsinki, Finland.
Architect: Alvar Aalto.
Program: 150,000-sq-ft concert and congress center with auditoriums and meeting halls accommodating 2300 people.
Site: in Hesperia Park on Toolo Bay, in what is to become part of the new Helsinki town center.
Structural system: poured-in-place, reinforced concrete frame, steel truss roof incorporating walk-through interstitial space above main concert hall.
Mechanical system: central air conditioning supplemented by individual steam radiators in offices.
Major materials: concrete frame, gray wool carpeting, Carrara marble and wood floors, painted white plaster and natural wood paneled walls inside, with heavy-use areas clad in Carrara marble, polished and unpolished black Finnish granite, bronze and brass hardware, wood and bronze grilles.
Cost: about $10 million, or $66/sq ft, including all interior furnishings and finishings, landscaping and fees.
Client: city of Helsinki, Finland.
Photography: Richard Einzig.
Transportation: provided through the courtesy of SAS.



Olympic site designed for the future

Walter R. Thiem

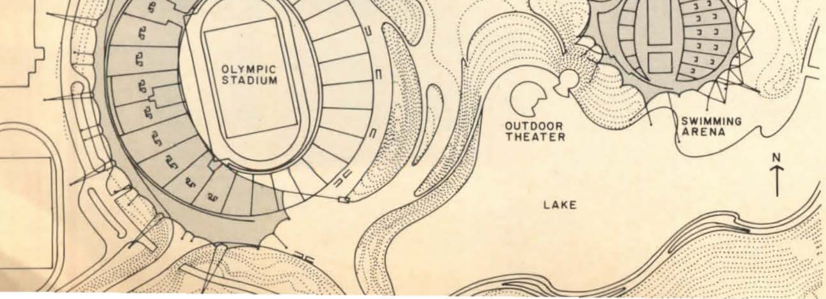
When the athletes have packed their medals and left, the real winner of the 1972 Summer Olympic Games will be the city of Munich itself. The prize: a college, student housing, a condominium development and a park for leisure and sports

Design of the XX Olympics site began in October 1967, when the firm of Behnisch & Partner won a nationwide competition that stressed a rural, yet close in, location; short routes; the arts as well as sports and youth; and post-games use. The design integrates all athletic facilities into a sculptured landscape, unifying them with a permanent tent roof by Frei Otto.

The site, a former private airport within the city limits of Munich, is 1.5 miles long by .9 mile wide. It is cut in half by a six-lane highway and the Nymphenburg Canal, and its only other feature except for Munich's TV tower, was a garbage-formed hill. "Sculpturing" the tract was done by contouring it with earth berms and adding a lake. The tent roof, which covers the three major stadiums, creates an atmosphere of openness, gaiety, lightness and transparency. It also manages to give human scale to the large structures. The berms are used as natural access routes; their changing levels add to the variety of views offered the visitor.

The stadium, sports arena and swimming arena are depressed into the ground. All utility rooms are underground or under the seating. The flow of space is maintained by bringing cobble-stone walkways into the foyers of the buildings. All supporting installations—snack counters, telephone booths, sitting areas, and dressing rooms—were designed as furniture for the landscape. Structurally, the stadium and sports arena are poured concrete frames with precast steps weighing up to 8 tons each—1280 in the stadium and 844 in the arena—that make up the grandstand. The swimming arena, with its extensive underground facilities, is largely poured concrete.

ROOF PLAN OF OLYMPIC STADIUM, SPORTS ARENA & SWIMMING ARENA



Because a roof was required to shelter vast areas of the "designed" landscape and to allow the space to flow from structure to structure, it was important that it be as light and transparent as possible. The obvious solution was a tent similar to the one which had covered the West German pavillion at Expo '67 in Montreal. For Munich, Frei Otto designed a prestressed cable net construction with transparent acrylic infill. Where full enclosure was necessary, as in the sports arena and swimming arena, a second transparent hung ceiling and a glass façade are added.

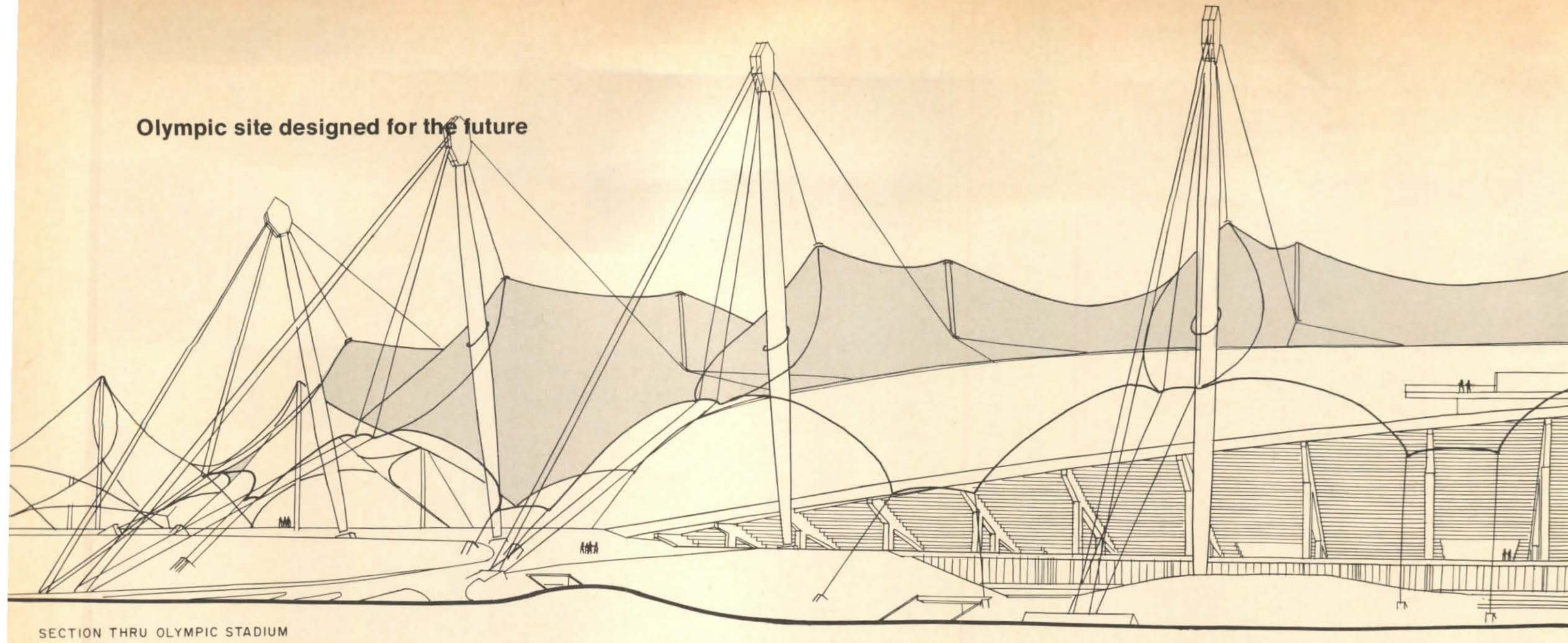
This tent structure is an important link in the long chain of development of this type of design since Frei Otto first published *The Hung Roof* in 1954. One technical advance at Munich has been the method of electronically calculating unequal bent surfaces. This development, funded in the same spirit of necessity and national pride that spurred U.S. space research programs, will have tremendous impact on this type of design.

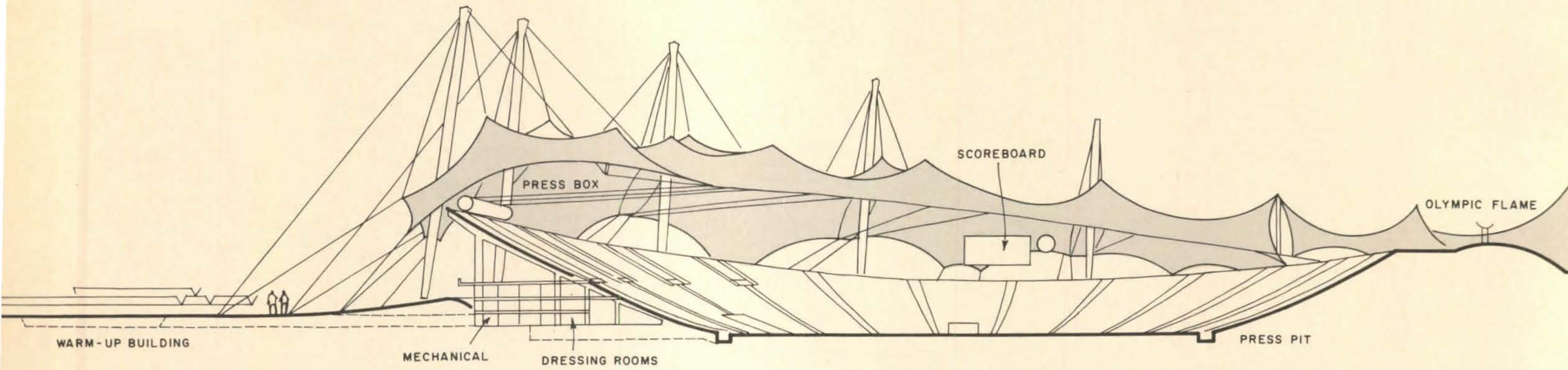
The overall impression of the Munich site is that its planning will provide the best post-games use of any such site to date, with very little conversion work. Some seating areas will be removed from the swimming arena, which will then relate more directly to the boating lake; temporary restaurants and other facilities needed for huge crowds will be removed. But students will move right into the Women's Village, and the Men's Village will be sold off as condominium apartments, all without further renovation. The press, radio and television center will become a college of physical education and the people of Munich will acquire a fully developed park. The pre-games verdict for this post-games changeover: very successful and imaginative.

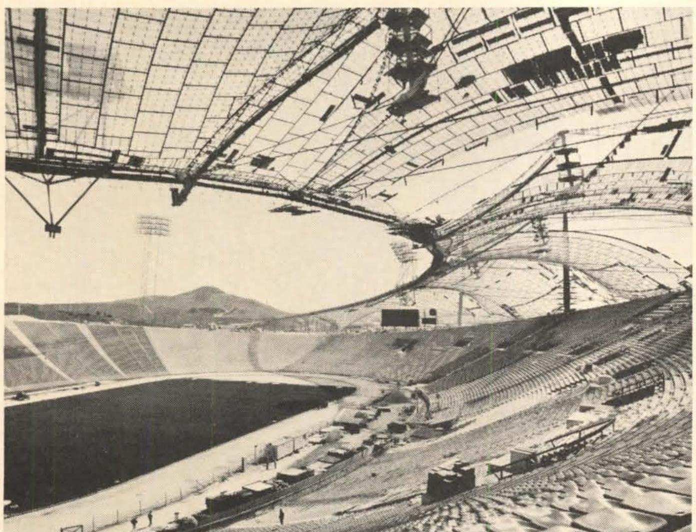
Author: Walter Thiem, a registered architect, visited Munich in the spring, just before joining the Architectural Department of the North Atlantic Division, Corps of Engineers. He took all photos in this article.

HOCKEY
OLYMPIC VILLAGE
RADIO, TV CENTER
SUBWAY STATION
RAIL STATION
VOLLEYBALL
SPORTS ARENA
TV TOWER
STADIUM
SWIMMING ARENA
OPEN AIR THEATER
BICYCLE STADIUM

Olympic site designed for the future



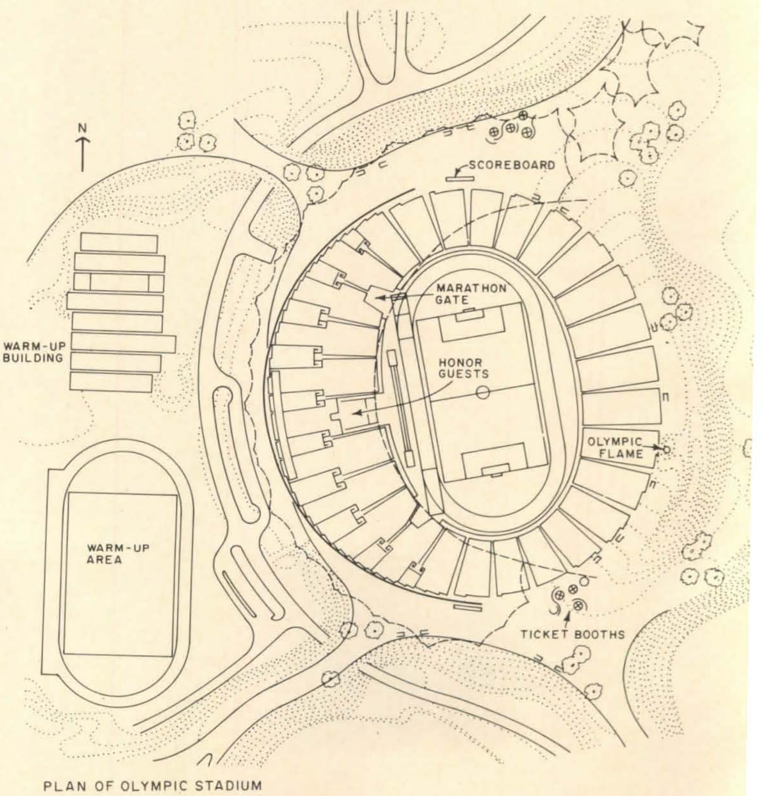




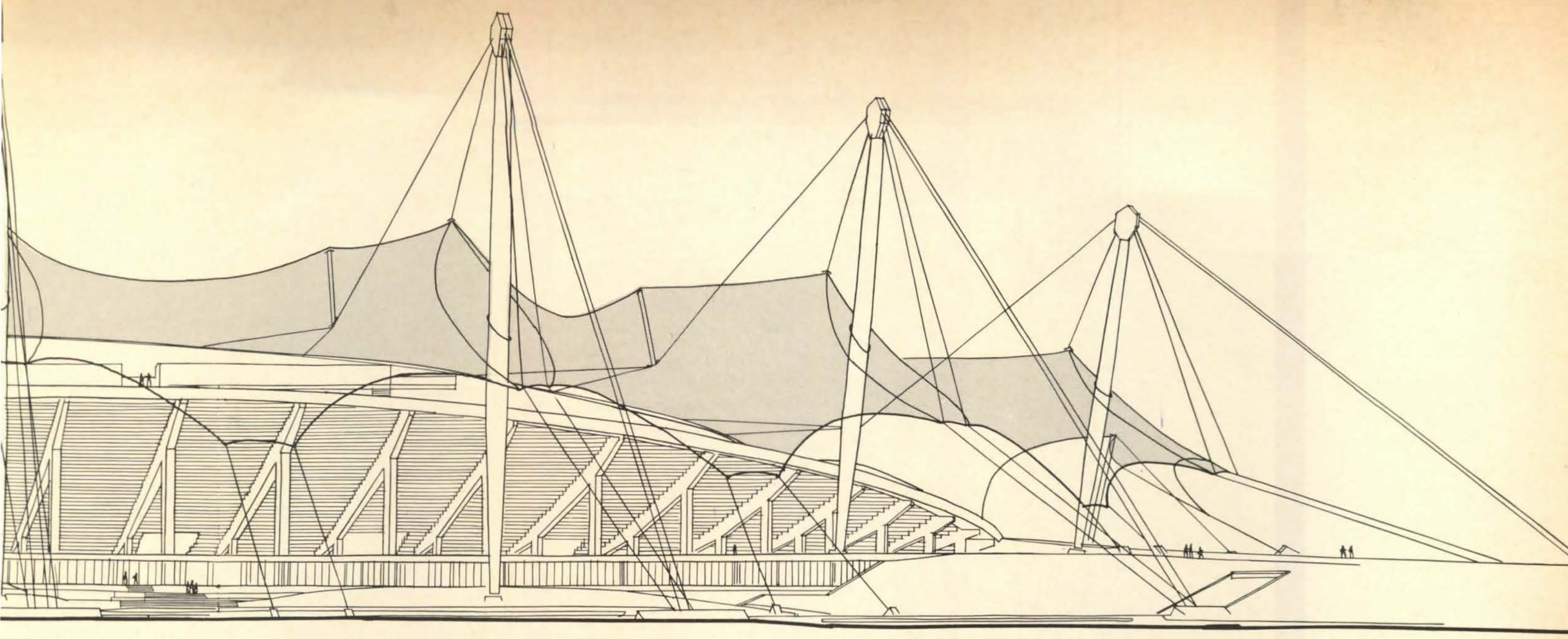
Frei Otto tent partially encloses the main Olympic Stadium. Various earth-tone colors delineate sections of the backless plastic seats; hill in the background was once a pile of wartime rubble and other trash. At right is the entrance from Olympic Village to the competitive areas.

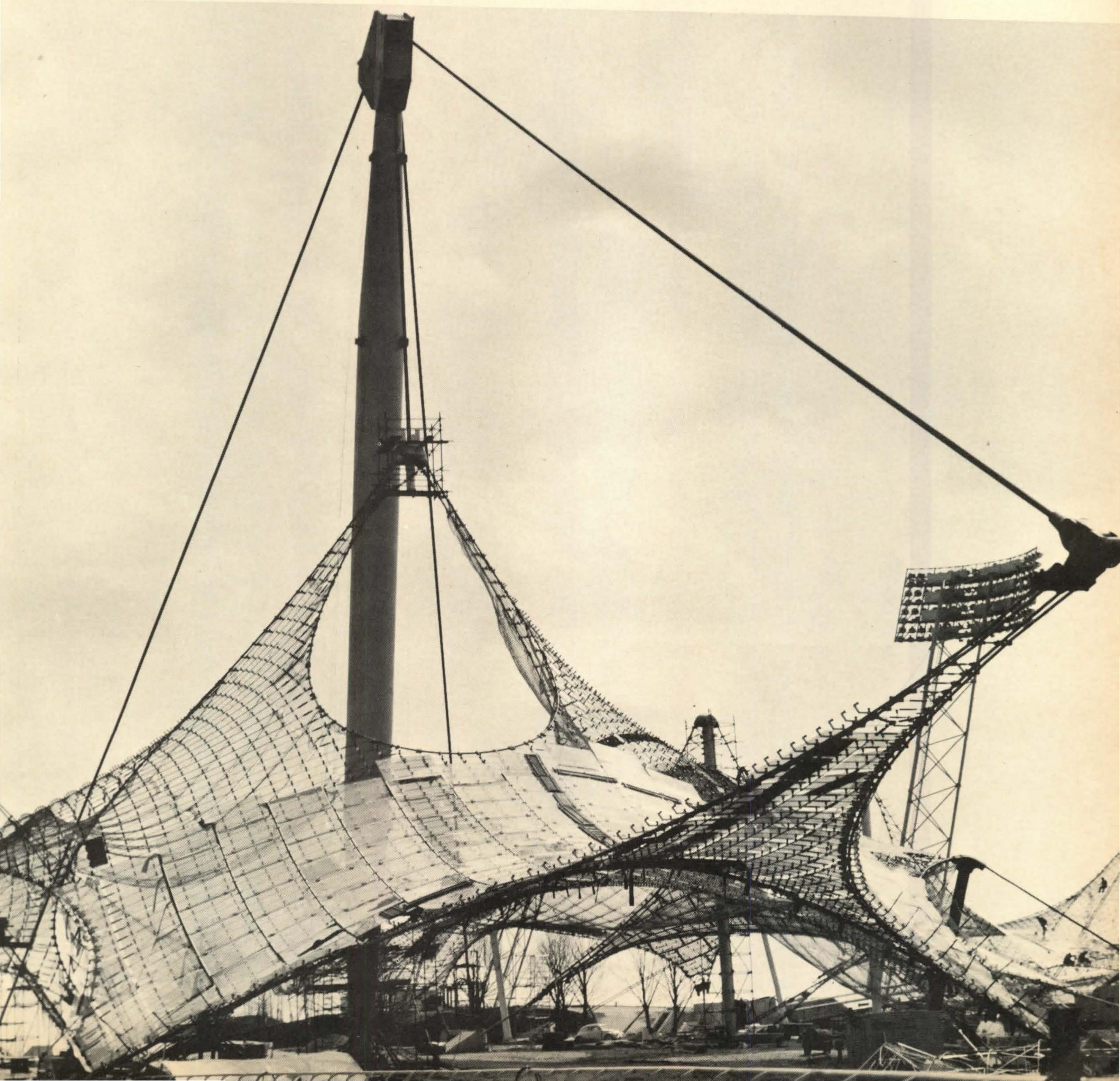
Olympic Stadium

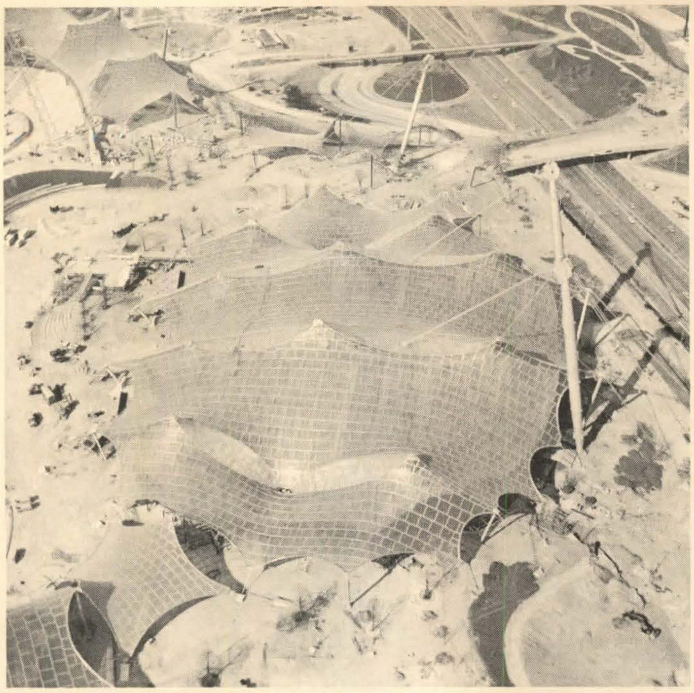
Architect: Behnisch & Partner.
Engineers: Frei Otto; Leonhardt & Andrae.
Program: field and track events, soccer, equestrian events; post-Olympic use for competition, training and leisure activities.
Spectator capacity: 84,143 (49,359 seats, 34,784 standees).
Major materials: poured concrete with prefabricated steps. Roof is prestressed cable with transparent acrylic infill.
Cost: $26,059,375 excluding land. Roof over the Stadium, Sports Arena and Swimming Arena, including suspended ceilings, $43,750,000. Landscaping entire site, including artificial lake, $28,696,875.



PLAN OF OLYMPIC STADIUM

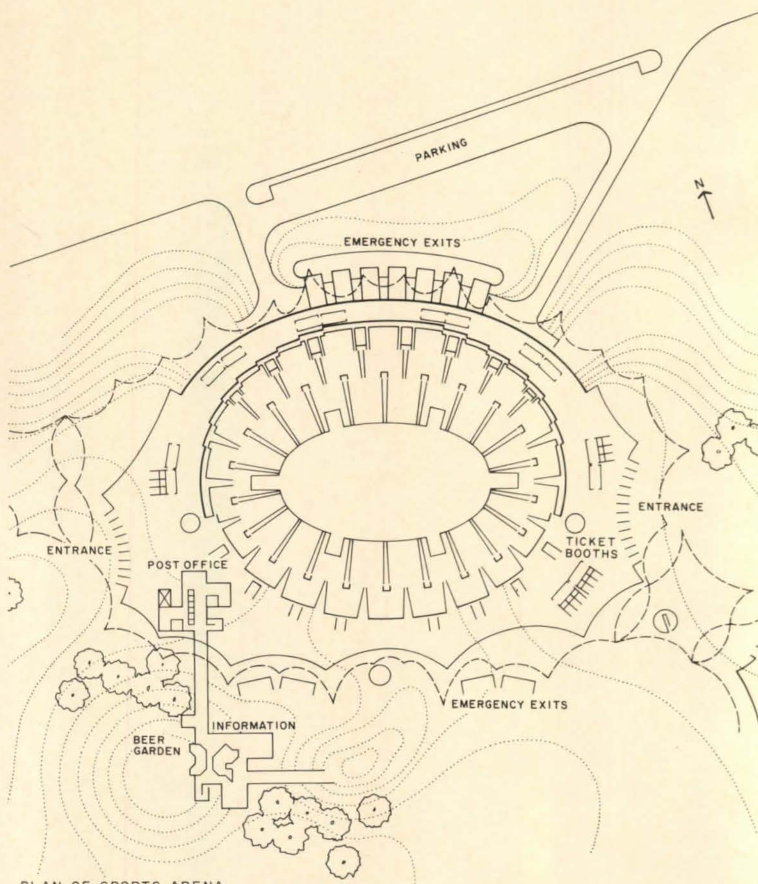






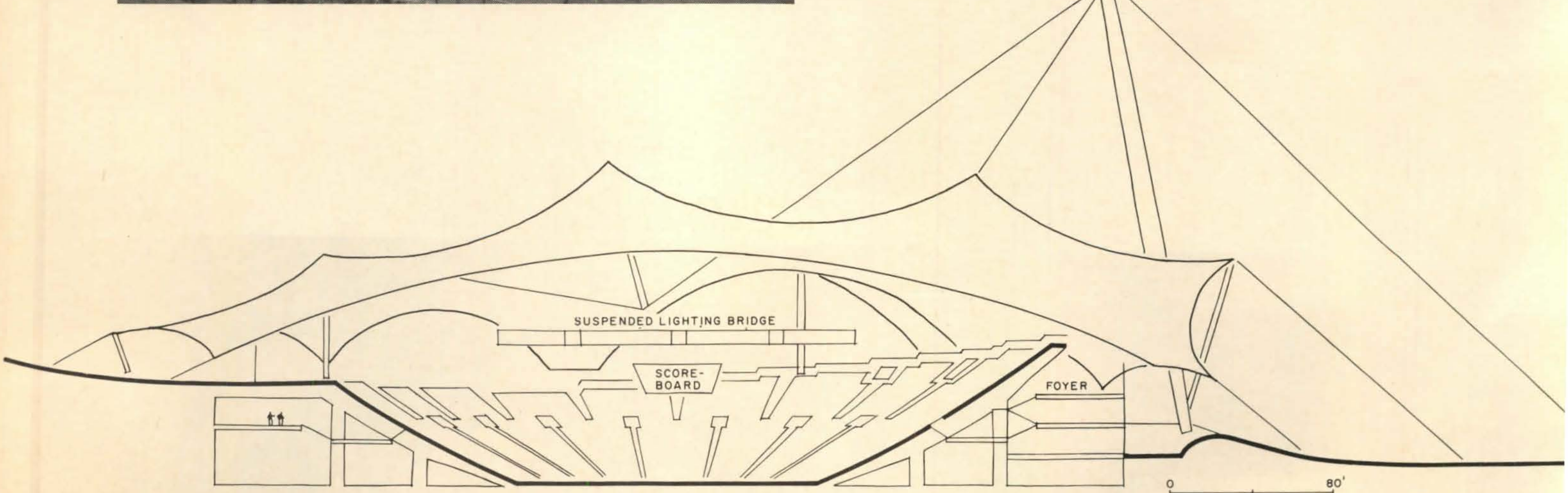
Sports Arena

Architect: Behnisch & Partner.
Engineers: Frei Otto; Leonhardt & Andrae.
Program: gymnastics, handball, basketball; post-Olympic use for ball games, boxing, wrestling, riding, track and field; entertainment performances, conferences and exhibitions.
Spectator capacity: 14,000 (10,000 seats, 4000 standees).
Major material: poured concrete with prefabricated steps.
Cost: $21,850,625 excluding land.



PLAN OF SPORTS ARENA

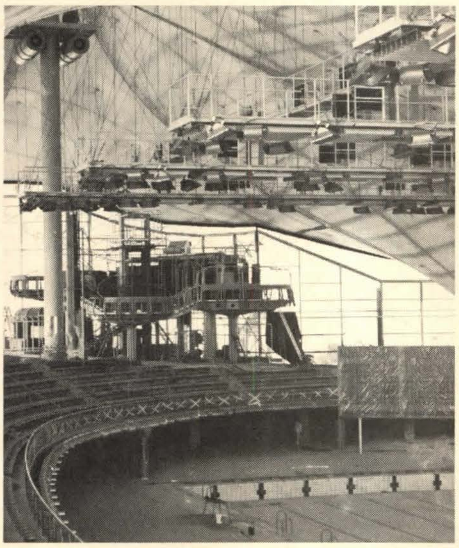
Fully covered Sports Arena is designed so that post-Olympic use will include stage presentations, conferences and exhibitions as well as sports events. Section below shows how most of the structure is below grade.

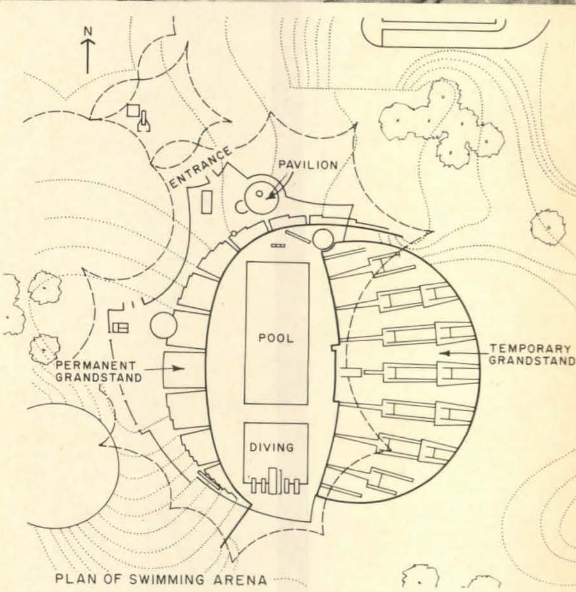


SECTION OF SPORTS ARENA

Swimming Arena

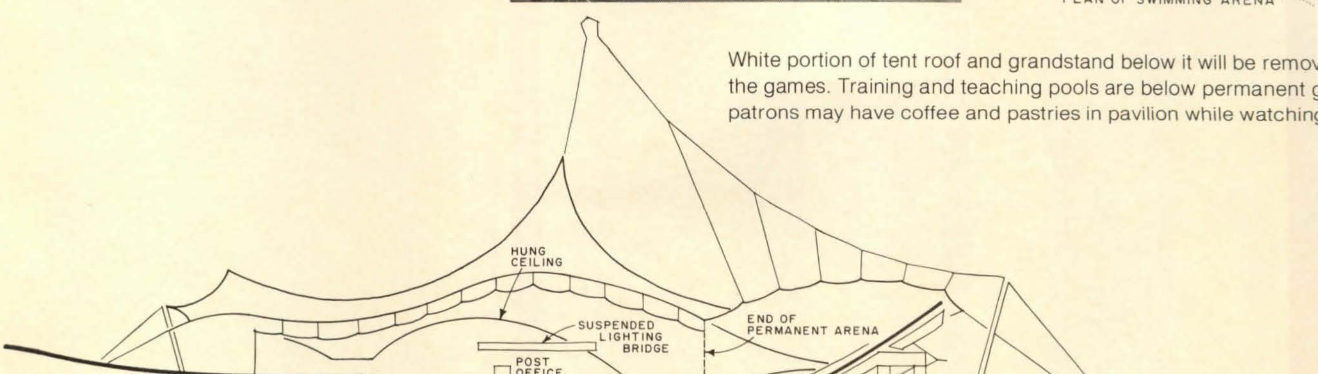
Architects: Behnisch & Partner with Domenig & Huth for pavilion in arena.
Engineers: Frei Otto; Leonhardt & Andrae.
Program: swimming and diving pools; training and teaching pools, with other service facilities, in basement or under grandstand; for post-Olympic use, temporary seats will be removed. Refreshment pavilion to be within enclosure.
Spectator capacity: 1600 permanent seats, 7400 temporary seats.
Major materials: poured concrete; pavilion is wrought iron covered with a chrome-nickel weave.
Cost: $18,225,000 excluding land.





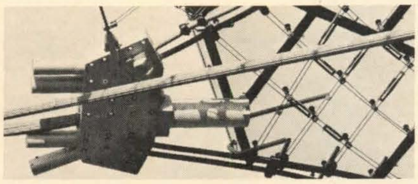
PLAN OF SWIMMING ARENA

White portion of tent roof and grandstand below it will be removed after the games. Training and teaching pools are below permanent grandstand, left; patrons may have coffee and pastries in pavilion while watching events.

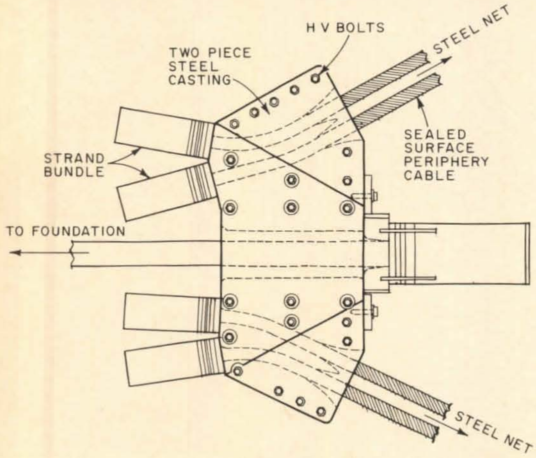


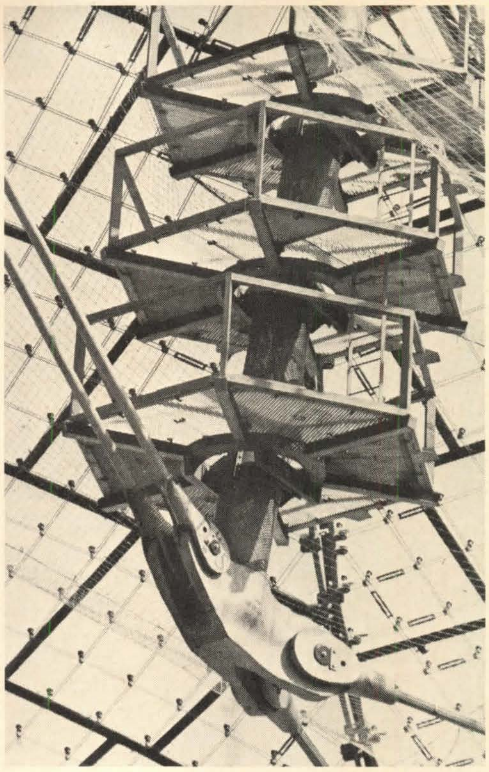
SECTION OF SWIMMING ARENA

Construction details

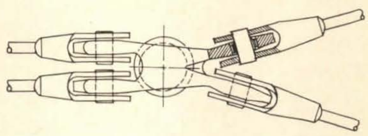


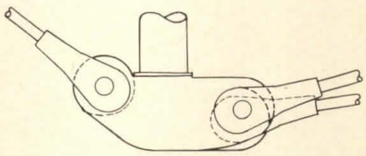
Ends of periphery cables are stabilized by the two-piece steel casting which is held together by the two HV bolts. Turnbuckles in the pre-stressed steel net allow adjustment of cables.

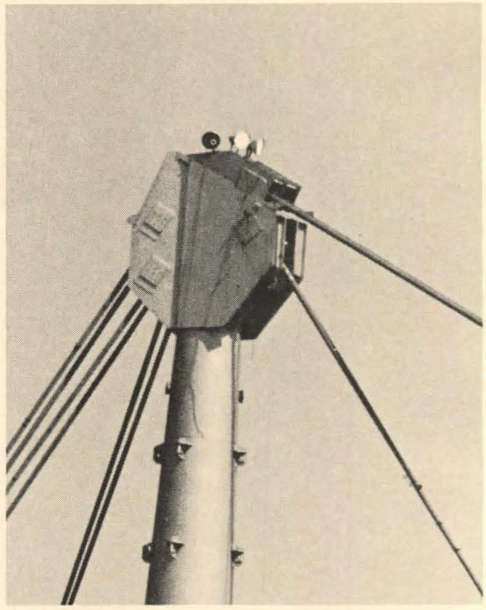




Cast steel intersection point supports small utility tower directly under the stadium roof.



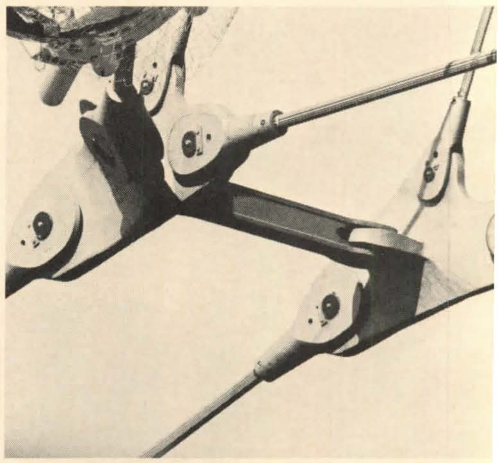




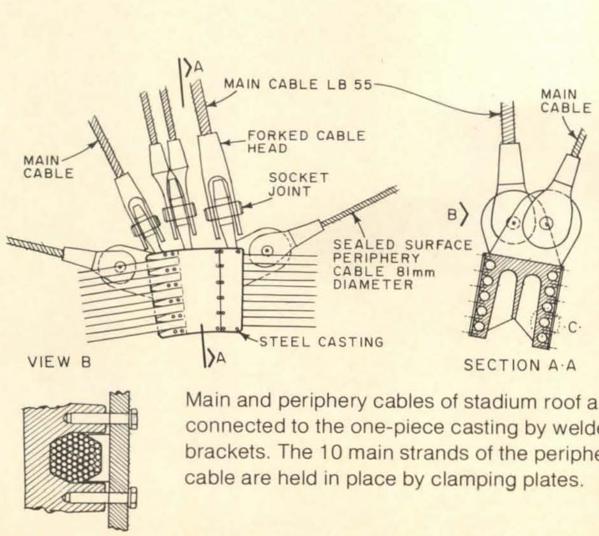
Masthead of Swimming Arena mast (near left in photo at right) has an opening through which maintenance men can climb to check the traverses and main cable ends connected to them.

Where total enclosure is required, a glass façade meets a second transparent hung ceiling. Space above the prefabricated façade is filled with a field-measured, custom glass panel.

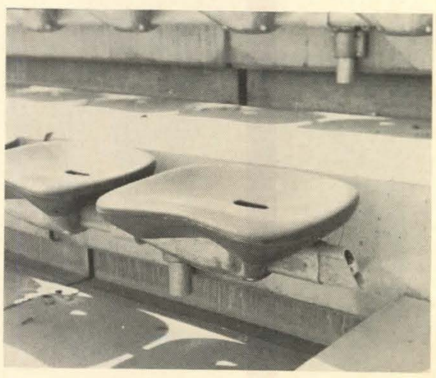
Rainwater will drain from roof surface into saddle areas, through low points into shallow saucers inlaid with cobblestone and central drains. Turned up edges help channel the water.



Closeup of intersection point at rear edge of stadium roof. Five main cables are connected by brackets to system points made of cast steel.



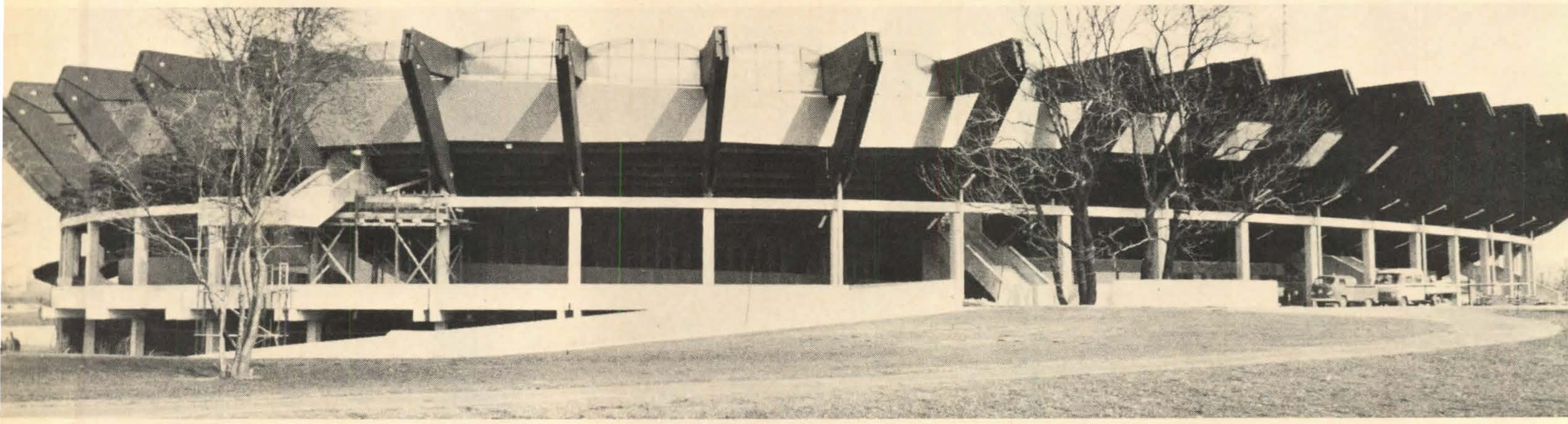
Main and periphery cables of stadium roof are connected to the one-piece casting by welded-on brackets. The 10 main strands of the periphery cable are held in place by clamping plates.

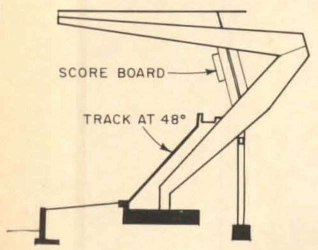


Closeup of stadium seat shows drainage hole.

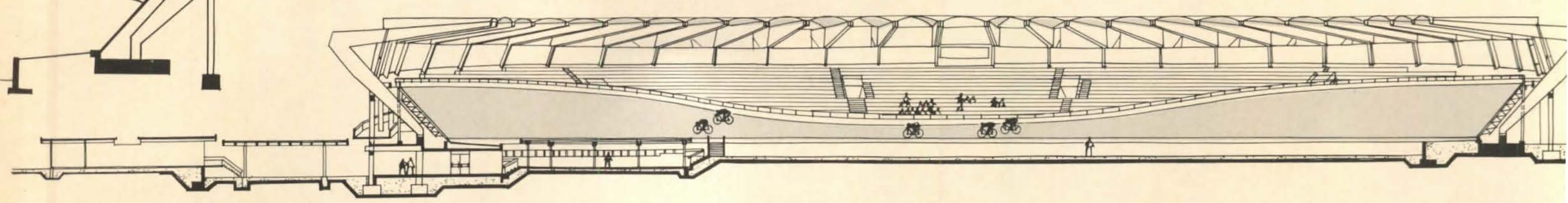
Olympic site designed for the future

Bicycle Stadium



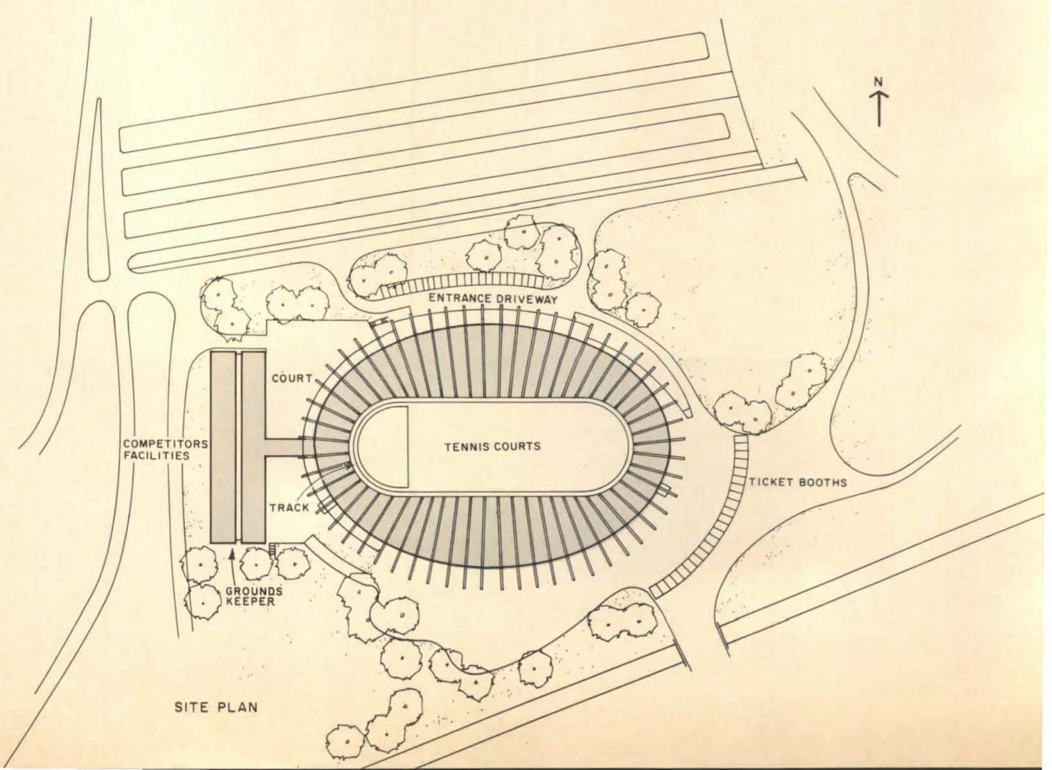


Oval track 286 meters long (approximately 935 ft) determined form and size of the Bicycle Stadium. Track is banked at a 48 degree angle at north and south ends, permitting speeds up to 56.6 mph. Roof covers seats and track, leaving tennis courts in center field open to sky.



LONGITUDINAL SECTION THRU BICYCLE STADIUM

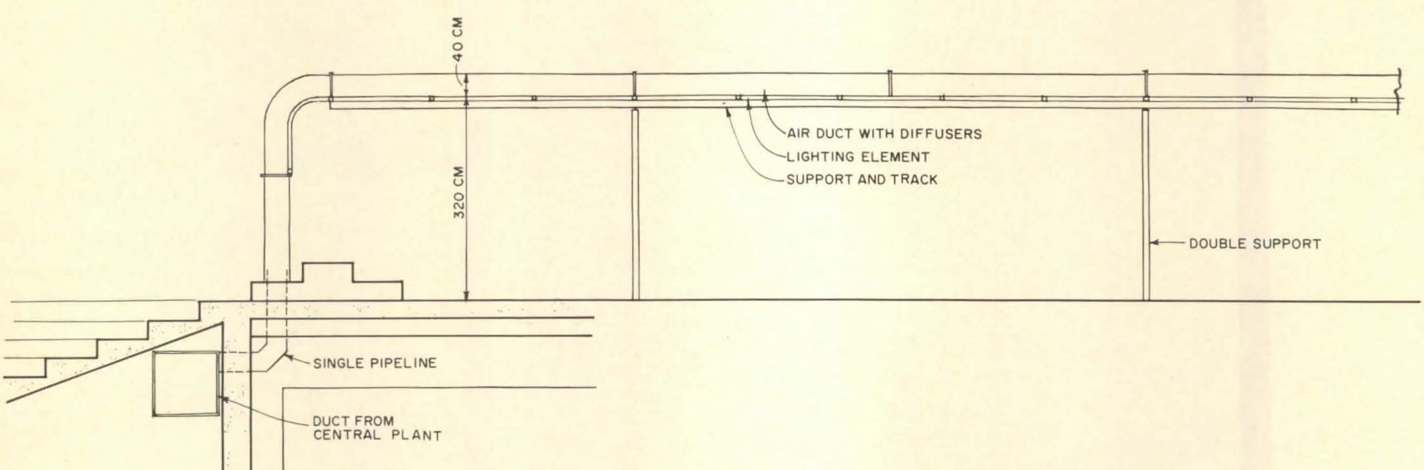
Architects and engineers: Beier, Dahms, Grube, Harden, Kaiser, Laskowski. Associates Rolf Stumpf & Helmut Coulon.
Program: a wooden track close to the spectators with roof over track and seating area, tennis courts in center field.
Site: approximately 10 acres of Olympic site.
Major materials: 56 laminated wood arches set on reinforced concrete compression ring. Roof is translucent plastic (20 percent) stretched over parabolically formed steel pipes.
Capacity: 5000 seats.
Cost: not available.



SITE PLAN

Radio and Television Center

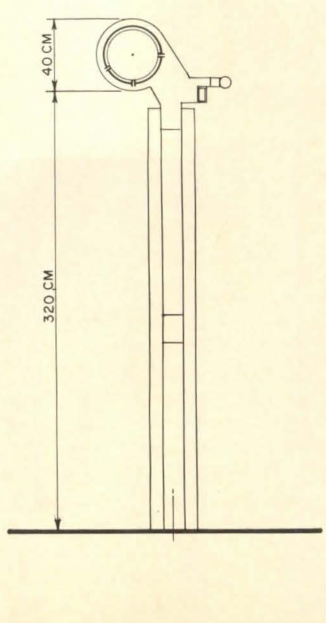
Project: Radio and Television Center, to become the Central College of Physical Education.
Architect: Heinle, Wischer & Partner.
Program: broadcast facilities, plus site for volleyball events; to be converted immediately to a college operated jointly by the College Institute for Physical Training, the Bavarian Academy of Athletics and the Technical University of Munich.
Site: adjacent to student portion of Olympic Village, between subway and rapid transit stations.
Major materials: steel frame clad with weathering steel.
Consultants: Leonhardt, Andrae & Boll, structural engineers; Billinger & Partner, traffic; Miller & Luz, landscape.
Cost: $17,500,000 excluding land.

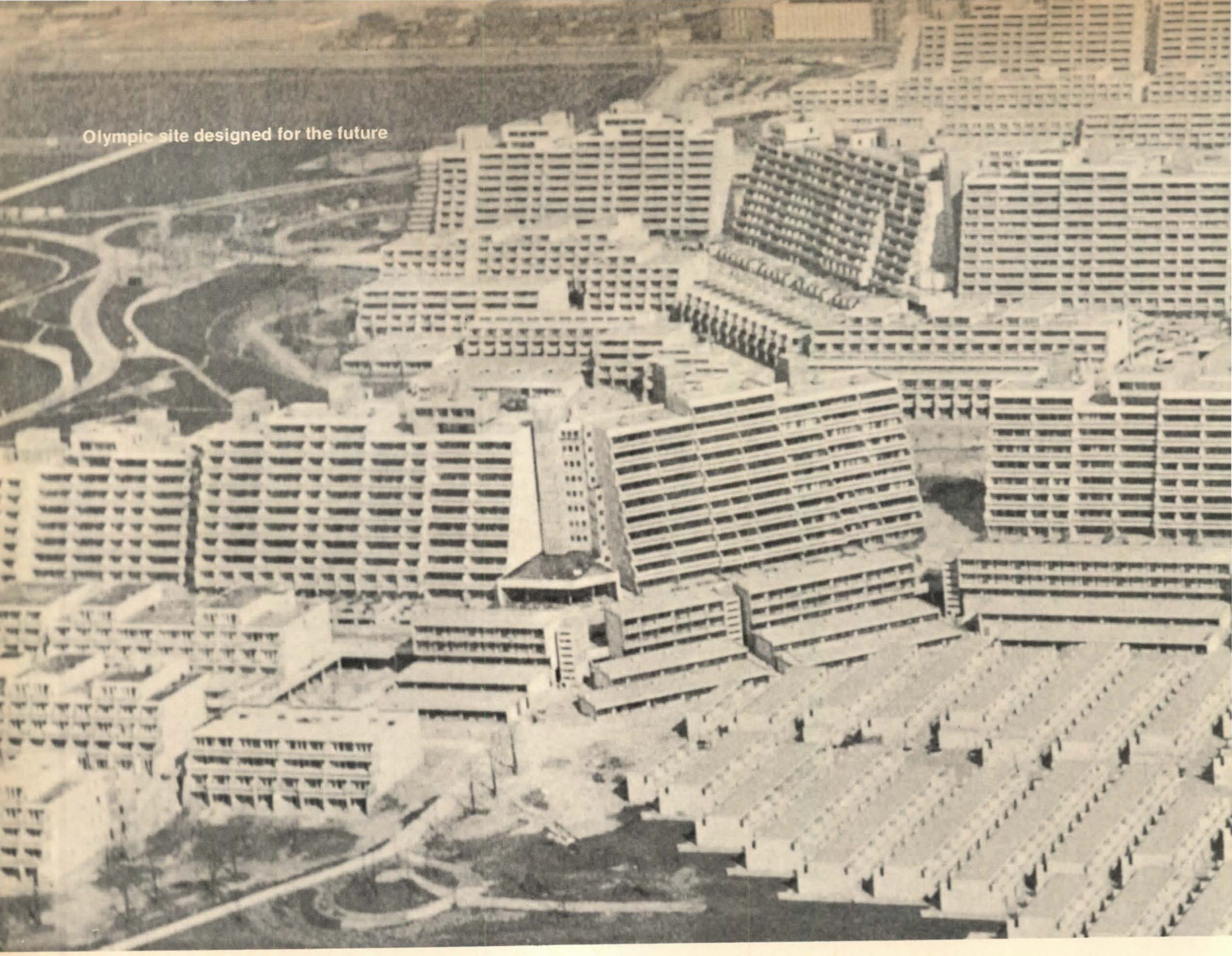


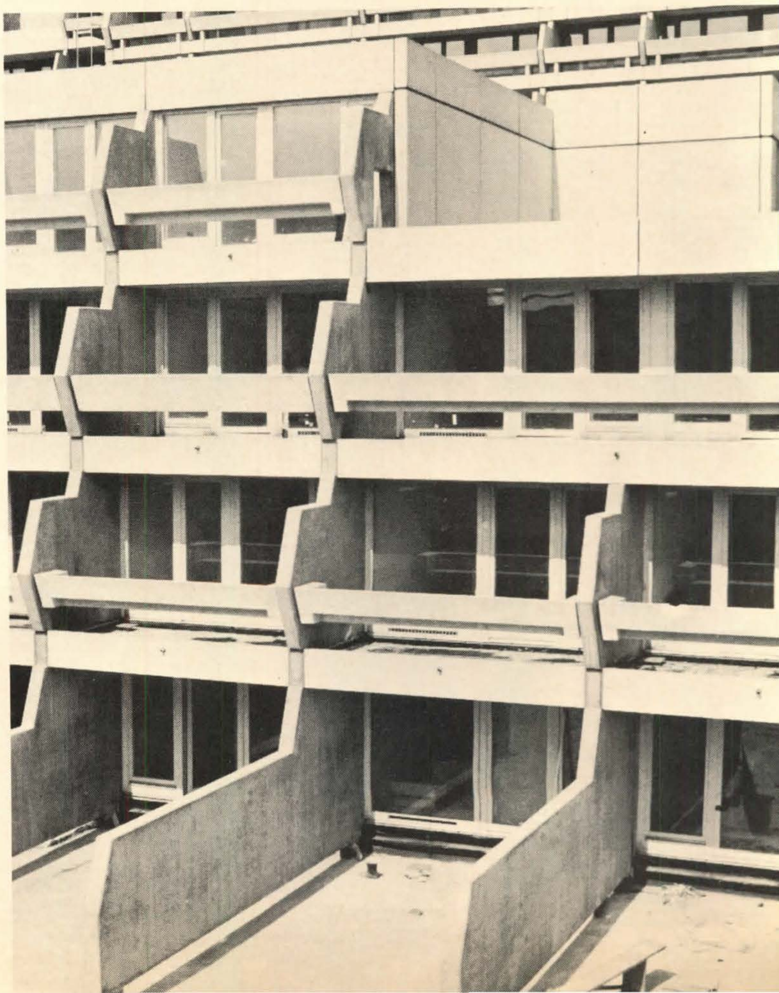
ELEVATION

Air conditioning the outdoors

Landscaping takes on new meaning at the Forum area of Olympic Village, where Hans Hollein's "Media Limen" (Medium Lines) not only provide supports for bulletin boards, movie screens and space dividers but air condition this outdoor gathering place. Chosen in a competition for "artistic enhancement" of the Forum, the lines are steel pipes 10'-5" in the air which serve as cooling or heating ducts. Supplementary infrared heaters run parallel to the pipe duct, as do electric lines with outlets for floodlights, projectors and loudspeakers. Sun shades and transparent roof panels could be stretched between two or more pipe rows. Estimated cost of the project, which was not yet under construction when photographs were taken for this article, is $468,750.







Olympic Village will be ready for new occupants as soon as the 12,500 athletes move out. The Women's Village (high-rise building at right front, $4,500,000, low rises in foreground and the five 3-story buildings just behind them, $5,650,000) will become student housing. Cafeteria/student union to the left of the high rise costs $5,850,000. Men's Village (all high-rise stepped structures in middle and back of photo) will be sold as condominium apartments. Project was built by several developers and costs for the Men's Village are not available.

Olympic Village

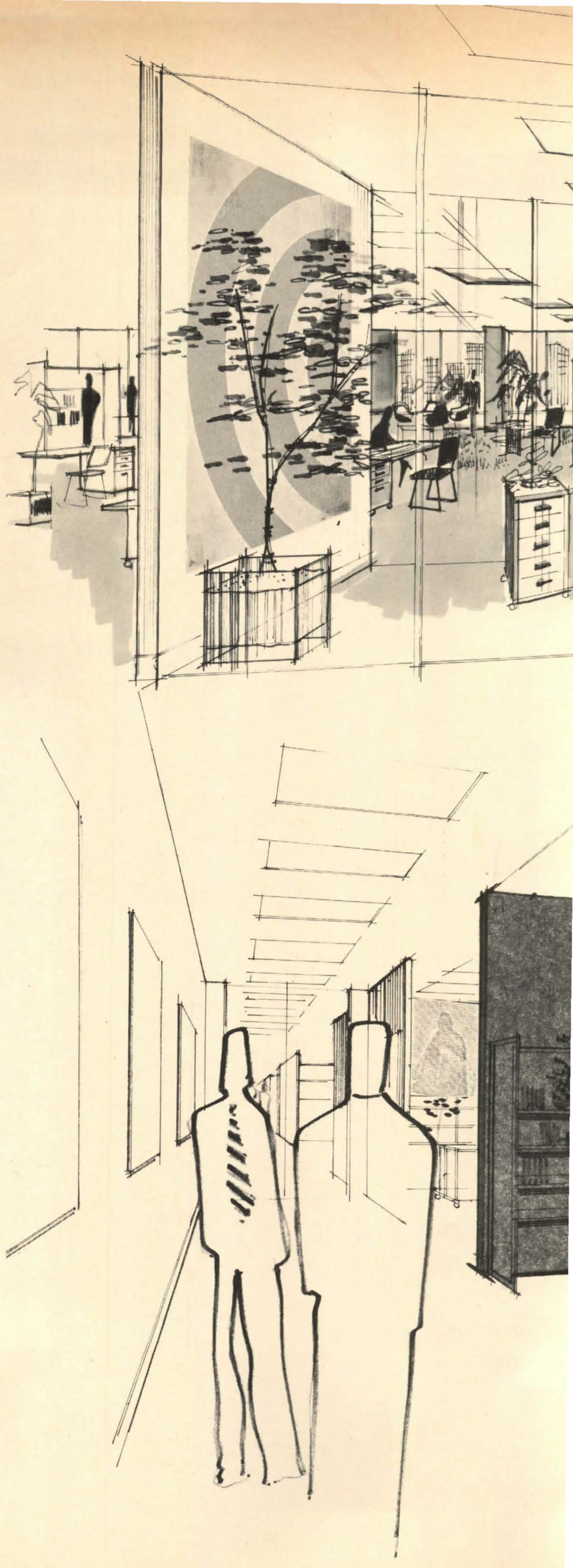
Data

Project: Olympic Village for Women.
Architect: Eckert & Wirsing.
Program: accommodations for women athletes; to be used later as student housing.
Structural system: for 19-story high rise, prefabricated concrete system consists of three basic elements: supporting, wind-resistant frame which forms the loggia; supporting beam; room-size panel. Two- and three-story buildings are poured concrete except for façade panels and all horizontal elements cast in a plant at the site.
Major material: concrete.
Consultants: Sailer & Stephan and Pfeiffer, structural engineers; Umstaetter, mechanical and electrical engineer; Miller & Luz, landscape.
Cost: total costs not available.

Data

Project: Olympic Village for men.
Architects: Heinle, Wischer & Partner associated with Ludwig, Wiegand, Zuleger.
Program: accommodations for male athletes; later to be sold as condominium apartments.
Structural system: poured concrete cross-wall and slab with partitions 20 cm thick. Early plans for using prefabricated structural elements had to be abandoned because of short planning and preparation time and difficulty in maintaining a large number of suppliers.
Major material: concrete.
Consultants: Sailer & Stephan and Pfeiffer, structural engineers; Umstaetter, mechanical and electrical engineers; Miller & Luz, landscape.
Cost: total costs not available.

Process planning

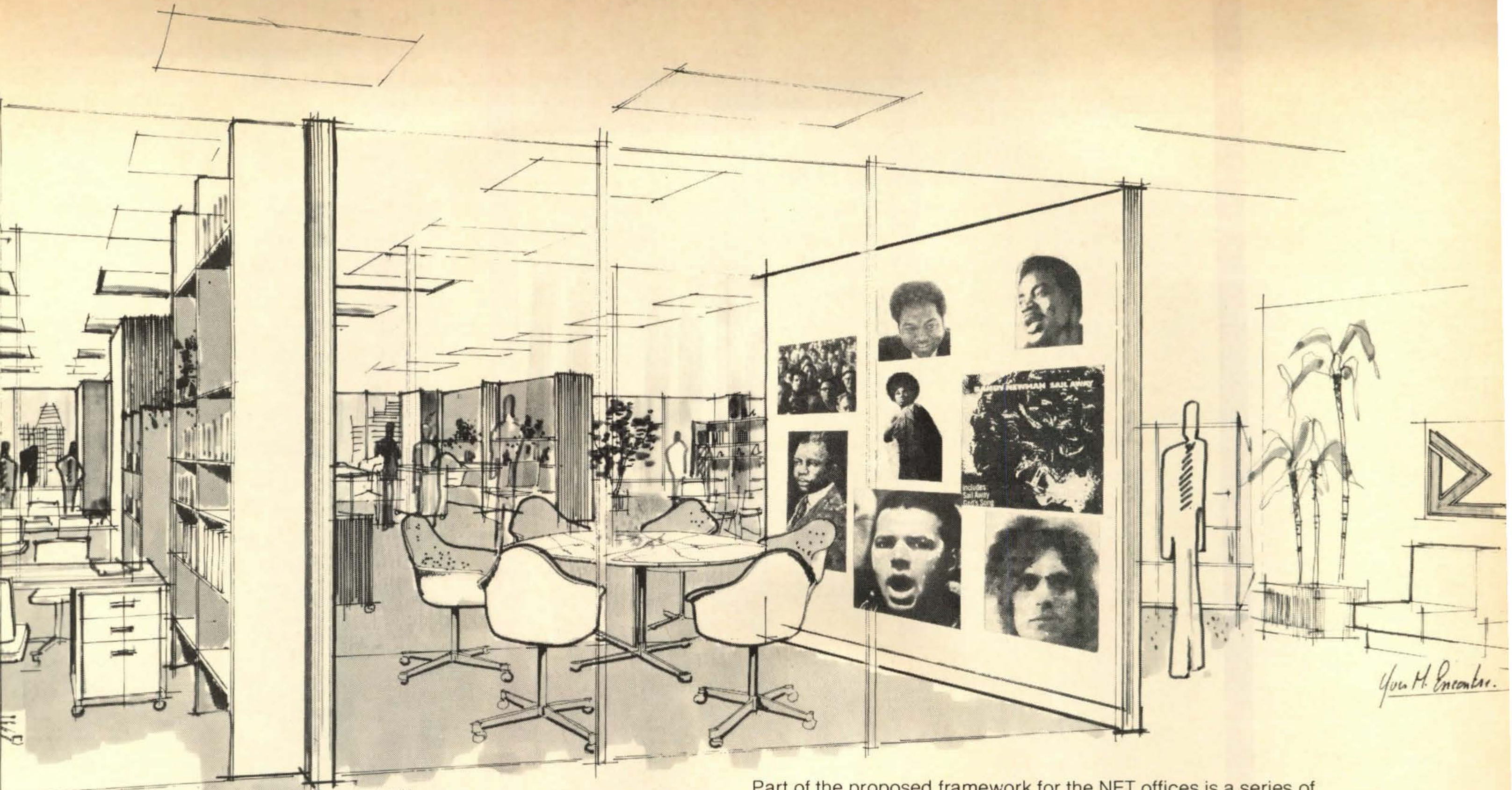


Departing from the standard routine of designing office space, JFN—in a project for National Educational Television—has provided a loosely structured framework as a set of tools to be used by the people who work there

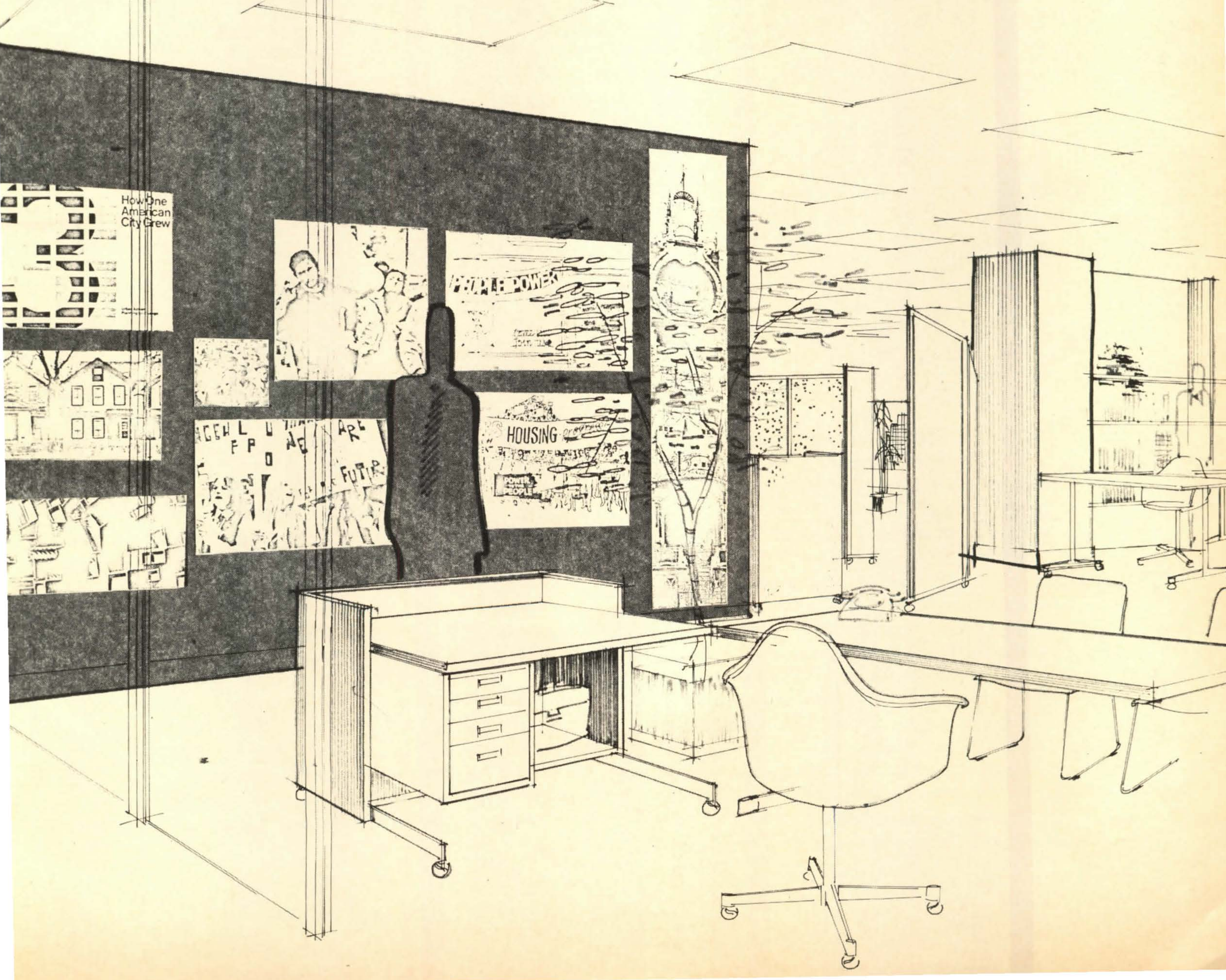
When National Educational Television asked JFN to plan its new offices in New York City, NET was considering four different spaces and wanted a plan that would work in any one of them. The problem demanded a nonsolution—a direction and structure that could be modified not only to suit any of the four spaces but also to accommodate the changing needs of NET.

The response is a three-part framework. The first part is an overall organization of generic space types—what kinds of activities need what kinds of spaces and how these spaces relate to each other and to constraints imposed by the existing building. "It is a job of synthesizing large groups of disparate needs and taking from them what they have in common," says Douglas Nicholson, president of JFN. "Out of this, we try to abstract the basic kinds of space that will solve a spectrum of needs within certain space limitations. In effect, we arrived at an understanding with the client of where the range of activities that exists is going and from this, the kinds of space that will satisfy this range."

This analysis produced three types of spaces—the building core and its vertical services are considered a fourth. The first general space allocation is for "hard uses"—audiovisual equipment and screening room, data processing, conference, kitchen and lounge facilities—which are considered permanent investments in space. This area is located next to the core both for the proximity of core services and to keep as much floor area as possible open for change. The second space category is a general group work area for the individual TV program staffs. The third type is to be nonspecific—a flexible area for whatever needs to happen.

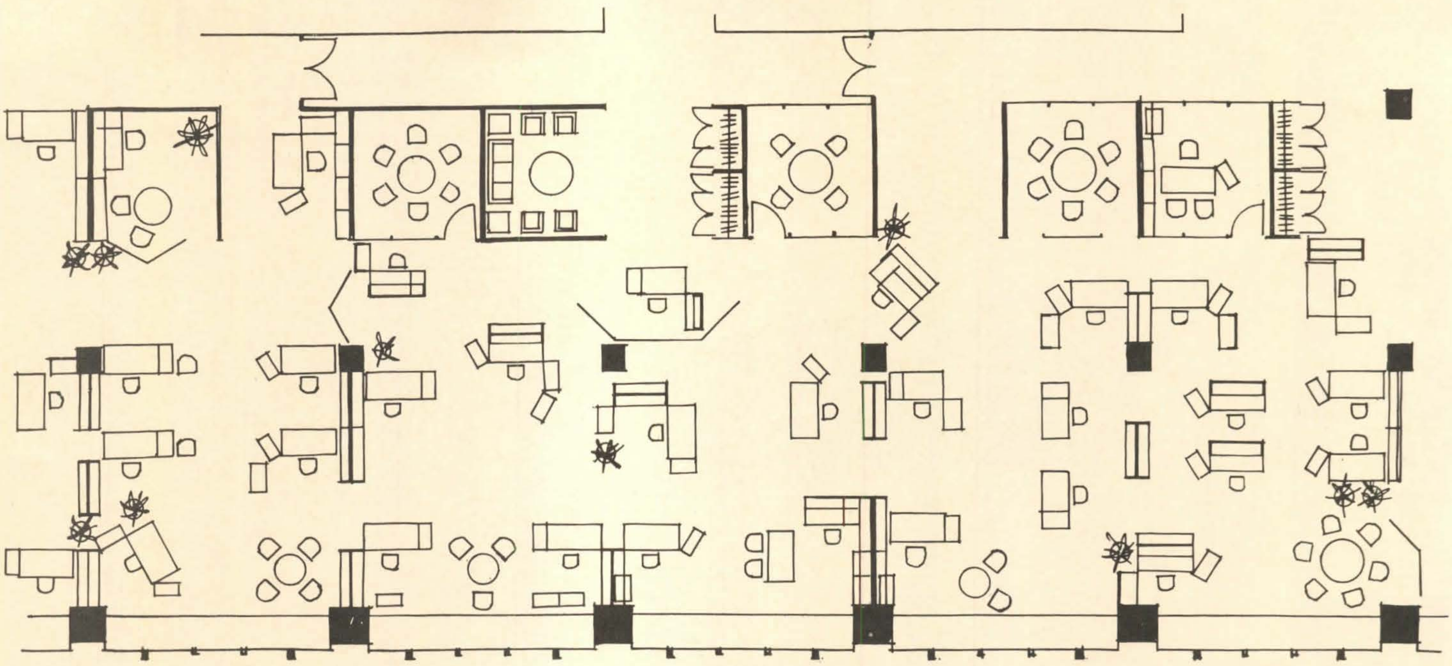


Part of the proposed framework for the NET offices is a series of flexible spaces defined by permanent dry wall "fins" for use as private offices, conference and meeting spaces, as part of the group work spaces and for the large graphics so prominent in the existing offices.



The second part of the framework is a series of fin walls which define this flexible area. The fins are part of the building's standard lease agreement and as such do not require additional expenditure by the client. As part of the framework they have two purposes. The first is as a semi-enclosure that *can become* part of the large group work area if necessary, could be used for small group conferences or presentations, might be part of an entrance/control system with a receptionist or would become private offices with temporary enclosures. The second purpose is to provide very large areas of pin-up space. One criterion developed by NET during discussions with JFN was that the planning should provide a stimulus for creativity. It was obvious that stimulus through over-design was not the answer; instead, the stimulus should be degree of mobility for the people who would be moving from group to group. When such changes take place, every six months to a year, people need only move their props to a new location and the number of variations is limited only by their imaginations. The freestanding walls will be used only to divide group from group or provide more graphic display space.

These two actively used systems—the component furniture and the fin walls—are the parts of the framework meant to be modified by the people working there. But their existence and relevance is based on the initial spatial studies that determine what kind and how much there should be. "The inherent qualities of the types of spaces for NET, their relationship to one another, the capability of the movable 'scenery' within

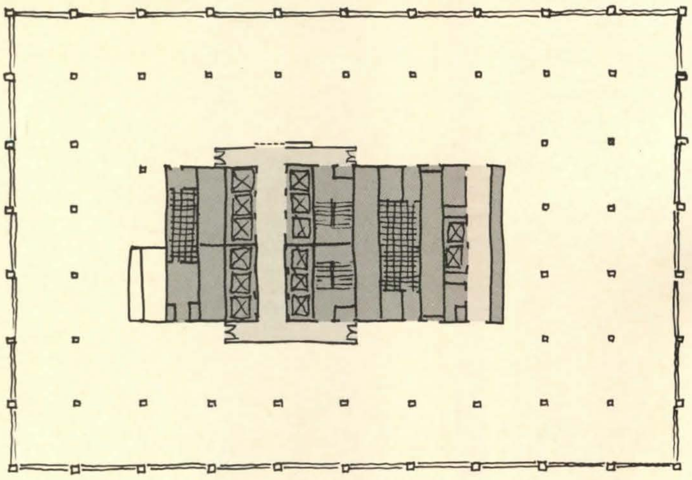


the natural outgrowth of the work being done; it was necessary only to give it a place to happen.

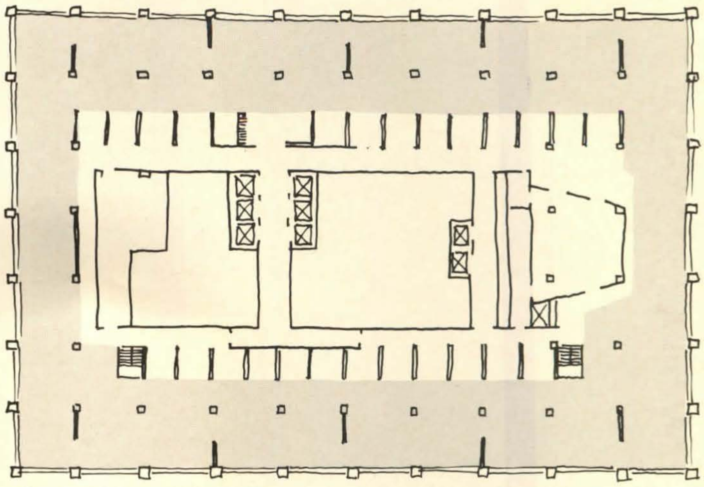
The third part of the framework is the component furniture system which is largely off-the-shelf. It represents the only investment that the client makes in the space. Components include a work surface 30" x 60"; a series of mobile storage units on casters, with files, shelves or drawers which can be placed under or adjacent to the work surface; a typing unit on casters with stationery storage; a free-standing hinged wall as a tack or storage surface; and a two-sided shelving unit. This system, like the pin-up fin wall space, is intended to be used by individuals as needed—for the equipment which best suits their work needs and its arrangement with respect to themselves and the rest of the group.

The planning allows two types of flexibility. The fin wall spaces adapt to a variety of spatial uses as the groups or management demand. Although the group area is inflexible since it will always be an open work space, it requires a high them, and the capacity for the interaction of these three," Nicholson feels, "allow what should happen there to happen—you end up with viable solutions as opposed to typical office space that doesn't work." Important, too, is the fact that although JFN is the planner, the types of spaces and the criteria to be met are decided by the clients, based on the information and observation of the planners as guidelines.

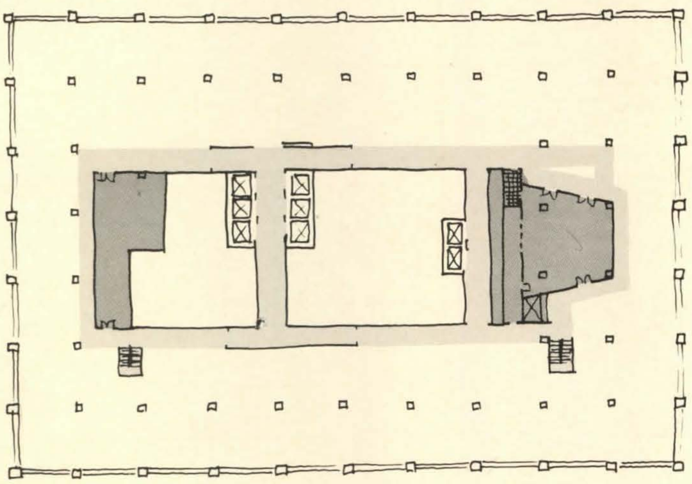
The attitude toward the planning of these spaces has application beyond the specifics of the NET offices. While the specific solution will vary, the approach taken here can be applied to any type of office. Currently, JFN is involved in programming two office buildings that will become the basis for the architectural design of the building. This type of pre-programming—setting up ground rules for potential uses—could produce a different kind of building. Whether this framework approach turns out to provide more adaptable space depends on how NET and future clients use its potential. [SLR]



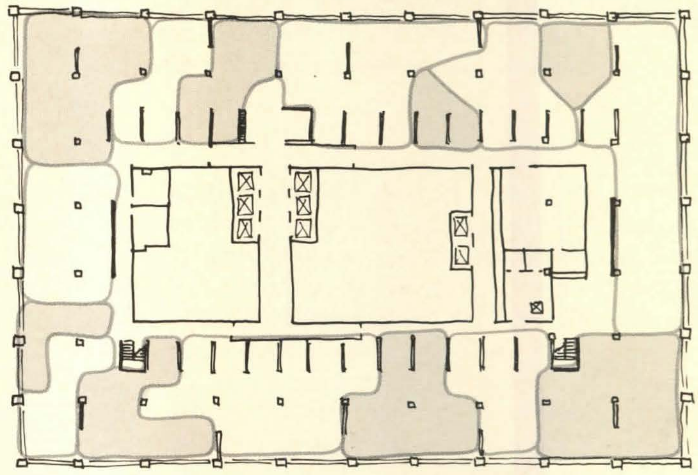
1



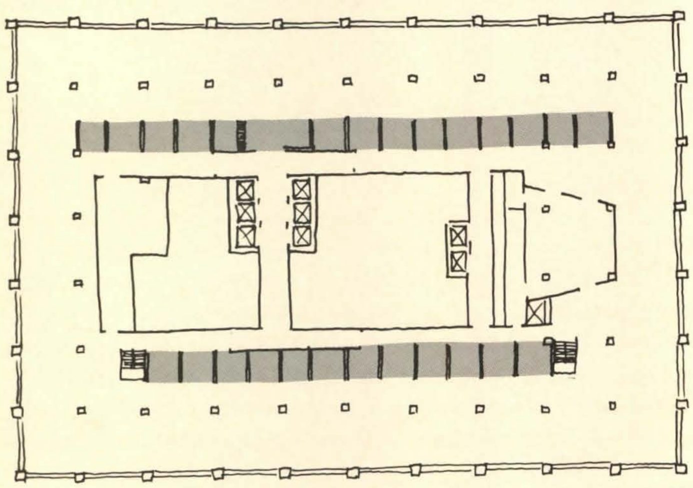
4



2

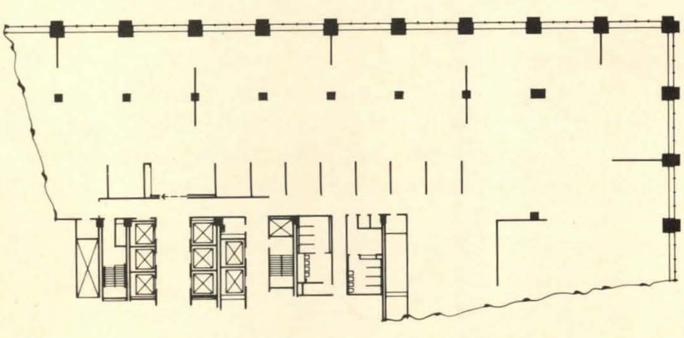


5

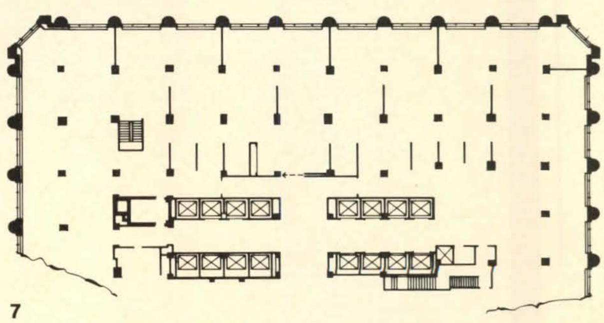


3

Partial plan (opposite) shows possible uses of the fin spaces and the arrangement of the movable "scenery" within the general group work areas. The series of floor plans (above) depict the generic spaces as they would be organized in one of the buildings being considered. **1** Fixed core, services and point of entry control. **2** "Hard uses" area containing permanent spaces. **3** Flexible spaces with permanent dry wall construction. **4** General group work space with movable "scenery." **5** Possible group configurations utilizing the flexible spaces as needed. **6,7** Application of the same framework to two other spaces being considered. Although a decision to move has not been made, the type of space appropriate to NET is apparent from the initial analysis and any space eventually chosen will accept this framework.



6



7

Acoustical misconceptions in open planning

Rein Pirn

Marketing Education Center, Eastman Kodak Company, Henrietta, N.Y. designed by Skidmore, Owings & Merrill (top) and the Bloom Agency offices, Zale Building, Dallas, by interior architects The Oglesby group; acoustical consultant for both is Bolt Beranek & Newman, Inc.

Open planning is not a whim to be indulged in for reasons of faddishness. When openness becomes necessary, however, there is a way to tame its rampant acoustics

Webster defines the word "room" as a delimited space, a partitioned part of the inside of a building. We know from experience that such basic cells of an architectural whole can be designed and built to serve many different purposes. Their shape and dimensions may vary, as may their surface finishes, furnishings and bounding constructions. Within certain liberal limits, the designer can determine the room's functional properties, including its acoustics. He can provide excellence for listening, yet exclude the annoyance of other sounds. The possibilities are very nearly unlimited because he is designing a self-contained room.

By the same authority, "space" is a boundless three-dimensional extent in which objects and events occur and have relative position and direction. Space is what we encounter in open planning. It is not exactly boundless, but it does depart significantly from the concept of a room. An open-plan space is a collection of imaginary rooms often, but not always, serving a similar purpose. We cannot by any stretch of our imagination claim that the acoustical properties of individual rooms can be duplicated in the open plan. Herein lies the fundamental and overriding misconception. Should we resign and leave the acoustics to fate? Not so.

There are schools and offices, built during the first rush of the open-plan concept, which display a woeful lack of acoustical quality. They are carpeted, the ceilings may be somewhat absorptive, and free-standing screens are used to "isolate" the micro-spaces from each other. Period. Everything else is conventional, which may or may not include specific provisions for mechanical noise control. The acoustical failure of such spaces is not surprising. Without any compensatory provisions, sound isolation has been ignored.

Let us consider a few simple numbers. On a scale where a conventional floor-to-ceiling partition will isolate anywhere from 30 to 60 db (depending on its mass and structural properties), a clear opening rates zero. A typical screen, which is nothing but a mini-partition flanked by large openings, could conceivably yield 10 to 15 db of isolation—no more. The acoustical limitation is quite staggering.

Another seldom-comprehended factor is the marked difference between a "reverberant" and "anechoic" room. Traditionally, all rooms are to a greater or lesser degree reverberant. The sound level decreases as one moves away from the sound source, but only up to a point. In an office this might be no more than 3 or 4 ft. Beyond this very limited radius, the sound level remains essentially constant to the extremities of the room. Precisely this property of reverberant rooms allows us to achieve a condition of equal loudness, even throughout large concert halls. In the open plan this would spell disaster.

In contrast, outdoor sounds continue to diminish with increasing distance ad infinitum, which is exactly what we want in the open plan. We need not build roofless buildings to achieve a quasi-outdoor condition. Sufficiently anechoic properties are easily found in a variety of sound-absorbing surface treatments. Consistent use of such materials on ceiling, floor *and* wall or screen surfaces is certain to assure a predictable sound loss with distance. So we may substitute

Author: Rein Pirn is a member of Bolt Beranek & Newman, Inc., Downers Grove, Ill.

walls with distance. Simple enough, but at what price? To lose 30 db, which is quite unimpressive in the conventional sense, we are speaking of at least 100 ft.

Surface absorptivity

Despite the apparent futility of the above approach, it is not only correct but also absolutely necessary to maximize surface absorptivity in the open plan. What would happen to our screens if a flanking wall or ceiling surface should be reflective? It would never give us the 10 or 15 db of extra isolation, which it could if sound transmission were limited to "bending" over or around the screen. Given the chance, it will reflect off a flanking surface and the screen's acoustical value will diminish to perhaps a few db, if that. Consider also the directionality of human voice. By facing away from an inadvertent listener, a speaker can contribute to his privacy—but not if the speaker's voice is re-directed backward by a nearby reflective surface.

An often-heard rebuttal to highly absorptive spaces is that they might sound lifeless. One hears of desired reverberation times and other tradition-bound criteria. Indeed, a properly treated open-plan office or school has no reverberation to speak of and individual sounds, once terminated, do not persist. But the continuous sounds of activity are there, which makes it a far cry from the unearthly environment found in an anechoic test chamber.

Another common error is the failure to select *particular* sound-absorbing materials that, on first contact, will substantially eliminate the intelligibility content of human speech. Many fine general-purpose absorbers fail in this respect—the space may sound "dead," but distracting fragments of conversation are still reflected from area to area.

Let us then envision a fully and correctly treated space, with highly absorptive finishes, ample screens and reasonable spacing of the mini-spaces. By a combination of the various factors, we might attain 25 bd of isolation between two "private offices" or "classrooms," which plainly is not enough to compete with conventional standards (say 40 db).

How much noise?

A common complaint among occupants of open-plan facilities is that of "too much noise," which leads us to a question of semantics. The understandable criticism is plainly leveled at noise, the distractor, and not noise, the obscurer. It is the latter that is so urgently needed in the open plan. By reference to the preceding example, we want some 10 to 15 db more masking noise than would be proper in a conventional school or office. Such noise could be mechanical (e.g., airflow), electronic or that of steady activity—never the speech of individuals. Specific solutions must necessarily respect specific requirements, but the need for a good measure of steady background noise simply cannot be ignored.

We have now arrived at an entirely practicable situation where individuals and small groups can converse without effort, think without undue distraction, and generally pursue their tasks. Their neighbors in the open plan can do likewise. In fact, a carefully conceived, well organized and properly executed open space can assume a standard of acoustical normalcy which will baffle its critics. But there are no shortcuts, no incantations that could be administered to save the acoustics of a space concept so far removed from the traditional.

A word of caution: Let no architect, executive or administrator ever take the open plan lightly. It is not a whim to be indulged in for reasons of visual frivolity or faddishness. But where openness becomes an indispensable part of the entire concept, be it for ease of circulation, supervision or flexibility, there is a logical, effective way to tame its rampant acoustics.

Epilogue

We have discussed the acoustical rights and wrongs of open planning, spoken of the limitations and suggested that success, at least in a relative sense, is within the reach of an alert designer. The illustrations on these pages convey the visual scene, as it exists in some recently completed offices, but they are silent. The following summary of data obtained in these facilities seeks to fill the factual void.

Since every representation of objective acoustical information raises questions of terminology and context, only the most basic of the reference scales used in architectural acoustics are employed in presenting these data. The reader is expected to be familiar with the decibel (db) and with the frequency range of audible sound (expressed in Hz). Furthermore, by way of a practical yet meaningful simplification, the data are weighted for maximum relevance to human speech—its intelligibility and its potential as a distractor—which means that particular emphasis is placed upon the acoustical condition in the octave bands centered at 2000, 4000 and 1000 Hz.

The ambient acoustical environment in each of the spaces is typified by a sound-pressure level at 1000 Hz of 34 to 39 db. From this point on the frequency scale, the levels decrease with increasing frequency (and increase with decreasing frequency) typically at the rate of 5 db per octave. Almost without exception, the level of steady background noise in any one of these facilities does not fluctuate from area to area by more than ± 2 db. This stands in sharp contrast to many offices were uncontrolled background noise may vary from a very quiet 20 db at 1000 Hz to a most uncomfortable 50 db.

All major room surfaces, including the free-standing screens, are finished in highly absorptive materials. Wherever possible, materials with sound absorption coefficients near 0.9 were selected in preference to the many available products with lower absorptivity. As a logical consequence of such treatments, there is no perceptible reverberation—and no one misses it.

A most tangible result of these treatments becomes evident when we compare the sound of typical office activities, as measured in conventional offices, with similar sounds in these examples of open planning. In each case, let us consider the situation about 10 ft from several typewriters, teletype and adding machines. In the critical frequency band centered at 2000 Hz, occupants of conventional offices experience levels of the order of 59 ± 3 db. In the deliberately treated open plan, the corresponding levels are a full 10 db lower, which the human ear interprets as being about half as loud. As a corollary to this observation, the attenuation of sound with increasing distance from the source was found to approximate the inverse square law—a reduction of 6 db with every doubling of distance, just as one would expect outdoors.

The height of the screens used in these facilities ranges from a minimal 5 ft to almost 7 ft. Typically, these screens attenuate the intelligible frequencies of speech by 8–10 db, and up to 14 db in some individual cases. Comparable measurements made in "normally" finished offices suggest 4 db as an expectable standard and 7 db as a maximum.

Air fare

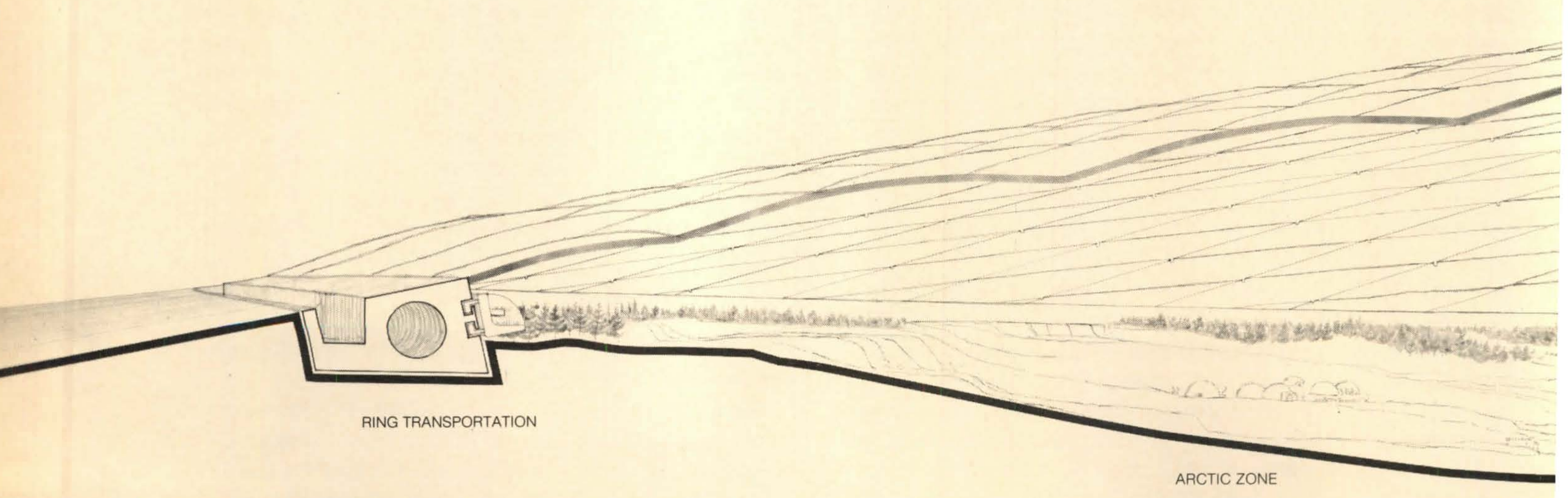
Much has happened in the world of air structures; changing images, concerns and priorities have put inflatables in new roles which, though not universally agreed upon, are evolving promising new solutions to some old problems

For some reason, it has been difficult for some people to take membrane structures, as a viable building type, seriously. Viewed as tents, or tennis court covers, or temporary whims, the structures have had, and continue to have, an uphill fight for acceptance. A relatively small but growing group is doing battle with the misconceptions, however, and is solving the real technical problems. The group comprises an interesting cross section, representing the engineering and design professions, industry, educators, students, sociologists, environmentalists and some for whom categories do not suffice. This diverse group is probably most closely assembled at meetings such as the air structures forums and workshops sponsored by the Building Research Institute (BRI) of the National Research Council. Motivation to attend covers as broad a range as that of those who attend. For each, the lightweight structures offer an opportunity, and, as in most things, that opportunity might take the form of profit for some *and a chance to* improve social and environmental conditions for others.

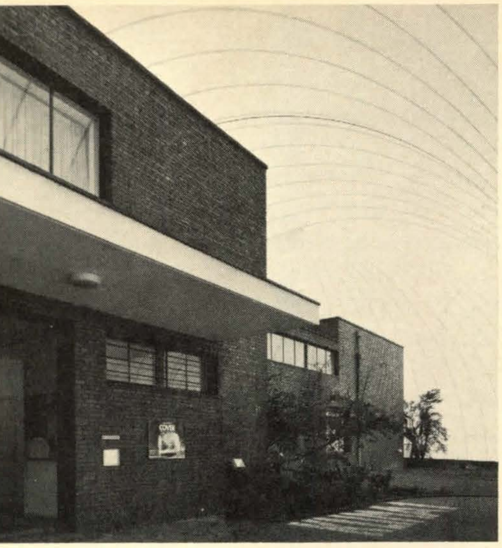
It can be argued, no doubt, that the profit motive is necessary in order that the available muscle of industry and technology be applied to the problems of membrane structures. In engineering and materials, a response to code and use problems has prompted a certain amount of action, as described by David Geiger's evaluation on page 81. The other end of the spectrum, the process oriented, or "soft," end, is equally serious about its goals, seeing a chance to make our built environment more responsive to people and to the natural environment. Given these varied aspirations, it is not surprising that there is both agreement and disagreement between factions over where the technological, the environmental and the sociological emphases should be placed. The pursuit of each leads, at times, to a cooperative effort, and at other times, to ideological conflicts.

No discussion of air structures can be without construction cost figures and, although they vary according to materials used, these statistics represent one of the most compelling reasons for considering bubbles. The U.S. pavilion at Osaka cost $4.50 per sq ft, including compression ring and foundation and the Antioch College structure should be comfortably under that figure. Future use of new materials and multiple skins may send costs up a bit, but cost is still one area of agreement for air structure proponents.

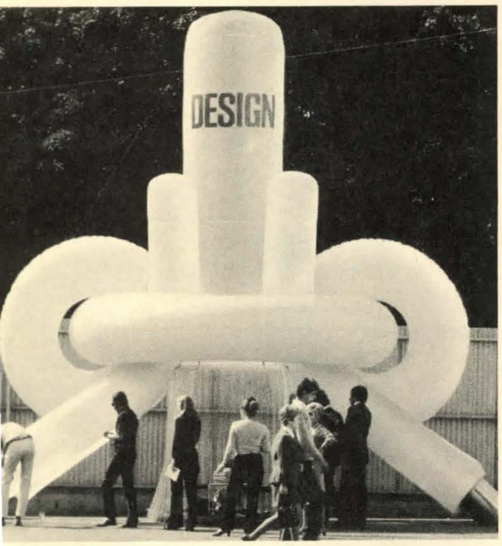
On the other hand, questions of permanence, sociological importance and environmental response are not so widely agreed upon. Although permanent, fireproof building materials satisfy code requirements more readily, some bubble proposals are based on nonpermanent structures, easily demounted and possibly recycled when their initial purpose has been served. There are at both ends, the broad view and the specialized one, both playing (sometimes overplaying) their parts. Technology can solve things that need solution, and the process-oriented can raise possibilities that need consideration. With intermixing, what follows is a sampling of each.

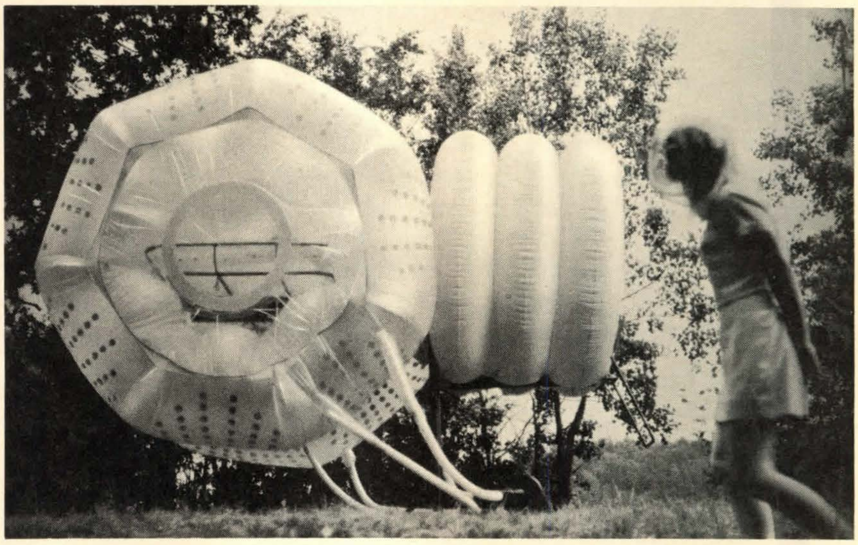


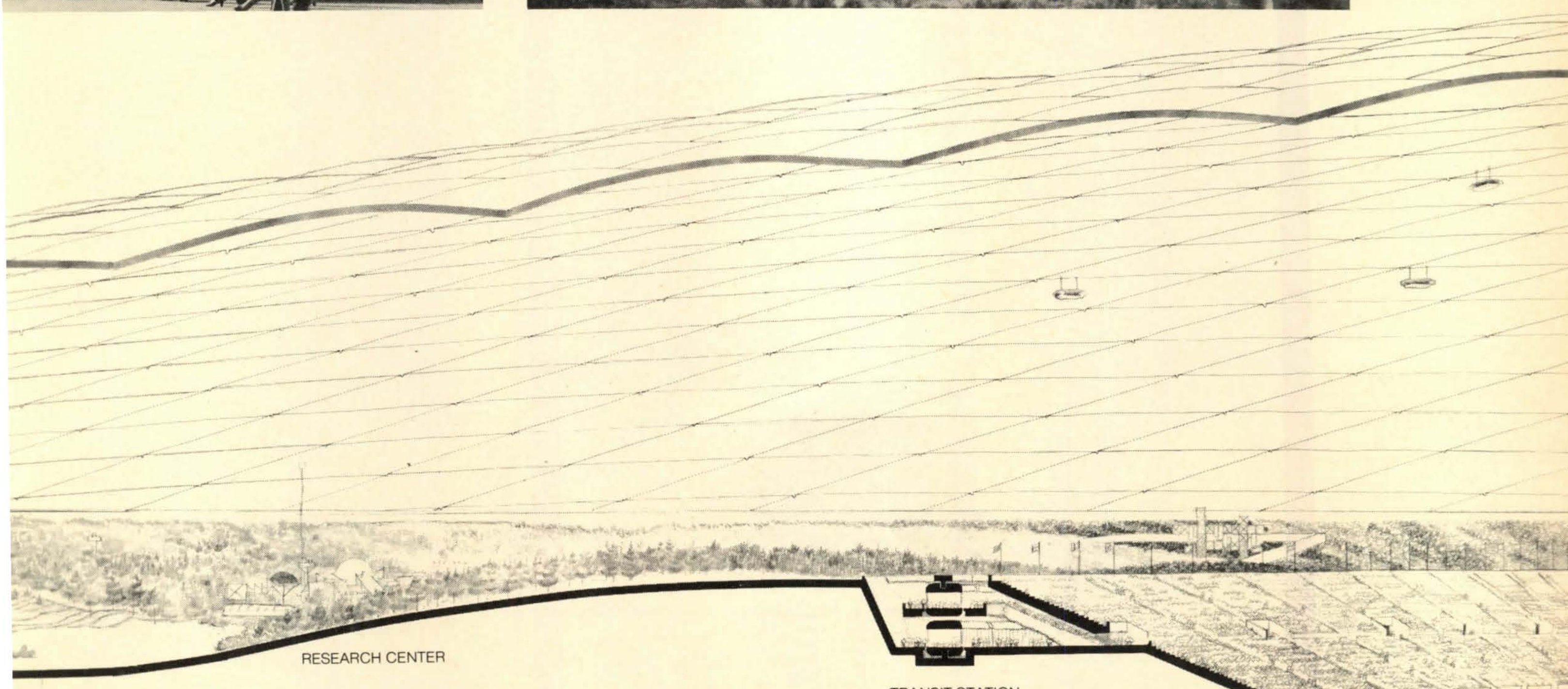
Proposal by Davis, Brody for an air structure spanning 8000 ft. Incorporating perimeter rapid transit cars and mechanical supply, the ring base design by engineers David Geiger-Horst Berger was solved through the use of a computer.



Four projects by Haus-Rucker-Co., from top, left to right: "Cover—Survival in a Polluted Environment," Krefeld, Germany, 1971; "Wegweiser," Nuremberg Airport, 1972; "Information Stand," Vienna, 1969 and "Yellow Heart," 1968.





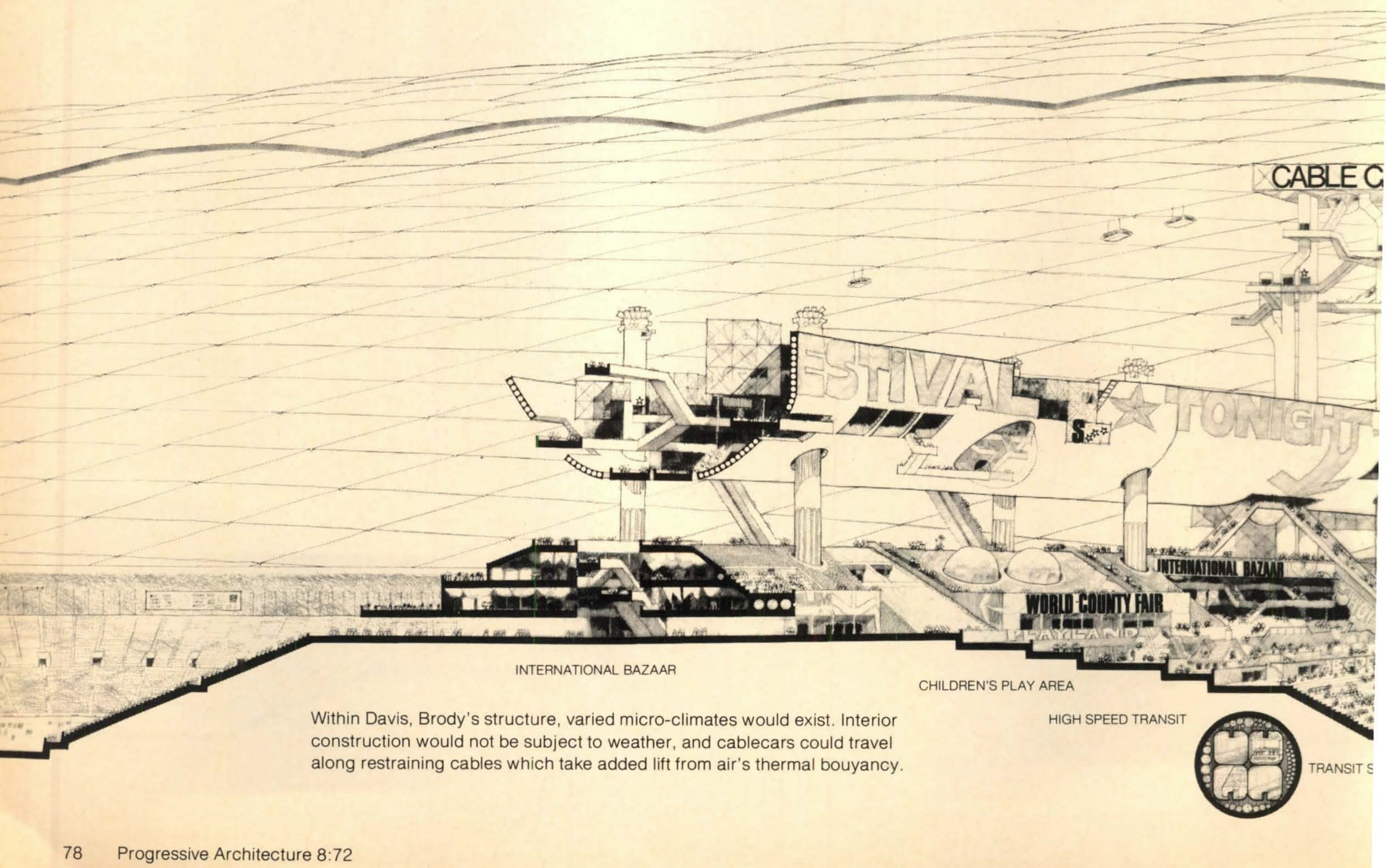


Inflatables have been used by Haus-Rucker-Co., a group of artists, designers and architects, for several years. Efforts aimed at providing new ways to inform or involve people have produced such projects as "Yellow Heart," "Information Stand," "Cover—Survival in a Polluted Environment" and "Wegweiser." "Yellow Heart" is an inflatable environment for two people, finished in 1968. "Information Stand" (1969) was just that, at Vienna's International Fair, and was sponsored by the Austrian Institute for Form. "Cover" was an inflatable structure entirely covering the Museum Haus Lange, Krefeld, Germany in 1971, to show a possible consequence of continued pollution. "Wegweiser" is a controversial 42-ft inflated finger, pointing the way to the city from Nuremberg Airport, and was finished in March. It represents one of a proposed series of what Haus-Rucker-Co. called "Urban Toys," elements relating to city scale in an urban landscape.

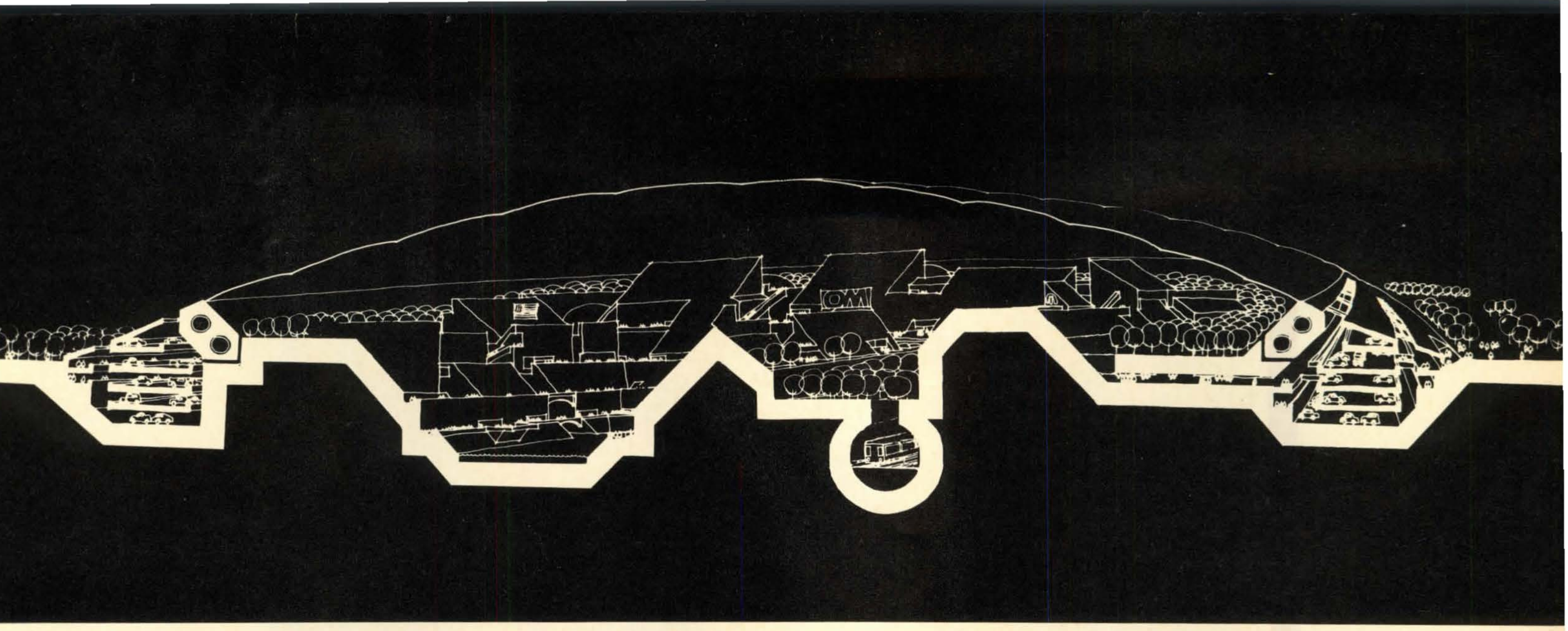
One industrial commitment to membrane structures is that of the Goodyear Tire & Rubber Company. Together with Environmental Structures, Inc., holder of exclusive rights to market, engineer and supervise erection of the air structures, Goodyear has taken aim at the greenhouse market. Other applications, such as recreation, education and warehousing are being studied. As a greenhouse, however, there is ample precedent in Goodyear's one-acre bubble for Pretzer Farms in Ohio. Large and obstruction-free space (428'x100'x20' high) will permit the owner to use regular farm machinery for planting and harvesting his crops of lettuce. The polyvinyl chloride film enclosure has a cable-restrained double-skin, with air circulating between the layers of assist in temperature control.

Another Goodyear-assisted project, the one-acre campus for Antioch College in Columbia, Md. (P/A, Feb. 1971), has faced many obstacles during the course of its planning, and has overcome most. Backers of the project, including the Educational Facilities Laboratories (EFL), the Research and Design Institute (REDE), the students of both Antioch and the University of Maryland, Goodyear and architect Rik Ekstrom have not given in to the seemingly interminable parade of code, zoning and materials tests faced by the proposal. Materials fire test results are the last hurdle as this is written, but sitework is under way.

Over and above the day-to-day problems of getting Antioch built, however, the project has provided valuable experience for all concerned. It was conceived for reasons concerned with the structure's ability to encapsulate a large, flexible area, conform to occupant uses and then disappear or move on when no longer needed. Blair Hamilton, long associated with the Antioch effort and now consultant to Antioch with REDE, sees the "soft architecture" as an opportunity. Membrane structures offer the possibility of going "from architecture as shell to architecture as interface," he feels. Working toward some of the same goals as Chrysalis (p. 87), Hamilton hopes to use existing technology to its best advantage in making environmental control systems with the capability of reliably responding to changing requirements, both of occupants and of surrounding factors.



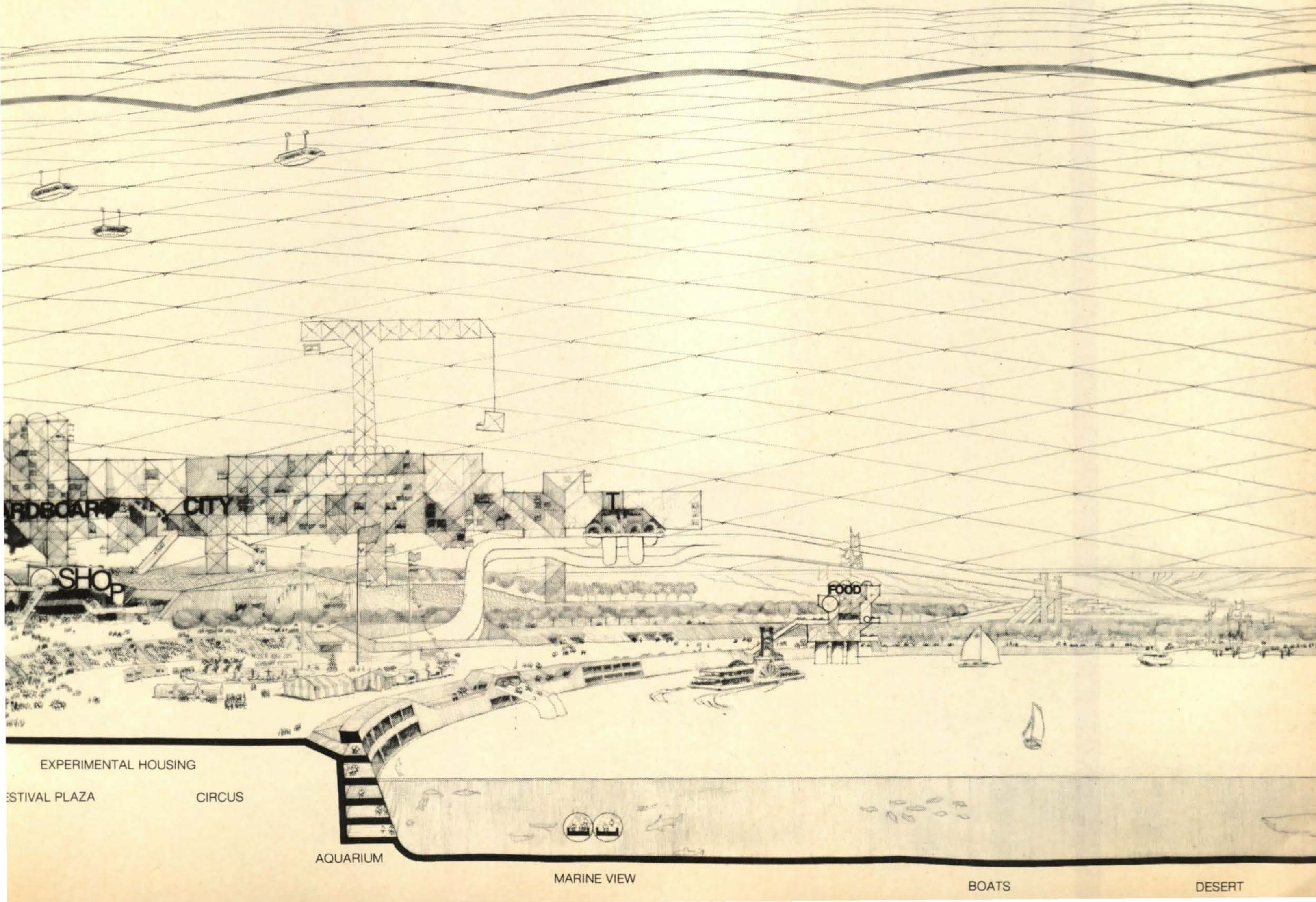
Within Davis, Brody's structure, varied micro-climates would exist. Interior construction would not be subject to weather, and cablecars could travel along restraining cables which take added lift from air's thermal bouyancy.



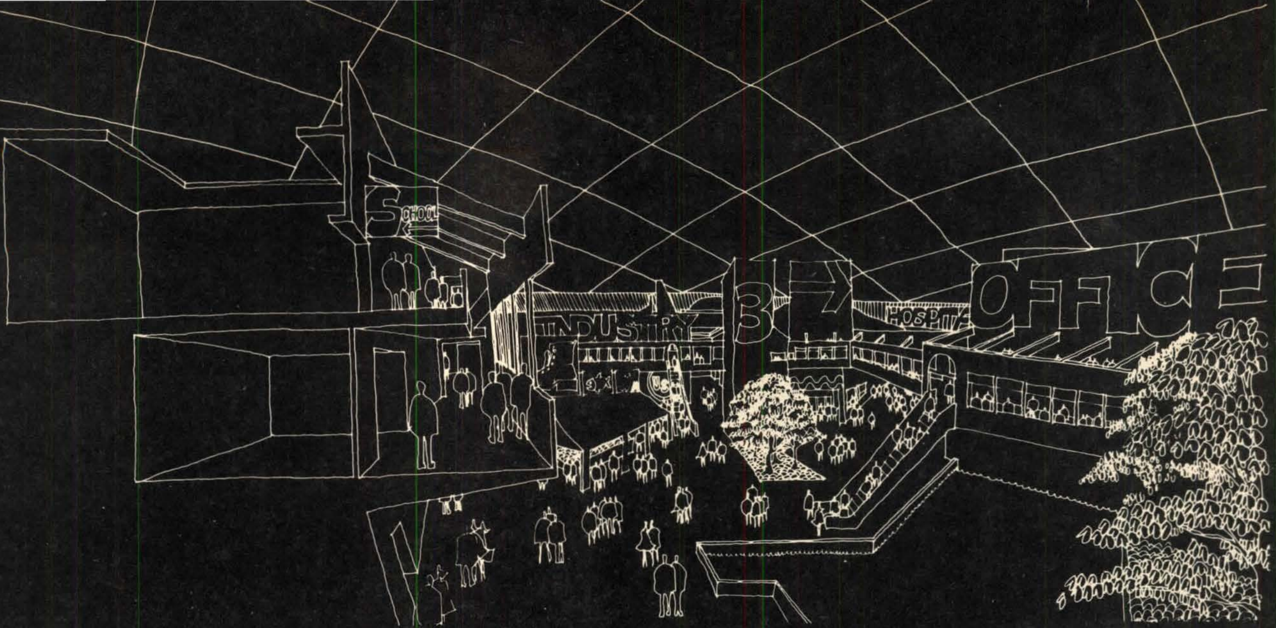
Bermlike structure, used to receive positive wind forces of a low profile air structure (David Geiger article, p. 81), can be used to contain parking.

Expanding on Osaka

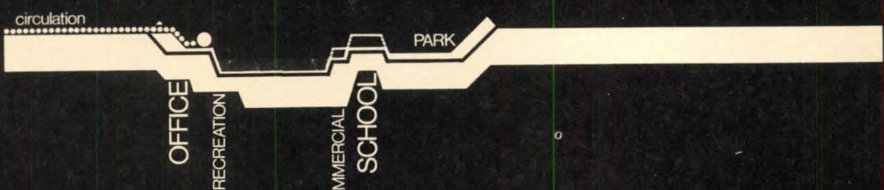
Since their involvement in the design of the United States pavilion at Osaka, Davis, Brody & Associates, architects, and Dr. David Geiger, engineer, have further explored the possibilities of encapsulating space with lightweight structures. Based on their Osaka findings, and other subsequent work outlined in Dr. Geiger's article, projections of other feasible uses began to emerge, and scope limitations began to fade. Of the schemes shown, some are feasibility studies for actual projects, some just projected possibilities and some, if it seemed desirable, could be done as tension structures with little modification. The proposals extend earlier solutions to reasonable limits, given existing technological capabilities. Parameters for materials used in structures inside the bubble would change, since exposure to weather would no longer be a factor. The natural lift and buoyancy mentioned in Dr. Geiger's article help the mechanical systems and, at large scale, would give restraining cables the ability to carry cable cars. Within such a structure for instance, environmental controls could make land in the far north into usable sites for whole communities, or provide pollution protection in other locations.

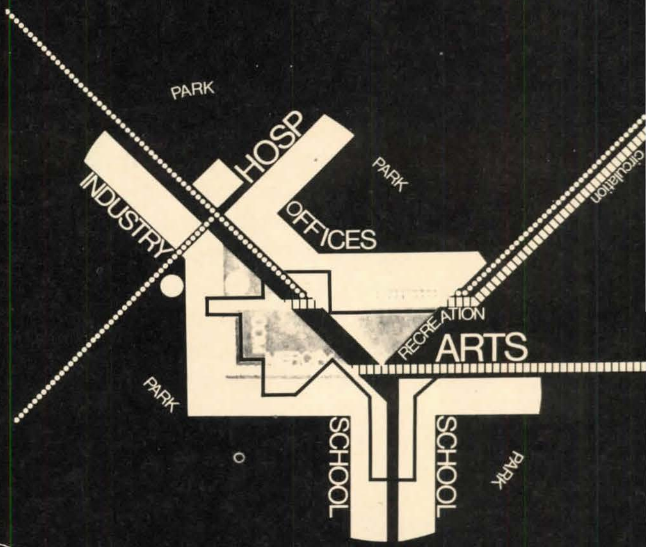


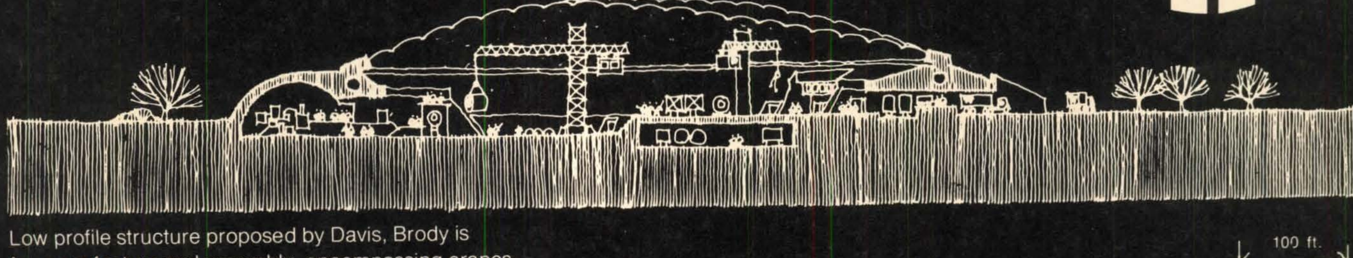
Air fare



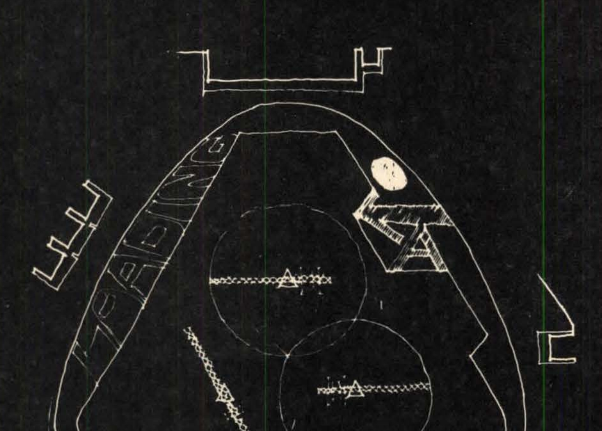
Schematic design for placing all nonresidential community functions under an air structure.



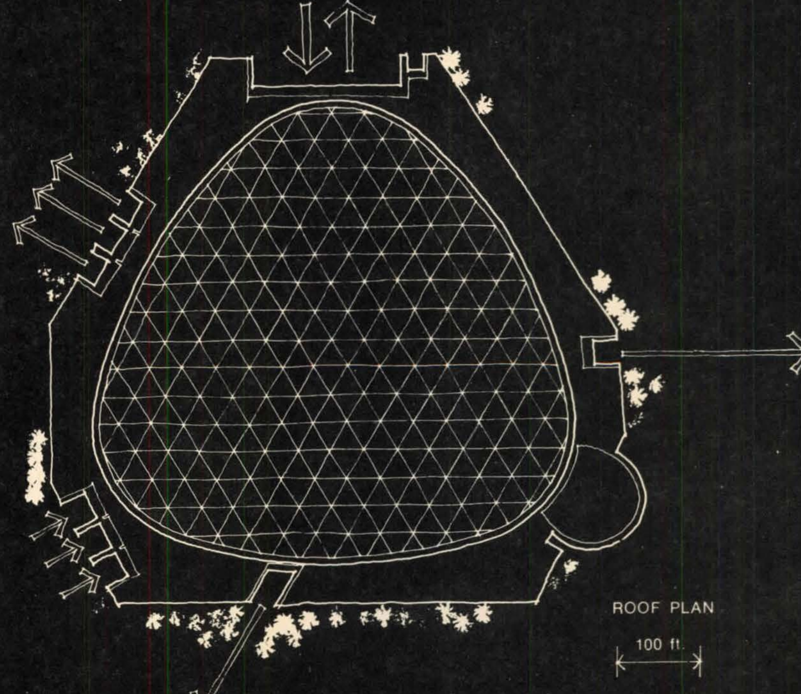




Low profile structure proposed by Davis, Brody is
for manufacture and assembly, encompassing cranes.



INTERIOR PLAN



ROOF PLAN

Pneumatic structures

David H. Geiger Ph.D.

Pneumatic structures offer unlimited possibilities of form and span with structural cost a fraction of that for conventional structures. Although ultraviolet degradation and flammability of flexible membranes have heretofore limited their use, new membranes can be considered both permanent and incombustible. Solar radiation has sometimes caused air conditioning loads to cancel all structural savings, but even that drawback is now being overcome with composite skins which bring these costs to levels comparable to conventional structures. Future developments may include a "thermal roof" to serve as a solar collector and thermal radiator, thus permitting climate control with no outside energy source.

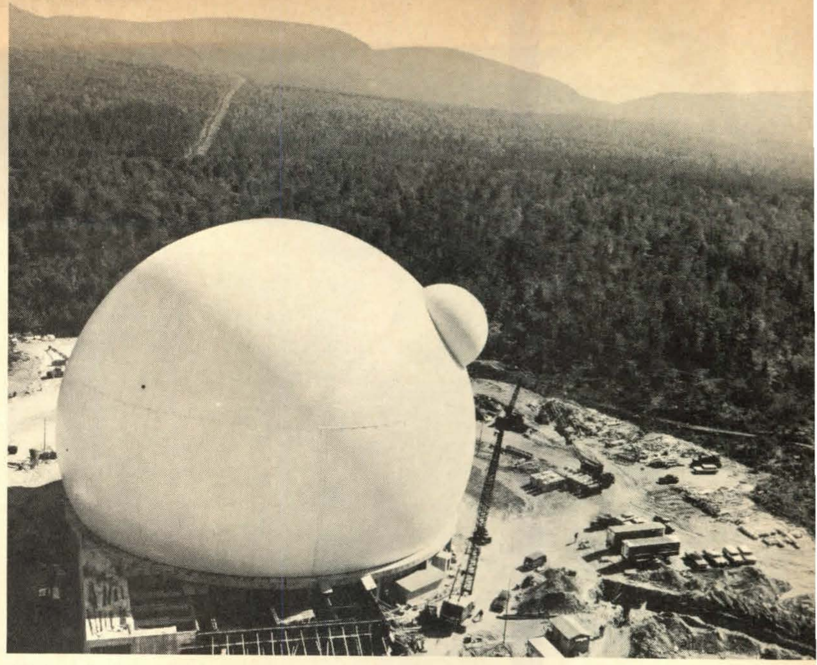
Pneumatic structures fall into three categories: single walled, double walled and dual walled. In each case, the structure is designed primarily to resist external wind forces, as snow loads have little influence.

Wind forces on a hemispherical dome are indicated in fig. 1a. The values for maximum suction, −1.0, and a maximum positive pressure, +.90, are approximately constant as the ratio of internal pressure p to stagnation pressure q varies from .65 to 1.3. For the higher value of this ratio, the flexible dome nearly holds its original shape on the windward side.

For the three-quarter sphere (fig. 1b), results are similar except that the maximum suction and maximum positive pressures increase to −1.25 and +1.0 and higher internal pressures are required to maintain the original shape, $p/q = 2.4$. If one considers an internal pressure equal to the maximum wind pressure, one obtains the net forces on the fabric membrane (fig. 1e), as the sum of wind forces (fig. 1c), and internal pressure (fig 1d), the combined force on the fabric.

If an earth berm or other solid structure is used to receive the positive wind forces (fig. 1f), then only suction forces act on the fabric membrane. At this point, the internal pressure is required only to carry the roof weight and give the structure overall dynamic stability when the wind is not blowing or is blowing only in gusts. This requires a pressure greater than the roof weight by about 2–3 psf, which yields a net internal pressure significantly less than that for the high profile air structure. The internal pressure, combined with wind forces (as with 1e), then leads to overall forces less than that on the high profile air structure. This does not mean that the membrane stresses are reduced, as the membrane, much as a chain or catenary, carries a given load with lower stress as the radius of curvature (or the sag of the chain) increases. There are now two opposing trends: the overall forces on the structure decrease as the rise decreases, but the internal stresses for a *given* external force increase as the rise decreases.

When a berm or other solid structure is not used to carry the positive wind forces (fig. 1e), the optimum rise is approximately 20 percent of the span. When the positive force is carried by the solid structure, the wind still confronts an overall structure with a rise of about 20 percent of the span, but the fabric roof has an optimum rise of about 5–7 percent of the span. Such a low rise would be impossible for a compression dome because of buckling, and herein lies the main advantage of the low profile air structure: it is possible to reduce



"Telstar" radome in Andover, Me, by Birdair Structures, Inc., is the largest example of a single-walled air structure to be built to date.

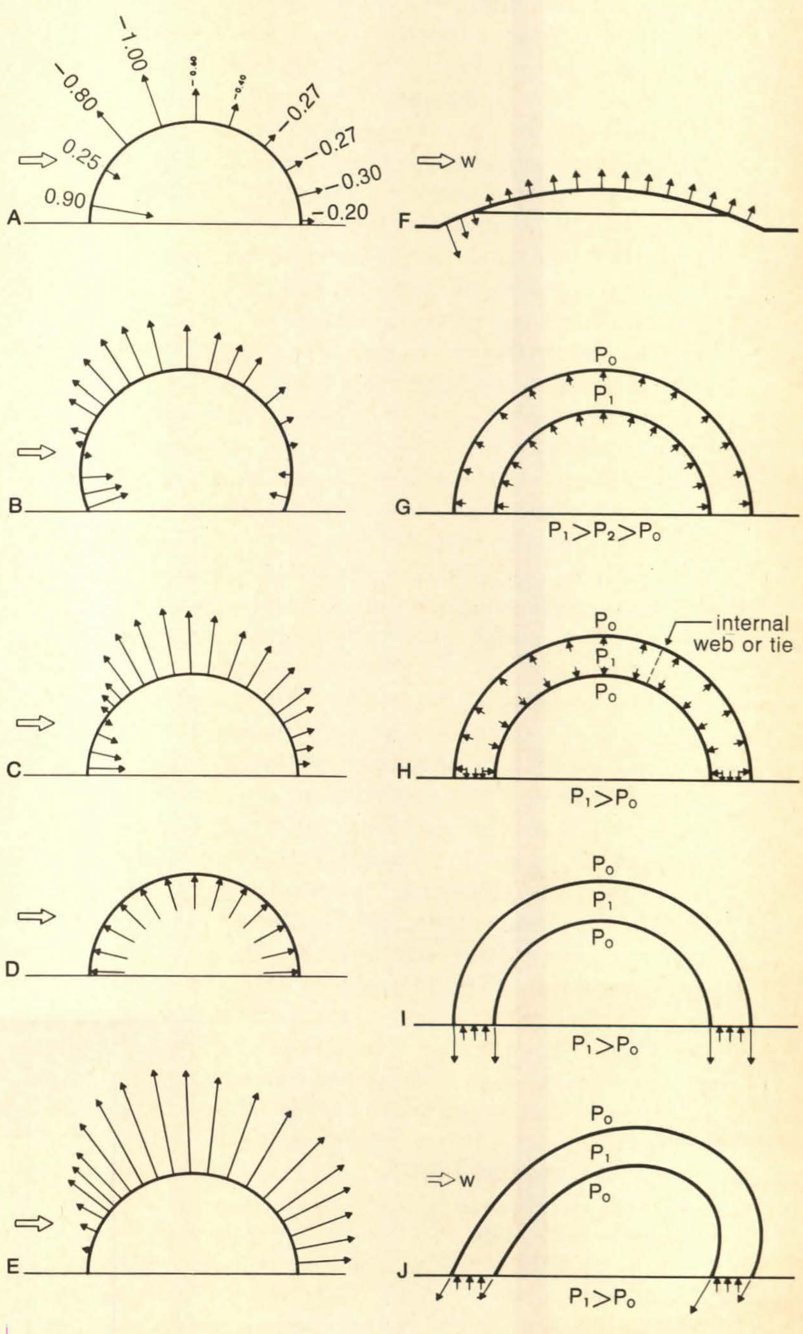


Fig 1: Diagrams of wind forces on domes, G. Begar and E. Macher, from the *Proceedings of the 1st International Colloquium on Pneumatic Structures.*

wind forces without the buckling effect of other structures.

In a double walled structure the occupied space has a pressure of p_1 acting on the inner skin while the space between the two skins is pressurized by a slightly smaller pressure, p_2, that is enough to resist the wind forces described above. The second skin may be added for several reasons: to provide a dead airspace for insulation; to greatly increase the safety factor against deflation (if not coinciding, holes in the upper and lower skin would be sealed by the escape of the pressure p_2 which causes the two skins to come together and seal the holes); to permit projections on the inner surface, since projecting against a single wall is impractical due to wind-induced deflections of the flexible membrane.

If the inner and outer skins are connected by webs or ties, it is possible to inflate only between these two skins (fig. 1h). This is the dual walled air structure or air inflated structure. Because its occupied space is now at atmospheric pressure, airlocks, revolving doors, etc., are not required. Structurally, however, it is much different from the single walled and double walled air structures previously discussed. Where the single walled and double walled structures act as membrane structures, the dual walled structure behaves more nearly as a shell with bending and possibly buckling across the shell thickness. This is most easily seen through consideration of a free body between the dual walled structures and the ground (fig. 1i). The tension in the fabric equilibrates only the pressure acting across the wall thickness and not the pressure across the span of the structure. Consequently, to achieve the same fabric tensions, much higher internal pressures are required to resist overturning force due to the wind (fig. 1j) without the fabric buckling on the leeward side of the wall. A low profile dual walled pneumatic structure has the same buckling problems as a compression dome.

For the high profile pneumatic structure, snow loads do not pose a problem since the heat loss through the skin is generally sufficient to melt the snow at the interface, allowing the snow to slide off the roof. The dual walled and double walled air structures also permit the use of the space between skins as a plenum to direct heat and more efficiently melt the snow.

Snow will not slide off the roof of a low profile air structure, so it is either melted or carried directly by increasing the internal pressure. If the snow were to impose a uniform load on the roof, the increase in internal pressure would result in no increase in fabric tensions. Otherwise, in areas of the roof having less snowfall the fabric stresses will increase due to the overpressure. Normally, however, this increase in stress will be less than the maximum stresses due to wind loading and will not affect skin design. The increase in pressure must, of course, be considered in the design of blower systems and of all elements—such as doors—that must carry the pressure differential. The United States pavilion at Expo '70 in Osaka, Japan (P/A, Aug. 1970) is the only low profile single walled structure built to date. For large spans, such as the pavilion's 460'x262', membrane stresses are so great that a pure fabric membrane is insufficient. Therefore, high strength bridge strand, 1½ to 2¼ in. in diameter, 20 ft on center, served as a cable net with fabric infill of vinyl coated fiberglass between. The translucent fabric had a strip tensile strength of about 500 pounds per inch.

Anchorage for the bridge strand was provided by a concrete compression ring. In order that anchorage forces of such magnitude be equilibrated in the most efficient way, relationships between ring shape, cable directions and roof ordinates were worked out so that there would be no bending moment in the ring under uniform loading. In that state, the ring is said to be funicular for the given loading condition.

As the ring was funicular under uniform pressure, it was possible to place it on top of the earth berm; horizontal forces being carried to the berm were limited by controlling the friction between the ring and its base. Sufficient friction was maintained, though, so that seismic loading would not cause the roof to slide off of its base. Since wind loading (1f) varied from zero on the windward size to a maximum at the center, then remained constant on the leeward side, a slight bending moment was caused in the ring. The ring balanced the upward forces on the roof, including the 29 psf suction due to typhoon winds. Consequently, the maximum vertical load on the berm occurred during construction, before the roof was inflated, and was 500 psf, including the weight of the ring and dead weight of the cables distributed along the perimeter.

Since Osaka

The use of a funicular compression ring does not restrict the plan shape of the structure as much as most people would believe. The ring of the U.S. Pavilion followed the equation of a super ellipse:

$$\left(\frac{x}{a}\right)^{2.5} + \left(\frac{y}{b}\right)^{2.5} = 1$$

but the exponent 2.5 could have taken on any value including infinity at which point the ring would be rectangular. The main point is that a unique mathematical relationship exists between the ring shape and cable directions for the ring to be loaded in a funicular manner. This relationship forms the basis of patent applications by the author in the US and Japan.

Most people intuitively recognize that a circular ring is loaded in such a funicular manner by equal radial forces. This has been used in the design of cable roofs where a tension ring was also required at the center where the cables would otherwise cross. It is the weight of the tension ring and cables at the center of the roof that makes this cable layout impractical for the air structure, since a dimple would be formed at this point, water would collect and the roof would subsequently collapse. Recognizing that the circle and the rectangle are all generic forms of the super ellipse, it becomes obvious that what is true for one of these forms is true for the others. Even in a rectangle this ring is loaded in a funicular manner by cables either along the diagonals or coincident with the sides. Moreover, it can be proved that such is the case for the super ellipse and the circle. Consequently, cables may be designed to load these rings in a funicular manner when the cables are either parallel to the major and minor diameters or parallel to the diagonals of the superscribed rectangle (known as conjugate diameters).

Once these relations are fully grasped, it alternately becomes possible to first establish cable directions and the magnitude of cable forces, and then to determine the necessary ring shape so that it is funicular. It now becomes clear

Fig 3
Estimated cost of blowers
and stand-by generators to prevent deflation

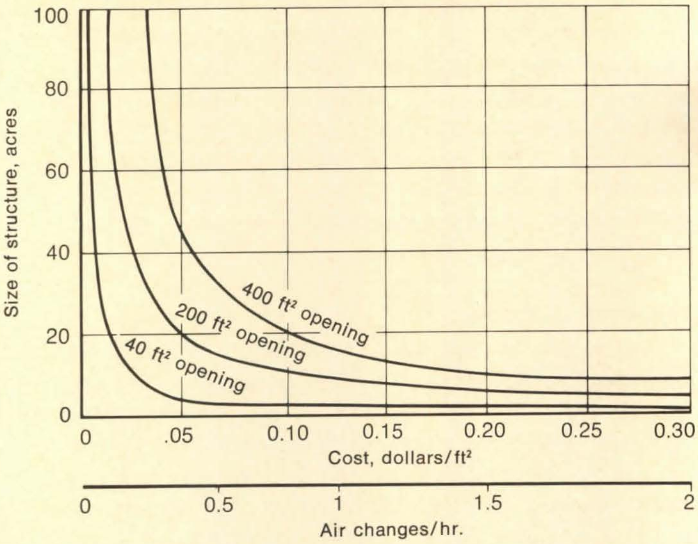


Fig 5
Deflation curves for a
40 ft² opening with no blowers,
Rise/Span = 1/10

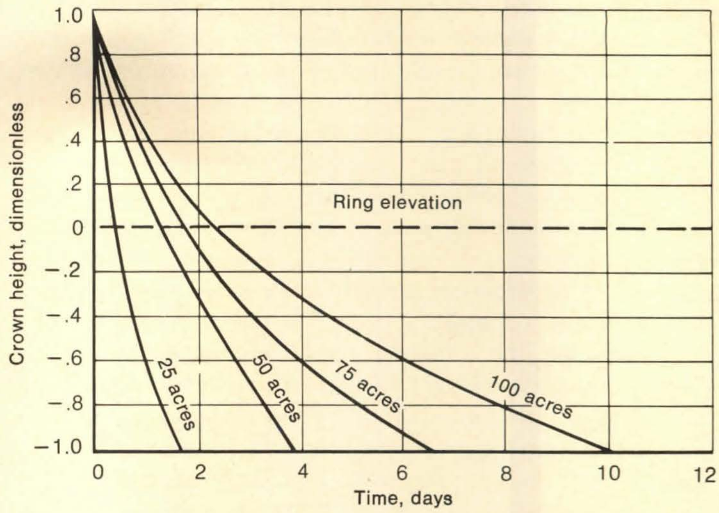


Fig 4
Deflation curves.
two-acre structure no blowers,
Rise/Span = 1/10

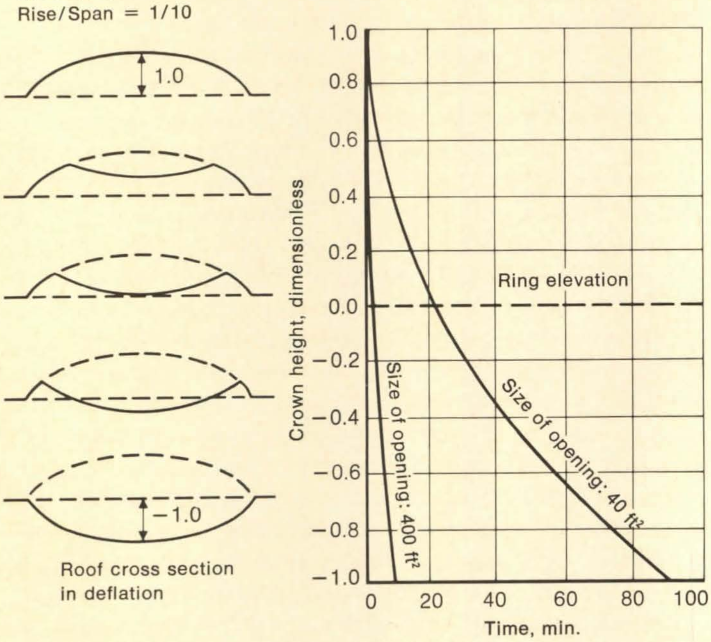


Fig 6
Deflation curves for a 400 ft²
opening with no blowers,
Rise/Span = 1/10

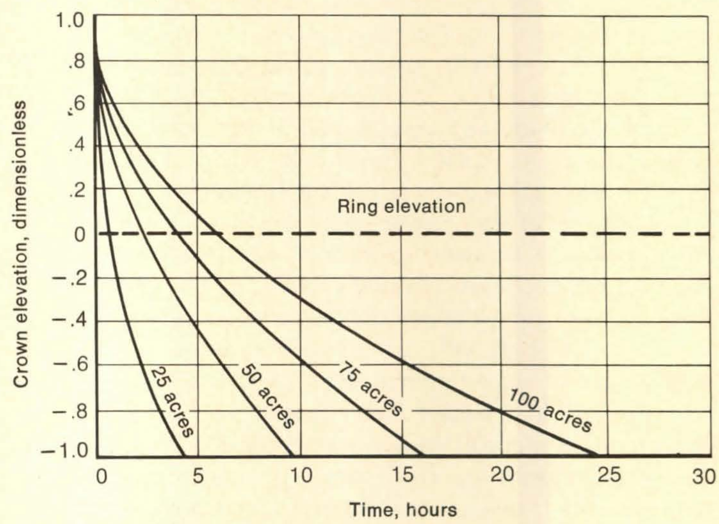
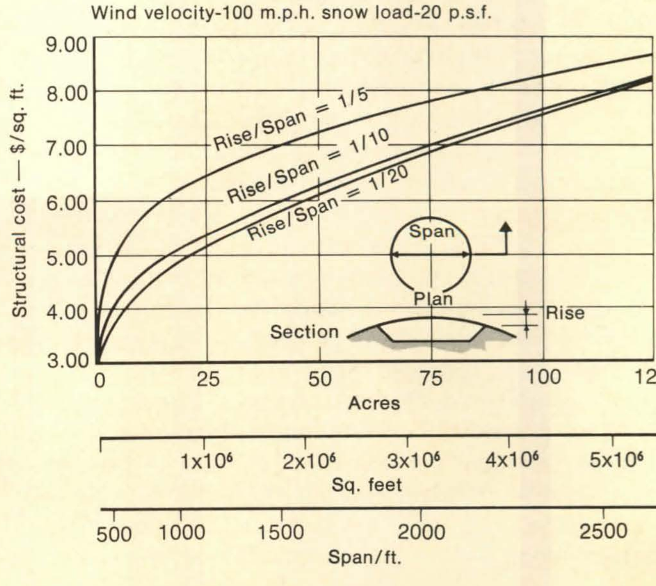


Fig 7
Cost-low profile air structure
1972 prices-includes overhead and profit (25%)
and contingency (5%)
Wind velocity-100 m.p.h. snow load-20 p.s.f.



that the low profile air structure need not be limited in plan configuration because of the large horizontal anchorage forces. Extreme variation is possible. It is no longer necessary to build circular stadiums over rectangular activities.

With steel cables and a concrete compression ring, the air structure is transformed from the demountable temporary structure to a permanent one. Infill fabrics, therefore, must also become permanent. The Educational Facilities Laboratories sponsored research by the author to investigate changes in the Osaka design that would permit use of this structural form for permanent installations—field houses, stadiums and the eventual encapsulation of complete college campuses. At that time, all existing materials for air structures suffered ultraviolet degradation within three to ten years. This degradation could be retarded by making the skin opaque, but for large-span structures this was bad architecturally.

In Osaka the membrane used was a vinyl-coated fiberglass. The fiberglass was a fine filament yarn (3 micron in diameter) which did not have the brittle properties commonly attributed to glass. Fiberglass, because of its incombustibility and high strength, is ideal as a structural element as long as moisture can be kept from the glass yarn and the yarn is protected from abrasion by either outside elements or other glass fibers. It is the coating that serves to protect the yarn and make the skin nonporous. The coating also, through heat sealing, transfers stress from one sheet of fabric to the next. The research located a material already being used by industry in conveyor belts. It is a fiberglass fabric, coated with duPont's Teflon, manufactured by Chemical Fabrics Corporation. Moreover, since it came in widths up to 16 ft across, the savings in fabrication partially offset its more expensive cost. Teflon is inert; it does not degrade under ultraviolet rays and it sublimes at temperatures of about 700 F. It is readily heat sealed within a controlled temperature range. It is being used in the fabric for the Milligan College (Tennessee) Field House, designed by The Shaver Partnership, a double walled air structure spanning 320'x210' with warped quasi-super elliptical compression ring. The cost of the roof, including ring, is about $5.50 per sq ft. Of this, the double layer Teflon-coated fiberglass fabric membrane in place is $3.75 per sq ft as compared to $2.70 for the single-layered, vinyl-coated fabric membrane used in Osaka. The double-walled membrane is 5 percent translucent and has a U factor of .3. Since all components of the roof structure are incombustible it is now possible to classify the assembly as such within the existing building code. The required minimum distance between the floor of the occupied space and the roof structure, typically between 18 to 24 ft, will avoid fireproofing of the roof structure. To date it has only been necessary to satisfy these clearances in the inflated state and to have the roof hang free of the occupied space in the event of deflation. It is a temptation to design interior supports to catch a deflated roof, but in structural terms this is difficult to do economically since the compression ring is not funicular for both the inflated clear span roof and the deflated roof with interior supports.

When the perimeter support cannot be made high enough for the roof to hang free of the occupied space, it is necessary to design the mechanical system so that the probability of deflation is so remote as to be acceptable to building code officials. This is done by designing blowers and standby generators of sufficient capacity to make up the accidental air loss. The probable size of such an opening is open to conjecture and will increase with the increase in the size of the structure. For openings from 40 sq ft (representing the size of an air lock) to 400 sq ft (the size of a hole caused by a small airplane) the first cost of the mechanical system required to prevent roof deflation is generally modest (fig. 3). Moreover, the same mechanical system would generally be required to supply necessary air changes for reasons of ventilation.

The ultimate catastrophe would be simultaneous failure of the mechanical system, including standby generator, coupled with a large opening in the structure. Even though the roof deflates, however, there will be sufficient time to evacuate people from the structure and there should be sufficient time to close openings, and/or to restart the blowers before collapse occurs (fig 4-6). All of the above considerations do not take into account the fact that as the span—and consequently the height—of the structure increases, the buoyancy due to the thermal gradient of the stratified air within the structure, plus lift due to wind forces integrated over the roof area, begin to exert forces such that, for very large roofs, the pressure differential supplied by the mechanical system is either minimal, or is not required.

Temperature control

Heating and cooling of the space cannot be dealt with in a conventional manner. For the air structure, the medium through which thermal interaction occurs between the outer and inner environments is the translucent fabric. By specifying a fabric with high reflectivity, low absorption and low translucency, solar gains, which constitute the major portion of air conditioning loads, can be reduced to a minimum. Moreover, conventional building skins absorb a large quantity of solar radiation on summer days, with accompanying high surface temperatures. The skin of the air structure, with its low thermal mass, absorbs very little solar radiation and, during the day, maintains surface temperatures close to ambient. At night the roof constantly radiates its heat to the sky, dropping its temperature as much as 15 to 20 degrees below ambient and cools the inner space. The high thermal mass of the horizontal expanse of earth within the structure then moderates the day-to-night and season-to-season temperature swing. These conditions, plus the air-tightness of the structure, result in a reduced load on the mechanical system.

For summer conditions throughout most of the United States, one skin should prove to be adequate. For winter conditions, the number of skins and the need for insulation depend on the height of the structure and the severity of the winters. For most of the country and for structural heights over 30 ft, one skin should prove to be adequate. Cost of heating and cooling equipment for an air-supported structure in a typical northeast climate is about $2 per sq ft. This figure is based on 6 percent translucency, an occupancy of one person for 50 sq ft, one-third of an air change per hour, a design winter temperature of —10 F and summer outside temperature of +90 F, with 50 percent relative humidity. Structure costs are around $5 per sq ft. Exact relationships between costs, span and rise are shown in fig. 7. These costs include fabric, cables and ring, in place. Note that, as the span increases, costs increase gradually, but not as rapidly as for conventional structures, where an increase in span results in an increase in internal forces. More material is then required, thus increasing the dead load and thus increasing internal forces, in a dog-chasing-his-tail-manner. For the air structure, the dead weight of the roof is carried directly to the ground through air columns and does not span the space. Only wind suction forces must span to the perimeter of the structure.

Considerations of deflation and cost of the structure all lead to the concept of encapsulating large areas. This expanded scale may indeed be the future of the air structure.

Author: David H. Geiger, partner in the firm David Geiger–Horst Berger P.C., consulting engineers, holds a Ph.D. in civil engineering, applied mechanics and architectural technology from Columbia University.

Symbolic mobility

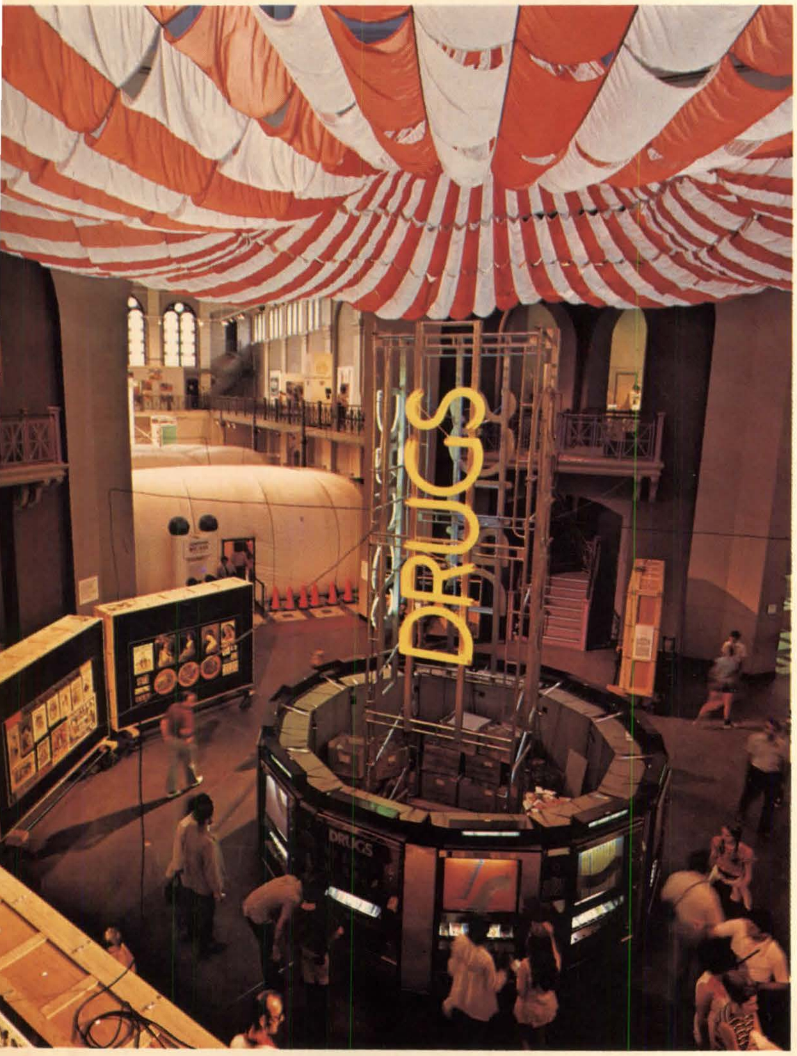
The curves of the Birdair structure help to isolate and focus sound from "talking heads" (above) which, with rear projection on vacuum-formed faces, discuss aspects of drugs. Photos by famous photo journalists (right) graphically present many aspects of such customs and events as tea ceremonies, public figures who died of cancer or an overdose and "social" drinking.

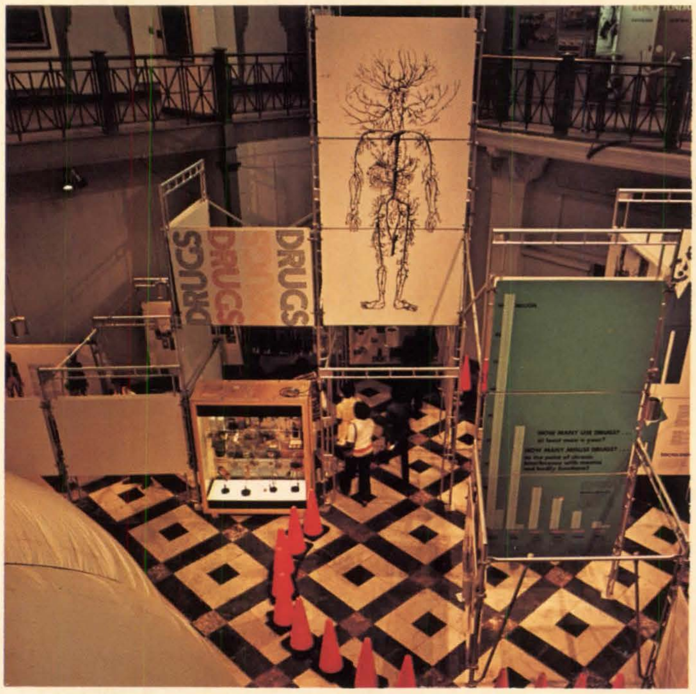
Quite another role of air supported structures depends upon their ability to speak to a specific culture. A recent show at the Smithsonian Institution in Washington, D.C., entitled "Drugs: A Special Exhibition," called for just such an interpretation. Smithsonian Secretary H. Dillon Ripley and Phillip Ritterbush, Director of Academic Programs, had a special goal when the show was conceived, late in 1969. In order that the Smithsonian might serve as more than a repository for objects appealing to wall-to-wall nine-year olds and retired bomber pilots, it had to mount a concerted effort to reach the 15 to 30 year age range. As Ritterbush put it, "... that we might employ exhibits more successfully in communicating to a wider audience, especially among young adults, than the museum usually reaches."

Research and Design Institute (REDE) of Providence submitted the proposal that, in order to accomplish the job, a drug show should be visually and practically designed in an idiom best suited to that wider audience. In content, it should be composed of facts, not preachings. In context, it should use, but not overuse, technology to produce mobility and message. This thought reflects what REDE director Ronald Beckman sees as one of the main points in the show, that overuse of overabundance, not the technology, is the basis of many problems. As a REDE background paper states, "Technology is not good or bad; the application of its methods, however, can be assigned a social value."

The technology of an air structure became an integral part of the drug show concept for several reasons. First, it is an economical way to achieve an enclosure with the required mobility. The mobility itself is an attribute of the young audience the show will draw. Although parts of the Smithsonian installation are not in the bubble, REDE proposes that, during the planned U.S. tour of the show, the current air structure and the other exhibits be housed within another air structure. Second, Beckman and Howard Yarme, REDE project director, feel that the air buildings make an ideal environment for the show, wiping out distractions, forming a neutral backdrop and fitting any tour itinerary. Third, but probably most important for an expression of, and to, a youth culture, the bubble and its contents represent the unslick world—Ant Farm and Drop City in an institutional form. It is what Beckman calls "the Alice's Restaurant of museum design."

Employing a variety of techniques to inform, the show tries for a new perspective. Featured are substances that humans through the ages have taken, sniffed, drunk, inhaled, chewed or injected to change their physical and/or mental state. The point being made is that these state-changers have been a part of the scene for a long time, and in many forms. Coffee, tea, tobacco, cola, alcohol and those things most commonly called "drugs" are all subjects of factual exhibits. As required, and insisted on, by the Institution, the straight-out drug message, in print, is on boards in a "drug maze" constructed of pipe scaffolding. If the scaffolding looks rigid and square to you, Beckman says you've caught the message.



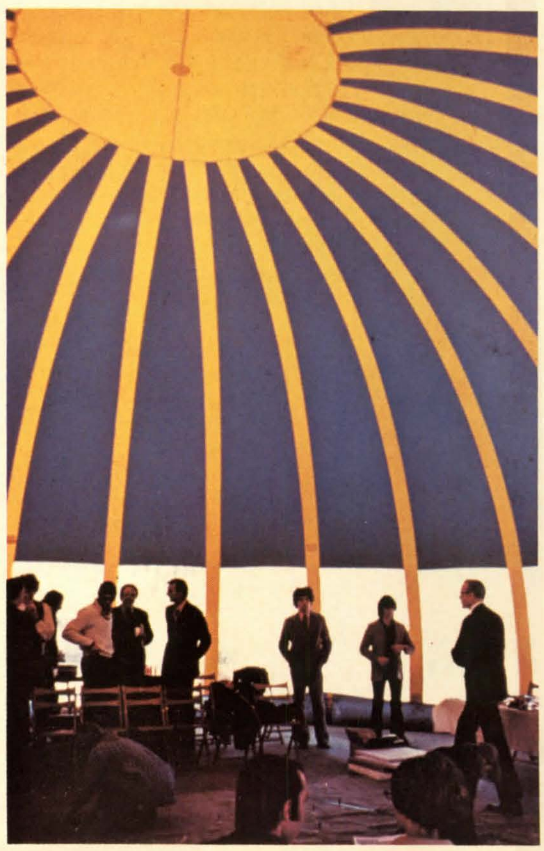


Entry to "Drugs" exhibition is past neon sign (above) in the center of a ring of vending machines. A "bubble pack," with accompanying factual card, from the machines serves as an admission ticket to the bubble (right). To permit mobility, displays (above) are in their own packing crates, while the "drug maze" (top right) is pipe scaffolding, holding removable panels.

Applied dynamics

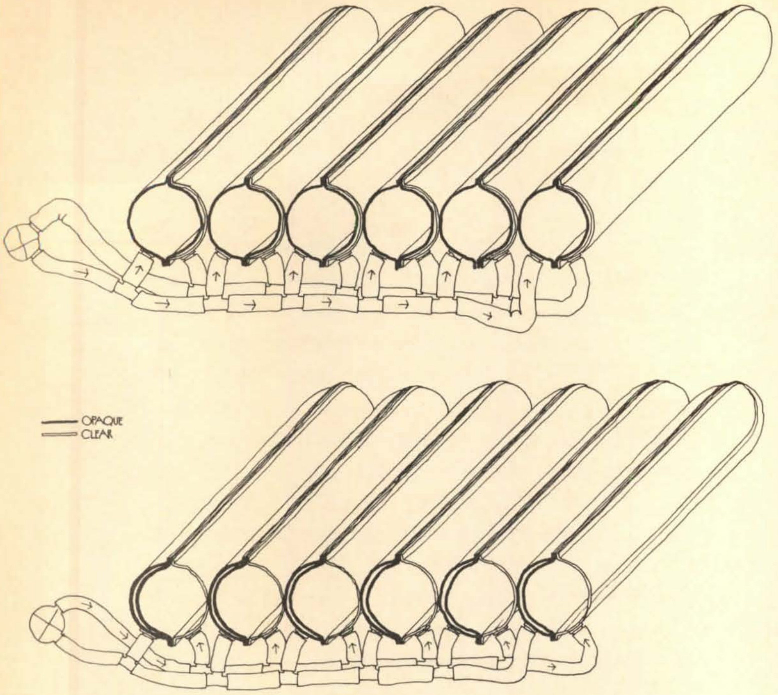
As used for the Smithsonian show, the air structure's role is more passive than another group would prefer. Chrysalis is described by Joe Valerio, one of its members, as "A group of resources, applied to solve particular problems." Although Chrysalis, like REDE, is involved in things other than air structures, their tenets are strongly oriented around already mentioned bubble characteristics of mobility and adaptability. Valerio doesn't even know where some of the group's buildings are at the moment, "but that's a key thing," he says. "We know that our buildings won't be around, constraining lifestyles after they've outlived their use."

Recently, Chrysalis has begun work on what it considers more important—dynamic, or active—structures, seeking ways to make the structure more capable of response to vary-

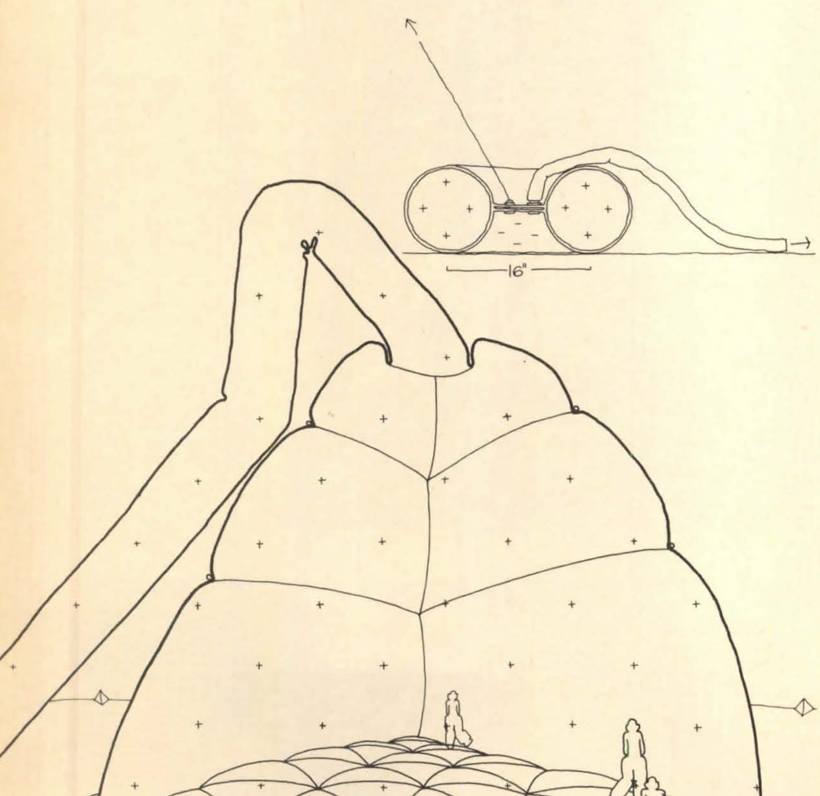


Three examples of Chrysalis' air structures reflect the group's interest in shelters that are mobile: soft entry tube to "Domenut" (above), meeting space in "Ecodome" (right) and two views (below) of a packaged "Pneudome."

Air fare



Variable opacity of the building skin can be achieved by the assembly of skins shown above. Opaque skins, indicated by heavy lines, form one-half of each tube, as well as an inner dividing membrane. The other segment of the tube is transparent. Greater air pressure in the clear side forces the divider to the opaque side, allowing light to pass through half of each tube. Higher pressure in the opaque side causes the divider to close off the transparent section, blocking light and heat transfer to the interior. Self-anchorage device (below) takes advantage of the suction inherent in any blower intake principle. A controlled amount of the negative pressure produced by the structure's supporting blower has been proven adequate to anchor test buildings to most surfaces, resisting 500 lb pull forces.



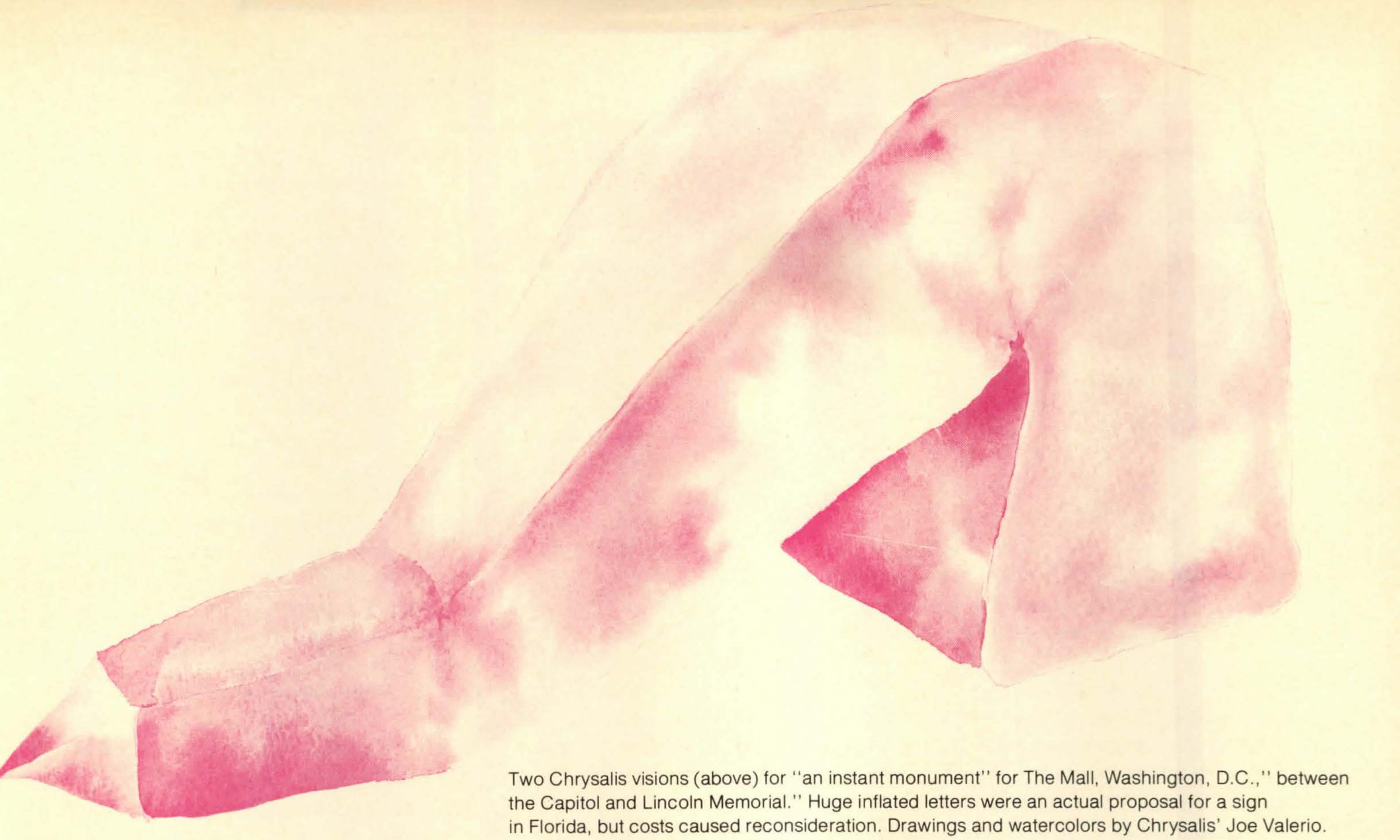
ing conditions, either in physical or human terms. Developments include such ideas as the ability to vary the opacity of the skin, proposed by Michael Davies, and the ability to anchor a structure without the normal ties or ballasts, devised by Valerio. With patents pending, both of these concepts are answers to conditional problems restricting comfort or mobility. As shown in the drawings, the variable opacity skin employs three skins, two of which are opaque, and one, clear, assembled in tubelike configurations. One opaque and one clear section make up the outer wall of each tube, and the other opaque surface divides the tube into two chambers. In position, half of the clear surface is exposed both inside and outside of the structure. Air pressure enters each tube through a variable flow valve which can change the pressure distribution between the two chambers of the tube and thereby the position of the dividing surface. More air pressure in the opaque chamber forces the opaque divider to the clear side, making the assembly opaque. Pressure in the clear side tucks the divider into the opaque side, allowing light to pass through 50 percent of the assembly. Also possible, it seems, would be combinations of translucent and transparent films, as well as colors or shades.

Another restricting problem with air structures has been that of anchoring the lightweight enclosure. A complete range of methods, even in Frei Otto's work, has not included one, Valerio notes: suction. With a very low (1 or 2 psi) negative pressure, Chrysalis' proposal has been tested in prototype form, and was found to resist up to 500 pounds of pull. It is said to seal on almost any surface, including gravel, sand or loose dirt, but excluding grass. Conceivably air could be evacuated from a cavity around the structure's edge, formed by a grating or mesh, by connecting a velocity stack to the intake for the blower required for building support. "This gets away from ballast or permanent foundations," notes Valerio, "and approaches real mobility—a self-deploying structure."

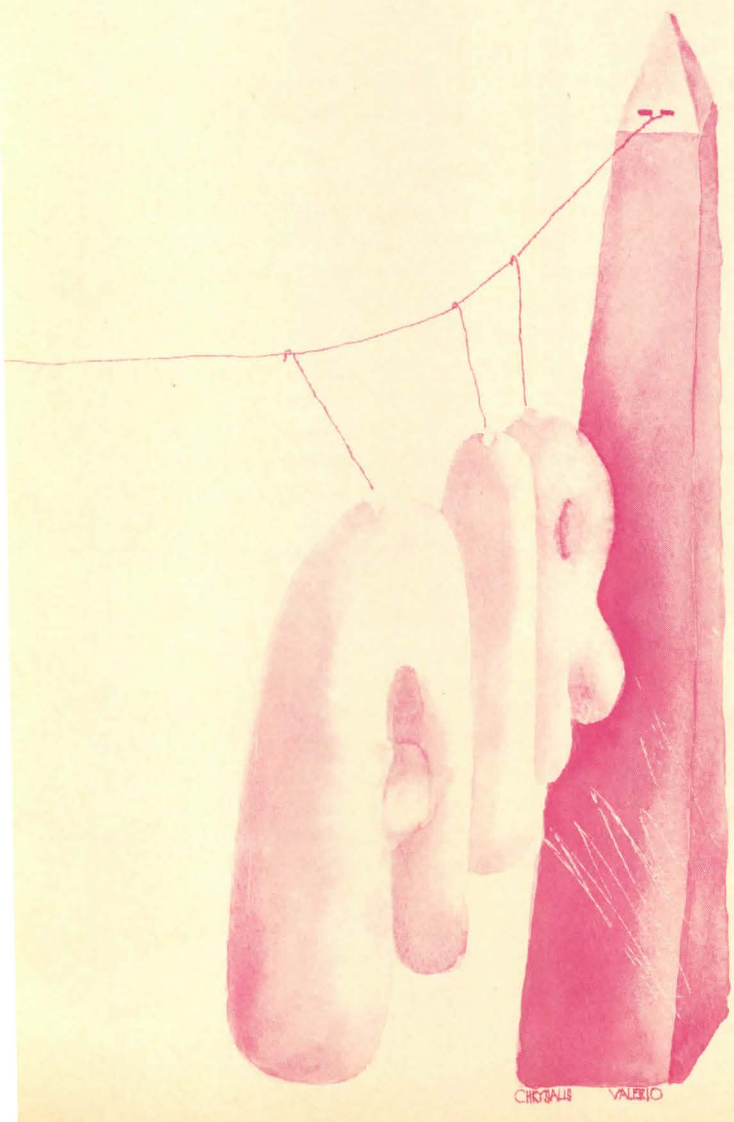
A prototype regional information center for the American Association for the Advancement of Science is also being developed by Valerio. Intended to show how science and technology are solving certain problems in given areas, the centers will probably make use of the air structures in several ways. Under investigation are their uses for circulation control, air supported display booths and projection screens and, generally, anything possible only with air structures.

When an exhibit by the U.S. Information Agency on manufactured buildings is assembled, another Chrysalis product will be included. "Pneudome," a packaged air supported structure will take its place "right in the middle of all the worst stuff in packaged buildings," Valerio says. "Pneudome" is designed for general use as a vacation house, a small commercial building or any function for which quick, movable space would be an asset, and it sells for $1900. It is seen as an introduction of air buildings to people, and acceptance of the structure for the USIA exhibit, plus exposure in Playboy, will surely accomplish that.

Along with these projects, Chrysalis has produced such diverse things as an inflated child's playpen and a reflective inflated movie set, each posing different problems to be solved by the "resources." They are working on many things, including an air supported toy that a person can get into to walk



Two Chrysalis visions (above) for "an instant monument" for The Mall, Washington, D.C.," between the Capitol and Lincoln Memorial." Huge inflated letters were an actual proposal for a sign in Florida, but costs caused reconsideration. Drawings and watercolors by Chrysalis' Joe Valerio.



across water. They have tried single-skin structures on water, but feel that a double skin—like an air-supported tank tread—is necessary for control.

Chrysalis' interest in air structures, therefore, is based on the ability of the bubble to adapt, its speed of erection, its dynamic possibilities and its alterability. With each "Pneudome" goes a note informing the buyer that he can send it back to Chrysalis for alterations. Try that with your average prefab.

It is evident from all of this that the concept of membrane structures has taken on a number of aspects. Some manufacturers of air structures are peering around the flap of their tents to see if, maybe, there's a bigger market out there somewhere. A few, sure of it, are producing new materials in answer to codes and problems of material life. As in most fields, some may be overselling and overproducing, limiting their view to existing uses and problems at hand. It should be clear, however, that some very important problems have been solved by technology. As REDE's paper said, technology has neither positive nor negative virtue, but a value can be attached to its use. It remains to be seen whether market, technology and environment can "get it all together" on a mutually beneficial path. [*JM*]

Photography: p. 77 courtesy of Haus-Rucker-Co.; p. 81 courtesy of Birdair Structures, Inc.; pp. 85, 86 Norman McGrath; p. 87 Environmental Communications, Chrysalis.

Specifications clinic

CSI standards for performance specifying. Part I

Harold J. Rosen, PE, FCSI

Two recently released CSI documents emphasize the relationship of performance specifying to systems building rather than to traditional design and construction

Two CSI documents related to performance specifications have been published as of May 1972. MP-2D, "Organization and Format for Performance Specifying," establishes a format and standards for performance specifying. MP-3F, "Performance Specifications," provides definitions, advantages, disadvantages and guidance for the preparation of performance specifications.

It might be well to point out that the traditional concept of performance specifications, i.e., specifying end results, while still inherent in the CSI documents, is no longer recognizable since both documents emphasize the relationship of performance specifying to systems building rather than to traditional design and construction.

In the November 1969 issue of P/A, this column was devoted to Systems Building and Performance Criteria. It indicated that systems building would require the establishment of parameters for performance characteristics so that subassemblies and components could be specified on the basis of structural adequacy, fire resistivity, sound transmission and other characteristics.

CSI document MP-2D is a format for performance specifying that is a consensus based upon previous work performed by California School Construction Systems Development (SCSD); California University Residential Building Systems (URBS); Florida Schoolhouse Systems Project (SSP); Toronto Study of Educational Facilities (SEF); National Bureau of Standards and GSA Office Building Project (NBS/GSA). All of these projects were based upon a systems building approach with performance specifying at its core in order to achieve new breakthroughs in methods and assemblies.

The key to the performance specification format is the recognition that the standard 16 Division CSI format cannot serve the needs for specifying building systems. In lieu thereof the format provides three major elements: Subsystems, Attributes and Aspects.

The Subsystems comprise any major components or assemblies such as structure, roof, partitions, ceilings, electrical, floor finish, casework and fire protection, which have, in fact, been utilized by the previous performance specified work of SCSD, URBS, SSP and SEF. These Subsystems are not specified under the normal CSI Division format since they may be an assemblage of many components. Although Division 13 might serve as a basis for specifying these Subsystems, the requirement for specifying the Attributes and Aspects makes this a more cumbersome approach.

The Attributes are the qualities or properties that one would employ in arriving at the performance characteristics for the components. These in turn are arranged under four major headings; namely, Safety, Functional, Sensible and Practical. The Attributes have been derived from the British document D.C. 9 published by the Ministry of Public Building and Works entitled "Performance Specification Writing for Building Components."

The Attributes are essentially a checklist which the designer, specifier or project manager would use in determining the performance characteristics of the proposed assembly or component. For example, under the heading Safety are included such parameters as Life with subheading of flammability, smoke production, toxicity, radiation and hazardousness. Under the heading Functional are properties such as Strength with subheadings of static, dynamics, wind, seismic, thermal and internal. Under Sensibility are subheadings such as Aesthetic, Environmental, Measurable and Physical, each with parameters to be specified on a performance basis. Under Practical are items such as Cost, Interface and Service. While approximately 100 Attributes are listed, it is not necessarily an all inclusive checklist of performance criteria. For some components some Attributes will not pertain; for others, some additional Attributes may have to be envisioned and developed by the design team.

The Aspects constitute four basic steps to convert a desired Attribute into specification language. These are requirement, criterion, test and evaluation.

The key to performance specifying is the Attributes. In descriptive specifications the specifier uses known products for which there are either reference standards or manufacturers recommended specifications. In specifying performance or end results, the process is much more difficult since the specifier in breaking new ground must have the foresight to specify all of the parameters of a component or an assembly to assure that nothing is overlooked.

The CSI documents are a comprehensive tool in that the task force that developed the criteria have apparently used the best current information available from work already performed by others.

A still larger question looms about the capability of the individual or team charged with the responsibility for developing performance specifications for building systems. No one individual is capable of defining all of the criteria essential in preparing a performance specification—witness the specification for the capsule used for the space flight in which three astronauts died in flames in seconds because of the flammable finishes. Even though the Attributes serve as a checklist, one must be thoroughly versed in many disciplines in order to master the development of a performance specification. Next month we will address ourselves to that problem.

Author: Harold J. Rosen is Chief Specifications Writer of Skidmore, Owings & Merrill, New York City.

Opryland U.S.A...

Where every day is Saturday night!

Nestled in the Tennessee hills, a few miles from downtown Nashville, is a unique entertainment complex—Opryland U.S.A.

Here thousands of visitors are singing and stomping their feet to five large musical shows. All this while their children sweep across the tree tops in the Timber Topper, plunge down the log flume into a tranquil lake, or enjoy the smoke and cinders of a live steam train. Appetites are assuaged in quaint restaurants with Country, Southern, Folk and Mexican foods.

In 1974 a new grand Ole Opry House will seat 4,400 in air conditioned comfort amid 369 acres of trees, flowers, brooks and lakes which ring perpetually with the notes of America's native music.

While dedicated to preserve the old, there is nothing antiquated about the appointments of the beautiful buildings and restaurants of Opryland U.S.A. Just as in America's finest hotels and office buildings—everywhere that demands good looks, good taste and good performance—selection of Sloan Flush Valves is a matter of course. Dramatically restyled, with totally new contours, the new regal appearance of Sloan Flush Valves reflects the traditional quality that has sustained their leadership for over sixty years.

Want your new building to have the finest in quality with beauty unsurpassed? Assure it by making Sloan Flush Valves a must in your plans.

SLOAN VALVE COMPANY
10500 Seymour Avenue • Franklin Park, Ill. 60131

Common law copyright

Bernard Tomson and Norman Coplan

Does the filing of plans with the building department amount to publication and thus terminate the architect's common law copyright? A recent New York State case gives the answer to this question

The architect's right to be safeguarded against appropriation of his plans by other persons is protected by what is known as common law copyright. As a creator of a unique intellectual product, the architect has a property right in any architectural plans that he prepares, and until such plans are "published" no other person may, without authorization, use them without becoming liable for their use. The "publishing" of architectural plans, which loses for the architect his special property right in them, is a term of art meaning some act which renders the plans common property. The most common area of litigation in this field revolves around the question of whether or not the plans have, in fact, been "published."

Several jurisdictions have ruled that the filing of plans with the Building Department amounts to their publication so as to terminate the architect's common law copyright. In more recent years, however, courts in California (*Smith* v. *Paul*) and in Massachusetts (*Edgar H. Wood & Associates, Inc.* v. *Skene*) have rejected this rule, concluding that the filing of plans with the Building Department does not constitute such a publication as will deprive the architect of his property right in the plans.

That this field of law is changing is illustrated by decisions in New York. In 1903, a leading decision was promulgated by a New York court (which was followed until 1972), involving the common law copyright of an architect in his plans. In the 1903 case, *Wright* v. *Eisle,* an architect had prepared plans and specifications for a residence and filed the plans with the Building Department in order to secure a building permit. The house was eventually erected and the architect was paid in full. A person unconnected with either the architect or the owner desired to have a similar house built. He secured the services of another architect who substantially copied the plans of the original project. When the original architect sued for breach of his common law copyright, the court dismissed his complaint, stating that by filing the plans with the Building Department, the architect had lost his common law copyright and had no recourse against those plans being copied.

The above decision stood as the law of New York until a few months ago, when the courts of New York were called upon to decide a similar question in the case of *Shore v. Williamsville Manor, Inc.,* 330 N.Y.S. 2d, 623. The facts, as found by the court in that case, were that in 1964 the architect had prepared plans and specifications for the construction of an apartment building pursuant to a contract in which it was expressly stated that he retain all property rights in the plans. The copies of the plans and specifications were filed by the owner in the office of the Village Clerk as required by the village law, and construction of the building commenced. The following year, when the building was approximately 60 percent completed, the owner defaulted in its mortgage payments and the premises were acquired by a mortgagee in a foreclosure action. The defendant purchased the property in 1966 and completed the building without using the services of the architect or paying him for past services. The architect sued the new owner for damages because of the alleged unauthorized use of his plans in violation of his common law copyright therein. The trial court dismissed the complaint, holding that the filing of the plans with the Village Clerk constituted "publication," resulting in the loss of the architect's common law copyright. Upon appeal, the Appellate Court reversed this finding and awarded damages to the architect. The Appellate Court stated:

"An architect has a common law copyright in plans prepared by him and may maintain an action against anyone using them without his consent until by publication they become the property of the general public ... 'It is a fundamental rule that to constitute publication there must be such a dissemination ... among the public, as to justify the belief that it took place with the intention of rendering such work common property.' ... A limited publication made under restrictions limiting the use of the subject matter to some definite purpose does not result in surrender of any right inconsistent with such limited purpose. ... The burden of proving that there has been a dedication to the public by publication is on the defendant. ...

"In our opinion it cannot be held on this record that plaintiff intended to render his plans common property by permitting them to be filed in the office of the Village Clerk. Such filing was a limited publication made for the definite purpose of securing a building permit and did not result in the surrender of any rights inconsistent with such limited purpose. 'It is not the purpose of the filing requirement to facilitate and permit architectural plagiarism, or enable one to obtain free of charge the benefit of another's work.' ... 'The architect derives no profit from the deposit of his plans with the building department. He does not thereby sell his work and has no intention of dedicating it to the public.' ... The above cases correctly state the rule to be followed in this appeal and we reject the contrary holding in Wright v. *Eisle ..."*

Authors: Bernard Tomson is a County Court Judge, Nassau County, N.Y., Hon. AIA. Norman Coplan, Attorney, is Counsel to the New York State Chapter of the AIA.

LIABILITY?

ADVANTAGES OVER ROOFING BOND?

EXCLUSIONS?

COVERAGE?

COST?

OWNER BENEFITS?

Answers to your Questions about the new Barrett roof inspection & service program.

Recently, we conducted a series of interviews with architects all across the country to determine their awareness of the advantages and benefits the new Barrett Roof Inspection and Service Program offers to building owners. The questions and answers on the following pages represent a composite of these interviews. We hope they will be helpful to you.

THE CELOTEX CORPORATION

Answers to your Questions about the new Barrett roof inspection & service program.

NO MONETARY LIMIT

Q *How does the new Barrett Roof Inspection and Service Program differ from the 20-year bond plan which has been so widely specified for so many years?*

A The most important difference is the amount of liability which Celotex assumes. The old standard 20-year bond limits the manufacturer's liability to a total of $10 per square during the entire 20-year period. Under the new program, there is no limit to the amount Celotex will pay, during the entire period of the contract, to correct leaks due to causes covered in the contract.

Let's use a practical example to illustrate the difference. You have a 20,000 square foot roof. A series of leaks develops and it is determined that the roofing manufacturer is to pay the cost of repair. Under the old bond plan, our maximum liability is $2,000. When that $2,000 has been expended, there is no further monetary liability, regardless of the bond issue date. Under the new contract, Celotex would pay for repair of all leaks covered, during the full period of the contract.

The new program also differs from the old bond plan in period of coverage, in cost, and offers additional inspection service.

Q *What is the period of coverage under the new program?*

A The contract covers a period of 10 years. It also gives the owner option to renew for an additional 10 years, if he makes recommended corrections and preventive repairs to the structure and to the roof, which our inspector determines are necessary to put the roof in satisfactory condition for continued good performance. This feature provides a valuable service which the bond did not offer: at no cost, at the end of 10 years, the building owner receives a roof inspection and recommendations which conceivably could help him avoid costly trouble. He can then elect to renew or not renew the contract.

$3 PER SQUARE FOR FIRST 10 YEARS

Q *What does the building owner pay for coverage under your new program?*

A Cost for the initial 10 years is $3 per square. Cost to renew the contract for a second 10-year period will be two-thirds of the charge for the initial 10-year period in effect at that time.

Cost of the new program, for the initial period, is the same as the current cost of the old 20-year bond—yet the new plan provides additional inspection service and has no monetary limit on leak-repair costs. When compared to the cost of the bond and to the cost of independent inspection services—which do not provide monetary guarantee in case of leaks, or continuing inspection service—our new program is obviously the best investment of all.

Q *How does the owner benefit by renewing the contract for a 10-year period? Why not just make recommended repairs, if any, and save the cost of renewing?*

A If no problems are indicated, he may be saving money by not renewing. If he renews, however, he gets all the original benefits for another 10 years: unlimited manufacturer liability in case of leaks due to covered causes; free inspections should leaks occur; and free inspection and recommendations, on request, when alterations or additions are contemplated.

Q *What other services and inspections are included in the new program?*

A To begin with, on request, a qualified Celotex representative will review plans and specifications, attend pre-job meetings, and make recommendations. During application and after completion, inspections will be made and notice of inspection will be sent to the architect or owner. When the roof is two years old, another inspection will be made. And we'll make the 10-year inspection and recommendations, if requested, at no charge, even if the contract is not renewed.

COVERS MATERIALS AND APPLICATION

Q *Does the Celotex liability apply to repair of leaks caused by faulty application, as well as to leaks due to defective roofing materials?*

A Yes. The new contract clearly states that Celotex will pay all costs of repairs necessary to correct roof leaks resulting from errors in workmanship of roofing contractors in applying Barrett roofing membrane and flashing materials. It also covers leaks due to failure of those materials resulting from usual and ordinary wear and weather. This liability does not apply to errors in building design or construction.

Q *Does your guarantee include expansion joint covers?*

A Yes, it includes the Barrett Expansion Joint Shield when installed in conjunction with a roof that is covered by our contract. It does not cover any other expansion joint cover even though that cover is installed by a Barrett Approved Roofing Contractor on a roof where Barrett roofing membrane and flashing are covered. To our knowledge, Celotex is the only manufacturer offering a guarantee-type plan that includes an expansion joint cover.

Q *If I specify a reputable brand of roofing materials, and the general contractor retains a reputable roofer, isn't that sufficient assurance of good roof performance? Why should my clients spend the additional $3 per square?*

A It is true that under those conditions you minimize the risk of leaks due to faulty materials or application. Our roofing materials are produced totally by machine under quality control methods, and there is very little risk of their failing. On the other hand, application of these materials is largely manual and the chance for leaks due to human error is far greater.

No matter how good the roofing contractor's reputation is, or how dedicated he is to doing a first-class job, one of his workmen can make an error, or fail to follow an instruction, or neglect to follow some requirement of the specification, and a leak can result. The Barrett contract protects the owner against cost of repairing leaks resulting from this situation.

As with most types of insurance, the buyer hopes he will not have to collect, but the nominal cost makes it a wise investment in protection.

OFFERS MOST RELIABLE PROTECTION

Q *Does your on-the-job inspection insure proper application and adherence to specifications?*

A Certainly the purpose of our inspections is to assist the contractor in making sure the roof is being applied as specified. No inspection, of course, can include every minute of time for every workman and every square foot of the roof during application. An error can occur on any roof, no matter how diligent the inspector. Under our program, chances for these errors are minimized in two ways: (1) the two-party inspections, ours and the contractor's, (2) the fact that only Barrett Approved Roofing Contractors are authorized to apply our guaranteed roofs. Contractors must meet the highest industry standards to qualify for approval.

Q *Why should the building owner buy an inspection and service contract to protect against the possibility of leaks due to faulty application? Doesn't the roofing contractor bear a responsibility for good workmanship?*

A In some localities the roofer has a written obligation to repair leaks due to faulty application during the first two years after completion, but no liability of any kind after the first two years. Some roofers accept responsibility for their work for two years or even longer, but do not enter into a written agreement. In short, there is no standard industry practice. During a 10-year period, a roofing firm may change management and policies.

Experience has proved that the most reliable protection for the building owner is a long-term guarantee by an established roofing manufacturer. Barrett introduced the roofing bond in 1916, and all major manufacturers adopted the same type of plan. We have paid out many millions of dollars to owners of Barrett-bonded roofs for repair of leaks. This new Barrett Roof Inspection and Service Program is an updated version of the bond plan, with additional owner benefits.

Q *One of our large clients has thousands of squares of built-up roofs installed annually. Wouldn't it be to his advantage to set up a $3 per square reserve fund for possible repairs, rather than buy your inspection and service contract?*

A It could work out that way. He may never have to spend any money for repairs due to faulty application or materials, and he would have saved the contract fee. On the other hand, one serious leak problem could wipe out his entire fund. What you are suggesting amounts to an underwriting plan with very little leverage. There would be no opportunity to spread repair costs against fees from a large number of owners as is normally done under insurance-type programs. Being his own underwriter could end up being a very uneconomical choice.

TYPE OF LEAKS NOT COVERED

Q *What types of leak problems are* not *covered by your contract?*

A The contract plainly states that Celotex is not liable for leaks or damage caused by: natural disasters such as hurricanes, hail or windstorms; or by structural failures; or by changes in building uses unless approved in advance by Celotex;

(CONTINUED)

(SEE PRECEDING PAGES)

Answers to your Questions about the new Barrett roof inspection & service program.

or by additional installations on or through the membrane, or repairs to roofing or flashing membrane, after completion, unless accepted by Celotex. Nor is Celotex responsible for damage to interior, building contents, roof insulation or deck over which roofing membrane is applied.

Q *How will it be determined whether a leak is due to errors in application, faulty materials, structural movement or other causes?*

A When we are notified that a leak has occurred, a Celotex representative will inspect the roof. The architect and owner may be present or represented. In most cases, the cause of leaks will be readily apparent. For example, leaks through openings in the plies in an area where there is no evidence of structural movement, or leaks through blisters which may have ruptured due to drying out, would be ascribed to improper application and cost of repairs would be paid by Celotex. If the trouble is due to structural movement, evidence is usually equally apparent. If a flashing has broken away from a wall in which there are severe cracks, the cause is obviously building movement and is not covered.

Q *Do other roofing manufacturers offer this new-type contract?*

A A number of other major manufacturers offer inspection and service contracts that are close enough to the Barrett contract to qualify for acceptance in your "or equal" specification. The cost, periods of coverage, and renewal options are essentially the same. There is, however, one notable exception: the Celotex guarantee is the only one, to our knowledge, that includes an expansion joint cover—the Barrett Expansion Joint Shield.

OLD-TYPE BOND STILL AVAILABLE

Q *Does Celotex still offer the old-type roofing bond?*

A Yes. Even though we strongly feel that our new Barrett Roof Inspection and Service Program is a far better program for building owners, we will continue to offer the bond as long as necessary from a competitive standpoint. Also, many existing specifications calling for "bonded roofs" were written before the new program was developed, and Barrett Approved Roofing Contractors must be kept in position to bid these jobs.

IF ROOF INSPECTION AND SERVICE PROGRAMS WERE FREE . . . chances are that architects and building owners would insist they be included in *every* specification. Therefore, the added cost would seem to be the determining factor in deciding whether or not guarantee-type coverage should be specified. *What is the added cost* of the Barrett Roof Inspection and Service Program in relation to total building cost?

	SCHOOL 2 floors 100 MSF	HOSPITAL 6 floors 180 MSF	FACTORY 1 story 100 MSF	OFFICE BUILDING 10 floors 200 MSF
Sq. Ft. Cost of Building	$24.	$45.	$14.	$18.
Total Cost of Building	$2.4 million	$8.1 million	$1.4 million	$3.6 million
ADDED COST FOR 10-YEAR BARRETT PROGRAM*				
Total at $3 per 100 Sq. Ft.	$1,500	$900	$3,000	$600
Per Sq. Ft. of Building	1½¢	½¢	3¢	3/10¢

*10-YEAR BARRETT ROOF INSPECTION AND SERVICE CONTRACT PROGRAM

The actual added cost for the Barrett Roof Inspection and Service Program is small. It is relatively insignificant in the total sq. ft. cost of the building. When consideration is given to the period covered (10 years) and the no-monetary-limit feature, the program is indeed extremely low cost protection.

We'll welcome your request to have a Celotex representative tell you more about the Barrett Roof Inspection and Service Program and supply you with data on Barrett roofing products and systems . . . "everything from the deck up."

Celotex*
BUILDING PRODUCTS

THE CELOTEX CORPORATION
Tampa, Florida 33607
Subsidiary of Jim Walter Corporation

*Trademark

Circle No. 333, on Reader Service Card

Books

Land and landscape

Building with Nature *by Richard Neutra. New York: Universe Books, 1971. 223 pp. $18.50.*

Richard Neutra believed that the individual was best served when architecture was biologically based and when the architect knew and respected man's responses to environmental stimuli. This book, first published in Germany in 1970, shortly before Neutra's death, is a pictorial record of his architecture of houses. Although Neutra designed many diverse architectural projects including embassies, hospitals, apartment buildings, hotels, churches and schools, his greatest love and the architecture he considered *the most* challenging was the individual house.

The text accompanying the photographs and floor plans tells of Neutra's relationships with clients and about his concern to design houses down to the smallest, finest detail. More significantly, however, the houses illustrate Neutra's philosophy that "the individual counts," and his goal that through his architecture he could provide a link with the natural world to enrich the lives of its users.

Civilizing American Cities: A Selection of Frederick Law Olmsted's Writings on City Landscapes. *Edited by S.B. Sutton. Cambridge: MIT Press, 1971. 310 pp. $12.50.*

The selections in this book demonstrate Frederick Law Olmsted's understanding of urban spaces and how, when politically unobstructed, he was able to manipulate them. Miss Sutton has concentrated on Olmsted's contributions to the theory and practice of city planning, and gives a broad and comprehensive cross section of Olmsted's career.

In proposing that large spaces be set aside for public parks—thus recognizing a century ago the need for extensive planning if American cities were to become civilized environments for man—and by achieving, with Calvert Vaux, what is still the miracle of Central Park, Olmsted came to grips with the problems of the cities well in advance of his time. Since he was a writer as well as a landscape designer, the book reads well. It describes his plans for such other cities as San Francisco, Buffalo, Montreal, Chicago and Boston.

Houston: an architectural guide. *Edited by Peter C. Papademetriou. Houston Chapter, AIA, 1972. 168 pp. $5.*

Of the many architectural guides to specific cities that reach this desk, this one, published in celebration of Houston's role as host city to the AIA's national convention this year, is particularly well done. A good-sized book this time, as against the pocket-sized guidebooks offered by other cities in past years, it allows for easily read maps, clear, interesting and in some cases touching photographs as well as a text that can be read without benefit of a magnifying glass.

An overview of the city itself, the buildings are shown in a particular context. As stated in the foreword "an environmental approach had to be taken, since greater Houston is not so much a city as a region.

[continued on page 104]

You never heard of a lifetime guarantee on anything?

You're hearing it now.

The FTC takes a dim view of vaguely worded guarantees, so A.W. Faber-Castell spells it out for you.

When you buy a Locktite lead holder, we guarantee it will last for the rest of your working life — even if you're still working at age 90. If anything happens to it in normal use, we will repair or replace it without charge. (Note: We said use, not abuse.) For details of our straightforward guarantee, see below.

We make this offer for two reasons: 1) because we build Locktite to last a lifetime and 2) we are hopeful it will occur to you that the company that's tops in holders has to be tops in refill drawing leads. Which means you will want to buy Castell 9030 drawing and drafting leads. 19 superb degrees, 7B to 10H. For a lifetime of drawing satisfaction see your dealer today.

For pros who prefer wood-cased pencils, our Castell 9000 in 20 superb degrees, 8B to 10H, is acknowledged the world's finest.

Write us on your letterhead for a free sample of Castell lead in your favorite degree. We'll include the bonus of a Magic-Rub vinyl eraser, non-abrasive and perfect for polyester film. A.W. Faber-Castell Pencil Co., Inc., P.O. Box 7099, Newark, N. J. 07107

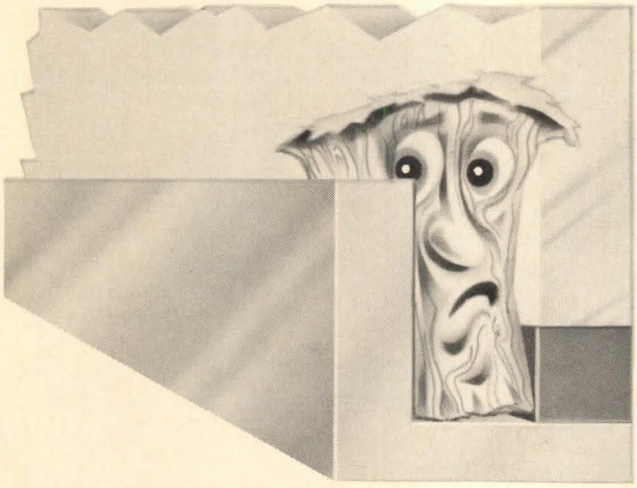
GUARANTEE

We guarantee any new lead holder imprinted "LOCKTITE" purchased after 1971 to perform efficiently in normal drawing board use for the lifetime of the original purchaser. Excluded — clutch damage caused by: improper sanding; insufficient extension of lead permitting clutch to be attacked by blades or discs of lead pointer. Also excluded: damage resulting from intentional abuse, accidents, or other unusual circumstances not connected with normal drawing board use. At our discretion we will replace either the entire lead holder or merely the malfunctioning part. This guarantee is not transferable.

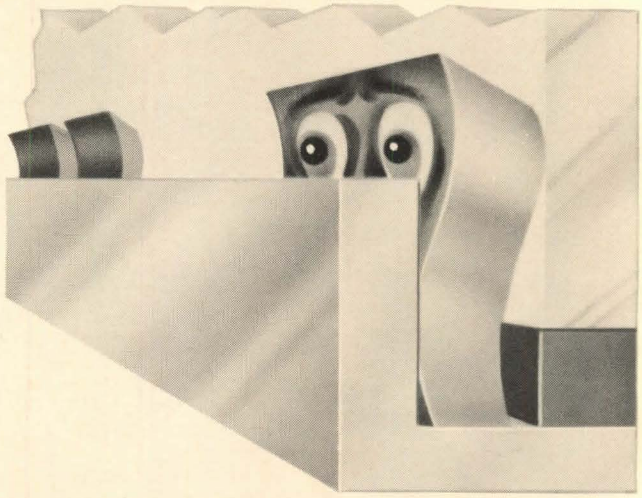
A.W. Faber-Castell
Pencil Co., Inc.

In Canada: A.W. Faber-Castell Canada Ltd.
36 Dufflaw Road, Toronto 19

To avoid glazing problems caused by faulty shimming, avoid three of these shims.



The makeshift shim. It might do the job for a while.



The misplaced shim. It can't do the right job when it is in the wrong place.

All but the Pre-shimmed Tremco 440 Tape can cause problems that might crack or break glass, or cause sealant pump-out or failure.

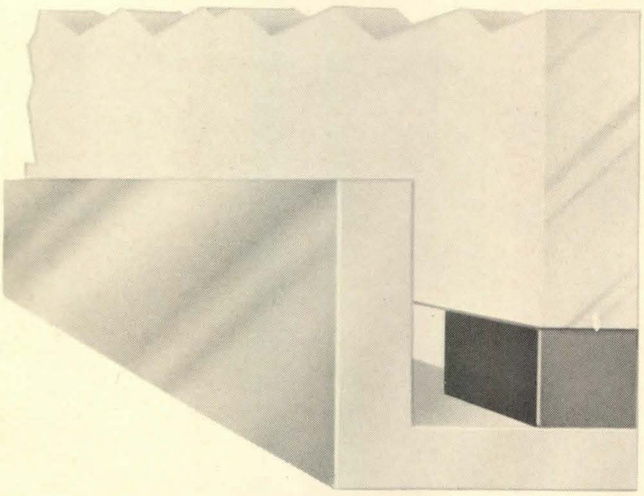
If a shim is unevenly spaced it creates pressure points which could cause glass breakage. A makeshift shim, like a splinter of wood or piece of floor tile, could cause sealant adhesive failure resulting from improper wind load transfer from glass to seal. And if there is no shim at all, the pumping action of the glass will soon squeeze out the sealant.

That's why you should specify Pre-shimmed Tremco 440 Tape. It's a highly adhesive, preformed, shrinkproof sealant with a built-in shim running through the center.

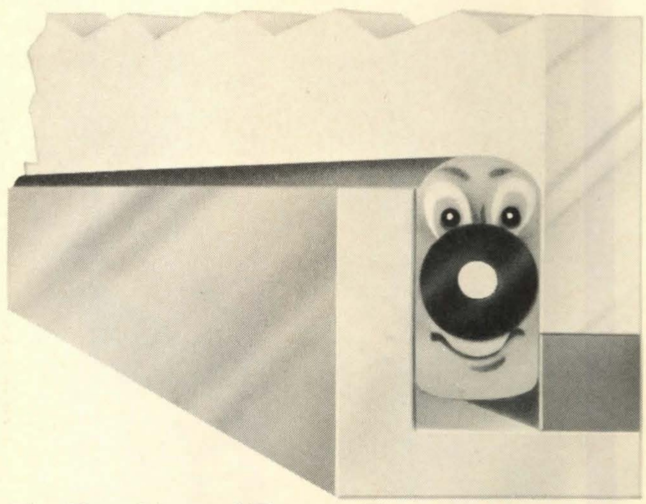
This shim – a continuous elastomeric rod reinforced by a fiberglass core – distributes loading stress uniformly around the perimeter of the frame.

So you don't get pressure points. Or sealant squeeze-out. Or adhesive or cohesive failure.

And with the trend to larger, heavier, more



The forgotten shim. Whoops. Someone forgot to put it in.



The Pre-shimmed Tremco Tape. It puts a continuous spacer-cushion all the way around the perimeter.

versatile glass, Tremco's ability to provide a leakproof glazing system from a variety of compatible components is more critical than ever.

For all the details on Pre-shimmed Tremco 440 Tape, see your Tremco man. In fact, your Tremco man has the answer to any sealant problem. Because for over 40 years now, solving sealant problems has been our primary business. In addition to our exclusive glazing systems, we have over 15 basic sealant formulations for construction joints . . . including such familiar names as MONO (our job-proven acrylic terpolymer), DYmeric (the Tremco-developed polymer), and Lasto-Meric (our polysulfide).

Contact your local Tremco representative, or write: The Tremco Manufacturing Company, Cleveland, Ohio 44104, Toronto 17, Ontario.

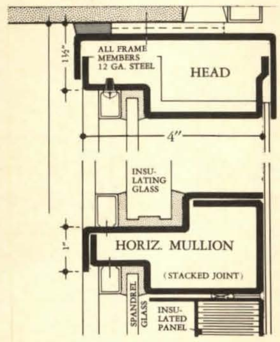
TREMCO
The water stoppers

Circle No. 373, on Reader Service Card

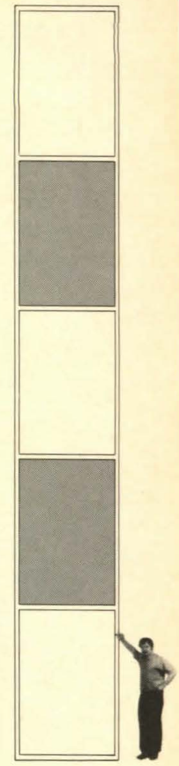
HOPE'S

How Hope's Serves the Creative Architect

This three-section building for Standard Oil Company (Indiana) typifies the large scale, highly specialized project on which Hope's reputation for quality custom work has been built. Wigton-Abbott Corporation, designers and constructors, specified installation of more than 180 monumental size steel custom windows by Hope's. Constructed of 12-gauge pressed steel members, the fixed windows are 30 to 35 feet high and over five feet wide. The installation provides an intriguing example of pressed metal's broad adaptability; steel was chosen for its strength, durability, rigidity, and economy. Note that the detail of the horizontal mullion is designed to accommodate two different thicknesses of glass in the same member, while keeping the outside glass surfaces in the same plane. The attractive apppearance is enhanced by finishing frames, beads and panels each in a different color, with Hope's unusually durable Ultra-Coat finish.



The Hope's pressed steel subframes used in the Standard Oil research center were installed in five sections to accommodate three sections of clear glass, interspersed with two of opaque spandrel glass. The vertical unit, with spandrel surface covering structural framing as well as ceiling and floor construction, functions as both window and window wall. The frames, formed in a tubular shape, provide the glass with a third-dimensional framing effect. The installation typifies the individual choices available to the architect using Hope's pressed steel subframes. They are custom made to suit the requirements of each installation, offering the designer broad versatility. Frames can be designed to accommodate: ventilated or fixed windows, panels, doors, grilles, louvers and all types of glass. Ask Hope's engineers to work with you on your forthcoming construction plans. Your creative ideas provide a challenge they welcome. Hope's Windows, Jamestown, New York 14701.



WIGTON-ABBOTT CORPORATION DESIGNERS and CONSTRUCTORS PLAINFIELD, NEW JERSEY
RAGNAR-BENSON GENERAL CONTRACTOR PHOTO BY HEDRICH-BLESSING

HOPE'S WINDOWS
A DIVISION OF ROBLIN HOPE'S INDUSTRIES, INC.

Books continued from page 98

This is a situation common to the Southwest, where cities are nodes on a web of centers spread across vast areas of the country. The ultimate extent of Houston remains to be seen although the city limits are already over 450 square miles."

For the purposes of the guide, the greater metropolitan area has been divided into 15 "areas" in which a map, a brief history, a photo essay and an inventory of buildings is presented. Although particularly useful for any visitor to Houston, the guide should be of interest to city planners and architects concerned with what happens to a city that develops rapidly and whose growth is largely the story of private development.

Historic Preservation in Inner City Areas *by Arthur P. Ziegler, Jr. Pittsburgh: The Allegheny Press, 1972. 80 pp. $4.80 hardcover; $2.80 paperbound edition.*

Those concerned with the preservation and restoration of architecturally significant neighborhoods in inner city areas should find this brief book of value. Essentially an essay, it is not a philosophical treatise but a manual of specifics for developing historic district restoration programs. Chapters include: Basic steps, Revolving Funds, Creating Community Interest, Housing Low to Moderate Income Residents, Bringing in New Residents, the Problem of Neighborhood.

The author is executive director of Pittsburgh History and Landmarks Foundation.

Documents

[The documents listed below are available from the associations and agencies cited. Request for such documents should be directed accordingly.]

"Folder on Architects Working Details": *14-volume series published by the Architectural Press of London. Crane, Russak & Co., Inc., 52 Vanderbilt Ave., New York, N.Y. 10017. $8.50 each; $115 for set. Folder is free upon request.*

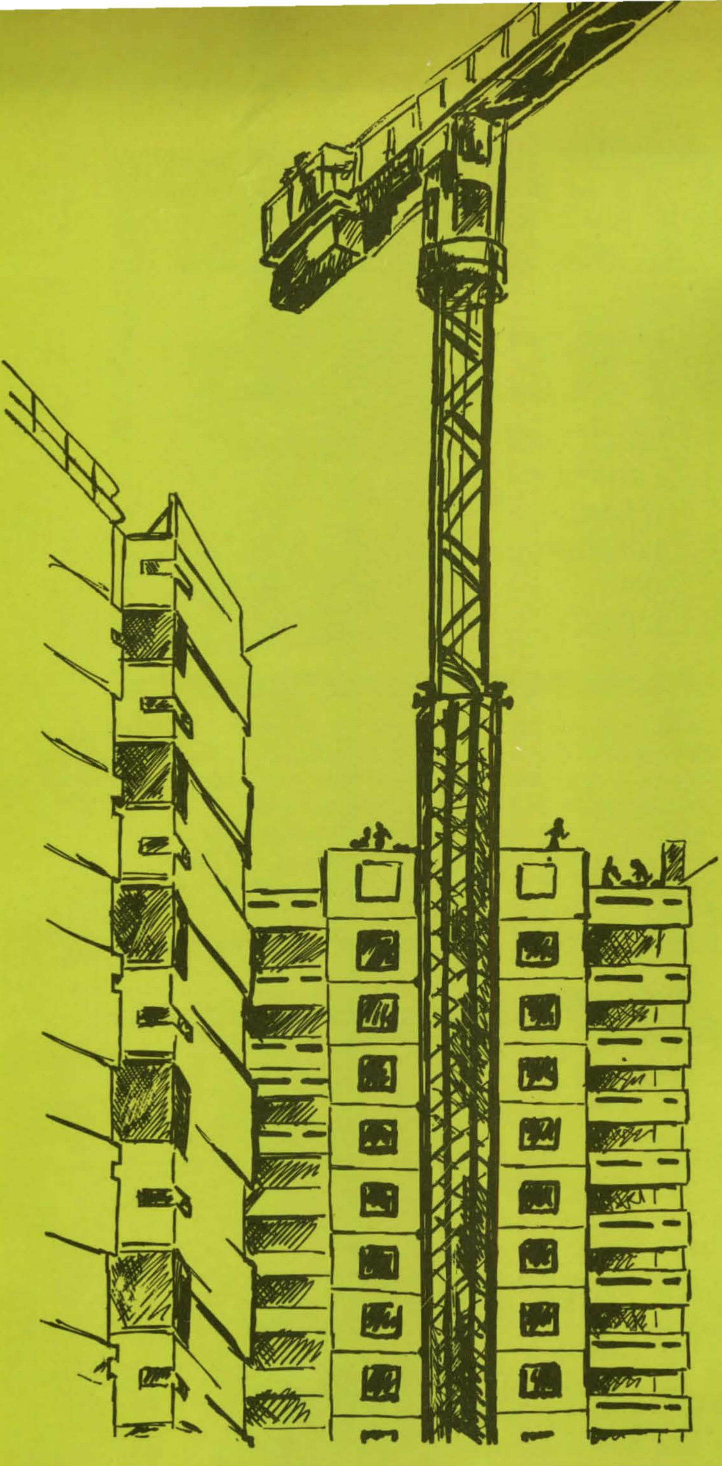
This folder describes a reference library of information and solutions to problems of architectural detailing and design. Five volumes are devoted to applications in countries outside of Great Britain—Continental Europe, the United States and Canada, Australia, Israel and Japan. Each 160-page book has over 140 illustrations and contains the ideas and applications of well-known architects throughout the world. The 14th volume includes a glossary of terms in four languages. Most of the material has appeared in the British Magazine, *Architects' Journal*.

Standards for Fiberglas Duct Systems. *44 pp. Hirsch, Arkin, Pineherst, Inc., 236 Krams Ave., Philadelphia, Pa. 19127. $30.*

Principles and procedures in sketching, fabricating and installing Fiberglas Duct Systems is described in this manual published by a firm of mechanical contractors. A 20-page section on fabrication covers tools, equipment and methods of assembly. Sketching, sheet metal accessories, hangers, bracing and a detailed description on methods of assembly and installation are also given. Methods of sketching are extensively illustrated.

Exchange Bibliographies. *Council of Planning Librarians, P.O. Box 229, Monticello, Ill. 61856. Individually priced or 20 consecutive issues by subscription, $20.*

The Council of Planning Librarians is a nationally organized group of librarians, faculty, professional planners, public and private planning organizations and others interested in problems of library organization and research and in the dissemination of information about city and regional
[continued on page 112]



Our light heavyweight

Permalite Pk • the new, compact roofing board that provides as much insulation as materials twice as thick.

Permalite Pk • increases design flexibility, sharply decreases operating costs, and reduces shipping and installation costs significantly.

Permalite Pk • combines the exceptional dimensional stability and fire protection properties* of famous Permalite Sealskin with the unmatched insulation qualities of urethane foam and a high-strength water repellent laminate.

Get the facts:

Grefco, Inc.

Building Products Division
2111 Enco Drive
Oak Brook, Illinois
60521

**Permalite Pk: Listed by FM for Class 1 Steel Deck Construction (fire and wind uplift); UL Metal Deck Assemblies Construction Nos. 1, 2 and others.*

grefco INC.

A Subsidiary of General Refractories Company

Permalite Pk*
RIGID ROOF INSULATION

Circle No. 394, on Reader Service Card

The best plans deserve Plan Hold

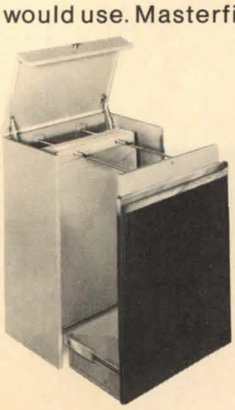
PLAN HOLD has a superior, high-efficiency product for every design and storage need.

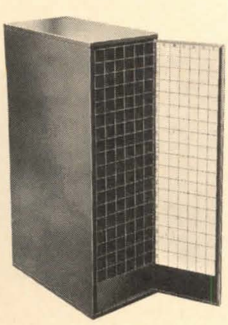
For instance, in *creating plans* our Designer II drafting table contains the key features of a fully-automatic—but at a fraction of the price. The companion Design/Desk completes the work station, and finally solves the age old problem of insufficient reference space. Design/Desk has it!

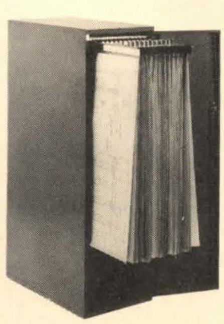
For *storing original drawings,* PLAN HOLD's Masterfile can handle up to 1,000 sheets in half the space flat drawers would use. Masterfile's vertical suspension technique keeps vellum, film or linen free from curling, smudging, and wrinkling. Filing is so easy, so quick.

For *handling prints,* PLAN HOLD's vertical binder systems can hold 1,200 sheets in just 12 inches! The binder is available in a variety of housings—mobile stands, fixed cabinets, executive furniture. Sheet for sheet, it's the most economical storage available.

PLAN HOLD has more than 150 other innovative products for increasing design room efficiency. (We could have helped the Pharaohs.)







Catalog on request.

PLAN HOLD®

TIMES MIRROR

P.O. Box 4907, Carson, California 90745

Circle No. **362**, on Reader Service Card

Circle No. **341**, on Reader Service Card


A splash of
summer sunshine
That's Eljer's Sunnygreen — the irrepressible new decorator color that's right in tune with today's decorating trends.
Eljer offers Sunnygreen in a wide selection of lavatories, toilets and tubs to brighten any bath or powder room.
Bring a splash of summer sunshine into the baths of the homes, apartments or commercial buildings you design. Ask to see Sunnygreen. Or write for our "Splash of Summer Sunshine" brochure: Eljer, Dept. PA, 3 Gateway Center, Pittsburgh, Pa. 15222.
ELJER
Eljer Plumbingware Division/Wallace-Murray Corporation

Now that all 6 window types are available in Andersen Perma-Shield® a little restraint may be called for.

Please don't get carried away and insist on including all 6 types (and shutters, yet) in your very next project.

The Andersen Perma-Shield® line is very compatible, but not, we think, that compatible. (Prove us wrong, if you like.)

But don't let sensible restraint curb your enthusiasm for Perma-Shield, and the benefits which flow from its happy combination of the qualities of wood (superior insulation, greater appeal) with a protective sheath of tough vinyl (no painting and low, low maintenance). Perma-Shield's list price is understandably often a little higher than alternatives. On-site savings close the gap.

We appreciate your enthusiasm. Go ahead and use Perma-Shield whenever you please—but just two or three types in any one project will be just fine. See your Sweet's File (Sections 8.16/An and 8.6/An), your Andersen dealer or distributor, or write us direct.

Double-hung. The Perma-Shield Narroline®, a great favorite. 44 stock sizes, up to 6′ 5⅛″ in height. Exterior surfaces of sash have a patented 4-step factory finished process; they won't need re-painting for at least 10 years.

Fixed. All Perma-Shield window types have fixed and operating versions.

Awning. Introduced with Perma-Shield Casement in 1966. A great mixer, especially with fixed windows. 12 stock sizes. Much copied, never equalled, let alone surpassed.

Andersen Windowalls®
ANDERSEN CORPORATION BAYPORT, MINNESOTA 55003

Circle No. 327, on Reader Service Card

17″ x 22″ full-color prints of this unusual dwelling, without surrounding text, and suitable for framing, are available. No charge, of course. We regret plans are not available.


Casement. The first Perma-Shield, now available in 24 stock sizes. Builders like the Perma-Shield line for its ease of installation and because it needs no exterior on-site painting.
Gliding Window. The latest in the line. Frame and sash all sheathed in Perma-Shield vinyl. 11 stock sizes. Perma-Shield is popular with all concerned, especially proud owners.
Shutters. Just out! Perma-Shield decorative shutters. 2 styles, 2 colors, 2 widths, 10 heights.
Gliding Door. Low maintenance, high security. 8 stock sizes, 2 and 3 panel. But all this talk is keeping you away from your drawing board where you could be drawing in some Perma-Shield Windows, Gliding Doors, and Shutters. But not all 6 types together, you understand?

Books continued from page 104

planning. Exchange bibliographies are published by the Council.

Enrollments and Statistics Chart. *The Association of Collegiate Schools of Architecture, Inc., 1785 Massachusetts Ave., N.W., Washington, D.C. 20036. $1.50.*

Statistical data on over 100 schools of architecture in the U.S. and Canada are offered in this chart. Information covers all departments and programs including planning, landscape, interior and building construction as well as information on costs, scholarships, admission requirements, years required, faculty ratios and other information of use to either the beginning student or one contemplating transfer or graduate work.

Recommended Practices for Cold Weather Masonry Construction and Guide Specifications for Masonry Construction. *International Masonry Industry All-Weather Council, 208 S. LaSalle St., Chicago, Ill. 60604. 50¢ for both booklets.*

Designed to prove that it is economically practical to close-in jobs and keep construction underway during bad weather, these two technical publications are designed to show how all-weather construction can be accomplished.

Reinforcing Bar Splices. *Concrete Reinforcing Steel Institute, 228 North LaSalle St., Chicago, Ill. 60601. 36 pp. illus. $1.00 soft cover.*

This second edition of the booklet on rebar splices conforms to the 1971 American Concrete Industry Building Code in presenting the most widely accepted practices in splicing reinforcement. The Institute believes that adherence to the recommendations in the booklet will ensure performance in accordance with the design requirements of the engineer and architect and will result in substantial economies.

Plywood Folded Plates, Laboratory Report 121. *American Plywood Association, 1119 A St., Tacoma, Wash. 98401. 100 pp. 25¢.*

New folded plate design data are available in a booklet that includes information needed for the design of rectangular plywood folded plates. Sections on fabrication and erection details plus an appendix with plywood section properties and stresses, a general diaphragm design summary and allowable nail loads for folded plate design are given.

Architects: Bulkley & Sazevich, San Francisco

Engineered wood products that can match your imagination

This dramatic waterfront house uses Cedar Lock-Deck laminated decking to form both structural and finished wall and roof surfaces in one imaginative application.

Potlatch manufactures wood in countless forms, as strong and versatile as they are beautiful. They open the door to a whole new world of warm, natural designs that once had to compromise beauty for practicality.

The remarkable durability of Inland Red Cedar boards and decking gives interiors and exteriors a beauty that grows with passing years. Lock-Deck decking and laminated beams of superb Southern Pine combine outstanding strength with a unique clarity of appearance. The wonderful workability of Idaho White Pine gives charm and permanence in countless solid and laminated forms, and solid hardwood panelings and floorings give durable, dramatic beauty. The wonderful world of wood is engineered to match your needs at Potlatch Forests, Inc., P.O. Box 3591, San Francisco, 94119.

Potlatch

Potlatch, the forests where innovations grow... in wood products and building materials, in paperboard and packaging, in business and printing papers.

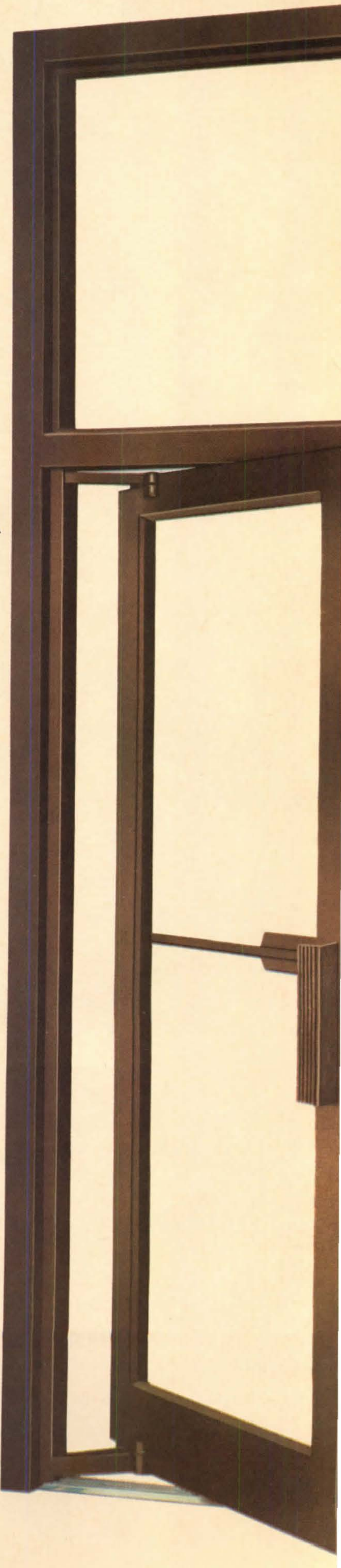
Circle **No. 385**, on Reader Service Card

Kawneer introduces

Manual Balanced Entrances

A versatile new entrance program

that adds design flexibility to the practical benefits of the Balanced Door Principle



Design options featuring exclusive 4½" frame depth

Kawneer's Manual Balanced Aluminum Entrances provide design versatility for those jobs which require maximum door control without sacrificing ease of operation. Narrow, medium and wide door styles can be installed in a narrow 4½" as well as a standard 5½" depth framing system. Now you can specify a manual balanced door and still maintain consistent mullion depth throughout your design . . . whether the desired look is an extremely slim or monumental profile.

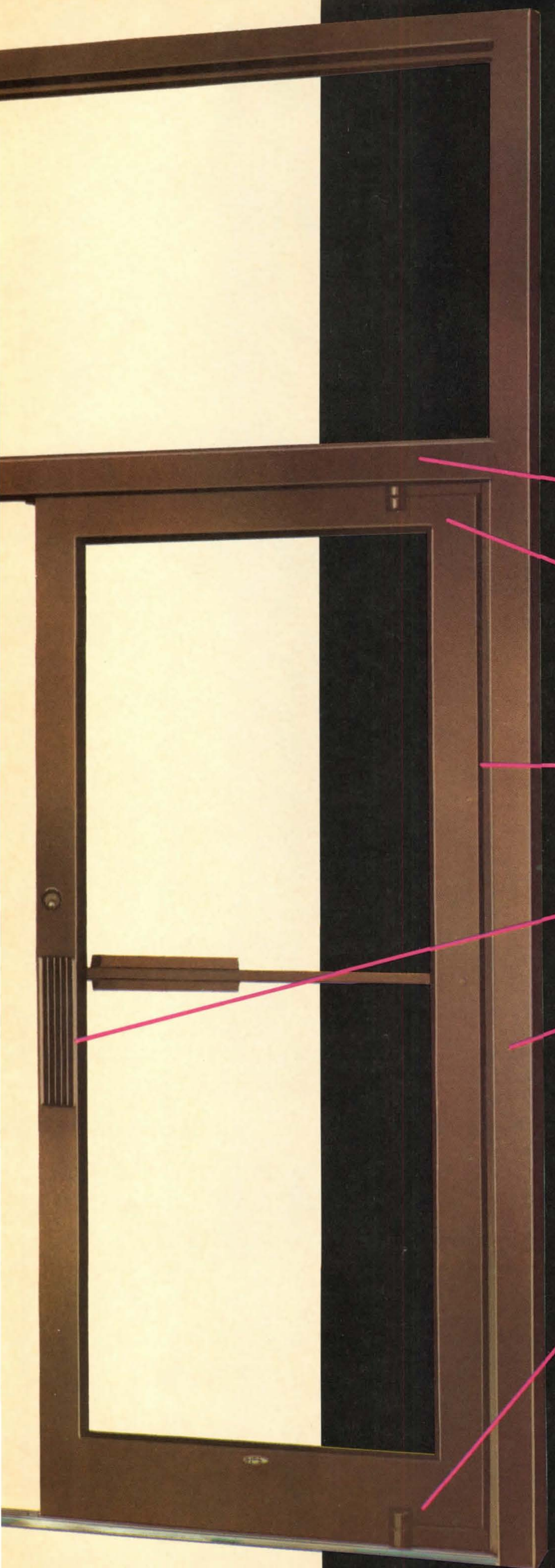
Engineered performance

Each entrance is engineered for maximum strength and durability. Doors feature rugged dual-moment corner construction, self-aligning pivots with spring-cushion backstop, and adjustable pile weathering on all four sides. Frame joinery is specially engineered to withstand abusive traffic and heavy winds. Pivot nearer door center nearly equalizes wind and stack pressures on either side—so the door rèquires less force to be opened, less pressure to stay closed.

Economical installation

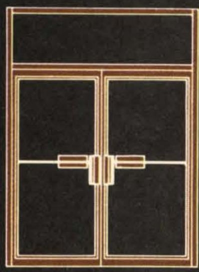
Factory fabrication and assembly of the total entrance unit insures precise alignment of moving parts and quality workmanship throughout. Elimination of time-consuming and costly jobsite fabrication and assembly holds installation costs to a minimum.

Circle No. 349, on Reader Service Card

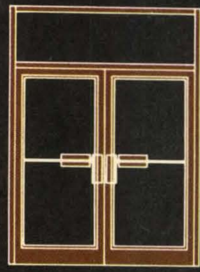


Design flexibility

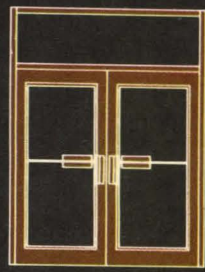
The Manual Balanced Entrance Program allows choice of any of these three basic door types. Each can be combined with 1¾" x 4½" standard framing for the slimmest appearance in the architectural aluminum industry. Or with 2¾" x 5½" framing to achieve maximum structural qualities.



'190' Narrow Stile Door



'350' Medium Stile Door



'500' Wide Stile Door.

Concealed Overhead Closer

Adjustable closing and latching speeds and adjustable spring tension keep door operation consistently smooth.

Rugged Dual-Moment Corner Construction

The combination of four sigma deep penetration welds plus mechanical fastening at all corners provides exceptional door strength.

Adjustable Pile Weathering

A perfect fit can be obtained on all four sides of the door to assure maximum resistance to air and water infiltration under the most severe conditions.

Hardware Options

Various designs and color combinations of push-pull hardware are available to complement the entrance design.

Available in Permanodic® Hard Colors and Clear Finish

Entrances are available in hardcoat PERMANODIC® finishes of medium bronze, dark bronze, and black or in Alumilite clear finish. Extruded aluminum balance arms and pivots can be anodized to match the entrance finish. Stainless steel pivots and arms are optional.

Balanced Pivoting Mechanism

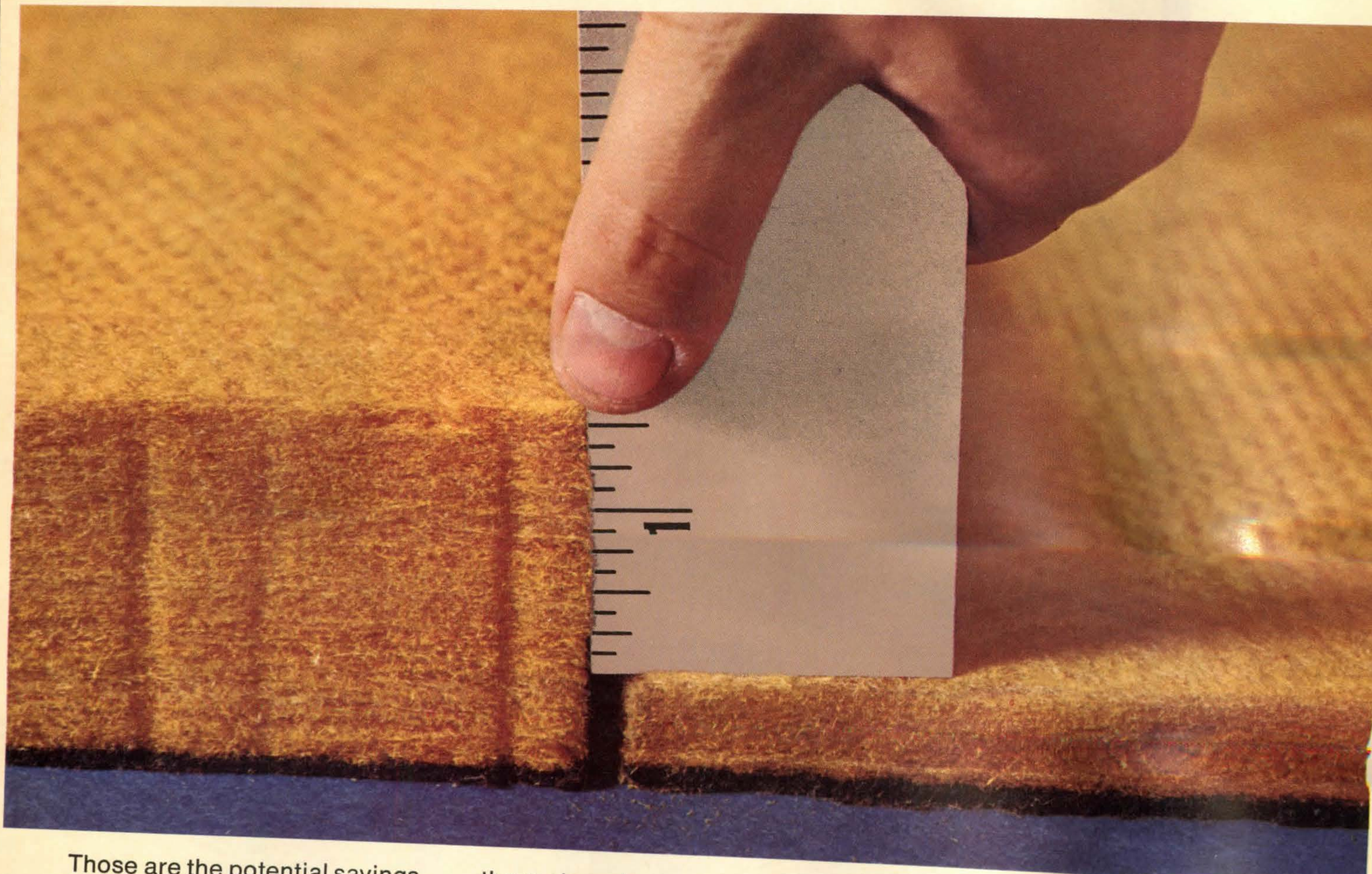
Self-aligning pivots at all points of rotation and a spring-cushion backstop insure years of trouble-free operation.

KAWNEER
ARCHITECTURAL PRODUCTS
AMAX
ALUMINUM

1105 North Front Street
Niles, Michigan 49120


Coastal States
Coastal States

Efficient building idea: Use this much more Fiberglas roof insulation and save up to $27,000 every 60,000 sq. ft.



Those are the potential savings you could realize on the initial cost of heating and cooling equipment. Your client could also save an additional $2500 a year on fuel.

Simply by using 2¼″ instead of ¾″ of Fiberglas* roof insulation.

These particular savings were figured for a suburban office plaza in the northern climates (zone 1). Factors taken into account were: the normal temperature range of the region, size and type of roof deck, the "U" improvement due to thicker insulation. And the added cost of the thicker insulation.

How much can you and your client save by using 2¼″ insulation?

Send for our free booklet "Raising the Roof." It'll show you how to figure your own savings for your section of the country for common types of roof decks.

Write Mr. A. D. Meeks, Architectural Products Division, Owens-Corning Fiberglas Corp., Fiberglas Tower, Toledo, Ohio 43659.

Energy Conservation Award

Owens-Corning is offering awards to stimulate new designs and ideas for conserving energy. Special Steuben sculptures will go to the three architects or engineers who—according to a panel of independent judges—do the best job of designing buildings that don't waste fuel. For details, write to Mr. Meeks at the above address.

Owens-Corning is Fiberglas

OWENS/CORNING FIBERGLAS TRADEMARK ®

*T.M. Reg. O.-C.F. Corp.

Circle No. 356, on Reader Service Card

Notices

Appointments

Upshur, Riley & Bultman, AIA, Columbia, S.C. is now Riley Bultman Coulter Associates, with the addition of Richard R. Coulter as a partner.

John F. Larkin, AIA, has been appointed vice president and technical director of Seri/Kling International, in Paris, France, a subsidiary of The Kling Partnership.

Richard G. Wiedemann and Norman S. Fott have been named associates of Schwarz, Henmi & Zobel, St. Louis, formerly Schwarz & Henmi.

Peter Nottonson has been named administrative assistant to the director of design for Ritchie Associates, Inc., Chestnut Hill, Mass.

The Office of Carl R. Blanchard, Jr., FAIA, New Haven, Conn., is now Blanchard & Tillinghast, Architects, with the admission of Stuart Tillinghast, AIA, as partner.

George S. Hammond has been appointed assistant to the president of Welton Becket & Associates, Los Angeles.

Tomblinson, Harburn & Associates, Inc., Flint, Mich., is now Tomblinson, Harburn, Hanoute & Associates, Inc. with the addition of David L. Hanoute, AIA, and Gerald J. Yurk, AIA, as principals.

Dr. Warren W. Yee has been elected chairman of the board of Harley Ellington-Pierce Yee Associates, Detroit and Southfield, Mich. Ralph Pierce has been elected president and chief executive officer.

Alden B. Dow has been elected chairman of the board of Alden B. Dow Associates, Inc., Midland, Mich. H.C. Allison has been elected president and treasurer.

Peter J. Protzmann has joined the interior space planning group of Neuhaus & Taylor, Houston, Tex. I.M. Durham, Jr., Henry C. Hwang, Paul M. Terrill and James L. Pilkington were named partners. George R. Thompson was named associate partner and Alfred Z. Carvajal was named associate.

Michael J. Koenen has been elected vice president and director of planning for John Carl Warnecke & Associates, New York City. Emilio Arechaederra has been named vice president and director of office buildings.

Otto H. Kilian, AIA, has been elected executive vice president and a member of the board of directors of Charles Luckman Associates, Los Angeles, Calif.

Richard L. Pearce has been appointed
[continued on page 128]

HERE'S AN ATTRACTIVE / PRACTICAL SOLUTION TO THE WRAPS PROBLEM IN THE MODERN CLASSROOM

SCHOOLINE SEMI-CONCEALED WARDROBES

do away with the costly, inconvenient nuisance of a cloak room—the slamming, banging, finger pinching of closet doors—the unattractive clutter of open shelving and, instead, give a completely flexible hidden-from-view wraps and storage system.

Each double wardrobe unit accommodates 16 pupils, is constructed to give long trouble-free service and as an extra bonus, provides 21 sq. ft. of colorful tackboard or chalkboard. Matching teacher's closet, storage cabinet, and sink units are available and can be combined to meet your special requirements. For a more complete story write for our catalog SL 510.

Vogel-Peterson COMPANY

"The Coat Rack People"

ELMHURST, ILLINOIS

Circle No. 378, on Reader Service Card

Wash your hands of expensive water bills.

A seven-month test recently concluded in New York showed that water consumption, both hot and cold, was cut by 90% when Unatap spray mixing faucets were used instead of conventional faucets on ordinary wash basins.

While maintaining a hygienic spray of water, the flow-governing mechanism that's the heart of every Unatap faucet cuts wasteful water consumption.

That also means a saving on water heating, a major factor in operational costs. And even installation costs because the entire water distribution system is scaled down to meet the drastically reduced hot and cold water demand.

Specify Unatap for the next job. With Unatap, you can wash up without pouring money down the drain.

Richard Fife Inc.

1140 Broadway, New York, N.Y. 10001 Phone: (212) 683-0745

Designed

FACTORY FLOORS by Jennison-Wright

ood block floors are often "taken for granted." ey're known for their many unique qualities (see nel at right), but not completely understood. To ly understand them requires living with them as have for over 60 years. We know, and would like prove to you. that properly pre-designed Kreolite® d Grain Wood Block Floors can serve many of ur traffic and production problems and make life autiful for you and all of your associates. Let us eplan your floors so that none of their advantages l be overlooked. This is part of our service.

ADVANTAGES OF KREOLITE® FLOORS:

1. Easy relocation and concealment of service lines to machinery.
2. Speed and economy of replacement in aisles and other heavy wear areas.
3. Special finishes for absolutely dust-free surfaces.
4. Versatility in providing for in-floor conveyor systems, tow-lines, etc.
5. Measurable contributions to noise abatement.
6. Easy installation of oil dispersal and/or recovery systems.
7. Traditional properties of comfort through insulation.
8. Non-sparking surface in volatile areas.
9. Reduction of damage to dropped tools and products.
10. Priced for profitable production.

JENNISON-WRIGHT

J.W ®

Jennison-Wright Corp., P. O. Box 691, Toledo, Ohio 43694 . . . *you'll find us in Sweet's Catalog and in the Yellow Pages*

cle No. 347, on Reader Service Card

Notices continued from page 122

president of Pearce Corporation, St. Louis, Mo. **David W. Pearce, Laurance P. Berri** and **Donald C. Donaldson** have been elected vice presidents.

Maher Zaky Labib and **Igor Bojanovic** have joined the firm of LeRoy Callender, New York City, as senior engineer and senior draftsman, respectively.

Expansions

Reynolds/Bailey/Vrooman, Inc, has become the Atlanta, Ga. office of **Welton Becket & Associates.**

Howard Needles Tammen & Bergendoff has formed an architectural subsidiary, **Howard Needles Tammen & Bergendoff Inc.,** headed by Stan Z. Gladych.

Name changes

Fehr Granger Emerson, Architects and Planners, Austin, Tex., is now **Emerson Fehr Newton.**

Austin Engineers Builders Limited of Sutton, Surrey, England is now **The Austin Company of UK Limited.**

Armstrong, Schlichting, Torseth & Skold, Inc., Minneapolis, Minn., is now **Armstrong, Torseth, Skold & Rydeen, Inc.**

New addresses

Zimmerman/Robbin & Associates, the Granada Building, La Fayette Park Place, Los Angeles.

Hackner Schroeder Roslansky & Associates, Inc., 24 Milwaukee St., La Crosse, Wis. 54601.

Joseph S. Ward & Associates, 1629 K St., N.W., Washington, D.C. 20006.

Robert T. Morris, AIA, 5572 Newanga Ave., Santa Rosa, Calif.

Offices of **Michael J. DeAngelis & Associates,** Western Savings Fund Building, Broad and Chestnut Sts., Philadelphia, Pa. 19107.

Stuart E. Cohen, AIA, 343 South Dearborn St., Chicago, Ill. 60604.

New firms

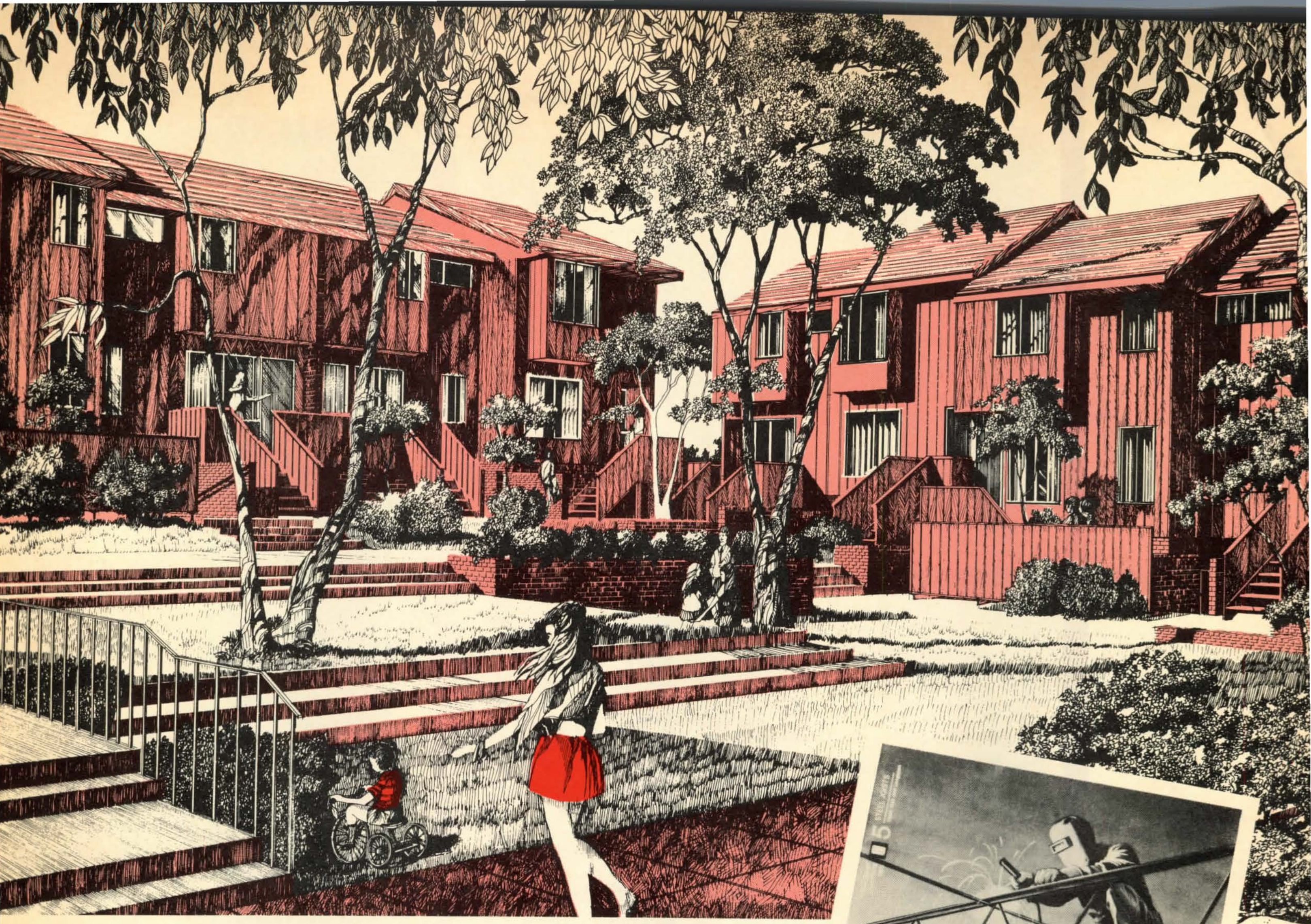
Erwin & Akers Associates, Architects, Benedum-Trees Building, Pittsburgh, Pa. 15222.

Wilson Stoeltje Martin, 30 Dobie Center, Austin, Tex. 78705.

Richard K. Miller & Associates, 524 Carnegie Building, Atlanta, Ga. 30303.

Lewis S. Goodfriend, 140 Morris St., Morristown, N.J.

Jon R. Schleuning, AIA, J. David Richen, AIA, AIP, and Fred C. Gast, Jr., AIA, have formed the **SRG Partnership,** 1133 S.W. Park Ave., Portland, Ore. 97205.



Why steel joists were the right answer to this building need

"THE WESTERLIES": STEEL JOISTS HELPED KEEP THE PRICE DOWN BUT THE LUXURY UP

Located in the highly affluent McLean, Va. area outside Washington, D.C., this 67-unit condominium complex with three condominiums per unit, offers residents the utmost in gracious living at moderate cost. The key to economy was total planning and judicious use of design, construction and material selection . . . including versatile, cost-cutting steel joists.

First floor construction includes open web steel joists, J-series, 12" deep, space at 24" centers with horizontal bridging. Drywall ceiling is attached to the bottom chords, and 3" batts of fiber glass insulation are installed over the ceiling and between the joists.

"We chose this type of floor construction," stated Richard Collins of architects-engineers Collins and Kronstadt, "to provide 2-hour fire resistance rating and reduce sound transmission. We also used the open webs for easy passage and concealment of pipes, wiring, ducts and conduits within the floor depth, for installation economy."

Want to learn more about open web steel joists and their value to modern construction? Write for new edition of Specifications and Load Tables for Open Web Steel Joists and Longspan Steel Joists. Mail coupon for your free copy.

Circle No. 368, on Reader Service Card

STEEL JOIST INSTITUTE
2001 Jefferson Davis Highway
Arlington, Virginia 22202

Mail to: STEEL JOIST INSTITUTE
Suite 707, 2001 Jefferson Davis Hwy.
Arlington, Va. 22202

Please send me your new copy of Specification and Load Tables.

NAME ______________________

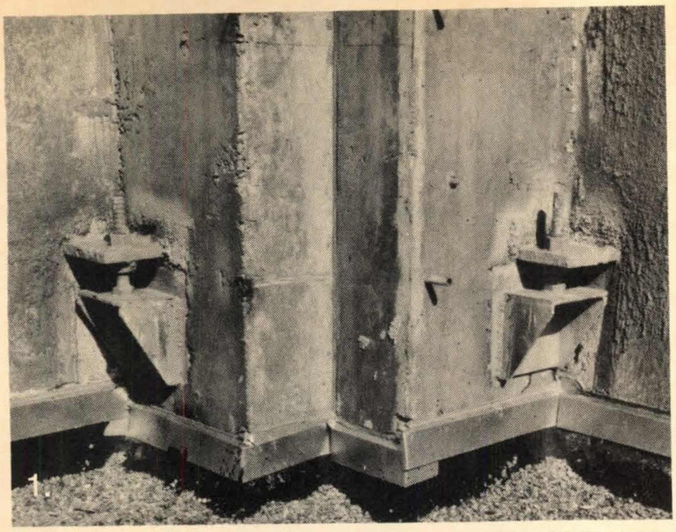
TITLE ______________________

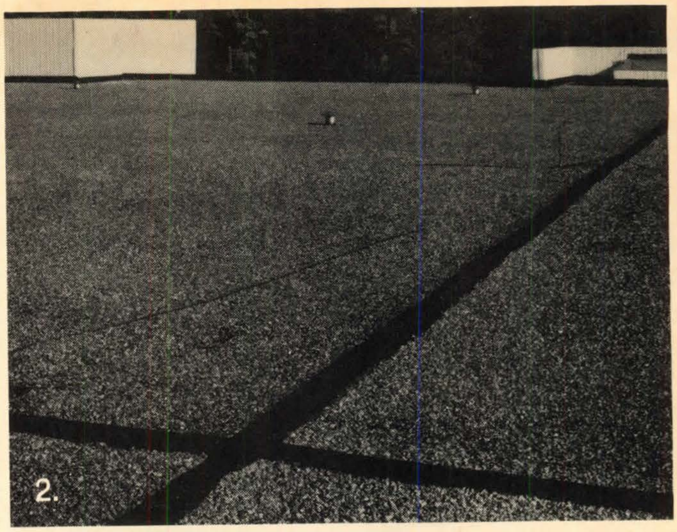
FIRM ______________________

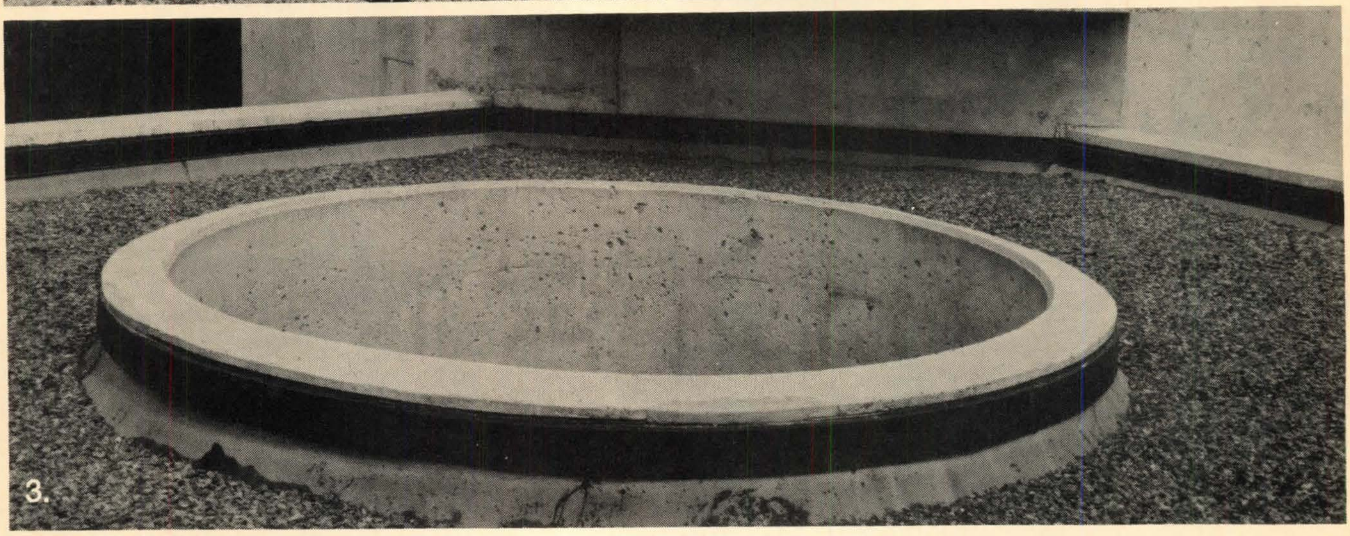
ADDRESS ______________________

CITY __________ STATE __________ ZIP CODE ______

72-001







1. Cullen Center Bank Building, Houston Architect: Neuhaus + Taylor, Houston
2. Houston Brookhollow Complex Architect: The Office of G. Pierce • Goodwin • Flanagan • AIA • Houston
3. New Alley Theatre, Houston Architect: Ulrich Franzen and Associates, New York

End flashing problems— with Gacoflex Contourflash.

Tricky joints in roof designs are no problem when you use Gacoflex Contourflash.

Contourflash is a specially formulated elastomeric sheet material designed for use in all flashing applications. With it, you can stop flashing failures at roofing terminations, parapets, curbs, and penetration and expansion joints. Contourflash is self-curing. It is easily and permanently adhered to concrete, wood and metal surfaces, regular and irregular in shape. Versatile Contourflash can be hot mopped into conventional roofs and stripped in with hot asphalt.

The natural elasticity of Contourflash allows expansion and contraction with the substrate and it remains flexible from —40°F to +220°Fahrenheit without getting soft or brittle. Gacoflex Contourflash is in use in buildings all over the country —commercial, monumental, and institutional. For details and specifications —check Sweets, Section 7.10/Ga. Or, write for the Contourflash bulletin.

GACO

SCM

GATES ENGINEERING—WILMINGTON, DEL. 19899

SCM CORPORATION

Circle No. 392, on Reader Service Card

New fruit from Florida (Tile).

There's a new crop of fresh and pure citrus colors in matte glaze ceramic wall tile — right from sunny Florida. We wanted to bring you a choice of colors you can work with today and tomorrow. We did it . . . and we're the first tile company to update our colors in the matte line in years. Each of these 14 colors is part of our regular production line. Not tile you must order special. Let us share them with you. Write us on your letterhead for samples of this year's crop of matte glaze from Florida (Tile).

florida tile

DIVISION OF SIKES CORPORATION
FLORIDA TILE • P. O. BOX 447 • LAKELAND, FLORIDA 33802

Circle **No. 343**, on Reader Service Card

Job mart

Situations open

Architect/Land Planner: Position available for architect/land planner in southern arctitectural-engineering firm participating with large, nationally based developer in residential construction and real estate development. Applicant should be prepared to produce responsible site plans for projects throughout the southeast and southwest as well as to take a position of leadership in a multi-professional research team investigating development, planning and construction of residential and new town projects. Experience and enthusiastic interest in innovative design techniques is desired and rewarded with a liberal salary and benefit package. Please send inquiries and confidential resume to TSG International, Inc., 1900 Exchange Building, Memphis, Tenn. 38103.

Architects: Both design architect and project architect desired for fast-growing, 15 man midwest firm with broad range of national/international projects. As design architect you should have strong experience in design and land planning, preferably on major projects such as shopping centers, office buildings, residential and institutional developments. As project architect, your experience should include working with designers and heading working-drawing teams on the above mentioned projects. Both will work with clients in developing projects from early concepts. Registered architects preferred, but persons of equivalent experience will be considered. Reply in confidence to The Ramos Group, Architects/Planners, 1004 Baltimore, Kansas City, Missouri 64105.

Architectural designers: Immediate openings for talented designers to work as project designers on a variety of interesting and challenging projects. Masters degree required with a minimum of 3 years design experience. We are a large architectural-engineering firm headquartered in St. Paul. Send resume to: R. A. Sorensen, Ellerbe, Architects/Engineers/Planners, 333 Sibley St., St. Paul, Minn. 55101.

Chief designer: Progressive, rapidly expanding architectural firm, engaged in the design of new communities throughout the state of Florida, seeks individual with flair, style, aesthetics and practical applications of architectural design and detailing, from start to finish, exteriors and interiors. Must know the latest products and materials, sources and construction. Will work closely with marketing and project managers, and will help create their work to completion. If you think you are the best, and want to grow through your personal contribution, write in detail with salary requirements to: Angel C. Saqui, AIA, Architect, 6912 Biscayne Boulevard, Miami, Florida 33138.

Design professional: Caudill Rowlett Scott, architects, planners, engineers, is recruiting talented and aggressive Health Facility design professionals to help meet sharply increasing client opportunities. Our needs range from Health Facility building type specialists and project managers to designers, MEPSC engineers, and design and engineering technicians. Excellent advancement opportunities. Reply in full in strict confidence to P. D. White, CRS, 1111 West Loop South, Houston, Texas 77027.

Director of design: Design-Management oriented firm seeks director skilled in hospital and health facility planning. Must be attuned to contemporary esthetics and design methodology. Ability to lead individuals and teams is essential. Send resume in confidence to Box #1361-394, *Progressive Architecture.* An equal opportunity employer.

Job captain: Draftsman, job captain (senior draftsman). A large retail food convenience store chain with 5000 stores and a projected 50% growth plan in the next 5 years has an opening for job captain/senior draftsman with 3-5 years of architectural/mechanical drafting experience. Preferably experienced with a commercial building contractor. Company offers stable professional job environment, salary commensurate with experience plus outstanding benefits. Contact: Wayne Snyder—214-828-7108, 2828 North Haskell, Dallas, Texas 75204. An equal opportunity employer.

Manufacturers reps: Manufacturers reps wanted by long established aluminum metal pan acoustical ceiling tile manufacturer with new and proven items to merchandise. Looking for agents who call on architects for our "Spec" items; and general contractors, acoustical contractors, lumber yards, building supply houses, etc. for our "Direct Sale" items. Many territories open. Commission basis. Flexible agency policy. No stock to carry. Write to Simplex Ceiling Corp., 663 Fifth Avenue, New York, N. Y. 10022.

Selling opportunity: Manufacturer of unique, new high quality, well accepted wall paneling appealing to upper segment of the market now expanding to national market, seeks aggressive sales representatives and/or distributors calling on architects, commercial and residential interior designers. Handsome brochure and samples available. Send resume and other details to P.O. Box 1996, Newport *Beach, Calif.* 92663.

Situations wanted

Architect/designer: NCARB, AIA, 41, family, Illinois graduate. Fifteen years diversified, comprehensive experience. Organizational ability. Desire position (with partnership potential) directing design and production in ethical, progressive, medium to small firm interested in producing best contemporary architecture. Prefer Rock Mountain area—will consider others. Reply to Box #1361-409, *Progressive Architecture.*

Architect/planner: AIA, NCARB certificate, AIP, (master in city planning), 15 years of diverse experience seeks responsible position with Boston area architect/planner/developer. Interested in organization and implementation of complex projects. Reply to Box #1361-410, *Progressive Architecture.*

Architect/urban planner: Degrees and NCARB. Age 35, married, children. Eleven years experience architectural design. Client contact, project head, construction documents. Recent planning graduate. Experience in Denmark and India. Desires design/planning/management position AEP or business in western Europe. Reply to Box #1361-411, *Progressive Architecture.*

Interior designer: Seeking position where responsibilities will include: Interior layouts, schedules, renderings, working drawings, electrical and reflected ceiling plans; Client contact with budger calculations, furnishings specifications, contract negotiation and administrative duties involved to complete final installation. Free to travel. Geographical location open. For resume and portfolio information: Reply to Box #1361-413, *Progressive Architecture.*

Landscape architect: Over 10 years of extensive background and experience. Seeking responsible position in management/design with flexibility in association with the company. Registered: Florida and Pennsylvania, B.S. Hort., B.S. in L. A. 1964. Experienced—grading, site development/engineering, city/county planning. Expertise in planting plans with unique interior landscaping knowledge. Reply to Box #1361-414, *Progressive Architecture.*

Mechanical engineer: P.E., HVAC and plumbing specialty. Will accept short term or long term contract. Geographical area no barrier. Reply to Box #8246, Detroit, Michigan 48213.

Principal associate of practices: Midwest for past twenty years wished to establish with solid moderate sized firm with varied practice, near culturally oriented center, in Midwest, Northwest or Southwest. Will travel, but not commute daily to ultra large

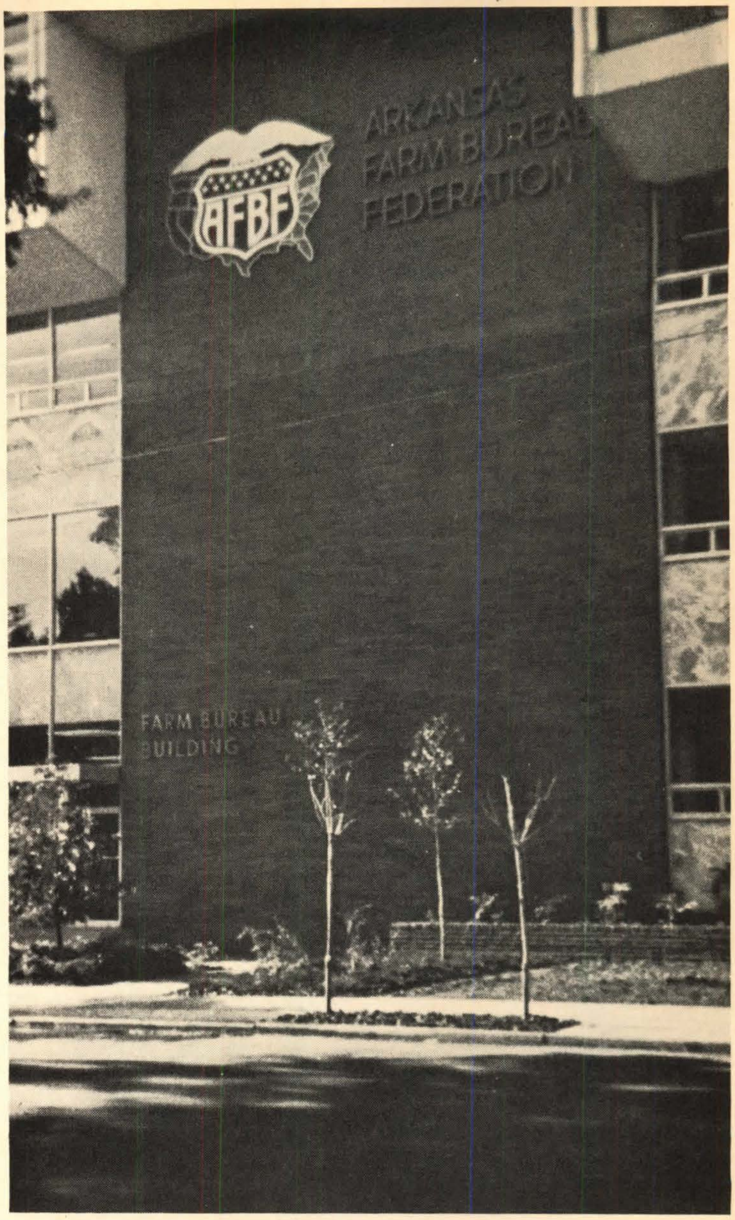
continued on page 135

Circle No. 336, on Reader Service Card

For more profits, identify with metal

. . . and Matthews

See us in Sweet's Ⓢ Architectural Design File 10.14.



Want to see more dollar signs in your business? Then recommend more metal signage. Applications for metal lettering are all around you . . . in banks, offices, professional buildings, specialty shops, and other businesses requiring high quality, prestige identification. Matthews is your single source for identification in metal . . . for exterior and interior applications. Handsome bronze or aluminum letters in a wide range of sizes, finishes and baked-enamel colors. Custom-cast trademarks, symbols, tablets, plaques, signs, name plates.

And here's something else you get from Matthews: Prompt, professional design assistance on any job. Take the first step toward boosting your prestige and your profits. Write today for FREE CATALOG on Matthews' Identification-In-Metal capabilities.

JHM

JAS. H. MATTHEWS & CO.
Identification In Metal

1315 W. LIBERTY AVE., PITTSBURGH, PA. 15226

PLANTS IN PITTSBURGH, PENNSYLVANIA; SEARCY, ARKANSAS; MILTON, ONTARIO
SUN CITY, CALIFORNIA; SENECA FALLS, NEW YORK; EL MONTE CALIFORNIA.

Circle No. 352, on Reader Service Card

Job mart continued from page 132

urban unit. NCARB certificate; registered in Illinois, New York, Wisconsin. Member and top officer in A.I.A., local and state levels; allied professional groups, as well as all municipal and service organizations. Also, interested in education; trustee well known prep school. Have done work in all architectural areas and levels. Resume and references willingly supplied. Reply to Box #1361-415, *Progressive Architecture.*

Registered structural engineer: MSCE, U.S. citizen, over 12 years diversified experience in concrete and steel structures for commercial and institutional buildings. Capable position with structural firm. Desires responsible position with good opportunities in NYC firm. Reply to Box #1361-403, *Progressive Architecture.*

Systemized structures: Position wanted involving systemized structures. Position must involve responsibilities to develop programs, construction documents, and economic analysis as well as construction follow-up. The position mode may be design, research, manufacturing or construction. NCARB architect strong in administration with experience and degrees in architecture and business administration. Reply to Box #1361-416, *Progressive Architecture.*

Architectural services

American Professionals: Our agency has a complete range of architectural openings. A low key approach is used with our client companies. Complete confidence is maintained at all times. All positions 100% fee paid. Send resume, location and salary requirements to 10730 Pacific St., Shaker Place Suite 226, Omaha, Nebraska 68114.

Career Builders Inc., Agency: Complete range of Architectural and Interior Design placement under the direction of Ruth Hirsch. Apprentices to Senior Designers and Project Architects. Professional screening and personalized service. References checked. 501 Madison Ave., New York, N. Y. 10022, PL 2-7640.

Edwards & Shepard Agency: We are a design and architectural placement service uniquely equipped to locate and appraise the qualifications, experience and effectiveness of architectural and interior designers, urban planners, systems and space planners, construction specialists, exhibit, lighting and environmental designers. We know (1) what positions are available (2) who the best prospects are (3) the right approach (4) how to break negotiating gaps (5) how to save money, time and effort (6) how to simplify procedures and appointments (7) the day to day state of the market. Contact Bill Shepard at (212) 725-1280. Interviews by appointment in our "dome on the roof" at 1170 Broadway, N. Y. C., N. Y. 10001.

Helen Hutchins Personnel Agency—Specialist: Architecture, industrial design-interior design and home furnishing. Interviews by appointment. 767 Lexington Avenue, New York, N.Y. 10021, TE 8-3070.

National Blue Print Co.: One of most versatile, best equipped reproduction firms in New York. Our facilities include whiteprinting, xerox reductions, photographic reproduction and low cost offset proposals, reports, specifications. Specializing in rush service on bid documents—plans and specs. Christopher Charles National Blue Print Co., 110 West 32nd St., New York, New York 10001.

Ritasue Siegel Agency: Comprehensive, confidential, international placement and executive search for architectural, urban, interior designers and planners by Mswoody Gibson. Industrial, environmental and graphic design by Mrs. Siegel, (former Pratt Institute placement Director and ID graduate.) All positions fee paid. By appointment, please. (212) 684-3537, 1170 Broadway, N.Y.C. 10001.

David S. Wachsman Associates, Inc.: Public relations/marketing: Is your architectural practice growing? Are you well known and highly regarded in your market? Is the best of your work published on a continuing basis? Excluding staff and clients, are at least 200 people currently familiar with your office and its work? Does your brochure represent you as well as your most successful project? If you answer "no" to any of these questions, professional public relations/marketing service may be of immense value to you. We would be pleased to discuss your growth plans. 51 East 42nd. St., New York, N.Y. 10017 (212) 687-1196.

Advertising Rates

Standard charge for each unit is Fifteen Dollars, with a maximum of 50 words. In counting words your complete address (any address) counts as five words, a box number as three words. Two units may be purchased for thirty dollars, with a maximum of 100 words. Check or money order should accompany advertisement and be mailed to Job Mart c/o Progressive Architecture, 600 Summer Street, Stamford, Conn. 06904. Insertions will be accepted not later than the 1st of the month preceding month of publication. Box number replies should be addressed as noted above with the box number placed in lower left hand corner of envelope.

Notice

Please address all correspondence to box numbered advertisements as follows:

Progressive Architecture
c/o Box......
600 Summer Street
Stamford, Connecticut 06904

Progressive Architecture

Advertisers

Advertising Sales Offices

Stamford, Connecticut 06904:
600 Summer Street *203-348-7531*

William F. Bondlow, Jr.
Advertising Sales Manager

Michael J. Hanley, Donald C. Stanley
District Managers

Philadelphia, Pennsylvania 19107:
12 So. 12th Street *215-922-0346*
John A. Teefy, *District Manager*

Pittsburgh, Pennsylvania 15222:
Three Gateway Center—Room 1827
412-281-9421
Albert E. McClimans, *District Manager*

Chicago, Illinois 60603
10 So. LaSalle Street *312-726-1282*
Dean E. Greener, James J. Hoverman

District Managers

Cleveland, Ohio 44114:
1717 E. 9th Street *216-771-4011-12-13*
John F. Kelly, *District Manager*

San Francisco, California 94104:
Jobson, Jordan, Harrison & Schulz, Inc.
57 Post Street *415-392-6794*
Charles S. Harrison, Cyril B. Jobson
Representatives

Los Angeles, California 90057:
Jobson, Jordan, Harrison & Schulz, Inc.
1901 W. 8th Street *213-483-8530*
Kenneth E. Jordan, Peter Schulz
Representatives

Atlanta, Georgia 30308:
H. Proctor Co.
505-805 Peachtree Bldg. *404-874-6427*
Harmon L. Proctor, *Representative*

Tokyo, Japan:
International Media Representatives, Ltd.
1, Shiba-Kotohiracho, Minatoku
Sumio Oka, *Representative*

Acme Plastics 137
Acme Advertising Agency

Alliancewall Corp. 35
Battle Advertising, Inc.

Altec 44, 45
Woolf Advertising Inc.

American Chain & Cable Co./
Page Fence Div. 106
Wilson, Haight & Welch, Inc.

American Gas Association 14
J. Walter Thompson Co.

American Plywood Association 17-24
Cole & Weber, Inc.

Amsterdam Corp. 28, 29
Alden Advertising Agency, Inc.

Andersen Corp. 110, 111
Campbell-Mithun, Inc.

Armstrong Cork Co. . . . . Cover 2
Batten, Barton, Durstine & Osborn, Inc.

Bally Case & Cooler, Inc. 47
Beaumont, Heller & Sperling

Bigelow-Sanford, Inc. 36
D'Arcy-MacManus-Intermarco, Inc.

Bradley Washfountain Co. 123
Hoffman-York Inc.

Carrier Air Conditioning Co. 14
Ketchum, MacLeod & Grove Inc.

Celotex Corp. 93-97
Bishopric & Fielden, Inc.

Delta Faucet Co. 133
Burton Sohigian Inc.

Dover Corp.—Elevator Div. 4, 5
Greenhaw & Rush, Inc.

Duriron Co., Inc. 1
Gray & Kilgore, Inc.

Eastman Kodak Co. 107
J. Walter Thompson Co.

Eaton Corp./Security Products & Systems 104
Fuller & Smith & Ross, Inc.

Eljer Plumbingware/Div. of
Wallace-Murray Corp. 109
Widerschein/Strandberg & Assoc.

Emhart Corp., Russwin Div. 32
Horton, Church & Goff, Inc.

Faber-Castell, A. W., Pencil Co. 99
J. M. Kesslinger & Associates

Fiat Products Dept., Formica Corp. 102
Clinton E. Frank, Inc.

Fife, Richards, Inc. 126
Bozell & Jacobs, Inc.

Florida Tile Industries, Inc. 131
Fry/Hammond/Barr Inc.

Follansbee Steel Corp. 46
George Hill Co.

Gates Engineering, Div. of SCM Corp. . . 130
John T. Hall & Co.

Glynn-Johnson Corp. 122
Stevens-Kirkland-Kreer

Grace, W. R. & Co., Zonolite
Construction Products 26, 27
Fuller & Smith & Ross, Inc.

Grefco, Inc.—Building Products Div. . . . 105
Motivation Dynamics

Haws Drinking Faucet Co. 112
Pacific Advertising Staff

Hickman, W. P., Co. 106
John H. Rosen Advertising

Hope's Windows 103
Addison Busch-Moss Chase, Inc.

Inland-Ryerson Construction Products Co.,
Building Panels Div. 10
Hoffman-York, Inc.

Jennison Wright Corp. 127
Phillipps Associates, Inc.

Johnson Service Co. . . . . Cover 4
Hoffman-York, Inc.

Kalwall Corp. 12
Synectics Group

Kawneer Architectural Products . . . 114, 115
Garrison, Jasper, Rose & Co.

Libbey-Owens-Ford Co. 118, 11
Campbell-Ewald Co.

Limestone Products Corp. of America . .
Edward Owen & Co.

Matthews, Jas. H. & Co. 134
Carey Advertising, Inc.

McPhilben Lighting 15
McClure Advertising Inc.

Modulo 3 Inc. 102
Bemiston Advertising

National Electrical Contractors Assoc. ..138
VanSant, Dugdale & Co.

Norton Plastics & Synthetics Div. 106
Northlich, Stolley of Akron, Inc.

Olympic Stain, Div. of Comerco, Inc. 31
Kraft, Smith & Lowe

Omega Lighting 8
McClure Advertising Inc.

Owens Corning Fiberglas Corp. 121
Ogilvy & Mather, Inc.

Pacific Clay Products 16WA
Fish Communications Group, Inc.

Page Fence Div. American Chain & Cable Co. 106
Wilson, Haight & Welch, Inc.

Panelfold Doors, Inc. 37
Bruce Agency

Pella Rolscreen Co. 41, 42
L. W. Ramsey Advertising Agency

Plan Hold Corp. 108
Frojen Advertising Inc.

Porter Co., H. K., Inc., Electrical Div. ...128
Garland Way Advertising Inc.

Potlatch Forests, Inc. 113
David W. Evans & Associates

Price Pfister 11
Enyart & Rose Advertising Inc.

Progress Lighting 116
APCL&K Inc.

Red Cedar Shingle 135
N. W. Ayer, F. E. Baker, Inc.

Rixson Closers—A div. of Rixson Inc. .. 39
Motivation Dynamics

Russwin, Div. of Emhart Corp. 32
Horton, Church & Goff, Inc.

Sargent & Co. 48
Hepler & Gibney Advertising

Schmidt, C., Co. 98
Schindler, Howard & Raut Advertising Inc.

Sloan Valve Co. 91
Reincke, Meyer & Finn

Spaulding, J. H., Co. 30
W/S Advertising Agency

Star Sprinkler 16
James William Robertson Advertising

Steelcraft Manufacturing Co. 2
Keller-Crescent Co.

Steel Joist Institute 129
Batz-Hodgson-Neuwoehner Inc.

Structures Unlimited 122
Synetics Group

Symons Mfg. Co. 128
J. W. Evans, Inc.

Thonet Industries 120
APCL&K, Inc.

Townsend Paneling, Inc. 37
Biddle Advertising Co.

Tremco Mfg. Co. 100, 101
Carr Liggett Advertising, Inc.

Trinity White, General Portland Inc. . . Cover 3
Glenn Advertising, Inc.

Uniroyal, Inc. 125
Vitt Media International Inc.

United States Gypsum Co. 43
Needham, Harper & Steers, Inc.

U. S. Plywood Div. of Champion International 117
Young & Rubicam Int'l. Inc.

U. S. Steel Corp. 13
Compton Advertising Inc.

Vogel-Peterson Co. 124
Ross Llewellyn, Inc.

Wilson, Ralph, Plastic Co. 6, 7
Jack T. Holmes & Associates, Inc.

Zero Weather Stripping Co. 12
Harvard, Peskin & Edrick, Inc.

Zonolite Construction Products, W. R. Grace & Co. 26, 27
Fuller & Smith & Ross, Inc.

When modern buildings go up, qualified electrical contractors go in . . . with the ready capability, latest equipment, specialized experience to install electrical systems correctly. Systems for heating. Cooling. Lighting. *Communications.* Systems adding up to the building's modern Electro-environment. It's an environment of comfort, convenience, efficiency and esthetic appeal for the people who will live or work inside for years to come . . . thanks to the qualified electrical contractor.

He'll safely satisfy a new building's power distribution needs, and keep pace with needs as they change. Many factors contribute to the ready capability he can put to work for your benefit. Among them, he has the best-trained manpower, the work-force flexibilities and the awareness of local codes to keep electrical problems from developing. To keep all electrical systems functioning efficiently. Economically. Reliably.

And remember: when he installs electrical systems, he *guarantees* electrical systems . . . for one full year. A qualified electrical contractor takes a lot of pride in his work. And you can count on it.

National Electrical
Contractors Association
Washington, D.C. 20036

The electrical promise of tomorrow needs the electrical contractor of today.

New construction. The building won't be complete until a qualified electrical contractor provides for its modern Electro-environment.

Circle No. 353, on Reader Service Card

mini-computer control emerges

JC/80 system stands alone in building automation.

Johnson's JC/80 breakthrough lets you specify programmable computerized control anywhere. At the price of fixed-program systems.

The JC/80 Stand-Alone is ideal for single buildings and small complexes. It has the first mini-computer designed for building automation. Connected to operator's console and remote points by co-ax, it is a general communications loop. Handles 500,000 bits a second. Operates in real time, always on line. Compares performance to stored ideals.

Maximum response time is just 4 seconds for any system. Reports alarms in chronological sequence. Compatible with all digital systems. Operator functions programmable on-line. Modular hardware and software available locally. And immediately.

Whatever your needs in system automation—air conditioning, heating, cooling, security and alarm systems, electrical systems, intercommunications—the JC/80 System can meet them better than anything. And it's ready right now. Get full information. Write for Publication 2036.

JOHNSON SERVICE COMPANY
MILWAUKEE, WISCONSIN • 53201

Circle No. 348, on Reader Service Card