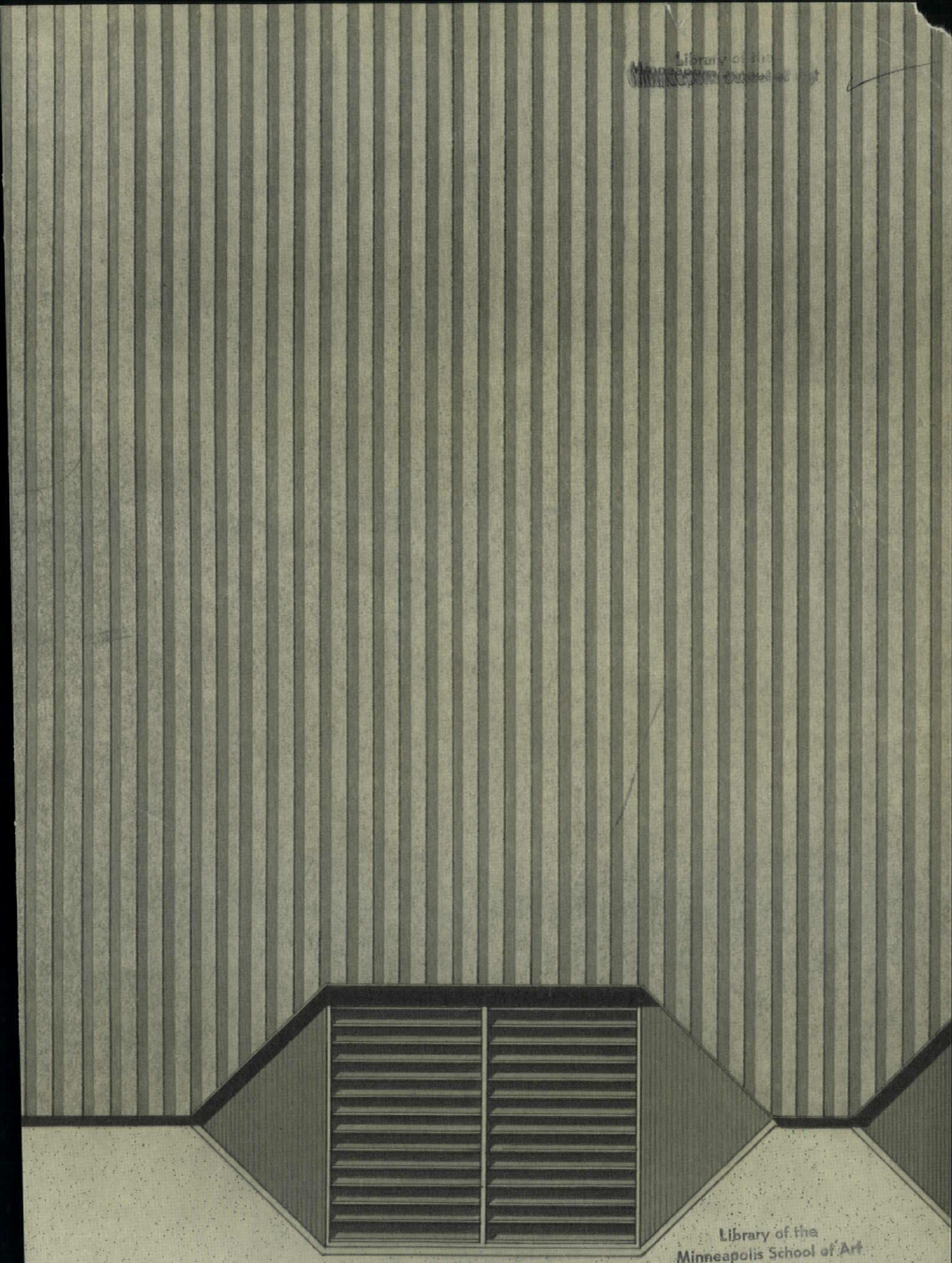
PA-1962-03



Colors: V-812 Florentine, V-815 San Marino, V-817 Adriatic

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unique floor beauty that won't "walk off"

. . . because the distinctive color-chip pattern is distributed through the full thickness of the tile. 800 Series in Vina-Lux vinyl asbestos tile retains its beauty and pattern under the heaviest concentrations of traffic . . . delivers so much more value and performance than surface patterns . . . yet costs no more. Specify Vina-Lux 800 Series, for installation over concrete — above, on or below grade, or over wood or plywood subfloors. Consult Sweet's Catalog — or let us send you samples, color charts and detailed architectural specifications. Azrock Floor Products Division, Uvalde Rock Asphalt Company, 522A Frost Building, San Antonio.

Magnified view shows pattern distribution through **full** thickness of tile. Available in 1/8", 3/32", 1/16" gauges.

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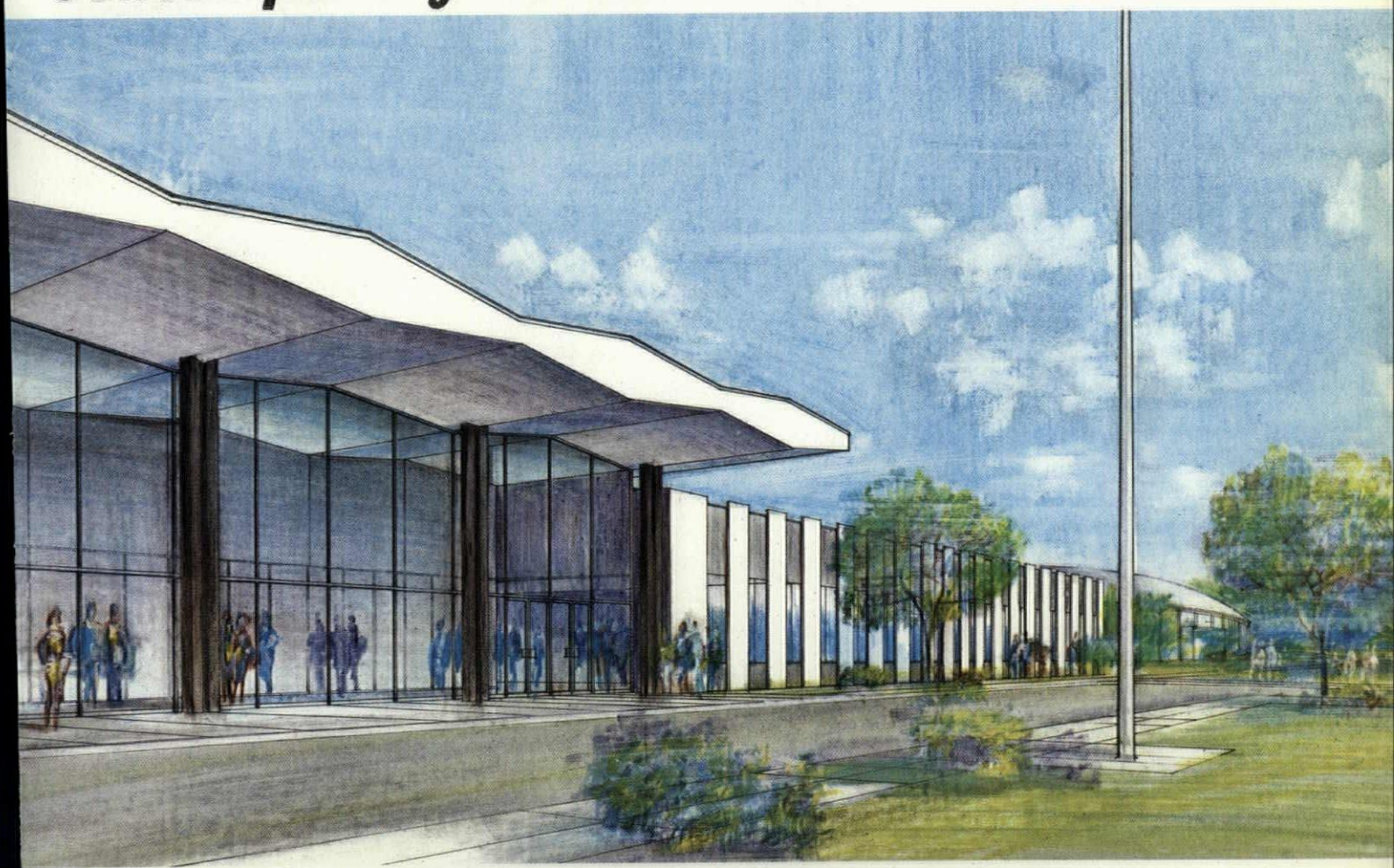
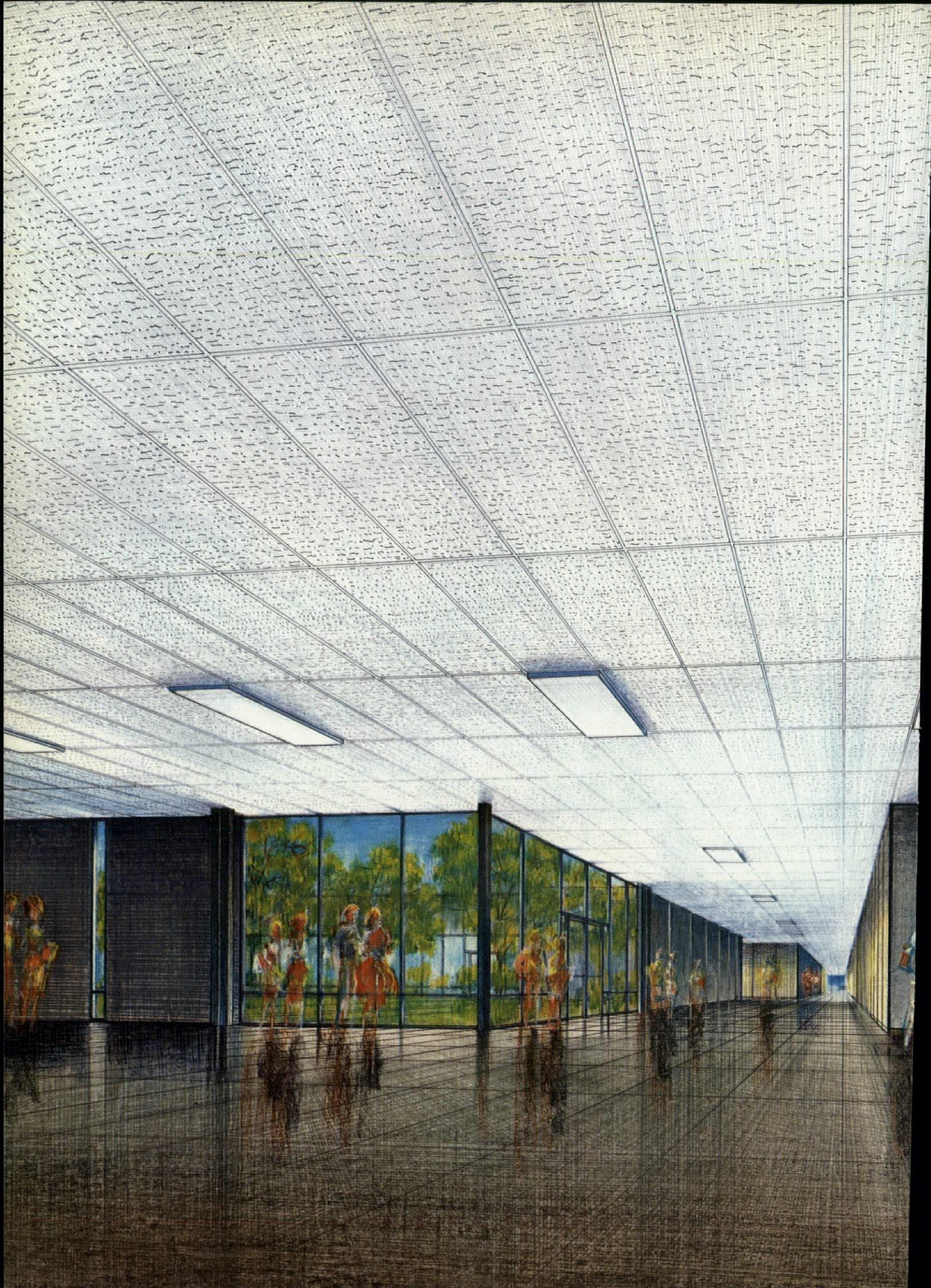
Contemporary school architecture:



a remarkable kind of ceiling—and how it saved an Indiana school $76,500...



Indiana school saves $76,500 with Armstrong Acoustical Fire Guard Lay-In ceilings

Even though rated fire protection wasn't required for this new Indianapolis school, the architects wanted the extra safety of a fire-retardant ceiling—so they built it in with Armstrong Acoustical Fire Guard ceilings. As a result, Fire Guard helped qualify the school for the lowest possible fire insurance rates. Because it's an exceptionally efficient, yet dense, acoustical material, Fire Guard quiets noise and greatly reduces the transmission of sound from area to area through the ceiling. The architects estimate that, to provide similar advantages of fire safety and sound control, a combination of conventional fire-resistive ceilings and acoustical tile would have cost $76,500 more than Fire Guard.

Lawrence High School, Indianapolis, Ind. Architects: Lennox, Matthews, Simmons and Ford, Indianapolis. General Contractor: F. A. Wilhelm Construction Co., Indianapolis. Acoustical Contractor: Commercial Floor Covering & Acoustics Co., Inc., Indianapolis.

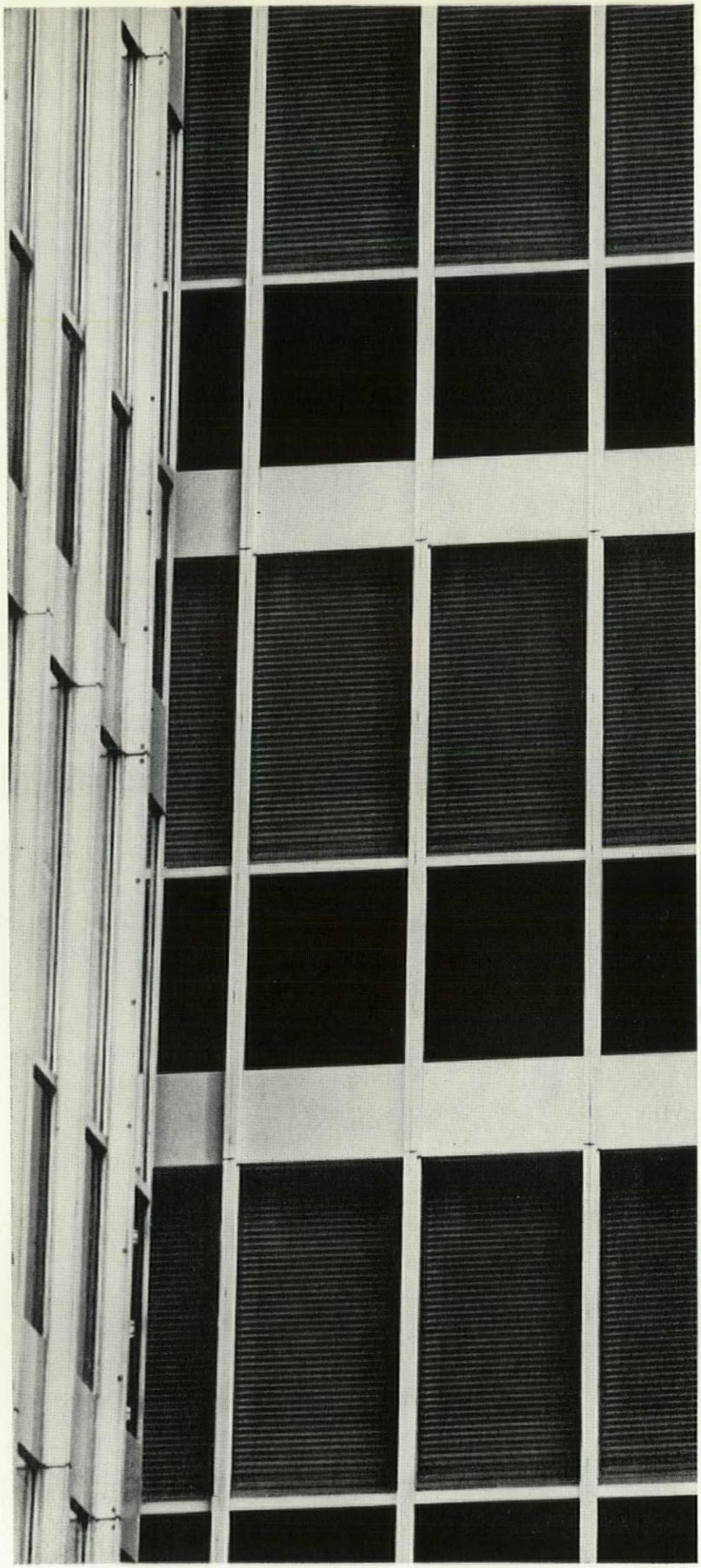
Whether you're in the hallway shown on the opposite page, the library above, or any other area of Lawrence High School, the Fire Guard ceiling, with its handsome fissured design, is a noteworthy decorative asset. And the 24 x 48" lay-in units provide above-ceiling accessibility, no matter what interior arrangements are created with the school's nearly two miles of movable partitions.

Armstrong ACOUSTICAL CEILINGS

First in fire-retardant acoustical ceilings

Technical data: UL rated: Armstrong Acoustical Fire Guard offers one- to four-hour rated fire protection for structural components. Saves money, construction time: up to 45¢ per sq. ft. by eliminating intermediate fire protection . . . up to two months' time through dry installation; often earns lower insurance rates. Ventilating Fire Guard: Provides uniform air diffusion across the entire ceiling surface, sound control, and rated fire protection. Available in tile and lay-in units. Suspension system: For tile: TDR or Zee; for lay-in units (24 x 24 x 5/8" and 24 x 48 x 5/8"): exposed grid system. Choice of designs: Fissured, Classic, Full Random. For full data, call your Acoustical Contractor, your Armstrong District Office, or write Armstrong Cork Co., 4202 Watson St., Lancaster, Pa.

Renderings by Ara Derderian



Where did the tapes go?

Behind the mullions.

Result: versatile, venetian-blind light control with no unnecessary verticals to mar the clean lines of a curtain-wall facade.

Architects asked for this look. Flexalum engineered it. You can specify it for your building, with tapes positioned anywhere from ⅜" to 12" from the ends of the slats (depending upon the width and position of your mullions).

This mullion-line tape blind is the latest – but not the first – Flexalum Twi-Nighter modification designed for and with architects. During the past year, many buildings have specified the skyscraper modification which restricts lift position to full up, full down, and one intermediate stop – thereby assuring a more uniform exterior by eliminating erratic blind heights.

There is also a special Twi-Nighter hospital modification which provides the maximum combination of light and privacy through opposite phasing of the upper and lower halves of the blind. For hospitals, Flexalum also supplies special plastic tapes that are fungus-resistant.

All these blinds have the Twi-Nighter's unique, integrated design. Only Twi-Nighters are designed like your buildings – with every part engineered with relation to every other.

Perhaps one of these blinds solves problems for your buildings. Or perhaps you've seen a need for some special new features which we can engineer for you. For specifications, or consultation on new innovations, write Bridgeport Brass Company, Hunter Douglas Division, 30 Grand Street, Bridgeport 2, Connecticut.

Flexalum® TWI-NIGHTER®
SPECIAL PURPOSE VENETIANS

For more information, turn to Reader Service card, circle No. 349

THIS MONTH IN P/A

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New building for UNESCO by Breuer-Nervi-Zehrfuss . . . Pratt students design a memorial to Hammarskjold . . . A K-14 school from Columbia . . . P/A Design Awards luncheon . . . AIA Honor Awards announced . . . An interview with Kenzo Tange . . . New standards from AISC . . . PRODUCTS . . . MANUFACTURERS' DATA.

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PROGRESSIVE ARCHITECTURE published monthly by REINHOLD PUBLISHING CORPORATION, 430 Park Avenue, New York 22, N.Y. Ralph W. Reinhold, Chairman of the Board; Philip H. Hubbard, President and Treasurer; Kathleen Starke, Secretary and Assistant Treasurer; Donald Hoagland, Merald F. Lue, Fred P. Peters, D. Bradford Wilkin, William P. Winsor, Vice-Presidents. Executive and Editorial offices, 430 Park Avenue, New York 22, N.Y. Subscriptions payable in advance. Subscription prices to those who, by title, are *architects, engineers, specifications writers, designers* or *draftsmen,* and to Government departments, trade associations, members of the armed forces, architectural schools and students—$5.00 for one year, $8.00 for two years, $10.00 for three years. Above prices are applicable in U. S., U. S. Possessions, and Canada. All *practicing architects* and *engineers* outside U. S., U. S. Possessions and Canada—$10.00 for one year, $16.00 for two years, $20.00 for three years. All others—$20.00 a year. Single copy—$1.00; special issues—$2.00 per copy. Printed by Publishers Printing Company, New York, N.Y.

Indexed in Art Index, Architectural Index. Second-class postage paid at New York, N.Y. VOLUME XLIII, No. 3

Motorola Western Military Electronics Center, Phoenix, Arizona
Architect: Edward L. Varney—Associates, Phoenix, Arizona
Contractor: T. G. K. Construction Co., Inc., Phoenix, Arizona

Manchester Savings Bank, Manchester, N. H.
Architect: W. G. Knoebel, AIA, St. Louis, Missouri—Associate, John D. Betley, AIA, Manchester, New Hampshire
Consultant & Contractor: Bank Building & Equipment Corporation of America, St. Louis, Mo.

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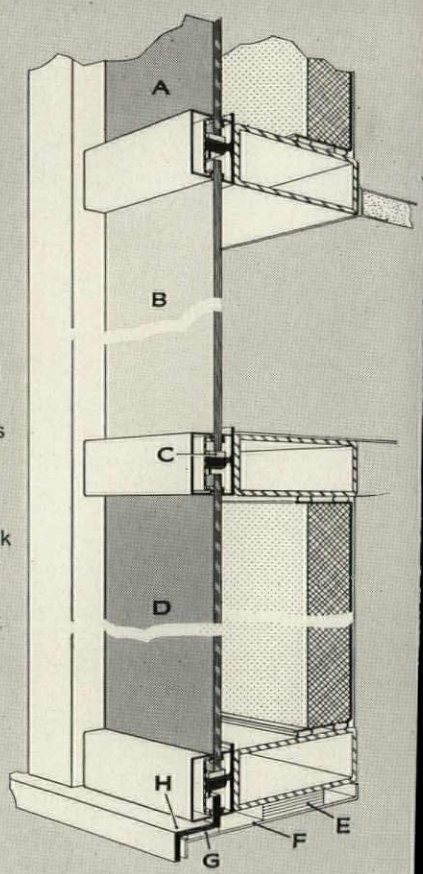
82-X

Weep-vent system and flexible, metal joint sealing compound assures leak-proof construction. Prefabricated components shrink on-site installation costs.



A. ¼" SPANDRELITE
B. Clear glass
C. Setting Block
D. ¼" SPANDRELITE
E. Leveling shims
F. Flashing
G. Sectional aluminum shim
H. Drainage and ventilation

Gibraltar Savings & Loan Association, Houston, Texas
Architects: Greacen & Brogniez, Houston, Texas
Assoc. Architect: J. Victor Neuhaus III, Houston, Texas
General Contractor: Marshall Construction Co., Houston, Texas

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You'll find the widest variety of rolled and extruded components—sash, jambs, sills, facing moldings, division bars—to suit any architectural style. When your plans call for double-glazing, the PITTCO 25X provides a framing system especially designed to accommodate TWINDOW® Insulating Glass.

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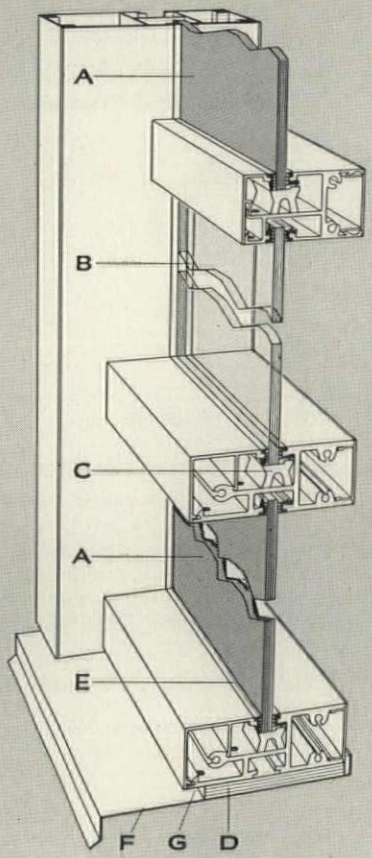
All these PITTCO curtain wall features give you greater design flexibility . . . mean more opportunities to make your design ideas materialize.

What's more, PPG will assume full responsibility for providing a complete curtain wall job—from your design to job completion.



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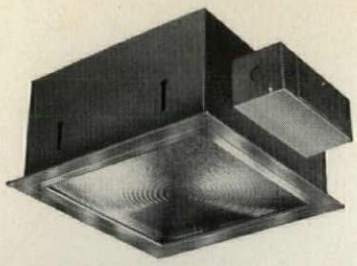
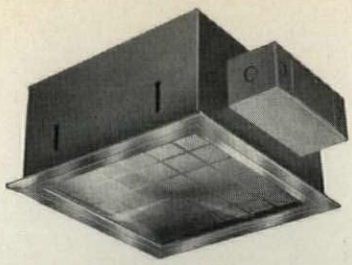
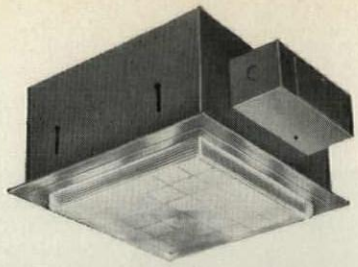


CAT. NO. 68-10
mc Philben Fresnel lens



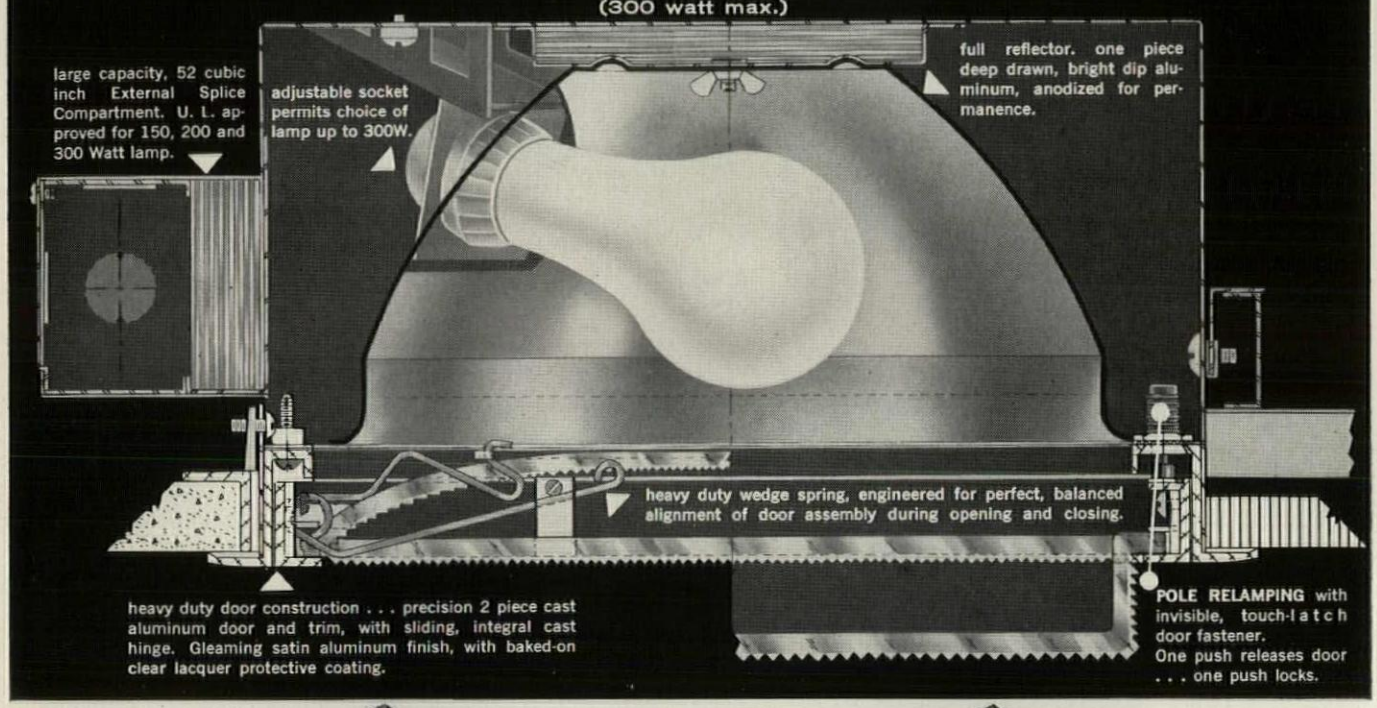
CAT. NO. 68-11
Holophane flat lens



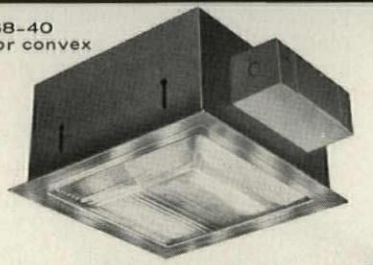
CAT. NO. 68-15
Holophane drop lens

new 68 line downlights

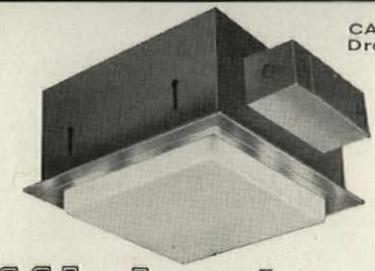
(300 watt max.)



CAT. NO. 68-40
Corning corridor convex



CAT. NO. 68-30
Drop Opal Glass



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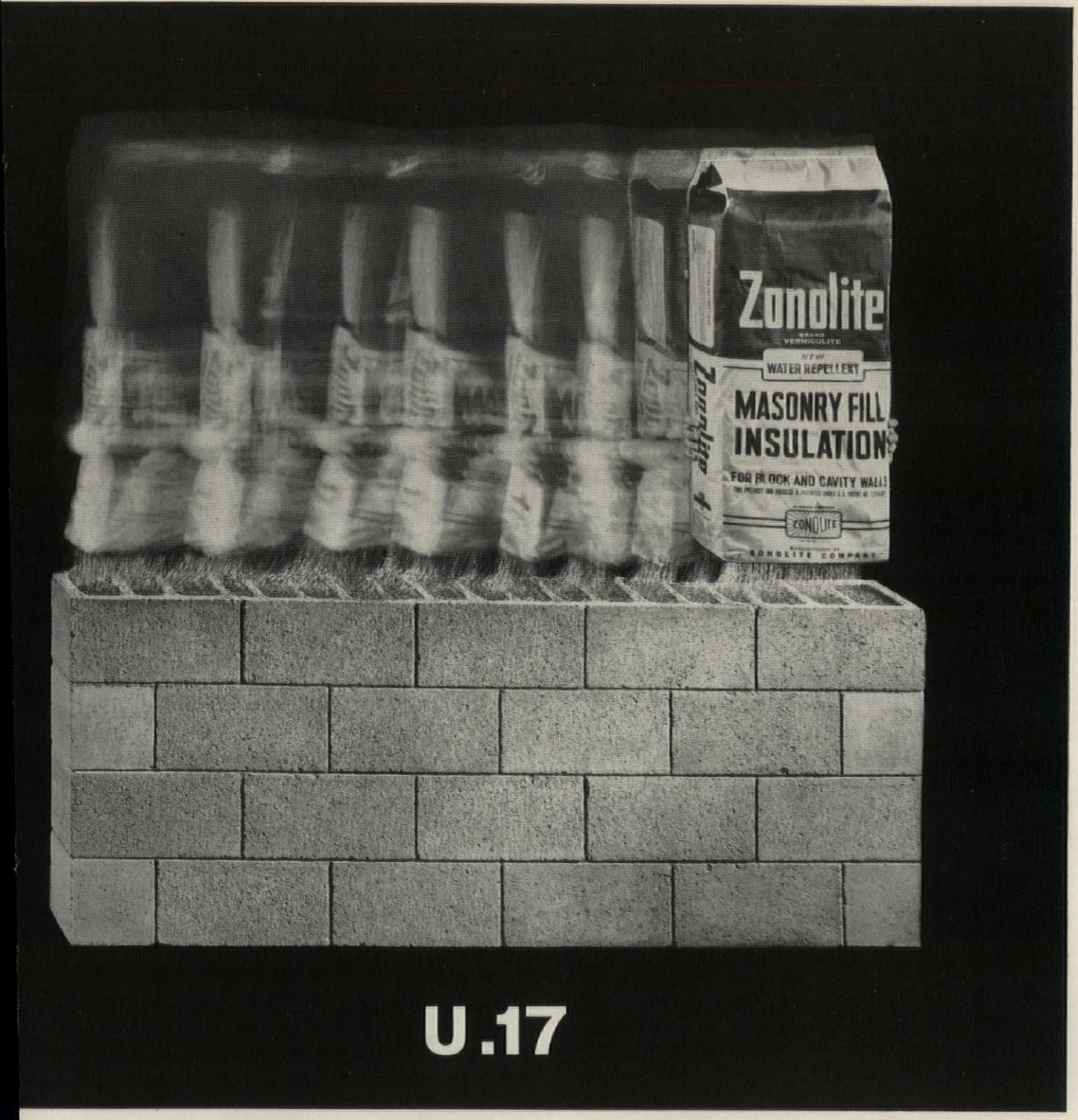

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Gen'l Contractors: Dick Corporation

Cons'lt'g Eng'rs: Amman & Whitney

Plumb'g Cont'rs: Wayne Crouse

These modern Halsey Taylor stainless steel wall fountains were specified by the Public Authority, owners of the Auditorium.

. . . and still the logical choice today for the buildings of tomorrow!

This unique structure, dedicated only last September, is another step forward in the continuing program of Pittsburgh's renaissance. Its most striking feature is its giant stainless steel retractable roof, providing a weather-proof arena for all kinds of civic affairs, trade-shows, ice-shows, conventions and sports.

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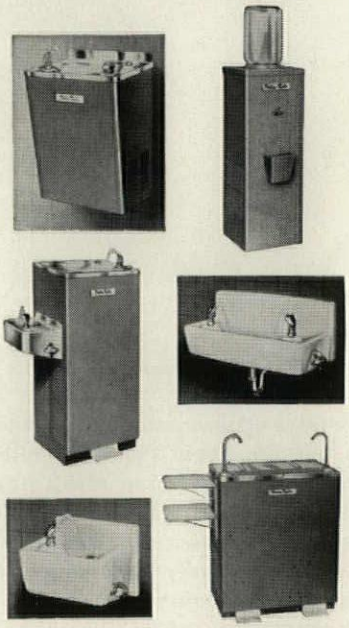

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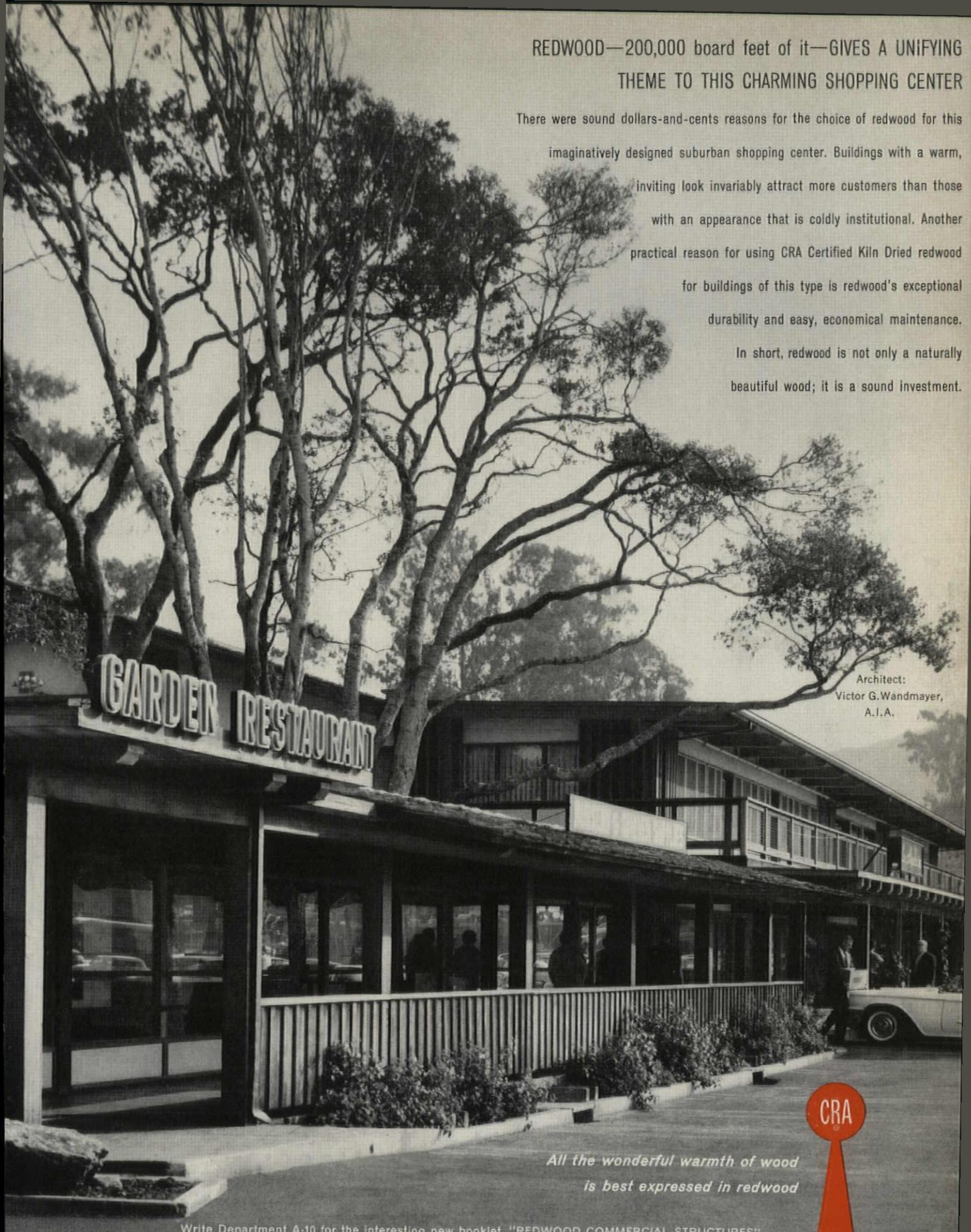

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There were sound dollars-and-cents reasons for the choice of redwood for this imaginatively designed suburban shopping center. Buildings with a warm, inviting look invariably attract more customers than those with an appearance that is coldly institutional. Another practical reason for using CRA Certified Kiln Dried redwood for buildings of this type is redwood's exceptional durability and easy, economical maintenance. In short, redwood is not only a naturally beautiful wood; it is a sound investment.

Architect:
Victor G. Wandmayer,
A.I.A.

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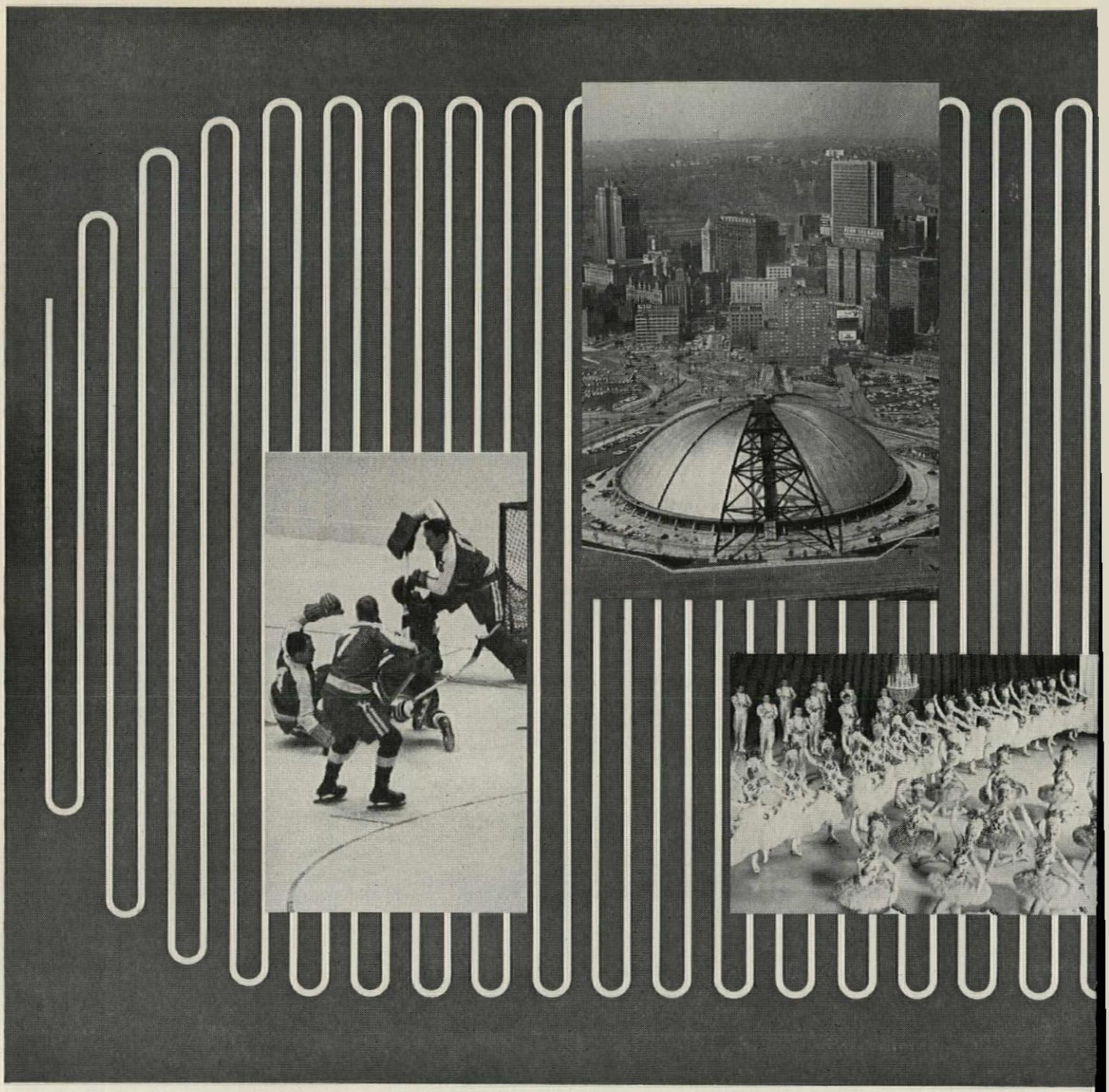
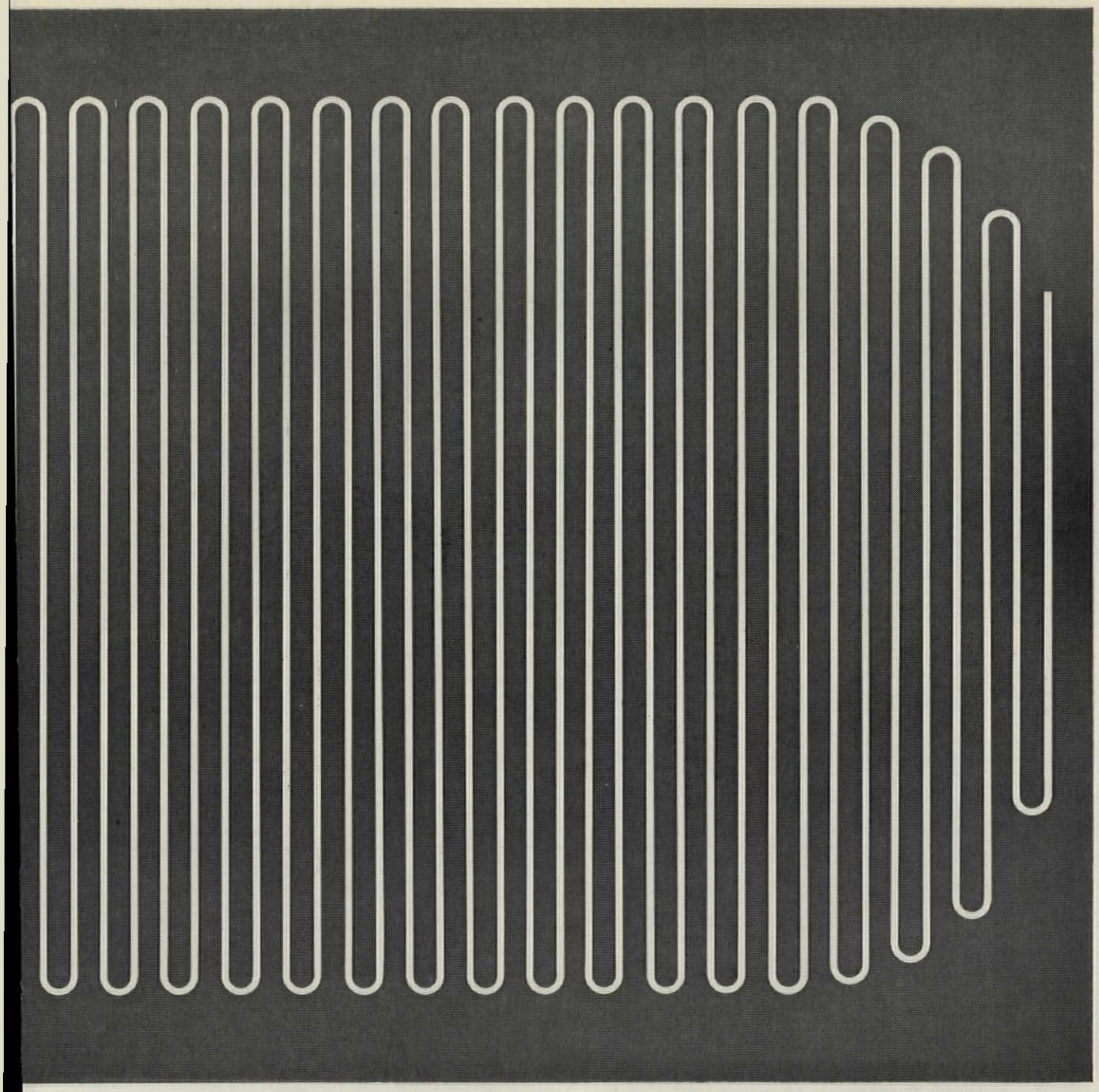


11½ miles of steel pipe . . . and every inch has to be right

Pittsburgh's gleaming new Auditorium, with its movable Stainless Steel roof, is now open. The world famous Ice Capades were the first attraction, and professional hockey returned to the city to cavort on the Auditorium's ice rink, which has some 11½ miles of USS National Pipe underneath.

For quick freezing of the ice, temperatures will go down around −42°F., although specifications called for a temperature of "only" −16°F. The system uses a calcium chloride brine solution with 1.25 specific gravity, and it is a 25.9% solution. The steel pipe used in the coils was 1¼" standard and extra strong; the reverse header pipe



Architect: Mitchell & Ritchey, Pittsburgh, Pa. **Mechanical Contractor:** Limbach Company, Pittsburgh, Pa. **Supply House:** Crane Supply Company, Pittsburgh, Pa.

consisted of over 600 feet of 4″ through 10″ pipe.

In a big commercial operation like this, the pipe has to be dependable or the show doesn't go on. That's one good reason they specified USS National Pipe. If you need top-quality steel pipe for ice skating rinks, snow melting and radiant-heating installations, or for any type of building or industrial application, be sure you get USS National Pipe. For further information, or assistance with any pipe problem, write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS and National are registered trademarks.

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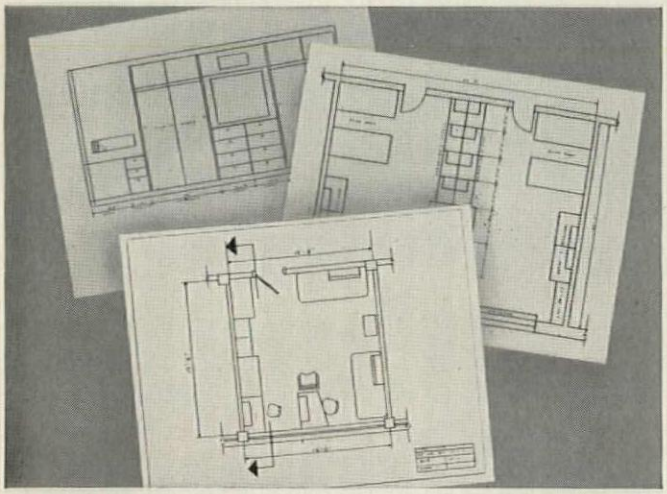
for these economies:



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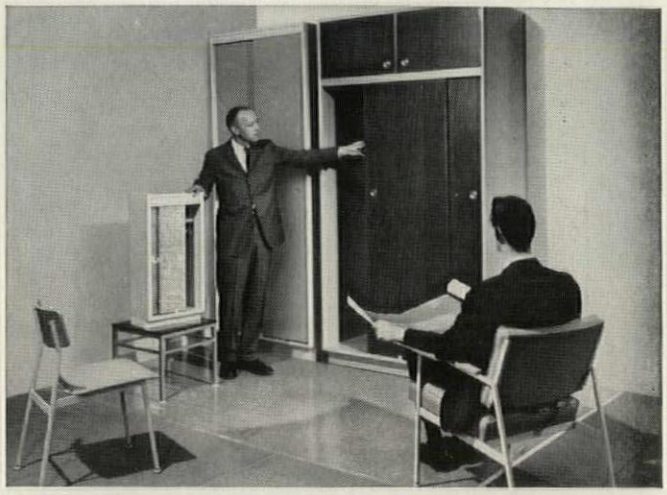
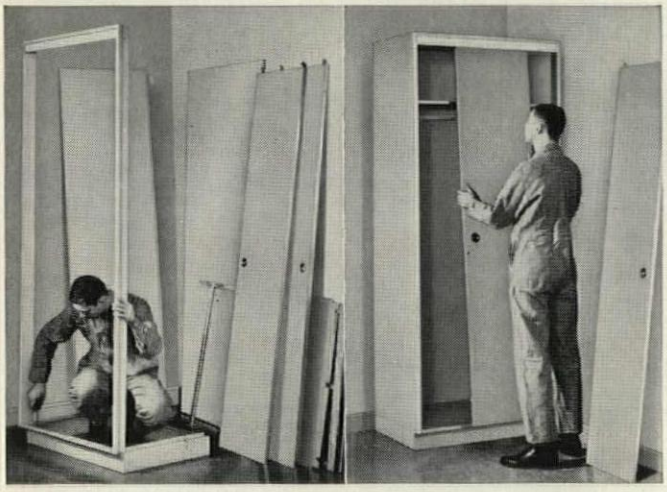


2. When you need to *meet a budget*, you may choose Dorm Line units—wardrobes, beds, desks, chairs—by types and finishes to fit your requirements. Dorm Line is not expensive.



3. You *save substantially* on Dorm Line wardrobe installation—from k.d. to completion in as few as 15 cost-cutting minutes! Compare this with hours or days required for other installations.

4. After installation, the *economy* of Dorm Line's durability and low maintenance keep down costs for years and years. And Dorm Line units qualify for long-term financing.

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For more information about Anaconda "Electro-Sheet" and a list of manufacturers of the flashing products, write: Anaconda American Brass Company, Ansonia Division, Ansonia, Connecticut.

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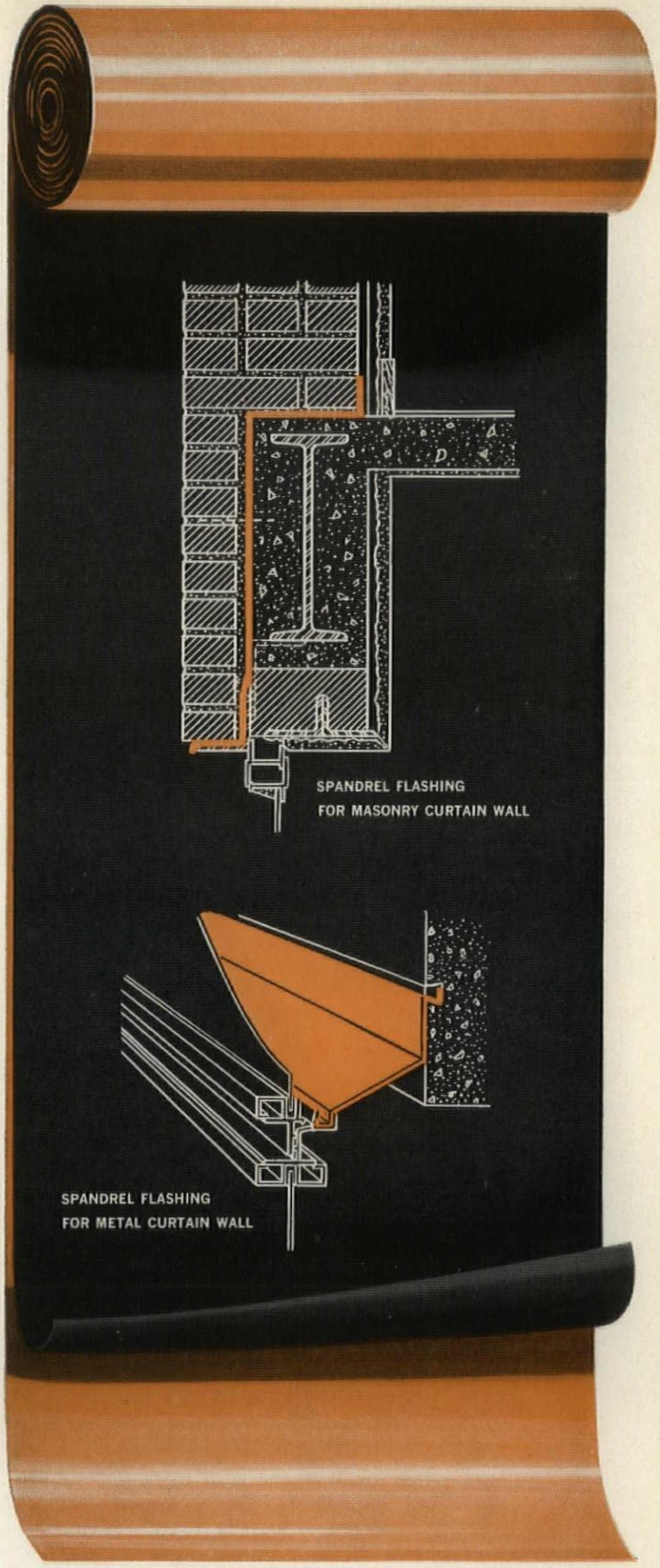
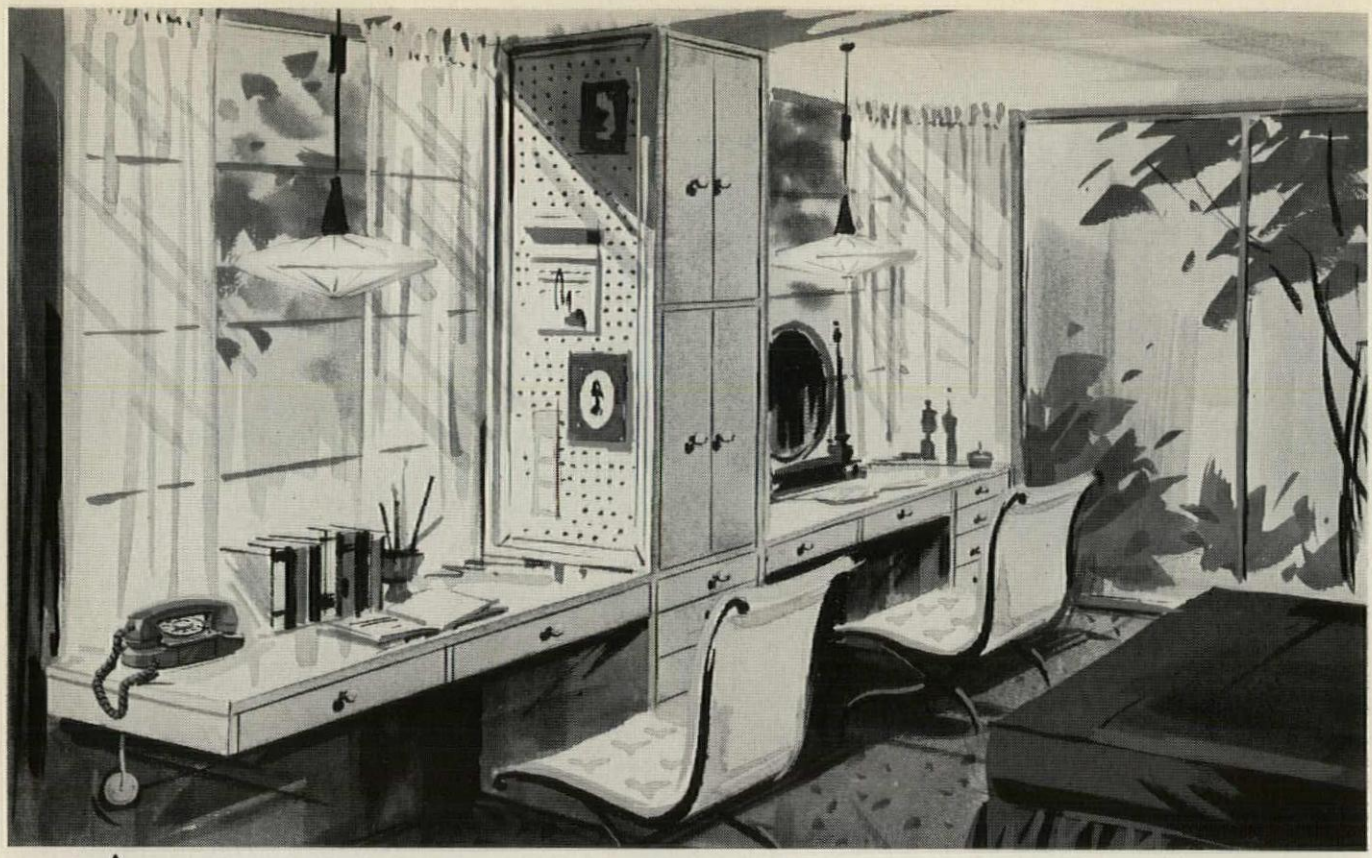
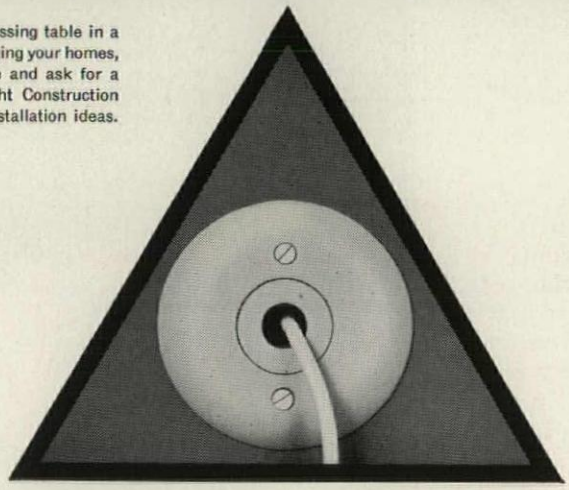


"Electro-Sheet" Copper is available bonded on one or both sides.

For more information, turn to Reader Service card, circle No. 327

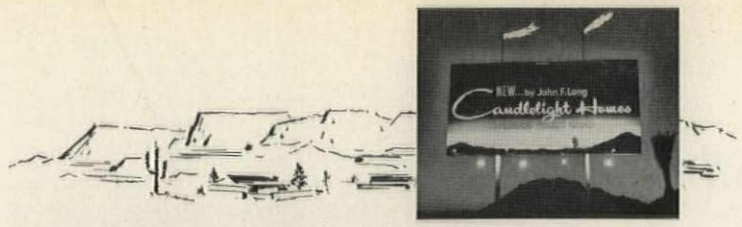


The Princess phone adorns study area and dressing table in a teen-age girl's room. For help in telephone-planning your homes, call your local Bell Telephone Business Office and ask for a Communications Consultant. See Sweet's Light Construction File, 11c/Be, for other residential telephone installation ideas.



SPECIFY *built-in telephone outlets and wiring concealed within the walls. When you do, you provide flexible telephone service, and protect the interior beauty of the home . . . you make homes more livable, more salable.* **Bell Telephone System**

For more information, turn to Reader Service card, circle No. 326



FILON FEATURES HELP BOOST SALES AT JOHN F. LONG CANDLELIGHT HOMES

Every Installation With Translucent Filon Fiberglass Panels Is A Powerful Sales Tool For Merchandising These Pace-Setting Homes

Upgrade the home, keep selling price down. This "more-home-for-the-money" philosophy of John F. Long of Phoenix, Arizona, one of the nation's biggest builders, motivates the use of translucent FILON panels throughout his homes. In kitchens and baths—even outdoors on the patio—John F. Long salesmen capitalize on the dramatic beauty and functional appeal of FILON installations.

According to Long's Director of Research, Charles Ince, the use of FILON converts an ordinary installation into a distinctive and more practical home feature without appreciable increase in cost. For example, FILON shower enclosures produce twin benefits of shatterproof safety and translucent beauty. FILON luminous ceilings provide a bright, spacious look to the kitchens. And on the patio, a glamorous roof of FILON panels creates cool shade and extra living space.

"Home buying prospects immediately recognize the extra value in these FILON features," states Mr. Ince, "and we merchandise them with great success. We have tested FILON in our laboratory and found that it not only meets the claims made for it, but surpasses them. Superior quality and application versatility... this combination continually leads us to new FILON installations—new sales features."

The FILON covered patios, optional features on the homes, are sold from $600 to $1200 depending on the style and size. The patio feature is so popular that over two-thirds of the buyers purchase and conveniently finance it with the home at a reasonable average profit to the builder.

John F. Long salesmen pull no punches when dramatizing the shatterproof safety of FILON shower enclosures. At left, Research Director Charles Ince demonstrates the impact test conducted for each home buying prospect.

When buying a home, the right kitchen is a bright kitchen for the real decision-maker in the family. Especially for her, this FILON luminous ceiling transmits softly diffused illumination, eliminates shadows and dark corners—an irresistible effect with an appealing look of spaciousness.

BUILDING WITH FILON: Get the facts about FILON for new construction and remodeling, the complete product story. Write: FILON, Dept. 43, 333 N. Van Ness Ave., Hawthorne, California.

FILON PLASTICS CORPORATION 1951 10 1961 ANNIVERSARY

FILON®
CORPORATION

Good Housekeeping GUARANTEED

LOS ANGELES • CHICAGO • NEW YORK • ATLANTA • MINNEAPOLIS
BOSTON • DALLAS • DENVER • DETROIT • INDIANAPOLIS • SEATTLE
PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO

For more information, turn to Reader Service card, circle No. 403

Another "first" from Bethlehem!

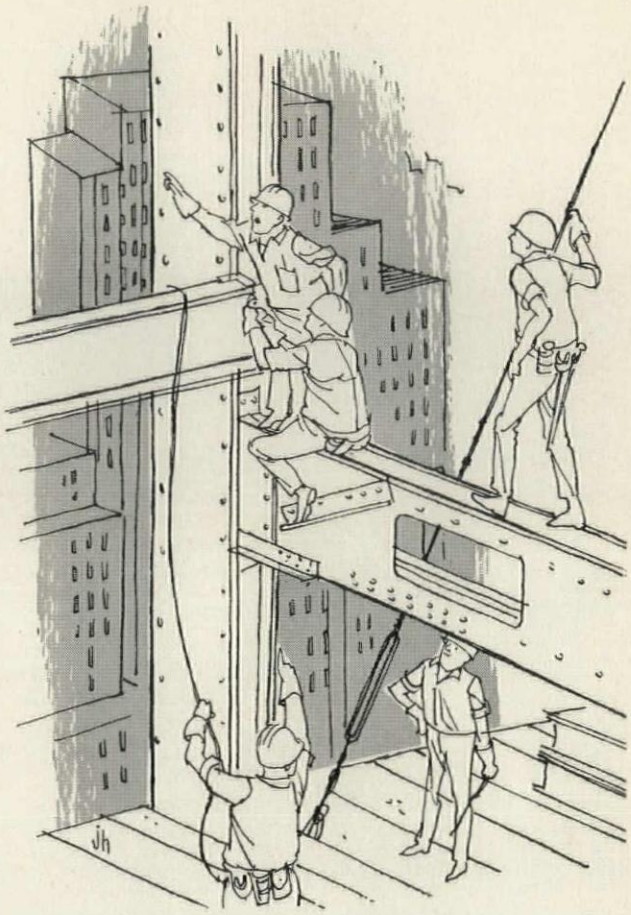
New BETHLEHEM V STEELS

...5 low-price, high-strength steels for construction and general purposes!

Steel

for Strength
... Economy
... Versatility

BETHLEHEM STEEL



- Immediately available in a wide range of structural shapes and plates.

- Yield points range from 45,000 psi to 65,000 psi minimum. That's why we designate them as Bethlehem V45, V50, V55, V60, and V65. Tensile strengths from 65,000 psi to 80,000 psi minimum.

- New V Steels extend higher yield points to thicknesses as great as 1½ inches for plates, and to the full range of structural shapes—at much lower prices than previously available.

- Greatest cost savings are in thinner plates and lighter structural sections where the advantages of higher strengths are most applicable.

- New V Steels can replace more expensive hot-rolled, high-strength steels.

- New V Steels are based on Bethlehem's manganese-vanadium steel, which has been used extensively for high-strength applications, particularly where welding was required.

- New V Steels resulted from Bethlehem research which proved that carefully controlled metallurgical combinations of minor additions of other elements in combination with vanadium made it possible to offer increased strengths at greatly reduced prices.

For more information, send for booklet.
Or call the Bethlehem sales office nearest you.

Publications Department
Bethlehem Steel Company
Bethlehem, Pa.

Please send me .... copies of your booklet on the new Bethlehem V Steels.

NAME.....

TITLE.....

COMPANY.....

STREET.....

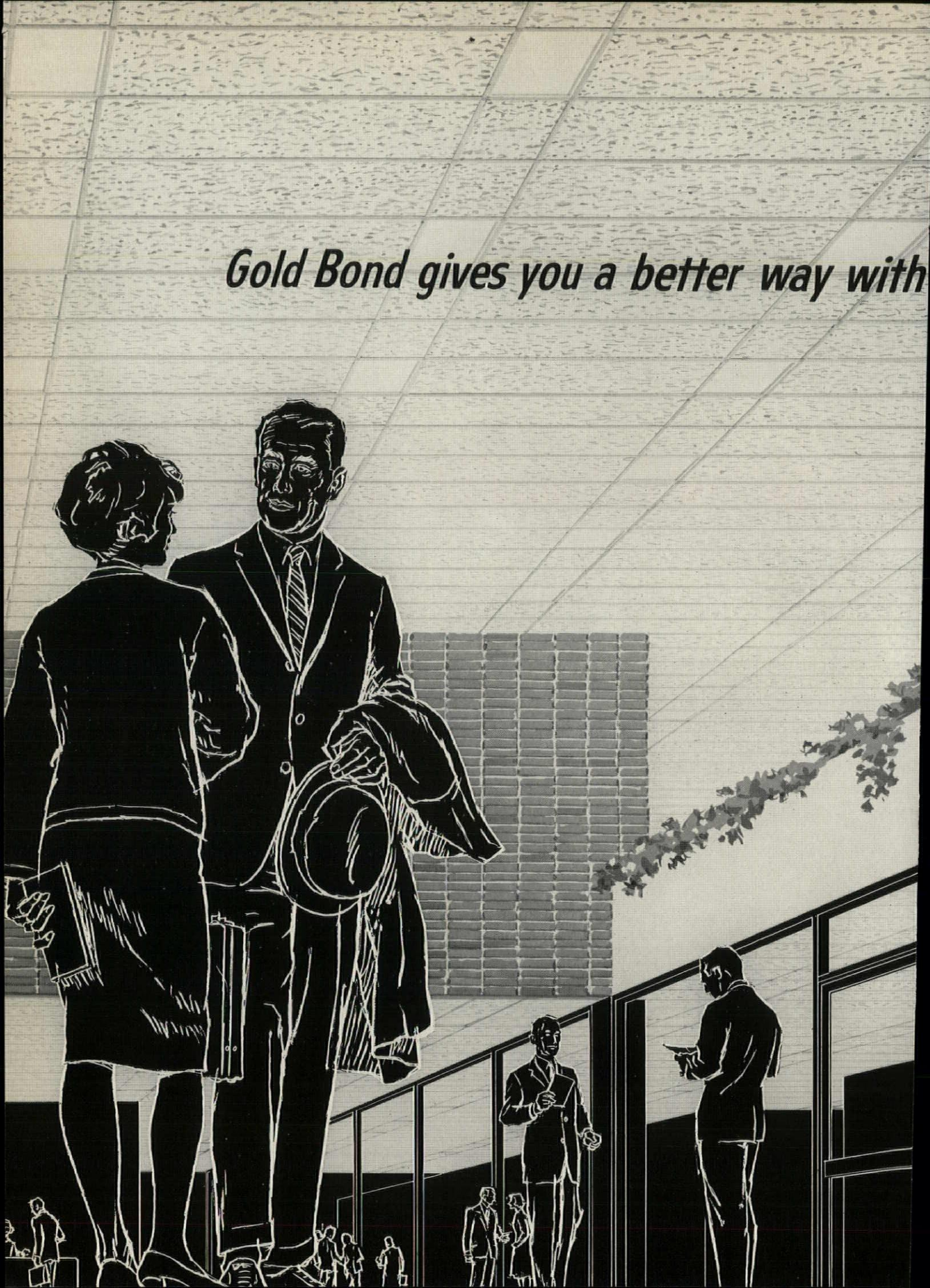
CITY.....ZONE.....STATE.....

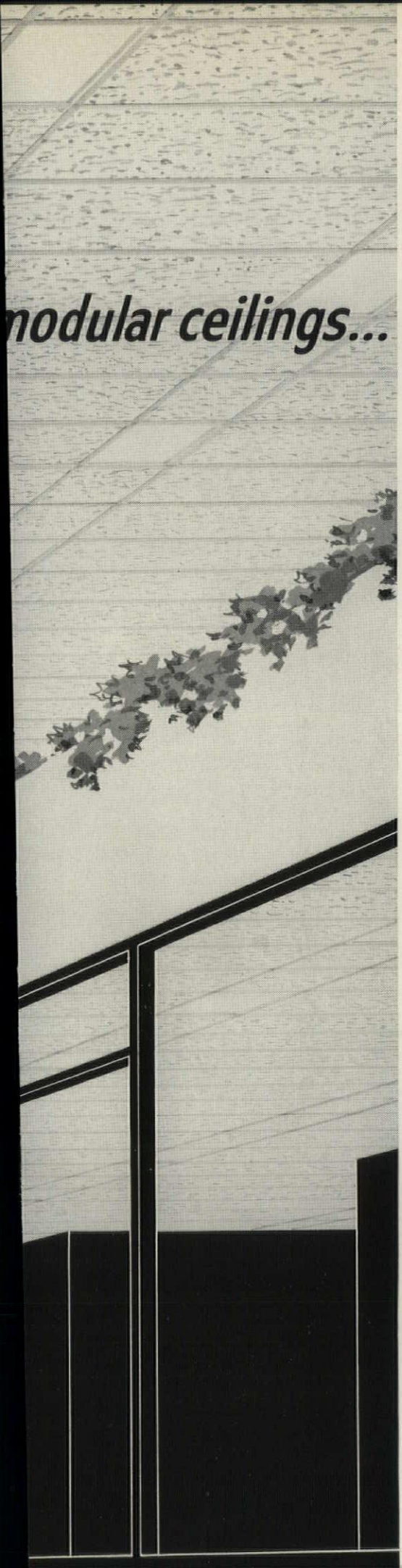
TYPE OF BUSINESS.....

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

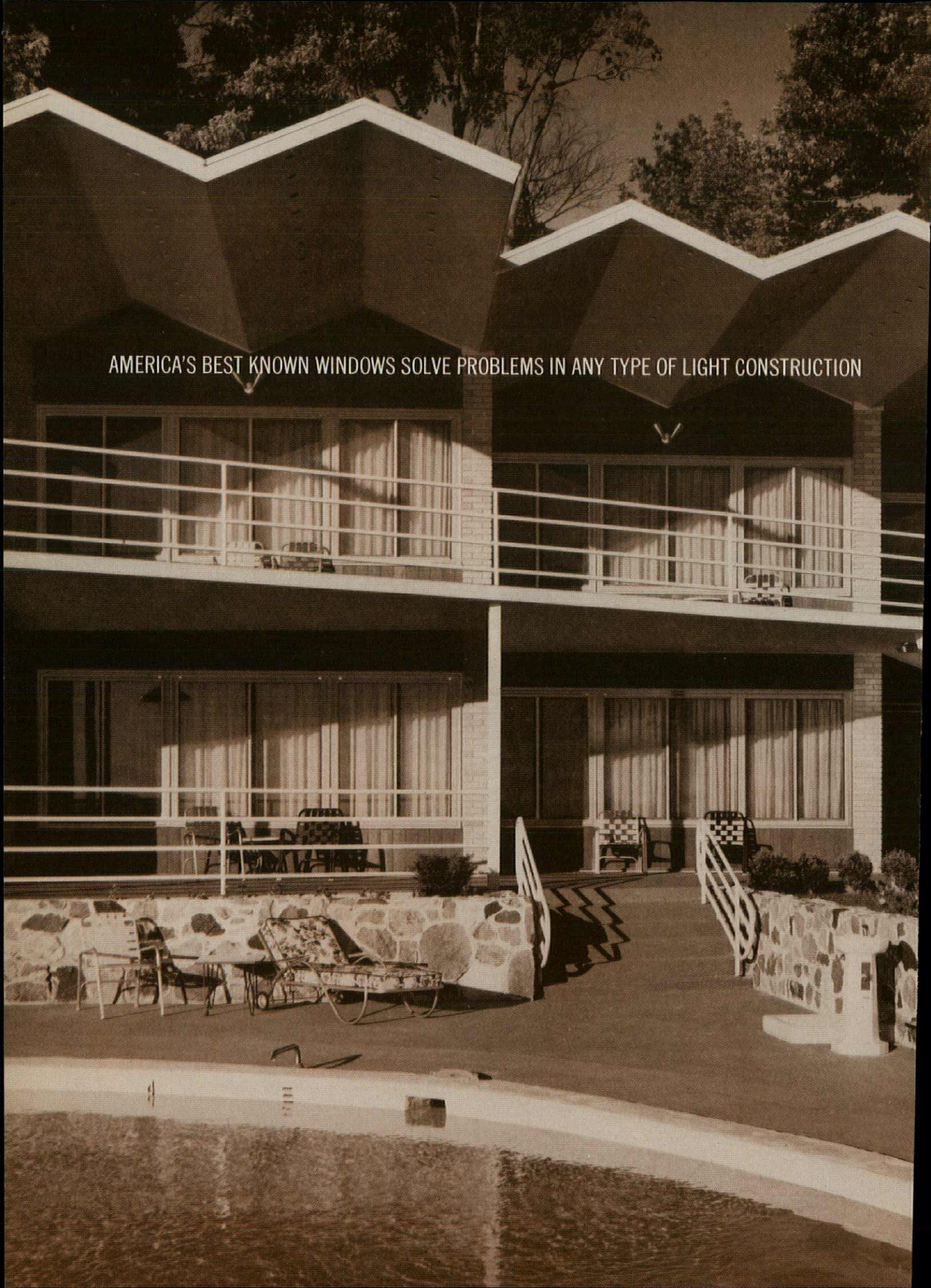

Gold Bond gives you a better way with

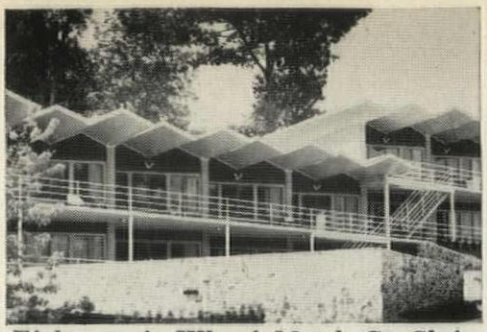


Fissured Pattern

Acoustiroc lets you custom design acoustical ceilings—with unusually large tile sizes without fear of sag (when supported by suspensions on all four sides). Like this office ceiling, for instance. Special 48″x 18″ panels, interspersed with 18″x 12″ tiles, form an orderly pattern around 18″x 12″ lighting fixtures. The product: Gold Bond Acoustiroc, made with an exclusive felting process that interlocks long mineral wool fibers—for 50% greater strength than ordinary mineral wool tiles. Acoustiroc has a good sound-attenuation rating. You can get an almost unlimited size range, from 6″x 24″ wide to 6″x 72″ long. The minimum order for special sizes is 30,000 square feet. You can match tile proportions better to building modules. You will speed erection, reduce material costs. For even more ways with ceilings, call your Gold Bond® Representative. National Gypsum Company, Buffalo 13, N.Y.

Gold Bond®
ACOUSTICAL PRODUCTS


AMERICA'S BEST KNOWN WINDOWS SOLVE PROBLEMS IN ANY TYPE OF LIGHT CONSTRUCTION



Fisherman's Wharf Motel, St. Clair, Michigan. Architect: George D. Lytle

The Andersen Window that solved two problems in this Michigan Motel

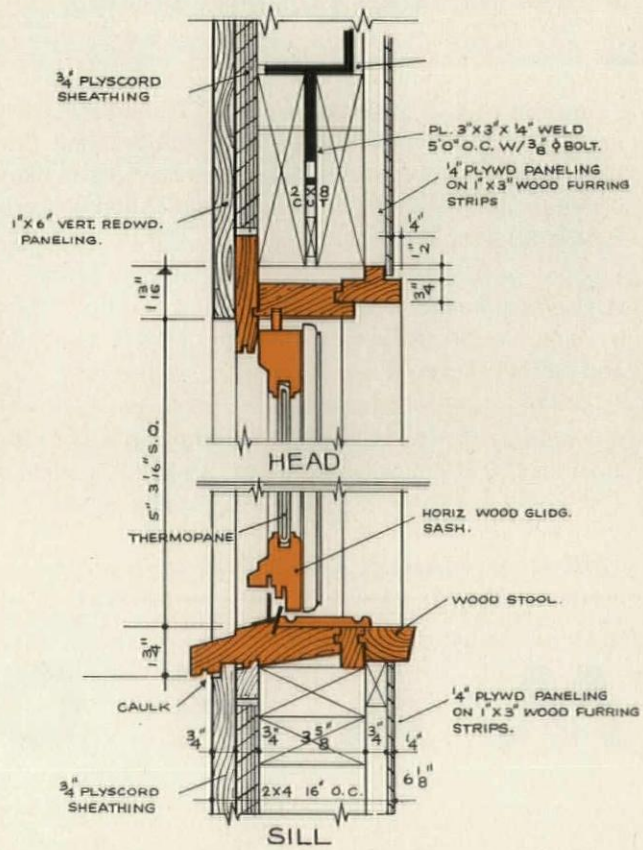
Need for large window areas plus insulating effectiveness met with Andersen Gliders

To take advantage of the view without sacrificing natural ventilation, Architect George Lytle selected Andersen Gliders—the picture windows that glide open sideways.

But, Andersen Gliders also helped solve the heat loss problem. Each unit is electrically heated—controlled in the unit and from a master control panel in the office. Temperatures in each unit can be lowered as guests leave, raised as guests arrive—all from the office. Saves on the heating bills. And, Andersen Windows, with the natural insulating qualities of wood plus their weathertightness (about 5 times industry standards) serve perfectly.

Andersen Windows offer you maximum design flexibility for any light construction project: 7 kinds of windows, 30 different types, 685 cataloged sizes.

Check Sweet's File or write for Detail catalog and Tracing detail files. Andersen Windows are available from lumber and millwork dealers throughout the United States and Canada.



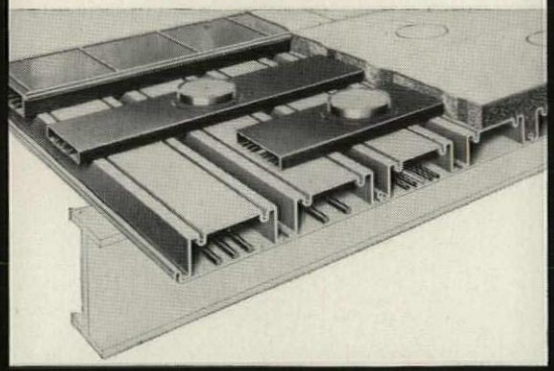
Andersen Windows

America's most wanted windows AW

ANDERSEN CORPORATION · BAYPORT, MINNESOTA

MAHON
M-FLOORS

part of "steel package" contract



DETROIT BANK & TRUST BUILDING
BUILDER-OWNER: SAM MINSKOFF & SONS, INC.
Consulting architects: Emery Roth & Sons
ARCHITECTS AND ENGINEERS: HARLEY, ELLINGTON, COWIN & STIRTON, INC.

There will be 438,400 square feet of Mahon steel cellular sub-flooring in the new Detroit Bank & Trust Building. This is part of the "Steel Package" contract awarded Mahon which also includes complete structural steel fabrication and erection for the 28-floor Building.

Erection of the structural steel and sub-floors (Mahon type M2SR) will be sequenced to take full advantage of the M-Floors as working platforms for erection crews as well as heating, plumbing and electrical crews.

In addition to the faster erection and safer working conditions provided by Mahon M-Floors, the large capacity cells are ideal electrical raceways for power and communications lines —now and in the future. Write for catalog or see Sweet's Files.

OTHER MAHON BUILDING PRODUCTS
Aluminum or Steel Curtain Wall • Metalclad Fire Walls • Rolling Steel Doors • Long-Span M-Deck • Steel Roof Deck • Acoustical Metal Walls, Partitions and roof deck

MAHON CONSTRUCTION SERVICES
Structural Steel-fabrication and erection • Steel Fabrication—Weldments • Geodesic Domes—fabrication and erection.

THE R. C. MAHON COMPANY *DETROIT 34, MICHIGAN*

MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, E. Orange, N.J., Cleveland Hts., Chicago, Torrance, San Francisco, Seattle

1912-1962
50 years of service to industry
MAHON

M A H O N

DEEP QUIET

WITH
B-E-H STYLTONE®
ACOUSTICAL TILE

Styltone absorbs sound. It delivers a noise reduction coefficient of .80, cuts clamor to quiet, lowers noise levels to a minimum, makes any interior better to work in, pleasanter to be in. Manufactured from non-combustible mineral wool, Styltone resists rot and decay. It won't sustain the life of fungus, rodents or insects. It's built for a lifetime of maintenance-free service – and with all this, a new, advanced B-E-H manufacturing process adds looks to Styltone. Slight variations in the fissure size and design produce the effect of veined marble, perfectly attuned to all interior design. Available with squared or beveled edge, ¾" thick in precision sizes, 12"x12", 12"x23¾", 12"x24".

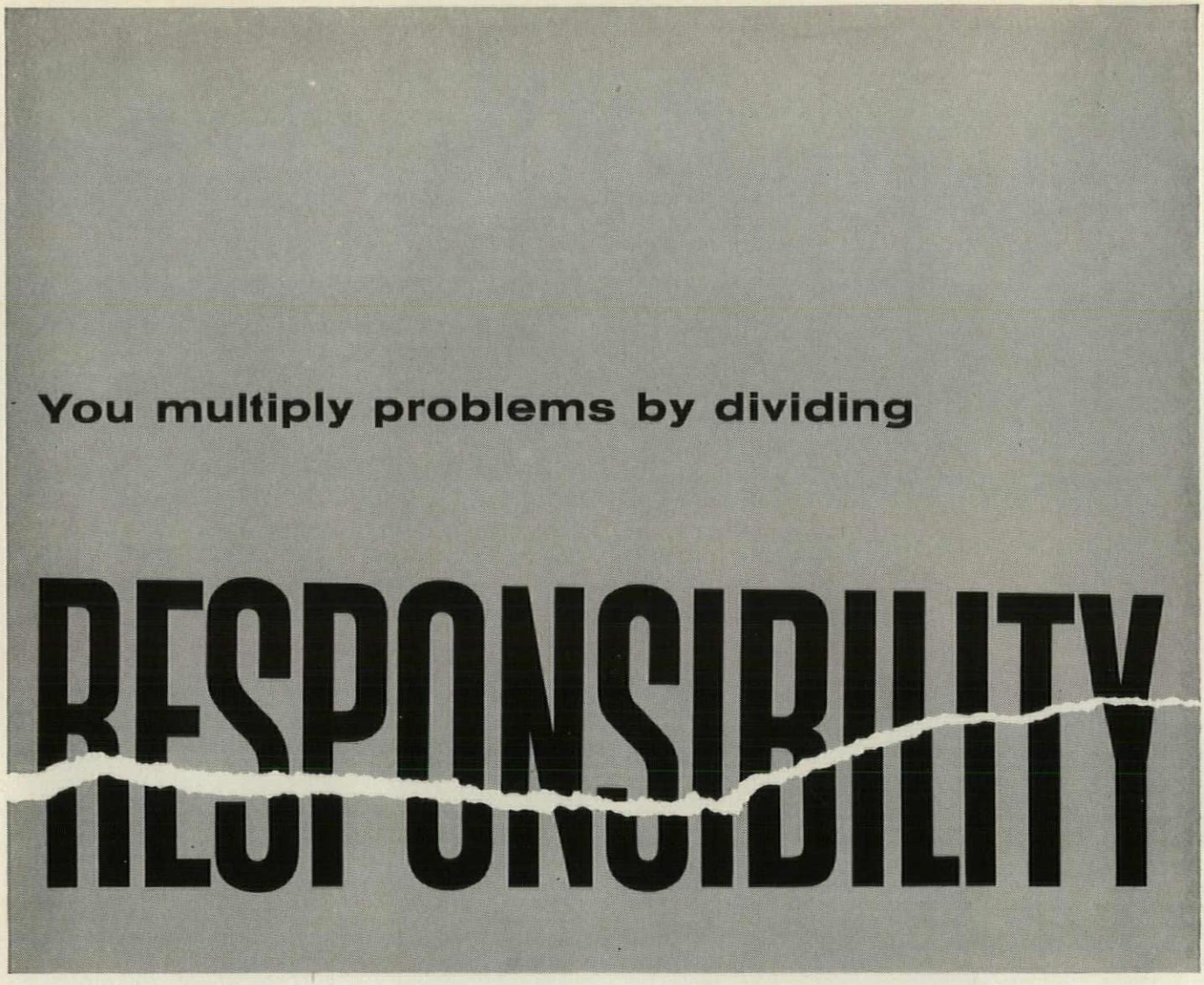
Write, wire or phone for complete information and the name and address of your nearest B-E-H acoustical contractor... the best man for the best job in your area. Baldwin-Ehret-Hill, Inc., Room 405 , 500 Breunig Avenue, Trenton, New Jersey.

BEH BALDWIN EHRET HILL

BALDWIN-EHRET-HILL, Inc.

Supplying a complete quality line of mineral, wood fibre and metal pan acoustical products for every requirement.

For more information, turn to Reader Service card, circle No. 331



It is certainly possible to design an air conditioning system by specifying a variety of major components made by different manufacturers.

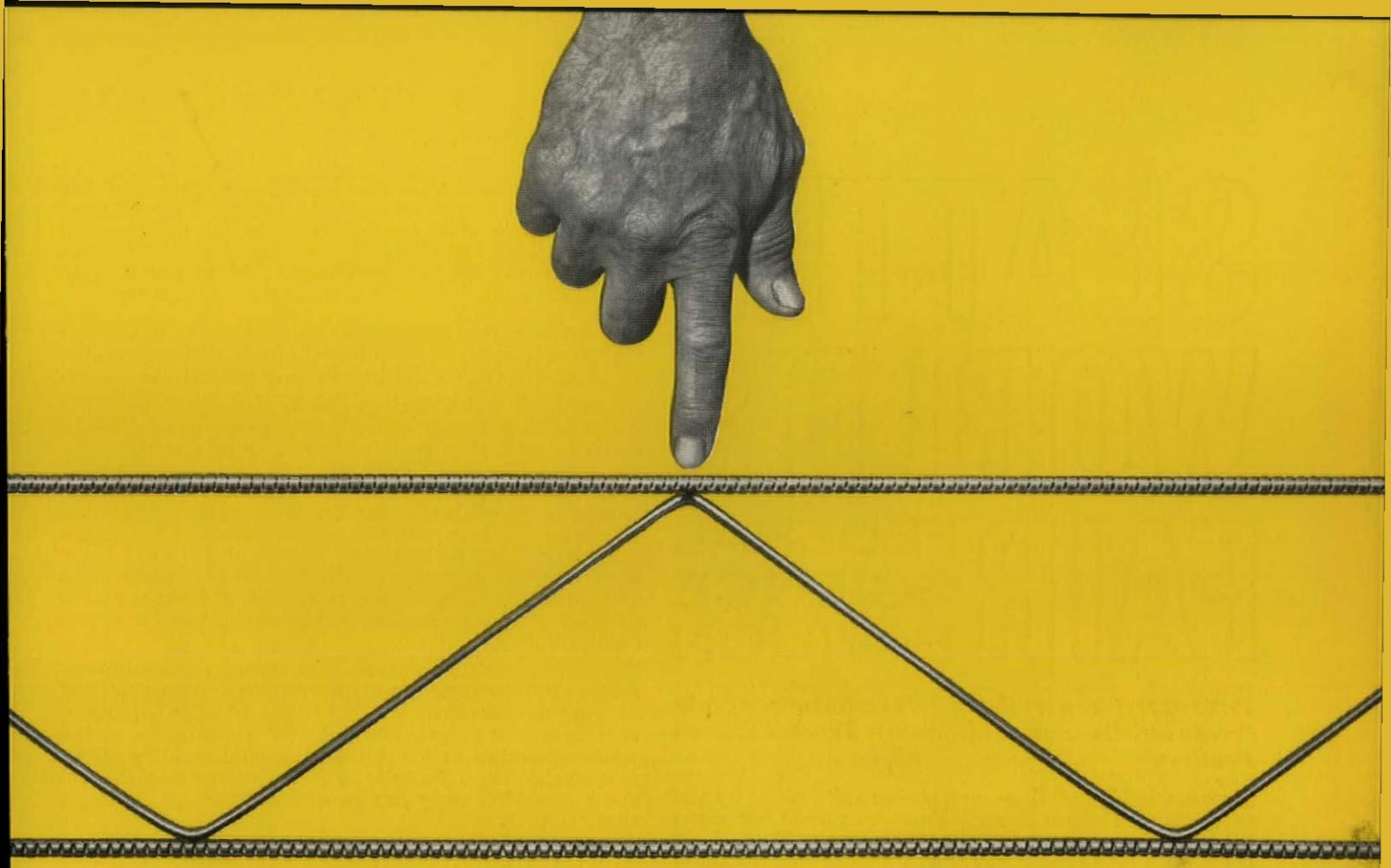
You may even save your clients a few dollars—with refrigeration equipment from one source, cooling and heating coils from another and fans from somewhere else.

But each added source of supply multiplies your clients' problems by dividing responsibility.

Whom will they call if mechanical trouble develops? Which component needs attention? Where will they turn for service? The answers come easily when you specify equipment from one responsible supplier of major components—able to keep the equipment in first-class operating condition.

Although not the only air conditioning manufacturer offering a broad line of components, Carrier is best prepared to serve the owner should trouble come. For our company and our dealers maintain the largest and best-trained service organization in the business—over 11,000 men strong.

Carrier ***Air Conditioning Company***



This is Dur-o-wal

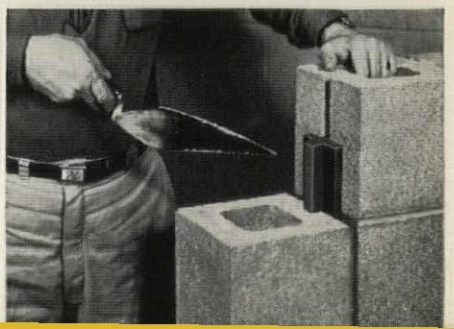
the masonry wall reinforcement with the butt-welded construction

Together with the trussed design, Dur-o-wal is distinguished from other metal-rod reinforcement by the electrically butt-welded contact between cross rods and side rods. All rods are held securely straight and level in a single plane, for bonding and structural efficiency.

This makes for reinforcement that exceeds accepted standards. Dur-o-wal increases the flexural strength of a masonry wall 71 to 261 per cent, depending on weight Dur-o-wal used, type of mortar, number of courses.

An independent new research study shows that Dur-o-wal tied walls outfunction brick-header tied walls. Write to any Dur-o-wal address below for 44-page test report.

STRENGTH WITH FLEXIBILITY—this basic masonry wall requirement is met for sure (and economically!) when Dur-o-wal, above, is used with the ready-made, self-flexing Rapid Control Joint, below, made by the makers of Dur-o-wal.



DUR-O-WAL®

Masonry Wall Reinforcement and Rapid Control Joint

RIGID BACKBONE OF STEEL FOR EVERY MASONRY WALL

DUR-O-WAL MANUFACTURING PLANTS

- Dur-O-wal Div., Cedar Rapids Block Co., **CEDAR RAPIDS, IA.**
- Dur-O-wal Prod., Inc., Box 628, **SYRACUSE, N. Y.**
- Dur-O-wal Div., Frontier Mfg. Co., Box 49, **PHOENIX, ARIZ.**
- Dur-O-wal Prod., Inc., 4500 E. Lombard St., **BALTIMORE, MD.**
- Dur-O-wal Inc., 1678 Norwood Ave., **TOLEDO, OHIO**
- Dur-O-wal of Ill., 260 S. Highland Ave., **AURORA, ILL.**
- Dur-O-wal Prod. of Ala., Inc., Box 5446, **BIRMINGHAM, ALA**
- Dur-O-wal of Colorado, 29th and Court St., **PUEBLO, COLO.**
- Dur-O-wal Northwest Co., 3310 Wallingford Ave., **SEATTLE, WASH.**
- Dur-O-wal of Minn., 2653 - 37th Ave., So., **MINNEAPOLIS 6, MINN.**
- Dur-O-wal Ltd., 789 Woodward Avenue, **HAMILTON, ONTARIO, CANADA**

Concrete design and performance report:

SEATTLE WORLD'S FAIR FEDERAL SCIENCE PAVILION

POZZOLITH controlled performance concrete speeds construction of all-precast Federal Science Pavilion

Six remarkable buildings on a six-acre site make up the $3½ million Federal Science Pavilion, one of the main "theme" features of the Seattle World's Fair. Built completely of precast, prestressed concrete components weighing a total of 11,000 tons, it is believed to be the largest building group ever to utilize this type of construction. It will provide permanent quarters for possibly the most comprehensive science exhibit ever assembled.

Gothic in white—The dazzling white concrete buildings are grouped around a central plaza and rest area containing a pool and fountains. A striking effect is achieved at the entry to the plaza by five open-ribbed vaults rising to 100 feet in height. Gothic in style, the soaring, slender concrete arches symbolize science's continuing search for knowledge.

Exterior surfaces are of white concrete, treated to obtain an exposed quartzite aggregate finish that gives a gleaming white mosaic effect.

Precast concrete throughout—All of the buildings and the 100-foot arches are built of precast, prestressed concrete units. The T-type wall panels are 52′ long and up to 4″ thick. On two sides of all buildings are S-type load bearing stud wall panels, designed to repeat the Gothic motif of the open-ribbed arches. These S-type panels are 32′ and 52′ long, 3″ thick, with a main section 18″ deep and 10″ wide. The largest components supplied were the single-T roof beams, 60′ to 112′ long, 5′ wide, 2½″ to 4½″ thick, and weighing up to 28 tons.

Special concrete considerations—Because of the limited construction time allowed, high early strengths were imperative to the prestressed concrete producer.

All of the S and T wall panels that were to have the white finish were cast face down with white concrete to desired depth, then gray concrete was used to complete the panel. The white concrete mix proportions were 1 part Trinity white cement to 3½ parts of ¼″ top-size quartz aggregate, and a special POZZOLITH formulation which further enhanced the appearance. For backup, a gray concrete mix containing 7 sacks of Type III Incor cement, ¾″ aggregate and POZZOLITH was used. With 140° steam curing, *release strengths of 5000 psi were obtained in 12 to 14 hours. Average strength at 7 days was over 7000 psi.*

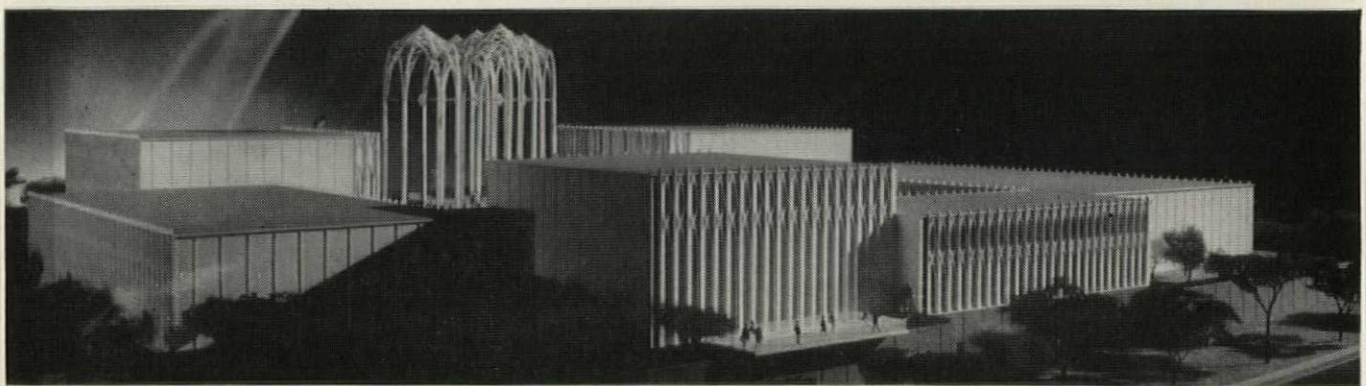
It was extremely important that the two separate concretes develop their ultimate strengths close together, varying not more than 15% in psi. Another consideration here was to provide sufficient retardation in the white concrete to allow integration and bonding of the two layers. *Use of POZZOLITH in the mix enabled the producer to control these factors and meet the performance specifications.*

The local Master Builders Field Man, working closely with Associated Sand & Gravel Company, producers of the precast, prestressed components, helped them develop the ideal mix formulations for fast production, specified strengths and superb finished appearance.

For your next project, call in the Master Builders Field Man near you. Without obligation, he will demonstrate how concrete made with POZZOLITH produces a superior building material—superior in performance, in quality, and in economy to plain concrete or concrete produced with any other admixture. *The Master Builders Company, Cleveland 18, Ohio • Division of Martin Marietta Corporation.*

MASTER BUILDERS

POZZOLITH® is The Master Builders Co. ingredient for concrete which provides maximum water reduction, controls rate of hardening and increases durability.



ARCHITECT'S MODEL OF FEDERAL SCIENCE PAVILION, Seattle World's Fair, Seattle, Washington—11,000 tons of POZZOLITH concrete used in completely precast, prestressed structure under supervision of U. S. Government General Services Administration for U. S. Dept. of Commerce. • Architects: Minoru Yamasaki & Associates, Detroit, and Naramore, Bain, Brady & Johanson, Seattle • Engineering: Worthington, Skilling, Helle & Jackson, Seattle • General Contractor: Purvis Construction Company, Spokane • Precast Concrete Components: Associated Sand & Gravel Company, Inc., Everett, Wash. • Prestressed Concrete Mix Designs and Control: Herman Adalist & Associates, Seattle.

Precast concrete Gothic arches and wall panels were formed and prestressed at plant 25 miles from fair grounds, trucked to construction site. Open S-type wall panels combined with T-type panels result in unusual and pleasing decorative effect. Use of all precast components speeded erection considerably.

137 ROOMS FURNISHED by HEYWOOD-WAKEFIELD

At Tucson's Magnificent Executive Inn New Executive Inn

As new as it is, the Executive Inn is fast becoming a Tucson landmark. Beautifully designed inside and out, this deluxe motor inn has every modern facility for the enjoyment of its guests. ■ Because each detail of the Executive Inn's furnishings had to reflect quality and also complement the crisp modern decor, Heywood-Wakefield's Riviera Group was selected to furnish all 137 guest rooms. Beautiful, durable and surprisingly reasonable, the Riviera Group adds brilliance to a superb motel. ■ The Executive Inn's management took advantage of the convenience offered by Heywood-Wakefield and its affiliated Contract Furnishers of America member firms and the entire transaction, including financing, was completed promptly and efficiently. ■ For complete details regarding Heywood-Wakefield's broad line of contract furniture, write Heywood-Wakefield Co., Gardner, Mass.

The Riviera furniture was supplied through Revere Furniture and Equipment Co., Washington, D. C.

All outdoor furniture was produced by the Lloyd Manufacturing Company, a Heywood-Wakefield subsidiary.

MEMBER
Contract Furnishers of America
5 YEAR FINANCE PLAN

CFA

HEYWOOD-WAKEFIELD
EST. 1826

2 MORE
NEW DOOR CLOSERS
by CHALLENGER®

Now offering immediate delivery in a complete line of compact closers to meet modern door requirements

Once again Challenger steps out ahead with its progressive product line, bringing to you more products, and greater services than ever before. Now, from three full series of locksets; from a wide selection of compact closers; and from an extensive range of accessories you can specify Challenger throughout for locking, latching and closing requirements on virtually any door in any type of structure.

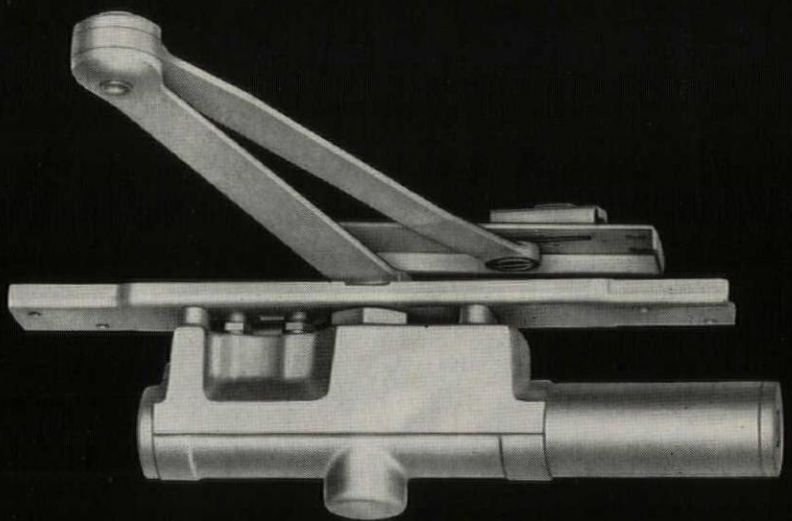
And, there is more to come. Challenger is on the move.

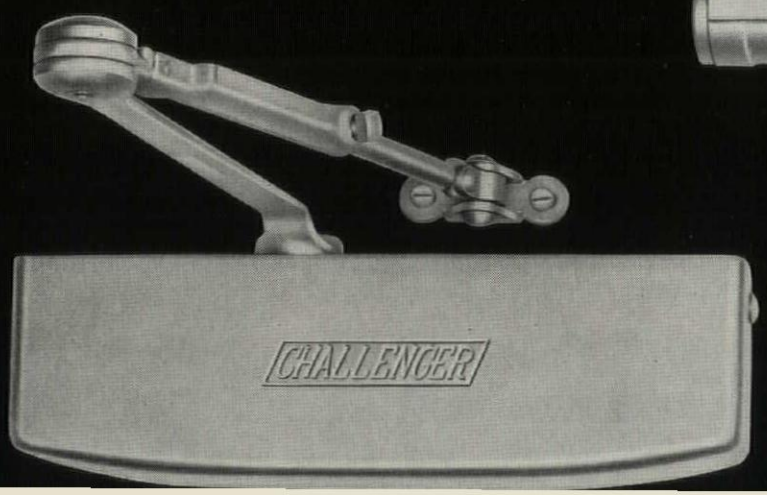
WATCH FOR OTHER NEW PRODUCT ANNOUNCEMENTS—SOON

Call collect—PRospect 4-1044 or write for complete literature. **CHALLENGER LOCK CO.** • 2349 W. La Palma Ave., Anaheim, Calif.

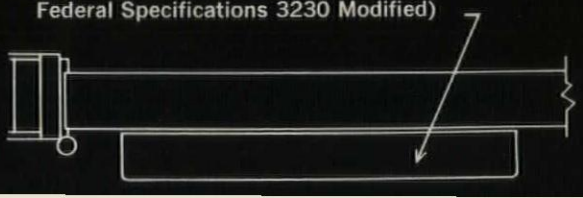
For more information, turn to Reader Service card, circle No. 402

CONCEALED—fits inside 1-3/4" doors
Series 2160 (meets requirements of Federal Specifications 3230)





COMPACT—narrow as 1-13/16"
Series 2140 (meets requirements of Federal Specifications 3230 Modified)



TERRAZZO

floors—in 688 classrooms save school system $37,262 per year

Henrico County, Virginia has specified monolithic Terrazzo floors *throughout* all schools built or planned since 1957. Savings in manpower and materials in floor cleaning and maintenance are exceeding original estimates. Here is a comparison made by Mr. George R. Grubbs, Custodial Supervisor for the school system:

Typical 30-classroom elementary school

Asphalt tile—annual cost of cleaning and maintenance	$4,505.00
Terrazzo—annual cost of cleaning and maintenance	2,880.00
Annual savings with Terrazzo	$1,625.00 per school or 54.16 per classroom

688 classrooms in Henrico's campus-plan schools will be floored with Terrazzo when present construction is completed. Annual savings in maintenance and cleaning total $37,262.08. At this rate, declares Mr. Grubbs, the higher original installation cost of Terrazzo (20¢ per sq. ft. more than the next best floor) will be justified in just a few years.

These savings are based on cleaning and routine maintenance only. Repairs and replacement are not included. County officials state that in 8 or 10 years, when asphalt tile would have to be replaced, savings with Terrazzo will be sharply increased.

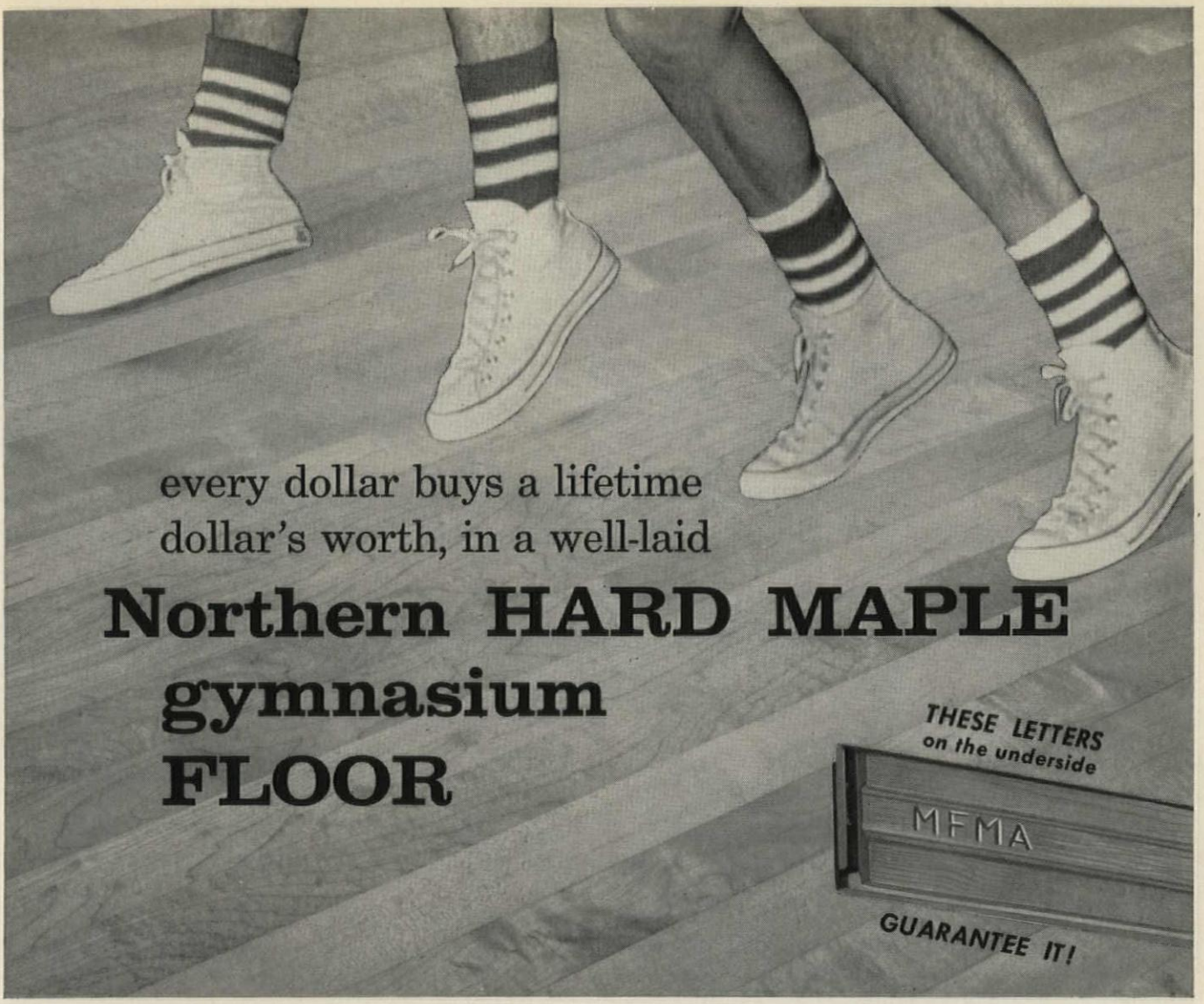
The benefits of Terrazzo have been more than economic. Teachers and students are pleased with floor comfort and beauty—beauty that will never be marred by indentations made by women's spike heels. Skillfully engineered acoustical ceilings keep noise at or below the usual classroom level.

Technical Data Brochure upon request. Field representatives available for consultation.
Catalogued in Sweet's

Member Producers' Council

THE NATIONAL TERRAZZO AND MOSAIC ASSOCIATION

N.A.D.A. Building, 2000 K St., N.W., Washington, D.C.

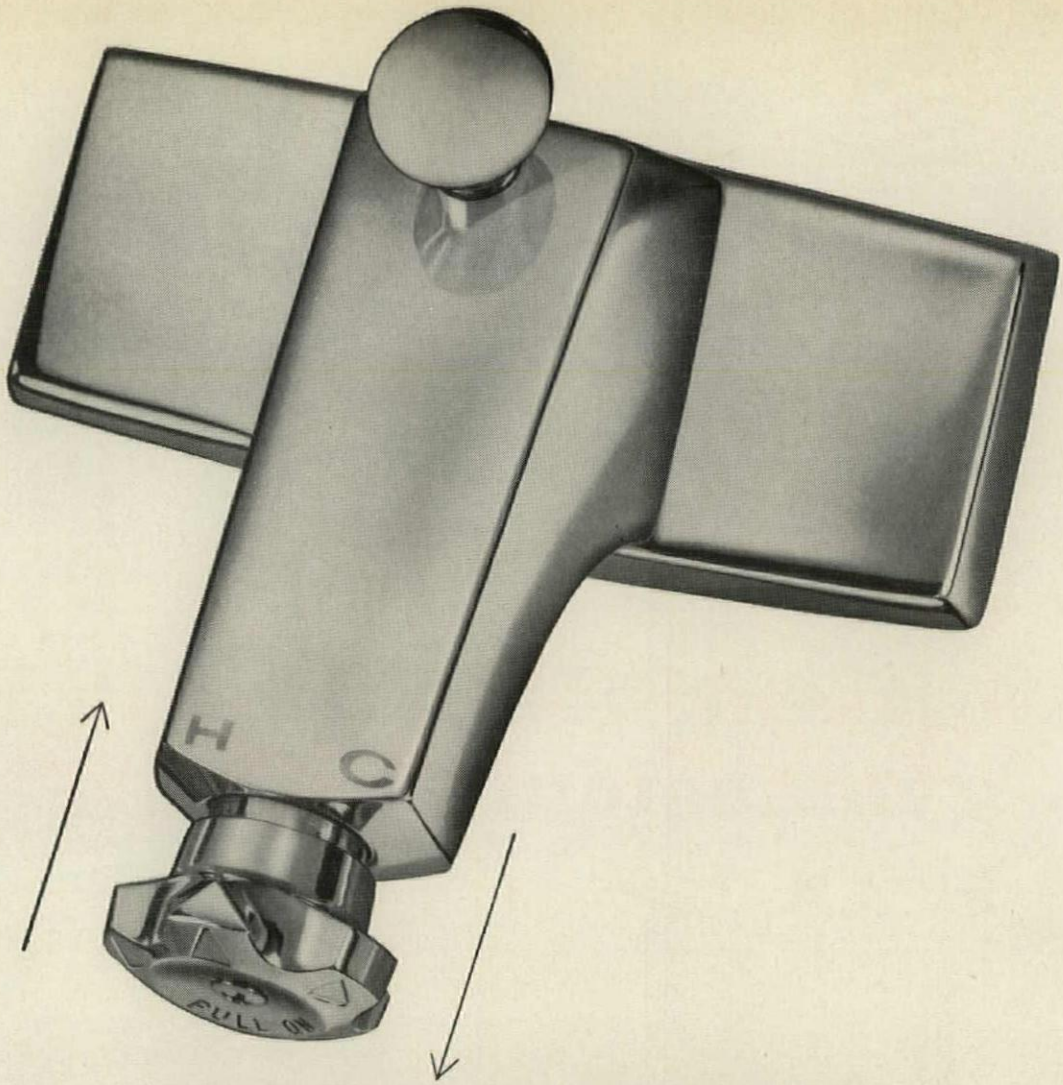


Every gymnasium ought to have a properly laid floor of Northern Hard Maple. That's the documented conviction — practically unanimous — expressed in a nation-wide survey of coaches and athletic directors. *Most gymnasiums do* have these beautiful, smooth, non-abrasive floors. • They promote confident play because: their brightness aids peripheral vision, their smoothness minimizes skin-burn, their *true* resilience vastly reduces shin-splints. And their tight-grained toughness fights off generations of strenuous usage — *usually outlasts the building* — with merely routine maintenance. • Specify this unique wood specifically. NORTHERN Hard Maple. The 65-year-old millmark, MFMA, pressed into the underside, attests that the wood is genuine *Acer Saccharum* — never, *never* mixed with a softer species. It *guarantees* precise dimension, scientific kiln-drying, grading and bundling in conformance with official MFMA standards and backed by strict MFMA mill inspections. • And, by all means, take this final precaution . . . have your floor laid by men with honest pride in their skill and reputation. The careful work of such men is well worth its fair price in your cherished building dollars. See Sweet's (Arch.) 13jMA and write for newest list of MFMA-approved floor finishes and for Coaches' Survey Summary. Address: Maple Flooring Manufacturers Association, 35 East Wacker Drive, Chicago 1, Ill., Suite 589.

IN STRIP, BLOCK OR PATTERNED TYPES, NAILED, CLAMPED OR LAID IN MASTIC

NORTHERN HARD MAPLE

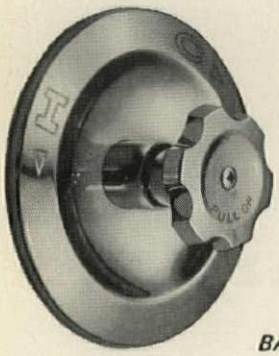
THE *finest* FLOOR THAT GROWS



NEW FROM AMERICAN-STANDARD

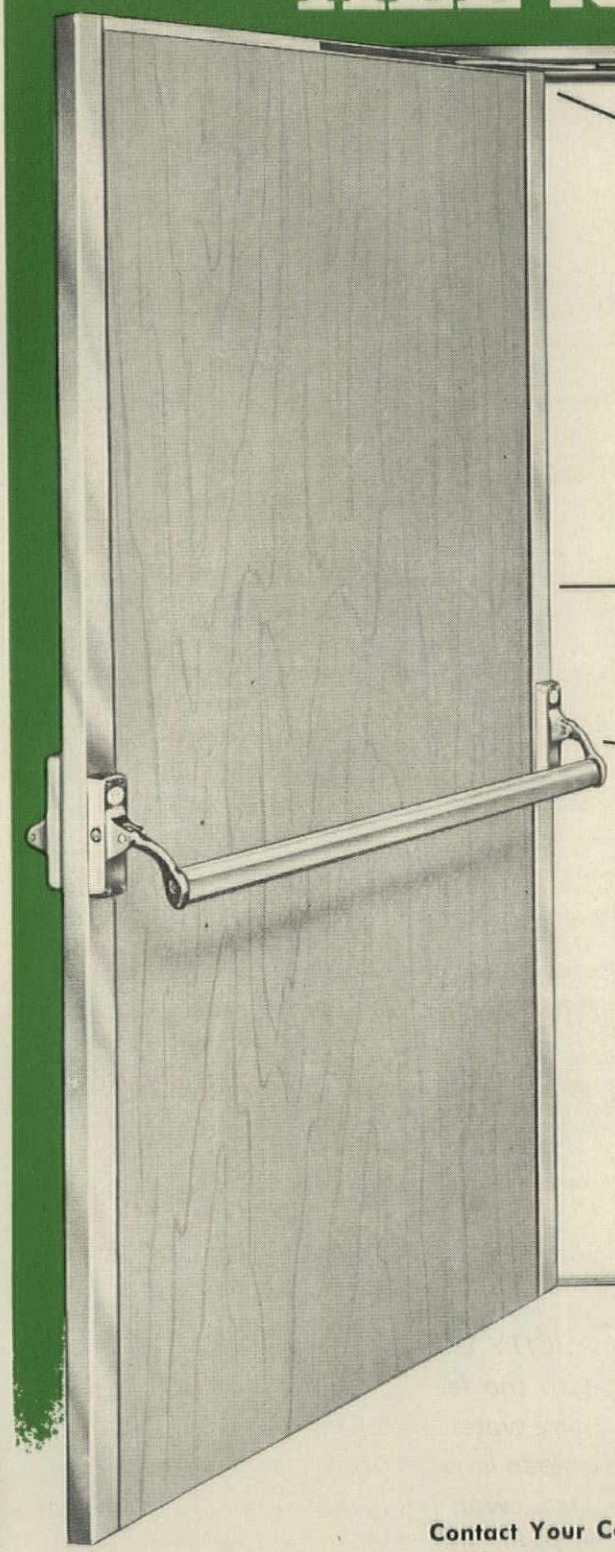
PUSH-PULL FAUCETS

...COMBINE FUNCTIONAL SIMPLICITY WITH EYE APPEAL! A pull turns on the new PUSH-PULL. A twist to the left releases hot water...to the right, cold...a push turns it off. Soapy water from wet hands drips into the bowl, not onto the faucet. It stays clean longer. The new PUSH-PULL with use-tested Hyseal valves is washerless...won't drip, leak or cause expensive service calls. All brass and stainless steel. Specify the newest...specify the PUSH-PULL. ■ *For more details, contact your nearest American-Standard sales office, or write: AMERICAN-STANDARD, PLUMBING AND HEATING DIVISION, 40 W. 40th St., New York 18, N. Y.*

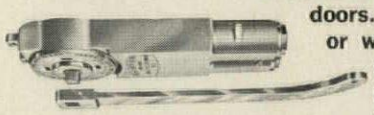


BATH AND SHOWER FITTING

ALL NEW for '62



New Offset Arm with Concealed Closer



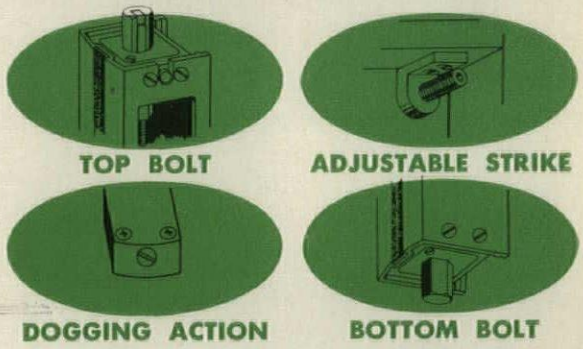
Now available . . . designed to meet your conditions for single acting wood or metal doors. Offset Arm units available with or without selective hold-open feature, for use with all models of the proven Jackson 20-330 Concealed Overhead Closer.

New "TRIMSTYLE"

Now . . . Jackson delivers another new innovation to you. Factory fabricated stiles to save on the job-time and labor and to enhance and simplify your hardware installation requirements on all types of wood doors.

Concealed Exit Panic Device

The 880H Jackson Concealed Exit Device for wood or metal doors has all new improved features. Full adjustment of bolts without removal. Solid aluminum crash-bar. New fast dogging action. Adjustable strike. New instant acting improved top and bottom bolt guides, non-handed.



All Jackson closers are unconditionally guaranteed for 2 years.

Contact Your Contract Hardware Consultant

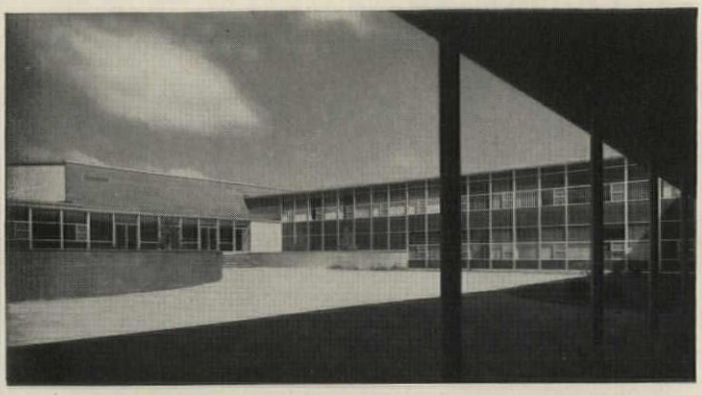
GUARANTEED PRODUCTS BY

jackson

EXIT DEVICE CORPORATION

3457P Union Pacific Ave. • Los Angeles 23, Calif.

Great Neck Junior-Senior High School, North Hempstead, L. I., New York. Architect: LaPierre, Litchfield & Partners (Alfred Hopkins & Assoc.). Contractor: Pealty & Fuhruman, Inc., New York, N, Y. Photograph by: C. V. D. Hubbard.



Carthage Junior-Senior High School, West Carthage, New York. Architect: Sargent, Webster, Crenshaw & Folley, Syracuse, New York. Contractor: John W. Rouse Construction Co., Gouverneur, New York. Photograph by: C. V. D. Hubbard.

St. Theresa Chinese Catholic Mission, Chicago, Illinois. Architect: Kefer and Cronin, Chicago, Illinois. Contractor: Ashland Construction Co., Chicago, Illinois. Photograph by: Hedrich-Blessing.

any curtain wall worth custom designing is worth Lupton undivided responsibility

Let your imagination go on custom aluminum curtain walls. LUPTON can follow through completely!

Our custom-produced units give functional versatility for any project, however large. You get wide latitude in expression, planning and form . . . as well as in colors, finishes and textures. Your ideas are creatively translated into facades precisely as you visualize them. And with *one source of responsibility*, from your final design to the final installation.

As you develop your designs, LUPTON project engineers are available to work closely with you, advising on or coordinating the manufacturing processes involved. Then LUPTON curtain wall craftsmen produce your designs exactly as conceived. Finally, skilled LUPTON field supervisors direct the installation with speed and efficiency for maximum savings to you and your client.

Financial responsibility is equally assured. LUPTON is a solidly established company that stands behind all jobs. Our reputation for reliability goes back 25 years.

Investigate all the advantages of LUPTON ability and total services as they apply to your current or future projects. See Sweet's Architectural File (sections 3 & 17) for the Michael Flynn Aluminum Curtain Wall and Window catalogs. A call to the nearest LUPTON representative (see Yellow Pages under "Windows—Metal") will bring fast action without obligation.

LUPTON® **MICHAEL FLYNN MANUFACTURING COMPANY**

Main Office and Plant: 700 East Godfrey Avenue, Philadelphia 24, Pa., West Coast Office and Plant: City of Industry (Los Angeles County), California.
SALES OFFICES: Stockton, California; Chicago, Illinois; New York City; Cleveland, Ohio; Dallas, Texas. Representatives in other principal cities.

NEW .....VALUE ENGINEERED

FOR LOWEST INSTALLED COST

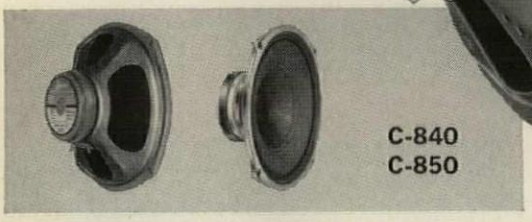
8″ SPEAKERS FOR DISTRIBUTED SOUND

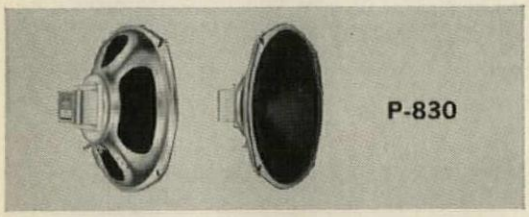
This new line of Jensen 8-inch Professional Series loudspeakers is specially designed to meet the exacting rigorous demands for commercial sound installations. The 8-inch size is ideal for the majority of all distributed sound systems giving more than adequate low frequency range without enclosure and mounting complications.

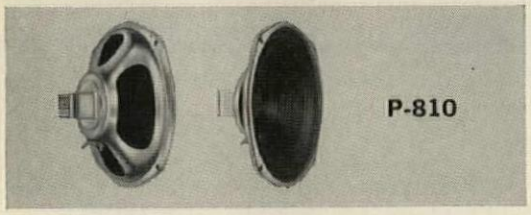
A wide selection of models to meet every need—from the lowest cost highly competitive application to the most sophisticated highest quality system.

This entire line is *value engineered* for *lowest installed* cost of the entire system. Convenient 10-pack with or without preattached 70.7 or 25-volt transformers are options available. Handy KWIKON* instant connectors for input and power tap adjustment.

For full details write for individual data/specifications available on each speaker.





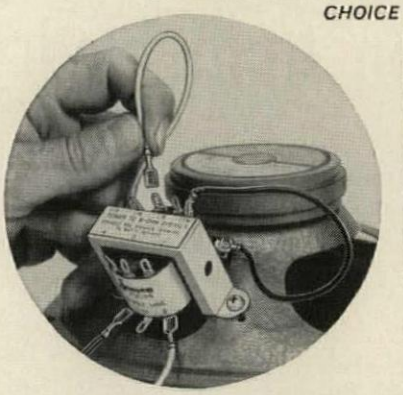


1. AVAILABLE IN HANDY 10-PACK

Added savings and convenience in bulk-packed carton of ten speakers, with or without preattached transformers.

2. PREATTACHED TRANSFORMERS

CHOICE OF 70 AND 25-VOLT LINE TYPES



Especially designed for use with the popular "constant voltage" distribution systems. Center-tapped primary windings for balanced-line or special circuit needs. Tapped secondary for adjustment of power to 8-ohm speaker in 3 db steps from ⅛ watt to 4 watts. Core size ⅝″ x ⅝″. Two 3/16″ dia. mounting holes on 2⅝″ centers. Prices below are for transformers only.

70CV4. For 70-volt distribution systems.

25CV4. For 25-volt distribution systems.

List Price.....**$4.75**

Model	Power Rating Watts	Magnet Weight Ounces	Loudness Level(3)	Overall Depth	Net Weight Pounds	List Price
C-855	12	10.0(1)	85.0	3 1/16″	2½	$13.50
C-850	12	10.0(1)	85.5	3″	2⅜	12.95
C-840	11	6.0(1)	84.5	2 15/16″	2	10.95
P-830	10	2.5(2)	84.0	3¼″	1¼	7.25
P-810	9	1.47(2)	82.0	3 5/16″	⅞	5.80

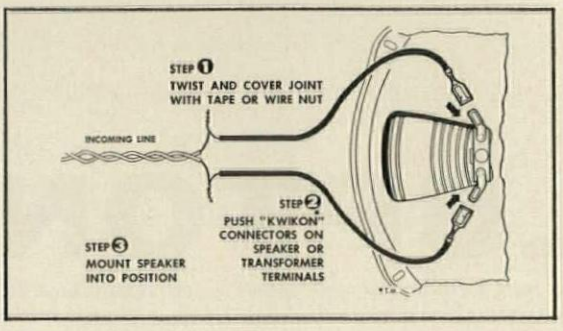
(1)—SYNTOX-6® Ceramic. (2)—DP-Alnico-5.
(3)—db above 2x10⁻⁴ dyncs/cm.² @ 10 Ft. for input power of 1.0 watt standard 800-1250 cps warble signal.

Speakers conform to applicable EIA Standards. Max. O.D. 8¼″; width and height 7 11/16″. Recommended baffle cutout 6¾″ dia. Nom. voice coil impedance 8 ohms. Facilities for standard 2-hole mounting transformers up to ¾ x ¾ nominal core size.

3. KWIKON* INSTANT CONNECTORS

Simply twist bare ends of two 12″ input leads supplied for each speaker to incoming signal cable leads, insulate with wire-nut or tape. Slide sleeve clips onto input terminal lugs of speaker or preattached transformer as speaker assembly is raised into place. KWIKON* instant connectors also provide simple fast power tap readjustment on transformer.

*T.M.



jensen MANUFACTURING COMPANY
Division of THE MUTER COMPANY
6601 S. Laramie Avenue, Chicago 38, Illinois
In Mexico: Universal De Mexico, S.A., Mexico, D.F.

STANLEY

MAGIC-DOOR Equipment makes shopping fast, convenient

IT'S FAST! Automatic door operation speeds traffic flow, reducing the number of doors needed. Through strategic door location — and the use of guard rails — a one-way traffic pattern is created to move customers directly into the selling areas, thru to the check-out counters and out the exit door. Pilferage is reduced.

IT'S CONVENIENT! Elderly people, mothers who shop with babies in strollers, and those carrying bundles prefer entrances and exits where there is no need to touch doors with hands.

IT CUTS COSTS! Door and equipment damage is reduced, and warm or cold conditioned air is conserved.

The complete STANLEY line of MAGIC-DOOR Equipment includes Hydraulic, Pneumatic and Electric Operators. You can be sure of specifying the equipment just right for any commercial, institutional or industrial application.

Write for literature covering your specific installation, to Stanley Hardware, Division of The Stanley Works, MAGIC-DOOR SALES, **Dept. C, 78** Lake Street, New Britain, Conn.

SLIM SILHOUETTE...

and "SWING-CLEAR" STYLING

The modern, trim BB600 Series 3-Knuckle Ball Bearing Hinge* recently introduced by STANLEY is now also available in "Swing-Clear" Styling.

Where the attractive, trim look is desired throughout modern hospitals and institutions, you can now specify matching standard and "Swing-Clear" type template hinges with the new BB600 Series slim silhouette styling. Specify BB641 for half mortise and BB651 for full surface "Swing-Clear" Hinges. Available also in full-mortise and half-surface "Swing-Clear" hinges.

Write for your copy of our Hospital Hardware Folder (H-157) to: Stanley Hardware, Division of The Stanley Works, Dept. C, 78 Lake Street, New Britain, Conn.

*Patents Pending

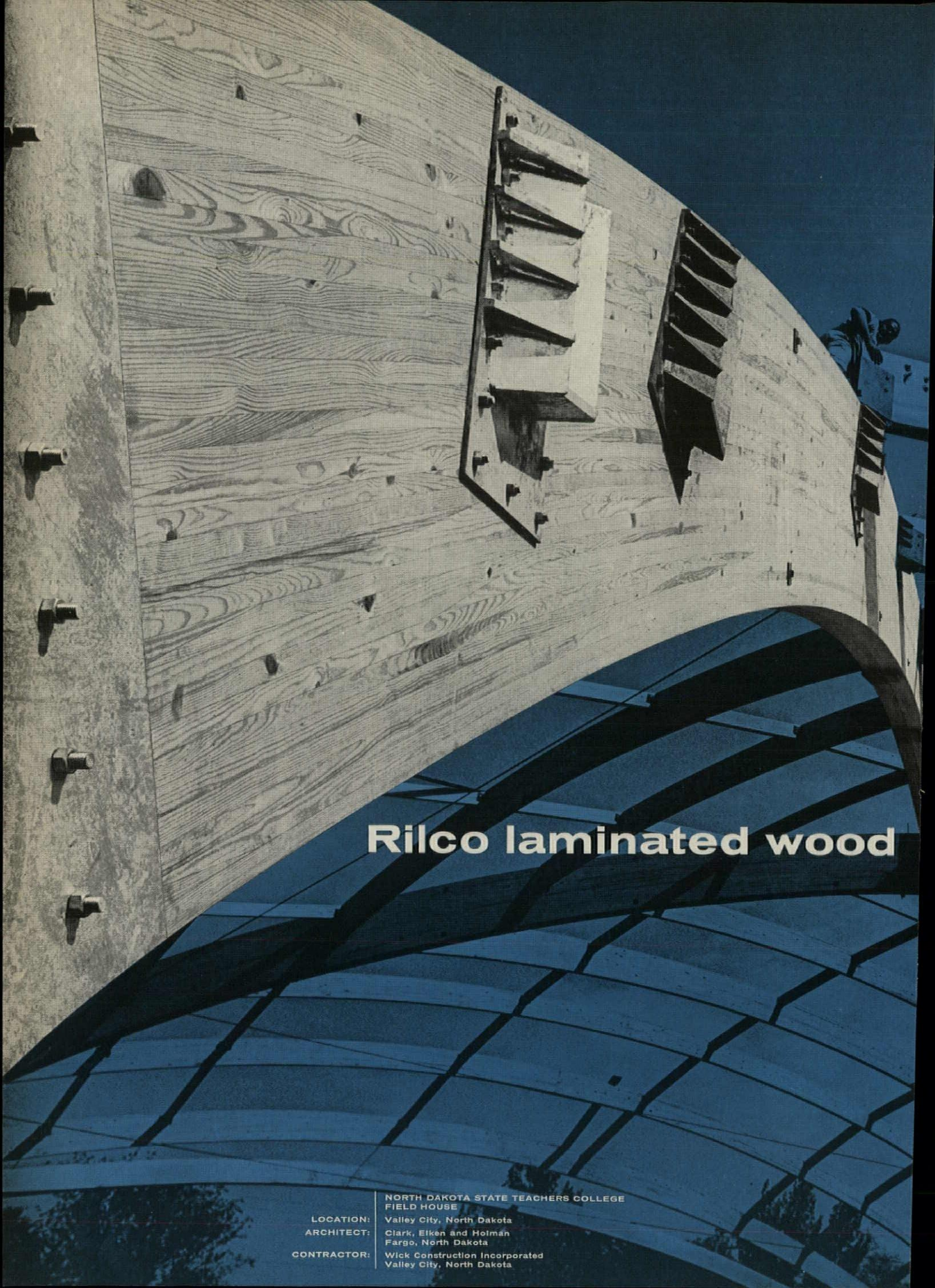
THE STANLEY® WORKS

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works, New Britain, Conn.—hand tools • power tools • builders hardware • industrial hardware • drapery hardware • automatic door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.

CANADIAN PLANTS: HAMILTON, ONTARIO AND ROXTON POND, P.Q.

For more information, turn to Reader Service card, circle No. 385



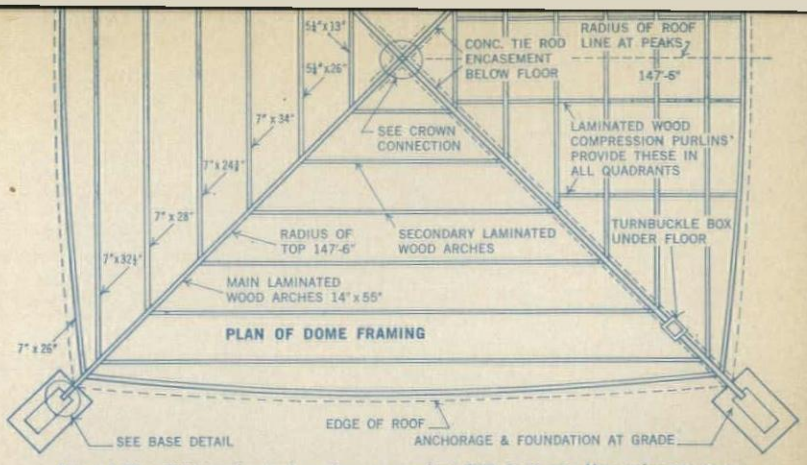
Rilco laminated wood

NORTH DAKOTA STATE TEACHERS COLLEGE
FIELD HOUSE

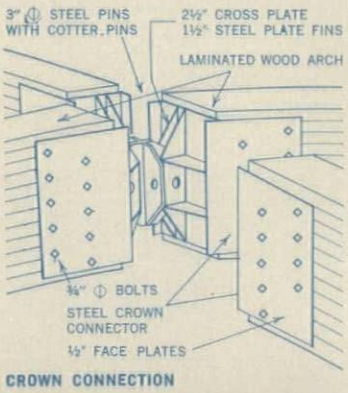
LOCATION: Valley City, North Dakota

ARCHITECT: Clark, Elken and Holman
Fargo, North Dakota

CONTRACTOR: Wick Construction Incorporated
Valley City, North Dakota

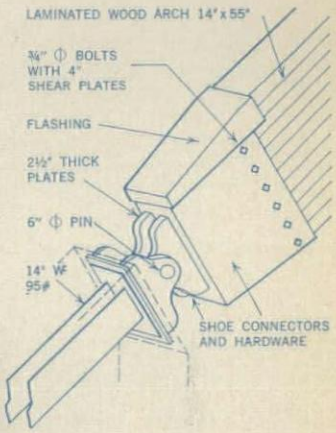


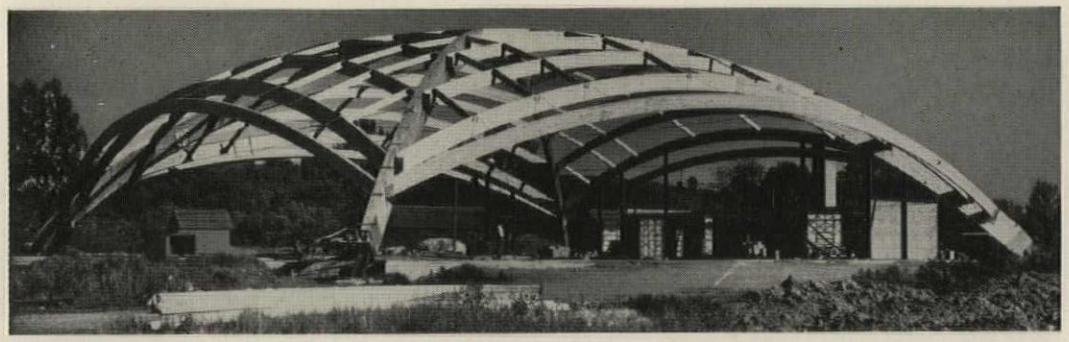
Four 14" x 55" laminated arches spanning 208 feet are the primary supporting members holding a roof load of almost 120 tons. 1⅛" tie rods with turnbuckles increase rigidity. Rilco 3" x 6" t&g wood decking was laid at right angles to segment timbers and face nailed with 40d spikes.



CROWN CONNECTION

BASE CONNECTION MAIN ARCH

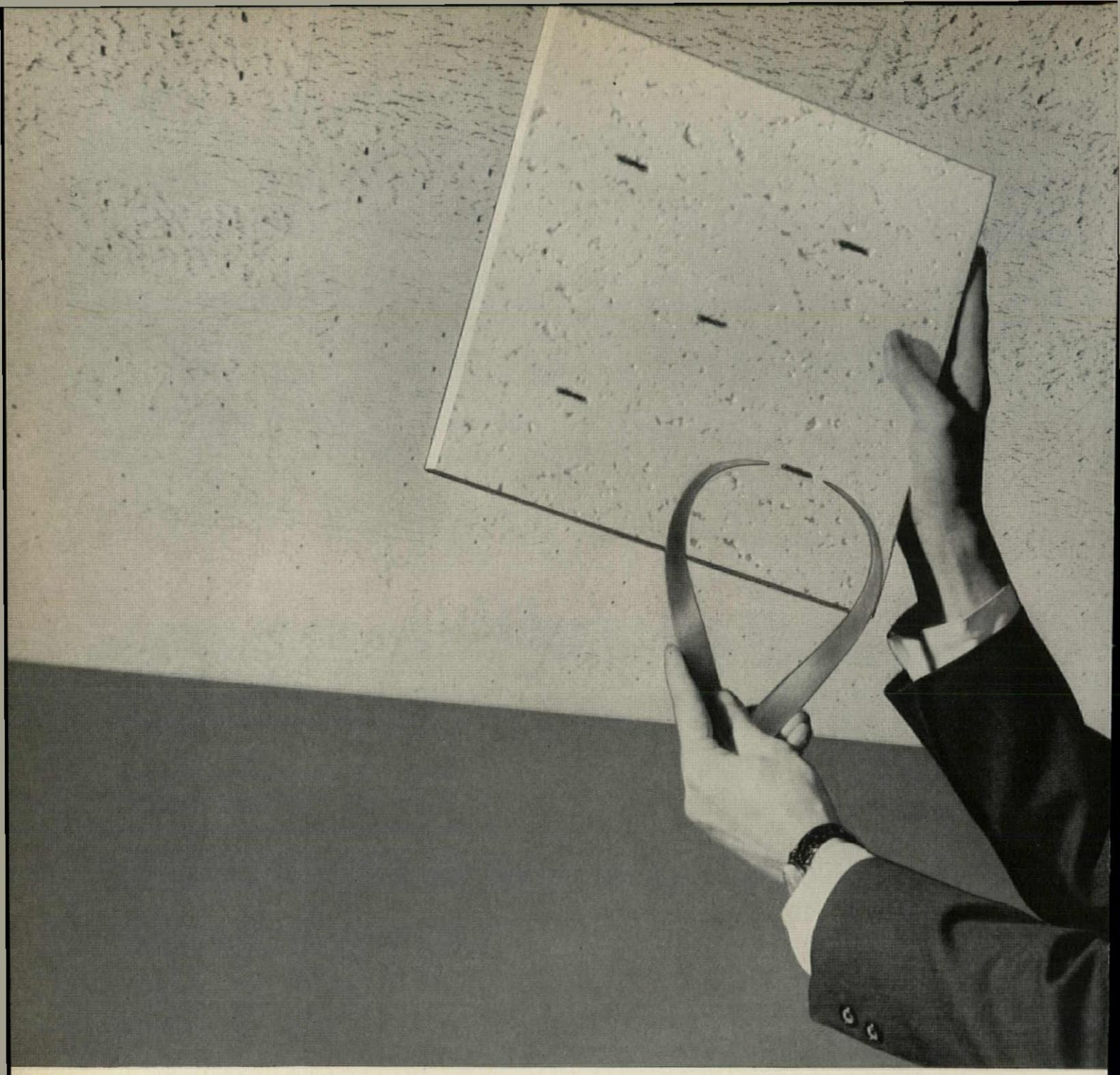




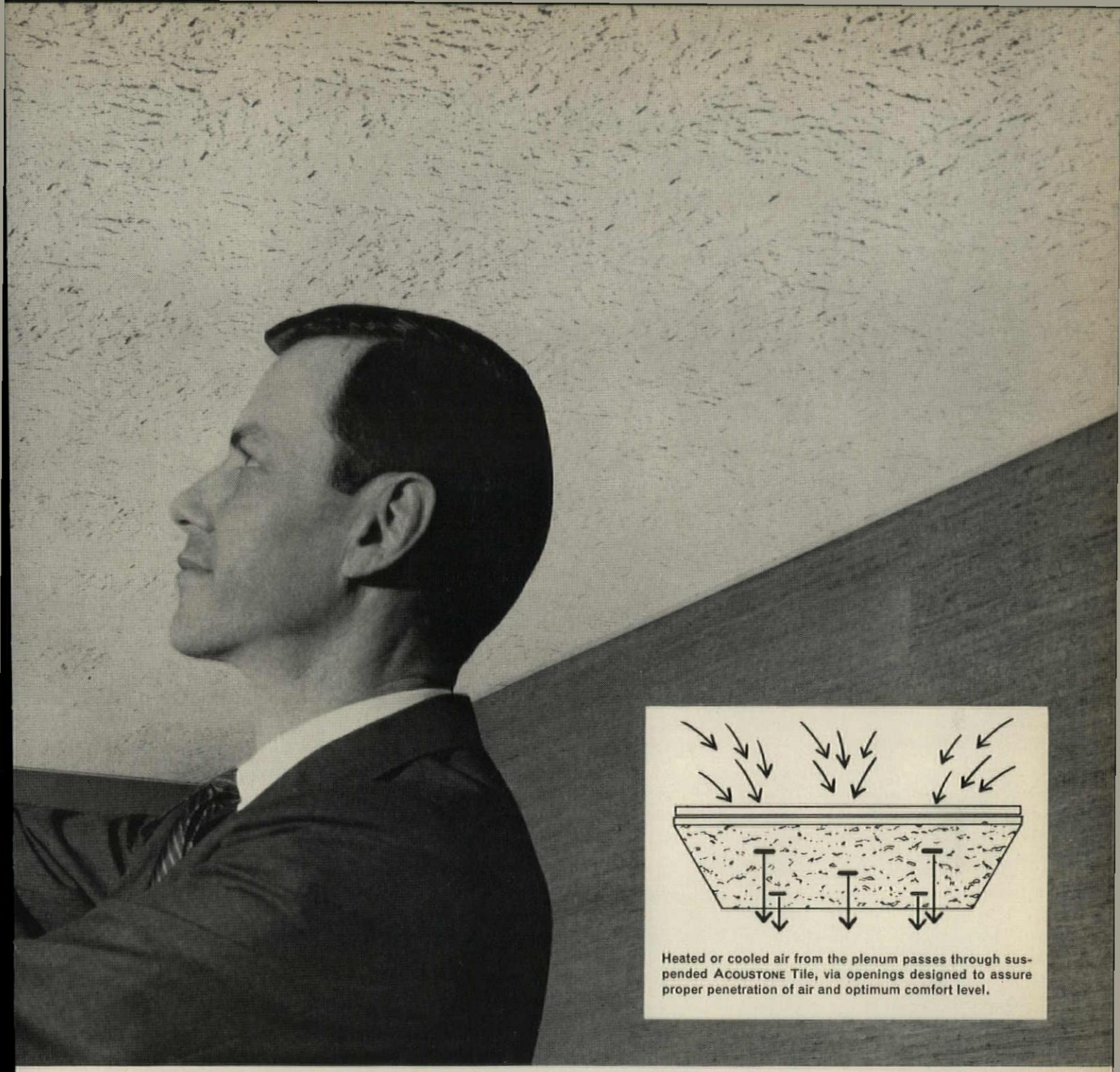
the span between imaginative design and economical construction

A web of 32 Rilco arches and 80 compression purlins forms the structural backbone of the North Dakota State Teachers College field house. ■ A Rilco framing system was selected for these reasons: 1) no other material could match the economy of Rilco members; 2) the architect was able to design the building to the exact shape necessary for indoor athletics, with 100% use of space; 3) good acoustical and insulation qualities were achieved without special treatments or need for framework enclosures; 4) through close planning with Rilco field service engineers, the prefabricated structure became a simple and fast field assembly job. ■ These same advantages can be put to work on your school, commercial and church projects. Experienced Rilco engineers will help you with preliminary plans, structural specifications and erection details. Information available in Sweet's Architectural Catalog File, 2bRi and AIA File 19-B-3, or write Rilco Engineered Wood Products Division, Tacoma 1, Wash.

Weyerhaeuser Company



Engineered for scientific air flow



Heated or cooled air from the plenum passes through suspended ACOUSTONE Tile, via openings designed to assure proper penetration of air and optimum comfort level.

CUTTING OPENINGS in acoustical tile for proper comfort-conditioning is not as simple as punching holes in doughnuts. Proper penetration of air into the room, so vital to effective air distribution, is provided by the AIRSON System through scientifically designed openings in the tile.

The size and shape of these openings channel conditioned air from plenum, through suspended ceiling to room, with just the right velocity for uniform penetration. This eliminates stagnation; provides comfortable air motion down where people can appreciate it. That's the reason for conditioned air in the first place.

AIRSON† Air Distribution System

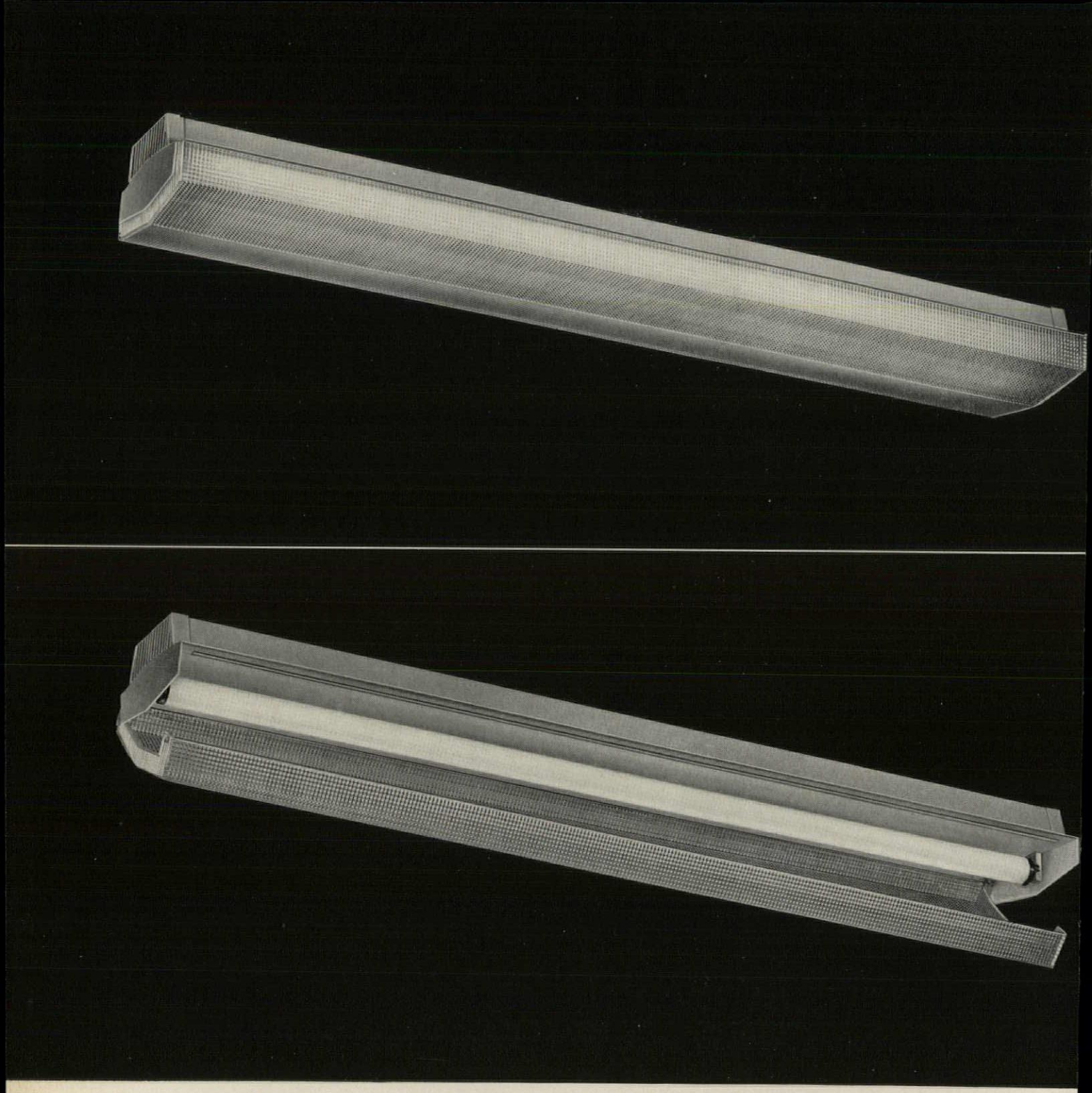
With AIRSON, you can pinpoint air penetration—actually design in the occupant comfort level. And AIRSON offers all these important features: control—to balance the air flow. Cleanliness. The beauty and quiet of ACOUSTONE* Acoustical Tile. Millions of square feet in use.

Get some eye-opening facts on air penetration. Ask your U.S.G. Architect Service Representative, or write Dept. PA-21, 300 W. Adams St., Chicago 6, Ill. *T.M. Reg. U.S. Pat. Off. † Reg. U.S. Pat. Off. by Airson Co., Inc.

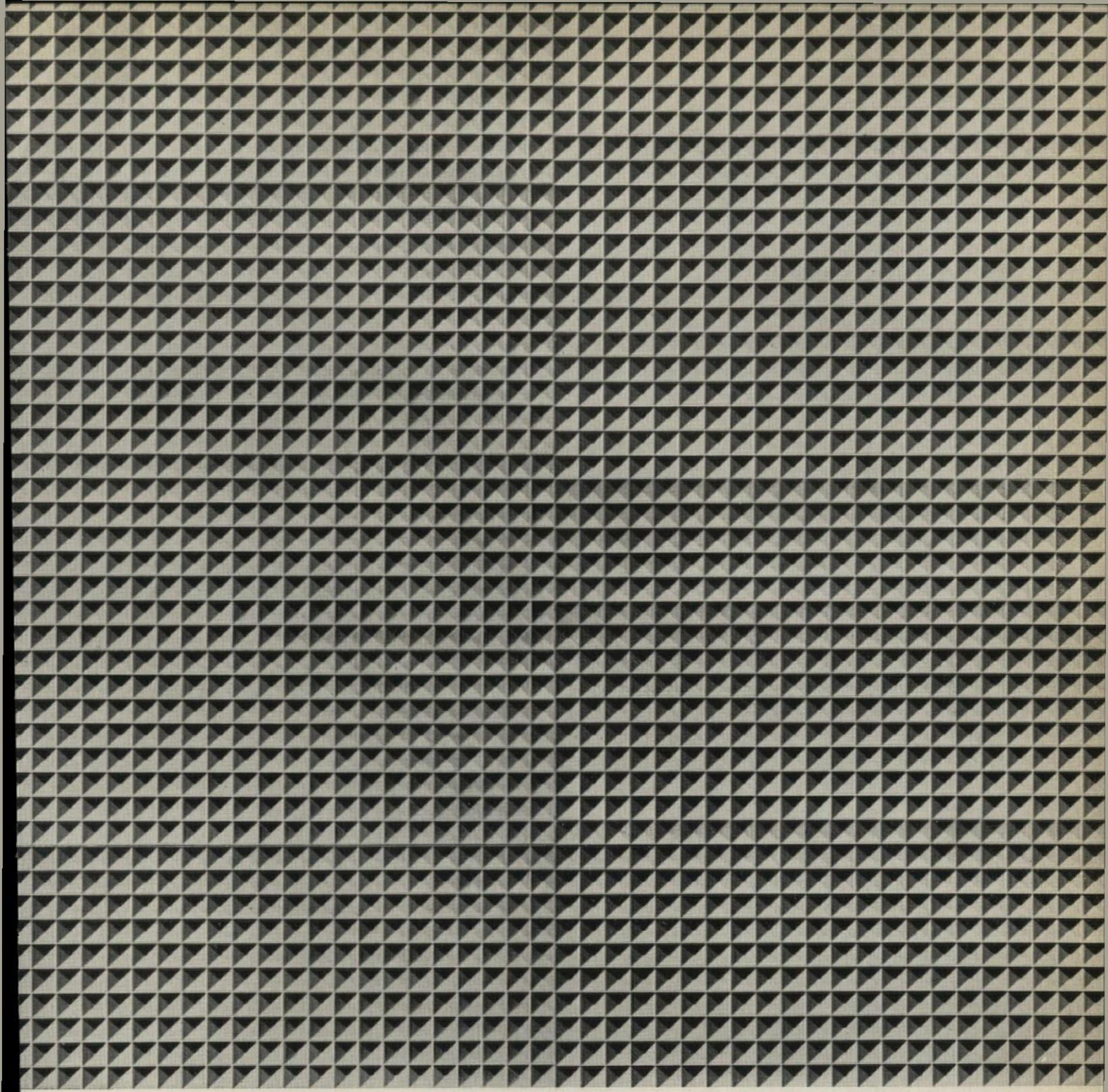
USG UNITED STATES GYPSUM

UNITED STATES GYPSUM

the greatest name in building



1 good reason to look into Opticon...



or 16,792*

Each Opticon® lens—sides, ends and face—is a single crystal-clear injection-molded unit four feet long. Each is comprised of more than 16,000 individual, optically engineered prisms. *16,792 by our count. The precisely molded, regressed bottom prisms provide wide-angle, glare-free task light, while the prisms on the side are patterned inside and out at cross directions to throw softly diffused peripheral lighting on ceiling areas for low brightness contrast.

Equally important is Lightolier's ability to design and produce this fixture at a low budget price while maintaining its respected standards of performance, aesthetics, and quality construction.

There are two catches to it (on each side). Press either side and the entire lens swings away on safety hinges for swift relamping without tools.

Other Lightolier touches: interlocking ends for straight, continuous runs (without dark joiner straps), slim 4½" depth, completely enclosed construction to keep fixture clean longer. Opticon is available in one- or two-lamp models, 48" or 96" length, stem or surface mounted. For more information on Opticon, write to Lightolier, Jersey City 5, N.J., for Brochure PA3-33.

LIGHTOLIER®

Opticon is stocked by the Authorized Lightolier Distributors listed on page 54▸

For more information, turn to Reader Service card, circle No. 356

fyi

(for your illumination)

Lightolier fixtures are stocked and sold by the following Distributors:

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ALASKA
Anchorage: Northern Sup. Co.
ARIZONA
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Bakersfield: San Joaquin Whlse. Elec. Co. **Fresno:** Electrical Suppliers, Inc. **Los Angeles:** Gough Industries, Inc. **Palm Springs:** Tri-County Elec. Whlsrs. **Riverside:** Tri-County Elec. Whlsrs. **Sacramento:** Capital Whlse. Elec. Co. **San Bernardino:** Tri-County Elec. Whlsrs. **San Diego:** Sunlight Elec. Sup. Co. **San Francisco:** California Elec. Sup. Co.
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Denver: Central Elec. Sup. Co.
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Bridgeport: B. M. Tower Co., Inc. **Hartford:** Beacon Light & Sup. Co. **New Haven:** Grand Light & Sup. Co. **New London:** United Elec. Sup. Co. **South Norwalk:** Klaff's Inc. **Stamford:** Marie Co. **Waterbury:** Starbuck Sprague Co., Suburban Supply Co.
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HAWAII
Honolulu: Hawaiian Light & Sup. Co.
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Ft. Wayne: Mossman-Yarnelle Co. **Gary:** Englewood Elec. Sup. Co. **Indianapolis:** Farrell-Argast Elec. Co. **South Bend:** Englewood Elec. Sup. Co.
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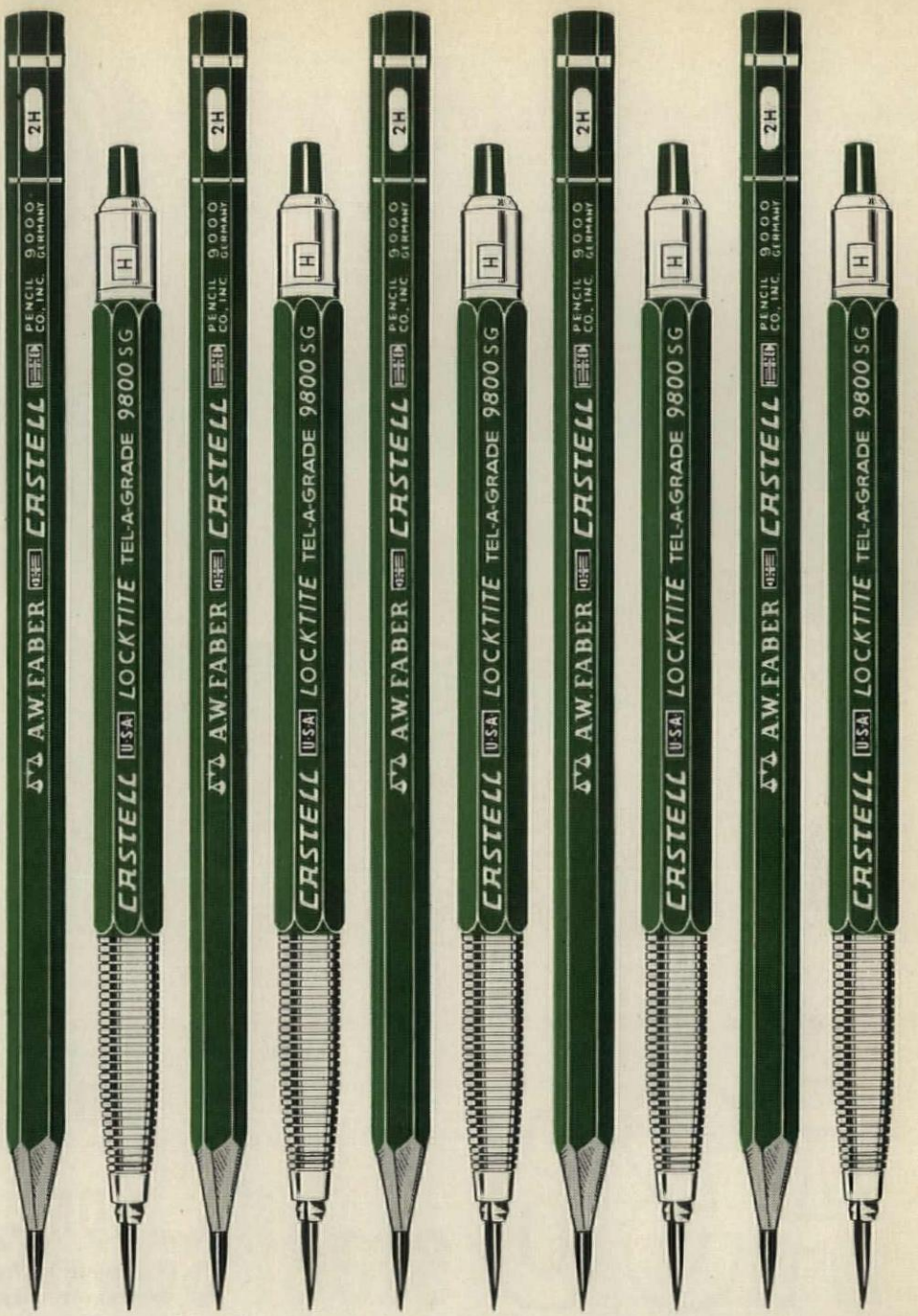

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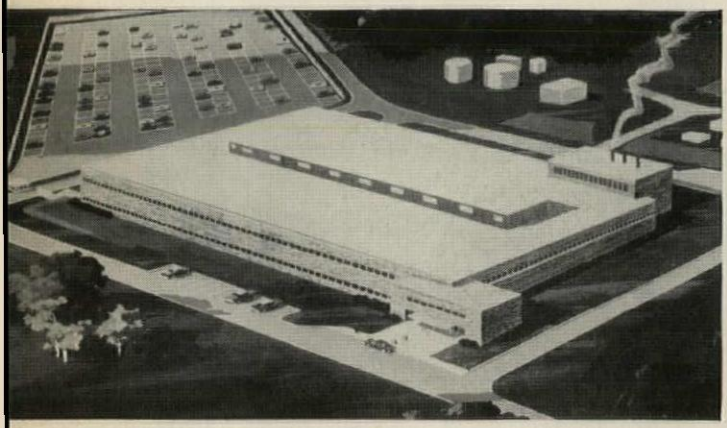

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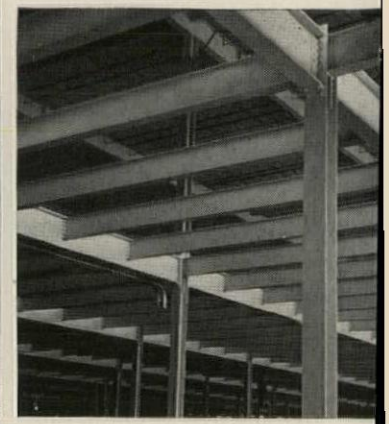
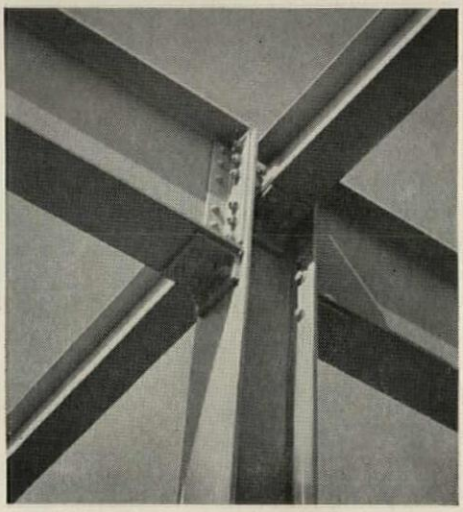


Western Electric Company, Incorporated manufacturing plant for electronic devices, Reading, Pa. 450,000 sq ft of floor space. Architects: Greater Berks Associated Architects (*Frederick A. Muhlenberg & Associates, Muhlenberg Bros., and Carl A. Eisenhower, all of Reading, Pa.*), *and* Western Electric Company, Design and Construction Division. *Structural Engineers:* Kneas & Long. *General Contractor:* Burkey Construction Company. *Steel Fabricator and Erector:* The Belmont Iron Works. *Owner:* Greater Berks Development Fund, Reading.



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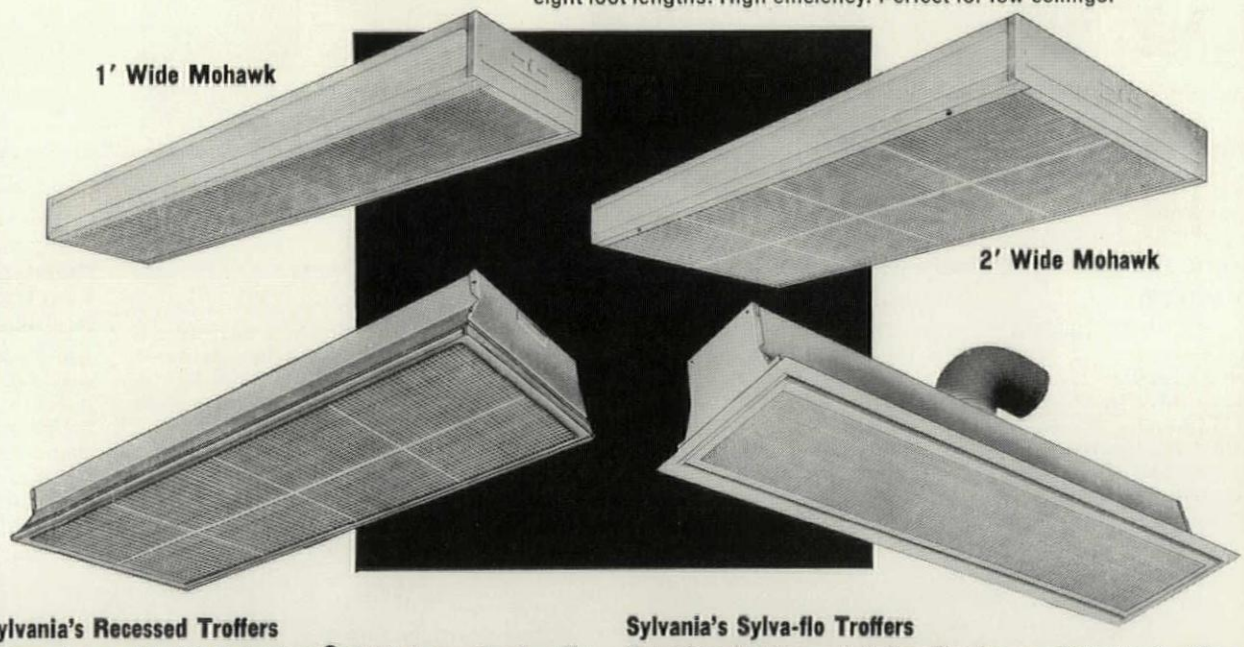

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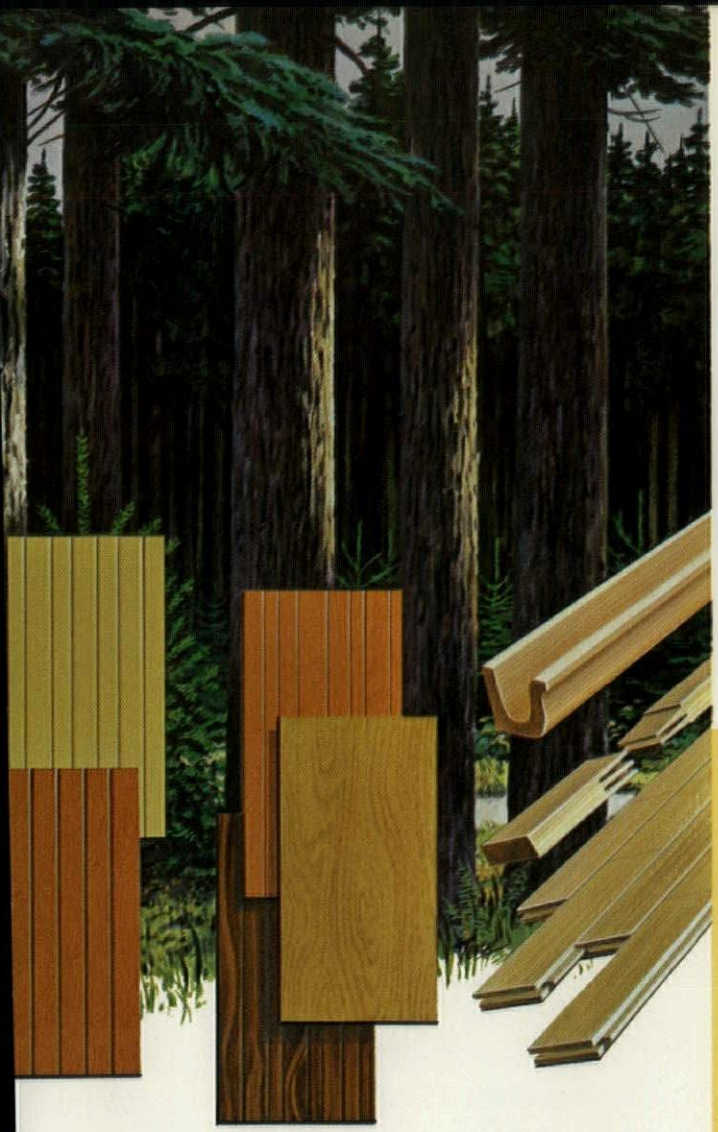

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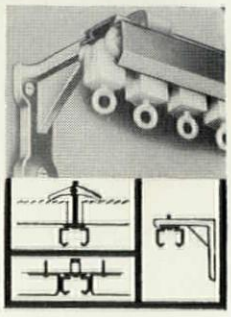

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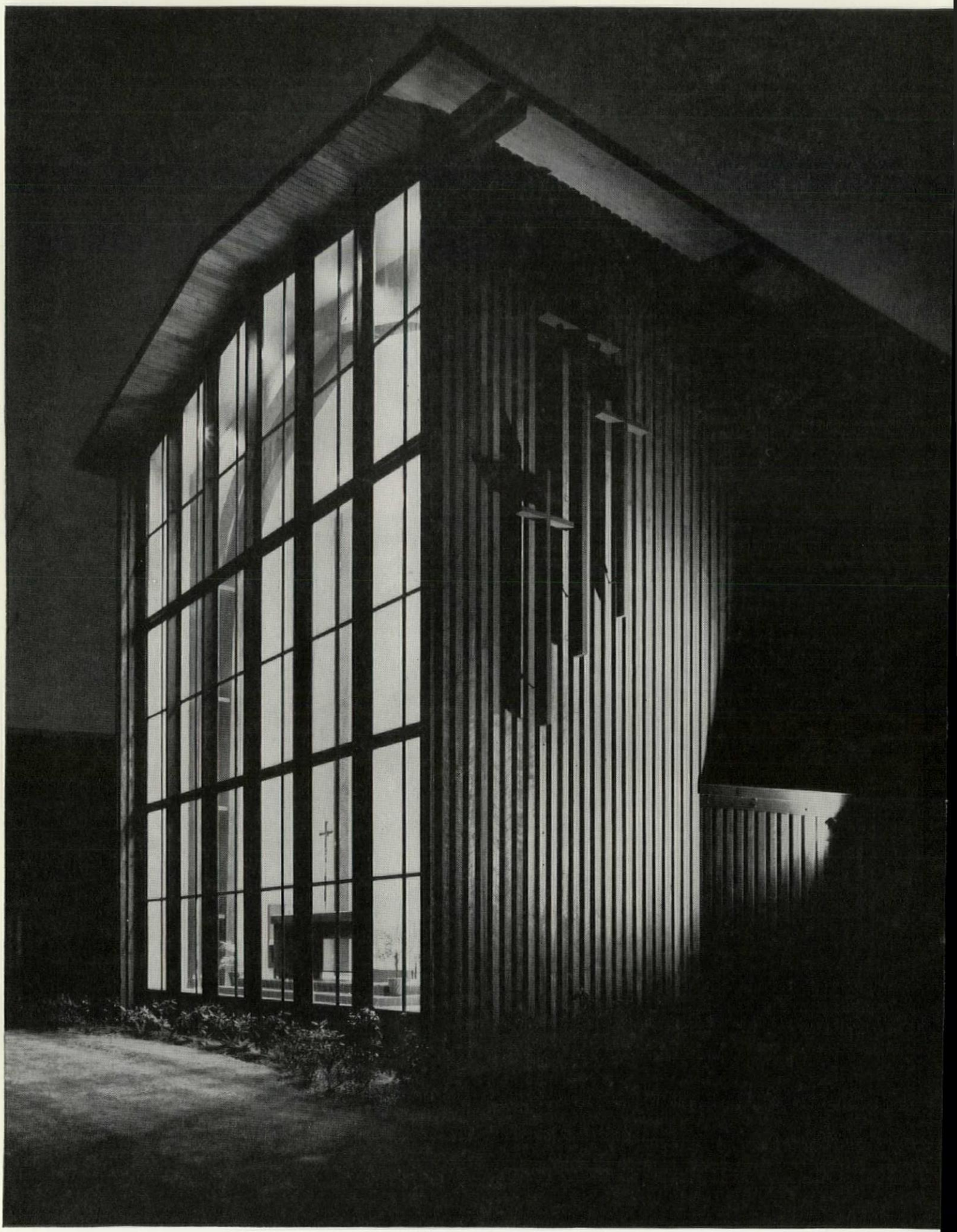

Dramatically lighted from inside and out, this church's vertical grillwork exterior of wood reaches up into the night. The large wood-framed windows topped by the overhanging planked roof create an uncluttered setting for the Cross. Architect: Oliver W. Olson & Associates, A.I.A.

For dignity with warmth in church design

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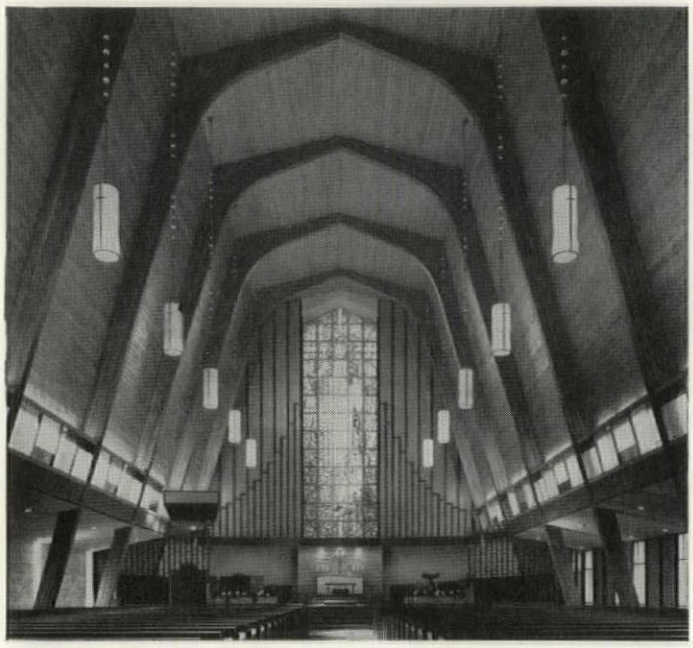

Massive laminated members supporting a planked ceiling uphold wood's strength and versatility. From pews to peak, wood's warmth is at work. Architects: Bergstadt, Hirsch, Wahlberg & Wold, Inc., A.I.A.

Wood for worship is tradition. Yet it is never bound by tradition in working wondrous new forms in construction, beautifully different shapes in design. Laminated members that create expansive interiors tell well of wood's inherent strength. Wood-paneled walls and ceilings are physically comforting, naturally inspiring.

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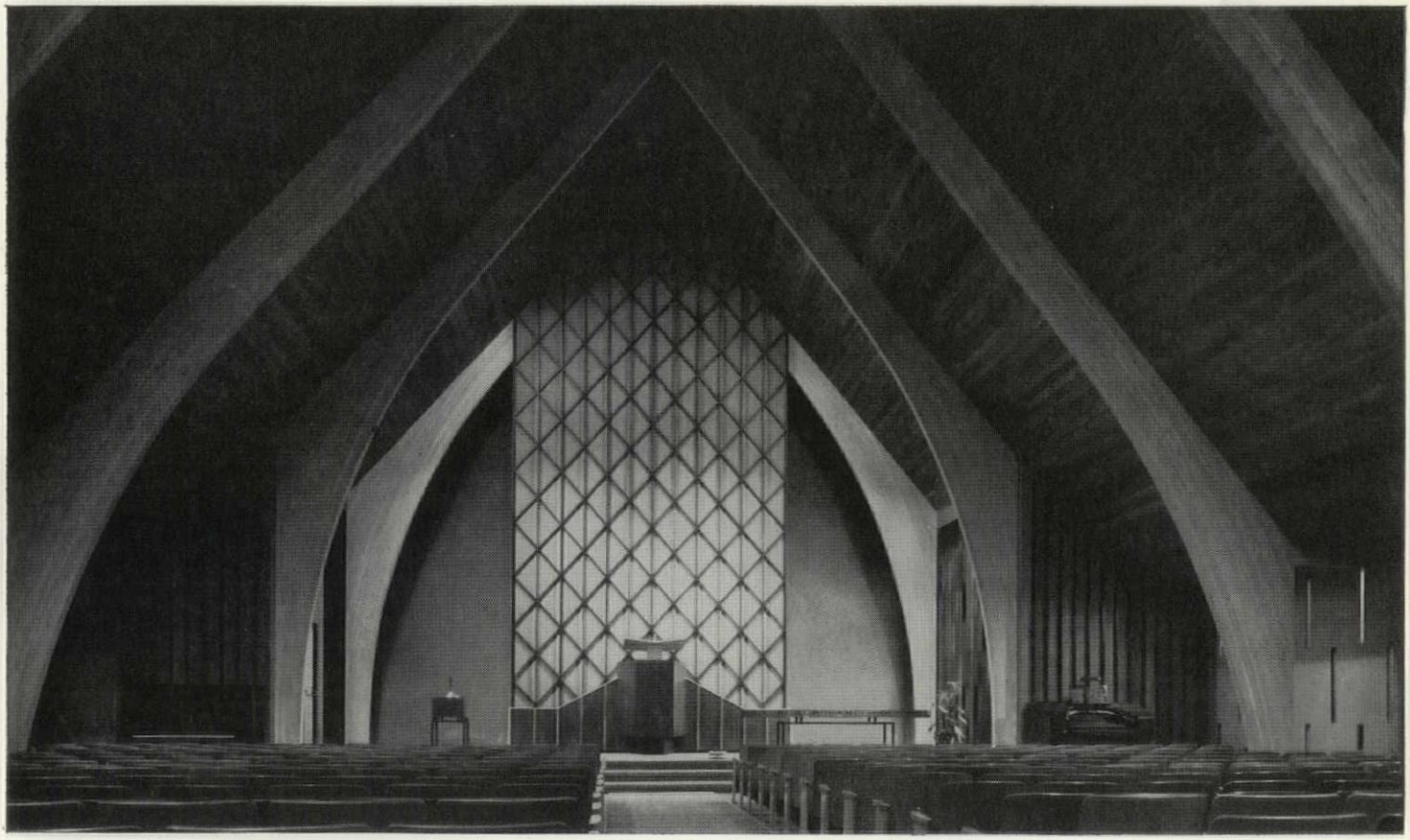
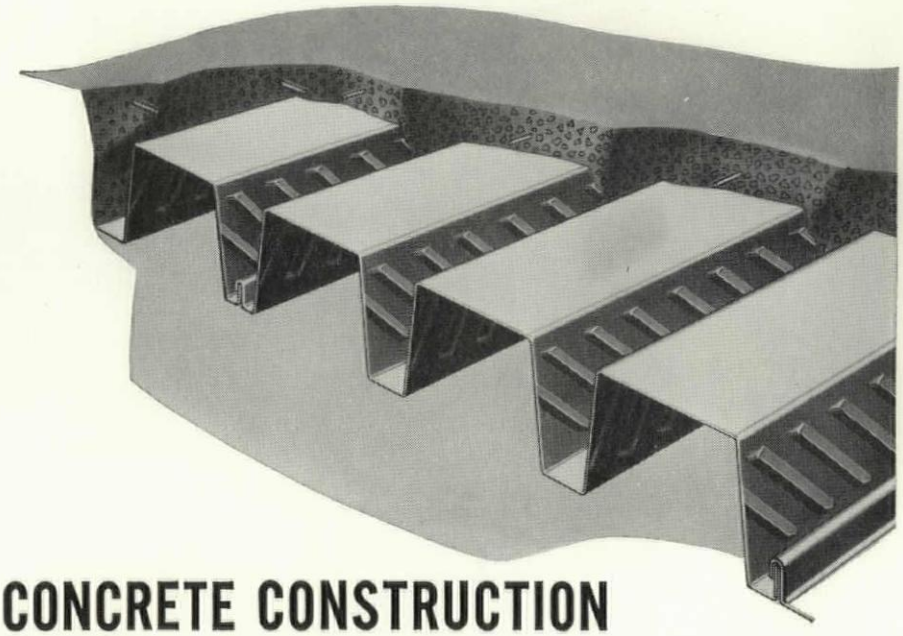


Sweeping laminated arches, tongue-and-groove walls, narrow-planked ceiling join to effect an invitation to worship. The simplicity of design suggests many of wood's economies; the variety of applications shows some of wood's countless advantages. Architects: Grant, Copeland, Charvenak & Associates, A.I.A.



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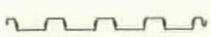

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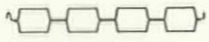

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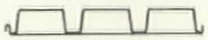

Type NF Celluflor
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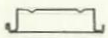

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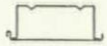

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EP-18

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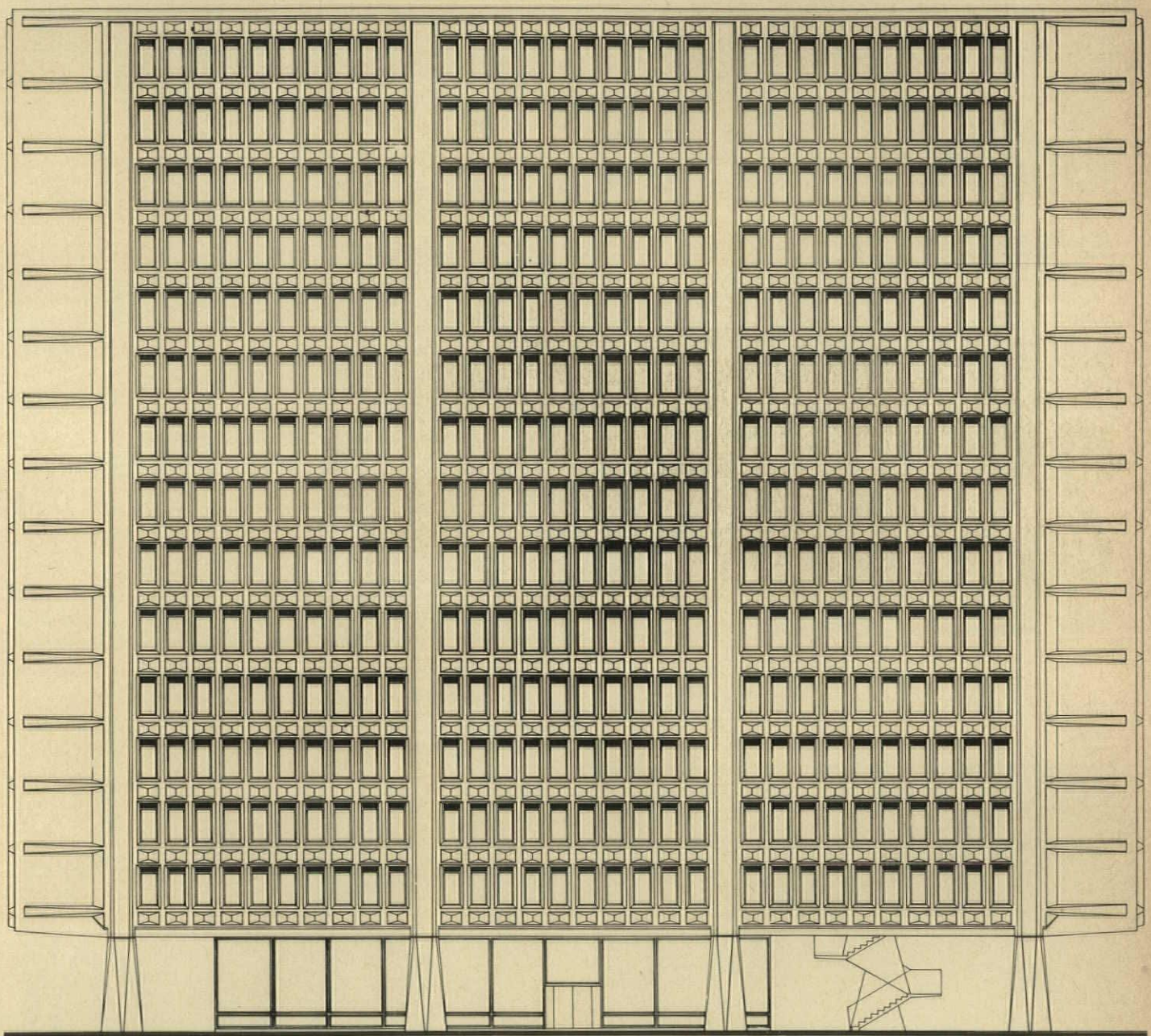
Executive office, LOOK Magazine

Robert Damora, photograph

PROGRESSIVE ARCHITECTURE MARCH 1962

NEWS REPORT

Architecture's Monthly News Digest of Buildings and Projects, Personalities, New Products



New office building at UNESCO Headquarters in Paris by Breuer, Zehrfuss and Nervi will serve body's continuously growing staff.

73 NEW OFFICE BUILDING FOR UNESCO

75 HAMMARSKJOLD MEMORIALS FROM PRATT

76 K-14 SCHOOL PROBLEM AT COLUMBIA

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84 PIGGY-BACK THEATER DESIGN BY GELLER

99 PRODUCTS: FORCED SPRAYING, AIR DOMES

108 MANUFACTURERS' DATA

HOW NOT TO SELECT A HARDWOOD FLOORING CONTRACTOR!

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- You establish his responsibility for the complete installation from subfloor to finished floor.
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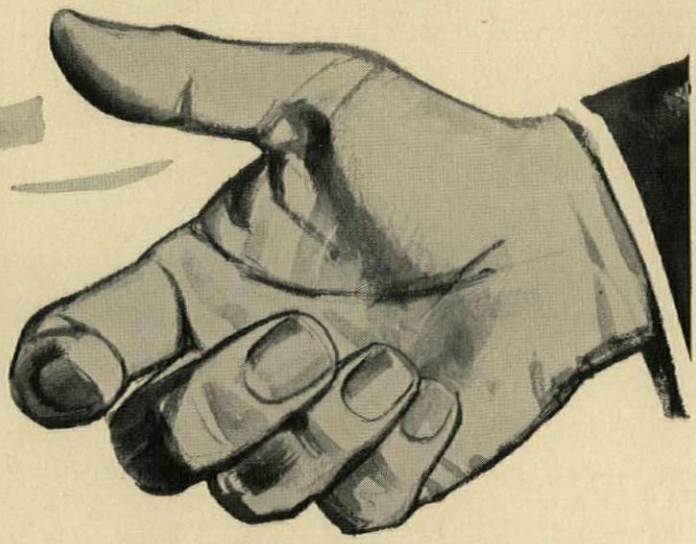
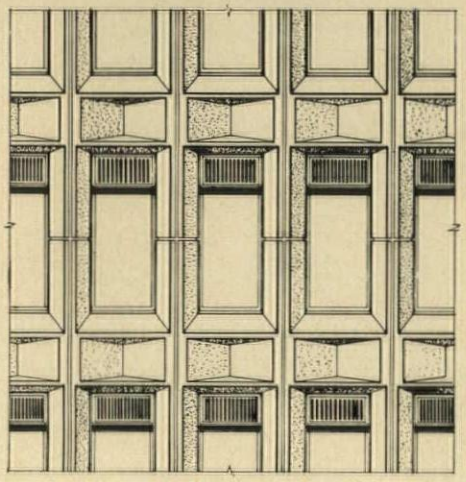


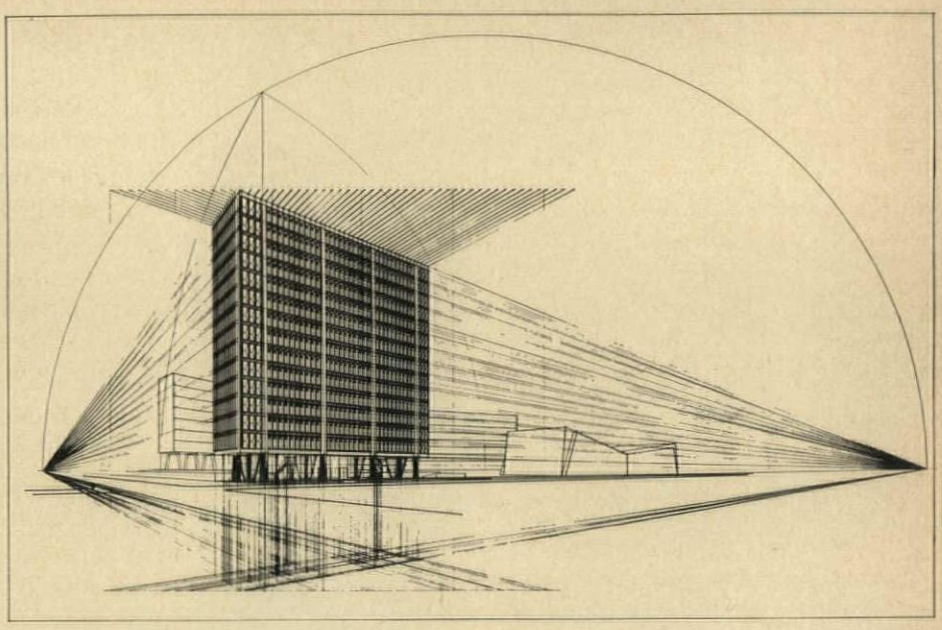
ROBBINS

MAKERS OF MODERN MAPLE FLOORS

New Offices for a Growing UNESCO



Detail of concrete façade.

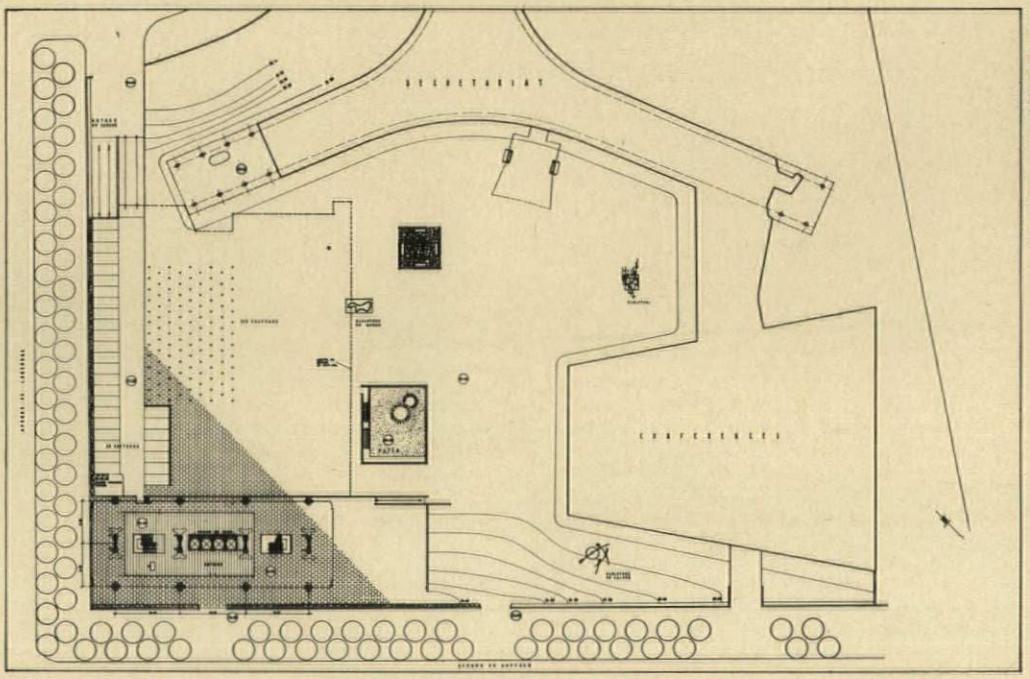


PARIS, FRANCE The increasing crush at the headquarters of the United Nations Educational, Scientific and Cultural Organization here, brought about by the addition of new member nations, will soon be relieved by the addition of a new office building to the UNESCO complex. The new addition, designed by the same team responsible for the existing buildings—Marcel Breuer, Bernard Zehrfuss, and Pier Luigi Nervi, will ultimately provide space for 600 workers.

The new building will be situated on the corner of the site away from the Secretariat and the Conference Hall. The area around this structure will be a slightly recessed terrace off the main plaza, due to existing grade conditions. In addition to the office building, expansion plans include a 400-car garage beneath the flag court and space below the main plaza for two 200-person meeting rooms, archives, and storage areas. The latter spaces will vary from two to four levels. A square patio will be located in the main plaza, bringing light and air down to the subterranean spaces. These areas will be accessible via elevators, stairs, and underground passageways from the three buildings. Following local laws, there will be a fire stair in the patio.

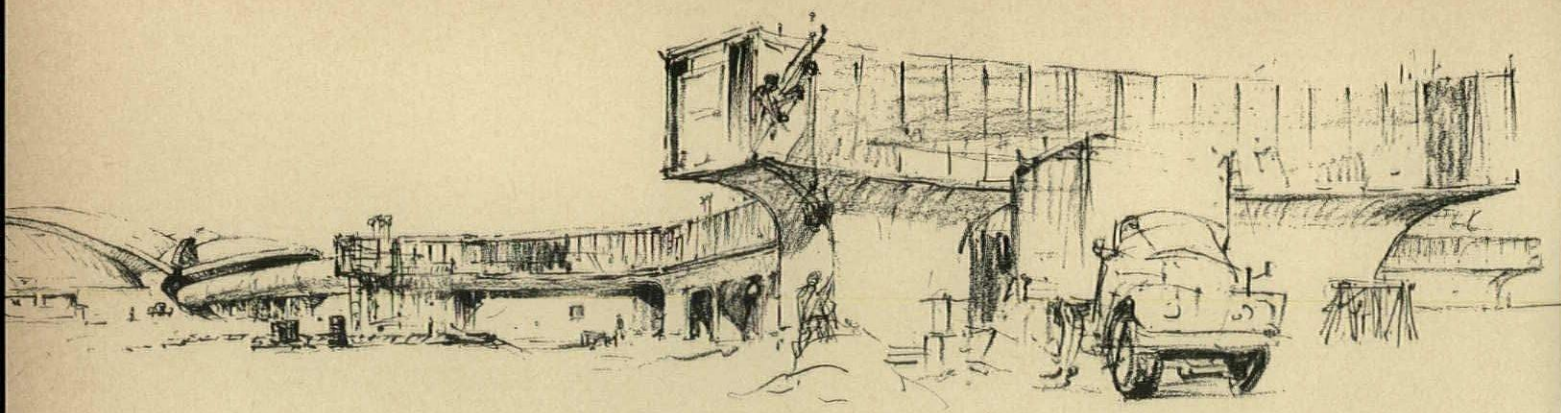
The new office building will be supported one story off the ground on pilotis, which will continue up the height of the structure as piers. Four massive columns at the center of the ground floor will split and continue in the corridor walls through all upper floors. The building will have a precast, prestressed concrete façade, using elements somewhat similar to those in Breuer's IBM Building at La Gaude.

As we go to press, word arrives that the French Government has denied UNESCO permission to build the new building.



Drawings Courtesy Marcel Breuer

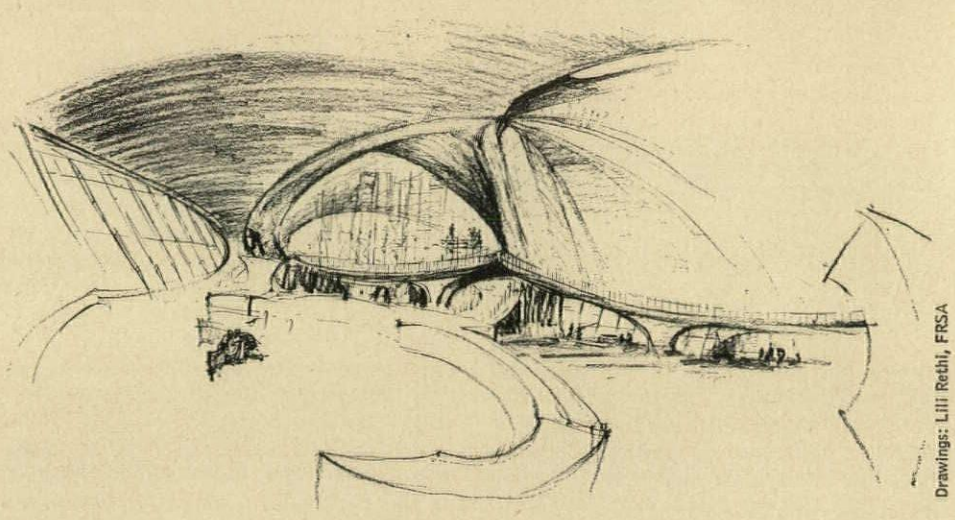
Site plan shows relation of new building (lower left) to existing buildings.



PROGRESS REPORTS: TWA AND DULLES

Delineator Lili Rethi and P/A Managing Editor Jan Rowan recently visited Saarinen's TWA Terminal at Idlewild and Dulles International Airport in Washington, respectively, and brought back both visual and word-of-mouth records of their impressions.

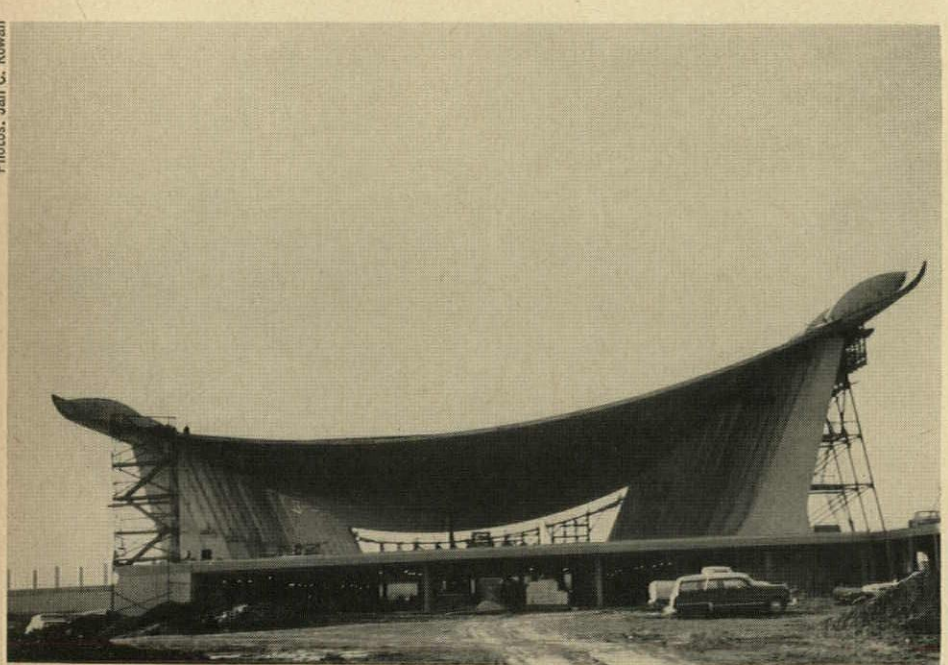
Lili Rethi was tremendously impressed with the raw, unfinished interior space of the TWA Terminal. It gave a sense of power and movement which, she said, she hoped would not be vitiated by enclosure and the necessary addition of furniture and other facilities. For P/A, she sketched the interior and an unfamiliar exterior view from one of the loading fingers (*above*).

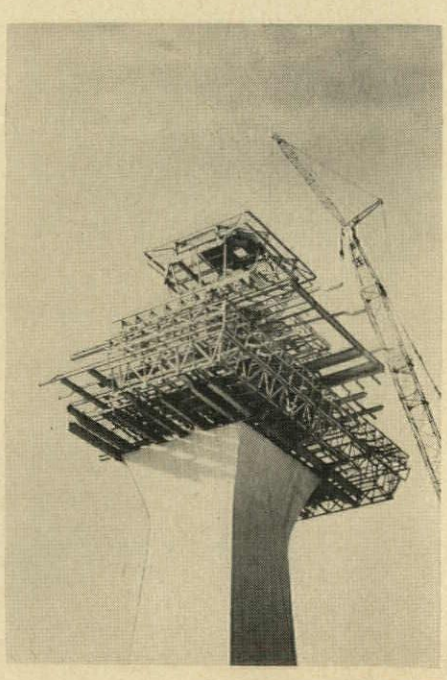


Drawings: Lili Rethi, FRSA

Dulles, Rowan reports, shows at this stage of construction all the strength and uplift inherent in Saarinen's original conception. "One hopes," he stated, "that at least some of that feeling will come through in the finished structure." Before enclosure, the structure could be seen (*below, left*) in its most dramatic, simplest form, the sweeping, cable-hung roof supported by the outreaching piers. Another unfamiliar Saarinen terminal detail was caught by Rowan's camera: the Dulles control tower on the field side of the terminal (*below, right*).

Photos: Jan C. Rowan





SHRINE TO HAMMARSKJOLD

BROOKLYN, N.Y. As a recent design problem for his second-year students at Pratt Institute, Professor Raniero Corbelletti conceived the idea of a shrine to Dag Hammarskjold. The site selected is a ¼-mile-square section of jungle near Ndola in Northern Rhodesia. Some of the students' concepts compare not unfavorably with entries in the FDR Memorial Competion.

The design by William Wright (1) creates a low plateau of waving grass ringed by an irregular stone embankment. Wright wished to symbolize the African sky as "the ideal world."

The sculptural solution of Fred Zeiger (2) is an immense stone structure in the middle of a "blasted heath." Zeiger says the scale of the shrine would show the proportions of the human figure to Hammarskjold's overwhelming task.

The sky is the leading character in the design by Suzanne Wertz (3). The visitor would traverse the top of a giant concrete maze to the overhanging roof. Upon ascending through the structure, he would come out on top, to be presented with the illusion of sky all around him, the heavens being reflected by a ¼-in. sheet of water.

Three interrelated, tapering concrete cones were designed by Robert J. Kaplan (4) to contain a pool (faith), a rough sculpture (courage), and a 20-ft. statue of Hammarskjold (devotion).

Visitors to the shrine designed by Richard Aidelman (5) would approach a vast memorial plaza through two tall concrete pylons. The effect would be to "aim" the visitor's vision through the slot between the columns toward a heroic-size statue of Hammarskjold.

Strength through unity is the theme of the design by Laurence Goldberg (6). The aspiring concrete and stainless-steel structures would be so constructed as to stand only with the support of their fellows.

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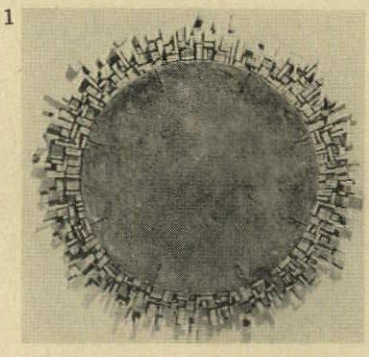

Photos: Edwin Link

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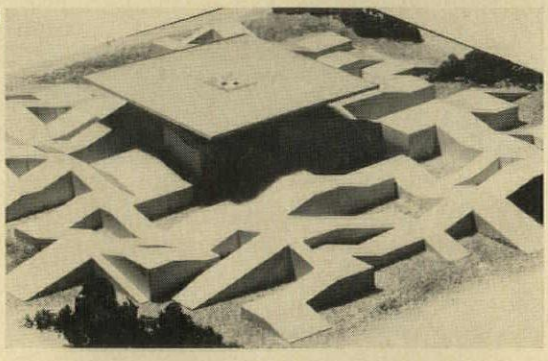

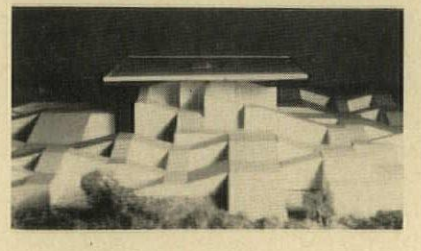

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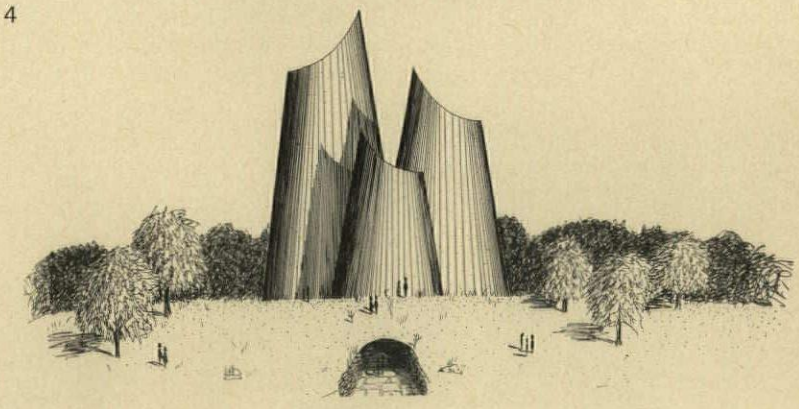

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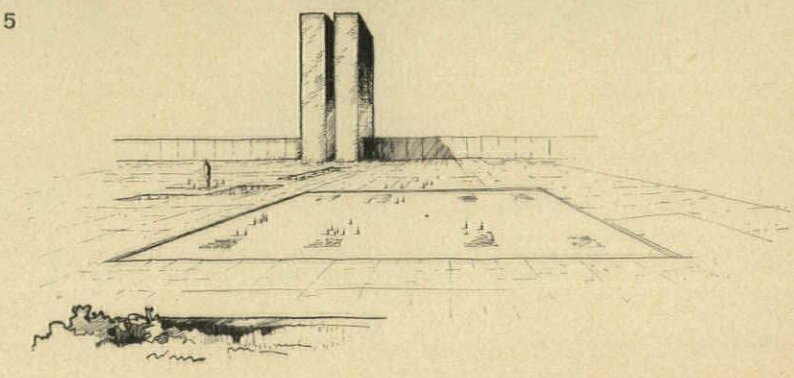

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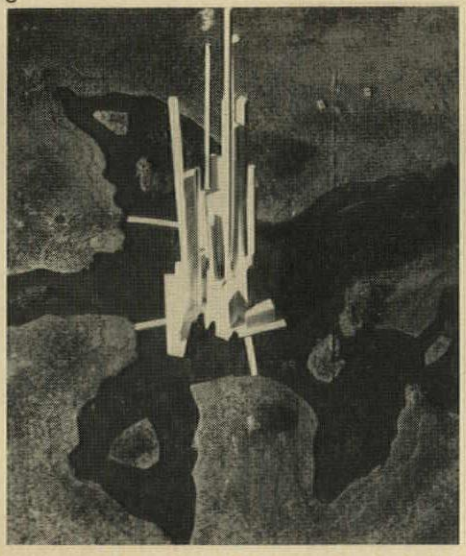
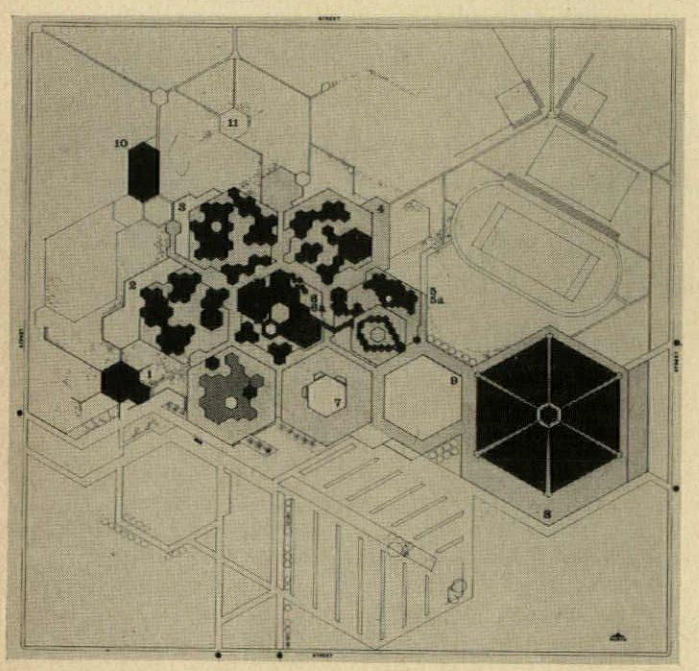


Kindergarten-Through-Junior-College School Studied at Columbia

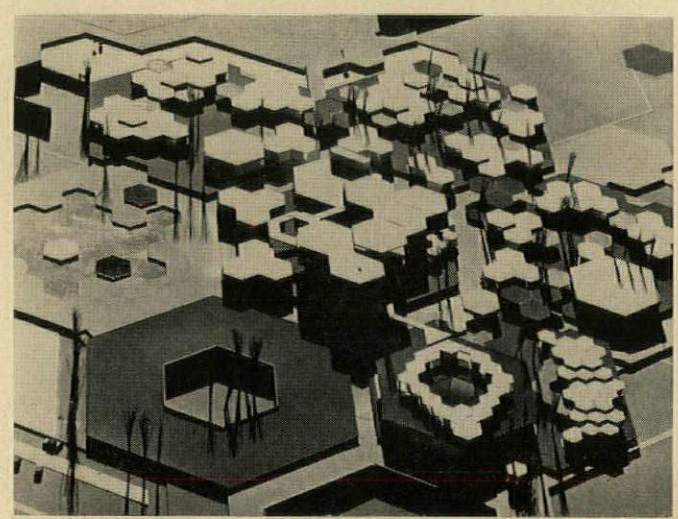
SARASOTA, FLA. A K-14 school program which may become an actuality here (with Mark Hampton as architect) has formed the basis of a student problem at Columbia University that may produce new directions in school planning. Using the program developed for the Sarasota project by John Beynom of Educational Facilities Laboratories, Professor Edward Rominiec set his fourth-year students the problem of designing a kindergarten-through-junior-college school with 12-months-a-year usability. The interesting solution of Robert Doerner and H. Finkelstein is seen here.

Basing their approach on a flexible, expandable, hexagonal scheme, Doerner and Finkelstein developed a plan which identifies all units within an over-all "campus plan," yet permits individual separation and functioning of the different units. The elements, which surround a common central area containing administration, auditorium, and library, include, in matriculation sequence, kindergarten, grades 1 through 6, grades 7 through 9, grades 10 through 12, and grades 13 and 14. Elements which are related, but which lie outside the central complex, are cafeteria, field house, community facilities (recreation area), and gymnasium. The library and junior college spaces are kept open at night for adult education. Within each grade group are located, in addition to instruction spaces, teachers' rooms and common spaces. All groups are expandable as the need arises. Wall systems are adaptable to four finishes: glass, brick, wood, and chalk board.

Recently, Philip Hiss, former Chairman of the Sarasota County Board of Education and a school planning expert of considerable renown, visited Columbia and expressed high enthusiasm for this design.

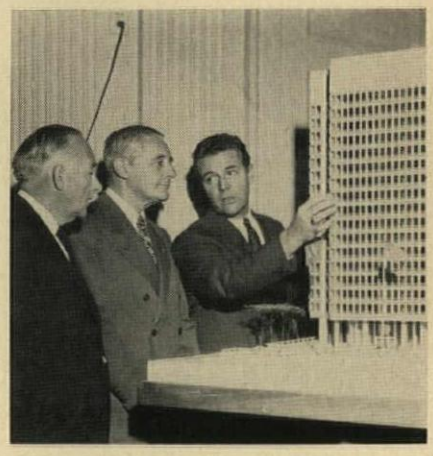


Site plan (left): **(1)** *kindergarten;* **(2)** *grades 1–6;* **(3)** *grades 7–9;* **(4)** *laboratories;* **(5)** *grades 10–12;* **(5a)** *grades 13–14;* **(6)** *auditorium-administration-music lab;* **(6a)** *library;* **(7)** *cafeteria;* **(8)** *field house;* **(9)** *community facilities;* **(10)** *gymnasium;* **(11)** *farming, gardening.*



Brecher, Hisaka, Schlesinger, Qualls

Harbeson, Rafsky, Peterson



Creighton, Dilworth, Kling

Photos: Jules Schick

Price, von Moschzisker

Boulware, Mrs. White, White

Bacon, Dean Perkins

Kahn, Brody, Rowan

P/A Fêtes Winners of 9th Design Awards Program

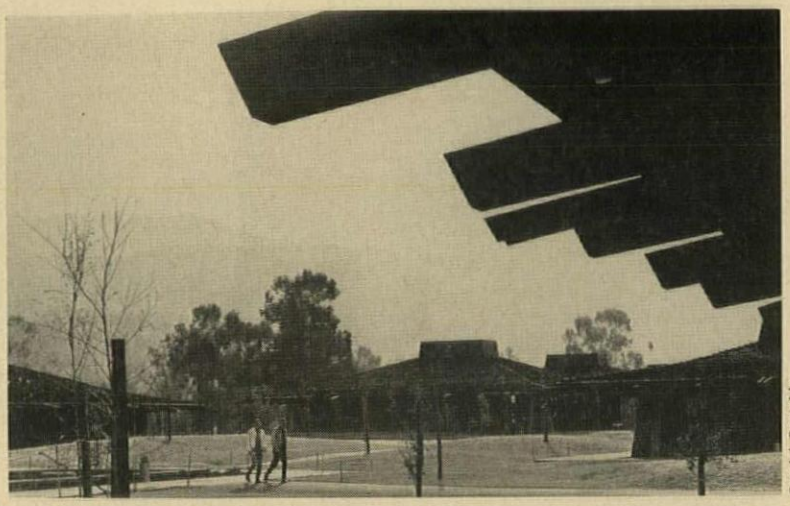
PHILADELPHIA, PA. A distinguished group assembled for luncheon in the Grand Ballroom of the Hotel Barclay on Rittenhouse Square here on January 19 to honor the winners of the ninth annual Progressive Architecture Design Awards Program. Client guests were headed by Philadelphia Mayor Richardson Dilworth (since resigned to run for Governor of Pennsylvania). Winning architects were led, of course, by the First Design Award winner, Vincent G. Kling (pp. 114–121, JANUARY 1962 P/A). Nine of the twelve winners were present, from California, Georgia, Texas, New York, Connecticut, Michigan, Ohio, and Pennsylvania. Present also to honor their colleagues were such notables as Louis I. Kahn, John F. Harbeson, and Edmund D. Bacon. G. Holmes Perkins, Dean of the School of Fine Arts of the University of Pennsylvania, and Chairman of the P/A Design Awards Jury, gave the jury report.

In a speech both welcoming the Design Awards gathering and speaking for the winning client of the 1962 Program, Mayor Dilworth commended P/A, and particularly the jury, for selecting two major Philadelphia public projects for awards, and stated that the city's laudable interest in good planning and design, thus enforced, would continue to wax strong and effective. In presenting the awards, P/A Editor Thomas H. Creighton returned the compliment, noting that the number of Philadelphia commissions which had won awards in previous years plus those in the current program vindicated the profession's enthusiasm for what Philadelphia is doing.

In making the jury report, Dean Perkins remarked that it was encouraging to see, during judging, the number of outstanding designs for public projects. Presumably, many municipalities and state governments have realized their responsibilities to provide not only adequate quarters but a handsome environment in the plans they undertake. The Dean noted also the tendency, which he felt healthy, leading away from superficial design and toward what may well become a strong, value-oriented idiom as represented by many of the submissions in the P/A competition.

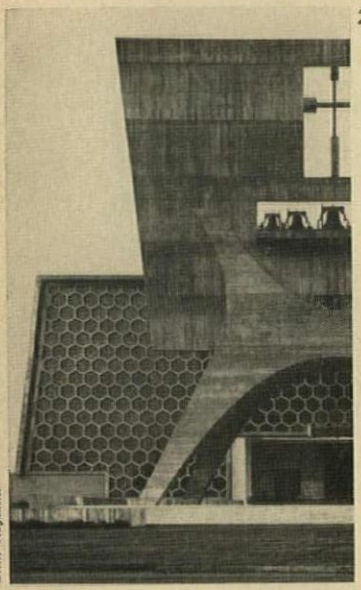
AIA ANNOUNCES NATIONAL AWARDS

1



Rondal Partridge

2



Shin Koyama

3

Roger Sturtevant

4

George Cserna

5

Ezra Stoller

6

Julius Shulman

7

Baltazar Korab

Medals and awards to be presented at the Dallas AIA Convention in May have been announced. The major honor, the AIA Gold Medal for Architecture, will be awarded posthumously to Eero Saarinen.

Gold Medals in associated fields will go to painter Stuart Davis, industrial designer Sundberg-Ferar, Inc., photographer Ernst Haas, and consulting engineer Ammann & Whitney. A Citation of Honor will be received by author-critic Lewis Mumford. For the first time since it was authorized in 1957, the AIA Architectural Firm Award to a firm maintaining a high standard of design excellence, goes to Skidmore, Owings & Merrill.

From a field of 382 entries, the AIA Honor Awards Jury (A. G. Odell, Jr., Charles R. Colbert, Paul M. Heffernan, Karl Kamrath, and Paul Hayden Kirk) selected only one Honor Award and seven Awards of Merit. The First Honor Award will go to Foothills College, Los Altos, Calif., (1) by Ernest J. Kump and Masten & Hurd (winner of a P/A Design Awards Citation in 1960). Award of Merit winners are: (2) St. John's Abbey Church, Collegeville, Minn., by Marcel Breuer & Associates; (3) Housing Group, Berkeley, Calif., by Roger Lee Associates; (4) Princeton University Tennis Pavilion, by Ballard, Todd & Snibbe; (5) New Sarasota (Fla.) High School by Paul Rudolph; (6) case study developer's house for *Arts & Architecture*, La Jolla, Calif., by Killingsworth, Brady & Smith; (7) Convent of the Immaculate Conception, Washington, Pa., by Deeter & Ritchey; and (8) Residence, Essex, Conn., by Ulrich Franzen.

The winning design of the 1962 Reynolds Memorial Architectural Student Prize is illustrated and described on page 86.

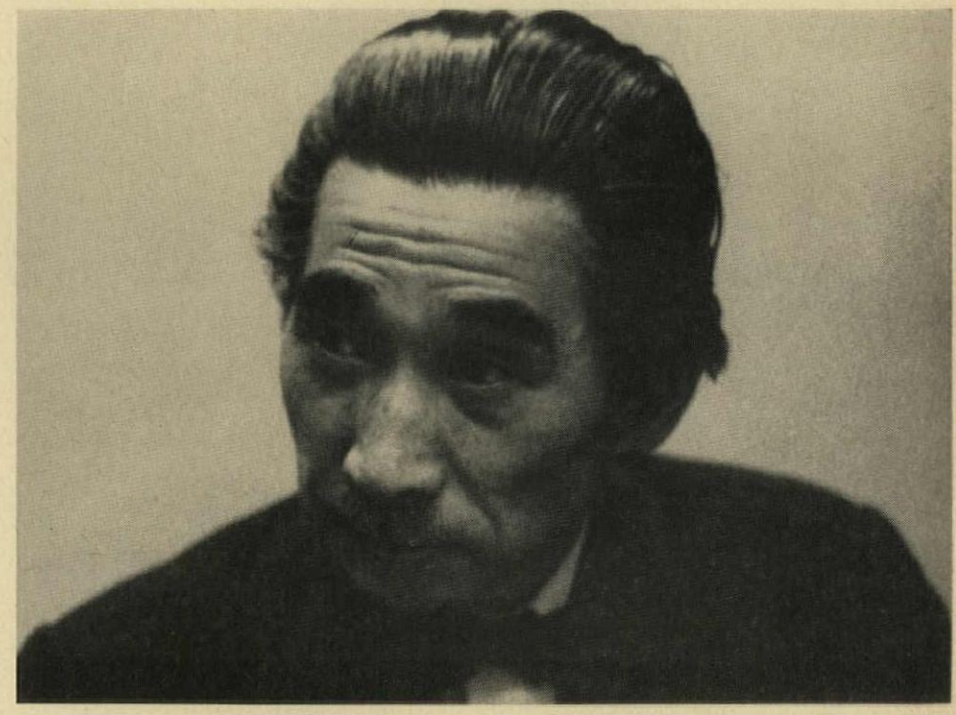
8

Wilfred Sevigny

P/A Talks With Kenzo Tange

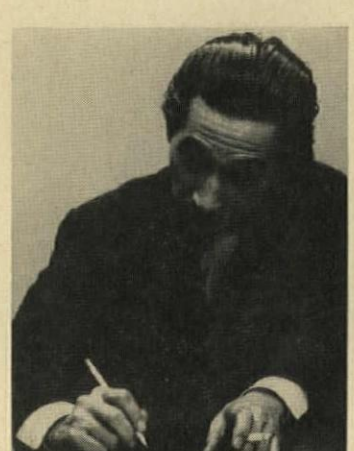
Several weeks ago, following a luncheon in his honor given by Philip Johnson at the Four Seasons, Kenzo Tange, Japan's leading architect, visited the P/A offices and treated us to a lengthy chat.

Two matters occupy Tange's thoughts these days: the relationship between art and architecture, and the future of city planning and redevelopment. He views the integration of art and architecture as a desirable but seldom accomplished goal. The process he divides into three categories: (1) painting and sculpture as decoration on buildings; (2) an architectonic collaboration using art, mainly sculpture, as a device to draw a given space together and identify it; and (3), his own preference, an "antagonistic collaboration" between architect and artist. In this latter view, Tange feels, the symbolic meaning of the space should be the paramount idea, especially in public buildings, and the architect and artist must have their minds open to the feeling of the space to be created. In his words, the collaborators must "extirpate their own microcosms." As a result of successful collaboration, Tange says, the creative man never loses, but rather gains through "the opening of a door or window" on another's "microcosm." Collaboration, in the highest sense, means creation. As two chemicals react to form a new compound, so do creative men react on one another to evolve a significant work of art. Such integration of architecture and art can be an adventure, and Tange feels that creative architects and artists must strive for this adventure.

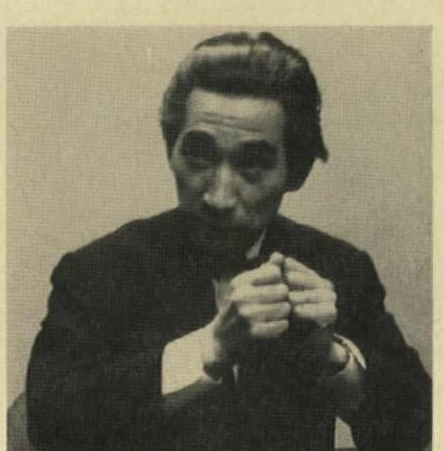


"Architects and artists must extirpate their own microcosms."

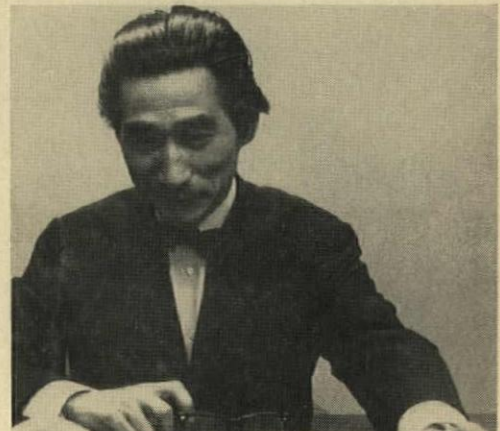
The Japanese architect is deeply concerned with "the metabolic process of the urban scene," and indeed his office is working on a bold plan for the redevelopment of downtown Tokyo by stretching a system of buildings, platforms, and roadways out over Tokyo Wan (bay). Tange thinks that the satellite system of development around an old city core is wrong; that this spread-out city is inherited from the hierarchy of the medieval system. The answer to the expanding city core, he feels, is a unidirectional, linear system with a highly developed communications network. Obviously, if the core expands in all directions, we are back to the old spread-out, satellite development. Tange compares these two approaches to man's physical development from the egg (center surrounded by substance, or the satellite system) to man (the spinal frame, or linear development). In the future, a relationship must be provided between the vast communications systems and the new types of buildings dictated by them. Tange's solution is the "man-made mountain" concept to create a bridge between man and his overpowering surroundings. (This approach was discussed on pp. 134-147, OCTOBER 1961 P/A.) The man-made mountain concept does away with deadly repetition of spread-out units, but at the same time gives a sense of freedom *and* belonging. "They must be open but related," says Tange; "I do not like a closed society." The major problem is "technological progress versus non-changing human scale."



". . . the man-made mountain"



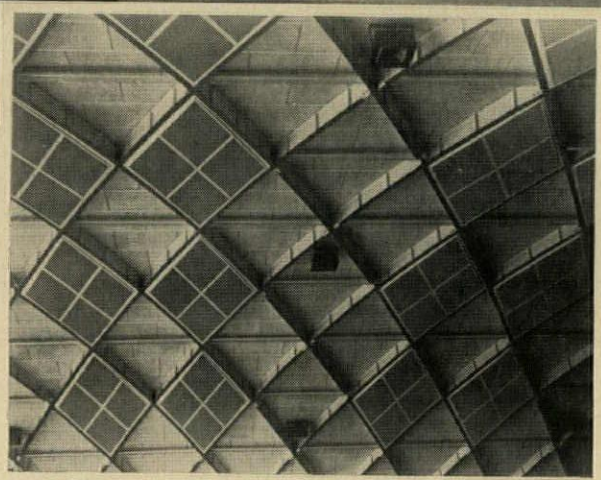
"I do not like a closed society."



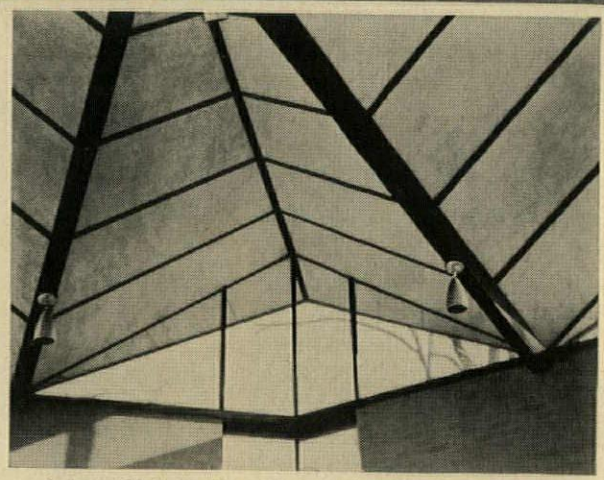
". . . metabolic process of the urban scene"

Photos: George Lubasz

Tectum . . . growing

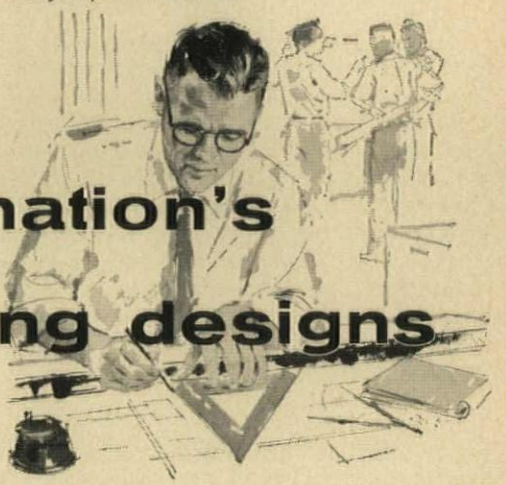


This section of a beautiful steel Lamella arch frame has an exposed 2½" Tectum roof deck. Building: Dearborn Youth Center; Architect: Harley, Ellington & Day, Detroit.



A beautiful section of a folded plate roof deck using 2" and 2½" Tectum. Building: Grace Episcopal Church, Detroit; Architect: Nathan Johnson, Detroit.

Under construction, this beautiful chapel incorporates 24,000 square feet of 3" Tectum roof deck plank. The planks are installed parallel to the wooden joists. Beams are laminated wood. Building: Shrine Chapel of Our Lady of Orchard Lake; Architect: Walter J. Rozycki, A.I.A. Detroit.



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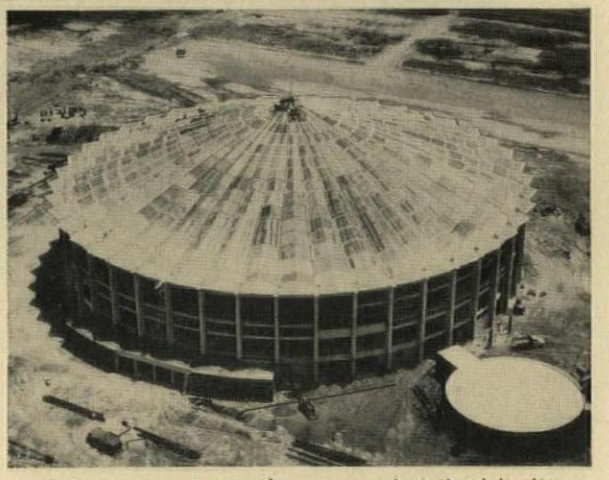


Precast concrete sections, poured at the job site on Tectum Form Plank forms, are lifted by crane to the roof level. Building: Coliseum for State of Mississippi, Jackson; Architect: Jones & Haas, Jackson.

Tectum®

New Data on Structural Steel

The American Institute of Steel Construction has recently released its "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings." Here, **Ira Hooper,** *Associate in the consulting engineering firm of Seelye, Stevenson, Value & Knecht, and frequent contributor to P/A on technical matters, examines the new criteria.*

The building professions will be deeply affected by the new stresses, materials, and design methods included in this completely rewritten specification; cost savings will make steel construction even more competitive with other materials; steel frames will be more slender, more uniform in appearance and more attractive as an exposed architectural element. Sixteen years of metallurgical research and theoretical study have increased the knowledge of steel structures so that allowable stresses can be liberalized while the factor of safety is more consistently maintained.

The major changes and additions are: materials; allowable stresses; combined stresses; plate girders; composite construction; connections and fastenings; and plastic design.

Materials. Formerly, one structural steel (A7) was specified; now six steels are included, with yield point stresses varying from 32,000 psi to 50,000 psi; the new steels possess improved weldability and higher resistance to corrosion. The ultra-high strength, heat-treated steels have not yet been included. Three rivet steels, two high-strength bolt specifications, and four welding methods are included.

Allowable Stresses. All stresses are expressed as proportions of the yield point stress; tables of stresses for each structural steel are included. As examples of comparative savings, A7 steel rolled sections can now be designed in bending for 22,000 psi instead of 20,000 psi; the new A36 steel, which costs only $1 per ton more than A7, is permitted 24,000 psi in bending; column design has been improved to include the effect of end fixities at floors, resulting in major savings for tier buildings where sidesway is prevented; bearing plates of A7 material can be designed for 25,000 psi instead of 20,000 psi.

Combined Stresses. The new formulae for columns with bending will permit designs which are in closer accordance with actual structural conditions. The formulae are more involved, but it is expected that, with practice and familiarity, rapid methods will suggest themselves.

Plate Girders. These members can now be made with very thin webs and fewer stiffeners. The new rules are an adaptation of aircraft design methods; they were thoroughly checked by full-scale tests to destruction.

Composite Construction. A composite beam uses the concrete floor slab as a heavy top cover plate; savings can be 20 per cent of the cost of a conventionally designed member. The specification describes design methods and includes a table of allowable loads for the shear connectors between the steel beam and the concrete slab.

Connections and Fastenings. High strength bolting procedures have been included. The section on welding has been amplified and includes the use of two types of electrodes for manual welding and two types of submerged arc welding.

Plastic Design. The specification incorporates the Rules for Plastic Fabrication as adopted by AISC on December 4, 1958, which permits plastic design of continuous one- and two-story structures. The addition of this section will eventually have more far-reaching effects than the other revisions. The plastic design conception of the ultimate strength of a structure is drastically changed from elastic design; a structure is now assumed to be on the point of failure when it has developed a sufficient number of "plastic hinges" to become a mechanism. With this concept, design for strength becomes simpler and great savings can be made in tonnage of steel. Plastic design uses the ductility of steel, a property neglected by the elastic method.

The new specification will encourage a trend to more slender members, which should be chosen with caution to avoid excessive deflection and vibration. Continuous beams will reduce deflections economically; they will involve plastic design and welding, usually. Composite beams will also reduce deflections; the effects of creep and shrinkage on the deflection cannot yet be precisely determined, so that engineering judgment is required. Generally speaking, more engineering effort will be required to get all of the savings allowed, but the extra effort will be more than justified.

Architects and engineers can commend the steel industry for beginning to set its house in modern order. We will expect more advances in the near future.

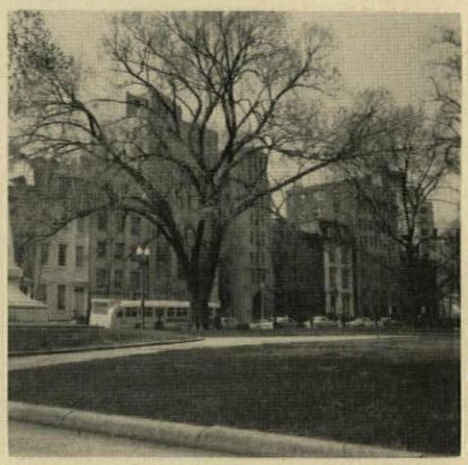
LAFAYETTE SQUARE DOOMED

WASHINGTON, D.C. Indications are that, despite earlier signs that it was anti-demolition, the Kennedy Administration is going to permit the wrecking of most of the buildings along Lafayette Square to make way for new Federal structures.

The Square, frequently referred to as the "front yard of the White

House," has been the subject of heated discussion ever since Federal plans to wreck its boundaries came to light. The AIA Committee on the National Capital, noting that the chance to preserve the original character of the Square is long since past, urged instead close attention to current and future designs in order to give to the space its proper dignity and scale.

On the west side of the Square, the Decatur and Parker houses are to be

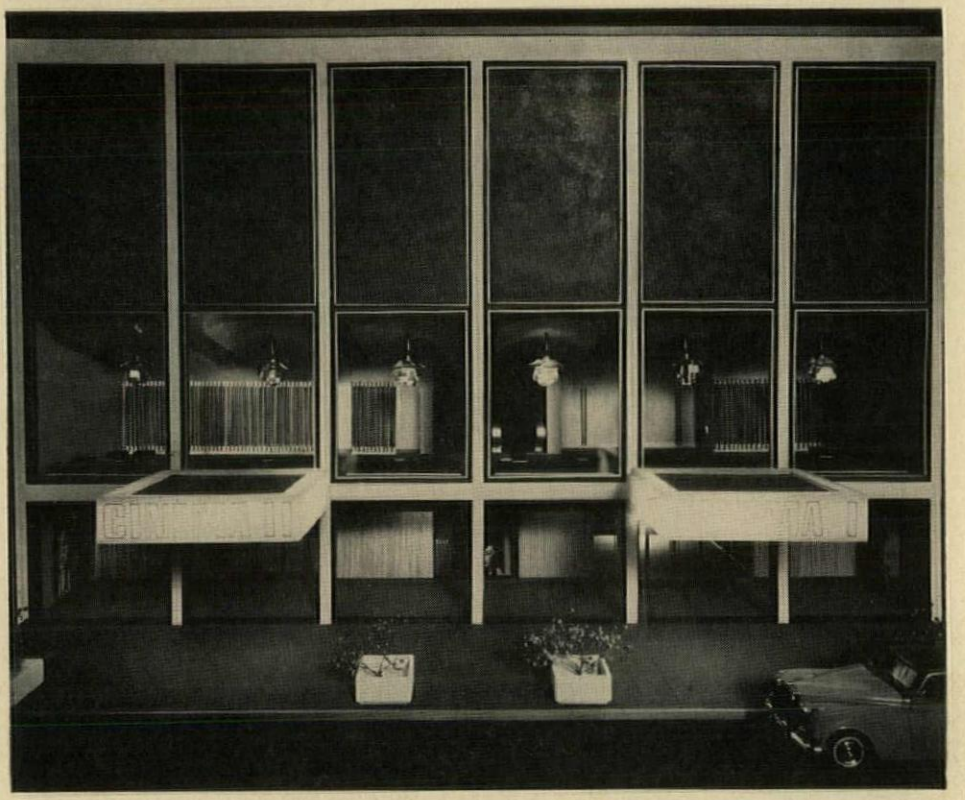


Photos: E.E. Halmos, Jr.

retained at either end of the block, to form a "frame" for the new Executive Office Building, reportedly to be designed by the Boston firms of Perry, Shaw, Hepburn & Dean and Shepley, Bulfinch, Richardson & Abbott. New U.S. Court of Claims will be built on the Square's east side.

PIGGY-BACK MOVIE HOUSE ON 3rd AVENUE

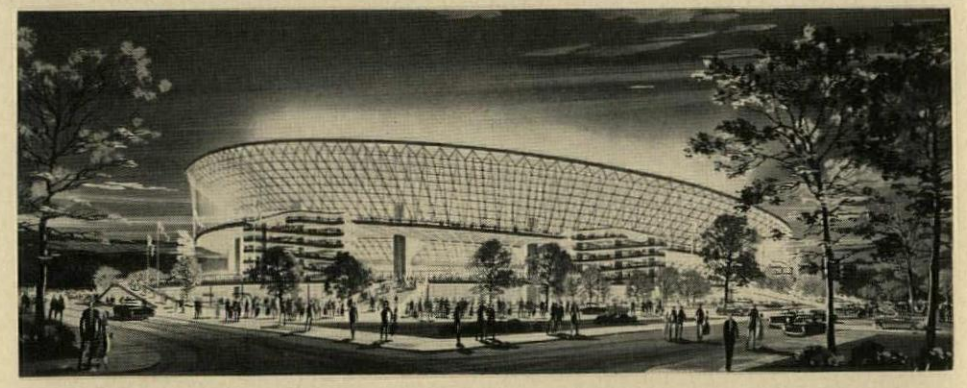
NEW YORK, N.Y. In a section rapidly becoming the art motion picture center of Manhattan (at least four new ones have been announced for the area), "Cinema One" and "Cinema Two" should set the tone for style and sophistication. The theaters, between 59th and 60th Streets and designed by Abraham W. Geller, actually form one building. Cinema One, a 750-seat house, will occupy the main, or upper floor of the structure, while Cinema Two, an intimate auditorium of 300 seats, will nestle below it on the lower level. A marquee announcing each theater will jut from an arcade sheltering entrances to both. From this arcade will open entrances to separate ticket desks, lounges, and audience areas. Study by Geller and his consultant Ben Schlanger is expected to give each theater perfect sight lines. All seats will be arranged to obviate disturbance from people leaving and entering the auditorium. There will be an upper level promenade overlooking Third Avenue for patrons of Cinema One. Steel frame of the project is now up.



Coming Up: End Runs and Pop Flies on the Ohio

PITTSBURGH, PA. Right across from "The Point," where the Allegheny and Monongahela unite to form the Ohio, will be built the Pittsburgh and Allegheny County Stadium. Designed by Deeter & Ritchey with consulting engineers Michael Baker, Jr., Inc., and The Osborn Engineering Company under the name of Deeter & Ritchey-Baker-Osborn, the stadium will have its upper tier and roof hung from a tubular steel space frame. Materials under consideration for the roof are aluminum, steel, and lightweight, preformed concrete.

Much design attention was given to achieving the maximum number of "ideal" seats for both baseball and football. For the larger playing field needed for baseball, three movable grandstand elements are moved back to surround the diamond and provide 35,800 "ideal" seats. For the football field, an arc of seats behind the outfield can be moved in and two semicircular sections shifted to either side of the field to give more of a football stadium layout. The football arrangement will furnish 29,300 "ideal" seats. There will be no pillars to obstruct the view from any seat.



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Knoll Co-ordinates

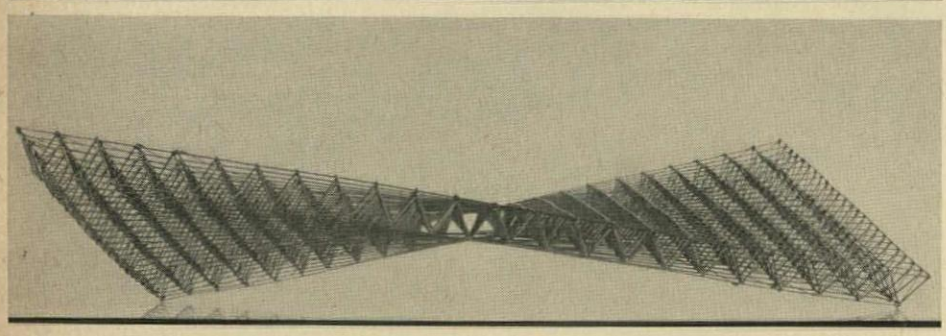
Deep in the Pennsylvania Dutch country, Knoll Associates, Inc., has combined facilities formerly scattered in several separate structures into one factory building. The new structure, designed and built for Knoll by Robert E. Lamb, Inc., of Philadelphia with Architectural Consultants Everett Associates of Allentown, encompasses operations ranging from metal forming to upholstery. Site is just out of East Greenville.

First of Twin Buildings for Century City

First major offices structure for Los Angeles' Century City development is now under construction at the corner of Santa Monica Boulevard and the newly created Avenue of the Stars, which will bisect the old main lot of 20th Century-Fox Film Corp., site of the jointly-sponsored Webb & Knapp-Alcoa venture. Building, designed by Welton Becket & Associates, will be known as Gateway West; Gateway East, its twin, will rise across the Avenue later. The reinforced-concrete building will be sheathed in an Alcoa-developed, light gold aluminum curtain wall, with spandrels and window units framed in charcoal brown aluminum. Yet another color—dark-gray aluminum—will face a narrow recess around each window-spandrel unit to give it "the appearance of floating in space." First and second floors will be glass-enclosed and set back from the face of the tower. Both Gateway buildings will be set back 100 ft from the Avenue of the Stars.

Center for Learning

An octagonal building containing classrooms, faculty offices, dining rooms, snack bar, and kitchen forms the nucleus of the new liberal arts college and residence hall complex at Michigan State University. This building will be connected to peripheral, six-story living units housing 1056 students by connecting links containing study lounge areas and resident advisors' suites. A lecture hall and a library adjoin the central building. The complex, designed by Ralph R. Calder & Associates, is under construction, with completion expected this fall.



REYNOLDS STUDENT WINNER

Jon Harris Starnes, 23, senior in the School of Architecture at the University of Texas, has won the $5000 top prize in the second annual Reynolds Aluminum Prize for Architectural Students. Starnes won the prize, which he will receive at the Dallas AIA Convention, for his design of a warped space frame component of aluminum. The jury, consisting of Olindo Grossi, Harold Spitznagel, and Linn Smith, commented on the winning design's diversity of application and the propriety of aluminum for such a use. "The intriguingly difficult joining problem in space frame design has been reduced to a very simple fabrication," the report stated. "With a minimum number of elements, the designer has solved a particularly difficult joint problem, utilizing uniform members throughout to create a space frame which permits assembly into diversified forms."

A New Word

In a report cautioning against the transformation of much of California into quasi-urban gray areas, California Tomorrow, a nonprofit organization which keeps a close eye on planning, or lack of it, in the state, described these areas as *slurbs*—"sloppy, sleazy, slovenly, slipshod semi-cities." Since California, unfortunately, is not peculiar in her slurbsness, it is a word we all must add to our lexicons.

Trade Center Shift

The site of the proposed World Trade Center in New York City (p. 51, APRIL 1961 P/A) has been moved from the East Side to the West Side of lower Manhattan, according to the Port of New York Authority.

FDR Winner Rejected By Fine Arts Commission

The Federal Commission of Fine Arts last month rejected the winning design of the competition for a memorial to President Franklin Delano Roosevelt (pp. 45, 47, FEBRUARY 1961 P/A). According to David E. Finley, chairman of the commission, the design, which recently received the official blessing of the Roosevelt Memorial Commission, was turned down mainly because "by its great size and height," it "competes with, rather than supplements, the three memorials [Washington, Lincoln, and Jefferson] with which it is required to be 'harmonious.' " A comment more revealingly displaying the commission's attitude was that the design, according to that group, is "lacking in repose, an essential element in memorial art, and the qualities of monumental permanence that are the essence of the three memorials with which it must, by law, conform." Francis E. Biddle, chairman of the Roosevelt Memorial Commission, commented, "I can hardly think that this action by the Commission on Fine Arts is calculated to encourage the Government hereafter to rely on the best architect they can obtain to plan and build public buildings."

The Fine Arts Commission's decision will now go to the President and Congress.

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British Money to Build in Boston

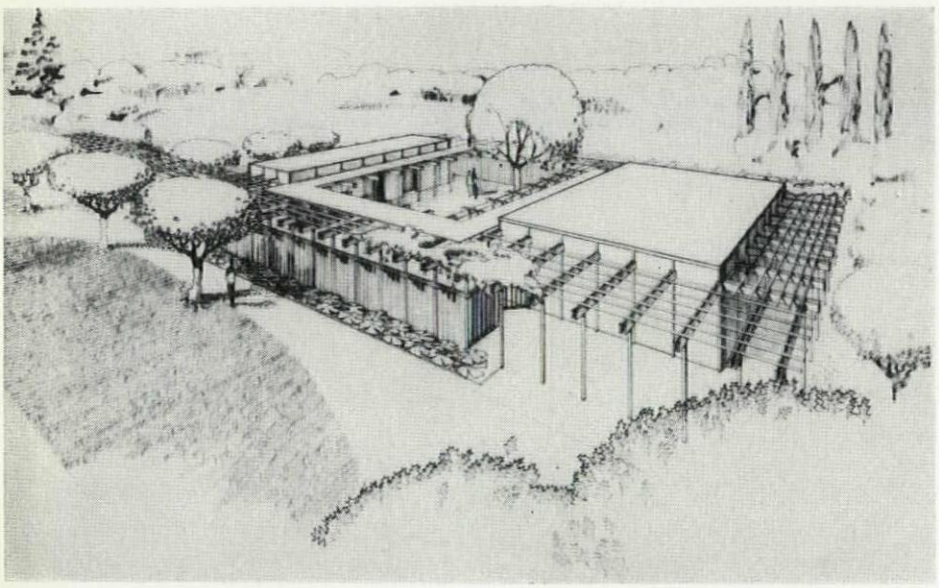
British investors recently purchased land for a building which, if erected, will be one of Boston's tallest buildings (30 stories). The building, a preliminary version of which is shown here, would be erected on a prime downtown lot at the corner of Pearl and Franklin Streets. Banded together as "Pearl Street Associates" for the project are Architects Frederick A. Stahl and Hugh A. Stubbins, and Structural Engineer William J. LeMessurier. It was Stahl who, working and teaching in England a few years ago, conceived the idea of interesting British capital to invest in Boston real estate.

. . . Where It Is Due

Additional credits on the International Science Center by Neill Smith & Associates (pp. 39 and 41, FEBRUARY 1962 P/A) are: Senior Staff Designer, John Foti; Traffic Consultant, Livingston & Blaney.

Everything in a Structural Shell

A "World Conference on Shell Structures" will take place in San Francisco, October 1–4. Sponsors are the University of California in Berkeley, the Building Research Advisory Board of the National Academy of Sciences-National Research Council, and the International Association for Shell Structures. Information may be obtained from the Engineering and Sciences Extension, University of California, Berkeley 4, Calif.



Prototype Design for Neighborhood Parks

For a series of four neighborhood parks in Santa Clara, Calif., Architect Marquis & Stoller and Landscape Architect Royston, Hanamoto & Mayes have collaborated on the design of a two-element prototype building in a setting of exterior recreational facilities. Facing each other across a patio will be the two elements, one containing the director's office and toilet facilities, the other containing an all-purpose recreation room with kitchenette and storage areas. Exterior walls are precast, exposed-aggregate concrete panels with redwood battens. For maximum protection against vandalism, glass walls face the court for the most part, and the open area between the buildings is defined by fences with gates which can be closed when needed. Structural Engineer, Eric Elsesser; Mechanical Engineer, Dan Yanow; Electrical Engineer, Robert Stern.

Net Worth of Architecture

For the recent Festival of Arts in Memphis, members of the local AIA chapter designed a dramatic entrance way using prestressed cable nets. Nets were suspended from hoops to flow through high warped planes into vertical surfaces. Indian bells were attached over the entrance to provide an aural as well as a visual experience. The structure was lighted by night.

Obituaries

Louis La Beaume, FAIA, died in St. Louis on November 9. He was responsible for much civic and ecclesiastical work there.

Charles E. Nelson, former architect with the Department of Health, Education and Welfare, died in the capital. He had previously been associated with McKim, Mead & White.

Ivan Mestrovic, responsible for sculpture on many buildings, died in South Bend, Indiana, on January 16. He was serving as resident sculptor at the University of Notre Dame.

Jean Tschumi, 57, winner of the 1960 Reynolds Memorial Award for architecture and the design competition for the design of the World Health Organization headquarters, died in his train compartment en route from Paris to Geneva on January 25.

Hugh Ferriss, architect and delineator of note, died at his home in New York on January 29. He was 72, had served as president of both the New York chapter AIA and the Architectural League. He was the author of two books: *Metropolis of Tomorrow* (1929) and *Power in Building* (1933).

Shepherd Stevens, Professor Emeritus of Architecture at Yale University, died at his home in New Haven on February 10. He was 81.

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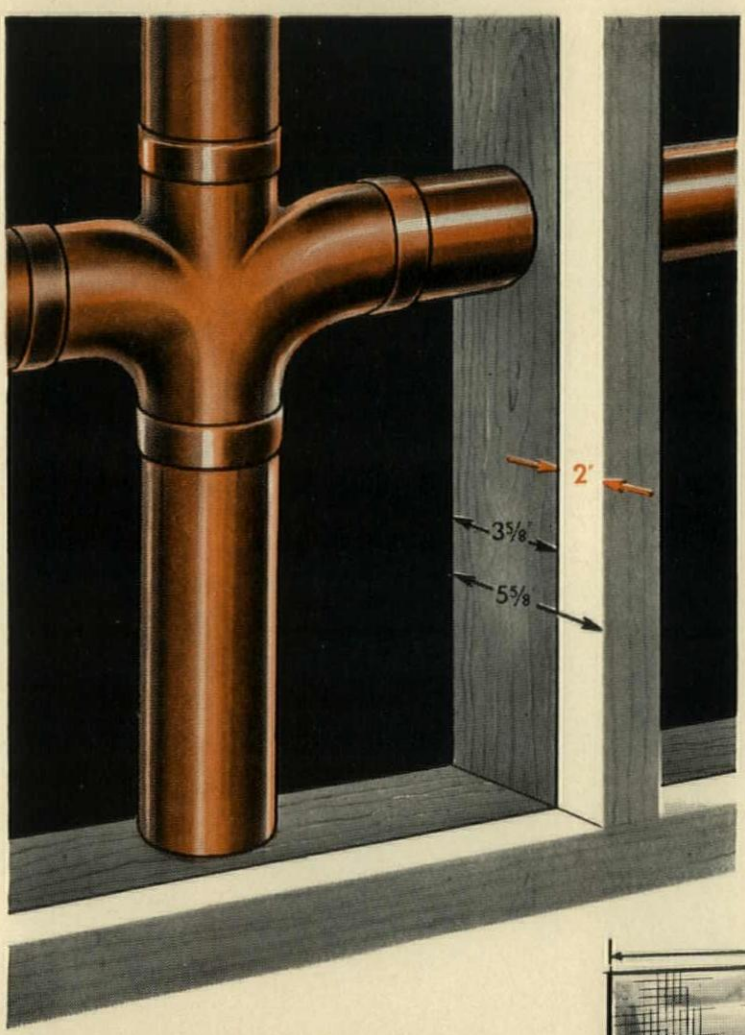

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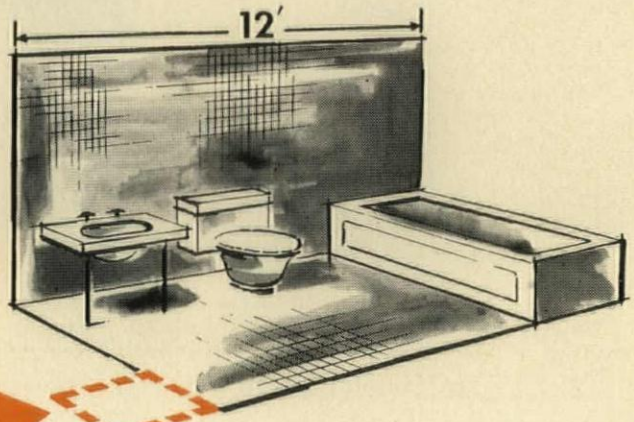

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MONEY FOR ATOMIC ARCHITECTURE

By E. E. Halmos, Jr.

The Atomic Energy Commission has changed some of its rules applying to reimbursements under Architect - Engineer cost-plus-a-fixed-fee contracts, thus bringing them into line with those it applies to research and development contractors.

In a nutshell, the changes provide for reimbursement of costs of incentive compensation; for salary of the responsible supervising representative of the A-E firm; and for some of the general and administrative expenses of central and branch offices.

Here, in greater detail, are the key points:

1. Costs of preparing proposals—whether successful or unsuccessful—that are properly chargeable to the unit where contract work is being performed, will be allowable if the subject matter is applicable to the AEC program. These costs, however, will not be permitted to exceed 1 per cent of direct material and labor costs for the contract work.

2. Incentive compensation will be allowable, provided total compensation paid to any individual is "reasonable for the services rendered" and doesn't exceed costs allowed by the Internal Revenue Service for tax purposes. Compensation for personal service must be commensurate with that paid under the employer's established policy, and must conform generally with that paid by comparable firms.

3. General and administrative expenses incurred in the central or branch office may be accepted for apportionment to the work under AEC contract on the basis of incidence to performance, properly allocable to the work.

4. However, no apportionment of general and administrative expenses will be allowed if the A-E establishes an office at the site of the construction work, or at some other site, solely for the particular job. In such a case, general and administrative expenses would be compensated for in the fixed fee.

After the Bomb Is Over

A close look at the Defense Department's shelter program is likely to disappoint many who look to it for a construction bonanza.

Fact is, surprisingly little construction will be required.

Reason is obvious, if you read carefully: Defense is talking about *fall-out* shelters—not blast-proof havens. To protect against fall-out, a shelter needn't have tremendous walls and roof, heavy beams, or lots of concrete. It needs only to screen out enough radioactivity with its walls and roof; have enough ventilation to supply reasonably clean air to occupants; contain sanitary and water supply provisions; have enough food for approximately a two-week period; and provide some means of communication (a small radio).

The military is being coldly logical about this, on the theory that very few structures would withstand a direct hit or a near miss. But people outside the "ground zero" area would need protection against the fall-out following the explosion.

With this in mind, Army's Corps of Engineers and Navy's Bureau of Yards and Docks are engaged in a crash program that amounts to a survey (through contracts let to consultants by district offices) of every sizeable building in the United States.

Objective is to find areas in these buildings that could serve as shelters, either as they are or with a little additional work. Next step will be to grade other areas that may have shelter potential, but that would require considerable adjustment before they could be used as such. Final move will be to decide how many people can thus be protected, and at what cost.

Base criteria is a "Protection Factor" of 100, which means simply that a shelter occupant would receive 100 roentgens of radioactivity per hour less than if he were in the open. The "PF" factor is arrived at by taking into account the size of the building (cubic content); thickness of floors and roof; wall thicknesses; and relationship of surrounding structures and terrain that might trap radioactive particles. These data are fed into computers, which produce, for each building, information as to safe areas on each floor and how many people these can accommodate.

The number of people who can be accommodated in a given shelter area is determined on the basis of ventilation: with natural ventilation, requirement is 500 cu ft per person; with ventilation through ordinary window-type air-conditioners, this can be reduced to 65 cu ft per person. Surprisingly, present-day air conditioners are estimated to be capable of screening out more than 90 per cent of dangerous radioactive particles.

House 'Em, but Don't Teach 'Em

There's considerable significance in the quick passage by the House of a $1.5 billion program to build college classrooms and facilities over a five-year period.

Nobody in Congress will fight very hard against construction aid to education. What starts fights over education bills is any proposal to increase teacher salaries or hand out more scholarships.

Opponents of anything that smacks of control of the educational curriculum forced deletion of a scholarship grant program from the House bill (though a similar Senate bill would provide $900 million for this purpose), then happily helped roll up a lopsided vote in favor of construction.

FINANCIAL

With the huge Federal budget, which includes appropriations of more than $9 billion for construction work (including space programs and military work) in hand, the predictions of a good year for the construction industry seem to be holding up.

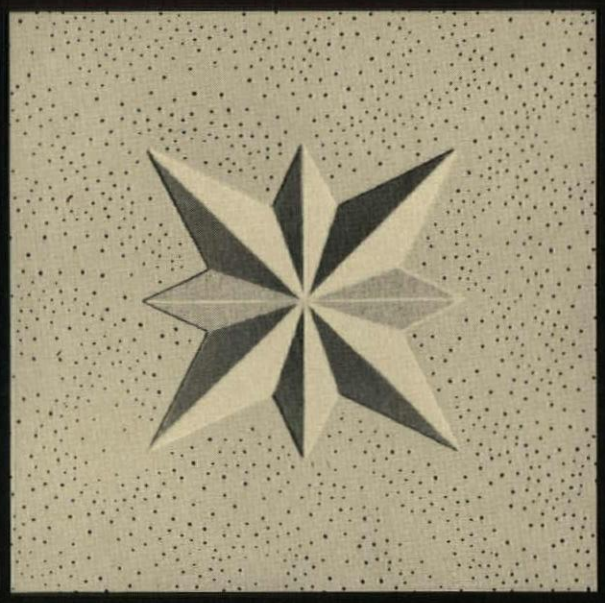
Some of the figures that usually bolster such predictions, however, were missing for a while: municipal bond elections were skimpy in the early months of the year (though a huge total will be presented to voters later); and—probably because of the season—few private companies reported new plans. However, there seems to be no fear that these indicators won't show up strongly a little later in the year. Certainly, there is no evidence of any tightening of money or lack of interest in plant expansion.

The big unknown for all businessmen—including the construction industry—was beginning to get more serious study as Congress received the President's proposal for new tariff cutting power (up to 50 per cent).

The unknown is the possible effect on the U.S. economy of the European Common Market—already a combine of more than 160 million people (and more than 240 million if Great Britain joins). Such a group, with its undoubted technical skills, and unhampered by restrictive tariffs, could make real inroads in the U.S. domestic market—for building materials as well as everything else.

For worship or for work

Stained glass window in Cathedral Chalons-sur-Marne, France, admired since the twelfth century.



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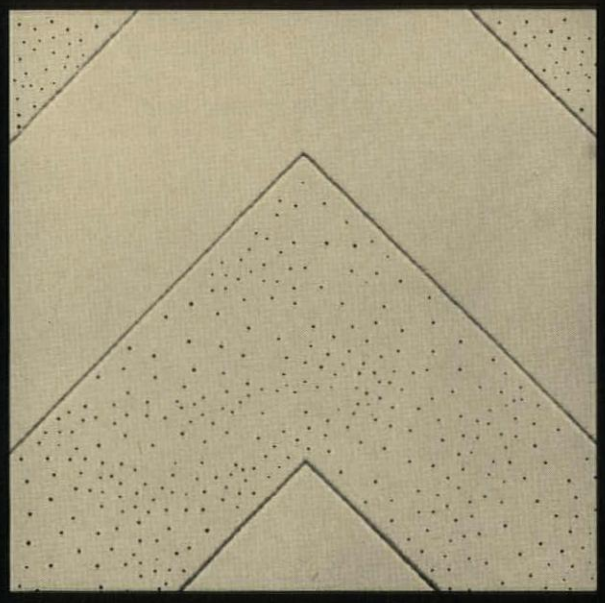

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Art: Out of Town

Paul-Emile Borduas who, according to Dr. Evan H. Turner, Director of the Montreal Museum of Fine Arts, "contributed more than any other single person to the development of modern painting in the Montreal area," was recently given a posthumous retrospective at that museum. In the course of his career, Borduas changed from representational to nonfigurative art, becoming the leader of the latter movement in his region. Throughout his life, he was a teacher and organizer. He presented the first *Automatiste* exhibit in Montreal, and published "Refus Global," the *Automatiste* manifesto. Shown here is the watercolor "Glace, neige, et feuilles morts."

Architects in many cities will have a chance to see the stunning show, "101 Masterpieces of American Primitive Painting," from the collection of Edgar William and Bernice Chrysler Garbisch. The show, which began its tour at the Metropolitan Museum of Art, is now at the Walker Art Center in Minneapolis, and will visit 17 more cities before finishing in 1964. It covers primitive art in the United States beginning in the early 18th Century, and ranges from portraits and landscapes to historic scenes and imaginative works such as Edward Hicks's "Peaceable Kingdom" (1830), probably the most famous painting in the exhibition. The collection is reproduced in a book published by Doubleday and called, appropriately, *101 Masterpieces of American Primitive Painting*. Illustrated here are "The Cat" and "The Hobby Horse," done about 1840 by unknown artists.

TAKING THE SLUMP OUT OF CONCRETE

ST. LOUIS, MO. Hellmuth, Obata & Kassabaum's St. Louis Priory, which won the Religion Design Award in the Fifth Annual Progressive Architecture Design Awards Program, is rapidly approaching completion. The acute vertical slopes of the high arches on the three-tiered structure presented a problem which faces more and more of our "sensuous" concrete designs these days: how to avoid "concrete slump." The standard method has been the use of double forming. Now, by use of a precisely controlled pneumatic mixing and spraying machine, superior adhesion is possible without double forming. In "True Gun-All" equipment, water under close control is introduced into the mix in the mixing chamber rather than at the nozzle as in dry mix machines. The material is propelled along the hose by intermittent slugs of air, and an additional blast of air at the nozzle gives greater application impact. All concrete at the Priory was placed from a single ground position. True Gun-All Equipment Corp., Div. of Detroit Tool Engineering Co., P.O. Box 232, Lebanon, Mo.

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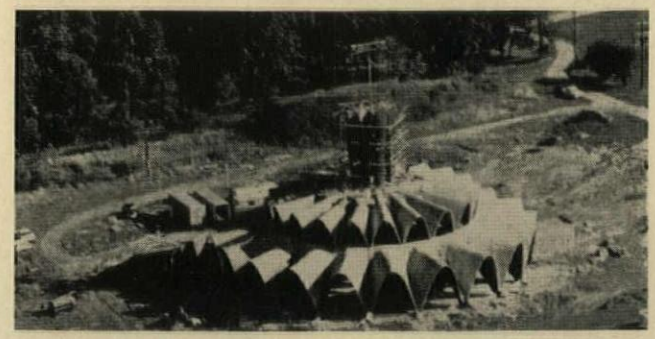
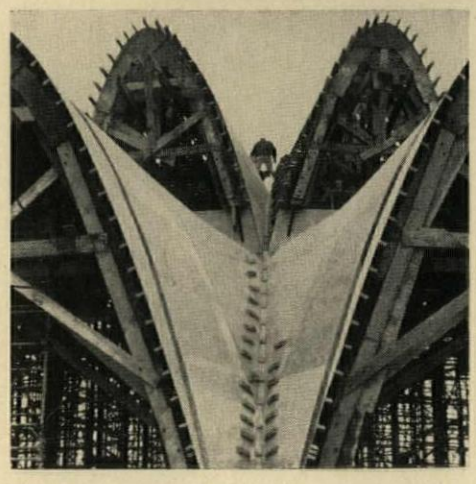
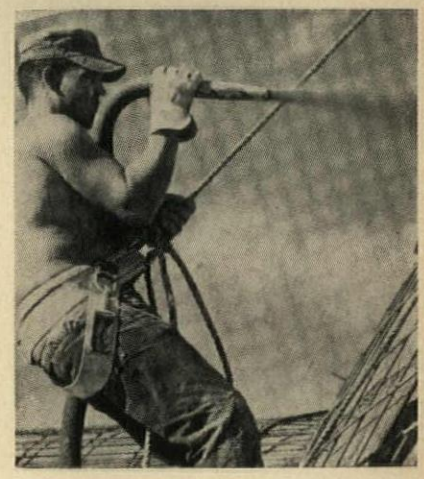
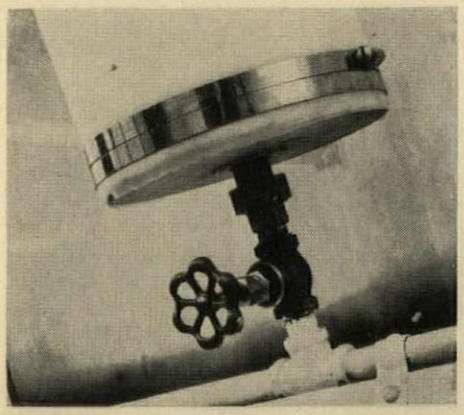




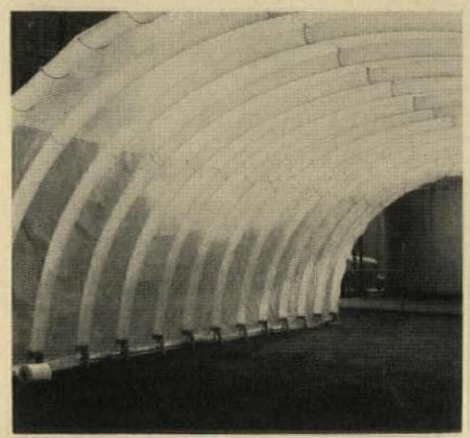


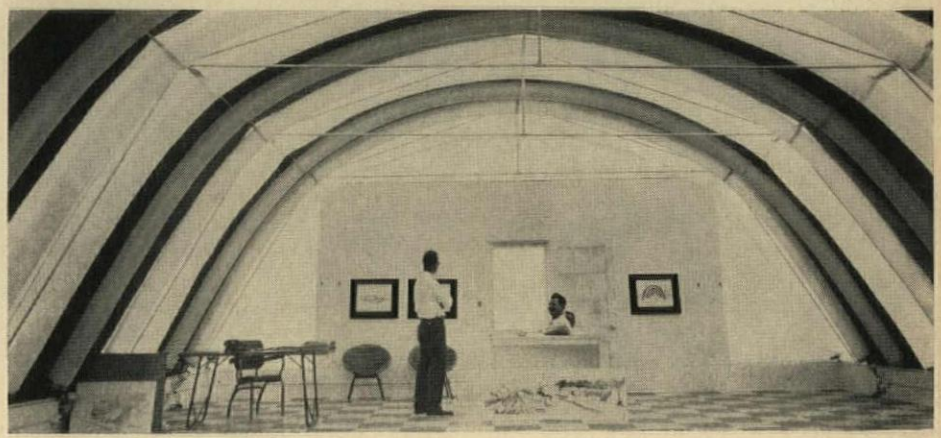
AIR ARCHES SUPPORT PLASTIC STRUCTURE

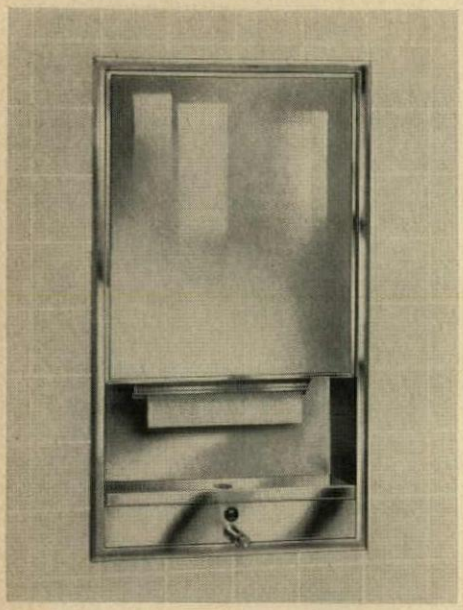


EVANSTON, ILL. Four elements make up the portable "Protectodome" building: a series of double-walled plastic tubes, a sheet of the same material, an aluminum truss frame, and an air compressor. The plastic elements are extruded from "Tenite" polyethylene plastic supplied by Eastman Chemical Products, Inc., a subsidiary of Eastman Kodak. In construction, the tubes are laid parallel to each other in the necessary number and curved in an S-shape to allow for expansion into arch form. The plastic cover is applied, one end of the tubes is sealed, and the other connected to an air compressor (see detail photo). When pressure is turned on, the tubes inflate to form the arch. Air pressure is so regulated that it shuts off when tubes are full, and "kicks on" occasionally to maintain proper pressure. A truss of lightweight, small-diameter aluminum tubing is then installed to act as spacers for the air arches, to anchor the cover at the apex line, and to give the structure added rigidity. The completed structure is seen below. Protectodome Corp., 603 Main St., Evanston, Ill.

On Free Data Card, Circle **101**



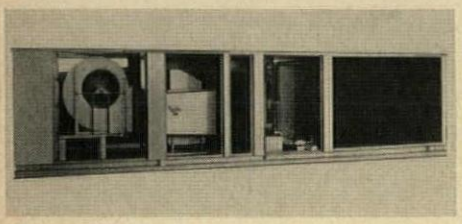




Four Functions for Washroom Unit

Wall-recessed washroom unit integrates four necessary elements: soap dispenser, shelf, mirror, and electric light. Unit, which is of stainless steel in a satin finish, is 15¼″ wide and 25⅝″ high. The top of the soap dispenser forms the shelf which is 4″ deep. Dispenser is filled from top, using special key provided by company. It comes in two versions, one dispensing lather. Architectural Service Dept., Bobrick Dispensers, Inc., 1839 Blake Ave., Los Angeles 39, Calif.

On Free Data Card, Circle **102**



One-Piece Air System Has Optional Unit

Optional feature—to conform to local codes or other regulations—of one-piece "Atmos-Pak" heating and/or cooling system is a blow-through system with heater by-pass. Other devices and optional features of the basic system include: larger than standard air-conditioning motor sizes where duct systems or greater static pressures are expected; stainless-steel heat exchangers for contaminated air; adaptations to special requirements for utilities or manufactured gas; cycling fan head pressure controls; two-stage cooling; time delay relays to reduce starting loads; permanent, electric, or automatic filters; 100% O.A. damper and motor; larger heater section; two-speed AC fan motor and starter to maintain higher delivered air temperature on heating cycle; accommodation to dual fuel supply where interruptable gas service is available; five-year motor compressor warranty; master control stations for specific needs; optional colors and shapes for housing. Atmos-Pak, Inc., 88 N. Highland Ave., Ossining, N. Y.

On Free Data Card, Circle **103**

Ceiling Is Believing

New installation technique, appropriate for areas where controls must be kept out of the way, has been used in several applications. Minneapolis-Honeywell engineers, in helping plan

a large Midwest department store, hung the thermostats from the ceiling to keep them away from possible shopper interference. The thermostat is mounted on the end of a standard "Prescolite" lighting fixture, but pneumatic tubing replaces the wiring inside the fixture. Because the fixture's swivel head is retained, the thermostat may be set at any desired angle. Unit can be hung from a discharge grille or a standard 4″ electrical box. Minneapolis-Honeywell Regulator Co., 2753 Fourt Ave., S., Minneapolis 8, Minn.

On Free Data Card, Circle **104**

Heat Pump Progress

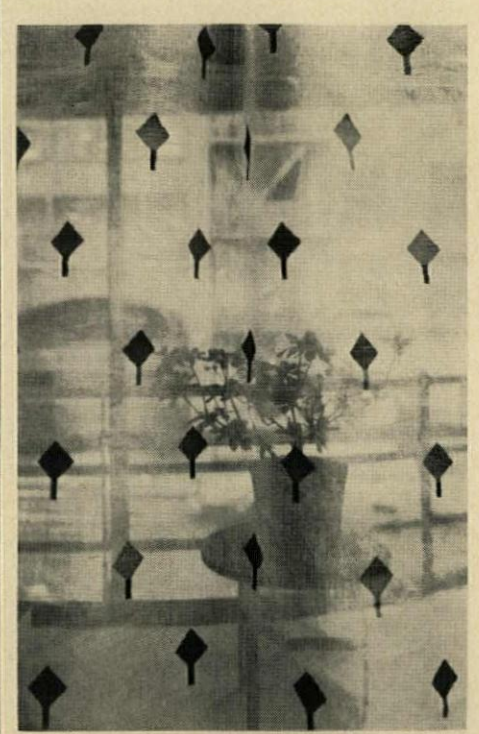
New heat pump, the result of two years of research and testing under every weather condition, boasts a simplified design which eliminates three- and four-way valves, expansion valves, oil separators and oil receivers, and many refrigerant controls. Because of this, complicated installations and field adjustments are no longer necessary: for instance, the contractor does not install a single refrigerant valve. The new heat pump is based on positive forced feed circulation of the refrigerant through the respective summer or winter evaporator; no critical superheat control settings govern its operation. Unit is available in both air to air and air to water operations, creating a freedom of choice which will make many types of applications possible. R. E. Japhet, Air Conditioning Div., Worthington Corp., East Orange, N. J.

On Free Data Card, Circle **105**

Fire-Resistant Plastic Laminate for Walls

Westinghouse's new fire-resistant "Micarta" has an asbestos base and is approved by Underwriters' Laboratories. The .050″ material is suitable for walls or counter tops in schools, hospitals, trains and other places where surface durability and fire resistance are important. Available in all standard patterns, colors, and wood grains in all standard sheet sizes. Westinghouse Electric Corp., Micarta Div., Hampton, S.C.

On Free Data Card, Circle **106**



For Sophisticated Nurseries

The Larsen Design Corporation has added a half-dozen velvet-weave fabrics that are printed in sumptuous colors inspired by Art Nouveau. Also in the collection are two sheer fabrics: one has blocks of different textures applied in a random pattern; the

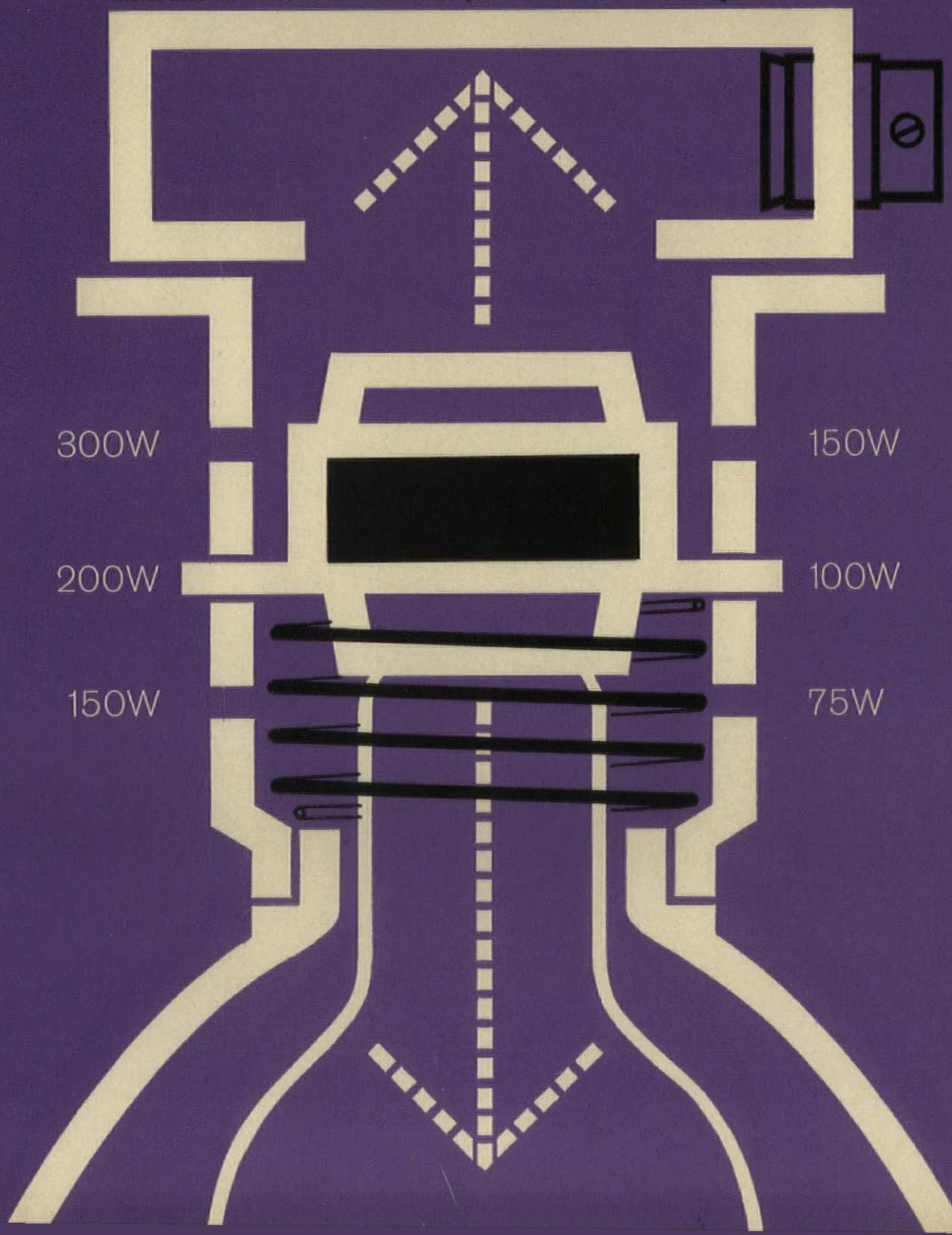
Continued on page 104

ADJUSTOMATIC HUB One of many innovations in our new Marco collection. Three J-slots, plus a compression spring, permit changes in sizes and positions of bulbs. Result: great flexibility in quantity and quality of illumination, often necessary after an installation has been made. Write for handsome catalog illustrating over 100 new recessed incandescent lighting fixtures.

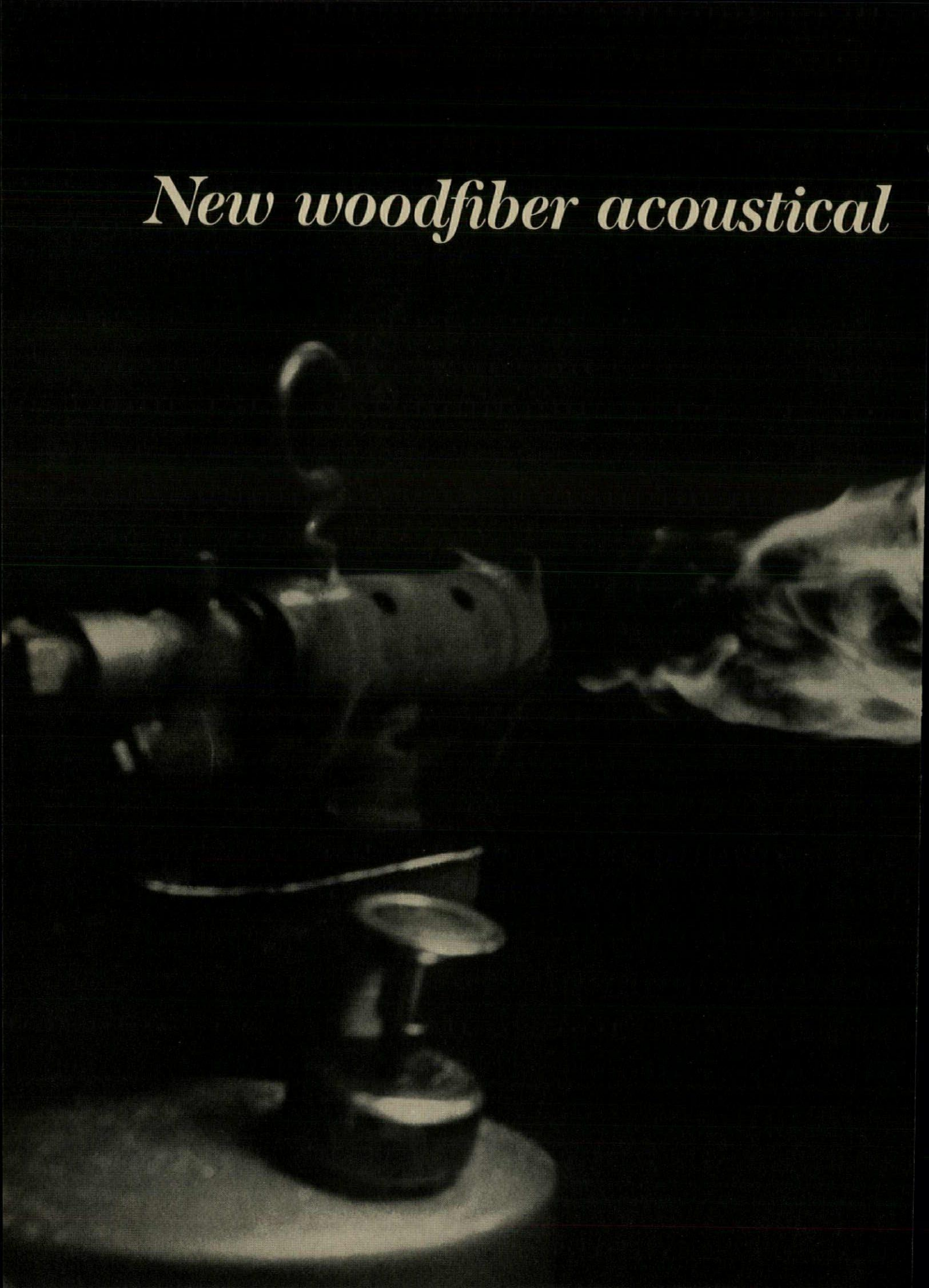
MARCO

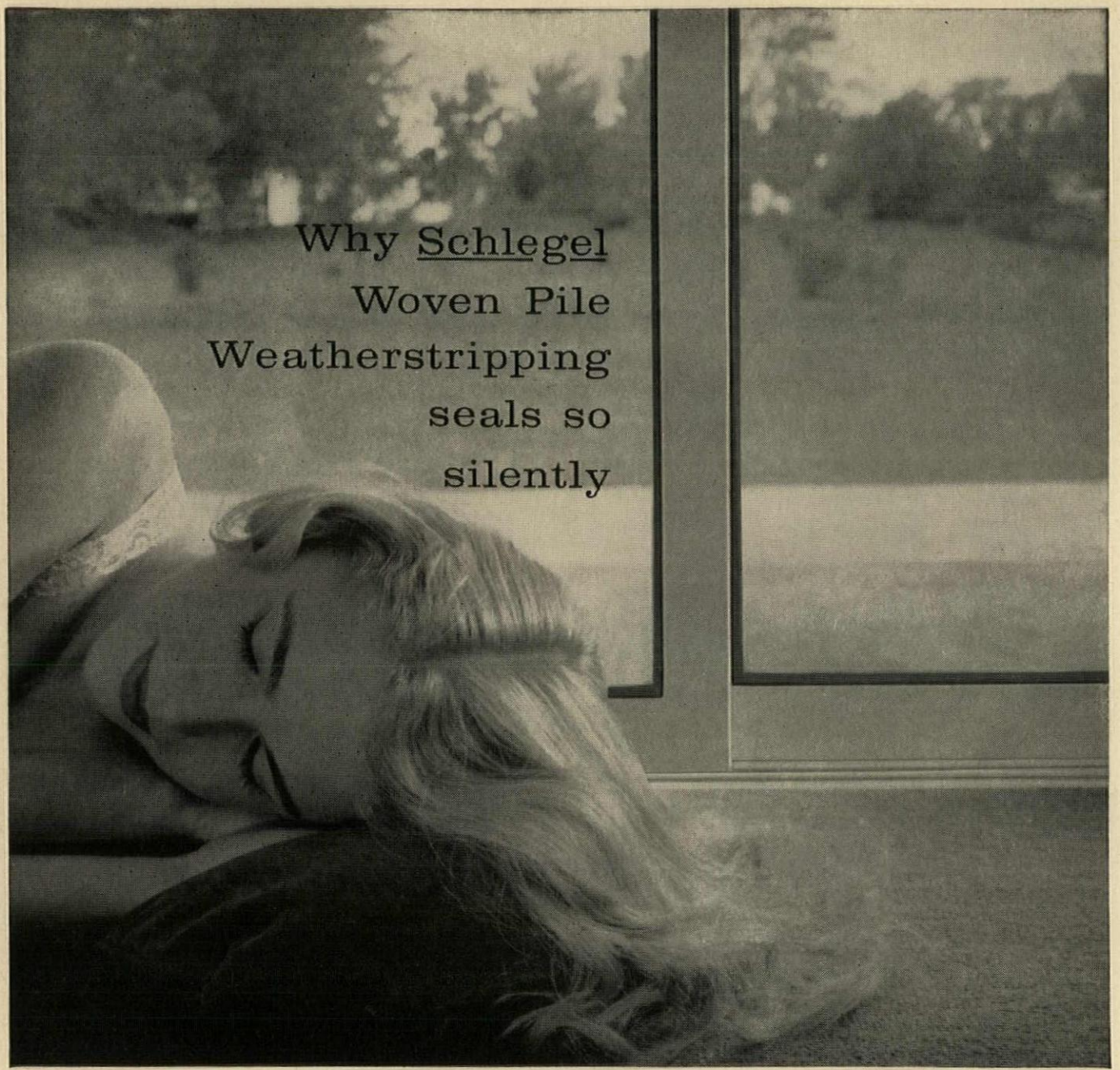
For more information, circle No. 416

MARVIN ELECTRIC MANUFACTURING COMPANY, Dept. PA-3, 648 Santa Fe Ave., Los Angeles 21, California



New woodfiber acoustical





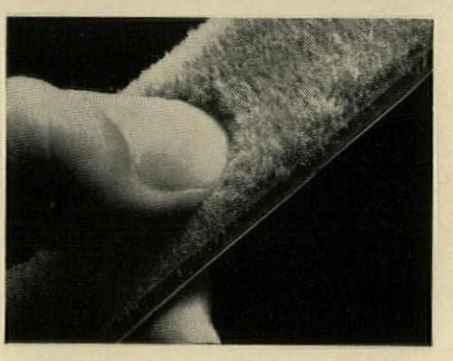
For sheer soundlessness, nothing matches Schlegel Woven Pile Weatherstripping. Its dense, soft pile won't squeak (like plastic), screech or rasp (like metal). Windows and doors won't bang or rattle—even in a storm. Seals weather out, seals heat and air-conditioned air in.

SMOOTH ACTION. Doors and windows ride smoothly on Schlegel Woven Pile Weatherstripping, under *all* weather conditions. They never stick or bind. Schlegel Woven Pile is friction-free.

GIVES SURE PROTECTION. Schlegel Woven Pile compresses, is truly resilient. It cushions doors and windows snugly and compensates for irregular metal or wood surfaces.

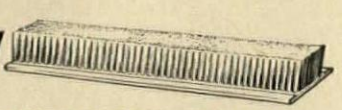
WEATHERPROOF. Neither air, rain, wind, nor dust can seep in. Only Schlegel Woven Pile is silicone treated to insure complete weatherproofing. Schlegel performance has been proven by rigid FHA tests for air infiltration.

We have much more information about various types of Schlegel Woven Pile Weatherstripping, yours for the asking. And the Schlegel engineering staff is available for consultation on any special weatherstripping applications you may have.



Schlegel Woven Pile Weatherstripping keeps its resilience under all weather conditions. Wool fibres smooth out the uneven surfaces, give a firm, snug bond.

Schlegel



WOVEN PILE WEATHERSTRIPPING

Schlegel Manufacturing Company, P.O. Box 197, Rochester 1, N.Y.

In Canada: Oakville, Ontario

For more information, turn to Reader Service card, circle No. 426

The Heat's On— In the Ceiling

Currently available from General Electric is an electric radiant-ceiling panel for installation in new or remodeled homes—in bathrooms, kitchens, game rooms, and above large glass panels or sliding doors. Measuring 2′ x 5′, the panel can be surface-mounted or recessed on any type of ceiling. Thickness is 13/16″; facing is steel, with ridges for added strength; and finish is a baked-on white enamel that can be painted to match room décor. Panel comes complete with its own insulation backing, ready for immediate installation. Predrilled holes accommodate any fastening device. General Electric Co., Electric Comfort Heating Section (NB), Appliance Park, Louisville, Ky.

On Free Data Card, Circle 113

Window Coatings Reflect 80% of Heat

Two new window coatings (applied like paint by brush, roller, or spray) reduce interior temperatures in industrial and commercial buildings by reflecting up to 80% of the heat striking the glass. (Other coatings for the same purpose absorb the heat to prevent its passage and thus transfer heat by conduction and convection when the windows become hot.) "Heat-Bar Liquid Plastic" #10 and #20 are hard and durable when dry, and can be washed without loss of reflecting and filtering properties. The products differ in that LP #20 is clear, allowing full visibility, with slightly less effectiveness as a heat-stopper. Professional Products Research Co., c/o Micro-Circuits Co., New Buffalo, Mich.

On Free Data Card, Circle 114

AIR/TEMPERATURE

People-Heating

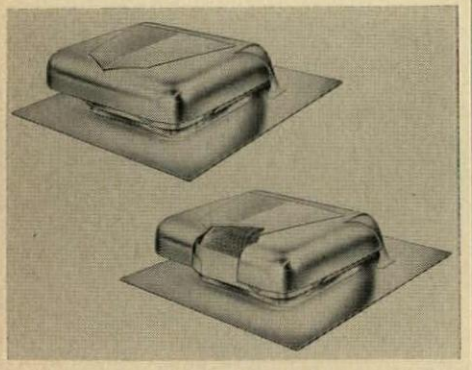
New technical publication, 16 pages, is entitled *People Heating with Infrared Lamps*. Illustrated with pictures of typical indoor and outdoor "people-heating" installations, the booklet de-

scribes the principles of heating with infrared lamps, the lamp types available, the distribution and control of their heat output, and design data for using them in snow melting, indoor zone heating, indoor space heating, and outdoor heating. A sample problem of designing a space-heating system with infrared lamps is provided. General Electric Co., Inquiry Bureau, Dept. TP-103, Nela Park, Cleveland 12, Ohio.

On Free Data Card, Circle **200**

New Principle in Roof-Ventilator Design

Incorporating a completely new design principle, new "Leigh 144" roof



ventilator provides savings both in ventilator cost and installation cost. Outstanding feature of the new unit is the "Dual Baffle," which makes it possible to provide 144 sq in. of free area with excellent weather protection, and still remain compact in size. The ventilator fits over a 12½" x 12½" opening, and is only 6" high. Bulletin, 4 pages, describes the new ventilator in detail, including prices. Leigh Building Products Div., Air Control Products, Inc., Coopersville, Mich.

On Free Data Card, Circle **201**

CONSTRUCTION

First Code on Prestressed Concrete

PCI announces publication of its new *Prestressed Concrete Building Code Recquirements*, the first national code on prestressed concrete. The code includes all design requirements—allowable stresses in concrete and steel, load factors, ultimate flexural strength, shear, etc. A separate chapter gives the latest thinking on materials and construction. The code is written so that it may be incorporated into any general building code; and it will soon appear in the next edition of the American Concrete Institutes' *Building Code Requirements*. Write (enclosing $1.00) to: Prestressed Concrete Institute, 205 W. Wacker Dr., Chicago 6, Ill.

On Free Data Card, Circle **202**

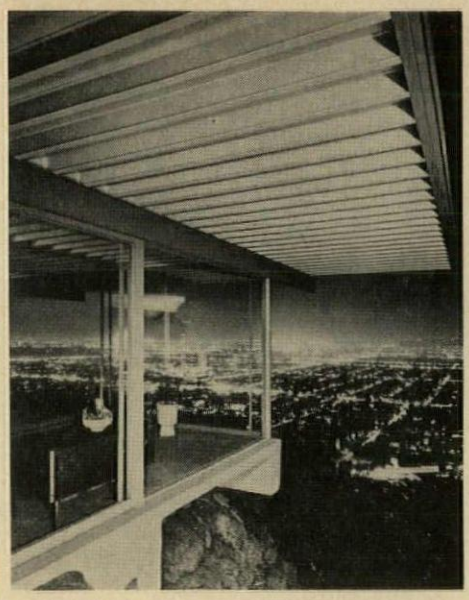
Translucent Walls/Roofs

Two new brochures contain up-to-date information on translucent building units by Kalwall. *Walls of Light*, 8 pages, illustrates "Translucent Wall" system applied to school, church, commercial, and residential construction. Details show "Clamp-Tite" aluminum installation system which provides a positive, weathertight seal by its continuous screw-clamp action along perimeter of panels. *Skylight/Skyroofs*, 4 pages, shows natural overhead daylighting brought into interiors, both by single-panel skylight units and by entire "skyroofs" of the sandwich material. Kalwall Corp., 43 Union St., Manchester, N.H.

On Free Data Card, Circle **203**

Steel Framing for Houses

The Steel-Framed House, 32 pages, reports on a number of noted houses that have used structural steel for framing. The booklet gives several over-all views of each residence, plus plans and a short description of the architect's objective and solution. The architectural advantages of light-steel framing—for difficult site problems,



uncluttered interiors, permanence, quick completion, and economy—are discussed. Bethlehem Steel Co., Publications Dept., P.O. Box 3494 Rincon Annex, San Francisco 19, Calif.

On Free Data Card, Circle **204**

Translucent Panels with Welded-Grid Core

Newest development in translucent building panels, "Sanpan All-Welded Construction," is featured in 1962 catalog. Major advantages of this exclusive welding of the grid core are: (1) greater over-all panel strength; and (2) more flexibility in supplying custom grid designs. The catalog, 12 pages, also illustrates the economical "Sanpan Unitized Window Wall" and "Sanpan Classroom Window," two more new developments by Panel Structures, Inc. Comprehensive details of available framing sections are included, as are many photographs of typical Sanpan installations. Panel Structures, Inc., 45 Greenwood Ave., East Orange, N. J.

On Free Data Card, Circle **205**

Perforated Metal: Stock Sizes and Patterns

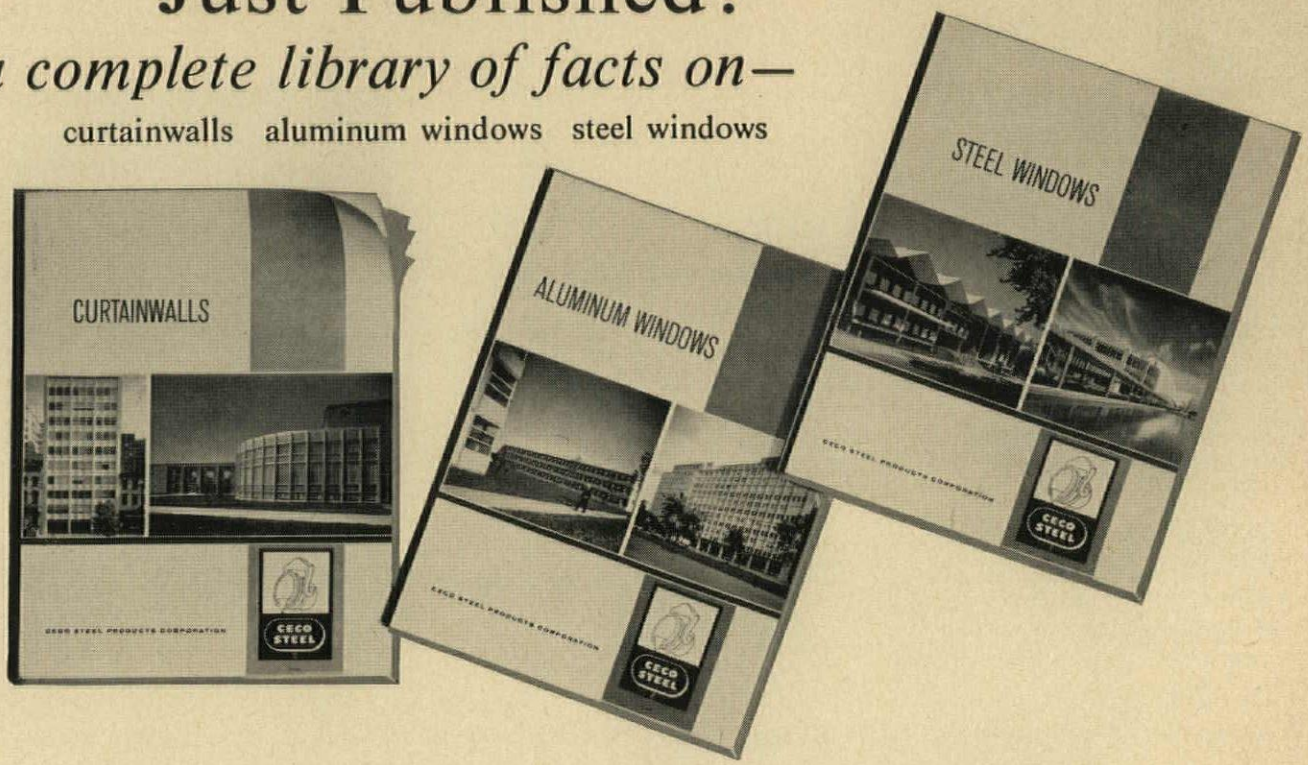
Stock sizes and patterns of perforated metal — for ventilation, protection, concealment, construction, and ornamental decoration—are shown in new 12-page brochure. The round, slotted, and decorative patterns are presented in actual size; percentage of open area, gage dimensions, and sheet sizes are given for each design. Cross Perforated Metals, National - Standard Co., Niles, Mich.

On Free Data Card, Circle **206**

Just Published!

a complete library of facts on—

curtainwalls aluminum windows steel windows



Brand new!—a three-part file that every architect, engineer and contractor concerned with institutional, commercial and monumental buildings should have. Designed and written for quick, easy reference.

Curtainwalls

- details and construction features of high quality aluminum and steel curtainwall systems; includes complete specifications.
- complete data on a new concept in curtainwalls using single and double-hung aluminum windows; a design that eliminates conventional mullions to lower costs and provide clean architectural lines.
- mullion and anchorage details; panel sections; typical head and sill closures.
- 38 pages; color photos, detail drawings and pertinent tabular data.

Aluminum Windows*

- design, construction features and specifications for commercial, monumental, intermediate and apartment residential double-hung and single-hung windows; also projected and heavy awning windows . . . for use in schools, hospitals, commercial and public buildings, churches and other structures. 36 pages.
- also shows hopper vents, fixed windows, insulating panel installation, spiral and tape balances, mullions, half-size sections, quarter-size installation details and insect screens.

Steel Windows*

- features and advantages of steel windows for schools, factories, public buildings and other applications; complete specifications.
- covers 1½" heavy-intermediate and 1¼" intermediate projected windows and industrial types; also mechanical operators and insect screens.
- 40 pages; all technical data clearly illustrated and tabulated.

**For information about residential windows, screens and storms, ask for "Commodity" catalogs.*

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Please rush my copies of your new bulletins:

☐ *No. 1069-F, "Curtainwalls"* ☐ *No. 6013-I, "Aluminum Windows"*

☐ *No. 1001-R, "Steel Windows"*

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PA

A Rule for All Joints

Slide-rule calculator that estimates required quantities of polysulfide-base sealant for any given set of joint dimensions has been developed as an aid to architects, specifiers, and contractors. Sliding chart on the reverse side of the rule provides application data for best sealing results on plastics, concrete, stone, marble, wood, metal, glass, porcelain, and ceramics. Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton 7, N.J.

On Free Data Card, Circle **207**

Everything's Up to Date in Hardwood Plywood

The Commercial Standard for hardwood plywood has been revised for the first time since 1956. Commercial Standards are not set up by the Government, but are written by interested groups, with the U.S. Department of Commerce, Commodity Standards Division, acting as clearing house and moderator. After the groups have agreed on its terms, the standard is distributed by the Department of Commerce, but enforced by the industry.

The new standard, designated *CS35–61*, contains the latest data on grades, sizes, and new core materials. Folder, which contains *CS35–61*, gives much additional information: four simple steps to install and finish hardwood plywood; strength-weight ratios and flexural strength properties; check list for specification writers; and illustrations of veneer types and matching. Hardwood Plywood Institute, P.O. Box 6246, Arlington 6, Va.

On Free Data Card, Circle **208**

Winter Concreting

New folder, entitled *Keep on Schedule in Winter Concreting*, tells how use of calcium chloride can reduce the time of initial and final concrete set by as much as 65%. According to folder, Solvay calcium chloride also provides substantial curing protection. By shortening the normal protection period, calcium chloride cuts delays between operations, saving on costs of labor and equipment. Solvay Process Div., Allied Chemical Corp., 40 Rector St., New York 6, N.Y.

On Free Data Card, Circle **209**

Curtain-Wall Panels of Precast Concrete

Precast-concrete curtain-wall panels in a variety of colors and textures are shown in Martin Marietta's new 12-page catalog. The various types illustrated are exposed-aggregate ("Marzaic") panels, sculptured panels, and broomed-finish panels. More than 2000 colors and textures are available. Catalog includes construction details and specifications. Martin Marietta Corp., 101 E. Ontario St., Chicago 11, Ill.

On Free Data Card, Circle **210**

Floors for Computers

Bulletin, 4 pages, presents "WACO Free-Access Floor Systems" for floors supporting heavy computer equipment. The floor panel is a unique welded assembly of steel sheets, giving maximum weight support for heavy concentrated loads. The construction's rigidity permits cut-outs to be made as desired, now or later. Bulletin further states that greater accessibility is possible, with easily removed panels and completely removable steel frames. These and other features of the all-steel system are described and illustrated. Panel Products Div., Washington Aluminum Co., Inc., Baltimore 29, Md.

On Free Data Card, Circle **211**

DOORS/WINDOWS

Handsome Hinge

New "Moderne" hinge — slender, smart, clean—is presented on 2-page catalog sheet. In addition to its simplicity of design, the hinge has a number of extra features: nonmagnetic stainless-steel pins to carry the horizontal load; nonmagnetic stainless-steel bearings to carry the vertical load; nonremovable pins for extra security; nonrising pins for improved appearance. Data on the hinges includes recommended uses, construction, finishes, applications, packing, and sizes, for both regular and extra-heavy weights. McKinney Manufacturing Co., 1715 Liverpool, Pittsburgh 33, Pa.

On Free Data Card, Circle **212**

Glass Patterns

1962 catalog of glass patterns—from manufacturer of rolled, figured, and wired glass—is now available. Mississippi's complete line of glass patterns for industrial, commercial, school, and residential uses is covered in the 16-page catalog. Photos show the individual patterns and typical applications; charts give light-distribution and other data. Mississippi Glass Co., 88 Angelica St., St. Louis 7, Mo.

On Free Data Card, Circle **213**

Weather Stripping: Full-Scale Details

Comprehensive catalog, 28 pages, details weather-stripping equipment of aluminum, bronze, stainless steel, and neoprene for all types of doors and windows. Details are drawn at full scale, and appropriate applications are suggested for each item. Specifications are clearly and simply organized, to help the specifications writer avoid excessive research. Zero Weather Stripping Co., Inc., 451 E. 136 St., New York 54, N.Y.

On Free Data Card, Circle **214**

ELECTRICAL EQUIPMENT

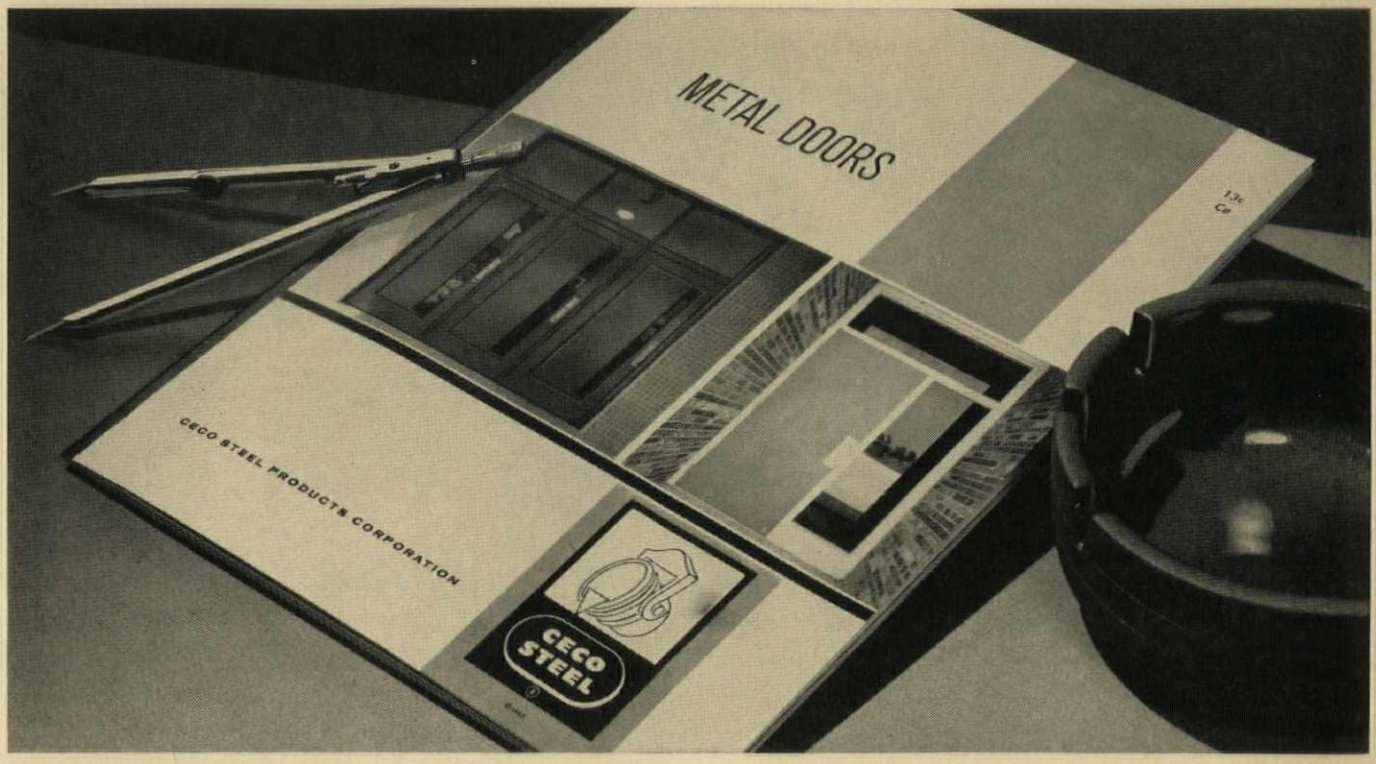
Largest Louver

New oversize louver panel, 2½′ x 5′ with 45° x 45° shielding, has been developed. Designed for the 10′ x 10′

Continued on page 114

Just released!

New metal door handbook



- complete specifications on 1¾″ metal doors of custom flush, commercial flush and stile and rail construction; 494 types and sizes designed for institutional, commercial, monumental and other building applications.
- also presents 220 Underwriters' Labelled Doors, with specially designated hardware and frames.
- introduces a new 1⅜″ flush metal door styled for housing projects, offices, clinics, apartments, motels, service stations and similar buildings.
- includes special metal doors such as trucking doors, panel slide types and Dutch doors; also folding metal closet doors.
- details sidelights, borrowed lights and transoms.
- covers a complete line of door hardware, including locks, anti-panic devices, surface bolts and door closers.
- separate listings of standard metal frames, louvers, vision lights and astragals.
- 28 pages, with more than 200 photographs, drawings, diagrams and reference tables.

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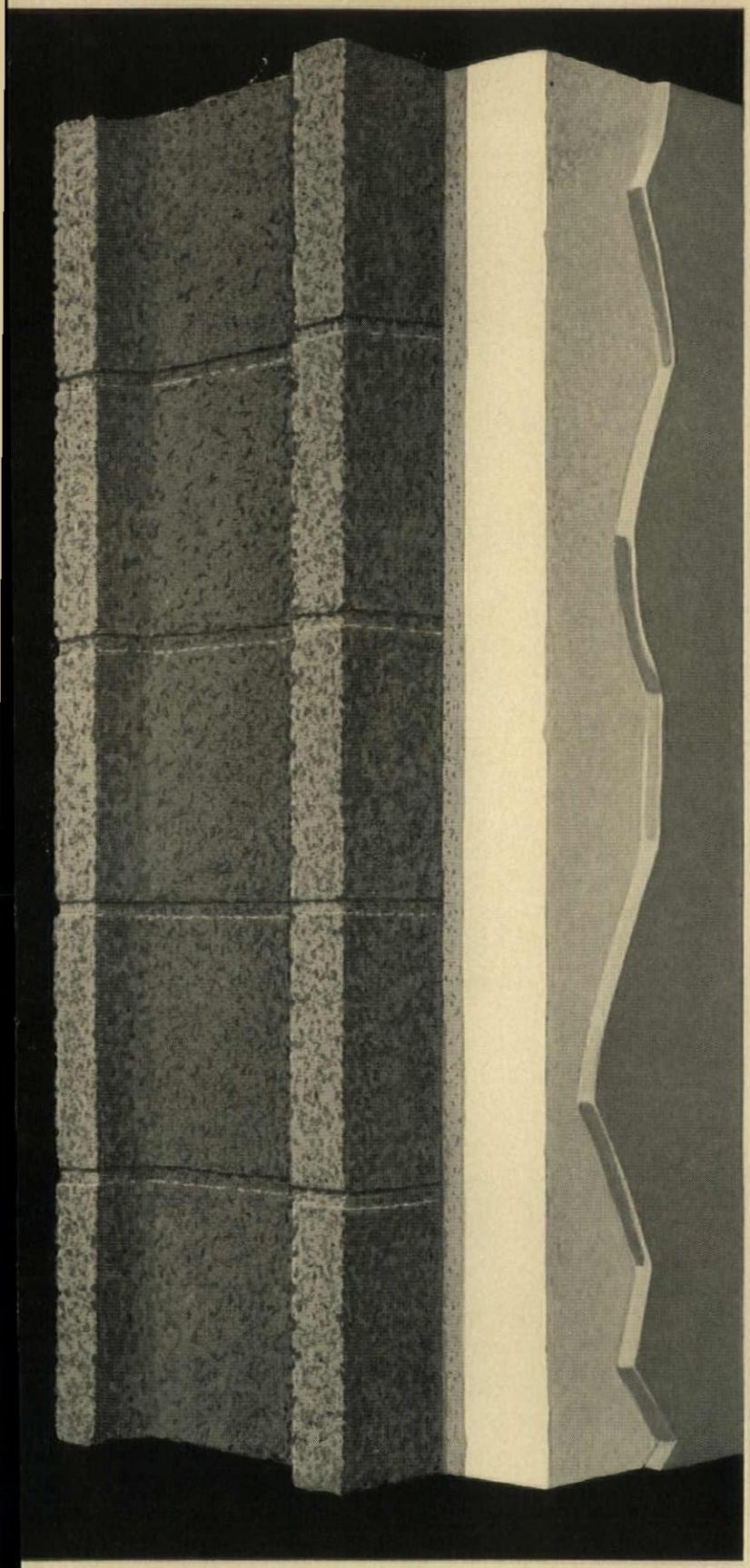
FA



STYROFOAM

brand insulation board offers advantages for use as both comfort insulation and for low temperature applications, in masonry construction. For example, this lightweight, foamed insulation offers savings in installation time and costs, by eliminating steps in "conventional" construction. It also offers a low "K" factor which will *stay* low year after year . . . Styrofoam insulation contains millions of tiny non-interconnecting air cells with high resistance to the passage of heat and moisture vapor.

Styrofoam has no food value, nor will it rot or mildew. It's easy to handle and install. High compressive strength permits pouring concrete directly over it for floor or ceiling construction. And Styrofoam insulation is flame retardant.

THURANE® brand insulation board is a rigid urethane foam which offers unusual insulating effectiveness for low temperature applications. For example, a curtain wall panel with a core of Thurane insulation permits approximately 40% *less* heat flow than a panel made with conventional core materials. Consequently, panel thickness can be reduced by up to 40% with no sacrifice of insulating efficiency . . . a decided advantage where low temperature space is at a premium.

For every kind of insulated masonry construction . . . for coolers, freezers, pipe covering . . . Dow insulating materials offer both installation and performance advantages. For information and data, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 1300EB3.

Styrofoam is a registered trademark of The Dow Chemical Company. It is applied only to the homogeneous expanded polystyrene made according to an exclusive Dow process. Styrofoam brand insulation board is available only from Dow and its authorized representatives.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

Continued from page 110

building module, the new panel is the largest interlocking louver panel ever molded. It requires less structural and suspension supports, and therefore reduces installation costs and gives less cluttered ceilings. Specifications and a free sample kit of the styrene panel are available. American Louver Co., Dept. W, 5308 N. Elston Ave., Chicago 30, Ill.

On Free Data Card, Circle 215

Light on the Subject

New *Datalog*, 64 pages, is a comprehensive guide to Holophane lighting equipment and good lighting practice. The booklet shows a wide range of fluorescent, incandescent, and mercury-vapor luminaires, for commercial and industrial, indoor and outdoor applications. Important features are listed, and other layout aids given, to permit easy selection. Engineering design data and recommended lighting levels are included. Holophane Co., Inc., 342 Madison Ave., New York 17, N.Y.

On Free Data Card, Circle 216

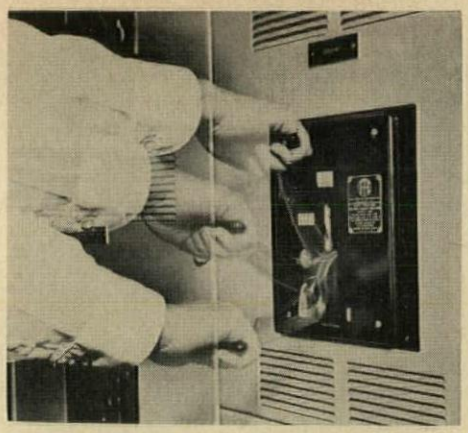
Garden Lighting

Lighting for gardens, patios, pools, shrubs, sidewalks, and driveways is illustrated in new 4-page brochure. Descriptions, data, and prices are given for a wide choice of portable "Floralites." Bulletin also gives information on outdoor convenience receptacles and underground wiring. Steber Div., The Pyle-National Co., Broadview, Ill.

On Free Data Card, Circle 217

Advanced Switchgear

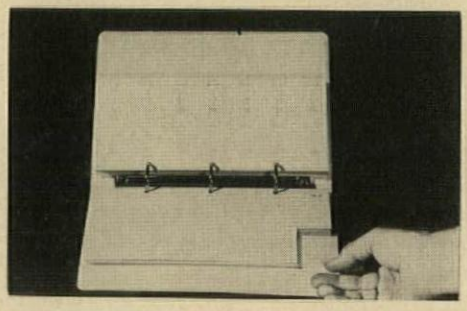
Advanced design features of 600-v switchgear with "K-Line" circuit breakers are described in 20-page *Bulletin 3200–1A*. Among the advantages of the stored-energy K-Line



breakers are quick-make manual closing for safety, less upkeep and longer contact life, easy pulldown handle operation, and increased accessibility of trip units. Bulletin includes guides for the selection of proper breakers, plus specifications. I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.

On Free Data Card, Circle 218

FINISHERS/PROTECTORS



Paint Possibilities

Ring-binder of 138 colors is available for use by architects, interior decorators, builders, and paint contractors. Each of the 138 pages, measuring 4½″ x 10″, is perforated to allow 14 chips to be removed, attached to specifications, or given to clients. Paint formula is given on back of each chip. Colors are available in six finishes. Write to: Luminall Paints Div., National Chemical & Manufacturing Co., 3617 S. May St., Chicago 9, Ill.

Urethane Wood Finishes for Concrete, Too

Recent issue of National Aniline's *Product News*, 4 pages, discusses urethane wood finishes, stating that clear urethane floor varnishes and sealers are superior to other types in drying time, surface adhesion, coating life, and resistance to abrasion, marring, water, and detergents. Recent tests

show that the finishes are also excellent for protecting concrete floors, as well as wood surfaces such as floors, paneling, boats, and furniture. Article gives general discussion of performance, properties, uses, and types of finishes. Dept. NA-71, National Aniline Div., Allied Chemical Corp., 40 Rector St., New York 6, N.Y.

On Free Data Card, Circle 219

SURFACING MATERIALS

Tile for Home and School

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ERRATA

Readers who inquired about the publication *Handbook of Year-Round Air Conditioning* (p. 82, DECEMBER 1961 P/A) are advised that it was inadvertently attributed to American Air Filter. This booklet is actually distributed by The Producers' Council, Inc., 2029 K St. N.W., Washington 6, D.C., at a cost of one dollar per copy. The handbook is the companion piece to a seminar on the subject which has been shown (on film strip and sound recordings) in 38 U.S. cities.

PROGRESSIVE ARCHITECTURE
NEWS REPORT

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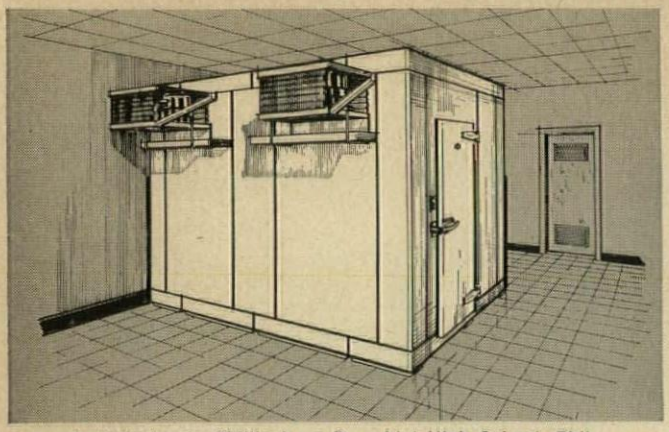

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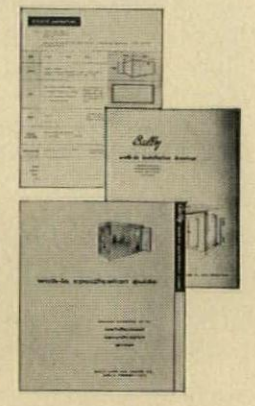

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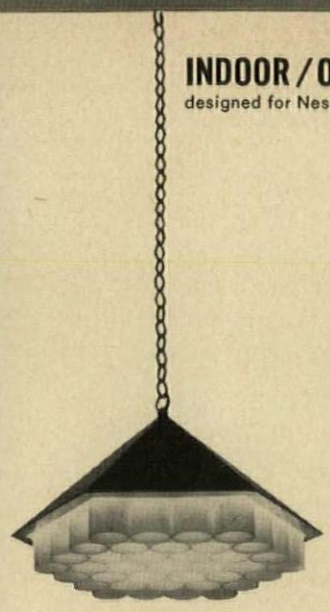

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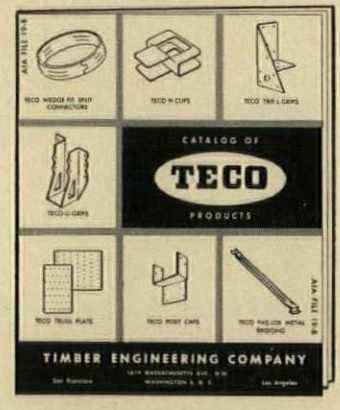

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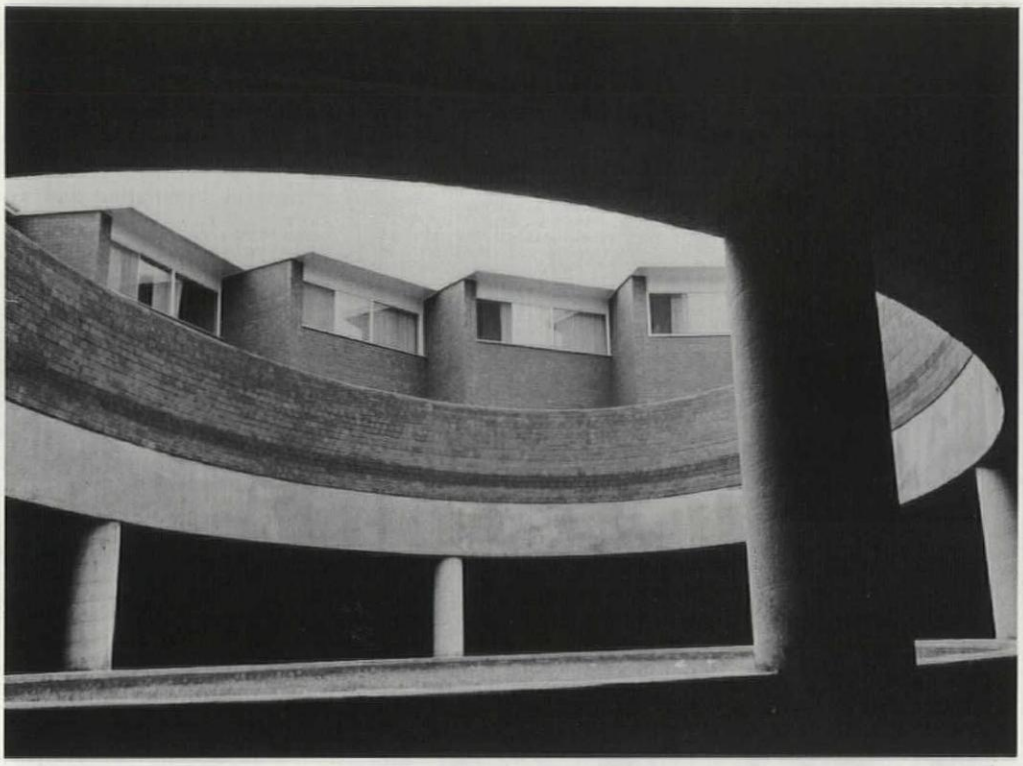


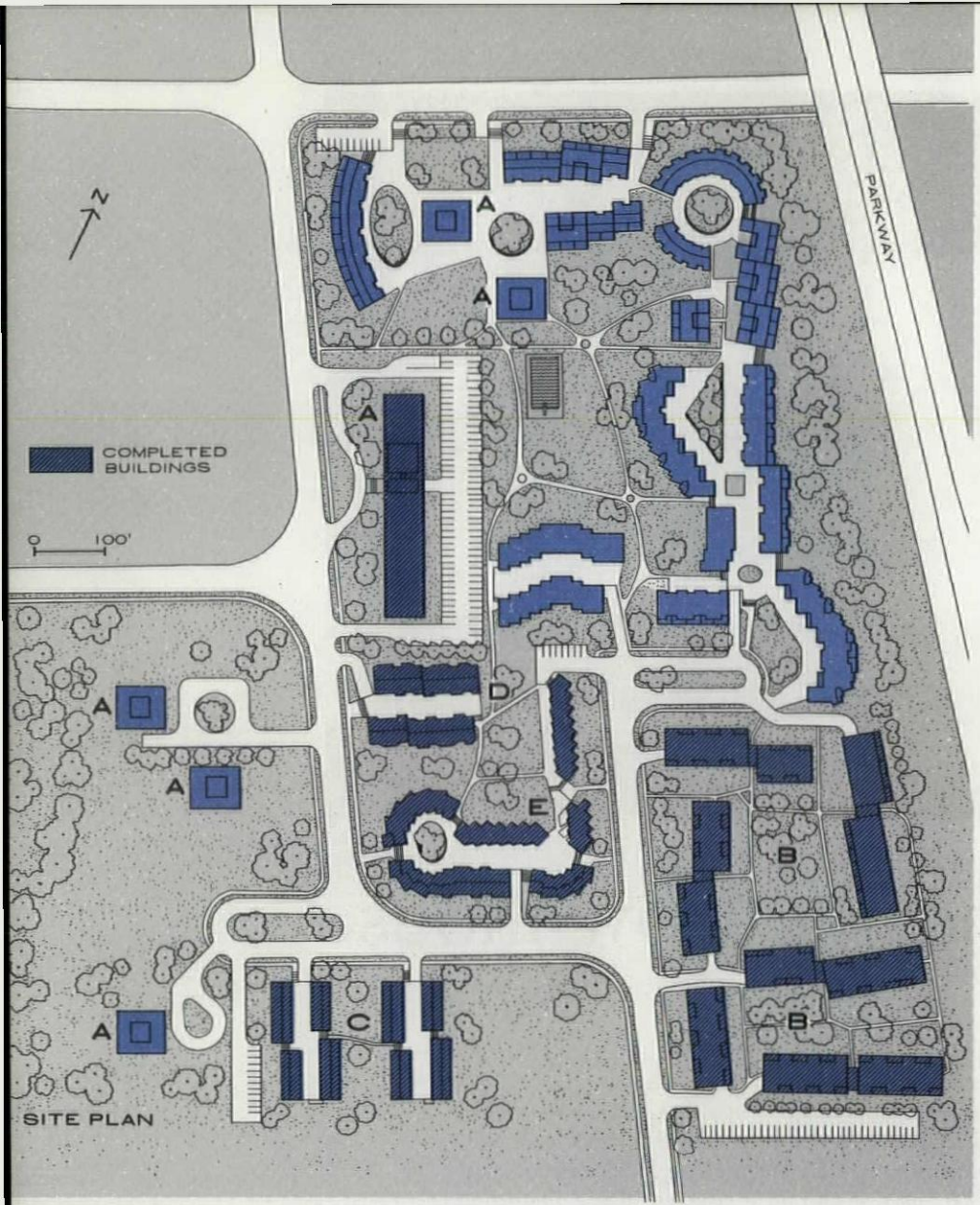
Photo: Clive Clark

Urbanizing the Townhouse

HOUSING AT FLEMINGDON PARK, CANADA • IRVING GROSSMAN, ARCHITECT

In Canada, within the Metropolitan Toronto area, a new town, called Flemingdon Park, is now under construction. Of the 600-acre site, 350 acres were planned as a residential area for 15,000 inhabitants; the rest will be developed mainly as a commercial and industrial area. One of the most interesting aspects of this project consists of residential sections designed by Architect Grossman. The section developed first, and the buildings completed so far, are shown in this presentation. Although the plans include other building types, the most significant part of Grossman's scheme is the design of the "townhouses." Using several rowhouse formations and a simple device of putting below grade not only garages but also driveways, he achieved a high-density development in which there coexist direct contact between car and dwelling without acres of asphalt; variations of forms and spaces; and pedestrian streets of an urban character. In the following text, the architect states his design approach.

The master plan of Flemingdon Park was produced by the planners and established the main traffic routes, total population, densities, and zoning. The task presented to me as architect was threefold: to develop designs for a variety of dwelling types, ranging from bachelor to large-family accommodations; to group these into buildings; and to distribute these buildings on the site in a manner which would create a pleasant and desirable community. A period of research began, during which I attempted to clarify the real nature of the problem. I looked with renewed interest at various modern housing projects that had been built in recent years, both in Toronto and elsewhere. I also re-examined the older parts of my own city, experiencing with the eye first, and then confirming with tape measure. I studied the plans of Georgian squares in which I had lived in



London and looked once more at my slides of the streets of Paris, the piazzas of Italy, the courts of Mexico, and the village greens of so many old towns. I tried objectively to compare what I saw, and at the same time to answer the question: Why has the recent growth of our cities been so blatantly ugly in comparison with certain stimulating and satisfying places I have visited elsewhere?

The closer I came to the answer, the more I realized, with some surprise, that there was more for me to appreciate and enjoy by analyzing the best of the old than there was in analyzing the best of the new, regardless of who the architect was. And by the old I mean not only the examples of Europe, but also some of the central areas of my own city, which had been produced by anonymous builders more than fifty years ago, and which I was now looking at with new eyes. This seems an open confession that modern architecture has so far been a failure in the field of domestic building. Perhaps this is true. Perhaps the conditions that produced these superior environments have forever changed in our time, and we have not yet replaced them with equal or better ones.

The fact is—and I can only refer to the limited range of my personal experience—that I could not find a community built in what could truly be called the modern idiom, which exhibited to the same degree those qualities that I had clearly appreciated in the older environments. Although new developments springing up all over the United States and Canada have all the benefits of a technologically advanced society, and should therefore have logically surpassed these older examples

The first residential section of Flemingdon Park is now under construction. Preliminary site plan (above) *evinces a mixture of several residential building types and several design approaches.*

Of the six high-rise buildings (A), only the one slab building (left) *has been built so far. Except for the inclusion of a series of maisonettes on the first two floors, its design follows conventional patterns.*

The low-rise apartment-maisonette combinations (B) indicate an attempt by the architect to depart from a rigidly designed, automobile-dominated environment (facing page). *The top*

(clean, spacious interiors, broad backyards, generous front lawns, and two cars in every garage), I had to admit that there was something lacking in every case. The explanation became more evident when I broke down the elements of comparison into two categories, *interior* and *exterior*.

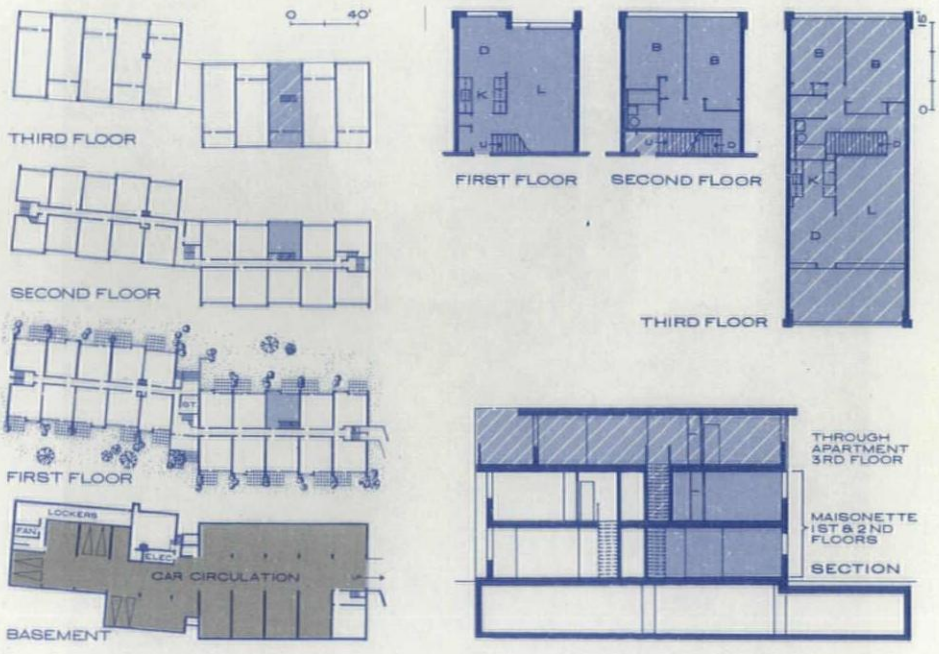
It is quite evident that the total experience of an environment involves passing from *exterior* spaces called streets, greens, squares, and piazzas, into *interior* spaces, called rooms, contained in houses or apartments. Most people experience this cycle every day, and have been doing so since man built his first shelters.

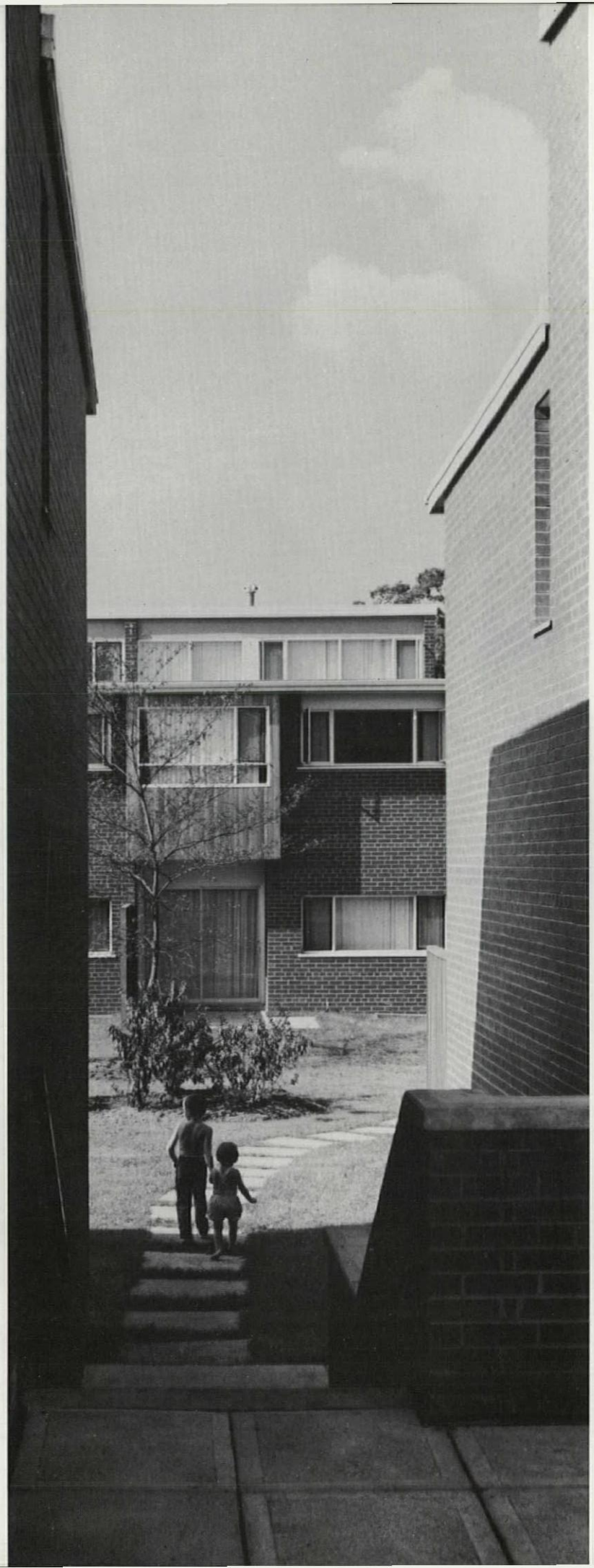
Now, from the point of view of interior spaces, I have concluded that not much has really changed during the past few hundred years in the basic pattern of mass domestic architecture, which, one could say, is a fundamental improvement. Although much is said of our changing ways of life, I believe that the interior of a good Georgian row house, for example, is just as suited to contemporary life as are the new bungalows on the outskirts of Toronto. In fact, there could be many advantages to the former, which I shall not go into here. The point is that the number of ways a three- or four-bedroom dwelling of restricted size can be internally planned is limited; and the basic house plans evolved many years ago have not fundamentally been invalidated.

Perhaps the informality of our daily pattern does permit certain living and dining areas to flow into each other more openly; but even here, the moment a person can afford the space, he usually desires separated rooms, as in the past. It cannot be an accident, surely, that so many

floor-through apartment is symmetrical, and can be placed with the terrace toward either side of the building, thus giving it a variegated silhouette. All tenant parking is in the basements; this makes possible, in spite of a high density development, open greens with buildings grouped around them.

Remaining areas of the site are being developed in low-rise rowhouse formations with "double-decker" streets. These "streets" are the most interesting aspect of Flemingdon Park housing. Groups (C), (D), and (E), which are now completed, are described and illustrated on the following pages.



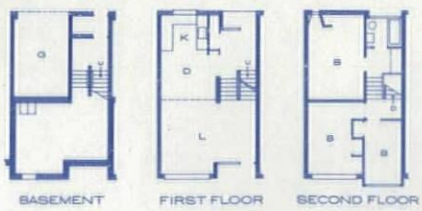


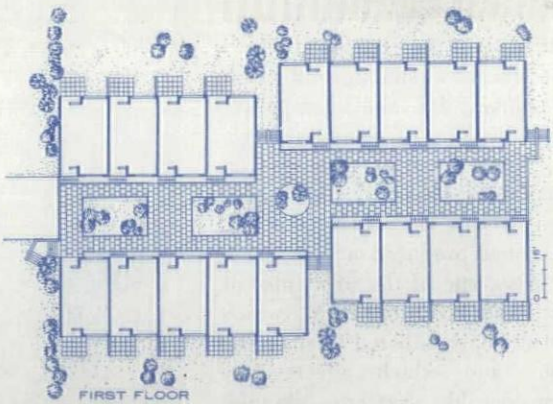
architects and other men of taste live in old, well-designed houses which they have modernized.

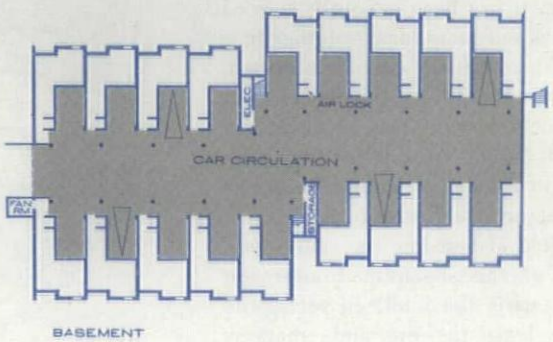
So the problem does not seem to stem from the interior. If we now examine the exterior aspects of domestic architecture, we find immediately that here is where the greatest contrast between new and old occurs. Indeed, it is in this area that the crux of our current problem lies.

Comparing the old with the new, we observe that we have lost the vital element of *defined exterior space*—the heart of urban design. Notice how anyone raving about his architectural experiences abroad praises the piazzas, or the boulevards, or the charming streets with the sidewalk cafés—all spaces—rather than the buildings themselves. When we enjoy the old streets in Toronto, we are enjoying an experience essentially similar: the buildings flanking them are generally two- or four-stories high, and the distance between buildings no more than forty to sixty feet, and often less. This relationship is basic; it reads as enclosure. Furthermore, it reads because the walls defining the street have only narrow spaces breaking them, thus preserving the illusion of a continuous surface. And when there are trees lining the street, which with time have formed a canopy, we have indeed the total experience of an outdoor room—space architecture. When we experience an Italian piazza, or a court in Mexico, or a *place* in Paris, it is again this defined space which primarily affects us—the relationships of the enclosing walls to each other and to the space formed. The fountain, statue, or group of trees in the center is the pivot about which the space moves. Added to this are the satisfying elements of social activity—of life and love—which such proximity of buildings evokes: a total expression of humanity, buildings, and space.

In our new, mostly suburban communities, we are faced immediately with 116 feet between walls fronting a street, due to set-back by-laws. In the case of houses only one and two stories high—and low stories at that—there is in fact no street space defined at all. At best, after ten years, some trees may grow up to reduce this apparent width. But instead of streets, we can have little more than wide traffic arteries which are dotted with separated points of interest, the houses—*but no street in terms of space.* This is one of the fundamental weaknesses of all our new developments. To deal with the formal problems of house design, without first integrating them *completely* (not partially) with this spatial aspect, can only produce partial solutions. Form and space are each mirrors of the other, and must







BASEMENT

The rowhouse group shown on this page was the first experiment with double-decker streets (area (C) in the site plan). *Cars go directly from the road down into a driveway located between the buildings, and then to individual garages. Permanently ventilated and pressurized vestibules (an air-lock idea suggested by a movie about submarines) separates houses from garages and makes them acceptable to local building department. Concrete slab over driveway is landscaped and becomes a pedestrian "street"* (photo above). *Photo at left shows view from the "street" toward a green. In this design, only one type of house was used.*

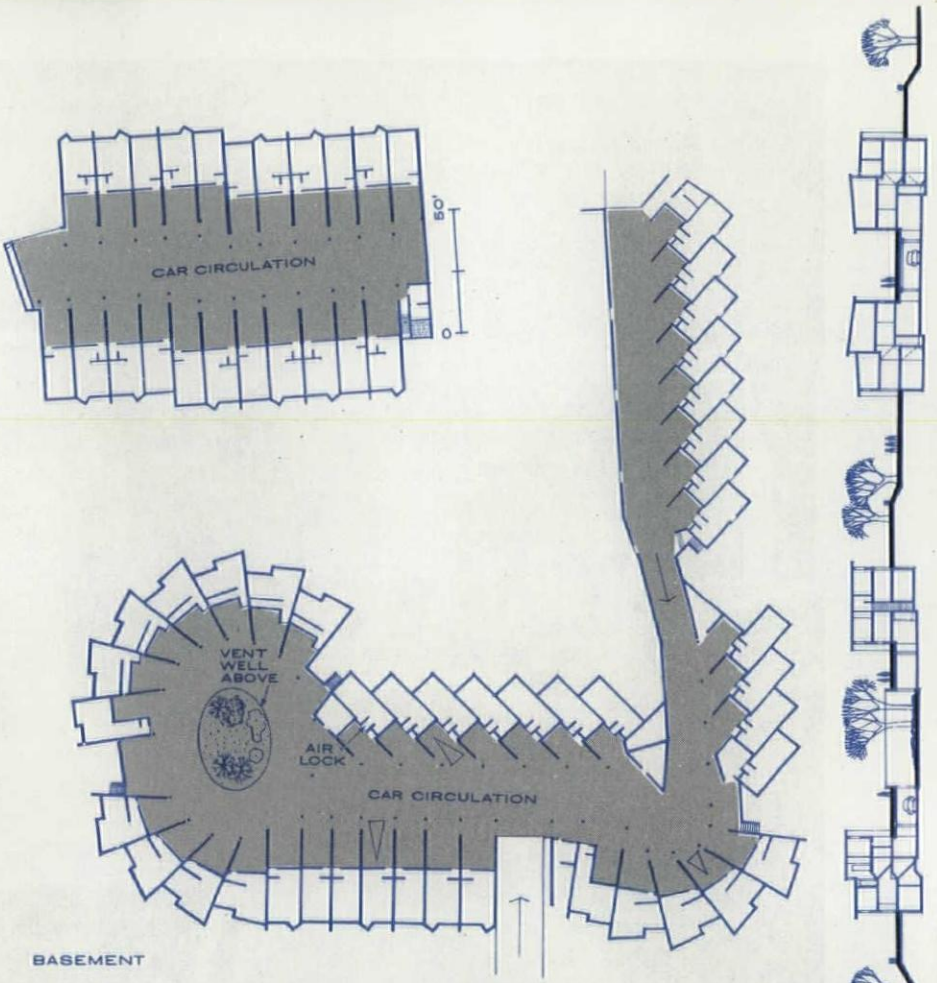
be solved simultaneously. Furthermore, the spatial aspect is so important that, when it is handled successfully, the fact that the buildings defining it might be dull and innocuous can often remain unnoticed or overlooked.

Now what about the formal aspects of domestic architecture? Again, looking at the older communities, we find in the buildings, whether designed by able architects or built by speculative builders (as were the Georgian squares), an eloquent vocabulary of form. This dealt with proportion, detail, and ornament, and was carried through the interior as well as the exterior. When copy books were used, these contained the results of years of refinement by able architects, and were embellished with contributions of skilled artisans and craftsmen. The builder had infinite solutions to his problems, and generally, even with his own improvisations, could not go far wrong.

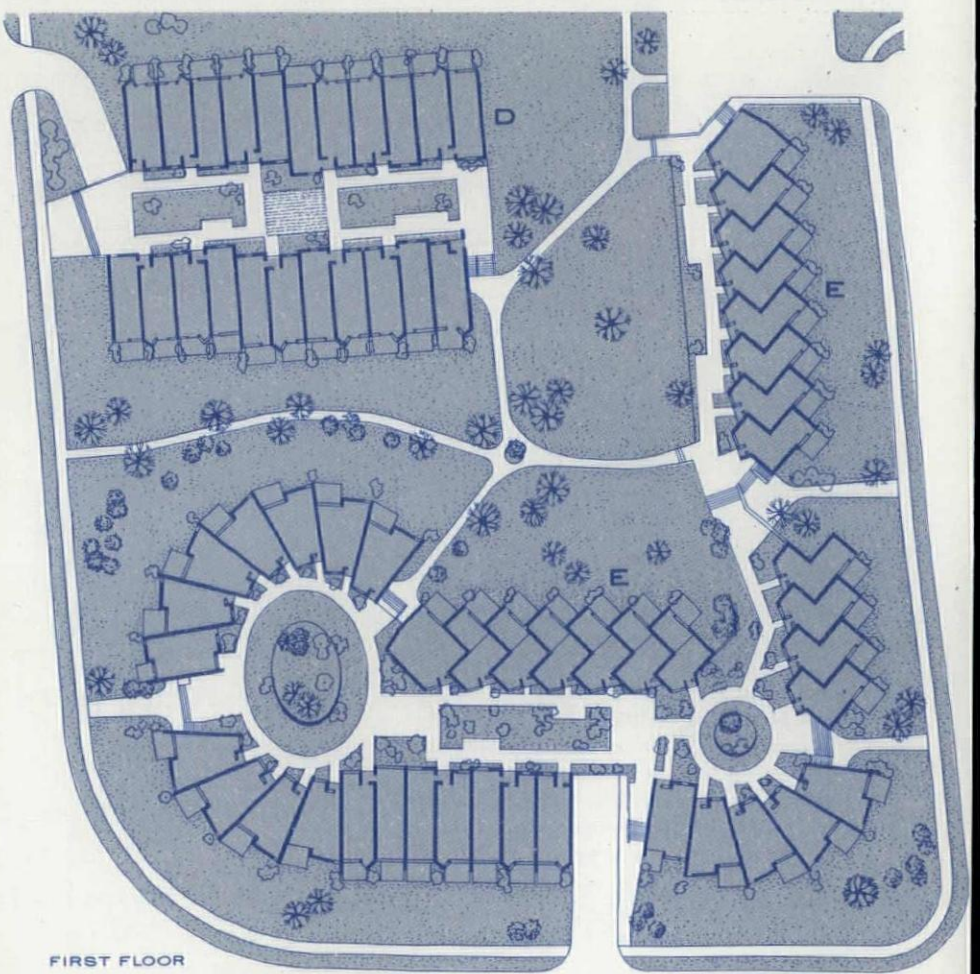
The results were rich in detail—bay windows, cornices, shutters, grillworks, color, and patterned brickwork. The proportions were generally good and the total effect unified. Although the façades were basically the same, there was an *infinite manipulation* of entrances, windows, porches, and details—all related because they came from good books, yet all sufficiently different to maintain a sense of identity for the individual occupants to enjoy. This is very desirable, particularly when large numbers of people are involved.

Today, our "copy books" are stock plans produced mostly by disinterested architects who dabble in the game of clichés and trite ornament. But what is even sadder is that when the capable architect does try, he reaches a point beyond which there is a vacuum; for the contemporary architect has little or no comparable vocabulary of form, detail, or ornament on which he can draw. Certainly not of ornament. The artisans are dead, and the machine has not produced a reasonable substitute. Also, one of the principles of the modern approach to design, which most architects have adhered to since the "revolution," and which affects this vacuum considerably, concerns the platonic nature of design—the rational basis of creating. It has been generally agreed that there is only one ideal solution to a given problem, which, once established, the designer should use whenever that same problem occurs. This is a kind of disciplined truth. To talk of applying variations to façades of similar buildings is irrational, arbitrary, and anarchic.

In the field of housing, the visual consequences of this disciplined approach can often satisfy the intellect, yet at the same time leave the eye and emotions

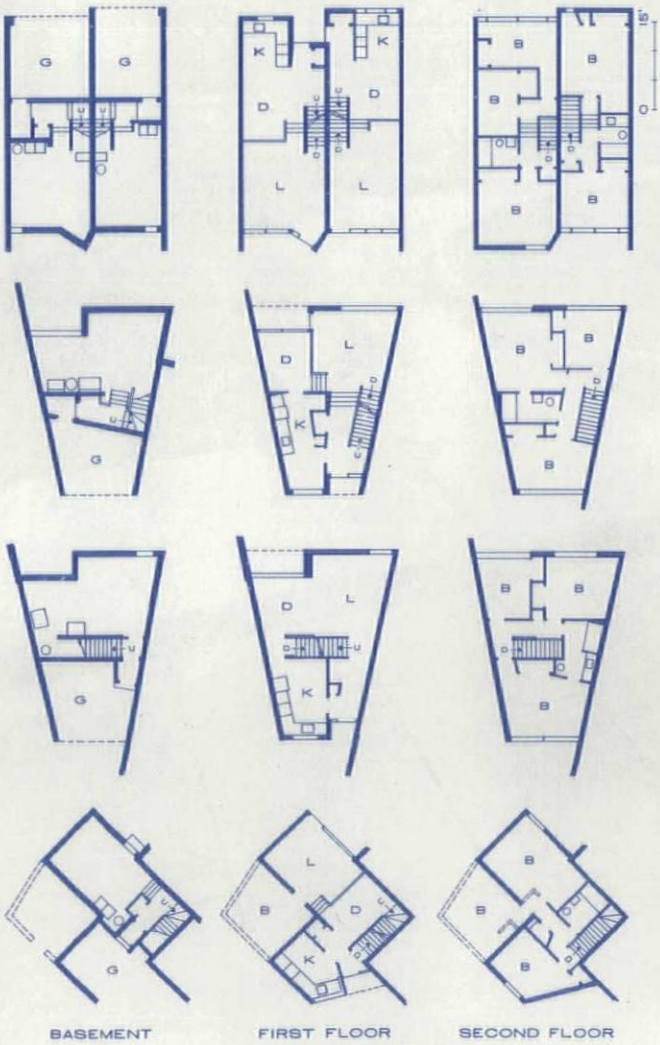


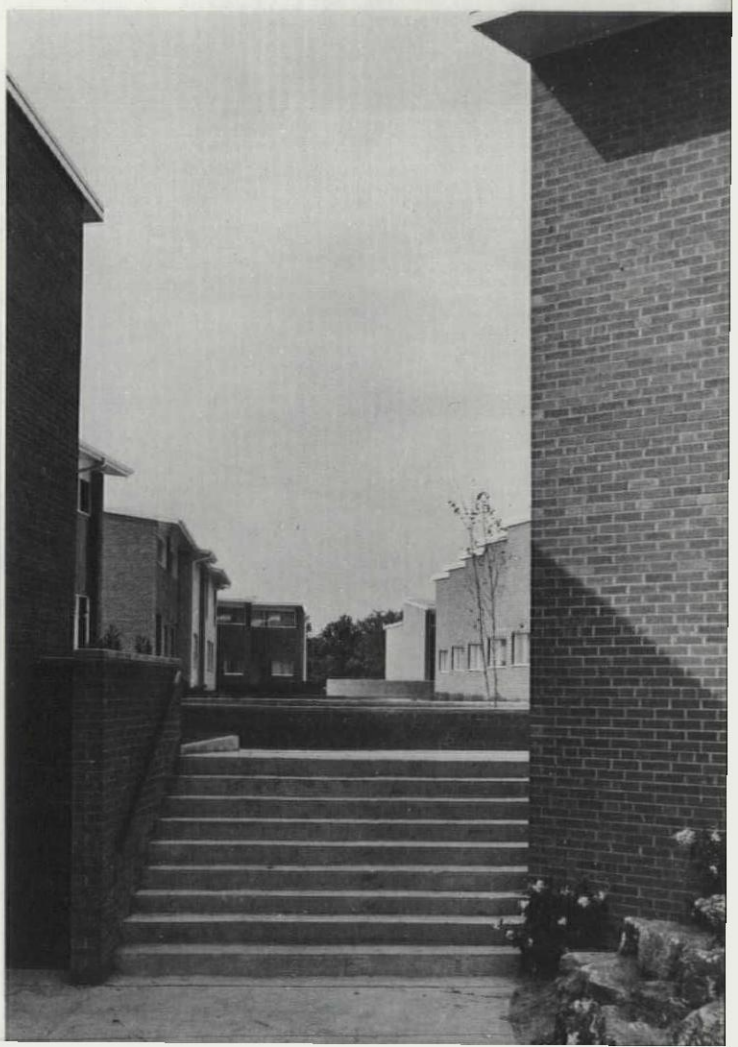
BASEMENT



FIRST FLOOR

The next two groups built (plans on facing page) *are a refinement of the basic concept. Group (D) is similar to the prototype, but has more modulated façades achieved by the use of two slightly different house types* (right). *The architect searched for proper street dimensions by measuring such proportions as those of old Philadelphia streets and of New York's McDougall Alley. In group (E), wedge-shaped plans, which form curves when placed together, and zigzag plans were also used* (below). *The result is a long pedestrian walk within one rowhouse composition that has a variety of urban spaces enlivened by constant changes in levels, planes, masses, materials, textures, and details. Open green areas between groups of rowhouses were contoured with earth excavated from basement driveways and garages. Views of this last group are shown below and on the first two and last two pages of this presentation. Other parts of Flemingdon Park are now either under construction or in the planning stage. They indicate further evolution of the "double-decker" street concept. In one area, the pedestrian street will continue for 1500 feet. The architect's ultimate aim is to carry the idea to a point where all residential buildings, including high rise towers, would be developed in this manner.*





starved for more stimulus, for exuberance and vitality. Even our better designed housing complexes invariably reveal this limitation. The fun of playful innovation in both form and detail seems to be a relic of the past. Together with this lack of innovation, there is also missing the sense of identity, which, even symbolically, was a good and necessary element. (Visit Mies van der Rohe's Lafayette Park housing project in Detroit to see what the machine-like repetition of housing as pure form can do to one's sense of individuality.)

Blasphemous as it may sound, I do suggest that arbitrariness does enter the design process, that often there are several ways of solving a problem dealing, say, with the façades of similar buildings or with details. Perhaps it is not so wrong if the architect, faced with such a problem so common in housing of any scale, chooses to use all his solutions. Surely it depends only on his ability to understand the difference between true variation and gimmick, between consistency and confusion. Although such freedom can open up dangerous possibilities (which chaotic suburbia testifies to), it also can be a liberating inroad that the architect can cautiously explore—but without the guilty conscience he seems to bear today. Two architects solving the same problem can produce different yet equally valid solutions; which proves that such variations can be good and still honest.

A third factor, which was no problem in the past but is very much one today, is the automobile. Regardless of how artfully one locates the buildings, one finds that the spaces between them are just enough for the moving and parking of cars; and, what is more serious, most people want to be able to enter their dwellings directly from their car, without having to walk in the open. This implies vast asphalt surrounds to every building, and it is exactly what most of the newer housing developments have been forced into.

I have criticized the present and praised the past. But we are told: "Forget the past. This is a new era of space-time, great technology, atomic power, vision in motion. Piazza San Marco is great, but times have changed. The past cannot be relived." I can only feel regretful and suspicious —particularly when I know that, in the field of housing, techniques have not really changed that much; that millions of houses are built today using the same load-bearing masonry walls, stud partitions, wood floor joists, and punched windows that the Georgians used hundreds of years ago. It is still the cheapest, most durable system—and that is an economic fact. So should the forms really be so different? The wall of glass does not solve all problems, and often produces new ones.

We are told again and again that the architect is a responsible member of society, that he must fight this battle with vigor and integrity. I do not think he has a chance if he tries to do this alone. I believe that one direction can be in the closer co-operation between the architect and the commercial builder-developer. The right architect, that is, with the right builder.

With the skilled artisan no longer present, the architect is the only one who can step into his place. He must add inspiration to economics, imagination to pure function and mass appeal. He must truly get involved with the real problems that present-day housing embraces; and together with the enlightened builder, who also must be concerned, the architect must attempt to discover the real, meaningful solutions to the problem. Only together can they solve the many vital problems dealing with construction, economics, finance, and such things as by-laws. Only together can they evolve valid solutions and thus broaden the forms of our architectural vocabulary, which at present is so poverty stricken.

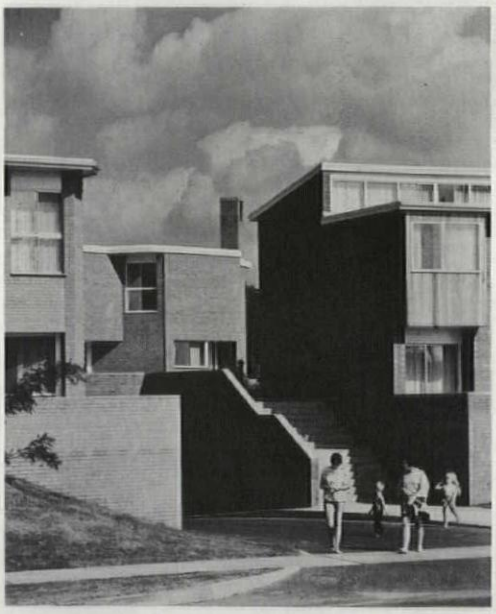
In Flemingdon Park, such a close working relationship has been attempted. And so far, there has emerged from it one or two interesting approaches on which both the architect and builder have worked as a team. A concept has taken shape that is an implement of both architecture and planning, for it fuses both into an inseparable unity.

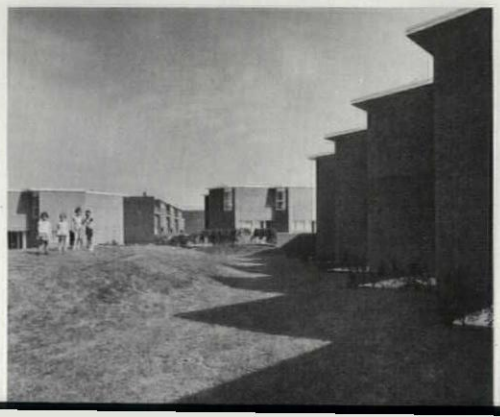
To describe the concept simply, we have relegated the car to its proper place—below the street. Main open roads will define large blocks of land of varying acreages, but within these blocks cars will move and park at lower levels, above which people will walk. In doing this, several advantages were gained: we have revived the pedestrian way; we have brought buildings closer together, creating intimate, readable spaces not unlike those of the English mews; we have eliminated the ugly acres of asphalt parking areas, thus preserving the green environment around groups of buildings; and we have made possible direct connection between the parked car and the house.

The implications of this idea are many. As the project is being built, we are able to evolve a variety of forms and spaces demanded by the changing conditions. Today, as we see the buildings rise on the site, we hope that one step has been taken toward rediscovering the lost street.

The above text is an adaptation of a statement by Architect Grossman that originally appeared in *Canadian Art*. Developer of Flemingdon Park is Webb & Knapp (Canada) Ltd.

Photo: Clive Clark





Diversifying the Redevelopment

CAPITOL TOWERS APARTMENTS • SACRAMENTO, CALIFORNIA • WURSTER, BERNARDI & EMMONS, EDWARD LARRABEE BARNES, AND DEMARS & REAY, ARCHITECTS

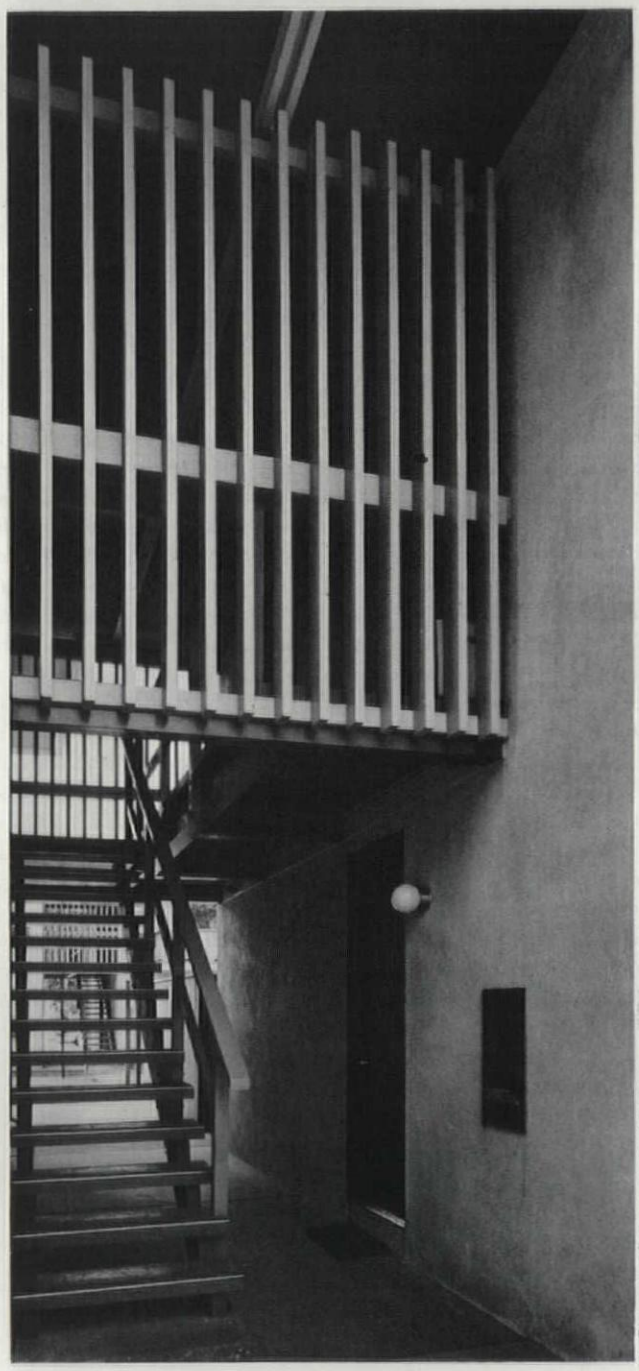
The First Design Award in P/A's Sixth Annual Design Awards Program went to a project that was a herald of new directions in redevelopment planning. Comparing this proposal with other urban design projects of the time, the editors summed up its exceptional characteristics by saying: "[The design] encompasses both high- and low-rise units and places particular emphasis on intensive ground use, the separation of pedestrian and vehicular ways, and the shaping of exterior space."

Since 1959, when this project was published as an award winner, the pattern of mixed high- and low-rise buildings has become a typical one for redevelopment proposals, and several have gone beyond it to a more sophisticated "man-made mountain" concept (pp. 134–147, OCTOBER 1961 P/A).

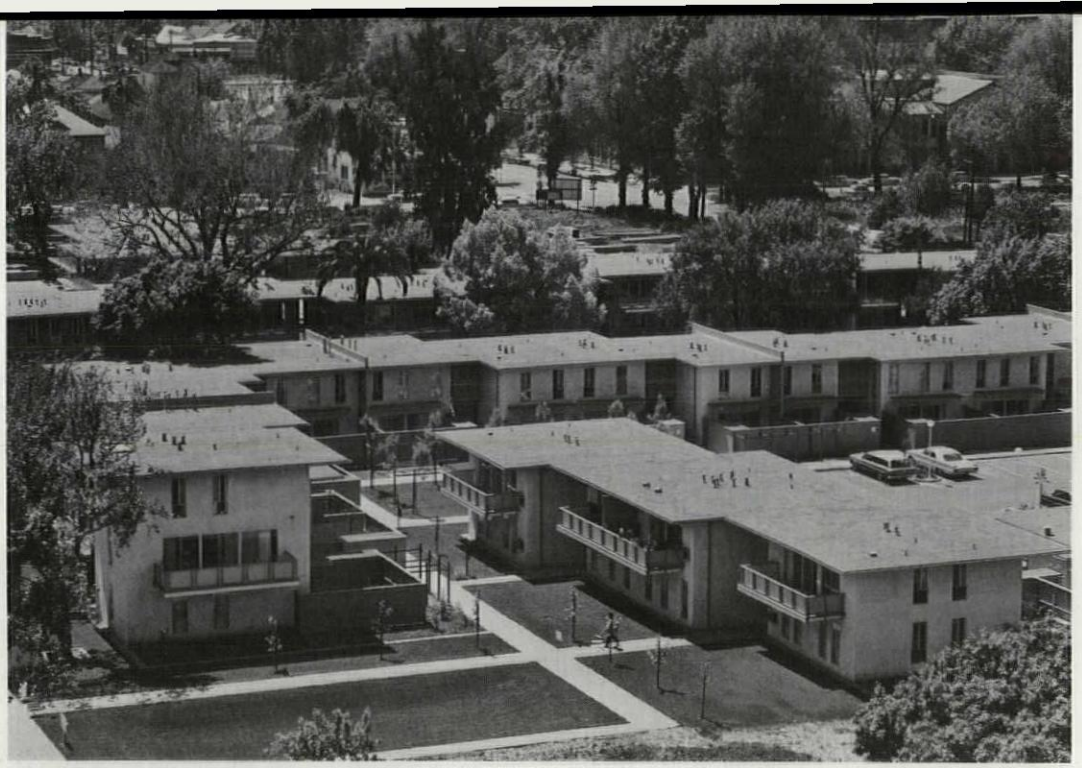
Although very few of these subsequent proposals have gone into construction (and many of them, unfortunately, never will), the precedent-breaking low-rise portion of the Sacramento project has been completed. Only the three high-rise towers remain to be constructed.

Capitol Towers originated as part of a major redevelopment plan for 15 city blocks to the west of the state capitol. Four of these blocks were to be cleared and assembled into a single 12-acre parcel for residential development. The master plan called for a high-rise project with a density of 110 to 145 persons per acre and a 75 per cent ratio of parking spaces to dwelling units.

A group headed by Roger L. Stevens and James H. Scheuer was selected as the private sponsor for the project. Instead of



Photos, except as noted: Karl H. Riek



merely accepting the limitations prescribed by the planners, the sponsor's architects and consultants were able to collaborate with the local Redevelopment Agency to revise these criteria. Low-rise units were introduced, the over-all density was lowered to 80-85 persons per acre, and the parking ratio was raised to 100 per cent for the low-rise units.

After the preliminary design had been published, the architects succeeded in convincing authorities that north light was preferable to west light in the tower apartments; as a result, the three towers were reoriented on an east-west axis and the entire site plan was revised.

The design concept of the low-rise apartments is based on the fact that they are rental units and hence not limited to the "town-house" pattern of land use. The basic unit is composed of two distinct types of apartment: one with a private outdoor living space, on the ground floor, and one with a balcony on the second floor. The lower unit is screened from the parking area by the garden wall; the upper balcony faces away from the parking area and does not intrude on the privacy of the garden.

Two-story open "breezeways" between the units permit access from either the parking area or the pedestrian walks and eliminate the need for interior circulation space. They also, of course, provide passages for breezes, which are essential to summer comfort in Sacramento.

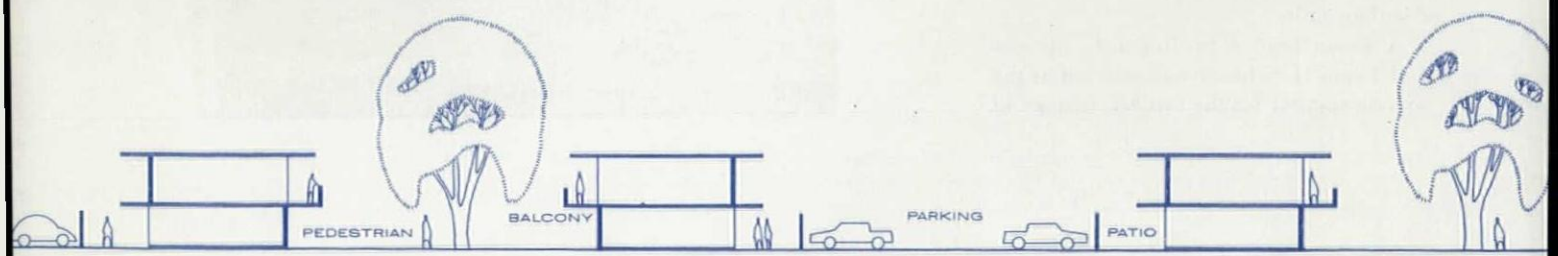
To prevent the breezeways from becoming narrow, dark alleys, the units themselves were laid out in a staggered arrangement. This meandering layout allows for the varying dimensions of the apartment units and enhances the privacy of the gardens and balconies.

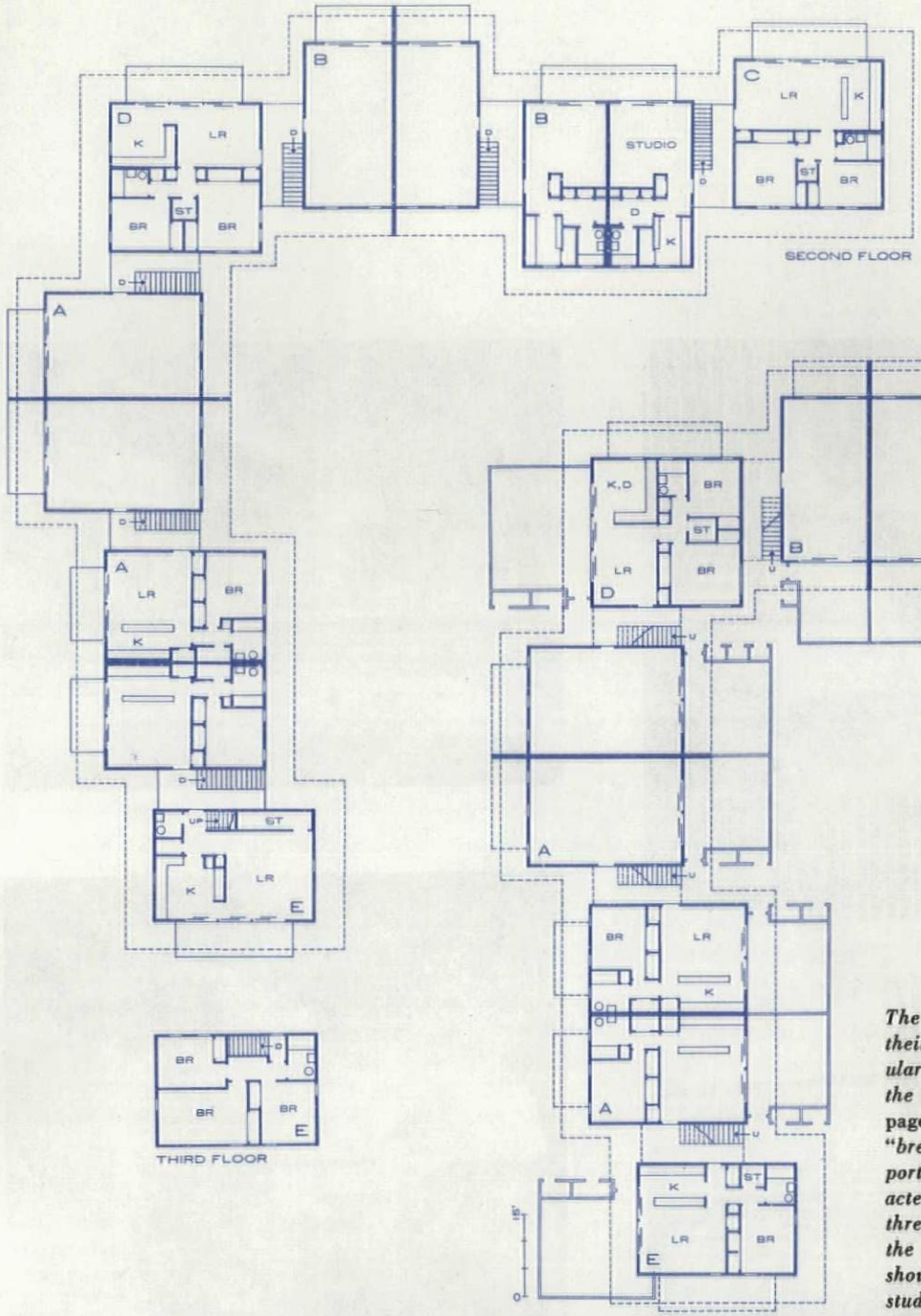
The low-rise buildings are of the most economical construction permitted—wood frame with stucco on the exterior. Because of the strong shadow patterns generated by the staggered plan and deep overhangs, walls were made uniformly white and details have not been emphasized. Wood trim, balcony railings, eaves, and stairways have been painted in a selection of colors—muted and vivid—which are varied to give each area an identity.

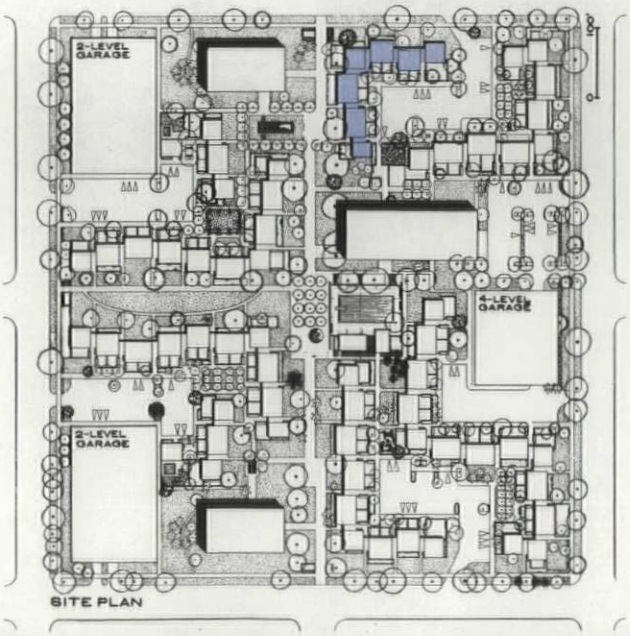
The handsome existing trees have been used to advantage in the landscaping of the site. The many open spaces of varying size and activity have been furnished with lighting standards, benches, kiosks, and signs carefully designed to support the developers' emphasis on community living. A 100-ft-long concrete bas-relief by sculptor Jacques Overhoff covers the wall between the plaza and the swimming pool.

The construction cost of the low-rise part of the project was about $10,000 per apartment. The total cost, including land and site development for these units, was about $15,000 per apartment.

Associated with the three architectural firms on the project were the following consultants: Mayer, Whittlesey & Glass and Dreyfuss & Blackford, Architectural Consultants; Carl Feiss, Planning Consultant; Nathaniel S. Keith, Housing Consultant; Lawrence Halprin, Landscape Architect; Alexander Girard, Color Consultant.

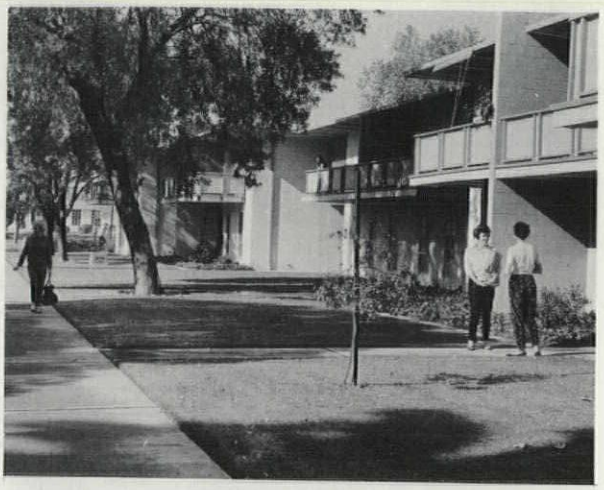


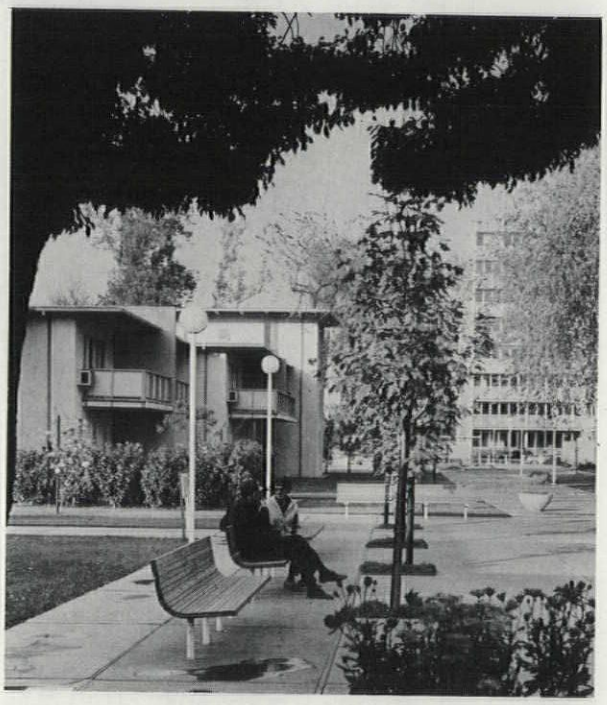




SITE PLAN

The basic concept of the low-rise units and their relation to the pedestrian and vehicular circulation systems can be seen in the photo and schematic section (facing page). *The staggered layout gives the "breezeways" between units acceptable proportions and establishes the spatial character of the development. An occasional three-story unit relieves the uniformity of the roof line. The floor plans* (above) *show the ten apartment types, varying from studios to three-bedroom duplexes and offering either balconies or private gardens. The site plan* (left) *shows how the pedestrian walks link the major open spaces at the base of each tower and relate to the plan of adjacent areas. Each of the tower buildings will have 15 floors, devoted largely to efficiency apartments.*

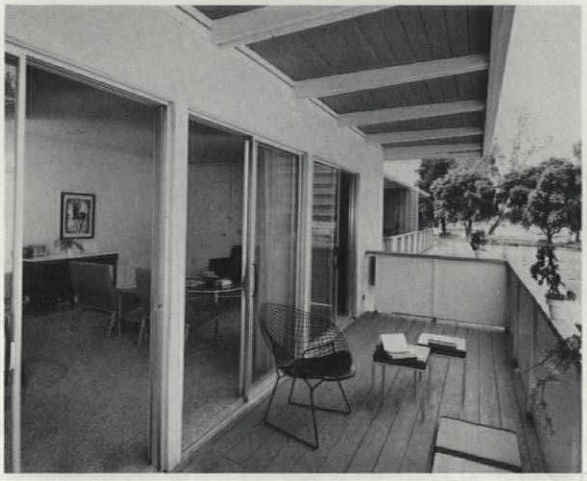




Photos this page: Jerry Stoll

The distinction between the two sides of the low-rise units is illustrated on the facing page and below. The side that fronts on the parking areas is shown below; the photo at the far left shows one of the small sitting areas outside the garden walls. The other two photos on the facing page show the balconies on the opposite side of the units, overlooking the pedestrian walks and the larger open spaces; the lower photo includes a corner of the central plaza and a walk leading north toward an area of state office buildings. All benches and "street furniture" were designed by Landscape Architect Lawrence Halprin.

The two varieties of outdoor living space in the project are illustrated at the right. The upper photo shows a typical balcony, sheltered by deep eaves and reached by wide sliding doors from the living room; in the lower view, similar doors lead to a private garden. Interior walls of the apartments are finished in gypsum board painted off-white; the backs of free-standing storage units are paneled with natural-finished wood.



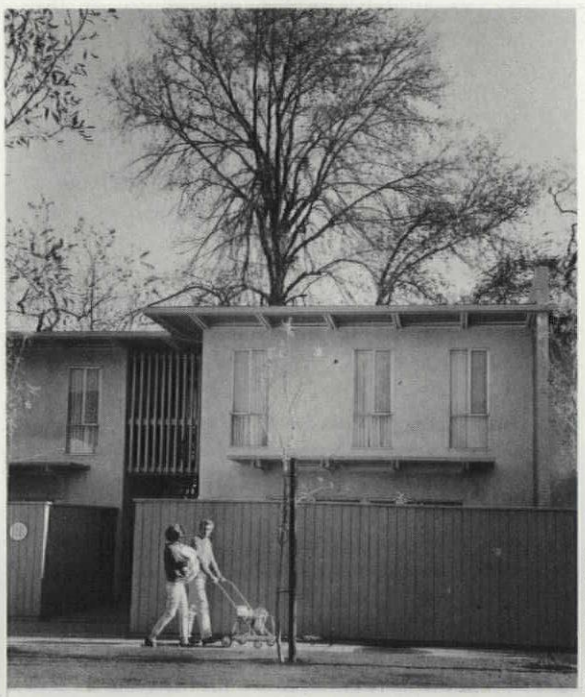
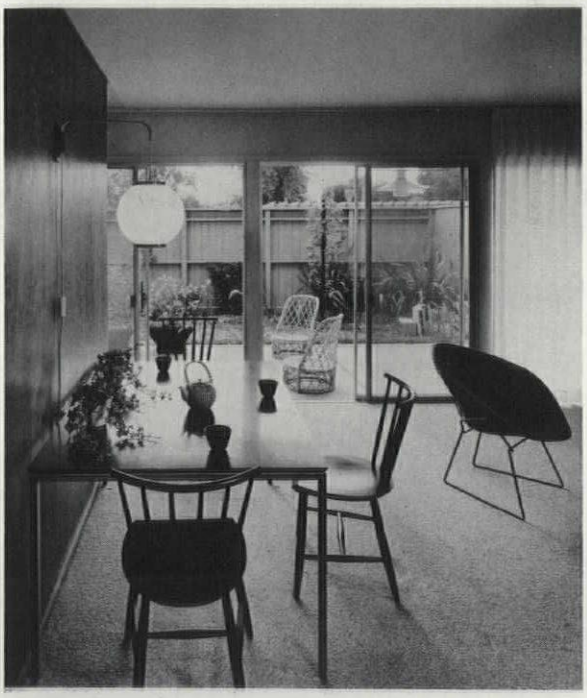


Photo: Jerry Stoll



THE WALRUS AND THE CARPENTER

or the Architect and the Contractor

The Walrus and the Carpenter
Were walking close at hand:
They wept like anything to see
Such quantities of sand:
'If this were only cleared away,'
They said, 'it would be grand!'

LEWIS CARROLL

BY FRED SACKETT

An ex-general manager of a contracting firm discusses in this article the differences between the profession of architecture and the business of contracting, and suggests ways in which conflicts of interest between the two groups could be reduced.

Construction slang for working drawings —"the funny papers" and "the dream"— is indicative of an attitude toward architects and engineers that pervades most contracting organizations: an attitude sometimes antagonistic, sometimes cooperative, sometimes hypocritical, but always problematical.

From the president of a construction company to the laborer on a jackhammer, the word "architect" conjures up an image of an impractical dreamer, concerned only with aesthetics, who wields his disproportionate power against the contractor. An unusual architectural solution is viewed as a deliberate plot to make the contractor's life less bearable, or at least as an unwarranted expenditure of the owner's money. From ground-breaking ceremony to job completion, the architect is seen as a prime obstacle to the contractor's making a profit. "If the inspector would just leave me alone, I'd finish this job" is a common complaint of superintendents. But construction management knows the architect is a power with which it must reckon, so these opinions are rarely mentioned outside of construction circles. Yet an aura of genuine respect leavens such views, for the contractor is intensely proud of praise from architects.

The origins of this peculiar working relationship lie deep within the institutions of American construction and the personalities of the people involved. Although the failure of the building industry to keep pace with technological advances is much lamented, an advance was made in at least one respect—the division of labor. American construction depends on a maze of specialists drawn from every segment of our economy, a trend that continues unabated. Conducting this cacophony is the architect, assisted by a skeptical concertmaster, the contractor. Starting with the needs and desires of the owner, the architect must, within a reasonable time, give him a workable building complex, using available materials and techniques. This he must accomplish without touching a single craftsman's tool; without even having any direct con-

trol over the craftsmen themselves. He must, somehow, imbue the contractor with a set of vicarious values consistent with the total building concept. He is somewhat like a sculptor who gives instructions to a set of automated chisels through an electronic computer.

But the contractor will have none of this. He has much sense, but little sensibility. He sees himself as a master of techniques. This is often true in the case of specialty subcontractor, but much less often true in the case of the general contractor, who is gradually coming to assume the role of broker and co-ordinator.

The typical construction firm is founded on the ambition of one man and built by his tenacity. It will probably die with him. This personal aspect of the industry is reflected in the Treasury Department's tabulation of income-tax returns, which shows that officers of construction corporations personally receive about half of the net incomes of contracting firms operating at a profit. Among manufacturing firms, the figure is about 10 per cent. These data are for corporations, but most contractors operate as proprietorships or partnerships, where the unity of management and ownership is even more pronounced. Although construction accounts for about 10 per cent of our national income, it has produced no enduring corporate giants, but remains as one of the last strongholds of the rugged individualists who dominated the American business scene a century ago.

Traditionally, the contractor starts as a construction worker, perhaps even as a laborer, then learns a craft, becomes a foreman, a superintendent, and then seizes the first opportunity to start his own business. His lack of formal education (the contractor with a degree is a rarity), scant business acumen, inadequate capital, and the notorious instability of the industry, often result in one or several business failures. But his determination and background have produced a malleable character, so he tries again with undiminished confidence. Conspicuous consumption, a classic syndrome of the *nouveau riche*, may follow his initial success; however, adaptability and affluence soon produce a degree of sophistication. He becomes increasingly aware of the importance of top managerial functions, to which he devotes more and more time. Meanwhile, he begins to round out his firm by adding a second level of management: engineers, draftsmen, accountants, purchasing agents, estimators, expeditors, and project managers. He seldom identifies with these subalterns, for he is not an organization man; he *is* the organization.

Contrast this personality with that of the architect, who cannot decide whether he is businessman, professional, or artist, often insisting that he must be all three, in spite of their incompatible natures. The egocentricity he requires as businessman, the social awareness as professional, and the sensitivity as artist, produce in the architect psychic stresses that the contractor senses and often turns to his own advantage. The inner conflict of the architect and the single-mindedness of the contractor produce a picture of striking contrast.

Ethical considerations are a major influence in an architect's behavior. In particular, as Article 38 of the Standard General Conditions states, "He shall side neither with the Owner nor with the Contractor, but shall use his powers under the Contract to enforce its faithful performance by both." The contractor's ethics are apt to be no better or worse than those of the business community as a whole, which, if viewed in the light of recent antitrust proceedings, are not exactly invulnerable. In the realm of ethics, however, the contractor will not accept an invidious comparison. He will argue that the architect's role as an impartial interpreter of the contract documents is valid only when the dispute involves the owner and contractor. But, he contends, when a problem arises due to the architect's carelessness, ethics are forgotten in the effort to accomplish the necessary changes "at no cost to the owner." (Business versus profession.) In addition, the astute contractor will recognize that an architect has an emotional attachment to *his* creation that cannot be erased by legal documents and codes of ethics. (Profession versus art.) The aim of the architect is to provide the owner with an environment suitable to his needs; the aim of the contractor is to make a profit. If the current mores favor the architect's aim, then the contractor's ethics will inevitably suffer by comparison.

Against this background of dissimilar origin, conflicting personalities, and divergent aims, there begins, with the invitation for bids, a prolonged association between the two pivotal characters in construction —the architect and the contractor.

The first examination of plans and specifications sways a contractor's opinion of an architect. Any major departure from rectilinear forms or established techniques will incur the contractor's disapproval, for he understands neither their purpose nor the methods of execution. This attitude will be reflected in an inflated bid, because even if the contractor sees a simple erection technique, he reasons that his competitors will not, and adjusts his bid accordingly. Ambiguities in the contract documents are not considered defects by the contractor, for they are potential change-orders from which a major portion of his job profit may come. A reasonable number of addenda he accepts with aplomb; but too many he views with alarm, since they indicate discovered oversights, and he wonders how many remain undiscovered. Also, an extensive addendum just prior to bidding can render useless hundreds of dollars' worth of estimating time.

When the contract is awarded, the contractor faces two problems bearing directly on the architect. He must establish a favorable rapport with the architect's field representative, and he must purchase materials and issue subcontracts as cheaply as possible.

The economics of job supervision are among the most questionable in the entire fee structure. For about 1½ per cent, the architect is expected to approve material submittals, establish levels of acceptance, and constantly watch for deviations from his norms. Perhaps the small size of the fee explains why the job inspector is often a young professional just out of school, or, more often, a nonprofessional with a background in the construction trades. In the former case, his lack of experience results either in defensive temerity or embarrassed timidity. In the latter case, his contractor-oriented background allows him to identify with the builder, thus substantially influencing his role of impartial judge. In either case, he probably makes less than most journeymen on the project.

An ironclad rule among contractors is that one must "get along" with the job inspector at any cost. This rule is drilled into project-managers, superintendents, and foremen, all of whom treat the clerk-of-the-works with a deference enjoyed by no one else on the job. Until the contractor knows and understands the inspector, his campaign is one of circumvention. Job problems are rarely broached directly. Conversation runs toward personal and

inconsequential topics during this sizing-up period. Thick and juicy steaks are freely bought; these are the beginning wedge of a series of favors leading, more often than is generally known, to the brink of bribery. A new world of hunting lodges, fishing trips, expensive liquors and other pleasures is offered as a gesture of friendship and generosity. When the contractor has won the confidence and respect of the inspector, actual job problems are approached with unexpected diplomacy.

Meanwhile, the contractor's office force is busy placing orders and negotiating subcontracts. Unless the specifications are tightly written around specific products, the buying process can be a veritable gold mine, with all of its benefits accruing to the contractor. True, some contractors buy only from suppliers and subcontractors whose quotations they used in preparing their bid, but the practice of shopping is so widespread that sales representatives habitually offer two prices: a "street price" for the shoppers and a realistic price for friends and "ethical firms." Awareness of this situation frequently leads a job-hungry contractor to offer a bid unrealistically near his cost in the hope that he can "buy out," i.e., obtain the required materials and subcontracts at prices sufficiently below those he used in bidding to assure an adequate profit.

The architect's job is not made easier by such practices. Although it is not true that a material's quality is a function of its price, there is a positive correlation between the two. If a contractor is buying on price alone, many of his submittals will be marginal or unacceptable. Both the contractor and his suppliers are past masters at finding loopholes in the specifications that will admit items below the quality intended. These loopholes are too frequently the basis for expensive change-orders, or they may become a bargaining tool. "Although the specs don't call for it, we'll furnish what you want if you'll accept our submittal on metal doors."

This is not a pretty picture of the current state of building, but unfortunately it *is* a true one. Those who deny the existence of these practices have only to read C. Wright Mills, David Riesman or Melville Dalton to discover that if this is not an accurate representation of the construction business, then the contractors deserve the adulation of us all, for they would be unique among businessmen. One begins to wonder how a satisfactory architectural expression is ever built; it forces one to agree with Edward L. Friedman that ". . . few buildings are so perfect architecturally that they can overcome defects in their construction." Indeed, it is doubtful that the chapel at Ronchamp could have survived the American system of competitive bidding, but then Le Corbusier was not designing for the American system.

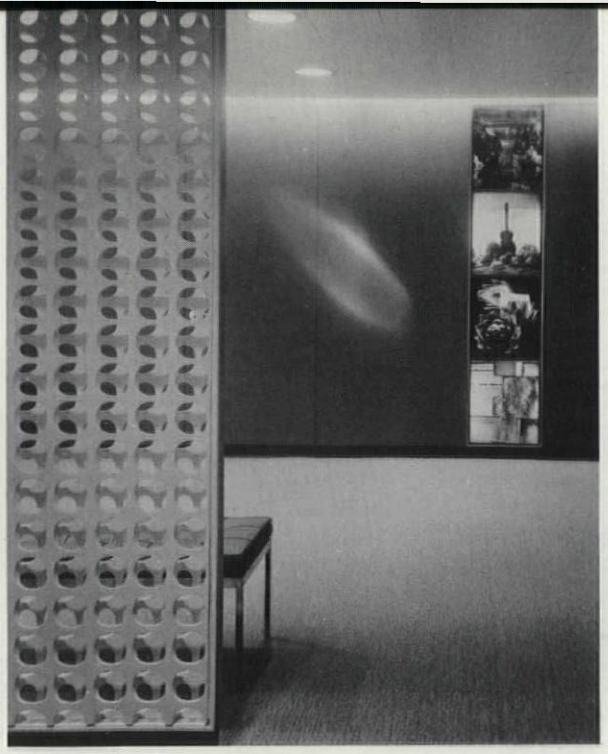
The picture is not all black; there are hopeful signs and possible solutions. Firmer and more competent job supervision by the architect is a must. The job inspector must have a background commensurate with his extensive duties and responsibilities. A man of such abilities must be paid accordingly, which is rarely possible under the present fee structure. The development of firms specializing in supervision may provide a logical answer to this problem. They could be retained by the owner with the approval and consent of both the architect and contractor. They would protect the contractor from arbitrary decisions of architects. They would insist on compliance by the contractor, thus assuring the owner of full value. They would free the architect from an onerous set of duties, allowing him to concentrate more fully on his art and profession. They would, in effect, be full-time professional arbitrators, objectively reconciling the conflicts of interest among the triumvirate of construction.

Whoever approves submittals must do so with firmness and courage, an impossible task without concise specifications. Only when specifications are written with the elegant simplicity of a mathematical proof, and are firmly but fairly enforced, will the contractor turn to improved techniques to effect his profit.

Some agitation exists among architects for a movement toward the European system of architect-builder combination, either as a team or with the architect assuming all the duties of the general contractor. This system has already made considerable inroads in America in the engineering-construction field. It should be noted, however, that American products of such combinations are not so much spaces and forms for human habitation as they are gigantic structures whose very size necessitates mass-fabrication and mass-assembly techniques. American socio-economic institutions are such that one wonders if the architect could long preserve his identity under a team system. Already, the architect's ideals are too often smothered by the owner's ideas. (Art versus business.) Could they survive the grist mill of commerce? The problems of bonding, financing, purchasing, and field organization certainly are not beyond the architect's ken, but such additional pressures could reduce an already schizophrenic art to a state of catetonia.

Much hope for a solution lies with the new type of contractor now emerging. Just as the professional executive replaced the business baron, a new breed of construction men is appearing. These are the well-trained young men from engineering and business schools whose awareness of the depression of the 30's is dim enough to have left their acquisitive instincts uninflated. They have a mature social consciousness based on a moral philosophy which, though not impregnable, at least exists. Much to their credit, organizations such as the Associated General Contractors strongly encourage enlightened management of this sort. State and local licensing of contractors, an issue of mixed blessings, is further encouraging the competent and forthright builder. And however slowly building technology is advancing, each advance creates a pressure toward development of management skills founded on more than manual dexterity.

Whatever the ultimate direction of construction management, the need for adequate liaison between it and the architectural profession is great. If the contractor is criticized for his lack of awareness of the subtleties of architecture, a similar criticism can be leveled at the architect. How few architectural journals, for instance, examine with depth and understanding the problems facing the contractor. Conversely, the construction magazines, in an effort to acquaint their readership with the total architectural goal, seldom go beyond elementary engineering concepts. There is no organization today that draws its membership from all segments of the building industry. The American Society of Heating, Air-Conditioning and Refrigeration Engineers, with its large affiliate membership, is doing a superb job in its own specialized field, without overlapping or injuring the more esoteric American Society of Mechanical Engineers. New channels of communications must be found and the existing ones extended if the architect and contractor are to find an effective working arrangement.



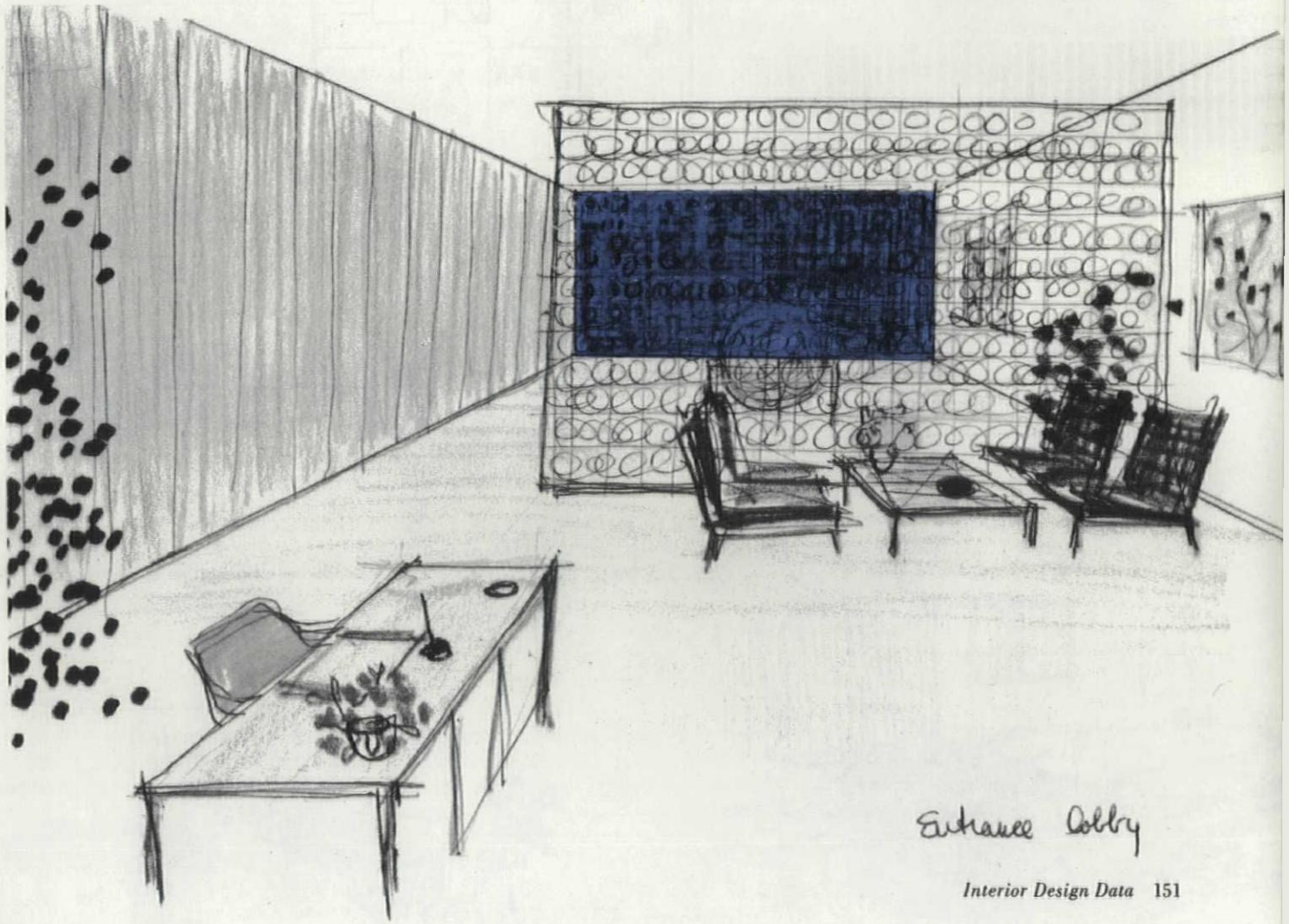
Photos: Robert Damora, Courtesy Knoll Associates

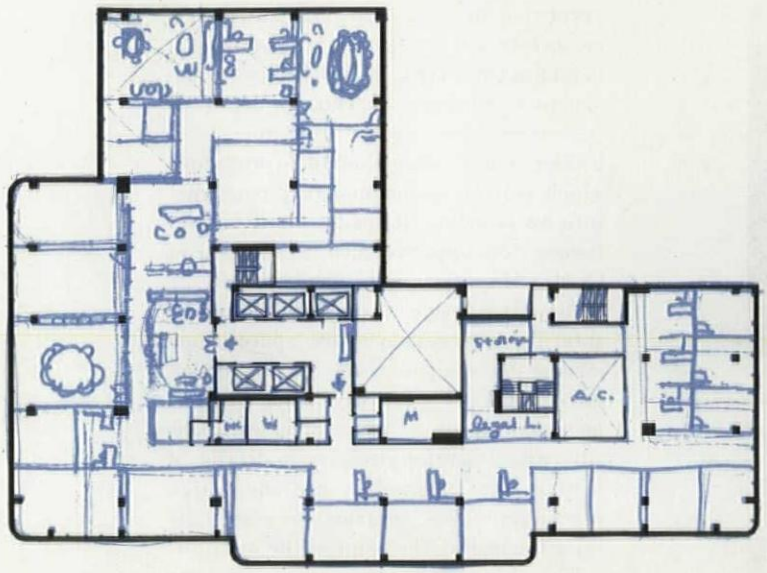
EXECUTIVE OFFICES • COWLES MAGAZINES, INC.•NEW YORK, N.Y.•KNOLL PLANNING UNIT, INTERIOR DESIGNERS • FLORENCE KNOLL, DIRECTOR • LEWIS BUTLER, PROJECT MANAGER

Unlike most office-planning programs, which call for accommodating personnel with an economy of space, the 13,000-sq-ft-floor for upper-echelon executives of Cowles Magazines is planned for only 27 occupants—11 executives and their assistants. This extravagance with space is one means the designers use to provide an atmosphere of pervasive calm for the management of a busy communications enterprise. Careful attention to details, of both designs themselves and the design procedure, also contributes materially toward effecting the tenor of the interiors.

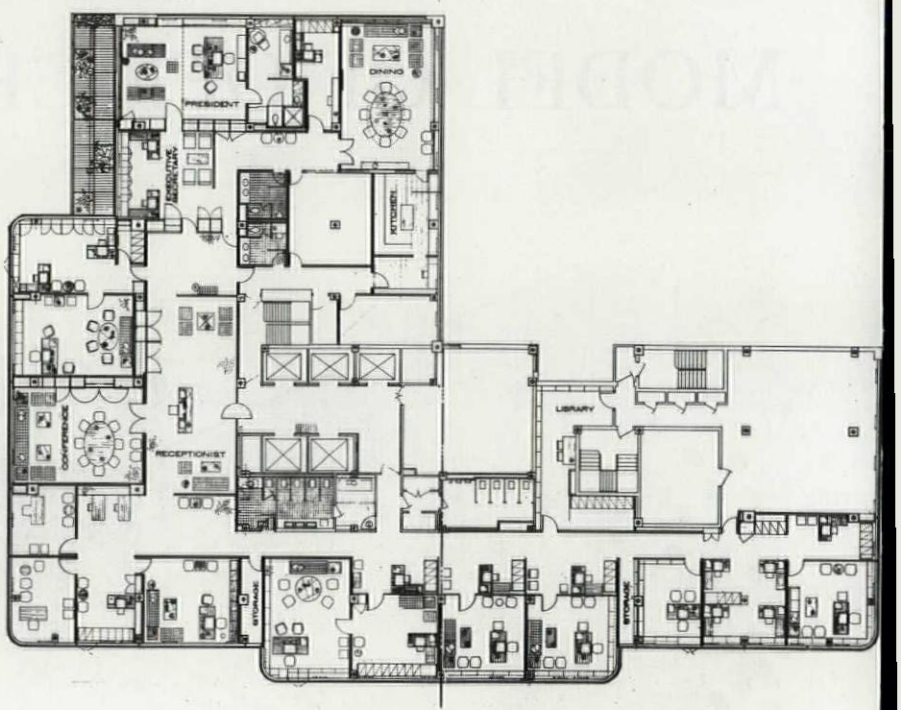
To achieve the privacy desired by the president of the firm, his suite and personal staff are located on one side of the

MODEL OF OFFICE PLANNING

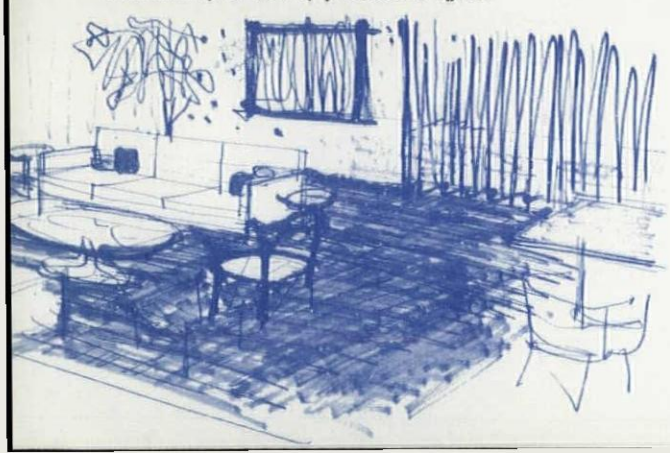




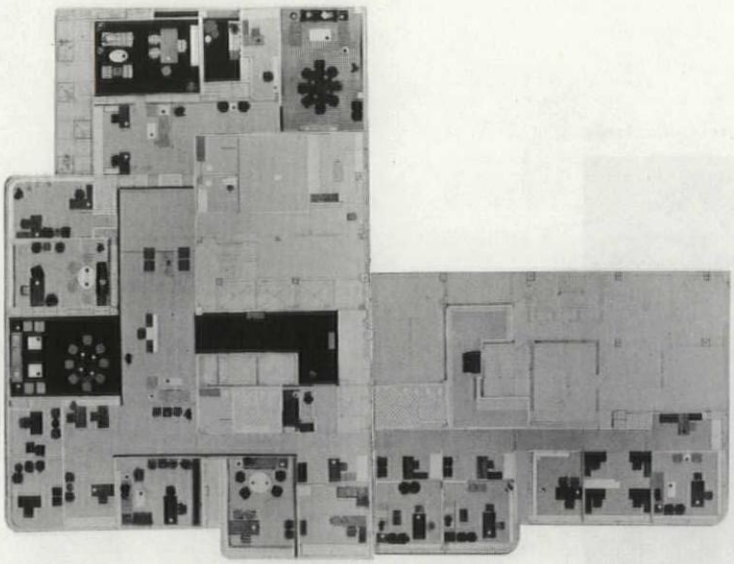
Florence Knoll's preliminary layout is shown superimposed in color on the basic floor plan (left). *The accessories plan is incorporated into the final furniture plan* (center); *a "paste-up"* (acrosspage, top) *and model* (acrosspage, center) *are some of the other design materials executed by the Knoll Planning Unit.*

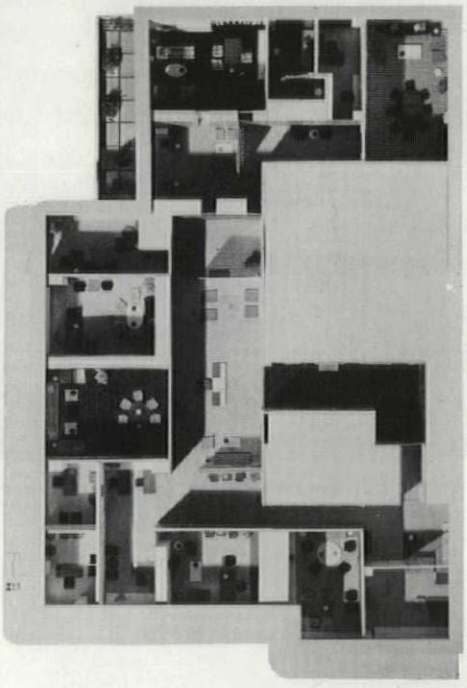


Preliminary sketch of president's office.

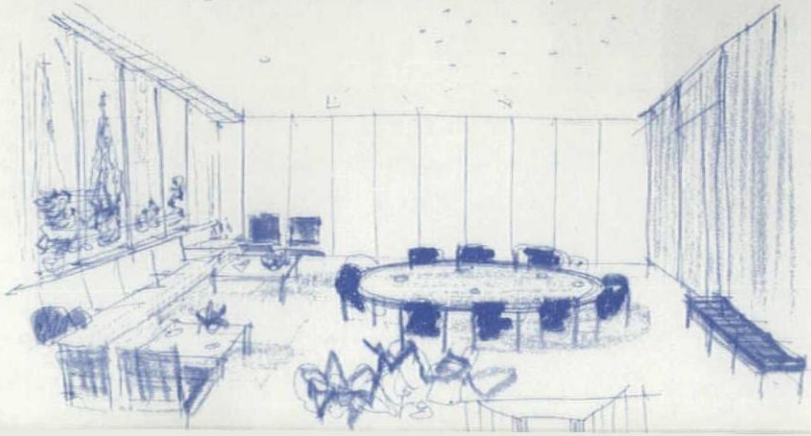


Rendering of executive dining room.





Board conference room. (All sketches by Florence Knoll.)



reception area; the other offices are situated on the other side along a corridor, which has a separate access to the elevator lobby. Knoll Planning Unit (KPU) incorporates several secretarial spaces into this corridor. In addition to executive offices, secretarial areas, and the reception area, provision is made for a board conference room (off the reception room), an executive dining room and kitchen (adjacent to the president's suite), and a legal library (off the long corridor).

The number and placement of interior columns presented a cumbersome problem that was deftly solved. The floor of the 10-year old building into which these executive offices expanded was stripped of partitions and other nonstructural elements. The required facilities were then laid out so that nearly all structural columns would be concealed in bookcase and storage walls. In two instances, a narrow storage closet has been planned between offices instead of leaving a column free standing within one of the rooms.

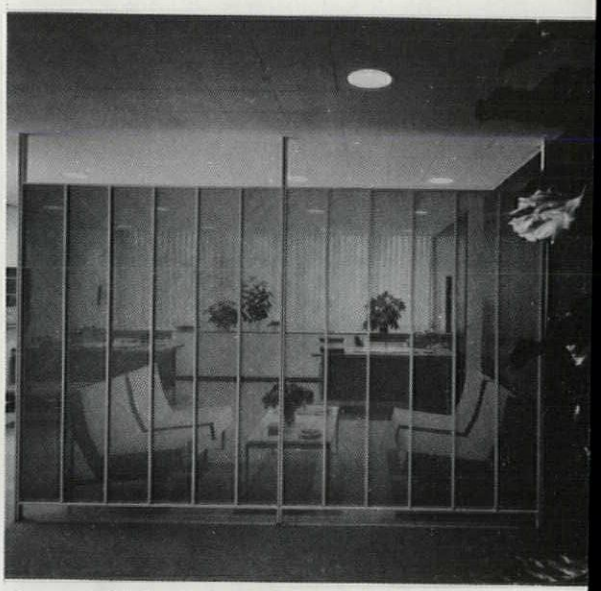
The number of drawings executed for the project is another indication of KPU's precision. Beside the usual plans—construction, electrical, plumbing, heating-ventilation-air conditioning, and finishing and furniture plans—and several preliminary sketches (*below*), KPU also executed plans and schedules for floor coverings, draperies and blinds, plants, pictures, and accessories. The latter is shown incorporated into the furniture plan (*acrosspage, center*). Details and working drawings of special furniture, joints, and appointments brought the total number of drawings for these offices to 197. The interior designers also used other planning materials: a model of the major areas was built (*center*), and a "paste-up," which is a furniture plan with textiles pasted over the designated areas, was used as a portable model (*above*).

Besides an atmosphere of privacy and calm, a sense of freedom, conveyed by a use of continuous space, has been achieved in these interiors. The reception room typifies this mood: two seating groups are widely separated; hallways continue beyond specially sealed Hauer screens.

The offices also possess an unostentatious elegance, which has been achieved in part by an adept orchestration of textures. A balance between fabrics and polished surfaces makes the rooms warm without being woolly, and bright without a suggestion of brittleness. The lines of the furniture are low; the arrangements are comfortable looking and rather residential in character. An array of work seldom looks like clutter, so tidy are the surroundings and appointments.

A quiet mood is established in the reception room.

Secretarial spaces are visible along the corridor.

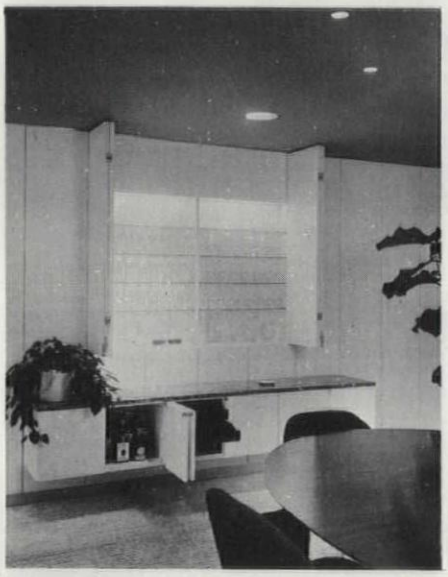


A screen shields the executive secretarial area.

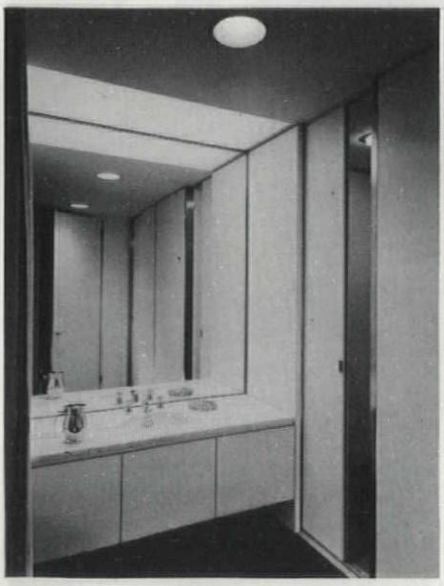
The color schemes are basically white and beige with strong accents. In the reception room, a rosewood-paneled wall serves as a backdrop to the desk, which faces the entry; beyond white screens are walls covered in deep blue felt (*acrosspage, left*). The executive secretarial area, which is visible from the hallway to the dining room through a pale tan filigree (*acrosspage, right*), has desk chairs that are upholstered in a royal blue wool. In the dining room, vivid orange chairs accent the white, rosewood, and charcoal background, which is further distinguished by a pale blue ceiling (*below*). The president's office (*next page*) is white and beige with natural leather and golden Burmese teak; a navy blue carpet and red accessories complete the surroundings.

The details of the project are pleasant to investigate. In the dining room, a lowered ceiling floats between perimeter air ducts and drapery tracks, which it conceals like a cornice. The draperies themselves are lighted evenly from behind, through fiberglass panels, to augment the light from an inner court. The dining table can be extended from 8'6" to 12'6" by the addition of four exterior, semi-horseshoe-shaped leaves; a kitchen buzzer on the underside of the tabletop is then extended under the added leaf. Above the table is a free-form pattern of downlights, which creates the effect of a chandelier that has been recessed.

In the president's office, the ceiling is divided by a channel, which symbolizes a separation of the lounge and desk areas. Special rings around the downlights are finished to match the ceiling plaster. Inside a teak-paneled storage wall, opposite the sofa, even the fuse box has a teak door. The cabinet behind the president's desk contains dictating equipment, stor-

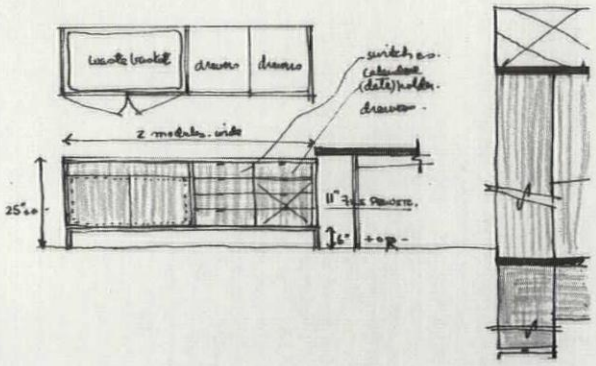


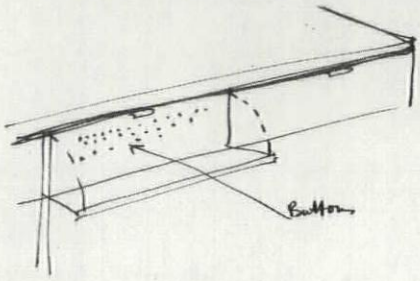
Overhead lighting and glass shelves create a decorative effect when the bifold doors of the dining room glassware cabinet are open (above). *The bath* (below) *and an adjacent dressing room are part of the president's suite.*



A lounge area has been provided at one end of the dining room.

The president's office has a lounge area overlooking a terrace at one end (below), *and at the other a desk and cabinet* (right *and* acrosspage).





age space, an oversized wastebasket for bulky newspapers handled each day, and two control panels. One of the panels is a narrow call director, which was specially developed by KPU in co-operation with telephone engineers. The other panel is an electrical control for: the opening and closing of draperies and vertical blinds; the angle of the blinds; all recessed ceiling lights, outdoor lights, and fluorescent window strips behind draperies, the latter on dimmers; and also the locking and unlocking of the office door. It is this meticulous attention to every detail of interior design for which the Knoll Planning Unit is renowned.

DATA: descriptions and sources of the major materials and furnishings shown.

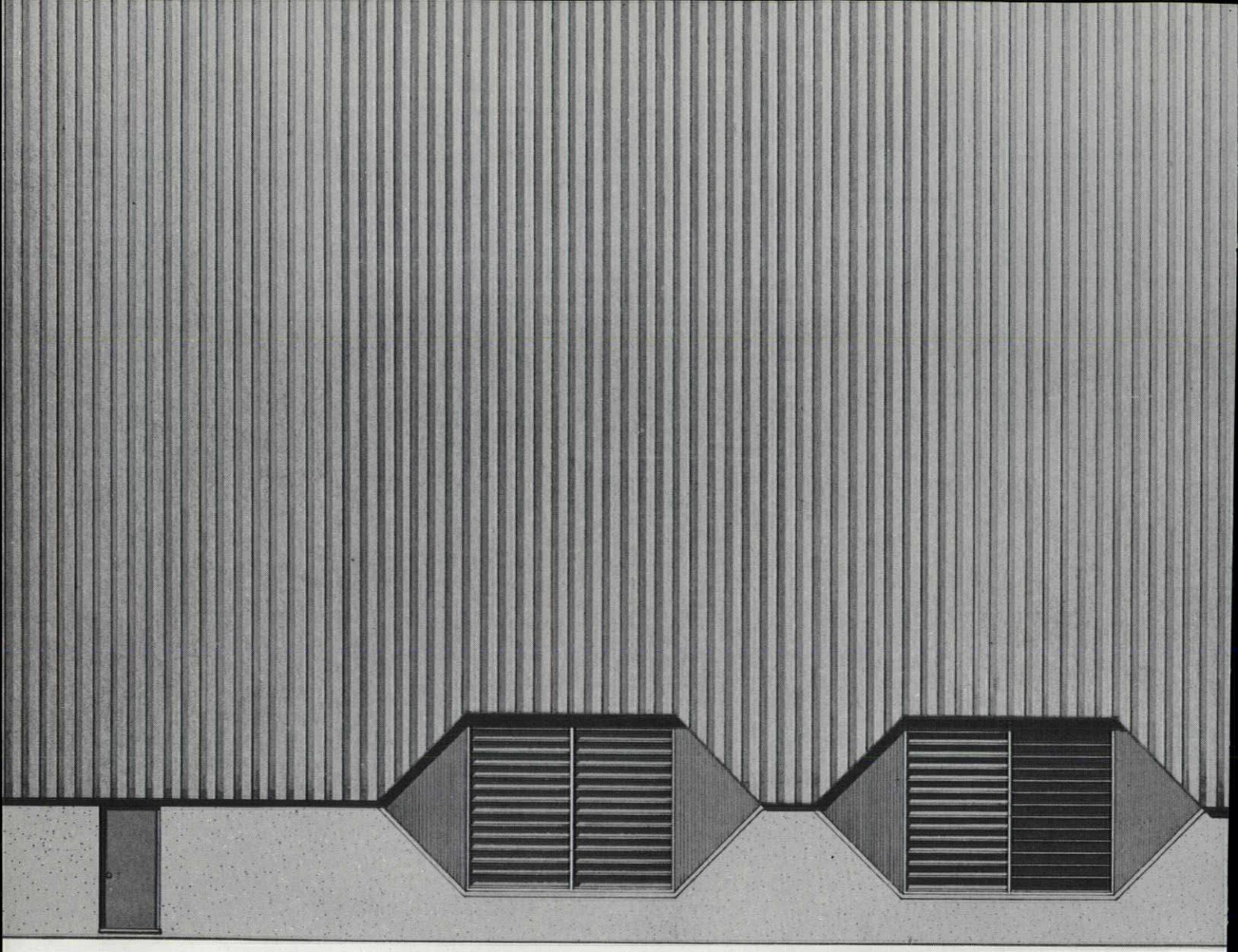
RECEPTION ROOM AND HALLWAY
Ceiling: off-white acoustical tile/Armstrong Cork Co. **Walls:** natural grasscloth/Murals, Inc.; deep blue acoustical felt/Hushalon/Central Shippee, Inc. **Doors:** glass/aluminum frame/Kawneer. **Carpet:** beige wool/V'Soske from Lord & Adams. **Screens:** white gypsum blocks/Murals, Inc. **Lighting:** downlights/Gotham Lighting, Inc. **Furniture, Fabrics:** Barcelona chairs/natural top grain leather; sofa and chair/beige nylon homespun; table/chrome steel/cremo marble; desk/chrome steel/rosewood/cremo marble/custom design; desk chair/vermilion wool; all Knoll Associates, Inc. **Plants:** Ficus pandurata/Julius Roehrs, Inc. **Pots:** metal/painted white/Knoll Assoc.

EXECUTIVE SECRETARIAL AREA
Screen: natural wood filigree/Shuttermodes; white lacquer wood frame/custom design. **Walls:** teak, white lacquer panels. **Storage cabinet:** white lacquer wood/custom design. **Furniture, Fabrics:** desks/teak; lounge chairs/beige wool; table/cremo marble; all Knoll Assoc.

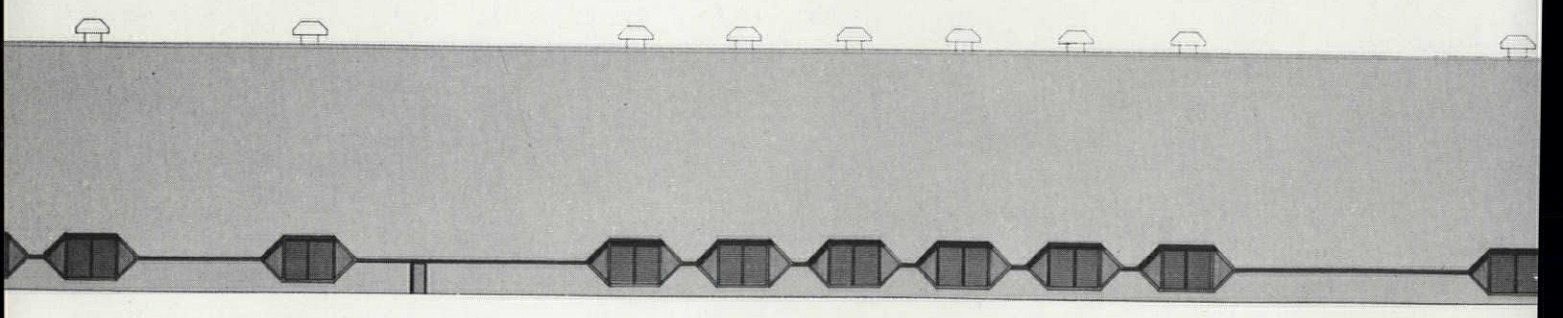
DINING ROOM
Walls: plaster/white; white lacquer panels. **Drapery:** white silk/Knoll Assoc. **Carpet:** wool stripe/dark gray low pile/white high pile/V'Soske. **Furniture, Fabrics:** dining table/rosewood/chrome steel; dining chairs, sofa/charcoal wool; table tops/rosewood, cremo marble; sideboard/wall hung/white lacquer/rosso merlini (rose red, white veined) marble. **Accessories:** painting/ black and white/by John Youngerman; pillows/yellow, ochre; ashtrays/yellow lacquer insides.

PRIVATE BATH
Walls, Doors: white Formica. **Lighting:** fluorescent/Fotalite glass diffuser. **Cabinet:** white lacquer/cremo marble/custom design; basin/white porcelain/Case. **Mirror:** Pittsburgh Plate Glass.

PRESIDENT'S OFFICE
Walls: natural grasscloth/Murals, Inc. **Doors:** glass/aluminum/sliding/The General Bronze Corp. **Drapery:** white sheer/Knoll Assoc; white vertical blinds/fiberglass/Sun Vertical. **Carpet:** navy blue wool/V'Soske. **Furniture, Fabrics:** sofa, chairs/beige and white handwoven wool; desk chair/natural leather back/beige wool seat; desk/teak/chrome steel/custom design; cabinet/teak/cremo marble/chrome steel/custom design; table tops/teak, cremo marble, stool/natural leather/chrome steel; all Knoll Assoc. **Accessories:** pillows/red, beige; painting/brilliant red with black/by Eugene Massin.



BUILDINGS FOR INDUSTRY



Why is the United States producing so few distinguished industrial buildings? Many of the most significant architectural innovations of the 19th and early 20th Centuries were first applied in factory buildings—the system of "mill construction" in wood, the principles of steel and reinforced concrete framing, the concepts of the curtain wall and of flexible "loft" space. Speaking of the development of 19th-century American architecture in his book "American Building" (Houghton, Mifflin, 1947), James Marston Fitch writes, "All major advances in building technology were to be based upon the factory; and this building type, at its best, was consistently to establish new standards for the rest of the building fields."

Industrial buildings were the pace-setters of that period because increasingly complex processes demanded structures of ever greater strength, span, flexibility, and fire resistance. Today, the structural requirements of our industrial processes can be easily met and the methods of meeting them have become conventional. Radically new approaches to the housing of industrial production, such as those of Buckminster Fuller, remain unrealized.

A definite division between buildings for production and those for administration and research has developed in recent decades. The gulf is widening continually as production becomes increasingly automated and the amount of related white-collar and white-coat activity grows.

The "administration and research center" emerged as a subject for architectural virtuosity in the 1930's, when Wright designed the Johnson's Wax complex. In the 1950's, many lavish projects of this type resulted from industry's need to attract highly trained engineering and scientific personnel.

Opportunities to create architecturally distinguished production facilities rarely occur. In many factory jobs, the architect is commissioned to design only an envelope for a preconceived arrangement of spaces.

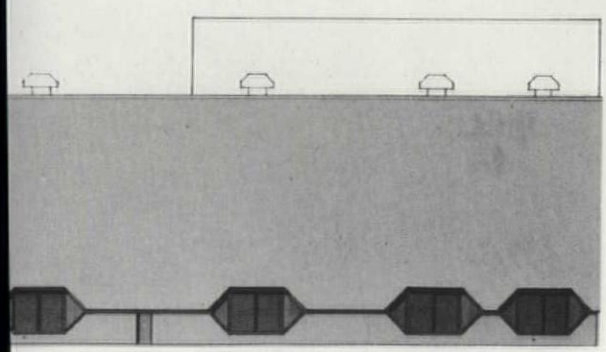
New York architect Ulrich Franzen suggests that imaginative solutions are likely only where strong personal leadership in industry survives. American industry tends increasingly toward group control by executives who are remote from the production process and rely heavily on a bureaucracy of "experts." These experts can seldom risk anything unconventional; they prefer the secure procedure of obtaining a plant for a fixed price in a predictable time, an arrangement that only the "package builder" is ready to make.

On the other hand, Willis Mills, of Sherwood, Mills & Smith, maintains that the administrative set-up of American industry does not discourage architectural innovation. He contends that "the American industrialist is quite able to recognize brains when confronted with them. It is up to the architect to prove his worth at a relatively early stage."

Both Franzen and Mills agree that only the architect is qualified to organize the industrial process in a functional and meaningful way. They caution, however, that he must be willing to acquire an intimate knowledge of what goes on inside the building. Franzen stresses that he must be able to demonstrate the value of clear architectural organization—even to the extent of rearranging, where necessary, the individual worker's equipment.

On the following pages we present several new industrial buildings. They vary in their functions from a building that houses all of the production and administrative operations of a company to one devoted solely to research activities. These buildings may not establish new architectural standards, as the factories of the last century did; yet, in each of these new structures, the architect's thorough understanding of the program has led to an efficient and architecturally satisfying design.

The walls of an aluminum plant now being built for Alroll, Inc., in Oswego, New York, will be clad entirely in aluminum, except for a poured concrete base wall. Louver units with triangles of translucent plastic will be located as required by the process. The building, which will cover several acres, will house only 35 workers. It was designed by Auburn Associates, Engineers, and Whittlesey & Conklin, Consulting Architects.



PLANT AND ADMINISTRATION BUILDING FOR THE BARDEN CORPORATION • DANBURY, CONNECTICUT • SHERWOOD, MILLS & SMITH, ARCHITECTS • THE AUSTIN COMPANY, STRUCTURAL & MECHANICAL ENGINEERS

Precision Ball-Bearing Factory

The precision ball bearings of the Barden Corporation are used in the guidance systems of airplanes, missiles, ships, and submarines, and in computers, X-ray equipment, high-speed cameras, dental drills, machine tools, and textile machinery. All of the administrative and production operations of the company are housed in a shiny new metal-clad building on a Connecticut hillside.

The most vital physical requirement for the plant was the maintenance of rigorous standards of cleanliness in certain "critical" areas where final assembly, inspection, testing, and packaging take place. Anyone who enters these departments must wear special lint-free smocks, caps, and shoe covers. Air showers in the locks at the entrances to these spaces remove any stray

dust from the uniforms. Customers and other visitors can observe these operations from the noncritical areas through windows. Material is transferred between departments by special pass-throughs, with gasketed sliding glass doors, designed so that only one side at a time may be opened.

In areas designated "super-critical," even the dust produced by ordinary paper cannot be tolerated. All operations are performed inside hoods and are visible to the operator through glass windows; air from the rooms is refiltered and forced into the hoods to maintain a positive pressure.

Floors, walls, and ceilings in these rooms are washable and as smooth as possible. Standard metal movable partitions have been redesigned to eliminate horizontal surfaces where dust might collect; joints between the masonite panels have been taped to prevent infiltration. Floors are of vinyl sheeting with a minimum of joints, or of special solvent-resistant terrazzo. Fluorescent lighting troffers with plastic lens diffusing elements are recessed in the ceilings; special caulking has been applied between the fixture and the ceiling and gaskets have been installed around the lens frames.

Two distinct air-conditioning systems serve the critical and super-critical areas. Both of them use the space between the roof and the suspended ceiling as a plenum, within which all air-handling equipment is located. Reheating coils and humidifiers are located near the diffusers for the various spaces.

The system for the super-critical spaces utilizes electrostatic and absolute filters to eliminate all particles larger than a few millionths of an inch in diameter; it also keeps the humidity below 40 per cent and the temperature within two degrees of 75 F.

In laying out the building, the architects placed all production operations on one floor, taking advantage of the slope to locate auxiliary services and employee facilities on a partial ground floor beneath

Photos, except as noted: Joseph Molitor

Part of wide view from cafeteria.

Photo: Courtesy Barden Corporation

Vast area of grinding department.

Photo: Courtesy Barden Corporation

"Critical" inspection department.

it. This arrangement permits short direct lines between the sources of process services—such as power, solvents, coolants, and vacuum—and the spaces they serve.

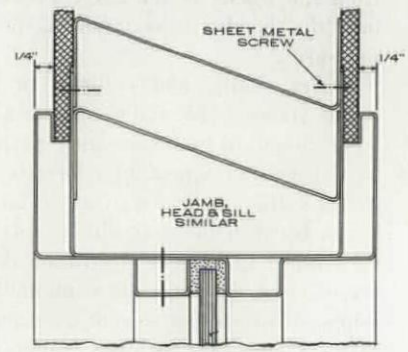
Production processes have been organized in a U configuration, which allows consolidation of receiving and shipping operations at one end of the building and makes the central service and supply core directly accessible from all departments.

The architects and engineers collaborated to insure that the plant was adaptable for expansion. The central core was designed with built-in expansion area so that it could meet the requirements of an enlarged production area. Long structural spans of 60 ft and 80 ft were used on the recommendation of the engineers and have already proven valuable in facilitating internal rearrangements of equipment. The 8-ft depth of the required trusses provide valuable space for mechanical equipment.

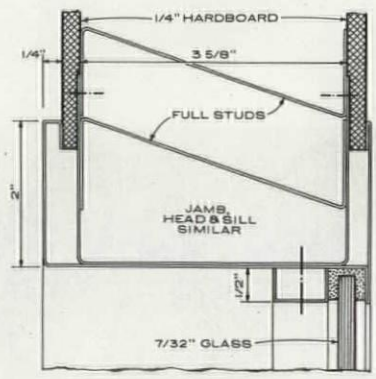
The prefabricated, insulated aluminum-clad panels used for the exterior walls of the factory were low in cost and require no maintenance. Their contribution to flexibility was proved in the first year after construction, when 15,000 sq ft were added to the factory (to bring it to its present form); the original panels were simply removed and relocated in the new wall.

The administration building has a steel frame and concrete floor slabs. Removable partitions in this wing are located on a 5-ft module. Vertical aluminum louvers are used to screen out direct sun on the northwest and northeast faces, and there are 5-ft-deep horizontal sunshades on the southeast side.

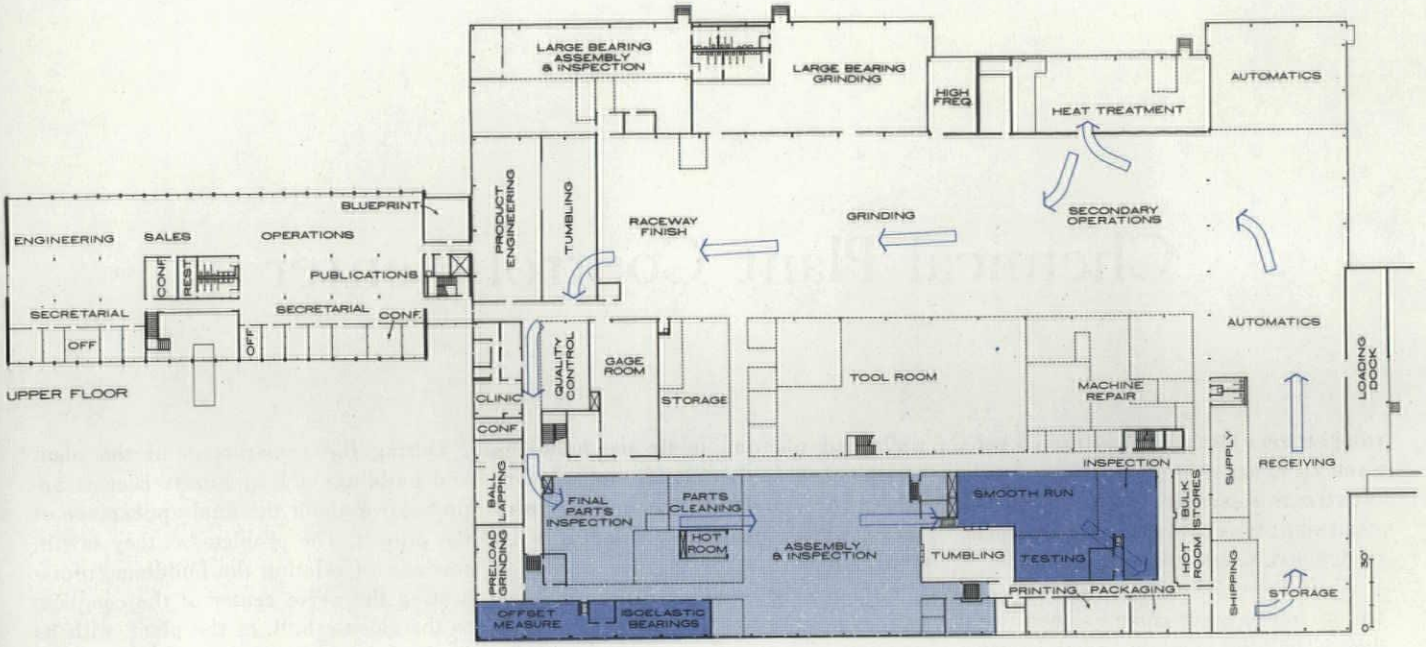
Architect Willis Mills gives principal credit for the success of the project to the officers of the corporation, who, he says, maintained an attitude of "dogged insistence on the best that the architect and the engineer had to offer."



CRITICAL AREA



SUPER-CRITICAL
INTERIOR PARTITION WINDOW FRAME


LARGE BEARING ASSEMBLY & INSPECTION
LARGE BEARING GRINDING
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QUALITY CONTROL
GAGE ROOM
STORAGE
TOOL ROOM
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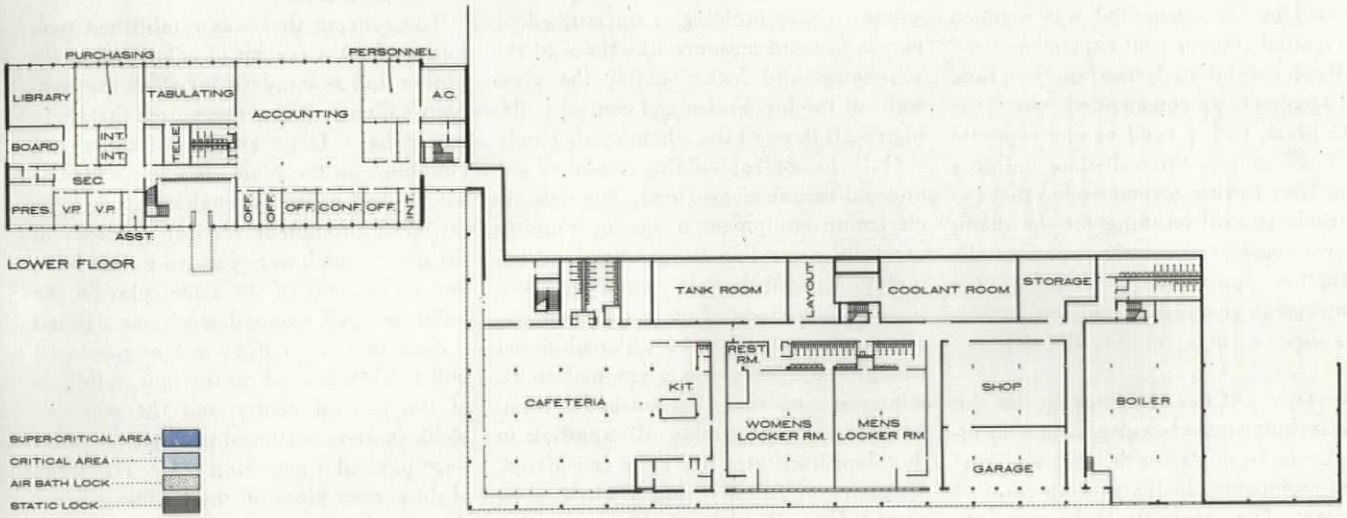
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REST RM.
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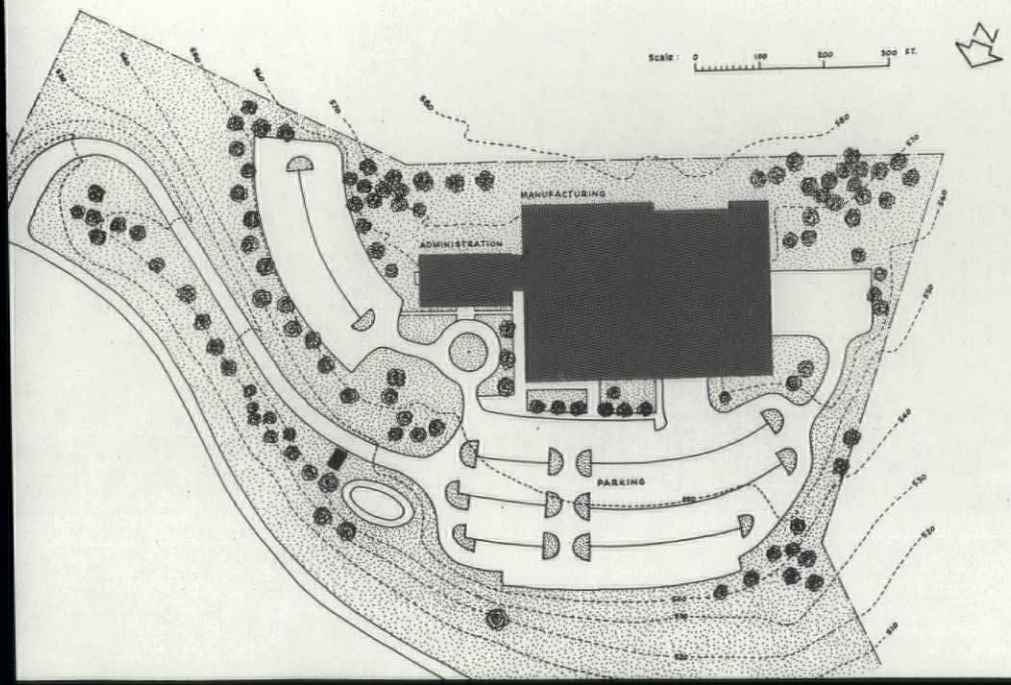
AIR BATH LOCK
STATIC LOCK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N
MANUFACTURING
ADMINISTRATION
PARKING

Chemical Plant Control Center

THE STAUFFER CHEMICAL COMPANY • DELAWARE CITY, DELAWARE • PERKINS & WILL, ARCHITECTS • SEGNER & DALTON, MECHANICAL ENGINEERS • GARFINKEL & MARENBERG, STRUCTURAL ENGINEERS

The architects were commissioned to design a building for the administrative, laboratory, warehousing, shop, and employee functions of a bulk chemical plant. The plant was similar to several others operated by the client and was planned for eventual 100 per cent expansion.

After a careful analysis of the program, the architects recommended that the client break with precedent and separate the functions into three distinct building units. They further recommended that the electronic control building for the plant, hitherto considered merely a part of the production equipment, be added to the architectural commission to become another element in a campus-like development.

The layout of the buildings on the site was carefully studied to give them a meaningful relationship to each other and adequate prominence in the over-all form of the plant. The architects laid out screen walls and planting to tie the buildings together and further clarify site relationships; but at present there are only wire fences where the walls are going to be constructed.

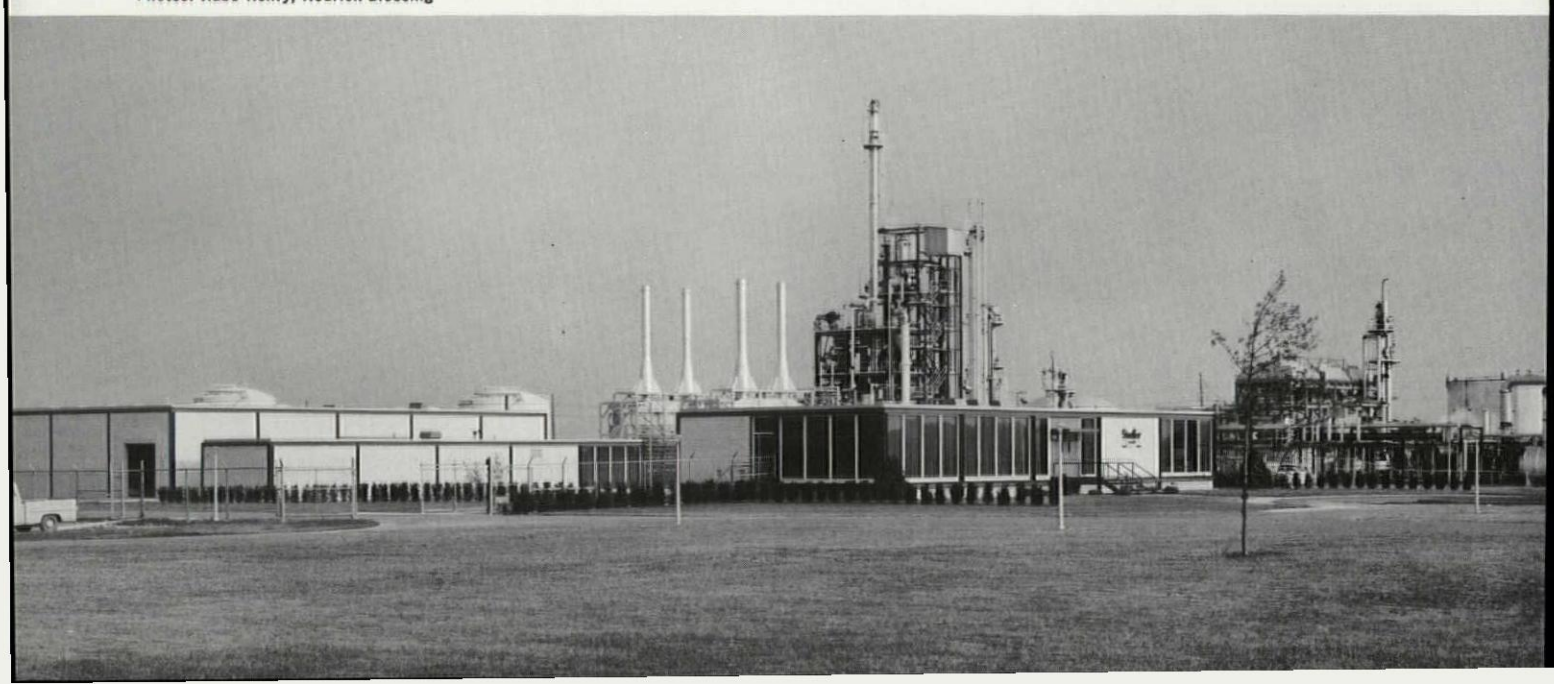
Although the buildings differ widely in the types of activities they house, their exterior appearance has been carefully correlated through the use of a uniform module and the consistent expression of structural elements. The glazing of the administrative building is interrupted by panels of solid masonry like those of the warehouse and locker units; the glass walls of the lunchroom and control building recall those of the administrative unit.

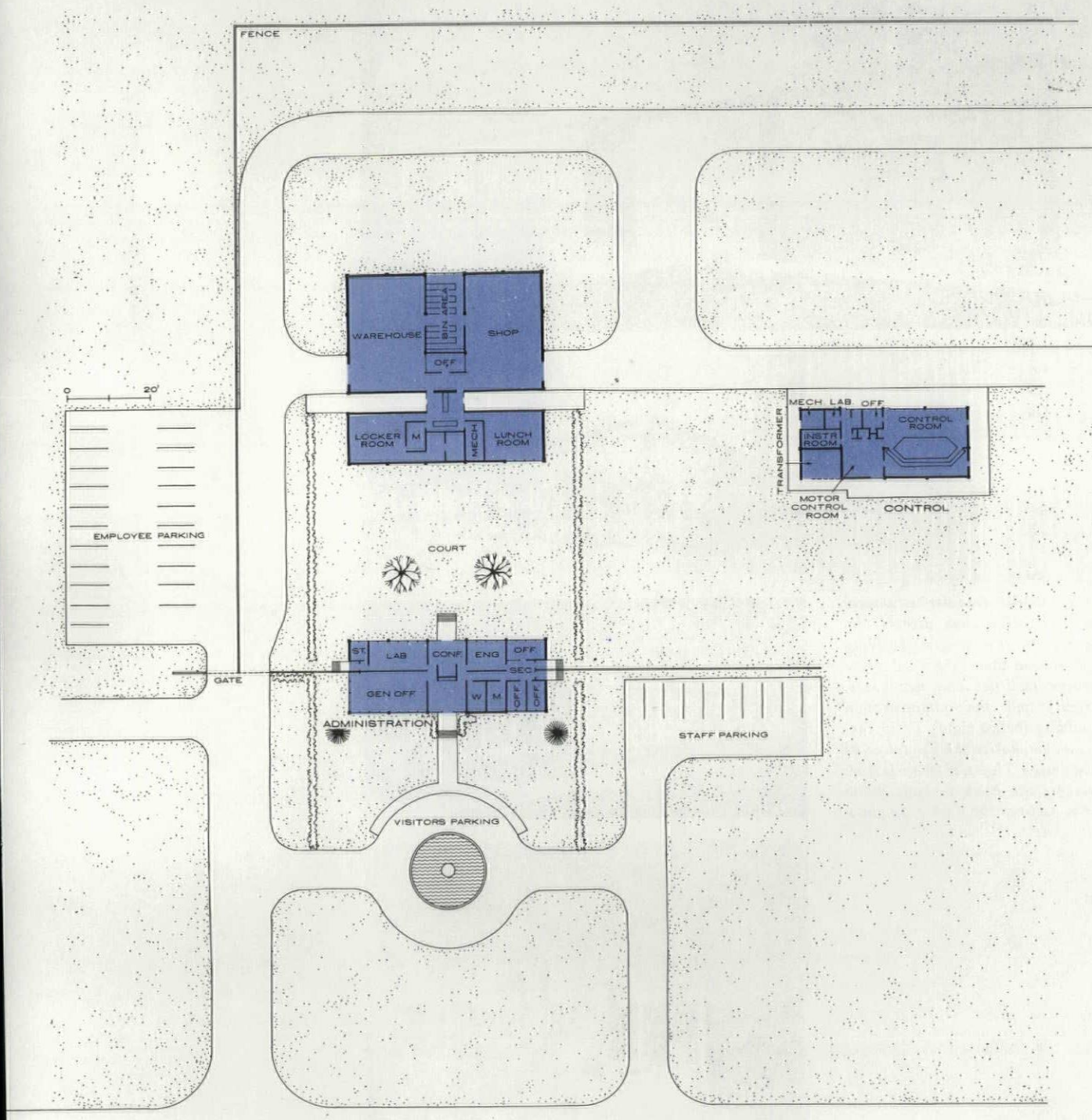
Only the control building presented any unusual technical problems. The delicate electronic equipment it houses requires carefully controlled temperature and humidity. An unobstructed view of the plant, including the tops of the stacks and vessels, is also required and, although direct sunlight and excessive glare had to be minimized, no visors or sunshades could be used. The possibility of explosion in the plant itself also had to be considered. Windows of heavily tinted wired glass provided an effective solution.

During the construction of the plant and buildings, the architects became apprehensive about the final appearance of the project. The problem, as they saw it, was one of relating the buildings, representing the nerve center of the complex, to the chaotic bulk of the plant, with its piping, vessels, tanks, and shelters. They urged the client to consider an over-all color scheme that would include both buildings and plant.

The scheme that was established took into account a system of color coding for piping that is standard for all of the company's plants; it also recognized that there would be a large amount of unpainted aluminum in the plant. It was decided to use neutral colors throughout, except for the most prominent vertical elements of the plant, which were painted a vivid blue, and for accents of the same color on the buildings. All exposed steel was painted a dark umber; a light and even-colored buff brick was used on the four buildings of the control center and the concrete block shelters scattered through the plant were painted a matching color. The areas of dark gray glass on the buildings were sharply defined by white-painted trim.

Photos: Hube Henry, Hedrich-Blessing

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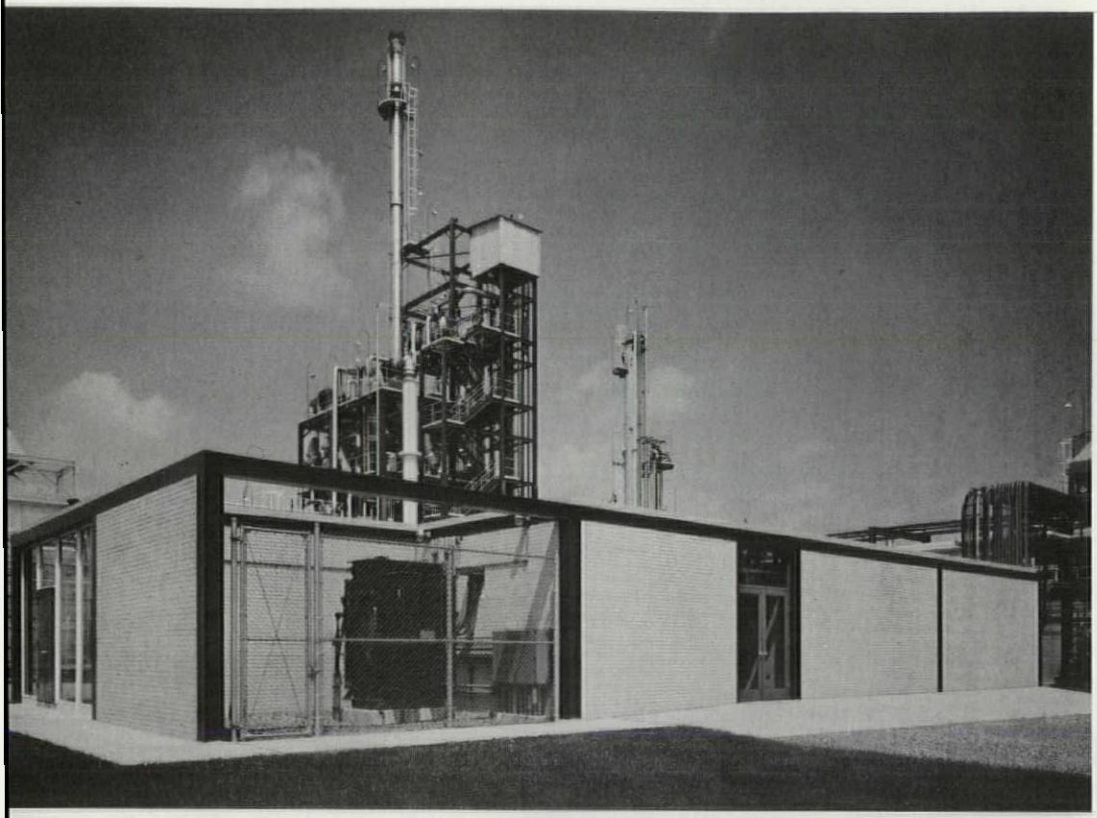
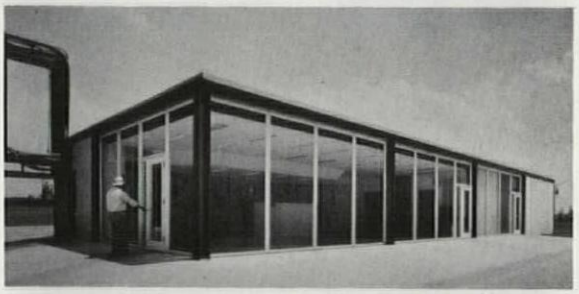
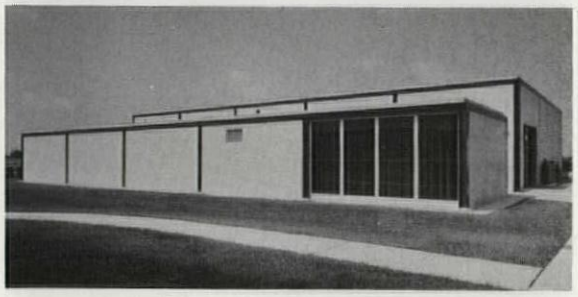






A consistent modular structural system unifies such diverse elements as the control building (above and above right), the *employee facilities and warehouse,* (right) *and the administration building* (below right). *Color contrasts emphasize the discipline of the design. The steel frame is dark umber; the brick is buff; white trim outlines the dark gray glass.*

Strapping Machine Engineering Facilities

RESEARCH & ENGINEERING BUILDING FOR SIGNODE STEEL STRAPPING COMPANY • GLENVIEW, ILLINOIS • HAUSNER & MACSAI, ARCHITECTS • PAUL ROGERS & ASSOCIATES, STRUCTURAL ENGINEERS • PAUL GAWRUSIK & ASSOCIATES, CONSULTING ENGINEERS

The client is a manufacturer of steel strapping that is used for packaging; this building produces the machinery with which this strapping is applied. Since each customer's machinery must be designed to an individual set of requirements, a relatively large part of the building is devoted to development, engineering, and testing.

Hausner & Macsai divided the functions of the complex into two groups with different physical requirements. The actual manufacturing processes were housed in one wing, which is windowless, except for small glazed slits to provide an occasional glimpse of the outside. Equipment installed for heating and ventilating this wing is adaptable for conversion to air conditioning in the future. Administrative offices, research, engineering, and testing activities were housed in the other wing, with natural lighting and air conditioning.

The extensive glass areas on the south side are protected from direct sun by aluminum louvers, which permit a full view of the rolling countryside (SELECTED DETAIL, page II-DD).

The two buildings are connected by a link housing reception area and employees' facilities. The front entrance serves all employees and visitors; intra-company communications pass along the rear side of the link. The lobby is paneled in teak and has black-brown brick paving that establishes continuity with the terrace outside. Furnishings, which were chosen by the architects, include chairs of black leather on chrome frames and white pottery planters.

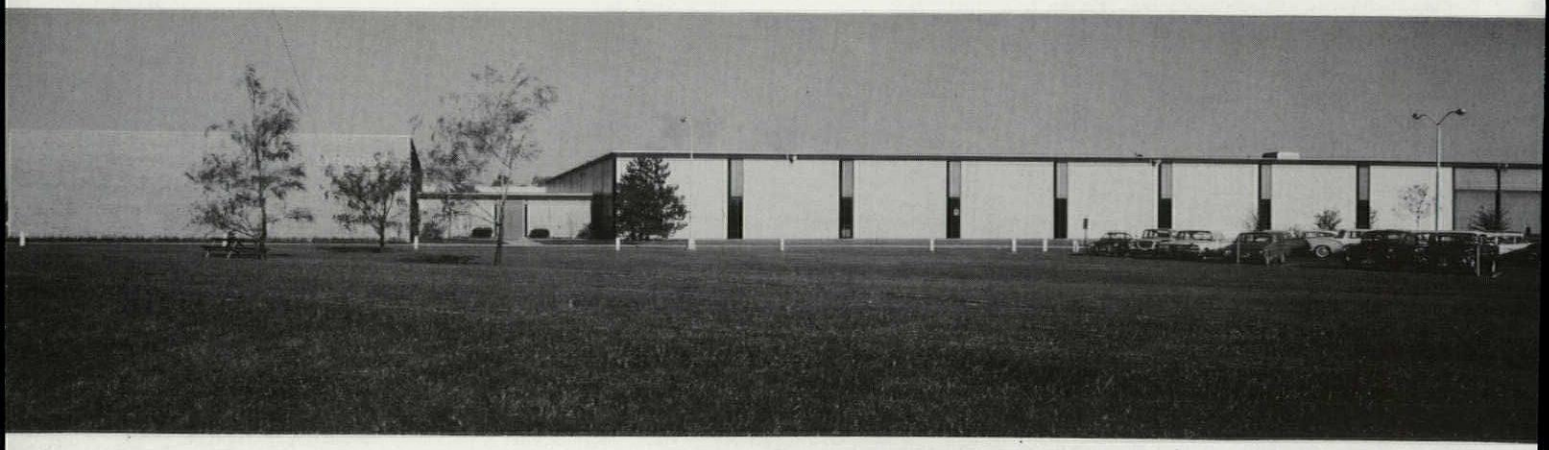
The arrangement of the manufacturing area was established by the client's own plant layout department. The architects feel that the plan is an excellent one, but they would prefer, on other jobs, to take part in this fundamental planning.

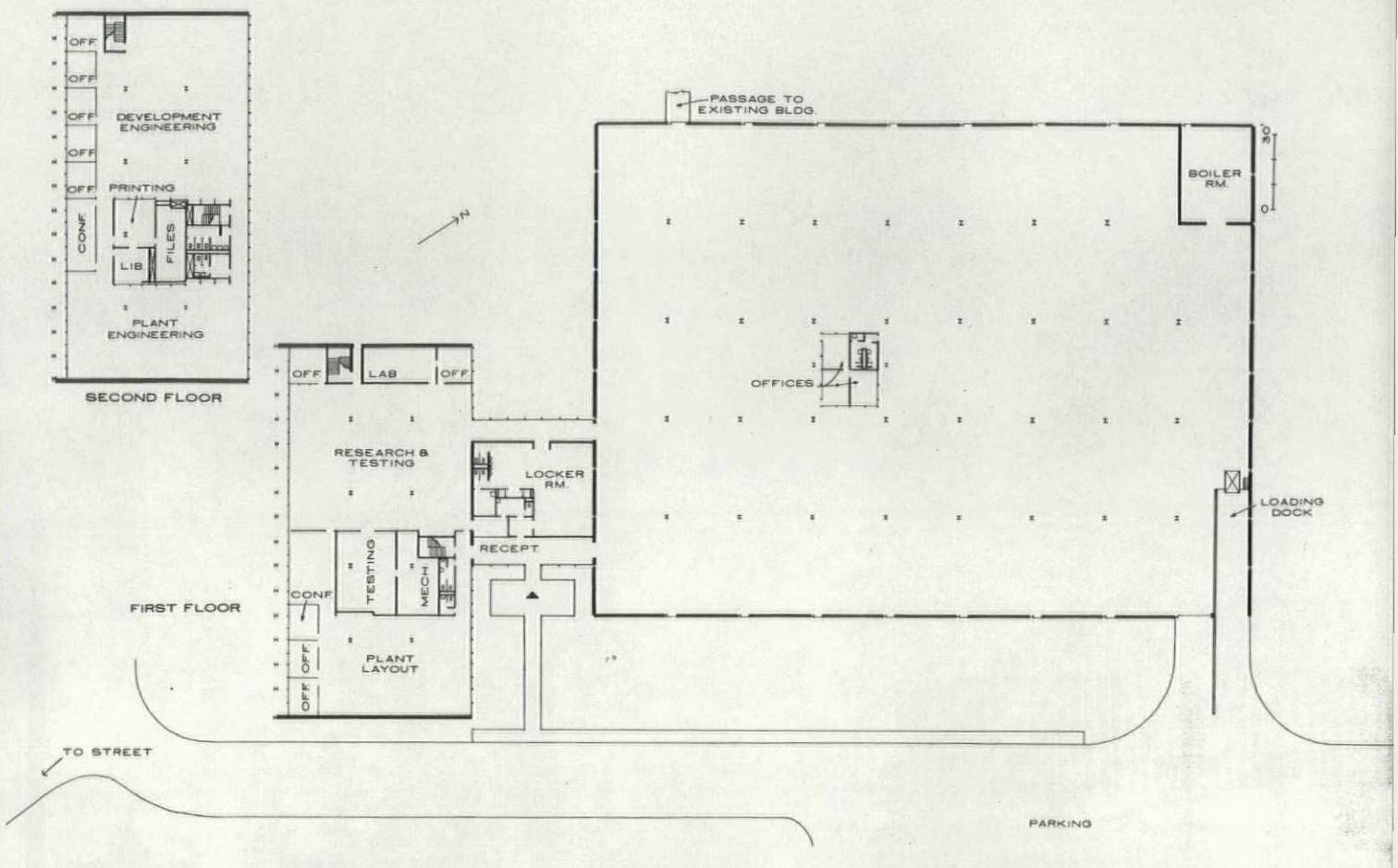
The structure is of steel frame, with steel bar-joists, chosen for economy and speed of construction. On the exterior, panels of glazed brick and curtain walls with porcelain-enamel steel spandrels are set between the exposed framing members. The client's request for a strong color scheme was met by using orange brick, white and black curtain walls, and white-painted steel framing on the research wing, and white brick, with charcoal gray steel and accents of blue porcelain-enamel, on the factory wing.

Landscaping was kept simple and consistent with the existing conditions; occasional trees and shrubs accent the level expanses of grass. The architects comment that the appearance of the complex could have been improved substantially if the budget had permitted construction of a pedestal—perhaps 18 in. high and 4 ft wide—to join the building to the land more gracefully.

The final cost of the project, exclusive of landscaping, furnishings, and architects' fee, was about $12.00 per sq ft.

Photos: Bill Engdahl, Hedrich-Blessing

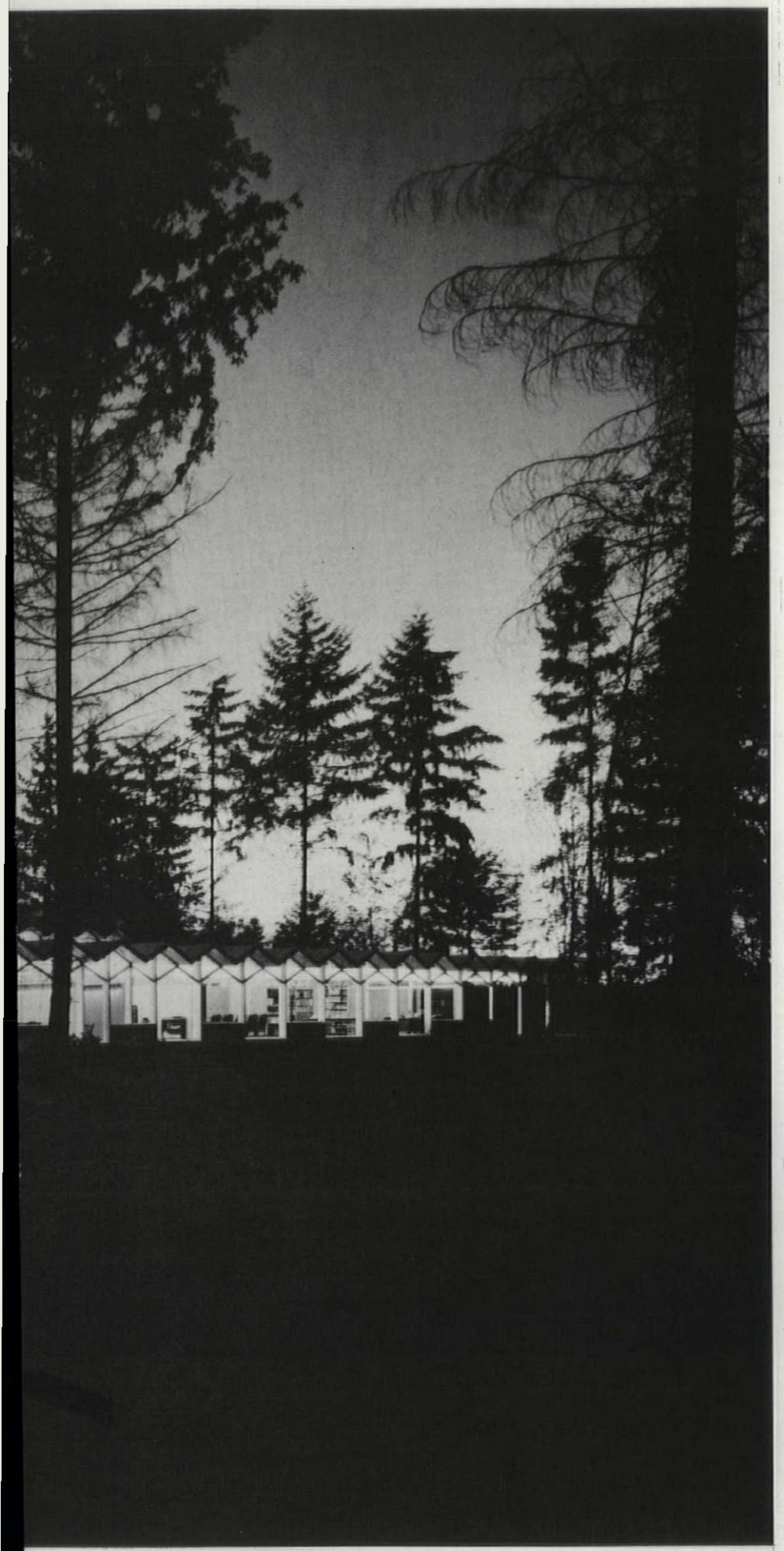




The view from the road (facing page, bottom) *shows the end wall of the engineering wing, faced with orange glazed brick, and the long, white glazed brick wall of the factory wing, interrupted by vivid blue porcelain-enamel panels above narrow windows. A single entrance in the connecting link* (facing page, top) *serves employees and public. The brick paving of the entrance terrace continues into the teak-paneled lobby* (below left). *Interiors of the engineering departments* (below right) *have exposed steel structure and partitions faced with wood battens.*

Photos: Hugh N. Stratford

Wood Products Research Center



RESEARCH CENTER FOR THE SIMPSON TIMBER COMPANY • BELLEVUE, WASHINGTON • KIRK, WALLACE, MC KINLEY & ASSOCIATES, ARCHITECTS • WORTHINGTON, SKILLING, HELLE & JACKSON, STRUCTURAL ENGINEERS

Standing in a grove of firs and hemlocks in the suburbs of Seattle, this handsomely detailed wood structure serves as an appropriate symbol for a company whose timber operations are distributed throughout the Pacific Northwest. The offices, laboratories, pilot plant, and testing facilities housed in it comprise the first stage in the development of a 10-acre site; eventually, it will include the company's main offices and greatly expanded research activities.

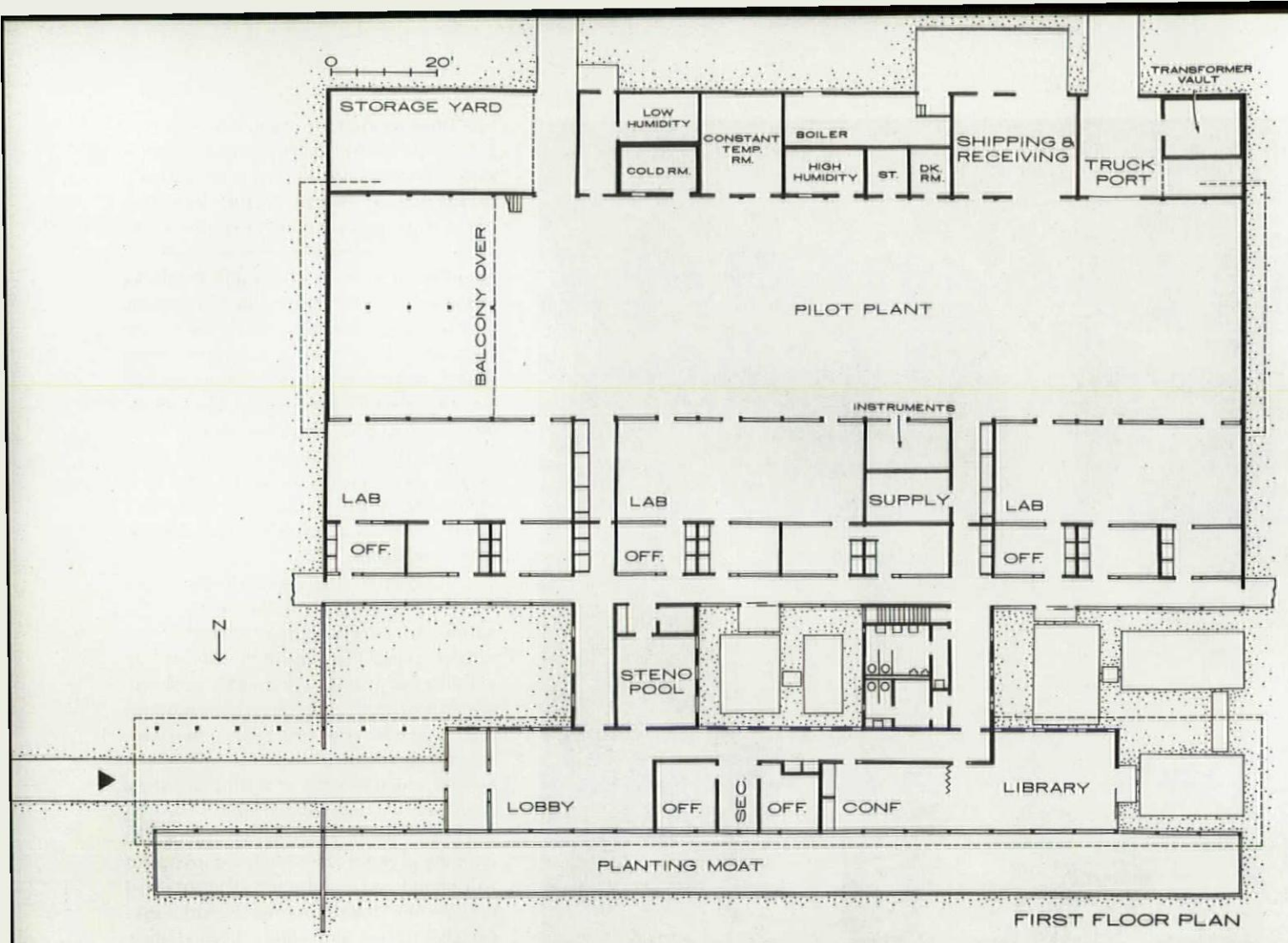
The layout is patterned closely on an organizational chart of the research department. Administrative facilities are ranged along the approach side of the building; a central stenographic pool connects them to the offices and laboratories that form the next two ranks; the laboratories communicate with the pilot plant, beyond which is a row of testing facilities. Any one of these departments can be extended without affecting the others. The ultimate plan for the research department will include a second pilot plant attached to the rear of the testing rooms, with ranks of laboratories and offices beyond them repeating the layout of the first stage in reverse.

The open spaces between the administrative wing and the laboratories have been developed as landscaped courtyards bordered by the glazed corridors. The scientist in his private office can look out through glazed partitions to enjoy the garden on one side and to oversee the activities of his laboratory on the other side, where his assistants are working.

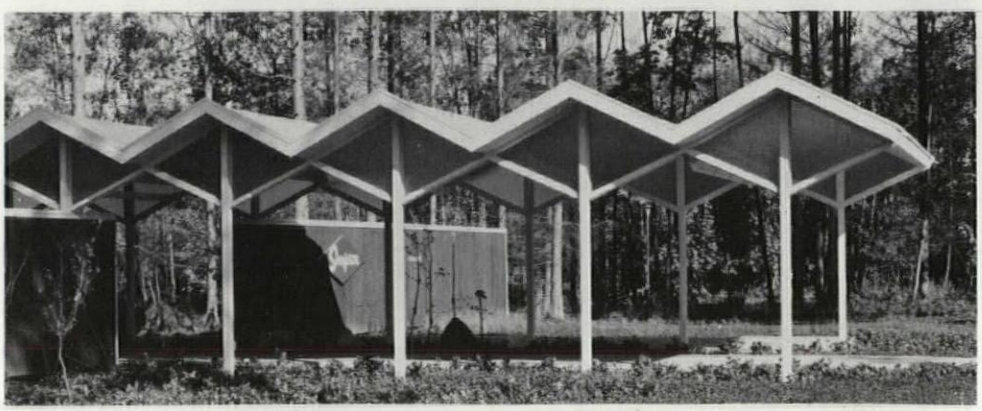
The 4-ft structural module of the building is based on the standard dimensions of plywood. The diamond box beams of the pilot plant are 4 ft high and 8 ft wide, with skins of ½-in. plywood. They will support a 2-ton crane load at the center of their 44-ft clear span. The folded-plate roof construction of the administration building repeats the diamond shape, which is the company's trademark. The exterior walls are clad with redwood plywood and a variety of wood wall panels are used on the interior. Natural wood finishes are used throughout.

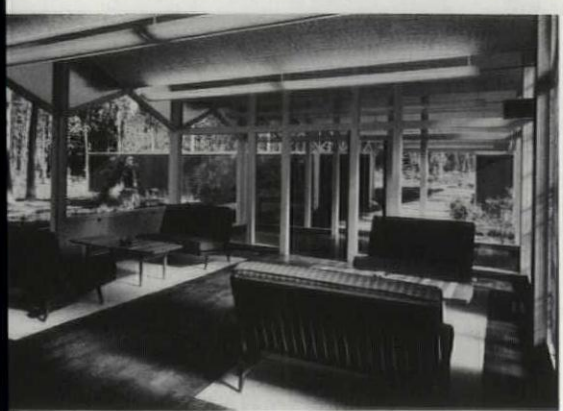
The constant-temperature testing rooms required special construction. Heavily insulated removable panels allow them to be kept at different specified temperatures or consolidated into one large room.

The total cost of the building was $375,000, or $15.17 per sq ft.

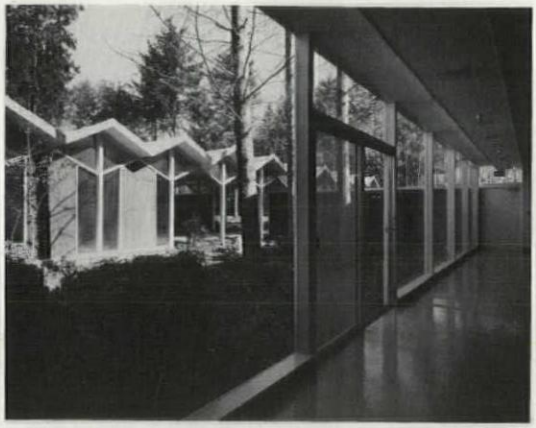


FIRST FLOOR PLAN





The building is approached from a parking area to one side. The entrance canopy (facing page) *is a continuation of the structure of the administration wing. Panels of obscure glass help to express the structural theme, especially when they are illuminated from behind at night. Passing under the canopy and through an opening in the redwood wall, one sees the first of the three landscaped courts* (above) *before entering the glass-walled lobby* (left).



Corridors leading to the laboratory offices provide pleasant views of the interior courts (top). *The laboratories themselves* (above) *communicate with the offices at one end and with the pilot plant at the other. All laboratory tables and cabinets are of natural-finished wood. The conference room* (above left) *has sliding shoji screens, concealing a kitchenette; it overlooks a dry moat* (facing page, top) *landscaped with rocks and gravel. Wood scuppers shed rain water into this moat. The roof structure of the pilot plant* (facing page, bottom) *is composed of diamond-shaped box beams, which can carry a 2-ton crane load.*

Photos: Forde Photographers

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CENTURY 21's COLISEUM ROOF

BY M. L. SHERER

This summer, Century 21's Coliseum will be used mainly for exhibits; when the Exposition closes in the fall, it will serve as a sports arena. Its hyperbolic-paraboloid roof is the primary structural element that will permit both types of occupancy. Construction details of this roof, as well as related engineering considerations, are discussed here.

When Architect Paul Thiry designed the Century 21 Coliseum **(1,2)**, he had a two-fold assignment: to create a theme-setting design in key with the "World of Tomorrow" exhibits that the building will house when Seattle's World's Fair opens next month; and to provide a structure capable of functioning as a sports arena when it becomes a permanent civic center element after the Century 21 Exposition has closed in October. A hyperbolic-paraboloid roof, composed of post-tensioned cables covered with insulated aluminum panels, helped Thiry to achieve these requirements.

Edge Beams

The Coliseum is a square building, 400' x 400', covering almost four acres of unobstructed space. With no interior supports, the roof is carried by four three-legged abutments, each resisting the thrust of one of the four 170,000-lb compressive roof trusses. Hollow triangular-shaped edge beams, 30' wide and pitched to continue the curve of the roof **(2)**, are also supported by these abutments. The character of this design made the analysis of forces extremely complex, and considerable study went into positioning the post-tensioned cables to satisfy the resulting moments. The BBRV system of post-tensioned cables was used throughout. Cables composed of ¼" high-tensile steel wires were button-headed into a threaded anchor head and secured by a lock nut that is tightened after jacking, thus providing a positive anchorage with no loss of prestress.

In the longitudinal walls of the edge beams, the engineers positioned 12 draped post-tensioned cables, each made up of approximately 2 sq. in. of high-tensile steel stressed to 283 kips each. These cables support the vertical load of the beam itself. Horizontal moments and torsion developed by the stressing of roof cables are resisted by 14 post-tensioned cables located transversely in the edge beams. In the corners, five additional post-tensioned cables were placed to balance the negative moments developed at these locations.

Roof Trusses

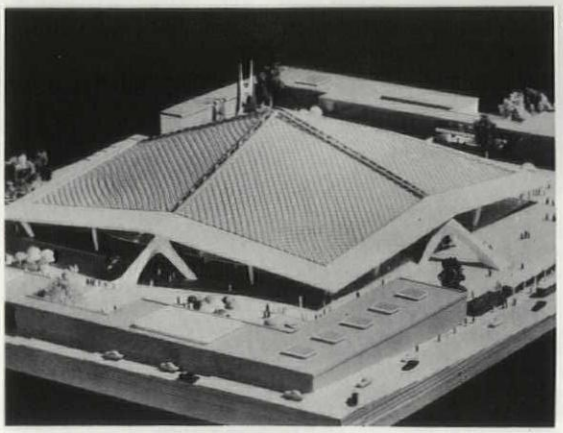
Roof trusses were fabricated in four sections, each weighing about 50,000 lb and having 14 WF 420 structural-steel sections for the main members **(3)**.

At the apex, where the trusses meet, a 12' x 12' monitor will contain broadcasting and television equipment. A housing for four exhaust fans, capable of changing the volume of air in the coliseum every 20 minutes, forms a protection around the monitor.

Engineering Considerations

Before making their computations, the engineers envisioned the roof problem as follows: In the installation of roof cables, the final aim will be to position and stress the cables so that when the maximum live load of 25 psi is applied, the hold-down cables will have a residual stress of between 5000 and 7500 lb and will not become slack. (This maximum live-load condition is never expected to obtain.)

Moment distribution in the edge beam was made difficult by the changing condi-



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tions at various stages of construction and the stressing of post-tensioned cables **(4,5)**. Because of the varying sectional properties of the edge beam, torsion, and the effect of the interacting systems of cables, precise analysis of every phase was necessary.

Calculations based on the design, no load position, and using known formulas for the hyperbolic paraboloid, determined the initial erection position of the main cables and the stress required in the hold-down cables. The theoretical values thus calculated had to be modified by such factors as friction loss at anchorages, loss through edge beam, and loss over the main cables. These losses were in some cases as large as 38 per cent. Also to be considered were deviations from design dimensions in the beams and trusses, effect of temperature change, varying stress in previously stressed cables as each additional cable was stressed, and deformation of trusses under varying loadings.

Roof Components

As support for the roof's surface, 29,700 lineal feet of 1½" and 2" diameter cables were laced from the trusses to the edge beams. Each quarter section of the roof has 29 main cables to form a parabola, with one end anchored at the truss and the other inside the edge beam. Each of these cables is made up of 35, ¼" high-tensile galvanized wires. Thirty hold-down cables, each composed of 20, ¼" wires, run from truss to truss and edge beam to edge beam forming the hyperbola of the roof. The shape of the cables is not an arc or curve, but a series of planes tangent to the curve. Thus when a load is applied to the hold-down cables, they tend to flatten out, engaging the main cables to take up part of the burden. When the load slackens off, the hold-down cables are released and the main cables then go back to their original tension.

The Coliseum roof consists of 4000 4' x 8' aluminum sandwich panels with a 2" core of Styrofoam FR, Dow Chemical Company's flame-retardant expanded polystyrene. These sealed units, with an acoustical baffle attached, are secured to the cables with aluminum extrusions in such a manner that the joints between adjacent panels are flexible.

At each intersection of the main and hold-down cables, special tie-down clamps are installed **(6)**. Secured to the top of these clamps is a continuous aluminum extrusion on which the edges of two adjacent panels rest. To attach these panels, an aluminum batten is placed over the top and secured with self-cutting steel bolts on 1' centers. To make a watertight joint, flexible plastic flashing is used beneath the battens. Also, a strip of 1/16" tape covers the area of each panel where the batten contacts it, thereby preventing undue wear or noise as the joint flexes. At the intermediate points where there is no cable intersection, hence no cable hold-down clamp, a special fixture is crimped on the hold-down cable in order to provide a base for the extrusion.

Panel Considerations

"Engineering for the Coliseum," said Thiry, "was a marked challenge, necessitating a drastic departure from all existing design concepts and conventional building components." He added that "Since this is the first structure to use panels of aluminum and expanded polystyrene on a cable grid, little technical information was available, requiring a great deal of research to determine the capabilities of this new building material."

In designing the panel, first consideration went to the insulation, an important factor in view of the vast expanse of the building's interior. Settling on expanded polystyrene because of its excellent permanent insulation value, structural qual-

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ities, and flame-retardant characteristics, the designers created a panel with a .05" aluminum top sheet, a .032" bottom sheet, and a 1/16" channel which seals the 2" insulation core while adding rigidity to the panel (7,8).

Another complicating factor in the engineering of the Coliseum was that of determining the amount of loading to which the roof would be subjected. To obtain a picture of true conditions, a scale model of the Coliseum was tested in the University of Washington's wind tunnel to study the reaction of the roof design to various wind velocities. Due to the unusual shape of the roof, a variety of conditions resulted, the most extreme being a 46 psi uplift on one corner of the roof. The result of the wind tunnel studies was to verify the feasibility of the roof design, which permits a 2' flex under extreme conditions of wind or snow.

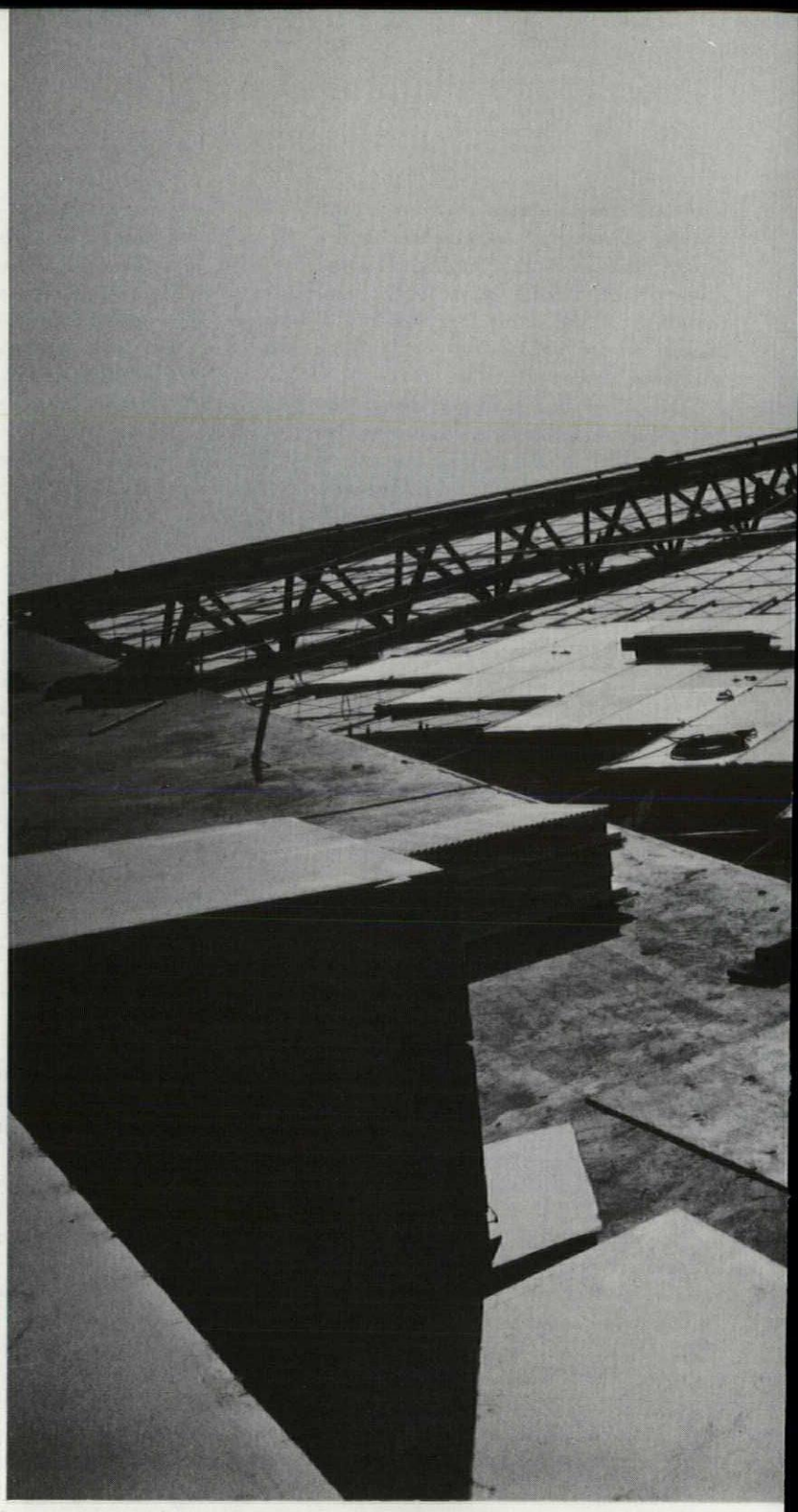
Although the possibilities of water leakage from rain or condensation are very slight, extra protection is given by a gutter built into the aluminum extrusion that carries moisture down to a collecting point where it terminates in a large drain cast in the concrete edge beam. The runoff is then channeled into a V-support at the corner of the building and carried into an underground drain without once being visible. To make the junction between four adjoining panels watertight, a star-shaped piece of flexible plastic was used to seal the joints where extruded members meet, with other passages being sealed off with a polysulfide sealing compound.

Conclusion

Reviewing the design of the Coliseum, Thiry said, "The development of adequate cable-stringing machinery and the availability of aluminum and expanded-polystyrene panels will make even larger structures of this type possible." As an example, he pointed out that original plans called for the Coliseum walls to be 600' in length, instead of the present 360' measurement. "The larger dimension presented no structural difficulties," Thiry pointed out, adding that "it was reduced only because of space limitations at the Fair site."

Credits

Peter H. Hostmark & Associates, Structural Enginers; Andersen, Bjornstad & Kane, Consulting Engineers for the beams and roof cables; Joseph T. Ryerson & Son, Inc., roof cables; Reynolds Metals Company, roof panels.



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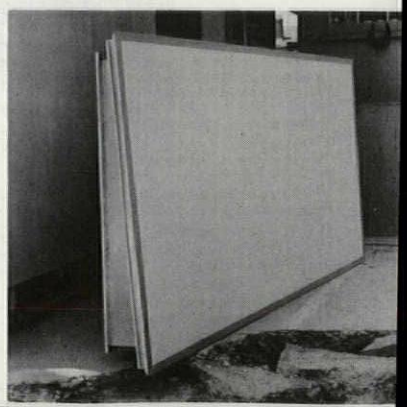

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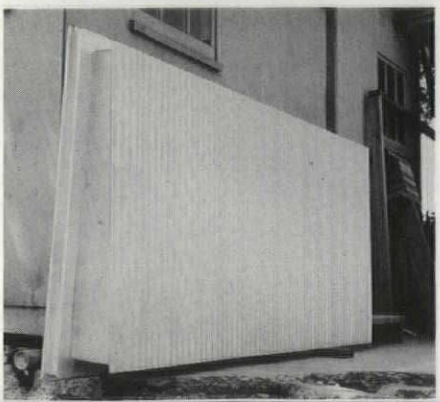


Simple Models for Structural Analysis

BY WILLIAM ZUK

Exact mathematical analysis of many structural forms is immensely complex. The use of simple models of cardboard and wire, made in the office, can often yield quantitative results quickly and with surprising accuracy. Models of this kind, and how they can simplify structural analysis, are described by a Professor of Civil Engineering at the University of Virginia.

A bold new structural form suddenly germinates in the mind of the intuitive designer; with a mounting sense of excitement, he makes a sketch of it. A moment later, his face saddens as he soberly realizes that it would require the genius of an Einstein to stress-analyze his creation, and the inspiring form that might have been is crushed and banished to the round file.

This designer gave up too soon. It is true that the exact mathematical analysis of many structural forms is immensely complex, with many still waiting for unknown solutions. This fact, however, did not stop the builders of S. Sophia, or Notre Dame; it did not stop Maillart, Nervi, or Torroja. Indeed, it does not even stop the builders of our modern, complex airplanes and missiles. For them, lack of adequate mathematical analysis means only that *model analysis* must be employed. For sake of economy, scale-model techniques are generally used, but occasionally full-scale prototypes are tested. Model testing, too, may be gruesomely complex; however, there are a number of simple "table-top" or "do-it-yourself" models of cardboard or wire that can readily be made in any office that will yield quantitative results in a matter of minutes and with surprising accuracy.

Elastic Torsion

To begin with something childishly easy, let us consider what can be done with soap bubbles and a pile of sand. Professor Prandtl, in 1903, observed that the basic equations controlling elastic torsion in a member (as a steel spandrel beam with an off-center load) are the same as those of a soap film blown up on one side by a small pressure of air. With precise laboratory equipment, this exact condition may, of course, be simulated. However, for "table top" use, a simpler situation will de described.

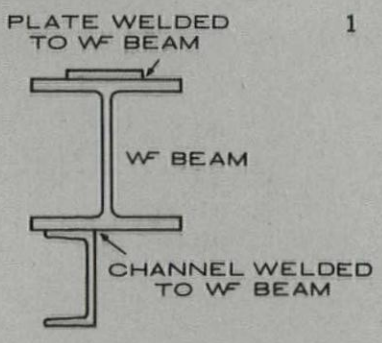
Consider as an example the irregular beam cross-section shown (1). No handbook would dare give the torsional shearing stresses for this odd a shape.

Proceed, therefore, by cutting out this shape—full scale—in a piece of plywood and next to it (for calibration) a circular hole several inches in diameter. Over these cut-outs, gently stretch a piece of thin rubber sheet (obtainable at a drugstore). Then pour some wet plaster of paris over the sheet for a uniform depth of one or two inches. When the plaster hardens, gently remove the cast, and on the bottom side there should appear a cast of the beam and the hole, bulging somewhat as shown (2). Theory has it that the *volume* of this bulge is proportional to the elastic *torque*, and that the *slope* at any point on the bulge is proportional to the elastic shearing or torsional *stress*. Exact slopes may be a bit hard to measure without good instruments, but this is no reason to smash the plaster cast in disgust, since by letting light shadows fall gently on the surface of the bulge, one can easily determine by visual inspection at least where the largest slopes are. These positions indicate where the torsional stresses are the largest. (For those determined to pursue these stresses quantitatively to the bitter end, the following reference is suggested: *An Introduction to Experimental Stress Analysis*, by G. H. Lee, John Wiley & Sons, N. Y., 1950.)

The volume of these bulges may be obtained in several ways. However, one suggested method is to make a reverse cast of the original cast by another plaster overpour, with an oil or wax coating between. Since the second cast will have concave depressions, these depressions (after coating with oil or wax) may be filled with water. As the weight of water is proportional to the volume, the weights of these quantities of water represent the respective volumes of the beam and circle bulges. To obtain a quantitative answer, first evaluate K as determined from the calibration circle,

$$K = \frac{\pi S d^3}{16 W_o}$$

where S is the allowable torsional shearing stress, d is the diameter of the circle, and W_o is the weight of the water of the circular shape. (Note: One must be careful to be consistent with units, such as pounds, inches, etc.) The maximum allow-



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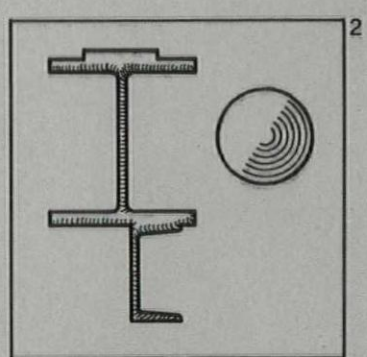

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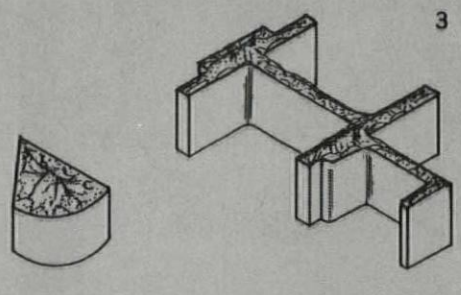

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able elastic torque for the irregular beam shape would then be merely,

$$T = K W_b$$

where W_b is the weight of the water of the beam shape.

Plastic Torsion

Whereas soap bubbles predict the elastic behavior in torsion, a pile of sand predicts the behavior plastically, i.e., at the ultimate collapse condition.

As an example, consider the same irregular beam as before. For this experiment, obtain an actual section of this beam (several inches long), a circular object several inches long and several inches in diameter (used again for calibration), and some dry sand. Gently sprinkle the sand on the two shapes so as to form heaps with straight sloping sides and sharp peaks **(3)**. (Let the waste sand spill on the floor.) After separately weighing the sand heaps on the two shapes, compute the plastic calibration constant,

$$K_p = \frac{\pi (S_p)\ d^3}{12\ W_o}$$

where S_p is the plastic yield stress of the material, d is the diameter of the circular shape, and W_o is the weight of the sand on the circular shape.

The ultimate or collapse torque on the beam section would then be, strangely but truly,

$$T_p = (K_p)\ W_b$$

where W_b is the weight of the sand heap on the beam shape.

Continuous Beams

Although the analysis of continuous beams may be obtained mathematically without too much difficulty by a method such as "moment-distribution," model analysis would have a place where loads and support conditions are perhaps not yet fixed and optimization is being sought. At any rate, a model study may be made quickly with only a straight piece of wire (⅛" brazing rods are easily obtained from welding shops) and some tacks. Consider the beam shown **(4)**. To proceed, lay out the wire on a sheet of paper with tacks for the supports located at some reduced scale. Disregard all loads for the time being. Next displace support A some small distance (d_a), such as ½" or 1", taking care not to permanently deform the wire. Then trace with a pencil the bent configuration of the wire **(5)**. This is called an influence line.

The reaction at A of the beam **(4)** is then obtained by a summation of the product of the load times its ordinate on the influence line as follows, noting that d_2 is in the minus, or downward, direction:

$$R_A = \frac{(P_1 \times d_1) - (P_2 \times d_2) + (P_3 \times d_3)}{d_a}$$

To find the beam reaction at support C, the same wire is deformed by distorting position C some small value (d_c), as in **(6)**. Thus,

$$R_C = \frac{(P_1 \times d_1) + (P_2 \times d_2) - (P_3 \times d_3)}{d_c}$$

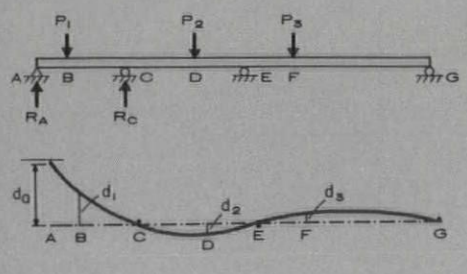
Should any confusion arise regarding the (+) or (—) signs, the model provides a positive check, as it can easily be observed that when a finger load is applied at F, for example, the beam lifts up at C, indicating an uplift force or negative reaction. Should uniform loads be encountered, these may be considered for all practical purposes as a series of closely spaced, concentrated loads. For example, a load of 2000 lb/ft may be treated as concentrated loads of 2000 lb positioned 1' apart; or if less accuracy is called for, 4000 lb every 2'.

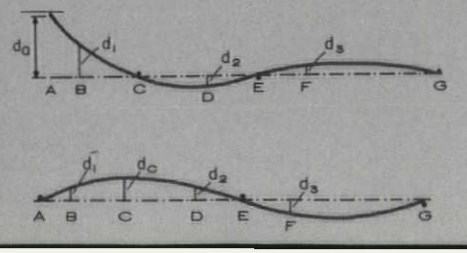
Once the redundant reactions are found by model analysis, the determination of the other reactions, moments, shears, etc., is only a matter of familiar static equilibrium equations.

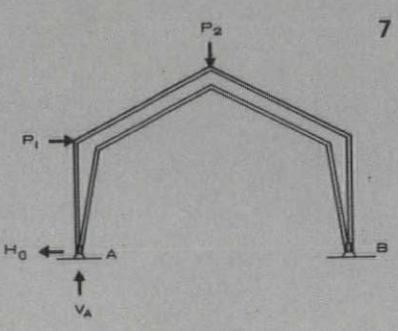
Many more interesting and exotic possibilities of wire models may be found in "Quick, Inexpensive and Accurate Wire Models" by R. L. Sanks, *Civil Engineering Magazine*, April 1960.

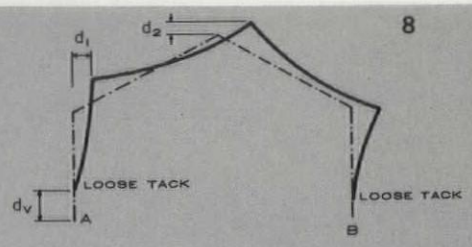
Rigid Frames and Arches

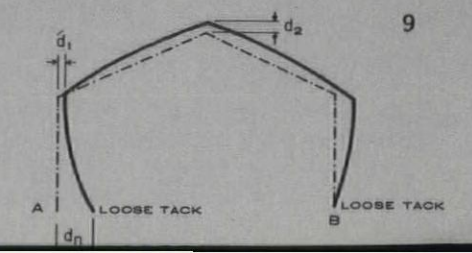
The same model principles apply to frames as to continuous beams, with certain additions. First, a rigid frame or arch usually has a variable cross-section. This requires that the model wire stiffness be made proportional to prototype member stiffness. Sometimes this may be done by a lucky choice of changes in wire sizes. More generally, the model would more easily be made of stiff cardboard, cut out with the width of the cardboard member some constant proportion of the cube root of the moment of inertia of the prototype member. The model, of course, should also be made to some geometrically











scaled-down factor for study convenience.

A second consideration when working with frames, a problem not encountered in beams, is that the reactions of frames have several components of forces with, perhaps, a moment. Consider, as an example, the pin-ended rigid frame of steel **(7)**. The scaled-down cardboard model would be made (noting that the widths of the model members may not be exactly proportional to the prototype members) and fastened to a board with loose tacks at A and B to simulate hinges. To determine V_a, displace model point A *vertically* some distance (d_v) and trace out the resulting influence line **(8)**. V_a would then yield the following equation, remembering the finger-loading rule for (+) or (—) signs as discussed before:

$$V_a = \frac{-(P_1 \times d_1) + (P_2 \times d_2)}{d_v}$$

Note that the distances (d) are always measured in the direction of the applied load.

Similarly H_a is obtained by displacing the model A *horizontally* some small distance (d_h). From the resulting influence line **(9)**,

$$H_a = \frac{(P_1 \times d_1) - (P_2 \times d_2)}{d_h}$$

From here on, computing the reactions at B and the moments and shears throughout the frame is again a simple matter of statics.

Should the rigid frame have fixed ends, moment reactions would also have to be found. The basic procedure is the same, except that the reaction where the moment is to be found is given a small *rotation* (no vertical or horizontal movement) and the resulting influence line is then traced. The end moment is then determined by the relation,

$$M = \frac{\pm(P_1 \times d_1) \pm (P_2 \times d_2) \pm \dots}{\theta} \times \frac{L}{L_m}$$

where L is the over-all prototype length, L_m is the model length, and θ is in radians (1 radian = 57.3°). Note that a proportionality scale factor enters this equation, as moments involve a moment arm or length unit.

Slabs

The elastic analytical solution of flat plates or slabs is a complex one involving a fourth-order partial differential equation, which gives even mathematicians gray hairs to solve. Although possible, model methods are hardly much easier, and certainly too complex to be treated as "table-top" methods.

Strange as it may seem, it is really easier to find the ultimate plastic collapse solution than the elastic, particularly for irregular shapes and loads. Historically, collapse analysis preceded elastic analysis by many years, yet it was ignored until fairly recently. (For additional discussion, see "Origins of Structural Laws," JULY 1961 P/A, by the author.) Because of the "newness" of the subject, a few words on collapse analysis may be appropriate.

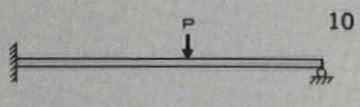
By way of explanation, consider what happens to a typical *beam* as shown **(10)**. As the load is increased, the internal beam material strains beyond its yield level, causing large rotations in the highly strained regions. A diagram of the bending moment-rotation relation would appear as **(11)**. Note that the bending moment reaches a limiting value called M_u. For reinforced concrete, the numerical determination of this value is explained in the current American Concrete Institute Codes.

For the beam in question, these large rotations or "plastic hinges" form at regions of high initial stress and then spread to other positions, eventually forming a collapse mechanism **(12)**, with the internal moment at the hinges equal to M_u. By equating the external work with the internal work during this collapsing phase, the following relation is obtained,

$$P \times d = (M_u \times \theta_1) + (M_u \times \theta_2)$$

since d and θ are found from geometry, the ultimate collapse load (P) may thus be determined.

Collapse mechanisms for *slabs* have been observed to fail in a similar manner. Plastic hinges are initiated at regions of high moment, and then propagate toward the edges in straight lines. For example, consider the irregular, simply supported slab with a concentrated load **(13)**. The hinge forms at or near the load and spreads to the edges, so that the flat segments rotate on the supports that are articulated along the diagonal yield or failure lines. If the load had been uniform, the yield lines would have formed in the



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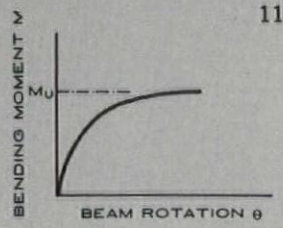

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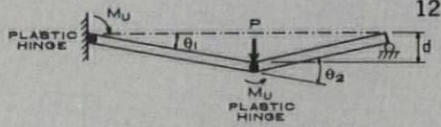

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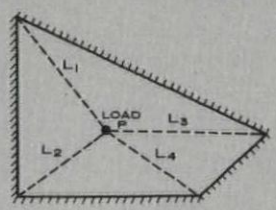

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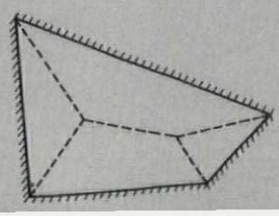


14

manner that is illustrated **(14)**.

Proceeding now with some cardboard and a pair of scissors, snip up the cardboard to some reduced scale of the slab, cutting along the yield lines. Then tape the result together in the *yielded* position, with kinks at the failure lines. An energy balance may then be written as follows, using **(13)** as the example,

$$P \times d = M_u(L_1\,\theta_1 + L_2\,\theta_2 + L_3\,\theta_3 + L_4\,\theta_4)$$

where d is the model deflection at the load position, L the length along the yield lines on the model, and θ the angle in radians between the yielded plate segments measured perpendicular to the yield line. Thus the collapse load (P) may be quantitatively determined.

There is, however, one catch to this approach: that is, just how do you know where the yield lines will form? One circumvents this obstacle as follows: first, intuitively assume some reasonable pattern consistent with the support conditions; next, determine for this pattern the collapse load as described; then, assuming a modified yield pattern, repeat the whole procedure and determine a new collapse load. This procedure may be repeated as long as one's patience holds out. The correct yield pattern will then be the one which minimizes the collapse load, thus giving you the correct ultimate load.

Nonquantitative Models

The model-analysis methods presented thus far represent some of the more easily executed ones. Many more—although generally more complex ones—are available for use by architects and engineers. The latter, however, require rather highly specialized equipment and skills available only at special research laboratories or universities.

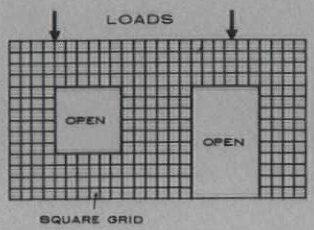
Before finishing our discussion of the subject, however, the use of structural models for nonquantitative purposes should be mentioned. Virtually every designer has at one time or another folded a piece of paper to simulate folded-plate action, or made a space frame of wooden sticks to test its integrity. Such *ad hoc* models give the designer a "feel" of the structure. He uses it to sense whether the structure is flexible or rigid. By pushing it here, or twisting it there, he sees which component gives and which one needs strengthening. Such models, also, have a vital place in a design office and are limited only by one's ingenuity.

With a little refinement, these nonquantitative models can sometimes be made to yield a bit more information than they would otherwise. As an example, consider a load-bearing wall with several cut-outs for windows and doors **(15)**. A conscientious designer would wonder what manner of stress concentrations these cut-outs would create, and how much load each lintel would take. Perhaps a sketch of the wall with a graphic pattern of stress flow lines intuitively superimposed may satisfy. (See "Intuitive Design of Structures," AUGUST 1960 P/A, by the author.) However, with only a bit more effort, specific information on the nature of the stresses may be obtained.

It is only necessary to get a small block of rubber of wall proportions, cut out the appropriate openings, and rule on the surface a grid of small squares as shown **(15)**. Then, applying forces by hand, one can graphically see local strains at work. Tolerating small errors due to Poisson's Ratio (lateral strain caused by longitudinal strain), one can evaluate the corresponding stresses by noting the distortion of each of the original squares (shown in **(16)** as dashed lines) necessary to cause these strains. It is obvious that the larger the distortion, the larger the stress. Thus the entire stress distribution of the wall may be mapped out, allowing not only the relative magnitude of the stress to be determined, but also the nature of the stress, i.e., tension, compression, or shear.

Summary

In summary, it is thus apparent that all model studies need not, by any means, involve delicate, tedious, and expensive work; for many situations need only quickly made models to supply reasonably accurate answers. Model studies become particularly useful when the loading or structural form is irregular, which takes it beyond the pale of standard analytical analysis. Such designers as Nervi and Torroja have made extensive use of models in creating their unique structures, and a basic understanding of model analysis could well promote confidence in the use of more daring and experimental structural configurations. At least in preliminary design, exact mathematical analysis is not a required tool for study.



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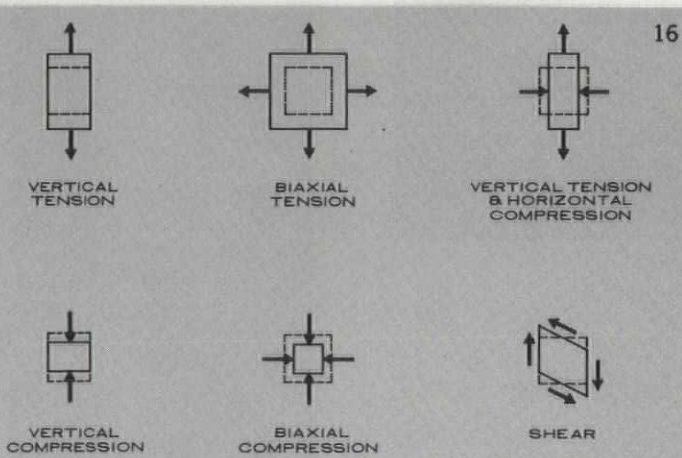

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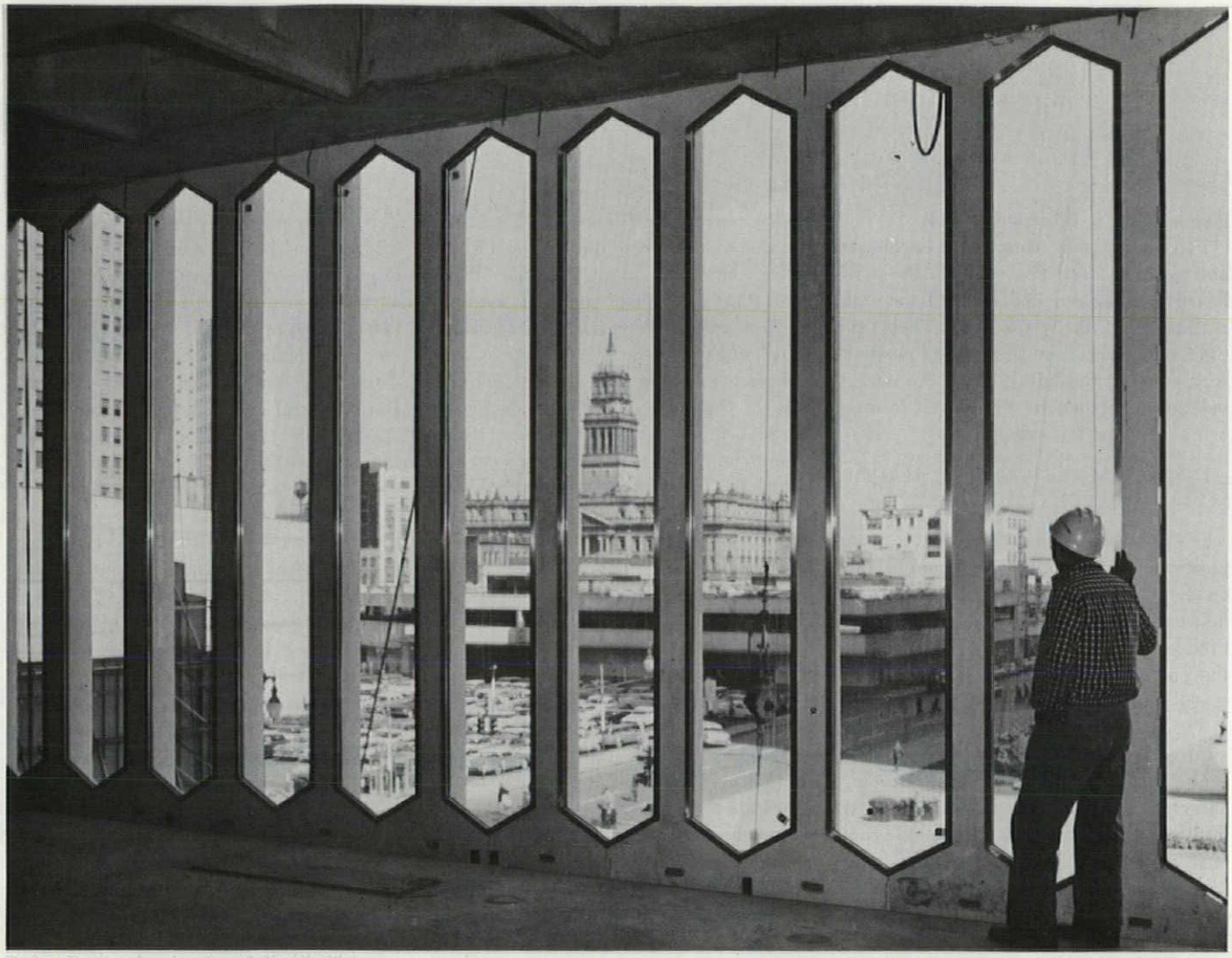

Photos: Courtesy American Iron & Steel Institute

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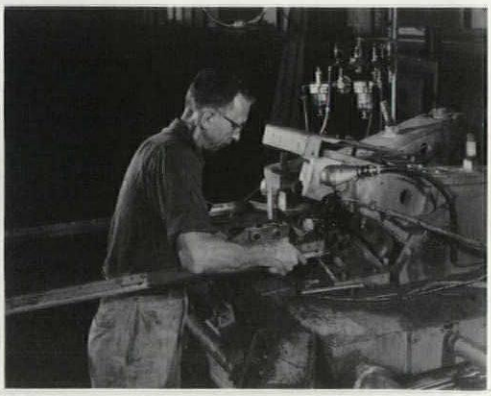

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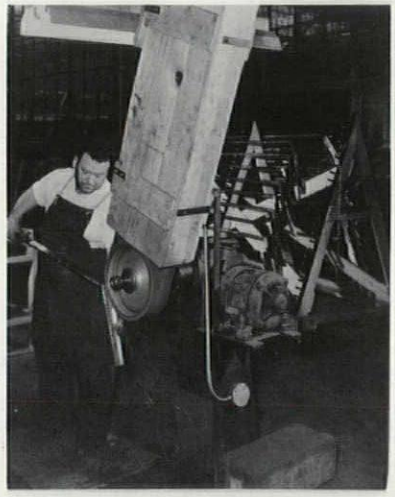

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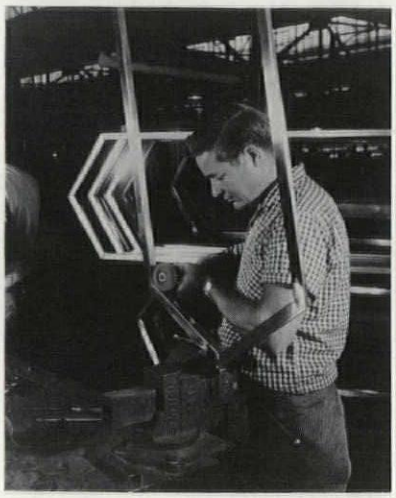

YAMA'S LANCET WINDOWS:
Fabrication and Installation

Report on the success with which a fabrication process and a material met unique architectural requirements through careful detailing and inventive manufacturing.

The 4800 slender hexagonal windows of Detroit's new Michigan Consolidated Gas Building (by Architects Minoru Yamasaki and Smith, Hinchman & Grylls) are noteworthy in ways other than visual. Using a new bending operation early in the fabrication process, which eliminated much welding of the stainless-steel frames, the windows were produced at 10 per cent under the cost of aluminum units. Further dividends derived from the simple installation, made possible by specially designed clamps.

Manufacture of the windows began by roll-forming the two basic sections—main frame and snap-on interior trim. Both were progressively die-formed and cut to length by Van Huffel Tube Corporation; the main frame was prepunched to receive installation clamps. Transported to the Adams & Westlake Company plant, the main-frame sections were then bent to an open "C" shape (in a top-secret operation that cannot be revealed at this time). To form the hexagon, two sections were flash-welded top and bottom **(1)**. Fillets were then heliarc-welded at the bends to give a sharp corner, and all weld areas ground and blend-finished **(2)**. The interior-trim section, too slender to permit bending, was flash-welded at all corners **(3)**. Final assembly of the main frame before shipment included neoprene glazing gaskets (making this the first major project with expanded-cell neoprene), and patented pressure clips every 11".

Supported by a jig, the main frame was lifted into place **(4)**, then clamped easily to the curtain-wall panel by a special tool **(5)**. To complete the labor-saving job, frames were glazed with gray-tinted glass **(6)**, and the inner trim snapped over the clamps **(7)**.

4

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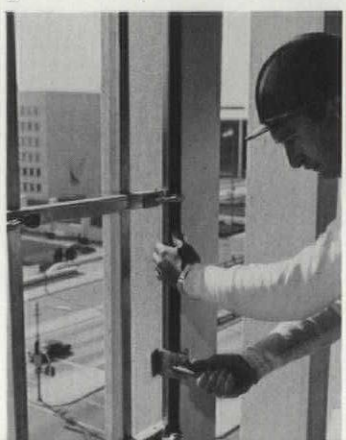

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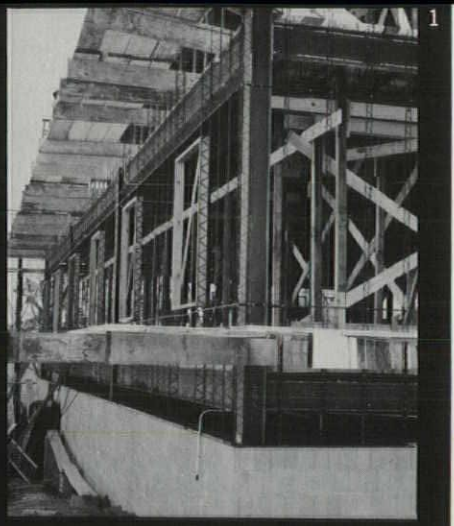

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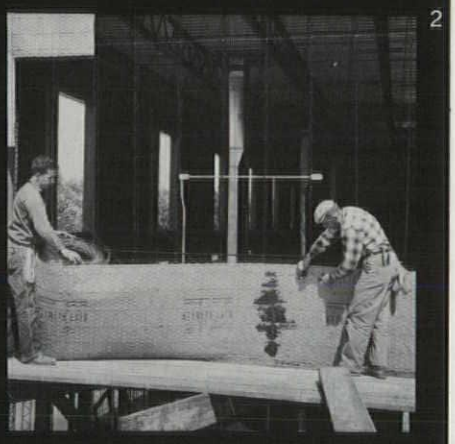

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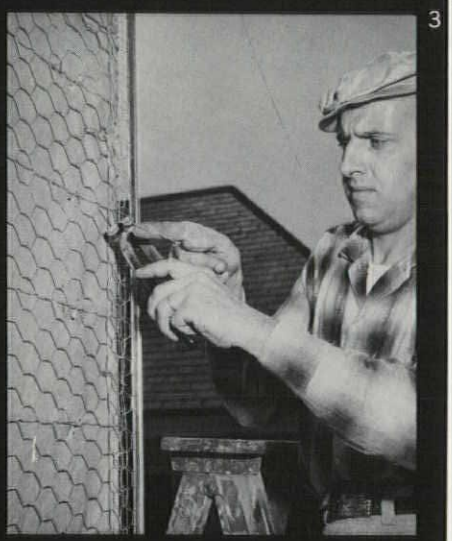

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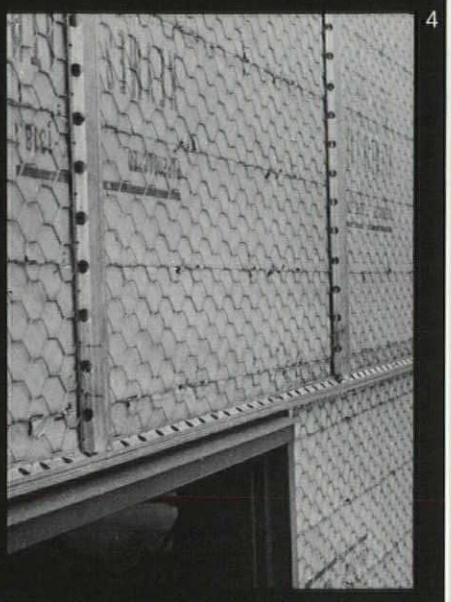

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LOW-COST FIREPROOF WALL

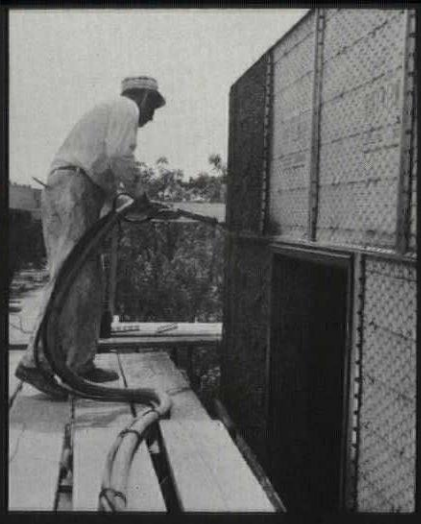
Photos: E. J. Kirwan; Courtesy Keystone Steel & Wire Co.

Report on a rapidly erected, reasonably priced, sprayed-on curtain wall that fulfilled all architectural and state requirements for a hospital addition.

A simple system of metal studs, paper-backed mesh-lath, and a sprayed-on curtain wall specified by Architects Foley, Hackler, Thompson & Lee for the Eureka Hospital Addition, in Eureka, Illinois, not only complied with state regulations that require such a structure to be fireproof, to have the characteristic of permanency, and to provide complete protection against weather, but also satisfied the hospital building corporation as to total cost.

Erection proceded as follows: Wire studs were placed 16″ on centers and extended 24′ from foundation sill to top of building **(1)**. Paper-backed mesh-lath was then unrolled and cut to length **(2)**. Solid, zinc-nosed Z-beads were attached to all outside corners **(3)**. To help form desired pattern of panels, on exterior of structure, expansion-joint screeds were tied to wire studs **(4)**. A ½″-thick scratch and brown coat was next applied by machine-spraying technique **(5)**. Succeeding application was a ⅜″ finish coat consisting of a mixture of white portland cement and pearl-gray marble chips **(6)**. Excess portland cement was removed to reveal embedded marble chips **(7)**. Close-up view shows finished exterior wall which has a minimum thickness of ⅞″ **(8)**.

5



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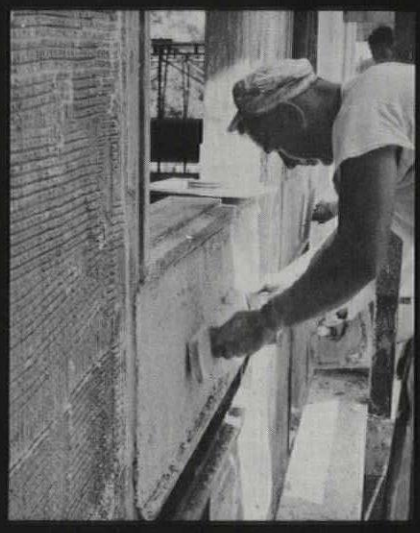

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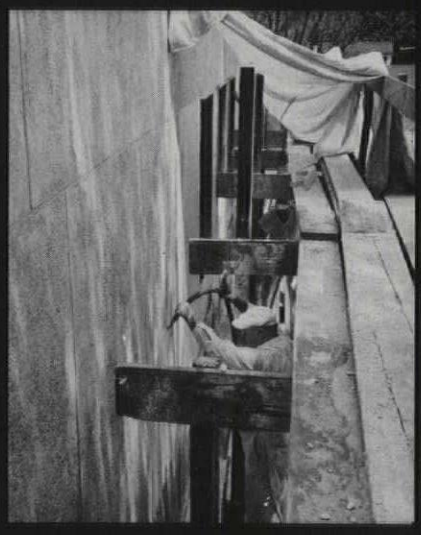

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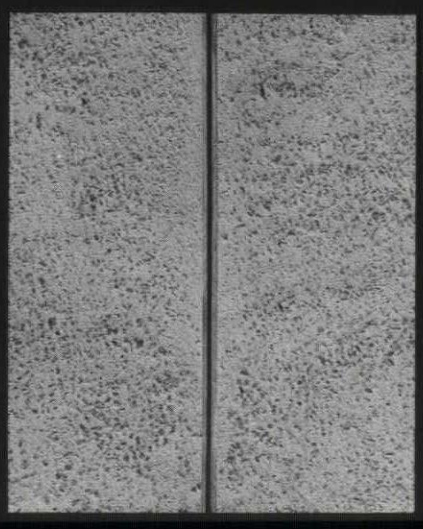
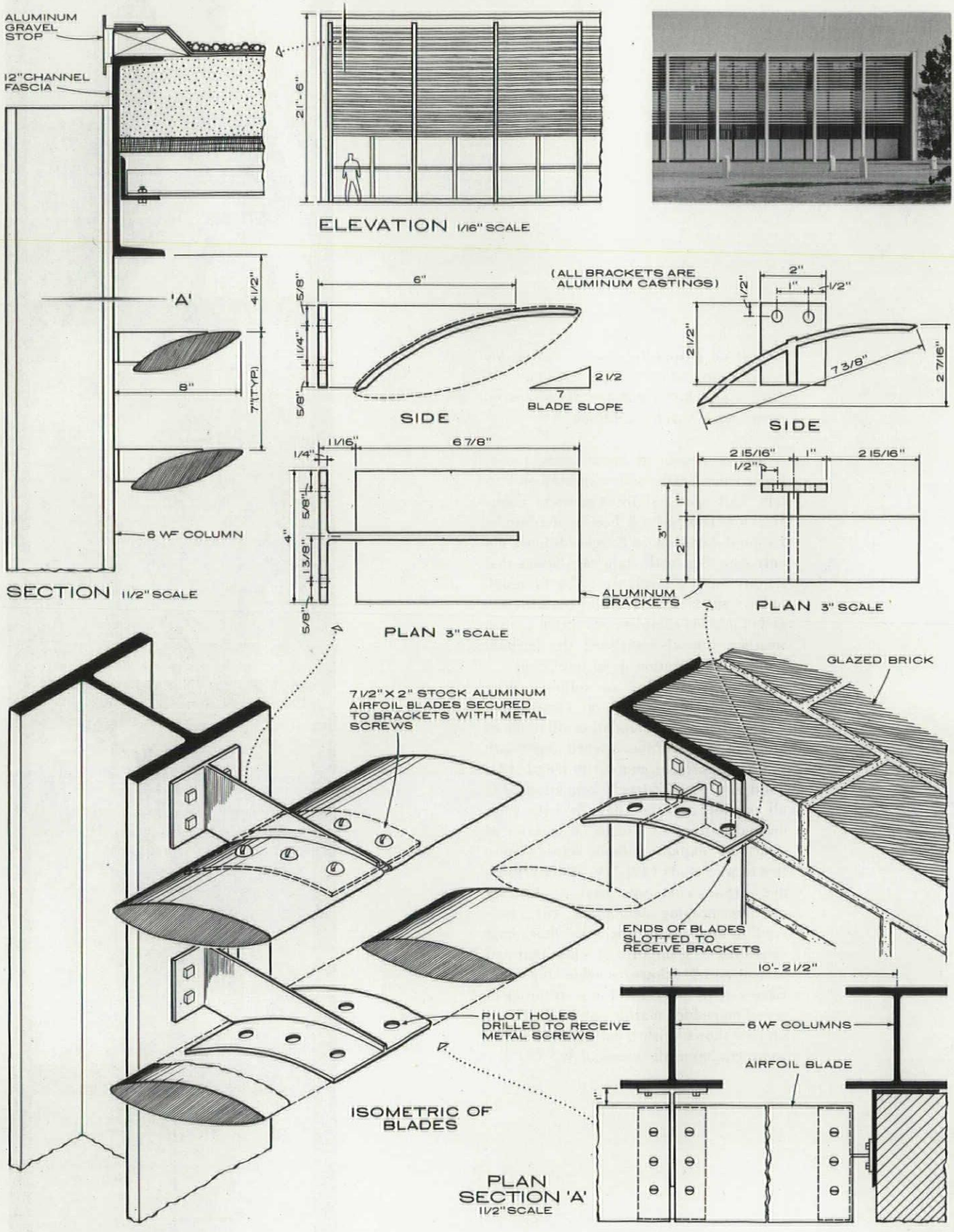
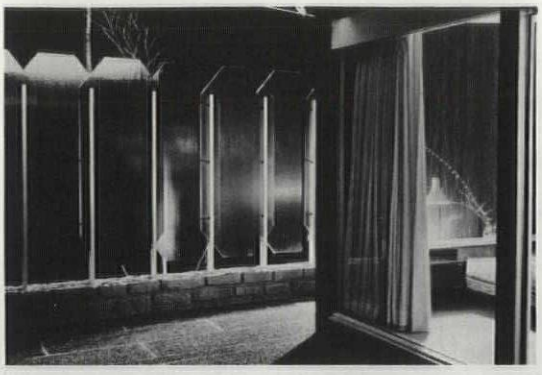




BUILDING FOR SIGNODE STEEL STRAPPING CO.: Glenview, Ill. HAUSNER & MACSAI, Architects	SELECTED DETAIL ALUMINUM SCREEN



* **RESIDENCE:** Grosse Pointe Farms, Michigan
MEATHE, KESSLER & ASSOCIATES, Architects
* See August 1961 P/A

SELECTED DETAIL
GLASS SCREEN

Thermal/Luminous Costs Restudied

BY WILLIAM J. McGUINNESS

Report on a recent paper, which argued in favor of normal fenestration in preference to windowless space with full artificial illumination, is made by a practicing mechanical engineer.

At the recent fall meetings of the Building Research Institute, O. F. Wenzler, Manager of Technical Services for Libbey-Owens-Ford Glass Company, delivered a paper entitled "An Economic Analysis of Integrated Lighting." He proposed a reconsideration of the use of daylight as a partial source of light for offices, where it has been largely disregarded in favor of luminaire systems that provide all lumens needed for the selected intensity at working level. Much of his data was drawn from the results of a research project by Prof. J. W. Griffith of Southern Methodist University. Wenzler made a convincing argument in favor of normal fenestration in preference to the use of windowless space with full artificial lighting. He responded to the growing opinion that, since offices usually provide self-sufficient artificial lighting and air conditioning, it would be an economic advantage to build with cheaper, windowless walls, thereby saving the cost of windows and reducing the solar heat gain with a corresponding reduction in the cost of air-conditioning installation and operation. His conclusions apply with equal validity to schools.

It should be borne in mind that the comparisons made were strictly economic. Utilitarian and aesthetic appraisals may be offered to show that solid walls prevent exterior distractions or that windowless construction is an abomination. The architect and his client, however, must make a final choice on the basis of all three factors: utility, aesthetics, and cost.

The research project studies were very complete, and included all construction and equipment costs and savings; power costs for lighting; interest on investment; maintenance costs of luminaires, windows, and venetian blinds; variations in the heat gain from artificial lighting and daylighting; heat loss through glass; the effects of all thermal values on the cooling and heating systems. These are reflected in the accompanying table. Many tests were made, including the separate performance—for full intensity—of incandescents, fluorescents, and daylight, but final recommendations and appraisals listed in the table were based upon conditions which included the following:

Number of offices	2
Size, each office	20′ x 30′ x 10′ high
Glass, each office	7′ x 30′
Glass orientation	1 east, 1 west
Ceilings	White
Walls	50% reflectance
Intensity	100 ft-c
Location	40° N. latitude
Time (cooling)	July 23
Temperature (winter)	Minus 5 F
Degree days	5000
Energy cost	2½¢/kwhr
Occupancy	2500 hrs/yr
Shading	Venetian blinds
Days overcast	120

In evaluating the separate performance of incandescent, fluorescent, and daylight to achieve 100 ft-c, it was found that incandescents generated too much heat and were too costly to operate for that intensity. Daylight alone, on an overcast day, produced 192 ft-c near windows, 97 in the center, and 57 at the far side of the office. The final decision was to compare a standard fluorescent luminaire system in a windowless office space with daylight integrated with minimal adjunct incandescent or fluorescent support; the artificial light, in each case, to operate for only 1000 hrs/yr as a daytime supplement and for janitorial use at night.

Column 5 shows fluorescent luminaires in windowless offices to be almost twice as costly as either daylight plus incandescent supplement, or daylight plus fluorescent supplement. Interestingly, incandescent is economically comparable when its use is minimal. The use of deluxe fluorescents in more luminaires, to simulate the quality of daylight, plus incandescent, would cost almost three times as much.

Offices (and classrooms) are infrequently used at night, yet some may question the adequacy of the 30 ft-c available at that time. It was not long ago, however, that 40 ft-c was considered adequate for both uses. In spite of convincing research, there are some who question the new high intensities. It cannot be denied that they are expensive.

Finally, the report appears to refute the contention that closing up the glass areas with solid walls will materially reduce the total heat gain. The need for full output lighting adds an electric gain that offsets the reduction in solar gain. Column 4 shows the first three systems to be almost exactly comparable thermally. The deluxe lamp installation of better light-quality but less efficiency shows an increase in thermal cost due to a greater heat gain from the luminaires.

SUMMARY OF NET COSTS, THERMAL AND LUMINOUS, FOR TWO OFFICES

1 Lighting source	2 Illumination intensity at working level	3 Uniform annual cost of illumination	4 Comparative uniform annual cost, heating and cooling	5 Total comparative uniform annual cost of illumination, heating and cooling	6 Present worth of 40 years of service
Daylight and Incandescent	70 Daylight 30 Incandescent 100 Total ft-c	$ 416	$ 352	$ 768	$11,554
Daylight and Standard Fluorescent	70 Daylight 30 Fluorescent 100 Total ft-c	384	356	740	11,137
Fluorescent only, Standard lamps	100 ft-c	1130	350	1480	22,274
Fluorescent only, Deluxe lamps	100 ft-c	1590	466	2056	30,931

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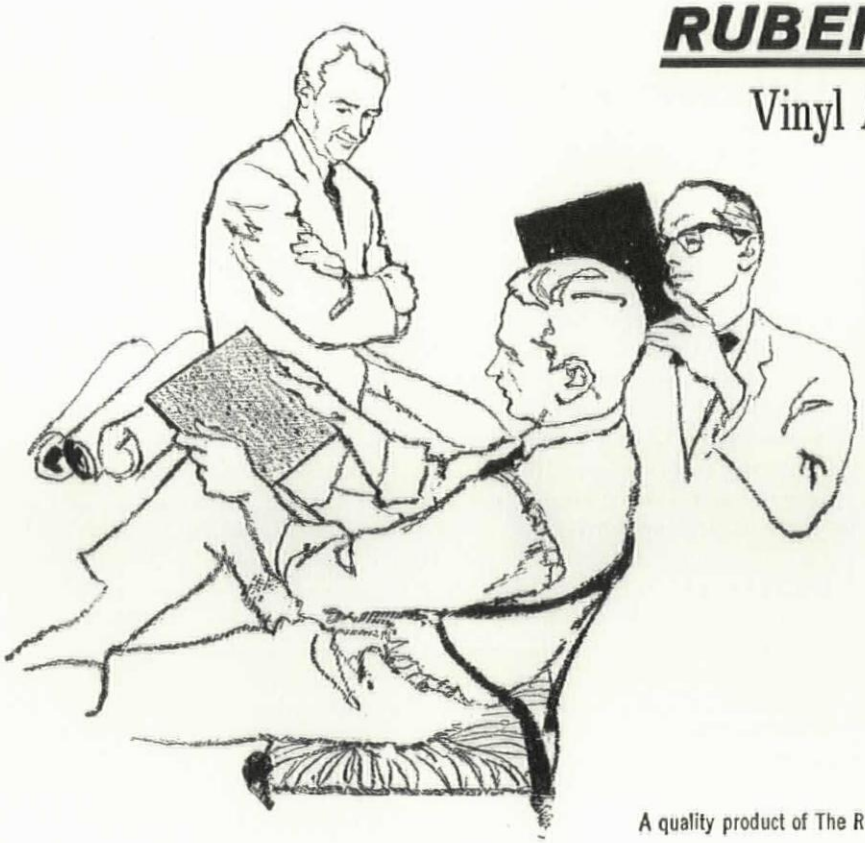

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Legal Responsibilities In Practice

BY HAROLD J. ROSEN

An architect's responsibility for the selection and application of materials, and what to consider in face of diametrically opposed claims by manufacturers or associations, is discussed by the Chief Specifications Writer of Kelly & Gruzen, Architects-Engineers.

The reader is probably taking a second look at the title of this article to make certain that he is reading the SPECIFICATIONS CLINIC column and not IT'S THE LAW. However, a recent article on professional liability and responsibility of architects, contained in a document entitled "Legal Responsibilities in the Practice of Architecture and Engineering," by John R. Clark, and published by the AIA and the Engineers Joint Council, closely concerns the specifications writer. It deals with his use of materials and the manner in which he specifies them, inasmuch as his selection may lead him into legal difficulties.

Paragraph "O" of this document deals with materials and equipment, and the problems associated with them that may lead to claims against the architect for professional negligence. Several examples are given to illustrate the architect's responsibility for selection and application of material. In addition, several court decisions are cited which indicate that (1) the architect is responsible for proper selection and application of material, and for adequate research; and (2) that reliance on advertising material of a manufacturer or other representations of a manufacturer do not necessarily protect the architect.

The foregoing illustrates the relative legal responsibilities of architects vis-à-vis manufacturers with respect to the selection and application of material.

In the APRIL 1961 P/A, this column reported on a Gypsum Association publication entitled "Performance of Lath and Plaster." The report was based on field observations of suspended plastered ceilings up to 20 sq yd, and the purpose of the Gypsum Association's research was to develop plaster constructions that would provide a high degree of crack resistance. It was found that the principal variables that affected resistance to cracking were the following: (1) types of finish coats; (2) base-coat aggregates; (3) plaster to aggregate ratios; (4) type of lath; and (5) presence or absence of perimeter restraint.

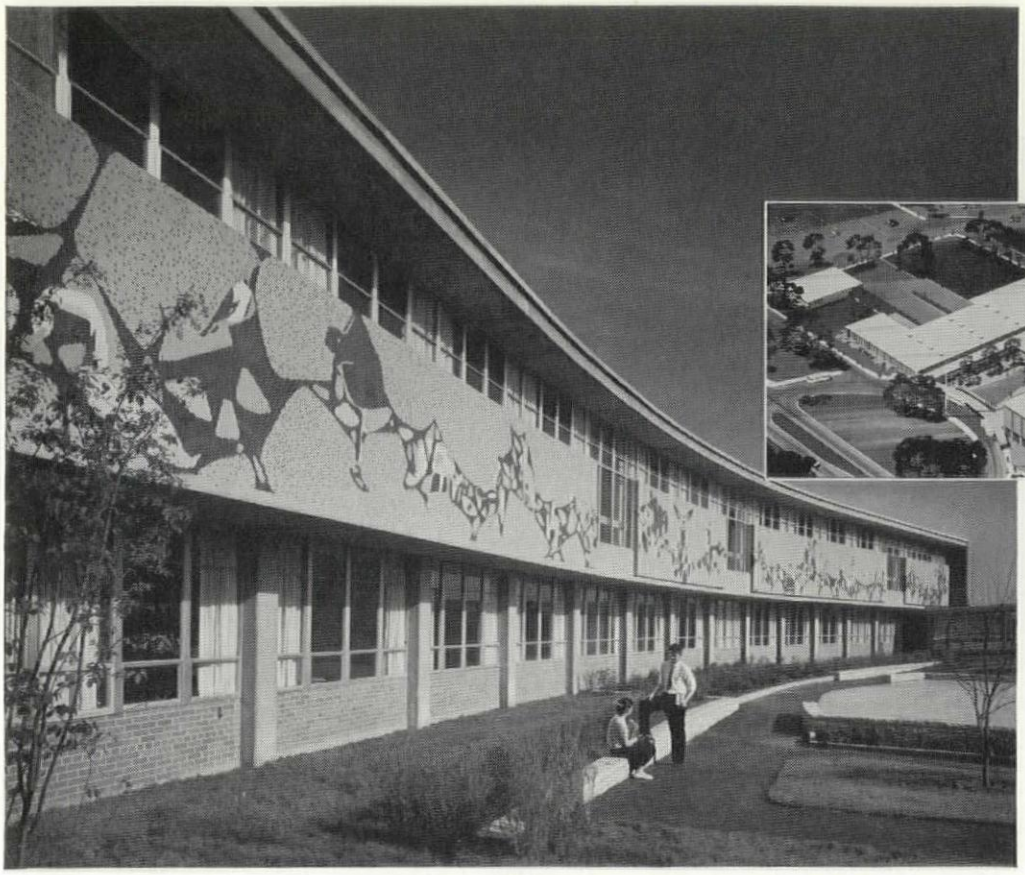
The Gypsum Association report, among other findings, notes that gypsum lath usually provides a higher degree of resistance to cracking than does metal lath, particularly when strengths of base-coat plasters are in the lower range. This item in particular prompted the Metal Lath Association to study the Gypsum Association report to determine the validity of the findings. The Metal Lath Association's study of the Gypsum Association's report suggests that certain judgments and assumptions in the latter's report are not warranted.

The Gypsum Association report is based on a study of 186 ceilings, and the recommendations drawn from this study are intended to provide the designer with information that will enable him to make the proper selection of systems and materials. The architect should support these selections with adequate construction details and definitive specifications. The Metal Lath Association comments, based on a study of the Gypsum Asssociation report, concluded that the latter's findings "contain unsupported, contradictory, and unsubstantiated statements."

The architect's professional liability is still very much involved if he specifies either gypsum lath or metal lath and cracks develop; citing either the Gypsum Association's findings or the Metal Lath Association's comments as a defense does not necessarily clear the architect for improper selection of material and methods of application.

What can the architect do in such a case—where he has primary responsibility, where representations by manufacturers do not usually protect him, and where the findings of two major associations are diametrically opposed?

To begin with, he should read both reports and determine for himself which one has greater validity. He should insist that the various segments of this industry get together and properly test the systems by reliable independent laboratories. He can discuss with his client the relative performance of various plaster systems, and point out the variables which affect cracking; he can indicate how other variables over which he has no control—such as lack of heat and proper ventilation during plastering operations—can affect plaster cracking. He can provide further protection for the owner by specifying special guarantees extending beyond the customary period.



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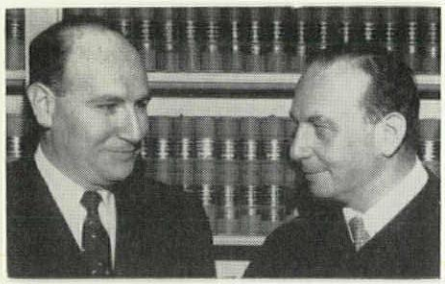

Contract Documents Amended

BY JUDGE BERNARD TOMSON AND NORMAN COPLAN

Nassau County District Court Judge and a New York attorney report on AIA-approved changes in the Contract Documents relating to architectural supervision that seek to protect architects from findings of liability.

The Board of Directors of the American Institute of Architects has approved certain changes in the contract documents relating to architectural supervision. These changes, which were recommended by a committee on "Professional Liability and Responsibility" of the American Institute of Architects and the Engineers' Joint Council, were inspired by the increasing volume of litigation instituted against architects for injury and damage resulting from the alleged failure of the architect to perform his supervisory function properly. Substantial and vocal opposition to these changes has been manifested, and the entire question will be considered before the annual convention of the American Institute of Architects.

The purpose of the amendments to the American Institute of Architects' Contract Documents was to delineate the limited nature of normal architectural supervision, and thereby minimize the danger of broad judicial interpretation of such function and consequent finding of liability. Opponents of these changes have contended that the architectural function has been belittled thereby, and that they offer no real protection against claims of negligent performance.

The 1958 edition of the standard document of the American Institute of Architects for the "General Conditions of the Contract for the Construction of Buildings" provided that "the architect shall have general supervision and direction of the work." The 1958 edition of the Standard Form of Agreement between owner and architect for services rendered on a percentage basis stipulated, in respect to the architect's duties during the construction phase of the work, the following:

"He shall keep the Owner informed of the progress of construction; check and approve schedules and shop drawings for compliance with design; maintain construction accounts; prepare change orders; examine contractors' Applications for Payment; issue Certificates for Payment in amounts approved by him; provide general administration of the construction contracts including period inspections at the site; determine date of substantial completion; make final inspection of the Project; assemble written guarantees required of the contracts; and issue the final Certificate for Payment."

It was the opinion of the joint committee considering revision of the documents that the terms "supervision" and "inspection" were too broad in scope to describe the function of the architect during the construction phase of the project, and that both the owner and the courts could be and were misled by this terminology. The conclusion reached was that reference to "supervision" should be eliminated, and that the architect's activity during the construction phase be described as "observation" rather than "inspection."

Consequently, the 1961 edition of the General Conditions of the contract describes the architect's function during the construction phase, in part, as follows:

"The architect shall be the owner's representative during the construction period, and he shall observe the work in progress on behalf of the owner."

The 1961 edition of the Standard Form of Agreement between owner and architect for furnishing services on a percentage basis stipulates, in respect to the services of the architect during the construction phase, the following:

"The architect will make periodic visits to the site to familiarize himself generally with the progress and quality of the work, and to determine in general if the work is proceeding in accordance with the Contract Documents. He will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work, and he will not be responsible for the contractor's failure to carry out the construction work in accordance with Contract Documents. During such visits, and on the basis of his observations while at the site, he will keep the owner informed of the progress of the work, will endeavor to guard the owner against the defects and deficiencies in the work of contractors and he may condemn work as failing to conform to Contract Documents. Based on such observations and the contractor's Applications for Payment, he will determine the amount owing to the contractor and will issue certificates for payment in such amounts. . . ."

The proponents of the foregoing changes contend that the term "supervision" can mislead the owner or the courts into believing that the architect's appropriate function is to act as an inspector to check all details of the construction work. They argue that the use of the term "inspection" indicates a greater degree of checking and attention than the architect normally expects to furnish.

On the other hand, opponents of these amendments contend that the change in language weakens the position of the architect during the construction period, and it is at this very time that the proper execution of the project requires the architect to function with maximum status. They further argue that the change in language furnishes an illusory protection and that the architect should seek his protection in insurance.

There would seem to be little question that the potential area of architectural liability has been increased by broad judicial interpretation of the architect's responsibility. Whether the language changes in the contract documents discussed above will accomplish the objectives sought can only be determined after the courts have considered and construed the same. Continuing consideration, however, of revision of the standard contract documents to define and limit the services which the architect is expected to furnish are both proper and necessary, and need not affect the architect's status.

The McKinleys chose a hillside

But they didn't want to bulldoze away the charm of their property, high on a hill overlooking Seattle. In designing his own home, David McKinley, an architect, decided on *steel* for the framework that carries the entire living area on a single level. Steel provided strong framing that could be left exposed for what McKinley calls "its sculptural beauty." See how attractive it looks in combination with wood paneling and decking.

Living and family rooms, three bedrooms, 1½ baths, music room, kitchen, and open decks are all on one level. Carport, and McKinley's quiet study are below. Steelwork by Seidelhuber Iron Works. Contractors for an addition to the house were Charles Tuttle and Atlas Iron Works. All are of Seattle.

The McKnews are on the beach

And what a house for enjoying the out-of-doors! Architect Jock McKay designed it with huge window-walls, a sheltered court for sunning, and a unique, "folded-plate" roof. Let the wild winds blow—this house is framed with *steel*. The same design in conventional stud-wall construction would have cost considerably more.

Spacious living room of the twelve-sided home. Three bedrooms, two baths, kitchen, utility area, and enclosed court. Steelwork by Lambrix & Son, San Rafael; structural engineer was David Hammond, Palo Alto; contractor: Bain Construction Co., Larkspur.

These are just two examples of steel-framed homes. Steel is equally suitable for more conventional houses. With steel you can build on that "impossible" lot, and build a house that will stand forever.

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Making a City Work

Dear Editor: I agree with the view you expressed in your "P.S." on "The Nature of Cities" [DECEMBER 1961 P/A] that "the big job ahead is to discover the nature of the city that we can build." Fortunately, the job is so big that it will never be accomplished. We can only build a part of a city at a time, and this is good because it makes our mistakes less serious and our successes less likely to become formulas.

There is — again fortunately — no "client" in the usual sense of the word. There are areas that have to be rebuilt, replacements that have to be made, public works (many of them foolish) that get built. These are for all kinds of people and needs.

No one — again fortunately — knows "how a city works." The "sociologists, professional and amateur," are mostly completely ignorant of the ways of people; certainly they are ignorant of what makes a city alive. They are, at best, skin specialists, not heart specialists. Nor do they know the pleasures of a Rabelaisian fort.

The development of the city is not merely a physical—i.e., three dimensional —matter. Physical form, which is the architect's purpose in life, is largely dependent upon changes in a world of physical non-form; the fluidities of transportation, the gaseous pressures of economics, the mental inconsequentialities of cheap politicians, the failure of a middle-class education to provide adequate appreciation of the tawdry.

I think we worry too much about our cities. We have acquired a magnificent inferiority complex about them. True, they are distinctly *not* "falling apart." This has gotten to be a cliché for the benefit of the speculators and politicians who are using it, together with urban "renewal," as one of the best bets since the palmy days of the railroad land-grabs.

I do not think architects should try to makes cities work better. Nobody, but nobody, knows what is "better or worse" in this reference, or even what is meant by "work."

The architects have a sufficiently great burden of responsibility to produce the best architecture of which they are capable in the best civic setting. That is their job: to produce architecture. We do not ask composers to produce concert halls or paper manufacturers to produce factories.

HENRY S. CHURCHILL
Philadelphia, Pa.

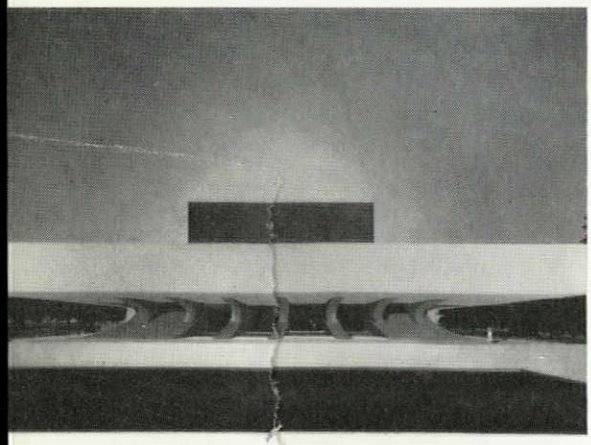
Same Design?

Dear Editor: I have noted in the JANUARY 1962 P/A NEWS REPORT that funds are now being collected for the erection of the Philippine-American Cultural Foundation in Quezon City, a part of Greater Manila, and that the center was designed by Leandro V. Locsin & Associates ***(1)***.

We have design patents covering a combination exhibition hall and planetarium ***(2)***, both of which projects were designed under the auspices of this firm. I think you will agree that there is a very great similarity between these structures and the Locsin center; we have already called this to the attention of both the Philippine-American Cultural Foundation and L. V. Locsin & Associates.

THEODORE J. KAUFFELD
New York, N.Y.

1



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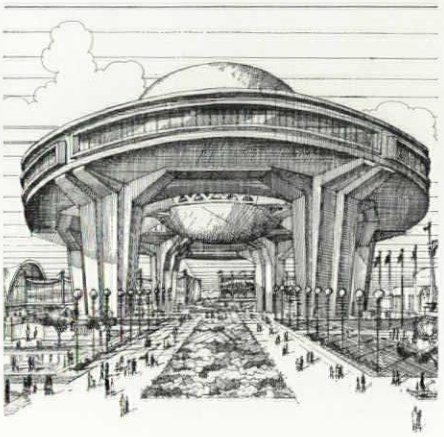

The Outsider As Architect

Dear Editor: Sorry to learn through your "P.S." ["The Outsider"] in the JANUARY 1962 P/A that Walter Jan Duschinsky has died. If you recall, I introduced him to you in the hope that, as the author of a just-published book, he could benefit from your knowledge as editor. You knew him just about as well as I did. But to work with him closely was something: he could out-draw and out-render anyone I ever worked with. And yet there was always an air of mystery about how he managed to live.

So now you tell us—and I agree—that there is always the prima donna in the architect: to some it befits them; to others it becomes an obsession; and to the serious it becomes the skeleton in the storage wall—it is there, but locked up.

LEONARD SCHEER
Levittown, N.Y.

Dear Editor: Thank you for your tender note on Duschinsky. You talked a kind of bitter truth concerning people of a rare and bitter kind—and I do not suppose any of us will ever really understand them. Of course, they are never to be let alone. Unhappily, they seem to have a taste for tearing out the guts of those who love them most.

JOHN D. ENTENZA
Chicago, Ill.

Dear Editor: There are times when your "P.S." says a good deal more in one page than all of the pages that precede it. I believe this is true of the JANUARY 1962 P/A. The same thought struck me also when you wrote a "P.S." on Soviet architecture [JUNE 1961 P/A].

Though I did not know him at all, I should like to join in paying respects to your friend, Walter Jan Duschinsky.

Is there some reason why this "basic value motivation" cannot make its way into the format of our major architectural journals? We often tire of being exposed merely to aesthetic gymnastics.

EDWARD COLBERT
Warren, Mich.

Sculpture and Architecture

Dear Editor: To accept your view that the integration of sculpture and architecture seems to be a "constantly more impossible ideal" ["P.S." in NOVEMBER 1961 P/A] would be tantamount to treating sulpture (and other arts) as furnishings. Such a point of view precludes solutions in which sculpture and archi-

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tecture are integrated to produce a richness unobtainable through reliance on the clear expression of materials alone or the installation of an autonomous piece of sculpture.

Collaborations leading to solutions of quality have, admittedly, been few. But some obvious examples come immediately to mind: the most outstanding of these is the Albers fireplace in the Graduate Commons at Harvard, which has been executed with admirable reserve and awareness of the material. It is also difficult to imagine the Saarinen chapel at MIT without the shimmering Bertoia altar screen. This screen is one of the most important "architectural" elements in the space. Bertoia was also successful at Manufacturers Trust—at least in the porous bronze wall. The Mirko gate at "Cave Ardeatine" in Rome is another fine example, where, in fact, the gate becomes a very special part of the screen; it is a truly significant transformation of sculpture into an indispensable architectural element.

It would be sad indeed if, because of a reaction to the superficial installations that sometimes occur, we were to exclude collaborations that produce this kind of vitality. The sculptor still has his place in architecture, but he must be used well. He must help to create the architectural experience, not to "spruce up" a wall or add some tinsel to a façade. This, of course, requires a sculptor who understands the true nature of a building; I lament the fact that such an individual is rare, but he certainly does exist.

LOUIS J. BAKANOWSKY
Cornell University
Ithaca, N.Y.

Impressed

Dear Editor: This is a tardy comment on the OCTOBER 1961 P/A, but I want to tell you I was much impressed and pleased with your treatment of urban housing. It was very well done.

WILLIAM L. SLAYTON
Urban Renewal Commissioner
Washington, D.C.

Requests Credit

Dear Editor: I have just read the article on New Jersey Capital Redevelopment [p. 59, NEWS REPORT, JANUARY 1962 P/A] and cannot resist writing you, since I feel credit should be given where it is due. Two of the buildings within the main compound, and one nearby, were the product—or, I should say, the result —of "planning from within."

These three buildings (Labor & Industry, Health & Agriculture, and Education) were planned by the space planners using the numerous existing spaces of these departments, which had been housed in various outdated and unfunctional structures, to form unified, well-planned and functional layouts. Not until our reports, layouts, and recommendations were completed and had been approved by the New Jersey agencies were the architects able to complete their plans for the structures.

Mr. C. Maurice Haring and I did most of the space planning for these buildings. Although the work was done under another corporation's name, I feel that the time, work, and results that we put into the project should not go unnoticed.

GUY R. VANDERMEULEN
President, International Planners of Space Ltd., Inc.
New York, N.Y., and Brussels, Belgium

"Collaborative" Architecture

Dear Editor: Since Saul Zaik's description of our collaborative practice was published in the OCTOBER 1961 P/A, I thought that I might write you and express some of my own thoughts. Our "collaborative" is no longer in existence.

For the duration of its existence, I think that the "group" allowed us all to find out more about ourselves: how we worked by ourselves, how we worked with others, and how we felt we wanted to work in the future.

I probably gained the most from participating in the group. I was the only landscape architect and also the youngest participant: 26 years old, whereas my co-workers were 10 to 15 years older that myself. I mention this only because I was possibly more deeply involved with the formative period, making the transition from "student" to "practitioner." Economically, the end of the collaborative did not effect me, as I still continue to work with the others on all of their own projects. I also think that I am able to do more work with other architects in the city now that they no longer think of me as "group property." This is something that I did not realize in the beginning, but a factor that a consultant must consider when sharing office space with other architects.

Throughout this experience, I think that I have been better able to formulate some strong feelings toward site-building relationships and their integration with one another. This feeling was greatly accelerated only through the mutual respect that was prevalent when working on projects together. For economic reasons, many of the ideals we had in the initial conceptions were compromised and as a result we felt something lacking. However, there is much time left and the realization of these goals is inevitable on future projects. Also, my feeling for "architecture" and a belief in the Northwest has also been strengthened. On occasion, I find myself working on the preliminary design phases of a building itself. I am sure that there are many architects who object to the approach, but is it not similarly reasonable for the architect to make thorough and objective investigations into the site? This does not mean that the architect and landscape architect should work separately, but rather that, by learning more about each other's philosophy and responsibility, a true "collaboration" and a more satisfactory solution for the client will result.

MIKE PARKER
Portland, Ore.

Fabulous

Dear Editor: Just finished reading the JANUARY 1962 P/A. Your news coverage is fabulous. The Design Awards are enough to make me want to go back to school and study medicine or law!

LOUIS A. GOLDSTEIN
New Orleans, La.

Rare Book Library

Dear Editor: I have read with great interest the report in the DECEMBER 1961 P/A on the design of The Beinecke Rare Book and Manuscript Library, which is one of the important postwar contemporary buildings constructed by Yale University. It is an outstanding example of the effective collaboration between progressive, alert architects and well-informed consulting structural engineers.

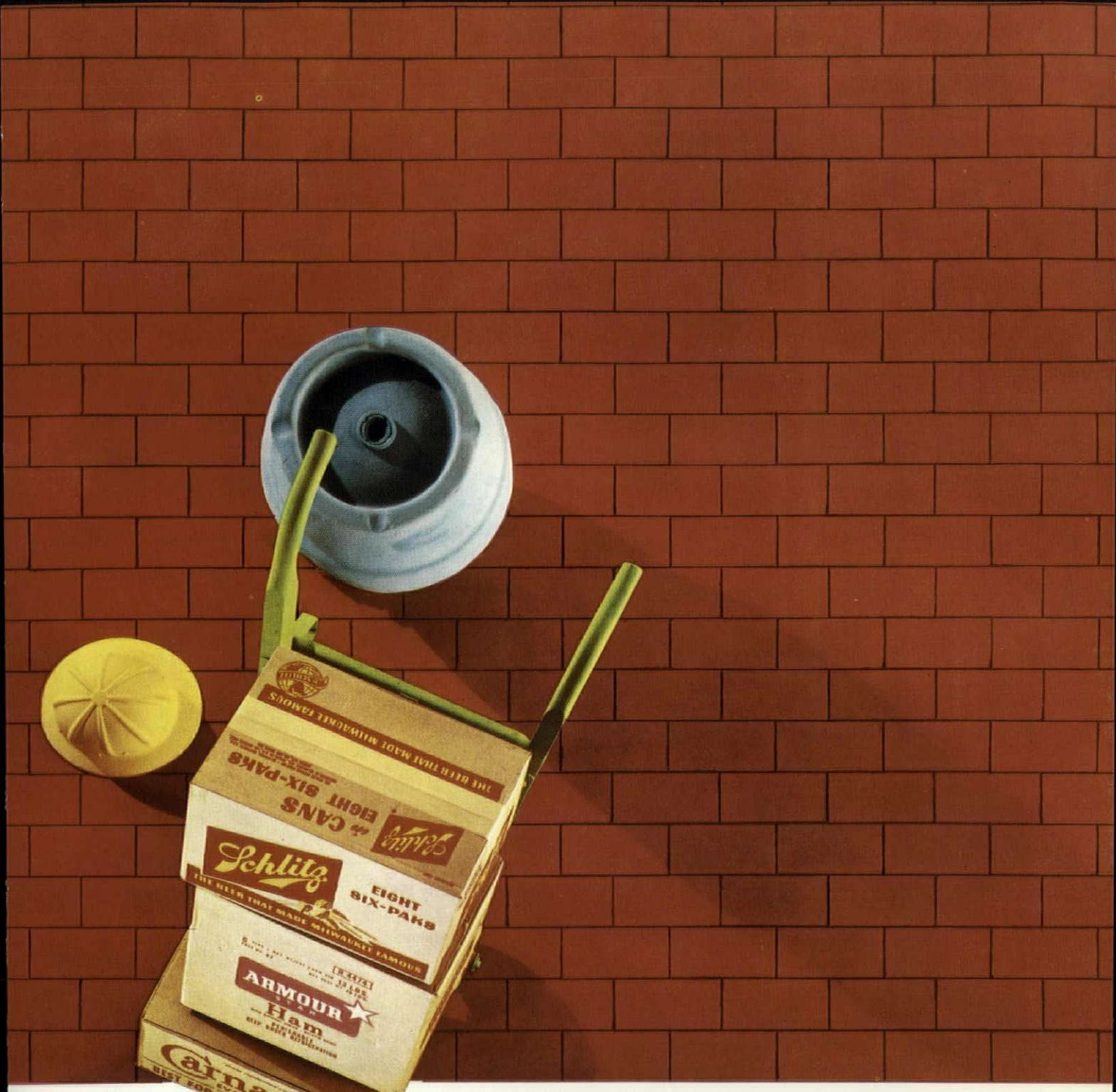
Architects Skidmore, Owings & Merrill, and Engineer Paul Weidlinger have effectively demonstrated their knowledge and appreciation of the inherent advantages in meeting architectural and service requirements through the economical use of properly designed welded steel structures. Too many architects, as well as some engineers, fail to keep abreast of new developments in materials, design, and fabrication techniques, and do not provide their customers with the best and most economical structures that fully meet all service requirements.

FRED PLUMMER
National Secretary, American Welding Society
New York, N.Y.

Dear Editor: I wish to commend your editorial staff for the splendid article titled "Yale's New Vault."

This building is an excellent example of the architect and engineer working with the latest materials available to achieve the most practical and economical design consistent with the aesthetic and functional characteristics of the building.

ROBERT E. RAPP
Regional Engineer, A.I.S.C.



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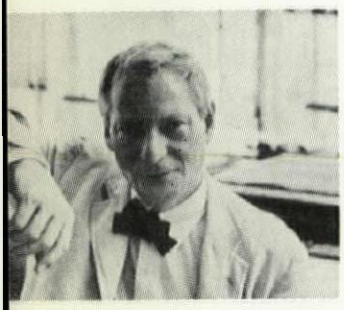
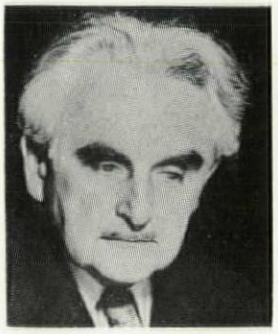


Myth of the Lonely Hero

BY ALBERT BUSH-BROWN

ARCHITECTURE TODAY AND TOMORROW, *by Cranston Jones. Published by McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36, N.Y. (1961. 243 pp. illus. $17.50) Reviewer is Associate Professor and Executive Officer of Architecture at Massachusetts Institute of Technology.*

Architecture Today and Tomorrow makes a bright package. Designed for the holiday trade, it probably caught the eye of many people, even at $17.50. Many of its 53 color plates are sharp and true; most of its 340 black-and-white illustrations show photogenic portions of strongly modeled buildings. The text should cause no strain—merely 24 short biographies about architects or engineers, brief enough to be read in half an hour before sleep, separate enough to be picked up or dropped without fear of discontinuity. The text is lively; the illustrations, dramatic—an ideal Christmas picture book.

Or so it would seem, if you were not worried about architecture, today *and* tomorrow.

For this book, on close study, is not merely a bad book; it is the worst kind of bad book. It is neither weak nor inept. It exploits enviable resources in photography, writing, information, typography, and printing to broadcast incidental facts as dramatic events, partial interpretations as responsible truth.

The text, for example, presents recent architects and engineers in a series of cover stories made familiar in *Time* magazine, where, in fact, Cranston Jones is Associate Editor and charged, presumably, with the architectural "reportage" in that weekly. (As you may expect, he has compiled many anecdotes—the sobering of Stone, the Taj Mahal's transfixing Yamasaki, the forest's grip on Aalto.) The biographies arrive in three groups. First are the "Form Givers"—Sullivan, Wright, Perret, Le Corbusier, Gropius, Mies van der Rohe, and Aalto—an accepted list, although the case for Perret and Aalto is not made convincingly. It is the second group, however—"Modern in Transition"—that brings surprises. Here we find Neutra, Breuer, Harrison, Stone, Saarinen, Yamasaki, Johnson, and SOM (a diversified group, surely) and also a "Second Generation" consisting of Rudolph and Lundy (together!), then Louis Kahn (why is he, born in 1901, in the second generation, while Saarinen, Yamasaki, and Johnson are in the first?), Kenzo Tange and Oscar Niemeyer (why are they not with Breuer?). The third group is stranger still: it does not tell us about the "Tomorrow" of the title but is a final set of biographies, this time about Maillart, Torroja, Candela, Nervi, and Fuller (surely, "Form Givers" or First or Second Generation Men in Transition). Nor is the confused outline helped by using Maybeck, the Brothers Greene. Wurster, Belluschi, and Pei as men of "expanding tradition" to introduce the section about Kahn, Tange, and Niemeyer!

One could forget confusion of this sort if Jones did not make out of biography exactly the wrong approach to architectural study: hero images. Pages and pages are riddled with the idea that architecture is created by some gifted genius working alone and in adversity, often against his times, denounced by his school, doubted by engineers, but prophesying until at last he is discovered, whips off a thrilling design and becomes a rampantly operatic figure. This myth causes Jones to neglect many who quietly and nobly serve the cause of architecture, creative men like Kay Fisker, William Wurster, Arne Jakobsen, John Lyon Reid, Sven Markelius, and Sir Lesley Martin; dedicated men who serve bureaucracy well, like George Aderholt, Supervisory Architect for the Federal Bureau of Prisons, whose buildings sustain rehabilitation programs; educators like Lawrence B. Anderson, who puts dialectical questions

Continued on page 210

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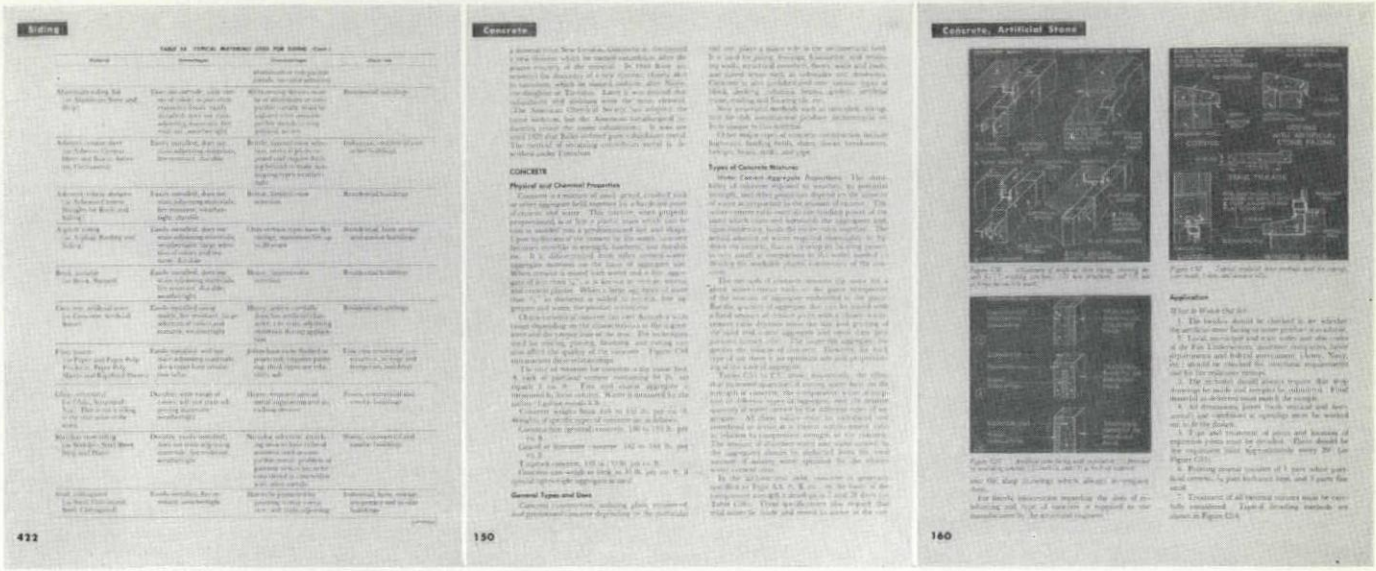

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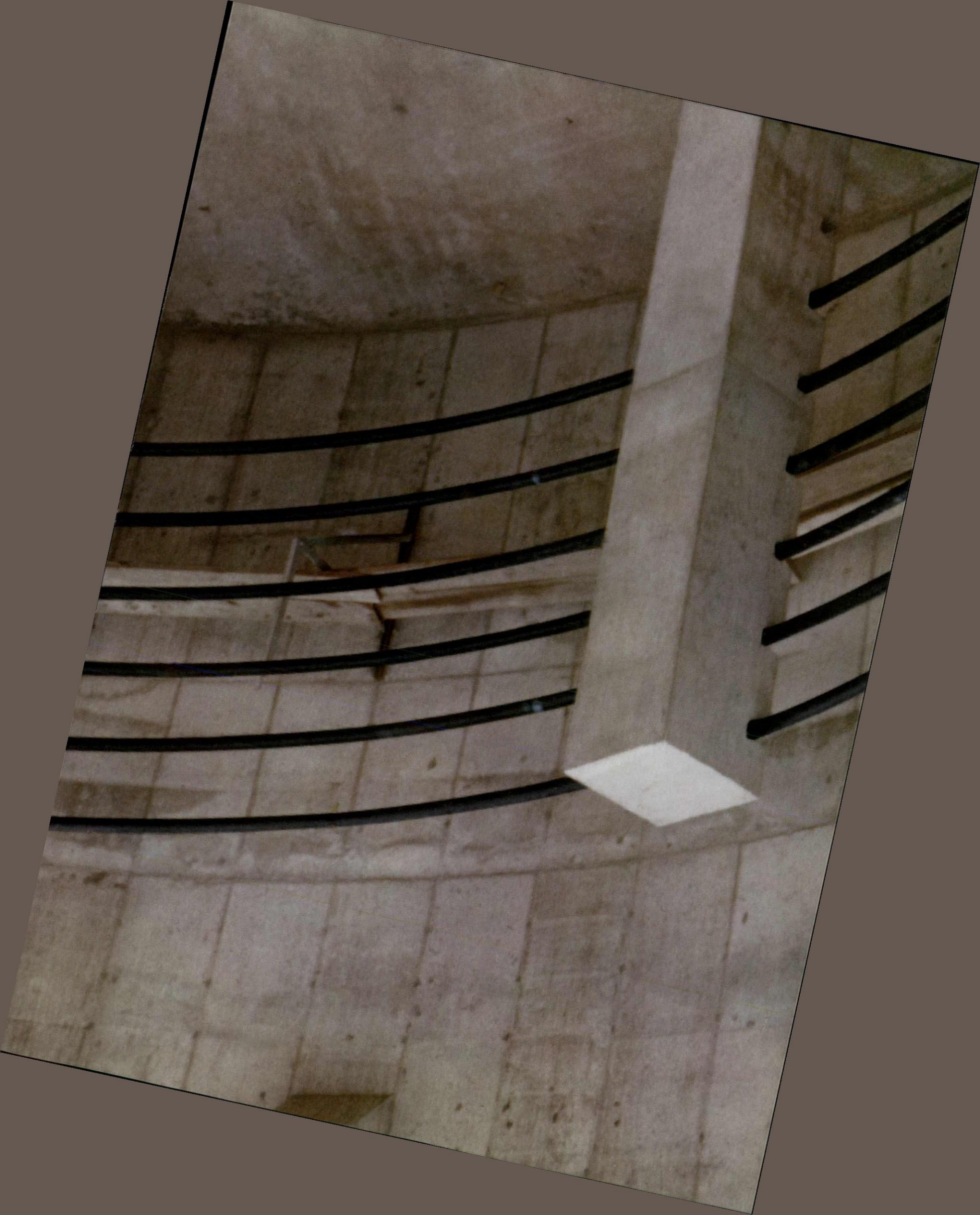

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	Original Pipe	Corroded Pipe	Grams per Lin. Inch	Per Cent
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Wrought Iron	41.3469	40.7438	—.6031	—1.46%

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2	6.1	52	4.3	41	4.8	48
5.4	11.1	81	7.2	52	8.8	75
7.4	12.1	89	9.5	79	10.9	89
9.3	17.4	88	10.6	79	12.2	97
14.3	19.7	107	11.8	93	16.3	98

*Wt. Loss, oz/ft² **Penetration—mils (Average Max.)

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Material	Days In Test	Wt. Loss (Grams)	Corr. Rate		Pitting—Mils	
			Mdd	IPY	Max.	Aug.
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Hand Puddled Wrought Iron	2384	1401	32	.006	Perf.	115
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Continued from page 202

to students in order to hold all the measures of architecture before them; young but tough designers like Edouardo Catalano, Walter Netsch, Bruce Graham, and Benjamin Thompson, whose buildings have not yet met the lens of Ezra Stoller or whose personal lives are too conventional; and—not least—the supporting entrepreneurs and engineers, the unsung and often unmentioned heroes who, as with Herbert Greenwald, helped Mies, or, with August Komendant, helped Kahn find strong statements.

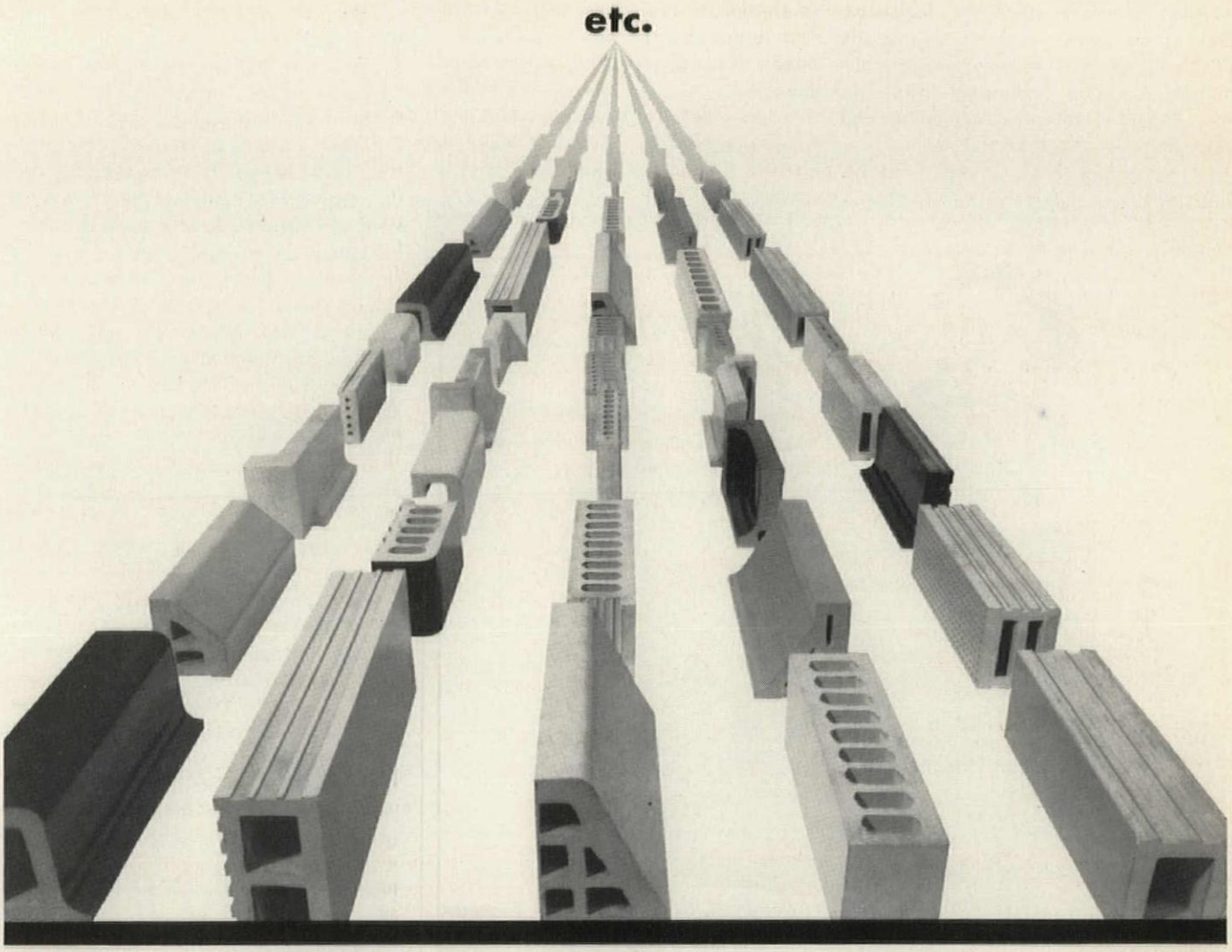
His "hero myth" leads Jones to ignore not only such men as I have mentioned but also to slay "group contributions" on the altar of his personality cult. His discussion of the firm Skidmore, Owings & Merrill is devoted almost exclusively to Gordon Bunshaft, who would be the first to declare that his New York work ought not to be tagged so personally even when it rivaled the finest buildings of the Chicago and San Francisco partners. Jones makes it appear as though the Jewett Art Center at Wellesley were entirely the work of Rudolph, unassociated with Anderson, Beckwith & Haible. The contributions Paul Weidlinger made to Baghdad are never mentioned—for the architect, here, is thought to work alone, a form-giver.

The "lonely hero" theme leads Jones to make many unhistorical statements. Three will suffice as examples: two involving Wright are intended by Jones to applaud innovation, one about Gropius criticizes a lack of innovation. Wright is said to have "geometricized structure" in a way ". . . which 20th-Century architects owe in large part to the work of Cézanne . . ." as though a painter's faceting of Mont St. Victoire had anything to do with the steel skeleton. Wright is also said to have invented the type of space in his Larkin Building, neglecting the Rookery, for example. And Gropius' Graduate Center ". . . is more a collection of modern art clichés than . . . looking toward the future . . ." as though it had not boldly struck for modern collegiate design, fine site planning, and the inclusion of art within buildings.

Worse yet, Jones admires a hero's work merely because it is sculptural. Architecture, he quotes Le Corbusier, is "man's greatest sculpture." Thus nearly all the buildings in Jones' book are powerful forms like Brasilia's government buildings or TWA's Terminal at Idlewild. The ungainly rear and sides of the Seagram Building, the tortured plan of MIT's Kresge Auditorium, are never mentioned. Each building is praised mainly because its silhouette is an innovation.

Time and again Jones misses the chance to strike for performance, not merely visual form. He does not mention the acoustic, visual, and circulatory difficulties in Crown Hall, the IIT Chapel, or the Farnsworth House. The wasteful plan of the Palo Alto-Stanford Medical Center is neither shown nor criticized. The noise and frenetic bustle in the universal space for offices at the Reynolds Metal Building in Richmond and the Connecticut General at Hartford are not mentioned. We learn that Saarinen "set the rooms as dramatically flaring cantilevers" at the Milwaukee County Memorial Center, but we are not told what the rooms do, or what the building does to the shoreline because of that flare. The soaring space inside the Lambert-St. Louis Airport is ruined by the displays and partitions of concessions; the sun screen on the Jewett Art Center

Continued on page 212



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Continued from page 210

at Wellesley is "giddy-making," Jones says, but not needed on the north side (in fact, it is in the way); yet we are asked by Jones to think that form is all. Anyone who has visited Brasilia must be struck with the problem of how to control echoes in the two legislative houses; but Jones, after mentioning the problem, speaks immediately of "the delight of these sculptured forms in space" and "the play of plane and curve."

Indeed, Jones' book is superficial beyond bearing. He notes that Le Corbusier recently has shown a new direction "which seems at a number of points to contradict his own earlier premises," but Jones is mute on explaining this. Breuer expresses structure and is praised for this; Wright suppresses structure and is praised for that. Jones leaves us often with uninformative statements such as "The final result [Grosvenor Square Embassy] . . . is less than exciting," and away he goes to another building's innovation. Perhaps his most rapid departure is from the campus at Brandeis; after a few innocuous, descriptive phrases about Brandeis, he leads us equally briefly to the University of Illinois with the sentence: "Nor has Harrison & Abramovitz been caught napping in the shift toward reinforced-concrete structures."

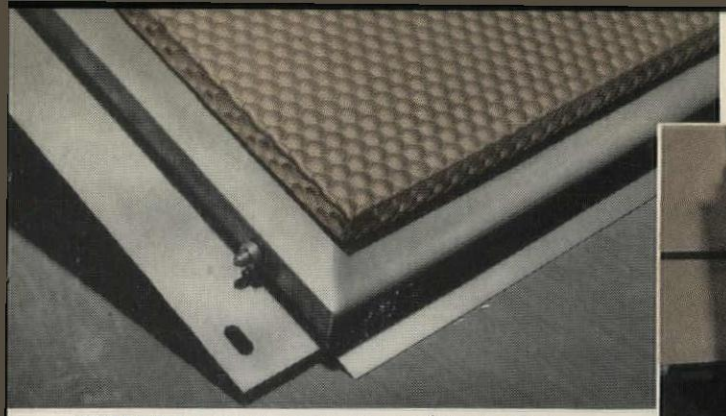
This sort of superficial review, combined with the hero myth, causes Jones to parade buildings past us like cut-out ducks in a shooting gallery. It is not a study of whole buildings; and of course it is not a study of architectural problems in buildings. It never suggests that the problem of gaining good environment has little to do with making powerful individual buildings, for Jones seems not to be interested in the large site, a neighborhood, a city, or a region. His architects are concerned solely with free-standing monuments. They have no social mission, no concern for schooling, government, or housing, except to strike bold silhouettes.

In Jones' hands, they do so in a series of what could be called "sudden creations." Here is the further fallacy that Jones' hero, the Form Giver, working alone and unwanted, suddenly, in a fit of sheer genius, creates form. "In a few quick strokes on the back of a brown manila envelope, Stone set down the plan and elevation for the new embassy . . ." The TWA Terminal, we are told, was originally conceived on a restaurant menu. Costa dropped two postcards into the mailbox and won the competition for Brasilia. Nervi is "that rare being, an instinctive artist." All this, depicting lightning work with a pencil, ill describes the hours, methods, and convictions spent on the best architecture.

Furthermore, many errors of fact mar Jones' book. For instance, Chicago's Harris Trust is one exception, at least, to the universality about placing mechanical equipment at the summits of skyscrapers; Hadrian's Villa is not in Rome; the Danish architect is Utzon; Aalto's apartment house at Bremen is not semicircular.

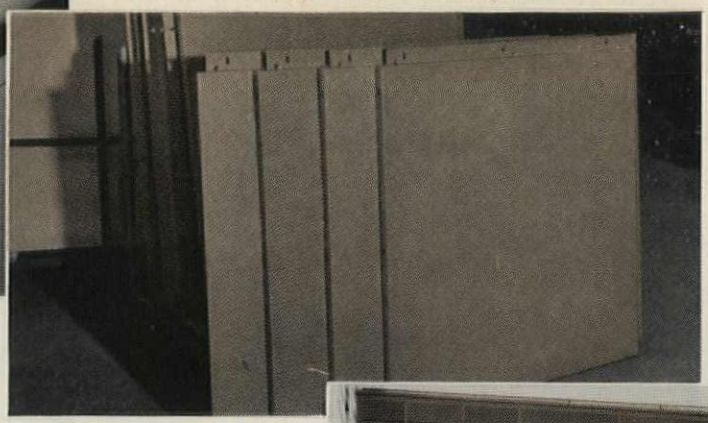
Beyond errors of fact, the book (costing so much) ought not to have so many printing errors. The pages are glossy stock, illustrations are well-disposed, and there are generous margins and readable columns of large, clear type. But omitted lines and transposed columns on page 21; two lines removed from the bottom of page 44 to the top; and several misspellings ought not to have been allowed to smirch the glamor that Hedrich-Blessing, Baltazar Korab,

Continued on page 216



CLOSE-UP of one of the embossed panels showing brass strip braces to which panels are silver soldered.

EMBOSSED REVERE MUNTZ METAL PANELS prior to assembly. 10,971 lbs. of metal were used to fabricate these panels.



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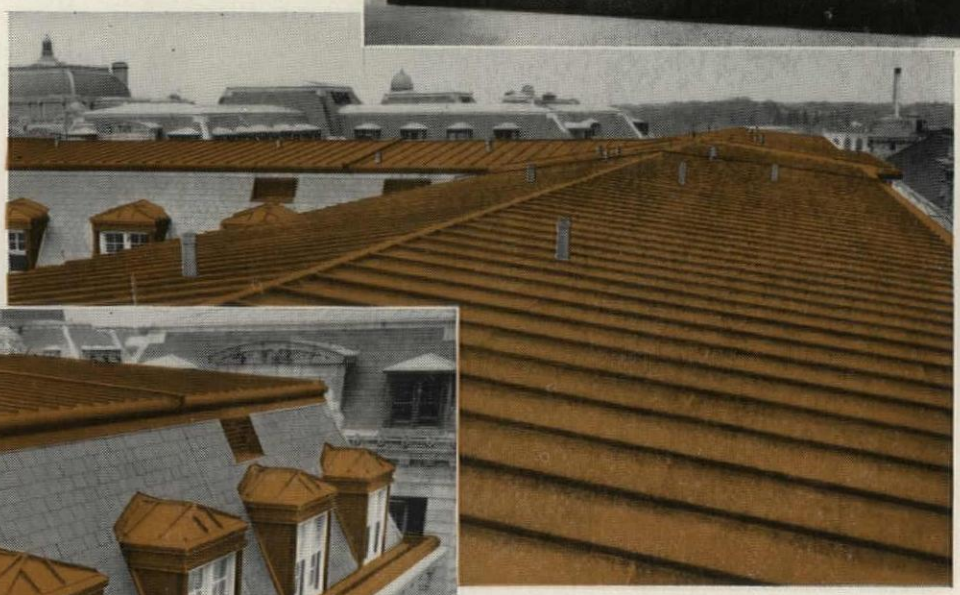
MAIN ENTRANCE LOBBY showing doors of Revere Muntz Metal and section of ceiling with square embossed panels.



BATTEN SEAM ROOF and dormers of Revere Sheet Copper. There will be no need for worry about corrosion here.

CLOSE-UP of dormers, deck molding, vents and gutter of Revere Sheet Copper. Outside section of gutter is lead coated copper.

Continued from page 212

Kidder Smith, Ezra Stoller, and *Time*'s photographers gave this book.

Above all, their photographs ought not to have been used to propagate such intellectual nonsense as Jones writes: "Just as Einstein's theory that energy equals mass multiplied by the speed of light squared ($E = MC^2$) inevitably led to nuclear fission and the H-bomb, so the revolution in metallurgy and synthetics could be projected to provide materials for solutions that can be envisioned now, and fulfilled within a time of approximately a quarter century." This garbled sentence, which introduces Buckminster Fuller, is nonsense all around: there was nothing "inevitable" about the course of scientific events; there is no parallel with the "revolution" in metallurgy and synthetics; and we can not "project."

If you can believe that architecture is merely a series of innovated shapes (no matter what the echoes, where the leaks, or how shambled the plan); if you can believe that architecture is an isolated building (forgetting its environment, forgetting, yes, forgetting above all that we have housing, school, civic, and urban problems); if you can believe that architecture is created by getting ideas suddenly on the back of an envelope—then this is the book for a son hoping to become an architect. He will learn many facts (Did you know that Christopher Morley's *Kitty Foyle* helped pay for Fuller's Dymaxion unit?), but not many truths.

The Japanese House, Then and Now

JAPANESE HOMES AND THEIR SURROUNDINGS, *by Edward S. Morse, with a new introduction by Clay Lancaster. Dover Publications, Inc., 180 Varick St., New York, N.Y. (1961. 372 pp., illus. $2 paperbound)*

First published in 1886, this work was written by a zoologist who went to Japan to teach his science at Tokyo University. Like many members of the Tokyo intellectual world, he was appalled by the willingness of the Japanese to trade in their ancient culture for the techniques and ideas of the West. It seemed at that time that the traditional Japanese way of life would be obliterated within a few decades.

For Morse, the need to record some aspects of this culture was more pressing than his scientific work. He pro-

Continued on page 218

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Continued from page 216

ceeded to write a description of the Japanese house in all of its details and in all of its major variations, explaining, wherever he could, the origin, function, and construction of each feature. His scientist's eye enabled him to make sketches with a clarity and selectivity seldom attainable with today's camera. Ironically, the residential architecture he illustrates has survived with surprising vigor. Except for its plumbing, electric lights, and television, the typical Japanese house of today is the one he describes.

As a man of his era, Morse could not stop at recording phenomena, however carefully he did that; he was obliged to assert the superiority of Japanese taste and even to draw moral and social conclusions. In fact, it is in his damning observations on the American Victorian house and the coarse life it sheltered that he is most engaging.

In his closing words he expresses a rather weak hope that the West may learn from the Japanese house, as indeed it has: "I do not expect to do much good in thus pointing out what I believe to be better methods, resting on more refined standards. There are some, I am sure, who will approve; but the throng —who are won by tawdry glint and tinsel; who make possible, by admiration and purchase, the horrors of much that is made for house-furnishing and adornment—will, with characteristic obtuseness, call all else but themselves and their own ways heathen and barbarous."

J. M. D.

New Light on Old Dogmas

THE DEMAND FOR HOUSING IN RACIALLY MIXED AREAS, *by Chester Rapkin and William G. Grigsby. A Special Research Report to the Commission on Race and Housing and the Philadelphia Redevelopment Authority. University of California Press, Berkeley 4, Calif. (1960. 177 pp., tables, maps. $6)*

The problem of racial segregation in housing has come prominently to the fore in recent years. A part of the impetus was given by the Supreme Court decision in 1948, which outlawed racially restrictive covenants. But a more pressing reason for the increasing concern with this subject has been the rapid growth of Negro population in major Northern cities and a simultaneous rise in its demand for housing. Even if the moral issues involved in denying equal housing opportunity to Negroes could be ignored, there would still be an urgent need for more information to guide public and private policy in regard to mixed or segregated housing.

Too often, architects, planners, and others concerned with urban housing have unquestionably accepted the real estate man's fiat that Negroes will lower housing values, that whites will not remain (much less move back) in areas where even a single Negro has gained entry, and that the only answer is to maintain the Negro population in enforced isolation lest it somehow infect otherwise healthy portions of the city. The claim of the Negro to decent, safe, and sanitary housing has been rejected as being in unfortunate conflict with immutable social and economic laws.

Rapkin and Grigsby have made a pioneering effort to cast some light on this area where, we have been so often assured in the past, all was known and therefore there was no need even to think any more. As in the case of numerous other social axioms, the dogmas about Negroes and housing, upon closer examination, turn out to be something less than scientific laws. Just as one

Continued on page 222

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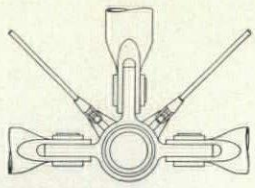

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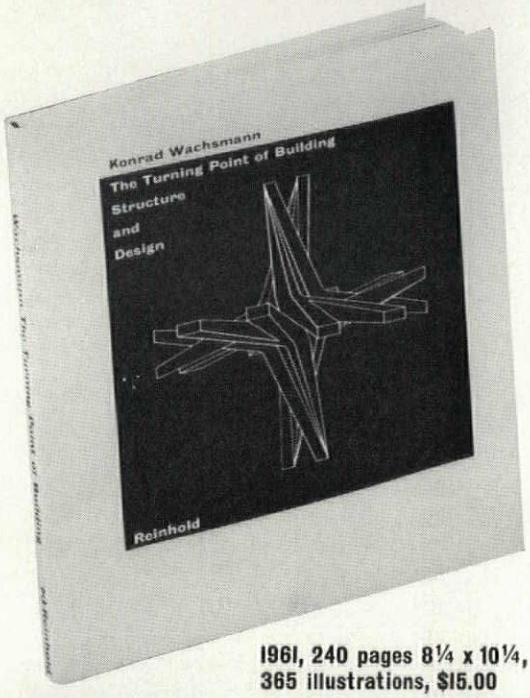

1961, 240 pages 8¼ x 10¼, 365 illustrations, $15.00

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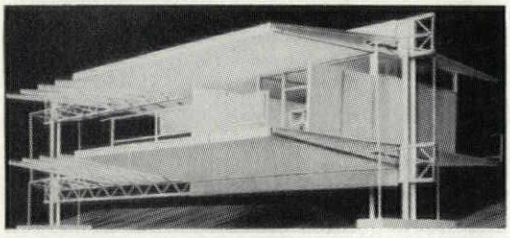

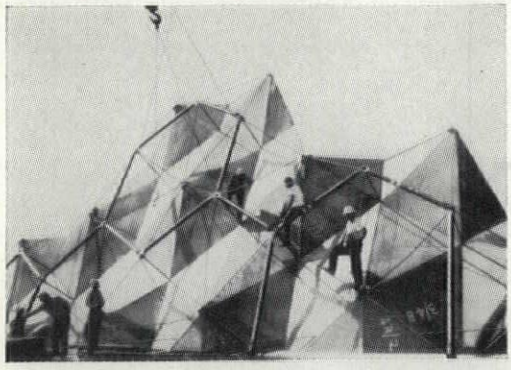

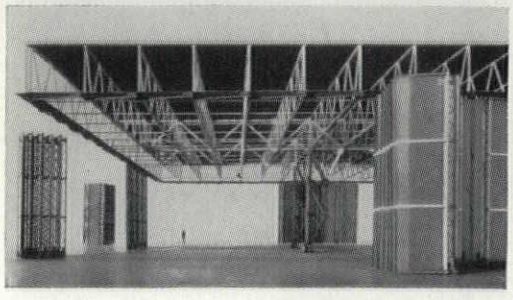

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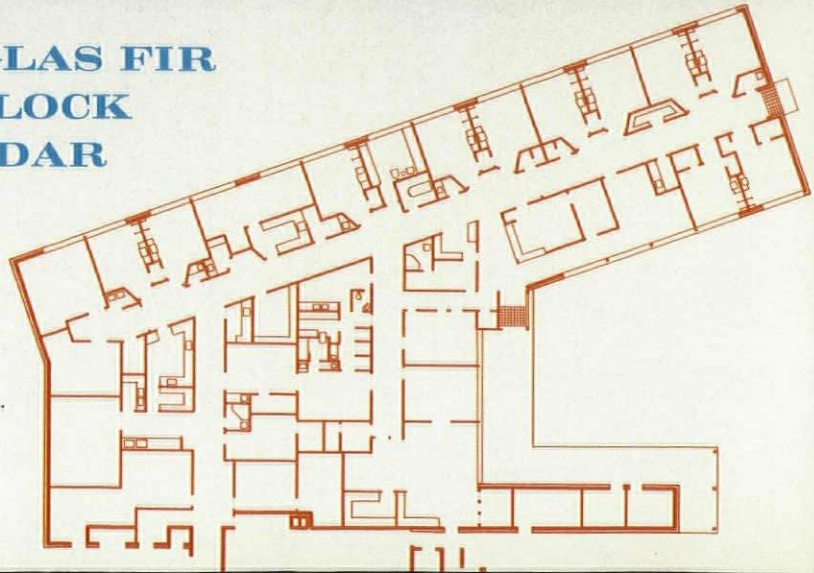

Architect: HOWARD LEONARD GLAZER, A. I. A.
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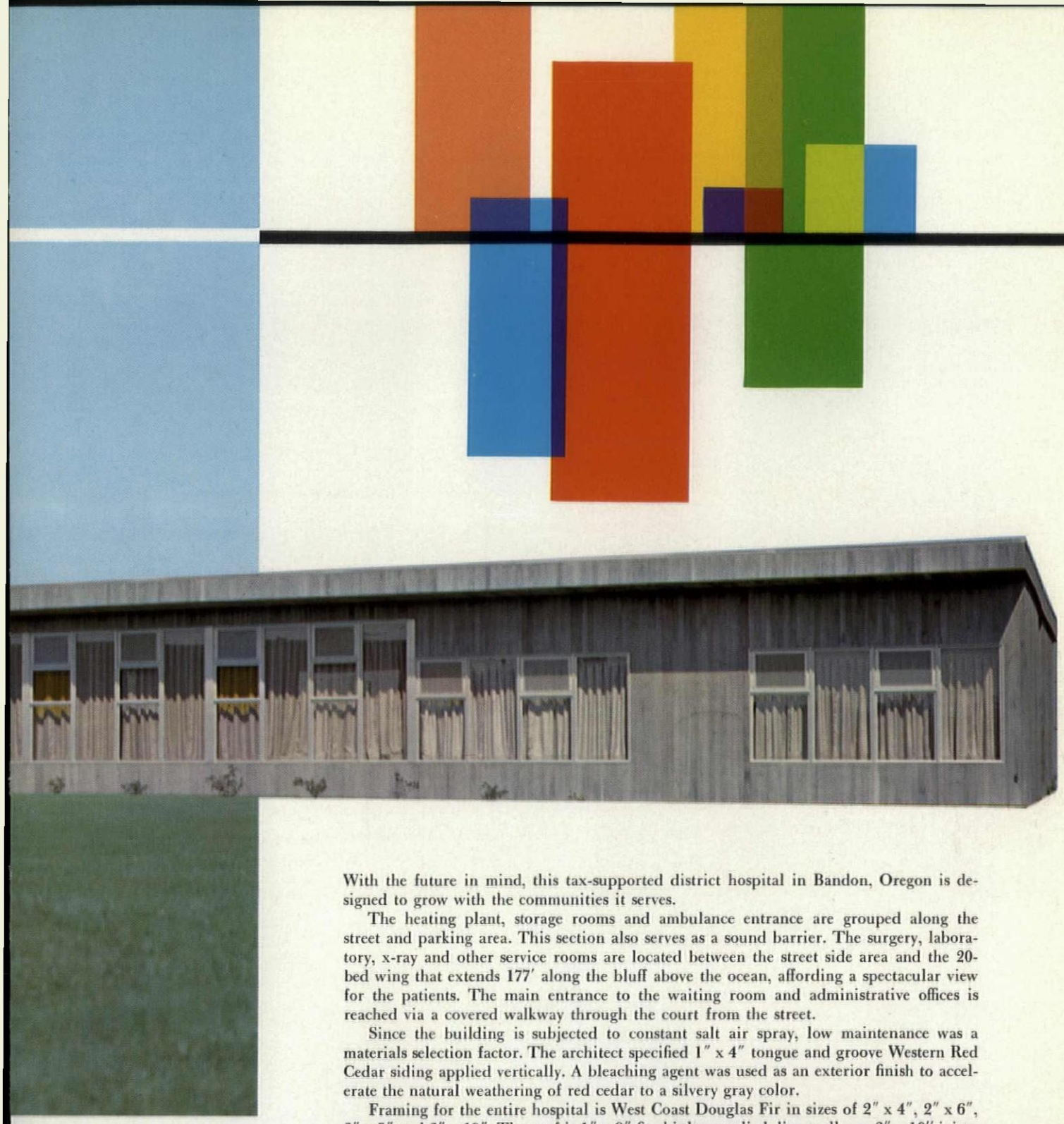

With the future in mind, this tax-supported district hospital in Bandon, Oregon is designed to grow with the communities it serves.

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Continued from page 218

might have expected, the real world is rather more intricate than a real estate rule-of-thumb.

One cannot report that the problem of racially mixed housing disappears upon closer examination; for whatever reasons the hesitation of whites to live in contact with their fellow humans of another complexion has arisen, it is a troublesome reality. However, this book shows that the reality is not a simple open-and-shut proposition; while many whites (and many Negroes) behave in this fashion, all of them do not and some of them do so only to varying degrees. The very fact that in their studies of four racially mixed areas in Philadelphia the authors found it necessary to examine not only the pattern of white sales and Negro purchases, but also of new white purchases which occurred after the areas had become mixed, is a vitally important discovery. In several of the four study areas (which vary widely as to character and rate of Negro infiltration) the number of white purchases was a very substantial proportion of all sales in the period surveyed, amounting in one case to half the total.

The study's tentative findings indicate that the rate, extent, and nature of Negro movement tend to affect the degree to which whites will remain or will continue to move into a neighborhood. Other important variables suggested by the authors are the condition and nature of the area's housing—rental areas and better quality housing appear to experience less panic in this respect. Also to be considered is the social character—the strong ethnic quality of one of the study areas (predominantly Italian) appeared to be a major factor in persuading many whites to stay and others to relocate there even after it became racially mixed.

This ably written, well presented survey is a first step toward a factual examination of an urgent social problem. It will be necessary to build on its foundations before we are able to develop an understanding of the very complex and continually changing reactions of people to racially mixed neighborhoods. Only on the basis of this type of knowledge will it be possible to develop action programs designed to break down the mental and financial walls that surround our urban ghettos. To have made a major contribution in this direction is an achievement of which the study's authors and sponsors can rightly be proud.

DAVID A. GROSSMAN
The Planning Services Group
Cambridge, Mass.

Parts Without the Whole

MODERN PHYSICS BUILDINGS: DESIGN AND FUNCTION, *by R. Ronald Palmer and William Maxwell Rice. Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y. (1961. 324 pp., illus. $13.50)*

To the average architect approaching a science building problem for the first time, this book provides much worthwhile information on typical programs, functional requirements, and current solutions. Unfortunately, it goes no further. Like many studies being published today, it is a reference work that catalogs what has been done; no attempt is made to project this invaluable store of research into conclusions that might effect significant advancement in future designs.

The opportunity for such a contribution is great. This book takes as its premise a 1958 survey that showed some 200 college physics departments planning nearly $250,000,000 in new physics buildings in the post-Sputnik years. To aid the planners and designers of these buildings, the American Association of Physics Teachers and the American Institute of Physics obtained a grant from

Continued on page 224

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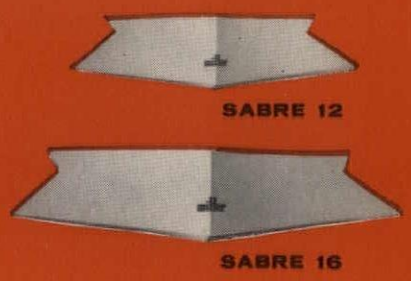

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Continued from page 222

the Ford Foundation's Educational Facilities Laboratories, Inc., to underwrite the cost of "collecting data on the good and bad features of existing buildings and on novel ideas or new products that might improve new buildings."

This task has been well carried out by the authors, R. Ronald Palmer, head of the Beloit College Physics Department, and William Maxwell Rice, practicing architect and one-time teacher of design. They visited about 50 institutions where new physics and science buildings have been constructed, collected architectural plans and photographs, talked to responsible department heads, etc., and according to the Introduction, "learned a great deal from their reports on the mistakes they would avoid if they were doing the job over again, as well as on the good results achieved."

The accumulated data is presented in a series of illustrated chapters that treat each function of a physics building—lecture rooms, classrooms, libraries, offices, and so on. In each case, the authors highlight what they feel are the best solutions, and the result is a good list of "do's" and "dont's" that should be useful to anyone planning a similar building.

However, the authors stop at this point. They have dissected the building, component by component, and they do not attempt to put it back together again. They even avoid commenting on the *whole* of any project that is presented. One chapter gives the complete floor plans of 33 different buildings without a single word of comment, without any indication of how well the over-all design decisions have served.

Conspicuously absent also is any comment about aesthetics—whether the environment that has been created is more, or less, conducive to learning. I would like to know the comments of some of the students who occupy these buildings, instead of hearing only from the department heads and other technical people who created them.

Most of all, I wish the authors had applied their knowledge to a crystal ball. The question, for example, of integration of the sciences—whether there is benefit from the integration of chemistry and mathematics with physics in a single science-education building—is completely ignored. Nor is there discussion of the many other broad questions that could provide the basis for new thinking on future projects.

Modern Physics Buildings has a place on the shelf as a useful reference work, a guide in detailing the next science building problem one faces. But it will not inspire.

VINCENT G. KLING, FAIA
Architect
Philadelphia, Pa.

The Care and Feeding of Autos

GARAGES AND SERVICE STATIONS, *by Rolf Vahlefeld and Friedrich Jacques. Leonard Hill Ltd., Eden St., London N.W. 1. (1960. 263 pp., illus. $9.50)*

As history shows, the written word, suitably documented, has had a special place in propagating design. Whether as "archaeological fodder," styleplates imported by local carpenters, or the latest and slickest photographic dissection of Corbu's concrete romanticism, books have influenced, and still affect, much of what is built in America.

Leaving aside those superb examples of craftsmanship and taste which can stand by themselves as works of art, design books published since World War II can be classified as *historical, inspirational,* or *didactic.* The first, chronologically or critically, through words and graphics, tell us what has occurred. The

Continued on page 228

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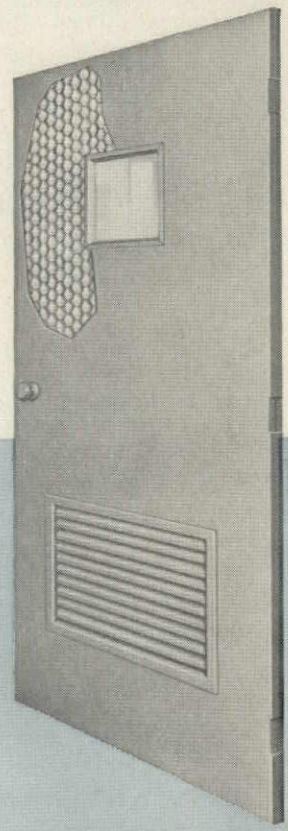
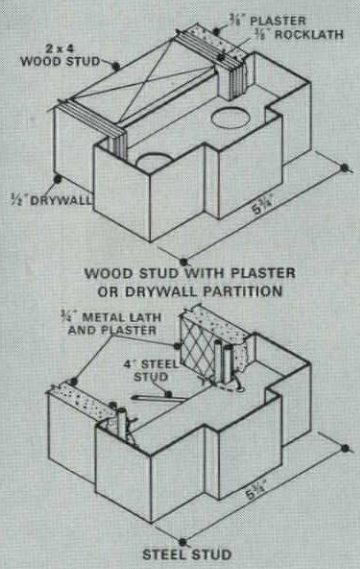


Another suggestion from the Steelcraft Architectural Detail File.



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David Eskin, AHC, Steelcraft Boston Distributor, with Ralph Leblanc and Irving Salsberg, of the architectural firm of Salsberg & Leblanc, discussing details of the modern office building the firm designed for Wellesly, Mass. Steelcraft doors and frames throughout.

Steelcraft has developed frame sections for every type of partition, wood or steel stud construction, solid or drywall finish, as well as for solid plaster and laminated partitions. Steelcraft frames and doors are stocked in a large variety by local Steelcraft distributors. All Steelcraft doors can be used interchangeably on any Steelcraft frame. Call a Steelcraft distributor for professional assistance in coordinating hardware and approval drawings . . . save delivery time . . . cut construction costs.

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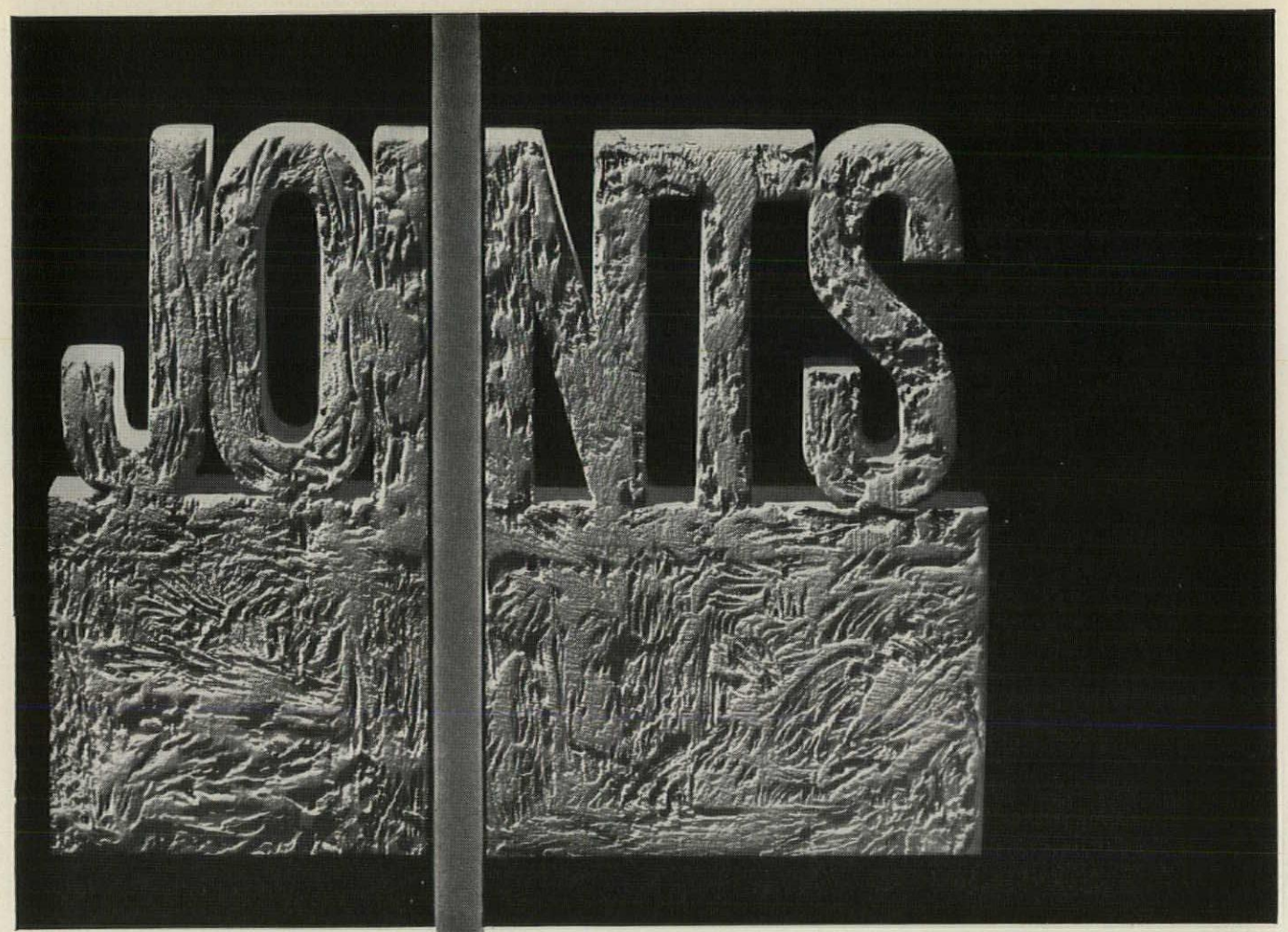

TYPE OF SEALANTS	EXPECTED LIFE	ADHESION PROPERTIES
1. POLYSULFIDE BASE SEALANTS	Twenty years or more. Will not harden appreciably, crack or lose adhesion with outdoor exposure; remain flexible and adhesive.	Excellent to most materials, including glass, steel, aluminum, cement, stone, etc. The bond is chemical and occurs in place.
2. OLEO-RESINOUS COMPOUNDS	Two to five years. Compounds harden rapidly. Lose adhesion with any movement.	Good when restricted to less than 5% extension for the expected life. Seal fails as compound hardens and cracks.
3. VULCANIZED GASKETS	Some types to 20 years. Although most remain flexible, satisfactory performance becomes a problem with continual deformity under pressure.	None. Requires tight fitting and constant compression to maintain seal.
4. MASTIC TAPES	Some types to 20 years. Will flow and deform under pressure, reducing effectiveness.	Adhesion generally good, but requires constant compression to maintain seal.
5. SILICONE TYPE SEALANTS	Expected performance up to 20 years. Case history performance is about 4 years.	Generally good. Evidence indicates that some types lost adhesion when immersed. Evidence that material will not adhere to itself.
6. ACRYLIC TYPE SEALANTS	Expected life unknown. Case history performance is less than 4 years.	Exhibits excellent chewing-gum type of adhesion to most materials.

ACTUAL COST OF SEALING— In structural sealing, the installed cost of sealant based on THIOKOL® polysulfide liquid polymer will be more than that of some materials, less than others. Actual cost must be weighed against acceptable results. If leakage due to sealant failure will present no problem, cause no property damage, or demand no recaulking with attendant labor costs, selection of a sealant compound

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Properly applied, polysulfide base sealants — measuring up to or exceeding American Standard Specification A116.1 — produce watertight joints that stay watertight for time unmeasured under extreme and varying weather conditions.

It was about 10 years ago that polysulfide base sealants were "discovered" as a practical solution to dynamic structural sealing. Previously, they had been used to seal fuel tanks in the wings of aircraft—from China Clipper days. Since then, they have been applied extensively and have performed successfully in the monumental curtain walls and other skyline-changing structures of modern architecture.

Polysulfide-base sealants combine steel-grip bonding with rubbery elasticity. They chemically weld themselves to all building materials in any combination, expand at least to 100% without adhesive failure. Sealants with THIOKOL® polysulfide polymer add structural strength, while outstanding resistance to sun, frost, moisture, ozone, chemicals and aging assure long-lived, trouble-free weatherproofing.

Chart below compares properties and performance characteristics of various sealant types. The time-proven advantages of polysulfide base sealants—and resultant economies--are self-evident. There is only one polysulfide polymer. And it's made by Thiokol.

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COHESIVE PROPERTIES	EXTENSION LIMITATIONS	OVER-ALL PERFORMANCE
Exhibits good resilience and cohesive properties during expected life.	Expected to exhibit minimum of 150% extension for American Standard Specification A116.1 requirements, and Federal Specification TT-S 00227 (GSA-FSS) July 17, 1961.	Satisfactory performance in many buildings already exceeds nine years in dynamic and static seals. Can be applied at any temperature at which a man can work.
Is not resilient.	Approximately 5%.	Fair to good when used within limitations of shore life and very low extension limitations.
Exhibits good resilience and cohesive properties during expected life.	Gaskets exhibit high extension but are limited in performance to compression limitations generally around 35%.	Generally good providing properly fitted and provided that there is positive pressure on gaskets. Failures generally result with deformation, loss of pressures to maintain seals.
Generally exhibit fair to good resilience and cohesion during expected life.	Same as above.	Same as above.
Most compounds exhibit high resilience and cohesion.	Extension limitations presently limited to approximately 50% to 75%.	Present performance record is about 4 years, but expected to be good providing extension limitations are not exceeded.
Generally very low to low resilience with low cohesion properties.	Would exceed 150% but do not exhibit any recovery properties.	Present performance is less than 4 years. Not recommended for dynamic seals due to very low cohesive properties and very low recovery.

can be based on the most for the least expense. However, if leakage is intolerable, selection of a sealant requires careful consideration. ■ In terms of leakproof performance, established longevity and maintenance-free benefits, sealants based on THIOKOL® polysulfide liquid polymer have proved a wise investment for architects, contractors and building owners. They can be the same for you.

For more information, turn to Reader Service card, circle No. 390

Continued from page 224

second, either as a challenge from the righteously indignant, or carrying the banners of a good cause, charts the course of what has to be done in the future—the future is usually illustrated by a personalized vision. In the third group, I would lump together all those manuals, guides, and how-to-do-it books which, in various degrees, help busy people solve important problems, as well as indoctrinate the young in the ways of the profession. The book under discussion here belongs to this last category.

Garages and Service Stations is the English edition of *Garagen-und-Tankstellenbau*, first published in 1953 in Munich. Thus, the country that built the first contemporary highway (Autobahn) and the most utilitarian automobile for driving thereon (Volkswagen) has produced the first encyclopedic view of the auto at rest. The contents are comprehensive, starting with what must be considered a tongue-in-cheek exposition of styles in coaches and wagons and their relationship to the buildings that house them. The authors cover the extremes of their subject, from town-planning considerations, space requirements by vehicle-type, parking arrangements, drivers' accommodations, to construction and particulars of equipment. All this in 87 pages. The last two-thirds of the book describes the layout and construction of garages: private, detached, groups of lock-up garages, single-story open types, multistory, garages for public-service vehicles, and filling stations.

The book favorably impresses the reader with its collection of line drawings. For example, on two facing pages, 50 separate renderings show the various ways a single-car garage can be attached to a house. Forty ink sketches of doors are shown on another single page. With great legibility, Friedrich Jacques' pen makes clear to the reader, in most economical fashion, such things as ramping techniques, principles of mechanical lifts, and site criteria for locating filling stations.

A useful book? Only partly so. Many dimensions are given in meters, and conversion to English measurements can be a nuisance. Portions of the book are awkwardly translated. Details of lighting, doors, hardware, and equipment have little pertinence to American practice and are probably even less related to what can be done under local building codes. Such complex and different multilevel garages as the Autosilo in Basle; the Park-o-Mat in Washington, D.C.; the Hudson Company garage in Detroit; the d'Humy system in Milan; and the Haniel-garage in Düsseldorf are suggested as prototypes. (The latter is a handsome building combining a hotel, a filling station, and a garage for 700 cars. Mass transportation is close by, connecting the site with the center of the city.) But nothing is said about comparative costs of construction per space, or the economics of operation and control in each prototype. Automated, semimechanized, and personal-service systems all have advantages and disadvantages; these factors can be defined, then evaluated, and are important in planning garages today. A critical aspect of core city garages, the absorption and discharge of vehicles in peak hours, receives no mention. And I would like to have seen some material on signs and signals.

But *Garages and Service Stations* has its merits. The authors suggest that garages can be designed as architecture. They successfully communicate the need for relating site planning to the interior functional considerations that are technical and special in designing a good garage, and give many examples of how it can be done. Finally, they have put

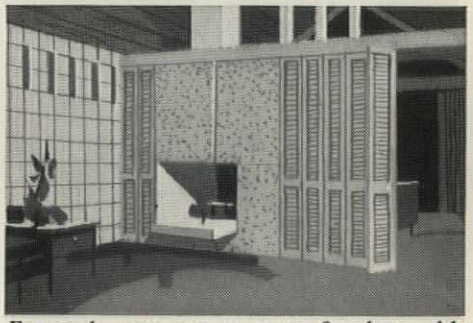
Continued on page 236

Award-winning home defeats Southwest's glare and winds with modern concrete

Regional design award winner, 1961 Concrete Industries Horizon Homes Program. Architect: Peters and Fields, AIA

In this snug desert home in Odessa, Texas, the architect has demonstrated the ability of concrete to fit the needs of design and locale. Patterned concrete masonry walls of the house itself are extended to enfold outdoor living areas. Protection is achieved with high decorative interest.

Used alone or blended with other materials, concrete offers today's architects structural efficiency and unlimited design opportunity. Readily formed, textured, colored, patterned to structural and decorative ideas, concrete is infinitely versatile . . . truly, the material of modern construction. *Plan to enter the 1962 Concrete Industries Horizon Homes Program.*



Exposed aggregate concrete fireplace adds drama to high-peaked living room. The distinctive detailing of interior walls is repeated with variations in outdoor areas.

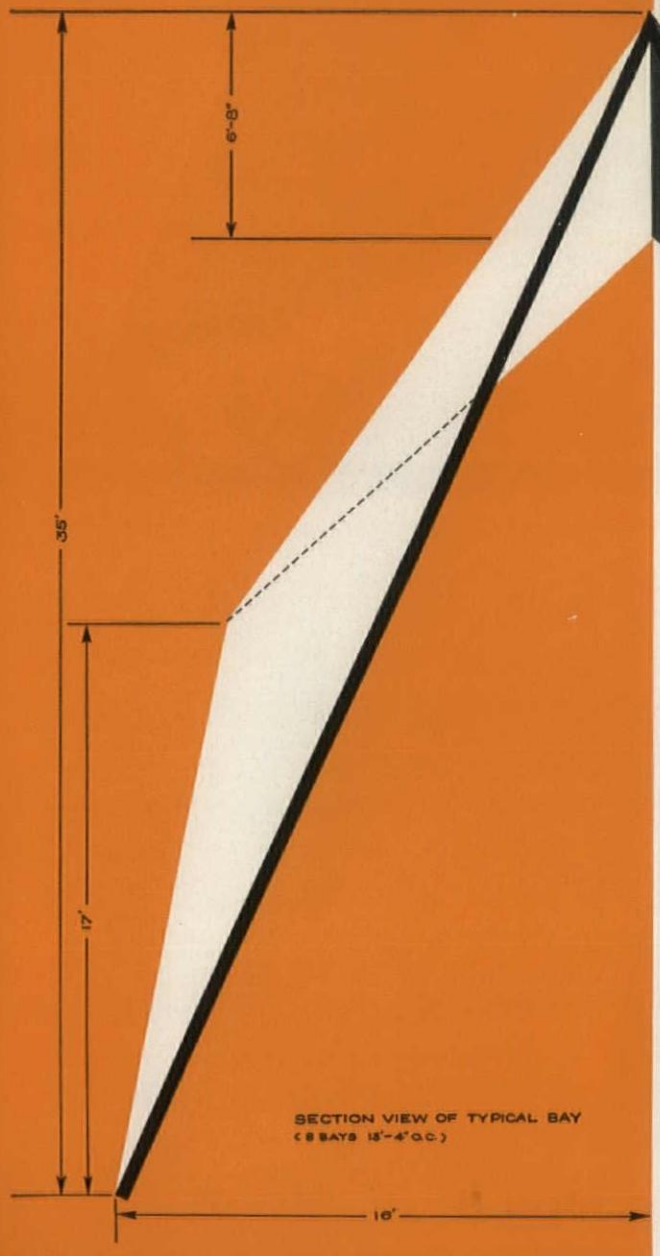
PORTLAND CEMENT ASSOCIATION *A national organization to improve and extend the uses of concrete*

office building cooled

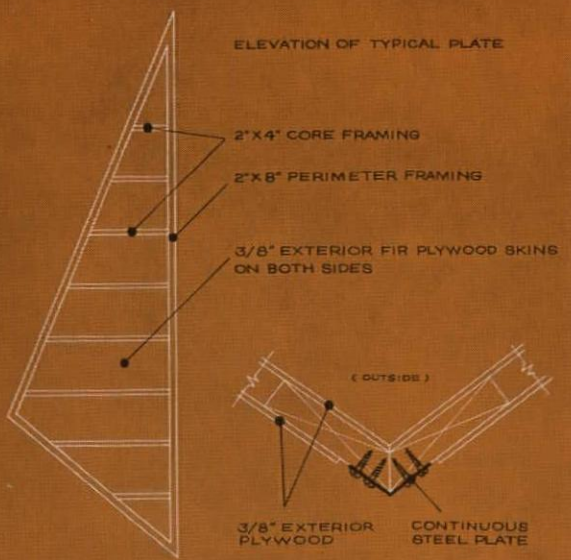
VISIT THE ARKLA GAS AIR-CONDITIONED SPACE NEEDLE AT THE CENTURY 21 SEATTLE WORLD'S FAIR.

Arkla's new 25-ton Gas Chiller-Heater—the DF-3000—has come to Phoenix in offices, churches and apartments. Reasons for its popularity: ▫ ***Heats or cools automatically—no boiler, no compressor*** ▫ ***Sealed for life, requires no lubrication*** ▫ ***Keeps same capacity for life of the unit*** ▫ ***No moving parts—no friction—in the heating and cooling cycle*** ▫ ***First large tonnage absorption air conditioner that also heats*** ▪ *For the whole story on the Arkla 25-ton DF-3000, call your local GAS company. Or write Arkla Air Conditioning Co., General Sales Office, 812 Main St., Little Rock, Ark.* ▪ *American Gas Association.* ***For Cooling & Heating... Gas is Good Business***

the most exciting ideas take shape in fir plywood



SECTION VIEW OF TYPICAL BAY
(8 BAYS 18'-4" O.C.)



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ARCHITECTS:	Manske & Dieckmann, St. Louis
COMPONENTS:	Roof Structures, Inc., Webster Groves, Mo.
BUILDER:	A. H. Haeseler, St. Louis

THE NINE SOARING PINNACLES of this church, recalling the boldness of Gothic arches, are a vigorous expression of advancing plywood technology. The roof is a space plane, a step beyond the folded plate with more versatility than any other clear-span technique using wood.

Like all folded plates, the space plane acquires strength and rigidity from interaction of inclined plywood diaphragms. But its components may take shapes other than rectangular, to create more complex designs. Here they are triangular stressed skin panels. Forces are transferred from one to another, and the entire multi-faceted roof becomes a lid-like shell, supported only at edges. Steel buttresses anchored to foundations absorb lateral thrusts. Clear-span area is 32′ x 110′.

The absence of framework or posts is only one of several advantages this roof shares with space planes in general. It went up fast (15 days); huge plywood components were precisely fabricated to insure exact fit. Prefabrication also guaranteed close cost control and quality of workmanship and materials. In-place cost compared well with other means of obtaining a similar span.

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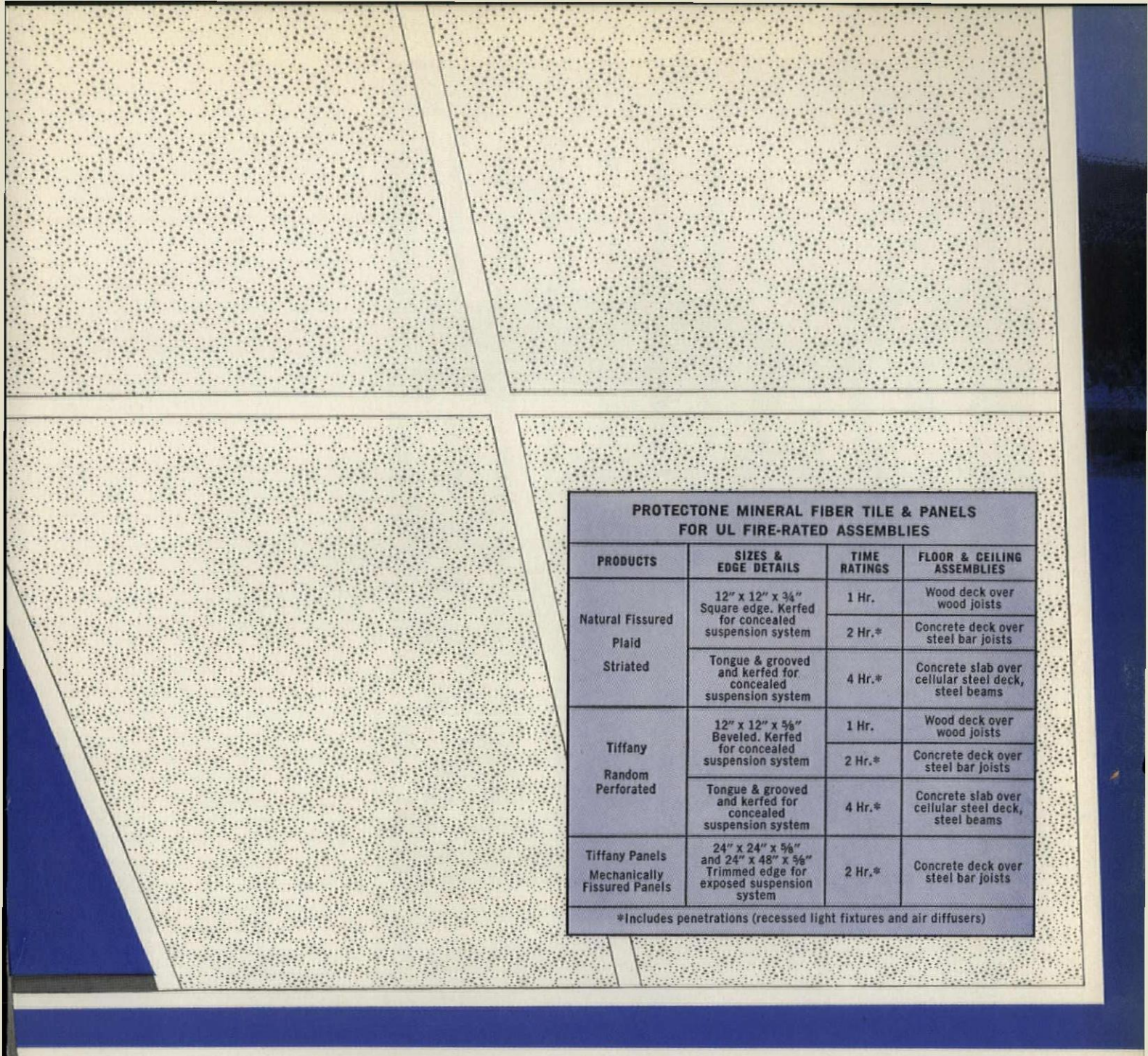

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Natural Fissured Plaid Striated	12" x 12" x ¾" Square edge. Kerfed for concealed suspension system	1 Hr.	Wood deck over wood joists
		2 Hr.*	Concrete deck over steel bar joists
	Tongue & grooved and kerfed for concealed suspension system	4 Hr.*	Concrete slab over cellular steel deck, steel beams
Tiffany Random Perforated	12" x 12" x ⅝" Beveled. Kerfed for concealed suspension system	1 Hr.	Wood deck over wood joists
		2 Hr.*	Concrete deck over steel bar joists
	Tongue & grooved and kerfed for concealed suspension system	4 Hr.*	Concrete slab over cellular steel deck, steel beams
Tiffany Panels Mechanically Fissured Panels	24" x 24" x ⅝" and 24" x 48" x ⅝" Trimmed edge for exposed suspension system	2 Hr.*	Concrete deck over steel bar joists
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For more information, turn to Reader Service card, circle No. 423

Continued from page 228

together—systematically and intelligently—the most comprehensive series of illustrations on the subject now available: drawings as well as photographs. If the automobile will fill 22.5 billion square feet of outdoor space and buildings by the end of the decade, hypothesizing ninety million vehicles at that time, this book has a tailor-made audience. Funaro and Baker's *Parking* (Reinhold, 1958) is still the standard work in America, but as a supplement, *Garages and Service Stations* will earn its keep on the shelf.

RICHARD P. DOBER
Executive Director
Sasaki, Walker & Associates
Watertown, Mass

In a Quiet Way, His Own Course

ARKITEKTEN KAY FISKER, *by Hans Erling Langkilde. Arkitektens Forlag, Nyhavn 43, Copenhagen (1960. 131 pp., illus. $7)*

Probably few architects in America are familiar with the achievement of Danish architect Kay Fisker, described in this delightful monograph. He is an architect who is content with what he is doing in his own country, pride in which motivates him greatly. Most of his work is in the field of domestic architecture, influenced at times by trends overseas, but respecting above all else the culture and way of life of Denmark. He seeks to do what he believes right in a quiet way; hence it is not surprising that his buildings have not been pioneering examples of new trends in architecture on the international scene. Yet we have much to learn from Kay Fisker. There are few men like him.

Fisker's birth in 1893 placed him in an important generation of trend-making architects, but Fisker set his own course, earning from his biographer a label as the foremost representative of classicist humanism. Langkilde writes: "This is presumably the most fitting formula for an attitude of mind which is not only deeply rooted in Danish building tradition but which has also been a decisive feature of the work of most of our best architects in the course of the last few generations."

In 1909, when he entered the Architectural School of the Royal Academy, a radical change in architecture was on its way: in Belgium and Holland there was the *art nouveau*, in Vienna the *Jugend* movement, in England the teaching of William Morris. In the Academy there was a reaction against authorized teaching, and although some students broke

Continued on page 238

Model 1016 EDA, one of the 1000 SERIES models chosen for The Upjohn Company's new general office building at Kalamazoo, Mich.

styled for the buildings you design... IT'S 1000 SERIES BY GF.

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GF
BUSINESS FURNITURE

Continued from page 236

away Fisker stayed on, contacted the liberal forces in other countries, and derived a philosophy from German and English town planners, from Wagner's and Behrens' functional constructivism, and from Danish civic architecture.

His earliest buildings (winning competition after competition) obtained inspiration from the domestic architecture of the region, which was somewhat romantic and at the same time quite precise. According to his biographer, Fisker's architecture earns its strength "from its simple and highly cultivated general effect. . . . His objective is a design where philosophy must comply with the given conditions of the task and with fundamental aesthetic requirements." He liked long houses, long and narrow—they were clear and precise, and in them it was easy to work with a rhythm of bays and windows. This philosophy was given further impetus during the German occupation in the 1940's, when only local materials were available.

From houses, Fisker went on to design multistory blocks of flats which have subsequently proved to be his greatest accomplishments. He not only varied the layout of buildings, and sought ways to permit the sun full access to each apartment, but also reduced the monotony of large areas by accenting bays with exterior stairs or other elements. In all of these designs, there is a strong reminiscence of traditional Danish elements—precise gables, warm textures, noble colors, good window proportions. His designs of 40 years ago are in many cases superior to what is being built today in American urban areas.

In the 1930's, exhibitions in Berlin and Stockholm gave a big push to functionalism as the departure point for architectural design. Most of Fisker's buildings, however, were built according to his original principles. Only a few had flat roofs, projecting bays, reinforced concrete, and the other hallmarks of this movement. Instead, Fisker relied on materials, contrasts, and "a controlled application of traditions."

In this same period he also did some work in naval architecture, respecting the demands of the sea for durability and quality. In a way he heralded Sir Hugh Casson's fine design of British ships 20 years later.

Fisker can teach us much about the elements of clarity, graphic conciseness, strength, proportioning, detail work, and logic. He also inspires us to continue the heritage of our own culture—where it is

Continued on page 240

This is the shape of good light as a photometer records it. At Gotham Lighting, photometry linked with mathematics forms the fundamental approach to luminaire design and development. For some units, a dozen or more exacting tests of the optical elements are required. These photometric explorations, at times, lead to modifications of just a few thousandths of an inch. And it is interesting to see how much difference even a few thousandths can make when you compare the performance figures of other units with those of **Gotham Lighting Corporation.**

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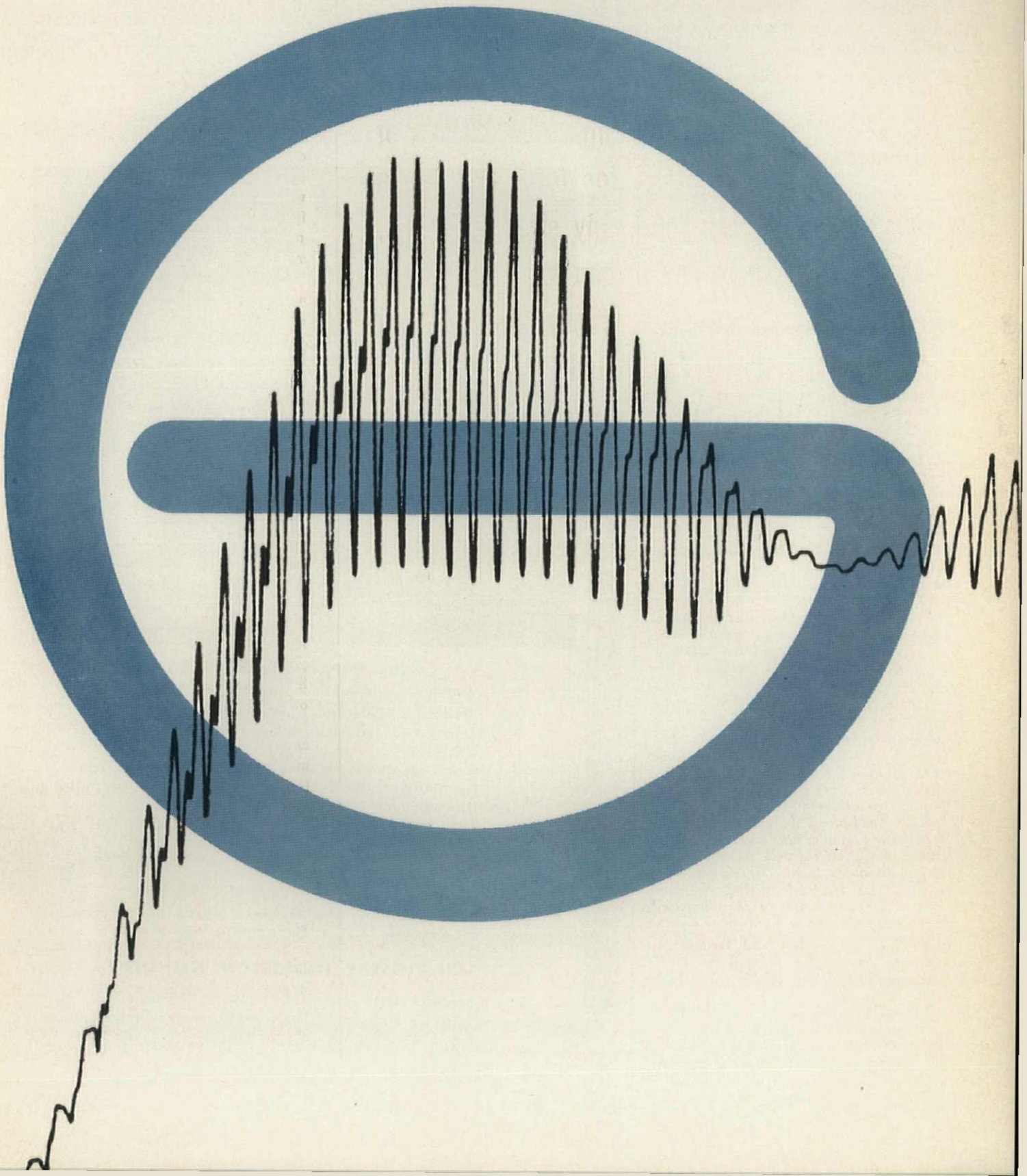

Continued from page 238

a viable one—and to stick to our principles. His is a refreshing and satisfying accomplishment, compared to so many of the architects today who seek to be different through striking, gimmicky innovations. Perhaps in Fisker lies the key to success of much Scandinavian architecture.

The book is in Danish, but has an excellent English summary, written in a smooth-flowing style by one well-versed in our language. It is good to see this after many unsuccessful dictionary-definition attempts elsewhere.

JEFFREY ELLIS ARONIN, AIA, RIBA
Architect
New York, N. Y.

OTHER BOOKS TO BE NOTED

American Architecture and Other Writings. Montgomery Schuyler. Edited by William H. Jordy and Ralph Coe. Harvard University Press, Cambridge 38, Mass., 1961. 664 pp., illus. $12.50

To be reviewed.

1961 ASHRAE Guide and Data Book. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 345 E. 47 St., New York 17, N. Y., 1961. 880 pp., illus. $12.50

Consolidation of two of the top reference books in this field: Heating, Ventilating and Air-Conditioning Guide *and* Air-Conditioning and Refrigerating Data Book. *The new reference is in two volumes: the 1961 volume on "Fundamentals and Equipment," the companion volume (to appear in 1962) on "Applications."*

Building Exits Code. (18th Edition). National Fire Protection Assn., 60 Batterymarch St., Boston 10, Mass., 1961. 256 pp. $1.50

An advisory code widely used for legal regulation in the interest of public safety. No loss of life is recorded for buildings where the requirements of this code have been met. New recommendations—on exits, exit lighting, signs—cover hospitals, nurseries, schools.

Coefficients for Analysis of Two- and Three-Span Continuous Beams of Constant Moment of Inertia. Stanley Engineering Co., Hershey Bldg., Muscatine, Iowa, 1961. 229 pp. $12.50

A direct and practical reference that makes it possible to avoid much of the tedious mathematics associated with structural analysis of continuous beams. Tables were prepared by an electronic digital computer, using a program based on the Simplified Three-Moment Equation Theorem.

The Cross as Symbol and Ornament. Johannes Troyer. The Westminster Press, Witherspoon Bldg., Philadelphia 7, Pa., 1961. 126 pp., illus. $4.50

A handsome publication, for architects, craftsmen, graphic artists, Troyer has hand-drawn some 100 crosses which date from before the Christian era through the Middle Ages. (First known crosses appeared in a solar wheel on cult stones in the Stone Age.) Text is minimal—small introductory sections plus short captions—but is interesting and is hand-lettered by Troyer.

The Death and Life of Great American Cities. Jane Jacobs. Random House, 457 Madison Ave., New York 22, N.Y., 1961. 458 pp., $5.95

To be reviewed.

Dictionary of Mechanical Engineering. Alfred Del Vecchio. Philosophical Library, Inc., 15 E. 40 St., New York 16, N.Y., 1961. 346 pp. $6

A dictionary of terms, arranged in alphabetical order, which provides short but precise definitions of expressions likely to be encountered by the practicing engineer, or students and teachers engaged in the fields of architecture, automatic controls, engineering mechanics, fuels and combustion, and power plants.

Encyclopedia of World Art. Volume IV: Cossa-Eschatology. McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36, N.Y., 1961. 416 pp. plus 468 plates. $39.80 (15-volume set: $597.00)

To be reviewed.

Failure and Repair of Concrete Structures. S. Champion. John Wiley & Sons, Inc., 440 Park Ave. S., New York 16, N.Y., 1961. 199 pp., illus. $6.75

British textbook, with comprehensive state-

Continued on page 245

Modern Door Control by

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Associated Architects:

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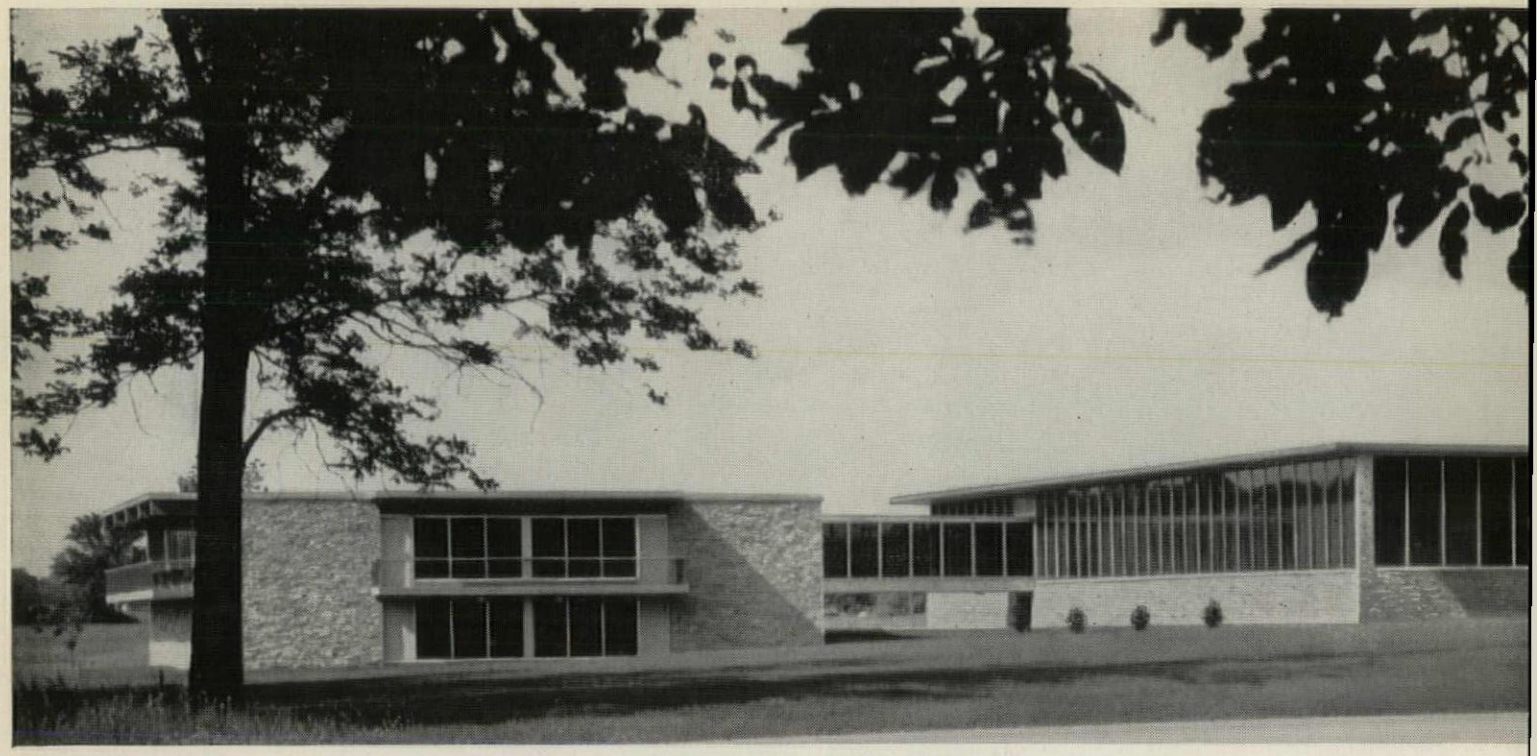
LCN CLOSERS, PRINCETON, ILLINOIS

Construction Details on Opposite Page



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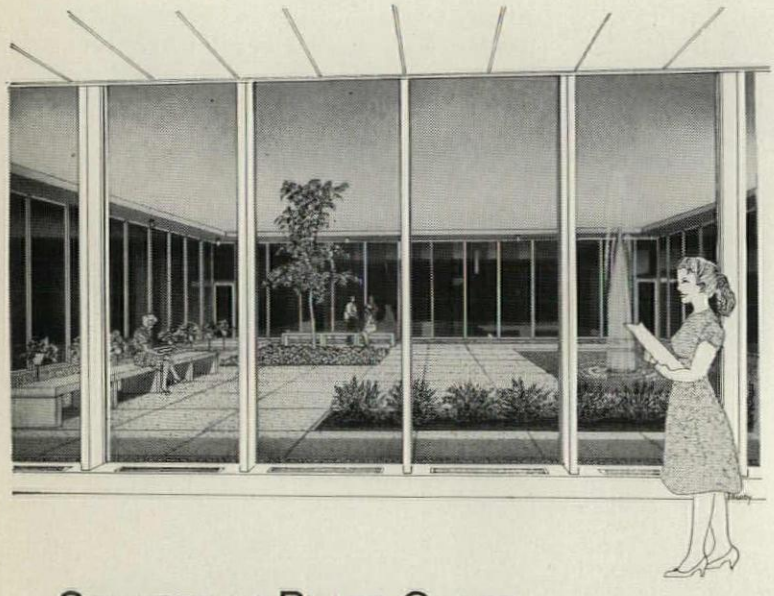
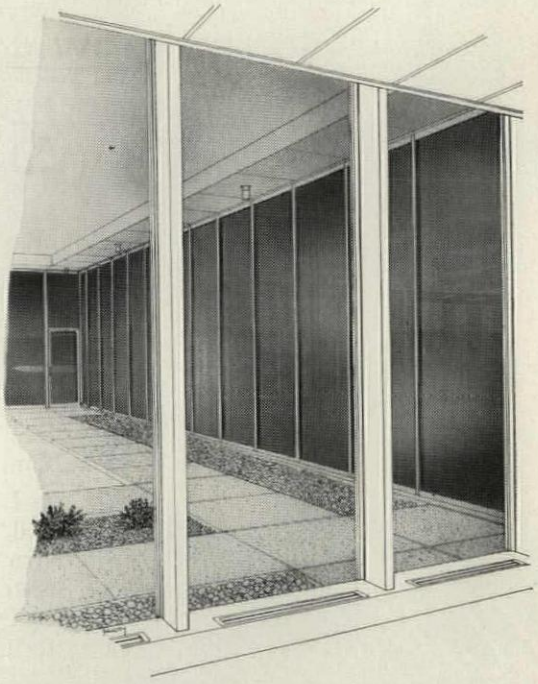


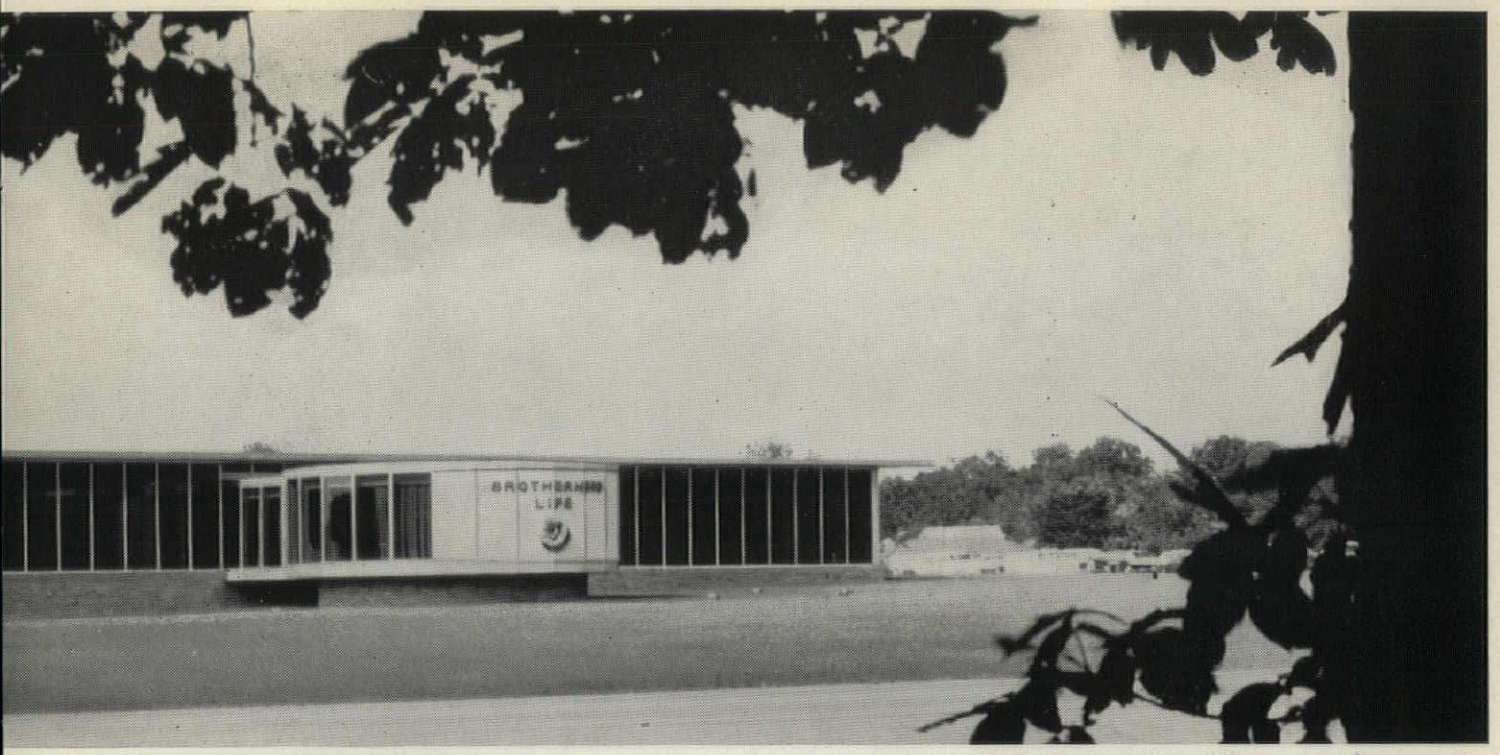
SOLARGRAY PLATE GLASS

This sketch of the interior court illustrates the wide use of SOLARGRAY in the Brotherhood Mutual Life Building. SOLARGRAY is a heat-absorbing and glare-reducing plate glass. Its soft gray tint absorbs about 50% of the sun's heat and reduces sun glare. Yet it permits plenty of light to come through, allowing a proper balance of natural and artificial lighting without creating color problems.



TWINDOW INSULATING GLASS

This view of the interior court illustrates the extensive use of TWINDOW in the Brotherhood building. TWINDOW is constructed of two panes of glass with a dry air space hermetically sealed in between. TWINDOW provides effective insulation all-year round. It reduces the amount of heat transferred through the window area . . . saves on heating and cooling costs, minimizes condensation and chilly downdrafts.



Architect: Orus Eash, Fort Wayne, Indiana
Contractor: Civilian Building & Supply Inc., Fort Wayne, Indiana

The Brotherhood Mutual Life Insurance Company Building, Fort Wayne, Indiana

Sunlight or snow . . . hot or cold—

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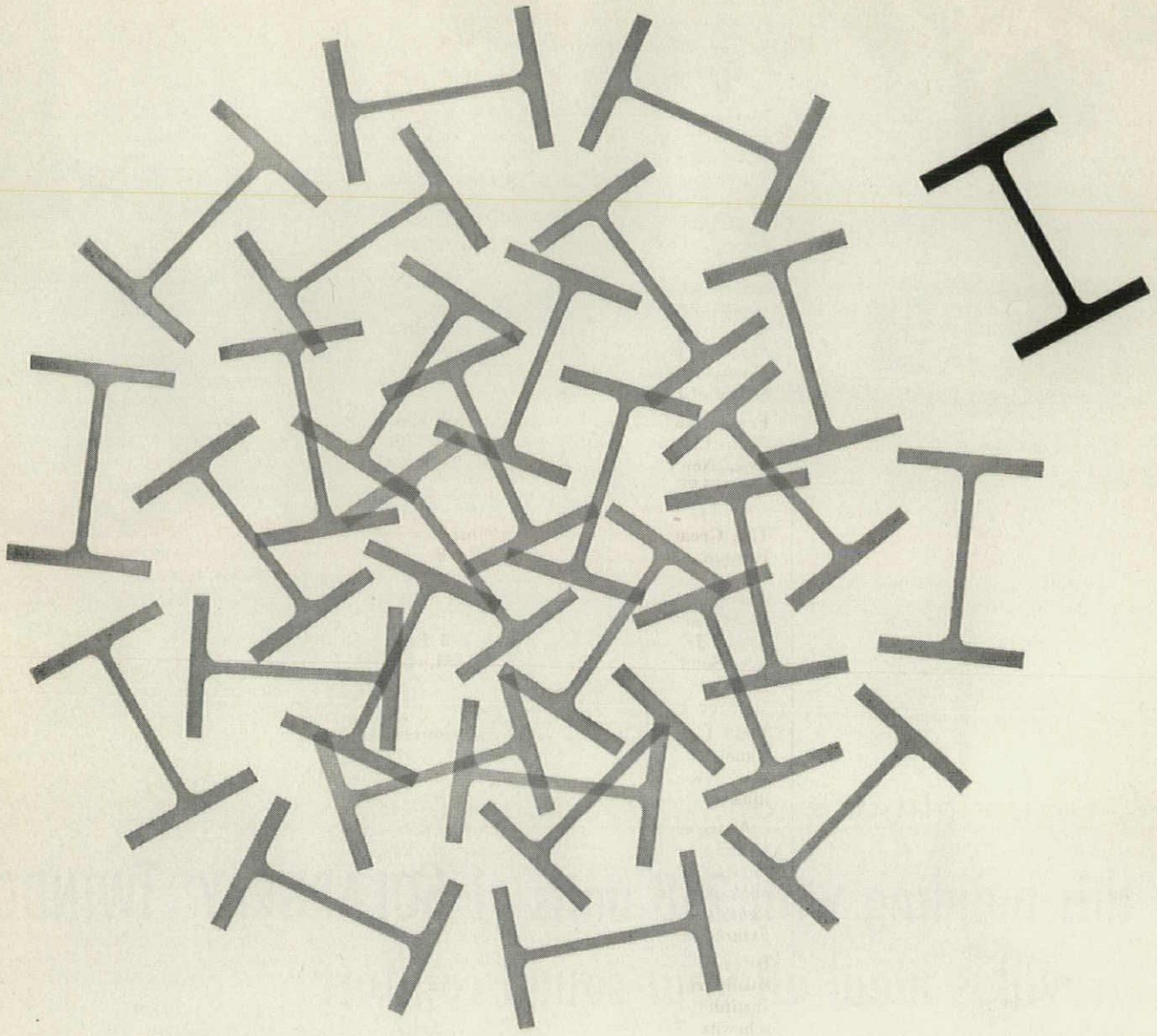

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ment on concrete difficulties that is "certain to influence future design, maintenance, and surfacing." Both chemical and mechanical deterioration are discussed, defining the limits of concrete as a structural material. The various methods of repair are detailed.

Food Service Planning: Layout and Equipment. Lendal H. Kotschevar and Margaret E. Terrell. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N.Y., 1961. 449 pp., illus. $11.75

Efficient and economical planning of the hospital, school, or industrial cafeteria. Book deals with such subjects as space allotment for all equipment, worker comfort, calculation of dining room size, plus the many aspects of refrigeration, acoustics, flooring, plumbing, shelving, conveyors. Authors are, respectively, at Michigan State University's School of Hotel, Restaurant and Institutional Management, and University of Washington's School of Home Economics.

Frank Lloyd Wright: A Biography. Finis Farr. Charles Scribner's Sons, 597 Fifth Ave., New York 17, N.Y., 1961. 293 pp., illus. $5.95

To be reviewed.

The Great Ages of World Architecture. Roman Architecture. Frank E. Brown. **Gothic Architecture.** Robert Branner. **Baroque and Rococo Architecture.** Henry A. Millon. **Modern Architecture.** Vincent Scully, Jr. George Braziller, Inc., 215 Park Ave. South, New York 3, N.Y., 1961. 128 pp. each, illus. $4.95 each

To be reviewed.

IES Lighting Fundamentals Course. Illuminating Engineering Society, 345 E. 47 St., New York 17, N.Y., 1961. 108 pp., illus. $3

Notes, explanations, and examples on basic lighting design and engineering; for use by instructors and students, but not a textbook in itself. Information covers physics of light, lighting terms, light sources, lighting fixtures, and lighting cost analyses.

Interior Design and Decoration: A Bibliography. Compiled for the American Institute of Decorators by Gertrud Lackschewitz The New York Public Library, Fifth Ave. and 42 St., New York 18, N.Y., 1961. 86 pp. $1 (paperbound)

A selective, annotated bibliography on the history, theory, practice, and elements of interior design. Items are keyed to the New York Public Library's classification system as additional aid to metropolitan users.

Materials for Architecture. Caleb Hornbostel. Reinhold Publishing Corp. 430 Park Ave. New York 22, N.Y., 1961. 610 pp., illus. $20

To be reviewed.

Megalopolis: The Urbanized Northeastern Seaboard of the United States. Jean Gottmann. The 20th Century Fund, 41 E. 70 St., New York 21, N.Y., 1961. 810 pp., illus. $10

To be reviewed.

Mid-Century Architecture in America: Honor Awards of the American Institute of Architects, 1949–1961. Foreword by Philip Will, Jr. Edited by Wolf von Eckardt. The Johns Hopkins Press, Baltimore 18, Md., 1961. 254 pp., illus. $12.50

To be reviewed.

Old Louisville. Margaret M. Bridwell and Theodore M. Brown. University of Louisville, Box 6, Louisville 8, Ky., 1961. 68 pp., illus. $1.75 (paperbound)

An excellent survey of residential architecture remaining from the late 19th Century, and a strong general plea for its conservation within the framework of urban renewal.

The Planning of a New Town: Data and Design Based on a Study for a New Town of 100,000 at Hook, Hampshire. London County Council, County Hall, London S.E. 1, 1961. 182 pp., illus. 50s

To be reviewed.

Prestressed Concrete Cylindrical Tanks. L. R. Creasy. John Wiley & Sons, Inc., 440 Park Ave. S., New York 16, N.Y., 1961. 216 pp., illus. $6.75

Simplified methods for the design of cylindrical storage tanks. Among other aspects, the book discusses the modification generally required to the conventional prestressing systems when these are applied to cylindrical structures, shell-roof analysis, alternative joint methods. A number of prestressed tanks now in service are described.

Principles of Air Conditioning. V. Paul Lang. Delmar Publishers Inc., Mountainview Ave., Albany 5, N.Y., 1961. 340 pp., illus. $6.25

Text written by Technical Editor of Carrier Air Conditioning Company. Intended as terminal instruction for those who plan, install, and maintain air-conditioning systems; as preparatory instruction for those who will go into advanced phases (design and engineering) of this work.

Recent Prison Construction 1950–1960. Federal Bureau of Prisons, 1961. Distributed by Federal Prison Industries, Inc., Leavenworth, Kansas. 92 pp., illus. $2.50 (paperbound)

Supplement to the Federal Bureau of Prisons' Handbook of Correctional Institution Design and Construction *(1949), this volume illustrates, describes, and evaluates 26 new institutions—among them major institutions, jails, workhouses, and detention facilities.*

Simplified Mechanics and Strength of Materials (Second Edition). Harry Parker. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N.Y., 1961. 285 pp., illus. $6.75

Basic practical information presented without the use of advanced mathematics. Revised edition reflects the continual development of new materials and the changes in unit stresses and design requirements.

Space for Living: Landscape Architecture and the Allied Arts and Professions. Edited by Sylvia Crowe. Djambatan, 41 Viottastraat, Amsterdam, The Netherlands, 1961. 140 pp., illus. $10

To be reviewed.

The Turning Point of Building: Structure and Design. Konrad Wachsmann. Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y., 1961. 239 pp., illus. $15

To be reviewed

Wood in Architecture. Finn Monies. F.W. Dodge Corp., 119 W. 40 St., New York 18, N.Y., 1961. 111 pp., illus. $6.95

To be reviewed.

NOTICES

New Addresses

ALBERT ALPER, Structural Engineer, 2050 Woodson Rd., St. Louis 14, Mo.

HANS A. FEIBUSCH, Consulting Engineer, 110 Market St., San Francisco 11, Calif.

FREDERICK G. FROST, JR. & ASSOCIATES, Architects, 30 E. 42 St., New York 17, N.Y.

IRA KESSLER, Architect, 25 W. 43 St., New York 36, N.Y.

CLINTON MARR, Architect, Standard Insurance Building, Suite 321, 3380 Fourteenth St., Riverside, Calif.

DAVID SHOLDER, Architect, 1133 E. Missouri Ave., Phoenix 14, Ariz.

J. STEWART STEIN, Architects-Engineers, 159 N. Dearborn St., Chicago 1, Ill.

J. GEORGE SZEPTYCKI, A.I.A., ARCHITECT AND ASSOCIATES, 7188 Sunset Blvd., Los Angeles 46, Calif.

LAURENCE M. WERFEL, Architect, 75-03 Main St., Flushing 67, N.Y.

New Firms

NICOLAS R. ARROYO, Architect, 1310 Eighteenth St., N.W., Washington 6, D.C.

BERTRAM A. BRUTON, Architect, Capitol Hill Finance Bldg., 2239 E. Colfax Ave., Denver 6, Colo.

PETER CALLINS, CYRUS H. WAGNER, principals in firm of CALLINS WAGNER, Architects, 146 Olmos Drive W., San Antonio 12, Texas

EDWIN T. PAWLOWSKI, Architect, 804 First National Bank Bldg., Johnstown, Pa.

ALEXIS SMISLOVA, THOMAS CARCATERRA, principals in firm of SMISLOVA & CARCATERRA, Consulting Engineers, 8719 Colesville Rd., Silver Spring, Md.

New Partners, Associates

MILLARD J. ARCHULETA, JR., named Partner in firm of BURKE, KOBER & NICOLAIS, Architects and Engineers, Los Angeles, Calif.

J. ARMAND BURGUN, made Associate in firm of ROGERS & BUTLER, Architects, New York, N.Y.

LERON A. HESTER, appointed Associate in firm of BLUROCK, ELLERBROEK & ASSOCIATES, Architects and Planners, Corona del Mar, Calif.

FRANK PAUL ORLANDO, EMMANUEL J. REMPELAKIS, made Associates in firm of EDWARD J. TEDESCO ASSOCIATES, Architect, Woburn. Mass.

Elections. Appointments

LOUIS S. BEAL, joined the staff of I.S.D., INC., the interior space design division of PERKINS & WILL, Architects.

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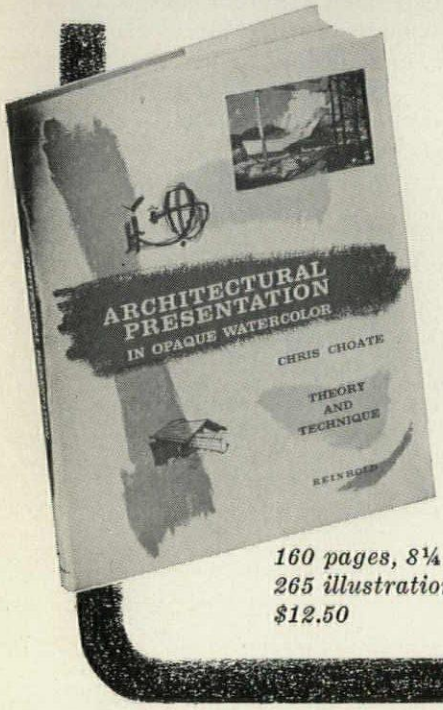

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SHERMAN SCHNEIDER, appointed Project Architect, in firm of CHARLES LUCKMAN ASSOCIATES, Planners - Architects - Engineers, New York City and Los Angeles.

ROBERT LEWIS MANN, appointed Member in Charge of Parks and Recreation; R. JACKSON SEAY, JR., appointed Member in Charge of Planning; PAUL DORR WOLFE, appointed Member in Charge of Office Management, in firm of SIMMONDS AND SIMONDS, Landscape Architects-Planners, Pittsburgh, Pa.

WALTER F. SPIEGEL, appointed Chief Engineer of Building Services in firm of EVERETT, ALVARE, HARKINS & GILBOY, Architects, Norristown, Pa.

Name Changes

RUTH, HUDDLE, WHITE AND HOWE, Architects, 1720 Euclid Ave., Cleveland 15, Ohio. Formerly HAYS AND RUTH, Architects. J. BYERS HAYS will continue as consultant to the successor firm.

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Acquisition

H. L. YOH COMPANY, INC., Industrial Consultants, announce the acquisition through stock purchase of DAY AND ZIMMERMANN, INC., Engineers and Constructors.

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A. S. CHALFANT elected President of A. M. BYERS CO. SAMUEL SALEM was elected Chairman of the Board.

CHARLES J. MELOUN, named General Manager of GENERAL ELECTRIC'S Outdoor Lighting Department. J. STANFORD SMITH was elected Vice-President and heads its newly created Marketing and Public Relations Services.

C. T. PERKINS named Chairman of the Board of MODINE MANUFACTURING COMPANY, succeeding ARTHUR B. MODINE, who has retired.

GEORGE C. ROPER promoted to Manager of Real Estate and Architectural Design for INTERNATIONAL BUSINESS MACHINE'S Eastern Region.

IRV WESCOTT named Sales Promotion and Advertising Manager of CURTIS-ELECTRO LIGHTING CORP., marketing division for subsidiaries of ELECTRO CONSOLIDATED CORP., which recently acquired CURTIS-ALLBRITE CORP. of Chicago.

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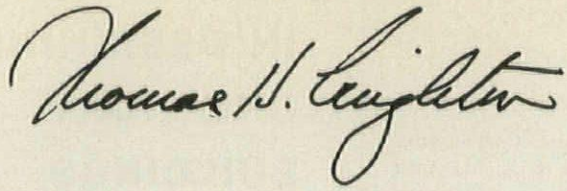

P.S.

The Art of Seeing is a simple one that is cultivated by too few of us today. It is astonishing how much more full, how much more interesting life can be when we are really visually aware of the world around us. I have been doing a good deal of reading in the various fields that make up this unrecognized art, and I find myself much more conscious of the things that confront the eye—as one walks along the street, as one enters or leaves a building, as one moves in a car or a train, and even as one sits in a presumably familiar space. If life is action based on and influenced by the environment we live in, then complete perceptual awareness of the objects that make up that environment—from the pencil in our fingers to the city we live in—is surely a necessity. Yet most of us are visually blind (we don't really look at our world) or visually selective (we see just what we want to see, and ignore the rest).

I believe that we would be more intelligently critical of the environment if we did make more of an effort to see it in some depth. It's interesting to me, and a little frustrating, that the many psychological studies in the field of visual perception are concerned only with passive seeing. When the eyes are open, certain images appear on the retina, and certain perceptions are translated from these by the brain, through a fascinating physical and physiological set of processes. The psychology of this procedure has been endlessly studied, and there are several dozen theories regarding depth perception, color perception, form perception, and so on. Almost none of them, however, make the bridge between simply seeing, and understanding what one sees. A seen object can be studied, it can be analyzed, to some extent it can be understood. One can see carefully, or one can just look and pass on to the next image.

The reason that I think this step between passive perception and analytical perception is particularly important for an architect is that it can lead to further stages in the art of seeing, which are important to the art of design. Once one has seen a given object, and then studied and analyzed that object, it becomes possible to evaluate it, and then to criticize it. Only when an object has been perceptually analyzed, can it be measured by value scales. What is its form, its shape, its size? What color, what texture, what physical characteristics does it have? How was it made, out of what materials, by what processes? When these and other characteristics are known, one can decide: what is it worth—in money, in use, in the pleasure it can give, and in many other ways. And then, and only then, does one really have the right to criticize: to say, "It is good," or it isn't; to say, "I like it," or not. The final stage of perception, of course, is to base some sort of action on the critical appraisal that follows the evaluation that comes from understanding of the objects seen. Then we can productively and purposefully use those things that make up the visual environment, or find ways to improve them intelligently.

So I think that architects should learn the art of seeing, as a first step to the arts of planning and designing buildings. And they should help others to become visually conscious. Perhaps the unconsidered, completely subjective appraisal of architecture—"I don't know anything about it, but I know what I like"—can be slowly replaced if all of us try to understand the things we see. Of course, it might be replaced with a bitter reaction: "I know quite a bit about it now, and I don't like it." But that might prove to be very healthy. If we had more *informed* criticism of architecture and the other arts, the professional performance itself might improve.