CINCINNATI'S NEW PLAYHOUSE: UNCOMMON ARCHITECTURE FROM COMMON MATERIALS

TOWER EAST: NEW OFFICE LANDMARK FOR CLEVELAND

SCHOOLS: TWO STRIKING EXAMPLES OF CHARACTER AND CONTINUITY

BUILDING TYPES STUDY: HOSPITALS—PLANNING FOR AUTOMATION

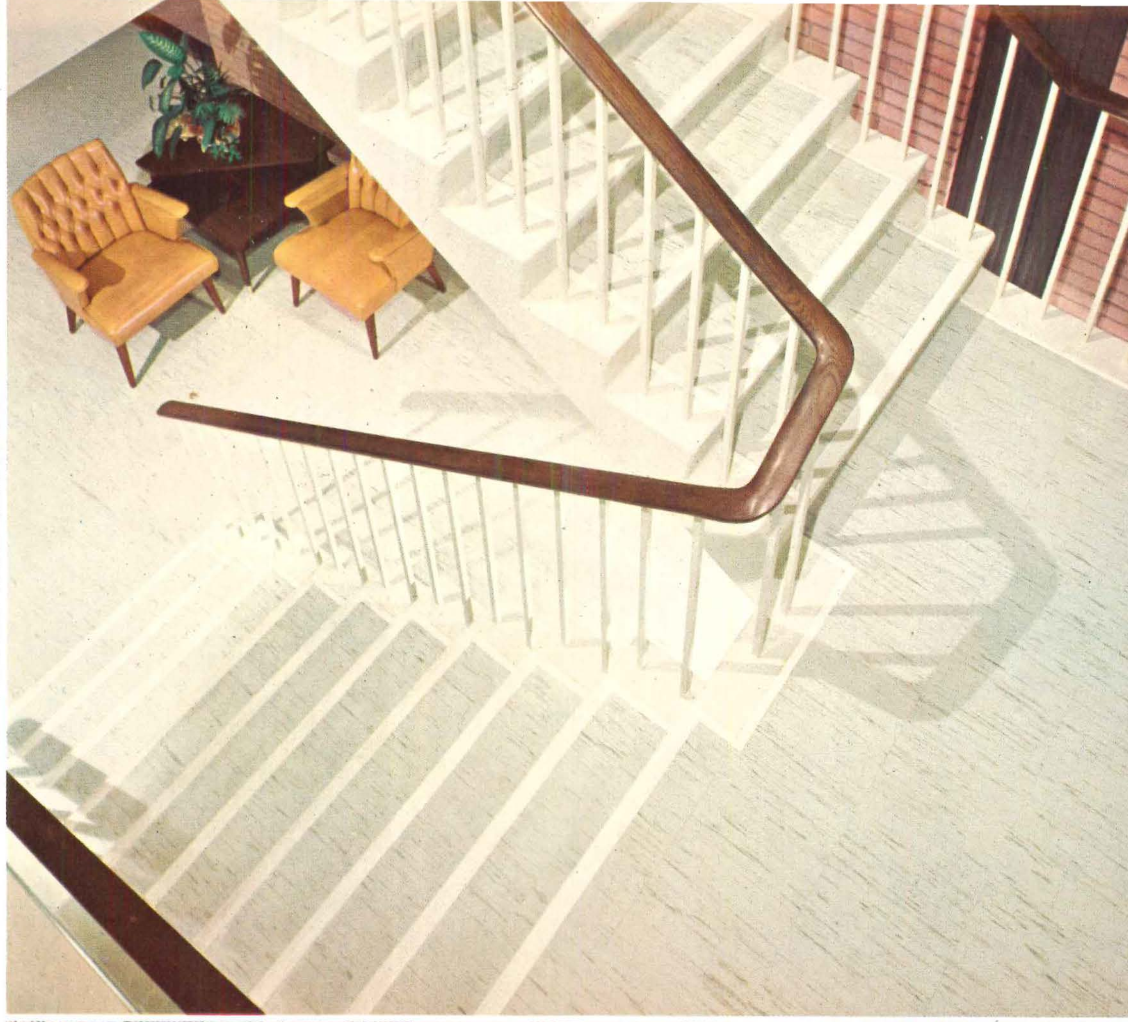
FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD

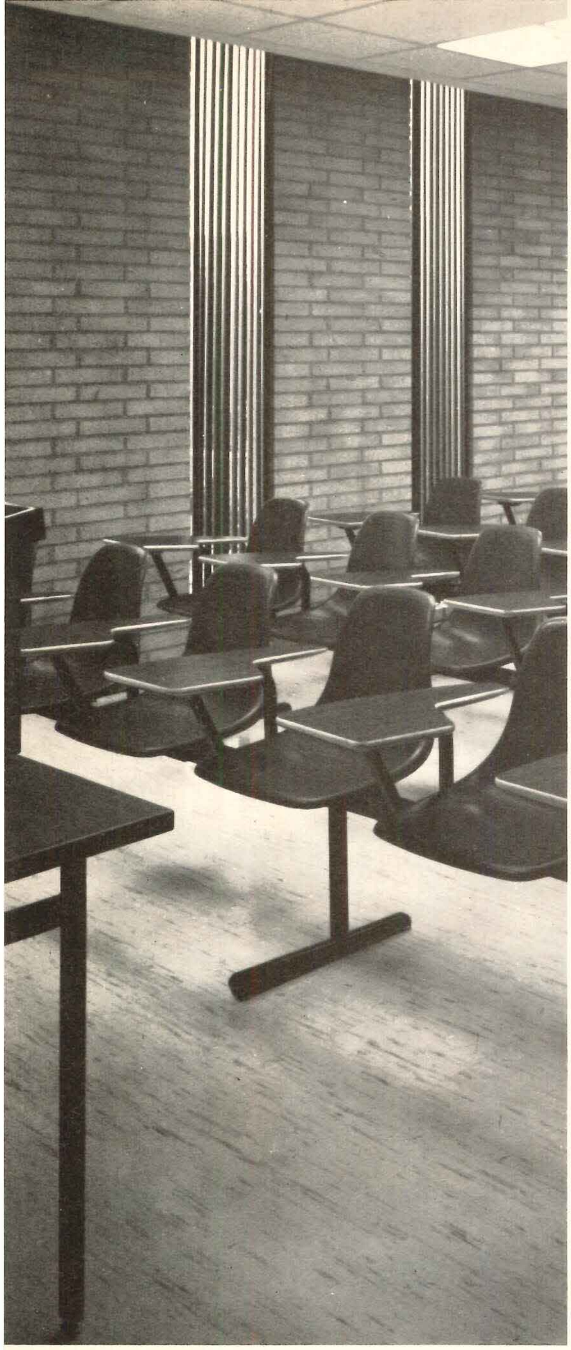
MARCH 1969 **3** A McGRAW-HILL PUBLICATION TWO DOLLARS PER COPY

The gleaming 12-story Waite Phillips Hall in Los Angeles houses all primary activities of the USC School of Education, the largest in the West and one of the oldest in the nation. **Architect:** Edward Durell Stone, Los Angeles. **General Contractor:** Collins & McPherson, Los Angeles. **Flooring Contractor:** Tri-Way Contractors, Los Angeles.

The choice of flooring for this new campus building was based on a simple and obvious goal. Practicality. Hence, carpet was limited to executive offices, library, and special-purpose rooms. In classrooms, general offices, corridors, and stairways—more than two-thirds of the total floor area—Armstrong Excelon Vinyl-Asbestos Tile was used. Specifically, over 56,000 sq. ft. of $\frac{3}{32}$″ gauge, 12″ x 12″ Standard Excelon. Its tight-mottled graining disguises the scuffs left by students' footwork. Practical, and then some. Because Standard Excelon is a handsome addition to the grace and beauty of this modern building.



The floor plan of a campus



The use of a single Excelon pattern and color throughout the USC installation achieves a pleasing unity of design. And since the graining of the tile runs in one direction, the floor appears seamless. Something else about the graining. It goes all the way through the tile, so it won't fade away or show traffic lanes.

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building. In planning a new University of Southern California Building, the architects called for a durable floor on a limited budget. Their choice: Armstrong Excelon® Tile.

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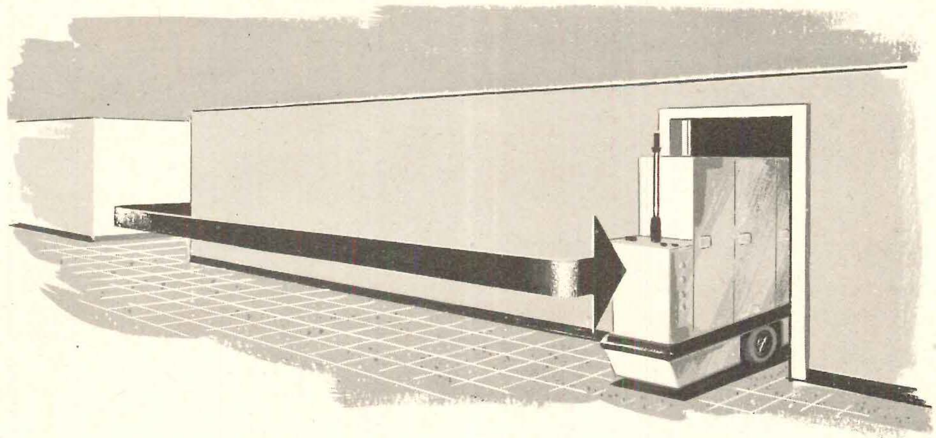
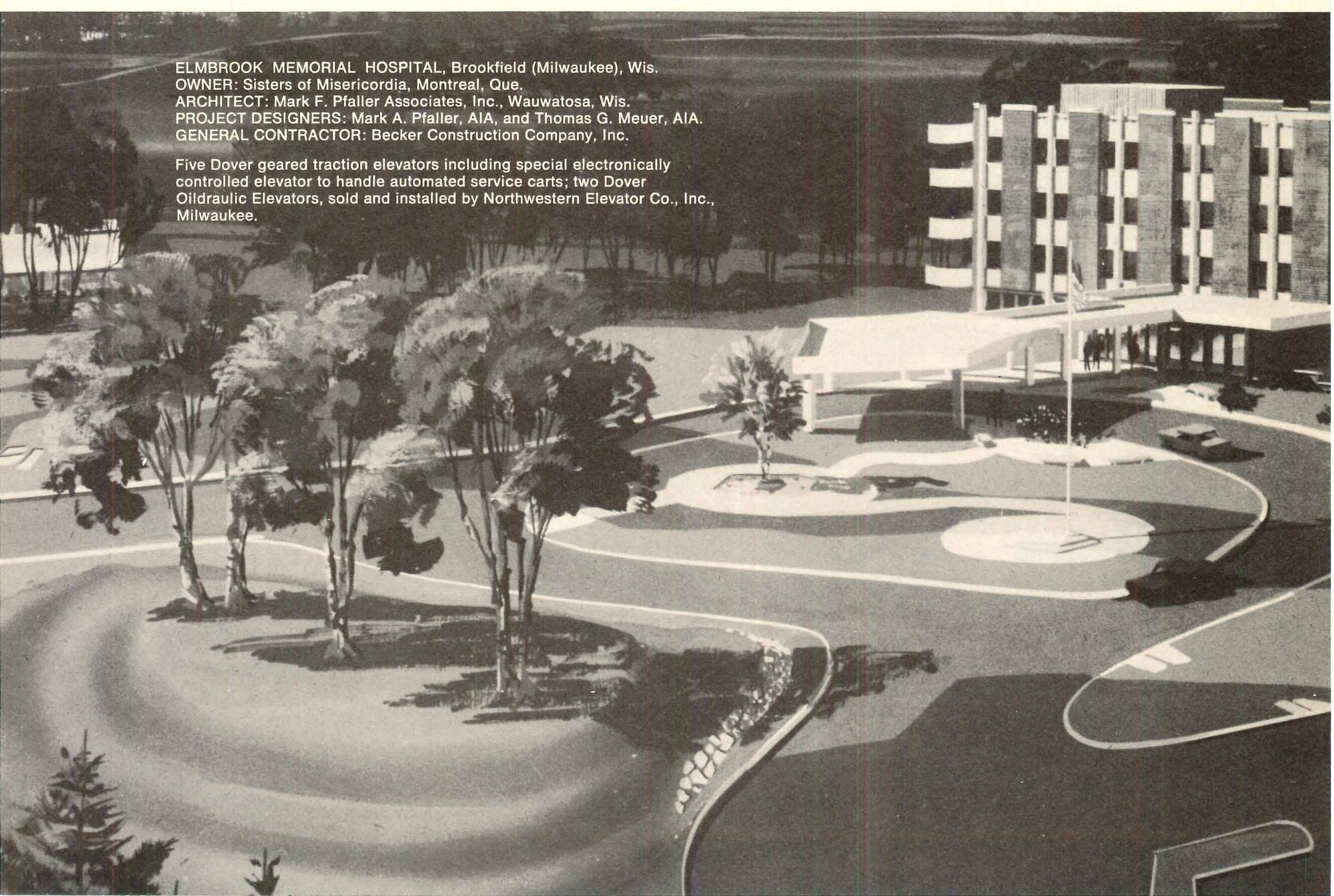


Dover innovates elevator to handle electronically guided service carts in new hospital



ELMBROOK MEMORIAL HOSPITAL, Brookfield (Milwaukee), Wis.
OWNER: Sisters of Misericordia, Montreal, Que.
ARCHITECT: Mark F. Pfaller Associates, Inc., Wauwatosa, Wis.
PROJECT DESIGNERS: Mark A. Pfaller, AIA, and Thomas G. Meuer, AIA.
GENERAL CONTRACTOR: Becker Construction Company, Inc.

Five Dover geared traction elevators including special electronically controlled elevator to handle automated service carts; two Dover Oildraulic Elevators, sold and installed by Northwestern Elevator Co., Inc., Milwaukee.

Driverless carts which will distribute food, medicines and supplies throughout the Elmbrook Memorial Hospital, Brookfield, Wis., will ride a special elevator designed and built by Dover.

The electronically guided carts will be programmed for pre-determined delivery routes, following a high-frequency wire buried in the floors. To go from one floor to another, they will call the special elevator electronically, enter when the doors open, exit at the proper floor and proceed to a preset stopping point, all without human assistance.

The labor-saving distribution method was designed by Amsco Systems Co., Division of American Sterilizer Company, Erie, Pa. An adaptation of Dover's Computamatic® automatic control system was developed to handle the special needs of the elevator required.

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Dover's wide experience in elevators for the special needs of hospital service can be helpful to you in planning a new or remodeled hospital or an addition to present facilities.

Contact your local Dover Elevator representative for assistance, or write for catalogs. Dover Corporation, Elevator Division, Dept. D-3, P.O. Box 2177, Memphis, Tenn.–38102

DOVER
the elevator innovators

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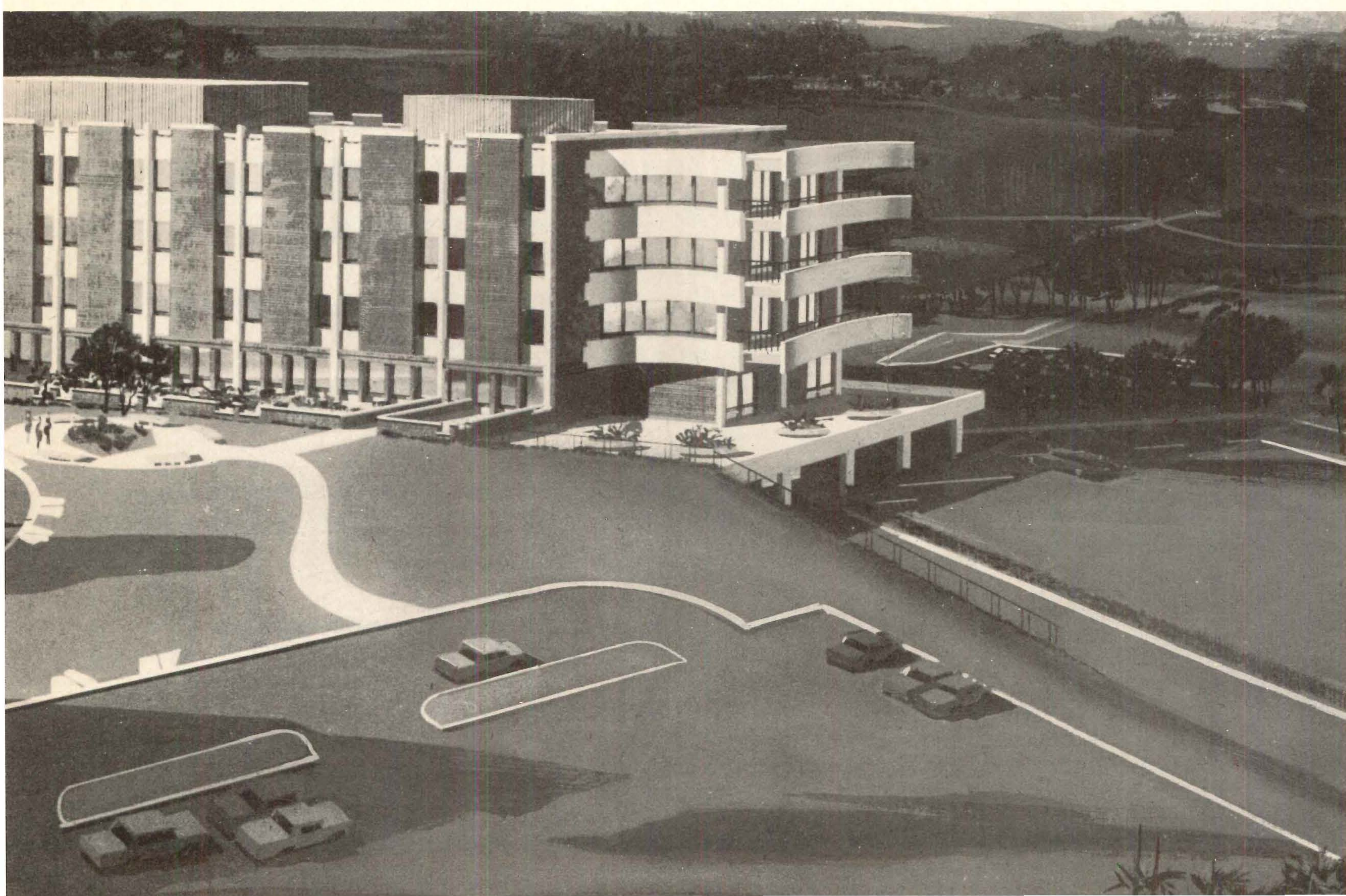

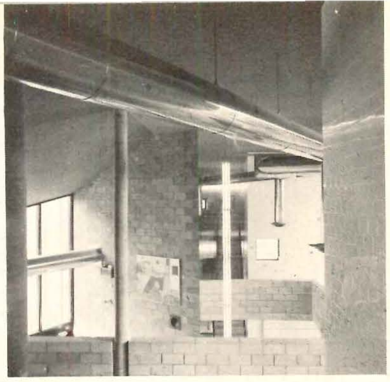

Cover: Robert S. Marx Theater
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ARCHITECTURAL RECORD

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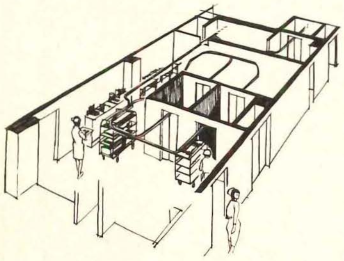

ARCHITECTURAL ENGINEERING

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COMING IN THE RECORD

STARTING A SUCCESSFUL PRACTICE: EARL R. FLANSBURGH AND ASSOCIATES

When Earl Flansburgh left TAC to start his own firm in Cambridge, Massachusetts several years ago, he elected to stay in the Boston-Cambridge area, which has more good architects per square block than exist in such concentration anywhere else in the United States. He has a 40-man firm now and gets his share of the interesting work. The April issue will tell how he goes about it.

TALL OFFICE BUILDINGS—THE PROCESS OF THEIR DEVELOPMENT

No other building type has more rules and habitual conventions applied to its design than does the high-rise city office structure. Next month's Building Types Study will focus on the processes by which the architect, the owner, and the city may apply these conventions, and sometimes break them, to achieve innovative solutions in office planning, the creation of urban spaces, and the design of the building itself.

McGraw-Hill

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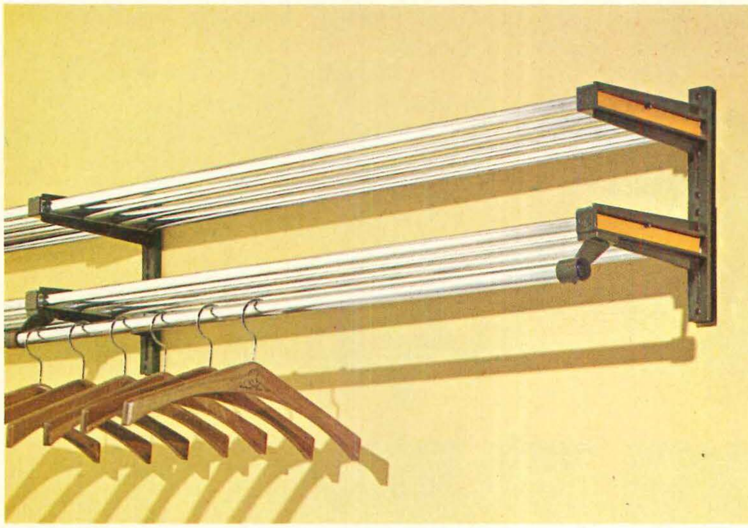
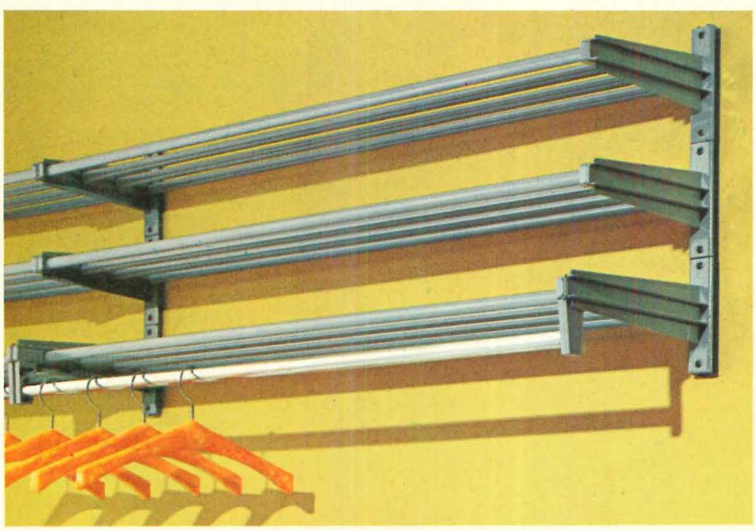


"Citation" aluminum rack with colorful vinyl inserts



"Sentry" enamel finish all-steel rack with chrome hanger rail

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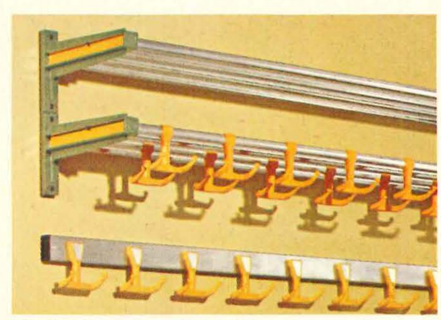

Hooks mount to rail or shelves

Nylon hooks in select decorator colors

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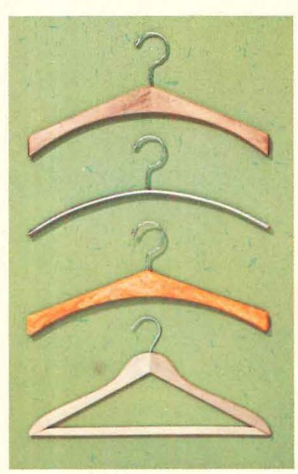

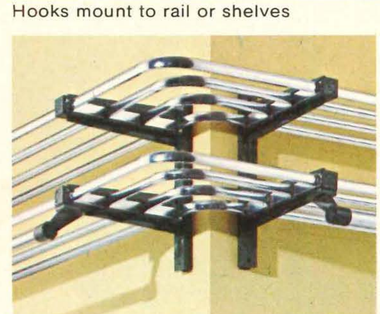

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Some random thoughts on downtown Italy

I got back just three days ago from a two-week trip to Italy. The whole thing was made possible by an invitation from the Azienda Autonoma di Soggiorno e Turismo, Venezia (the tourist office) to attend a press conference on the proposed Palazzo dei Congressi and Biennale building for Venice designed by Louis Kahn. Those of us invited from the U.S. wondered (though of course we didn't ask) just why Vito Chiarelli (the president of the tourist office) chose to hold the press conference in the Doges's Palace on the Piazza San Marco instead of the Plaza Hotel on 59th Street—until we realized (see Buildings in the News, page 40) that the Venetians' goal is not the construction of a new building but nothing less ambitious than (their favorite English word) revivification of their city. What the city needs is tourist business—and not just in the summer.

With enough year-round tourist business (including the conferences and happenings that Kahn's new buildings are designed to stimulate), Venice might just be able to finance meaningful efforts to keep the whole confection from sliding into the Canal in pretty pink Byzantine pieces.

Having opened in Venice, I drove to Padua, Verona, Sermione (which is what Provincetown, Massachusetts and LaJolla, California wanted to be) and Milan, later took the train to Rome and snuck in a one-day side-trip to Florence.

On the basis of a barely sub-sonic visit like that, I'm not about to attempt any kind of serious analysis of recent architecture and building in Italy (you'll get that in pieces when I've had a chance to think about what I saw and heard).

But maybe some purely personal impressions (in no special order) are valid reminders in these days of environmental systems analysis:

The appeal of pedestrian spaces for our cities takes on a whole new meaning when you've shopped or just strolled for the sheer pleasure of it anywhere in Venice or in the older sections of Padua or Verona or Rome. Life is everywhere (instead of automobiles being everywhere). You get the rare feeling that human beings are important and that the streets and shops and hotels and fountains and piazzas and restaurants are for the use of people—or, maybe even for enjoyment by people.

Not that I'm against or unrealistic about automobiles. But I find I'm asking again if ours *really* need to be so big. In Rome, where there is an awful lot of in-city traffic, they squeeze in an extra lane both ways on the Via Veneto simply because the cars are smaller. There are a few other automotive-oriented random thoughts:

The international signing system along roads is not only much clearer than our wordy, complex, and many-shaped system; but the smaller signs are less intrusive (though no less noticeable) and, mostly, quite handsome graphically. I suppose there's some good reason why we haven't adopted it.

Similarly, roadside billboards are smaller and close to the road. Thus they are part of the road, not part of the landscape, and I mind this much less.

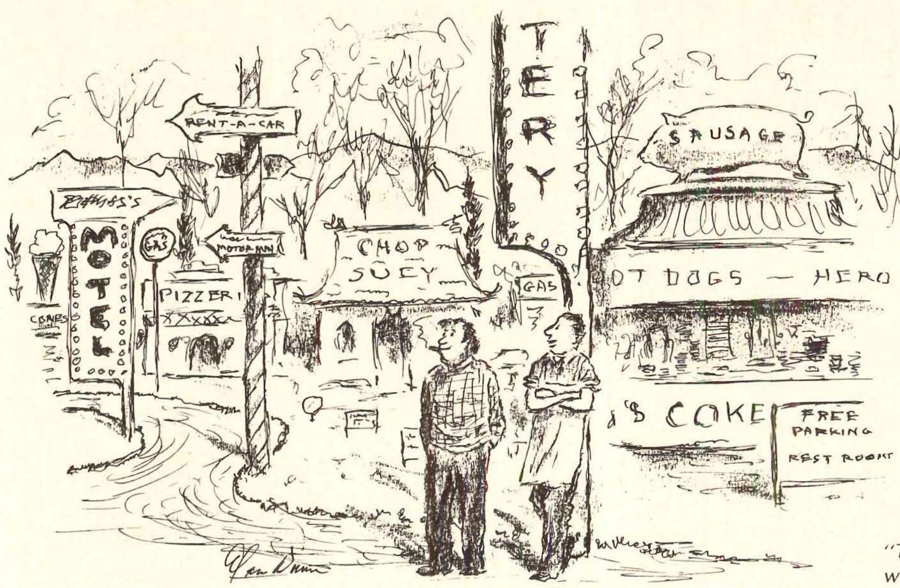
My second-favorite discovery along the roads in Italy was that the proprietors of the roadside gas stations and restaurants are willing to make the civilized assumption that the motorist knows whether he is hungry or needs gas without a series of large neon signs starting three miles out.

My first-favorite discovery is that you can get gas and oil and water for your car without gas stations. The Italian system of tucking four small (chest-high) pumps along 12 feet of curb makes an awful lot of sense. The whole thing is about as obtrusive as a bus stop.

And I can't think why this effort to "disappear" gas stations isn't a better idea than our efforts to make them beautiful.

I got some special enjoyment out of seeing for the first time some of the "Essentials of Urban Space" that architect David Specter photographed so beautifully (RECORD, January). Seeing them was a reminder (and what a good reminder for an editor) that if one picture is worth one thousand words, 10 minutes of being there is worth one thousand pictures. The visit was a good reminder (as we all hoped Specter's pictures were when we published them) that there are environmental values that we have mislaid. A fountain can make your day. If fluorescent and/or mercury lighting is essential to your well-being as a motorist at 60 miles per hour, incandescent lighting is essential to your well-being as a pedestrian strolling down a street. Arcades are marvelous—they enable you to forget cars whizzing by just three feet away and enjoy the pedestrian scene. Color—in awnings and buildings and sidewalk restaurants—is a treat we should get more of. Signs that protrude over the sidewalk should be prohibited—if no one is permitted to scream "here I am," then no one has to do it. And everyone is back in the same much more pleasant boat. Of course, one could run on and on. About the trains. About the urbane food in the little towns (ever try to get a good meal in Rockford, Illinois?). About the marvelous blending of business and residential spaces not just within a neighborhood but within buildings (don't you wish your office were an elevator ride from your apartment?). One could also write a very long list of things that are wrong with the environment and way of living in Italy. I guess my only point is this: this two-week trip was sort of a battery-charge for me, a review of things I'd learned and seen before but had sort of put on the back burner. Maybe some night you ought to dig out your slides and refresh your memory and your resolve to build a place where people don't just live, but enjoy living. —*Walter F. Wagner, Jr.*

—Drawn for the RECORD by Alan Dunn



"Thank goodness,
we no longer have Ladybird to fight!"

Highways, highways everywhere?

"We are now at a point of crisis," said A.I.A. President George Kassabaum in an appeal to the Nixon administration for "far-reaching reforms" in urban highway planning. "We are all car owners and highway users," Kassabaum said, "but we don't want them destroying our front lawns and the character of our communities. This is urban suicide, and it is being forced on us by the use of our own tax money. Unless these policies are changed, the American city cannot much longer remain a coherent place to live or work."

Kassabaum proposed that:

"1. All forms of urban transportation, not just highways, must have equal access to Federal tax funds. . . .

"2. Planning of Federally-aided interstate highways in cities must be taken out of the hands of state highway departments and turned over to interdisciplinary design teams responsible to the cities or metropolitan planning compacts." He said that "Urban highways should be planned by design concept teams that include architects, engineers, planners, landscape architects, and social scientists. No single professional, including the architect and the engineer, has an automatic right to assume leadership of the team. . . .

"3. Cities should set up design review committees or development corporations capable of considering all parts of such multi-purpose design projects and, equally important, of financing them." His suggestion can be accomplished, Kassabaum argued, by pooling at the local level those Federal, state, and other funds traditionally held apart from each other and used to build roads or housing or schools or urban renewal.

The proposed new Federal Highway Administration regulations calling for broader public hearings are, of course, a step in the direction of controlling the march of highways. But . . .

The loyal opposition: "Love that freeway"

During the last month, at least as many pages of press release fighting back against efforts to rethink the highway problem have reached this desk. My favorite: "Trip Talk," published as "a service of the American Road Builders Assn." The most recent issue points out that only 27 per cent of a California sample felt that "many urban freeways are eyesores that deface cities" and only 23 per cent felt that "freeway noise, dirt and pollution is a menace to health and comfort." All one can do, I guess, is weep . . . and wonder.

What makes Paris great and Hamburg dull?

In a speech to the American Institute of Planners' conference in New York last month, Herman Kahn, director of the Hudson Institute, offered some good reminders:

"A city's future depends, among other things, upon the positive as well as the negative; on the emotional responses of the people living there; on whether they have high morale and positive identification with their city or not; on their personal hopes and expectations as well as their fears and anxieties; on the successful and happy as well as on the deprived and troubled.

"A failure to pay adequate attention to the positive leaves out precisely those things which make Paris a great city and Hamburg, which is a very pleasant, prosperous, and attractive city, also a dull one. Very likely, by most—perhaps all—of the criteria used in current discussions, Hamburg will appear superior to Paris—and from the viewpoint of many of the problems of urban cities, Hamburg has indeed dealt with these much more successfully than Paris has. Yet there are few people who would argue that Hamburg (pleasant and desirable as it is) really is 'superior' to Paris from all important points of view.

"Solving the 'people' side of the problem is not just a matter of curing aches and pains, but of building up people's idea of their city and its past and future."

This year's Aspen: what happens now?

"The Rest of Our Lives" will be the theme of this year's International Design Conference, to be held June 15th through 20th. Ivan Chermayeff and Henry Wolf, co-chairmen, visualize a series of explorations into what history and technology have in store for us during the next decades—"the rest of our lives"—the effects on the designer of the forces of economics, politics, science and philosophy. Their hope: "conferees will come away with a picture of a future design environment that is clearer and possibly less frightening for having been looked at and evaluated." Details about the conference are available from the International Design Conference, Box 664P, Aspen, Colorado.

Now you can get a multi-media clock

CONTINUUM of 937 Second Avenue, New York City 10017 has just sent along a plain old single-media brochure announcing a "unique service . . . providing complete facilities for the design and execution of electronically programmed environments, architectural time-pieces, and multi-media displays [in which] emphasis is placed on integrating light, time, space and change sculpturally in order to create unique and personal environmental effects." My favorite involves "three concentrically orbiting bodies floating optically in a black Plexiglas cube representing minutes, hours and seconds. The white outer body revolves once every hour, the larger red body revolves every 12 hours . . ." and so on. They'd be great to watch happening, but I must say I'd keep my Timex in case I wanted to know when it was happening. —*W.W.*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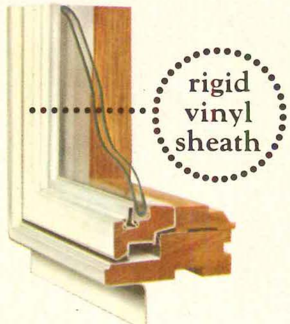
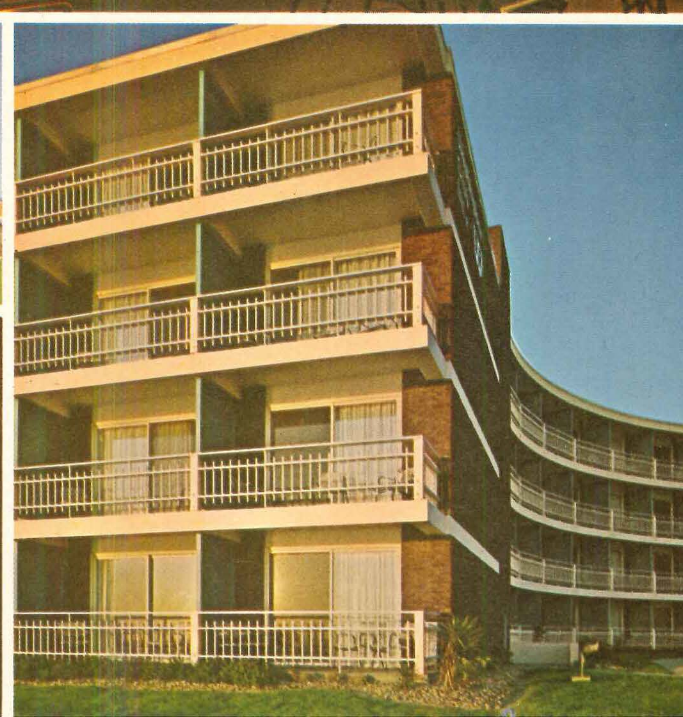
Andersen Perma-Shield eliminated window maintenance.

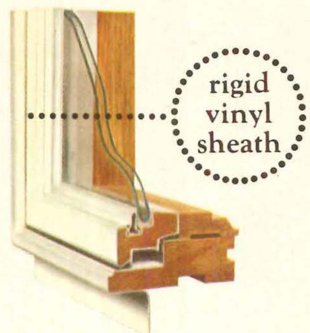


There's a beautiful ocean view from the balconies of this seaside inn. There's plenty of corrosive salt air, too. That's why the architect specified 8-foot Perma-Shield Gliding Doors, with welded insulating glass. Inside both sash and frame, there's a heart of warm, stable wood. Outside, there's a sheath of rigid, weatherproof vinyl that doesn't need painting, resists denting and warping, can't rust or corrode.

Washington Club Inn, Virginia Beach, Virginia. Architect: Evan J. McCorkle, Virginia Beach.



Windows have practically
That's the real beauty of them.



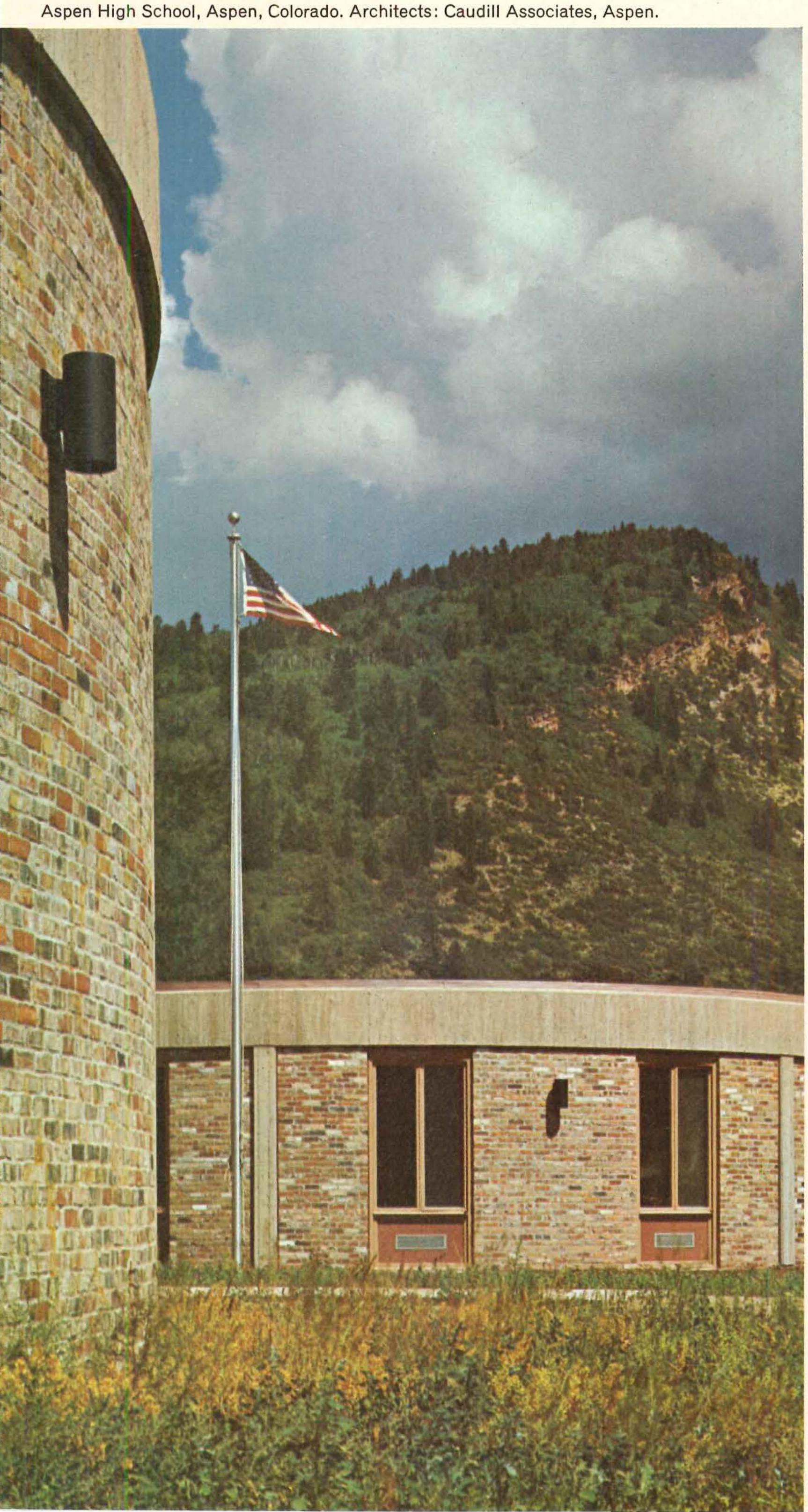
Because of a difficult elevation, window maintenance might have been a nightmare at this St. Paul, Minnesota girls residence. Perma-Shield Windows avoided the problem beautifully. There's no need for storm windows with welded insulating glass, and the rigid vinyl sheath doesn't need painting. You can choose Perma-Shield double-hung, casements, awning style, fixed types, single or multiples right from stock. There are six sizes of gliding doors, dozens of window sizes and combinations.

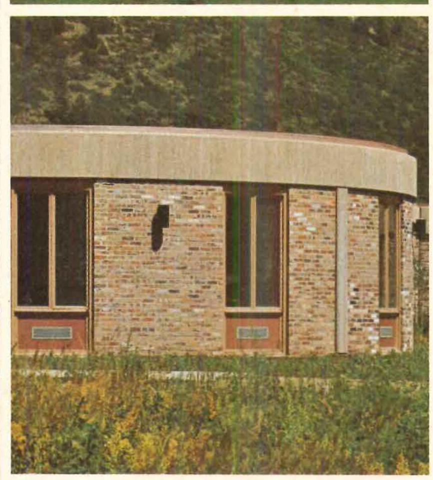
Emma Norton Methodist Girls' Residence, St. Paul, Minn. Architects: Progressive Design Associates, St. Paul.

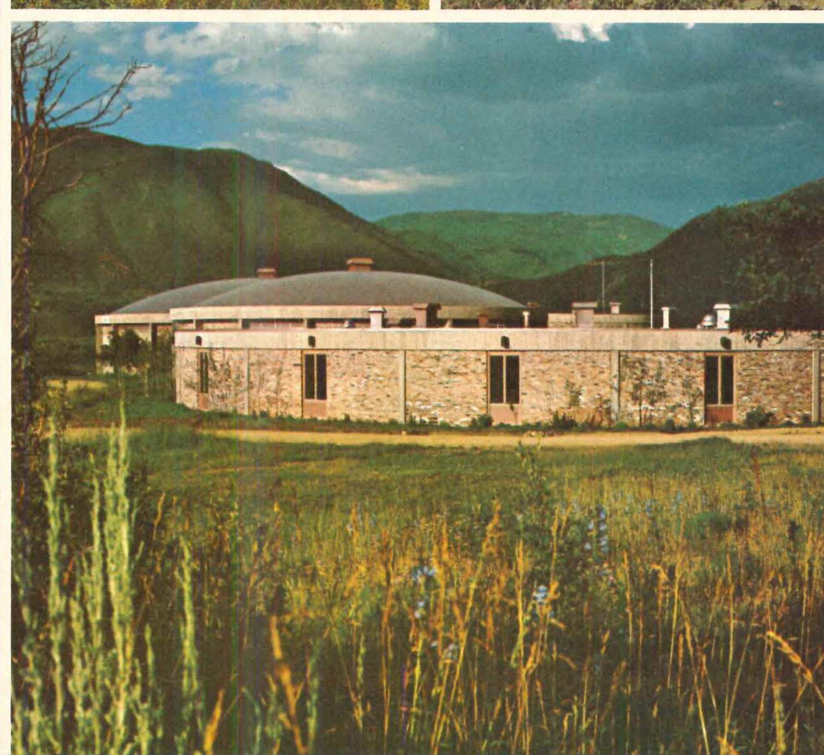
More new schools with to match the settings.

You might expect custom windows in a design as different as Aspen High School, but there was no need for them. The students look at the mountains through *stock* Andersen Casements, just one of 6 types and hundreds of sizes available. Close Andersen tolerances may mean up to 15% fuel savings. It didn't take a crew of window specialists to install them, either.

Aspen High School, Aspen, Colorado. Architects: Caudill Associates, Aspen.



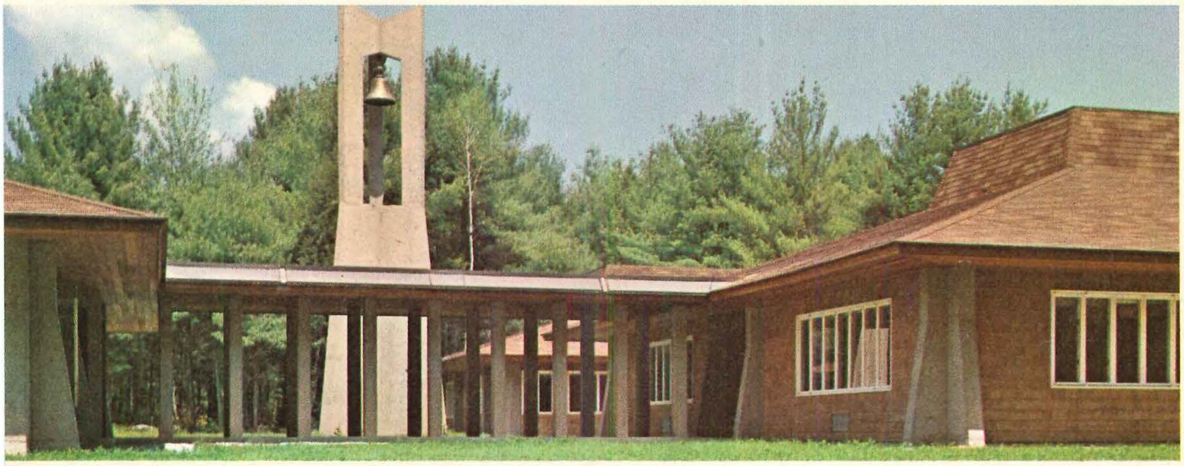


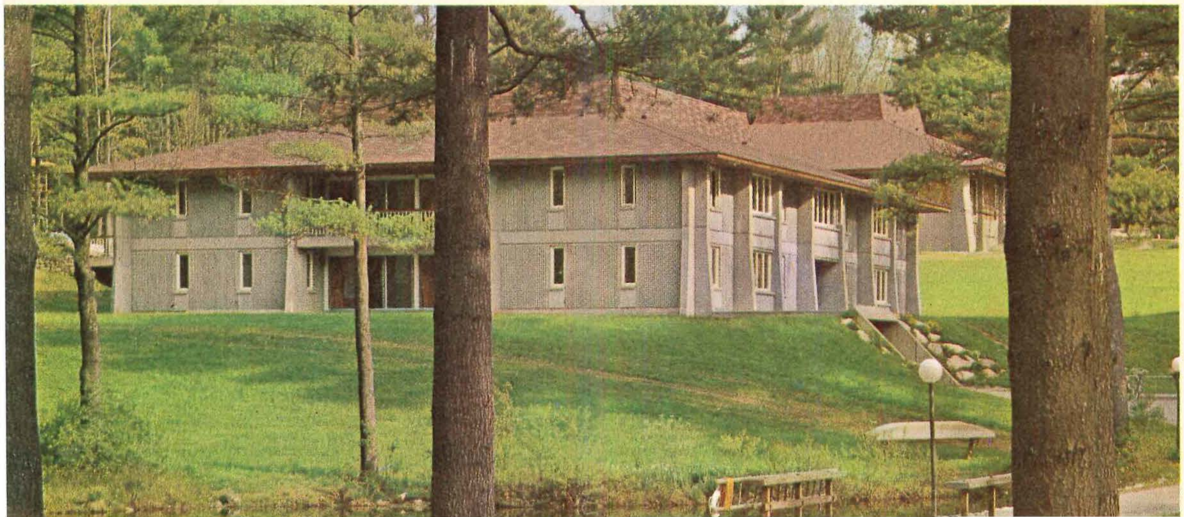


beautiful, weathertight windows

The natural look and warmth of Andersen wood windows match the warmth and charm of this beautiful school setting. There are plenty of Andersen sizes and styles to permit design freedom. And the architect knew in advance that every window for Simon's Rock School would be available fast from local warehouse stock . . . a comforting thought on any job.

Simon's Rock School, Great Barrington, Massachusetts. Architects: Morehouse, Chesley and Thomas, Lexington, Mass.

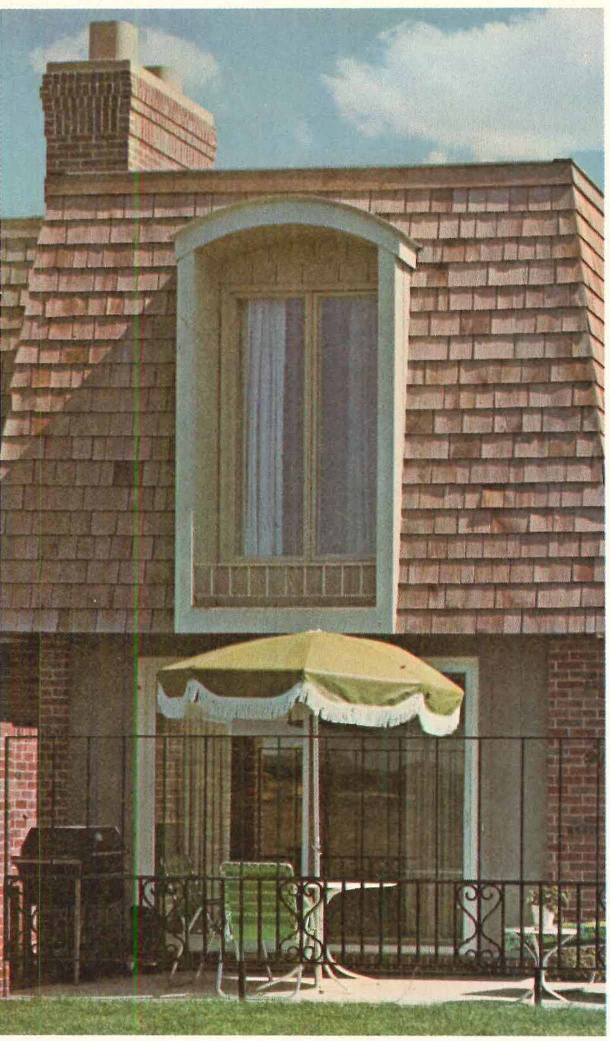


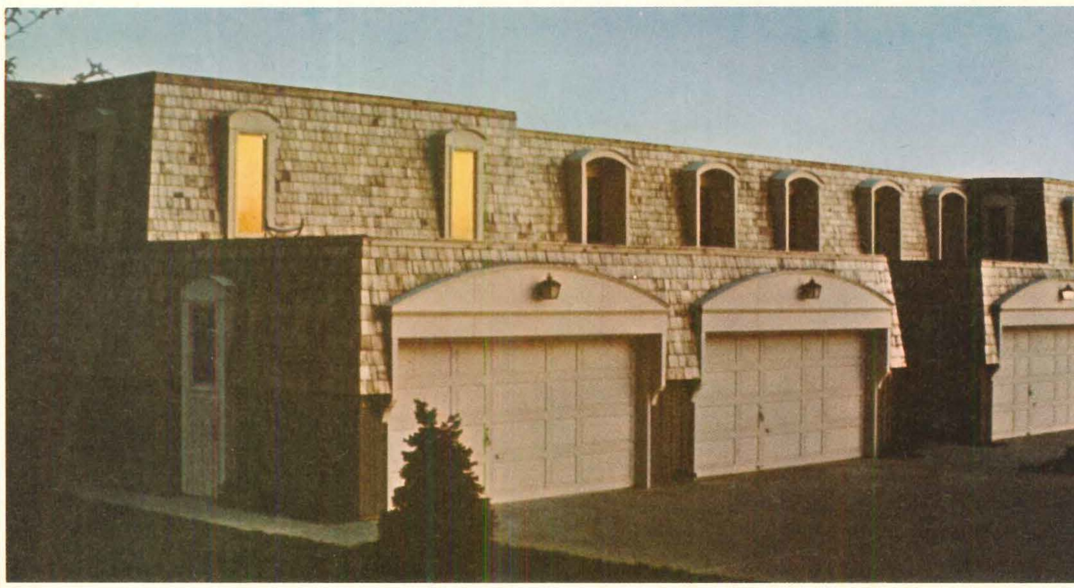


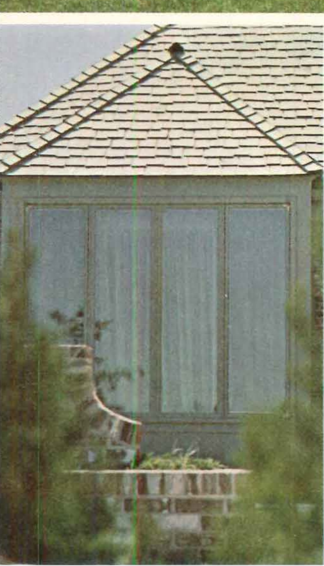
Proof that stock beautifully custom.

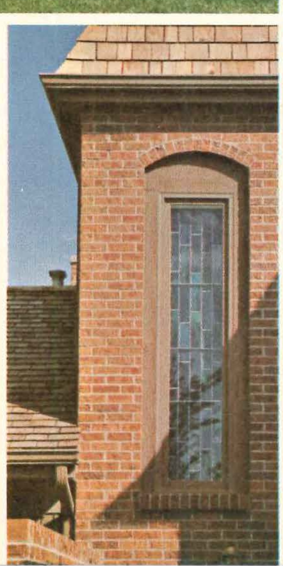
Here again, window design details make the difference. These might have been look-alike townhouses. They're all part of the same development. Yet each unit has its own charm and sales appeal. Each townhouse has its own style with stock Andersen windows. Maintenance is the builder's obligation here, so he appreciates the solid service backup he gets from his nearby Andersen Distributor.

Wellington Greens, Lincoln, Nebraska. Architect: Sidney Campbell.









Andersen Windows can be

This condominium has *character*, thanks partly to the creative use of windows. It has another kind of appeal, too: the sales appeal of low maintenance. That's the sales key for many condominium prospects. They're quality conscious, and they know what they *don't* want. They're out to avoid all the usual upkeep of home ownership, and trouble-free Andersen Windows fit into the picture beautifully.

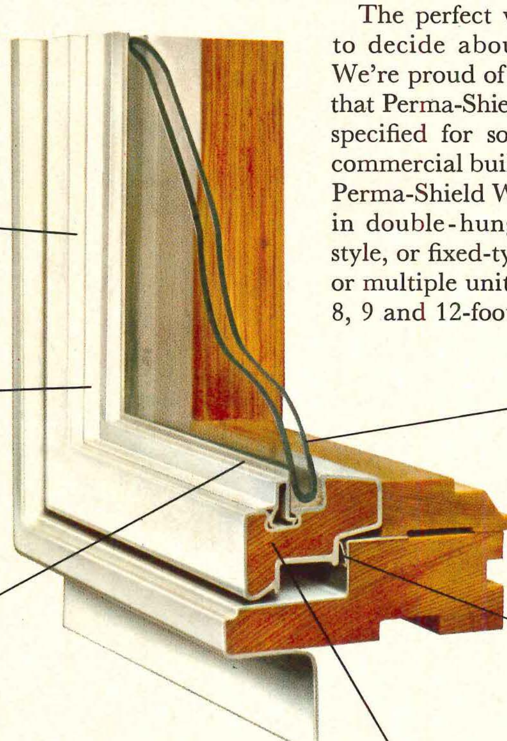
Bonnymede at Montecito, California. Architects: Hawkins and Lindsey and Associates, Los Angeles.

Look at all the styles, features and options you can get.
Beautiful, huh?

Meet Andersen Perma-Shield . . . the most attractive window option to come along since insulating glass.

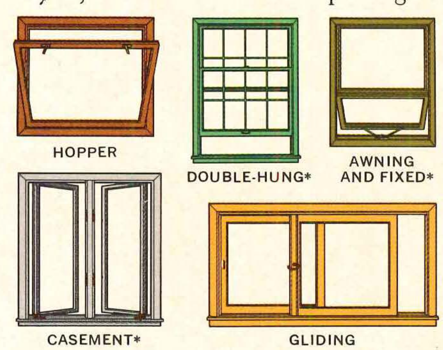
Perma-Shield Windows don't need painting or storm windows. They resist denting and warping. They can't rust or corrode. They've now been performance proved on thousands of jobs—exposed to every climate over the past 10 years. Inside, they have natural wood trim, so they can be finished to match any decor.

The perfect window? You'll have to decide about that for yourself. We're proud of it, and we're pleased that Perma-Shield Windows are being specified for some of the best new commercial buildings and residences. Perma-Shield Windows are available in double-hung, casement, awning style, or fixed-type windows in single or multiple units. Gliding doors in 6, 8, 9 and 12-foot widths.



Hundreds of sizes, thousands of combinations.

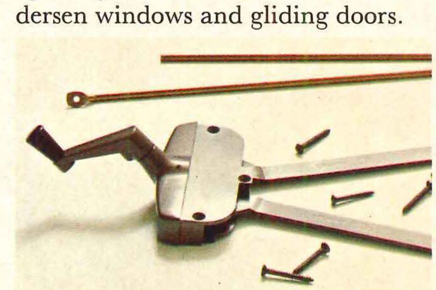
There are 6 Andersen wood window styles, so we never handicap design.



*Available in Perma-Shield

Options to match.

Welded insulating glass, safety glass, tempered glass, removable vinyl grilles, screens, storm panels . . . every option you need is available on Andersen windows and gliding doors.



Quality down to the finest detail.

Durable, special-finish operators, stainless steel hinges on all Perma-Shield Windows, preservative treated wood, millwork tolerances so close that Andersen Windows are often up to 4 times more weathertight than other windows—things that add up to the big Andersen difference.

Help keep America beautiful, specify and use...

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Window Beauty is Andersen

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AR-39

WANT MORE INFORMATION?

You'll find technical details in Sweets Architectural or Light Commercial Catalog. But if we can do anything else to help you make beautiful buildings, let us know.

Mail to: Andersen Corp., Bayport, Minn. 55003.

☐ Send me literature on your Perma-Shield Windows.
☐ Send me literature on your wood window line.
☐ I'd like a Perma-Shield demonstration, have a representative call me.

NAME ______________________

TITLE ______________________

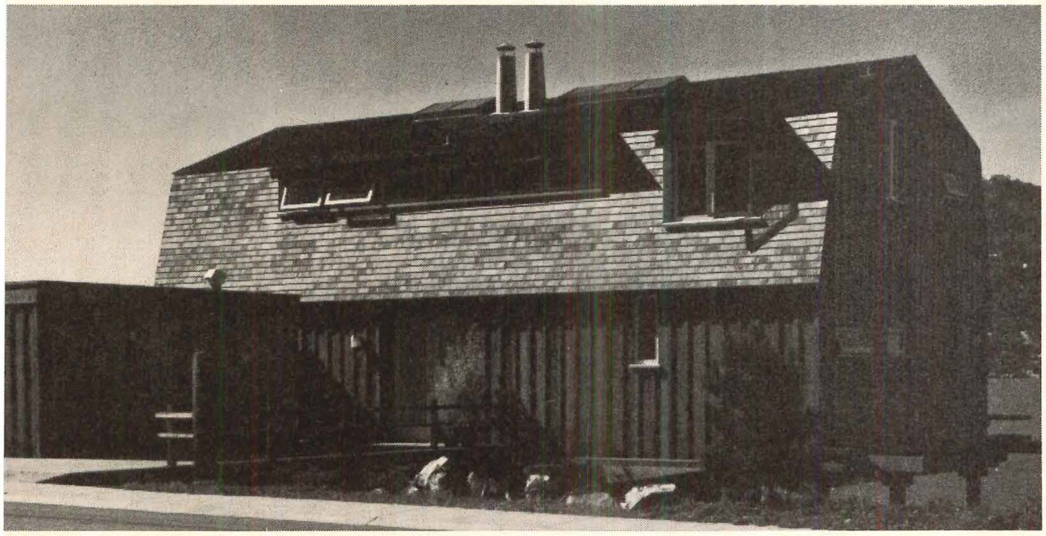
ADDRESS ______________________

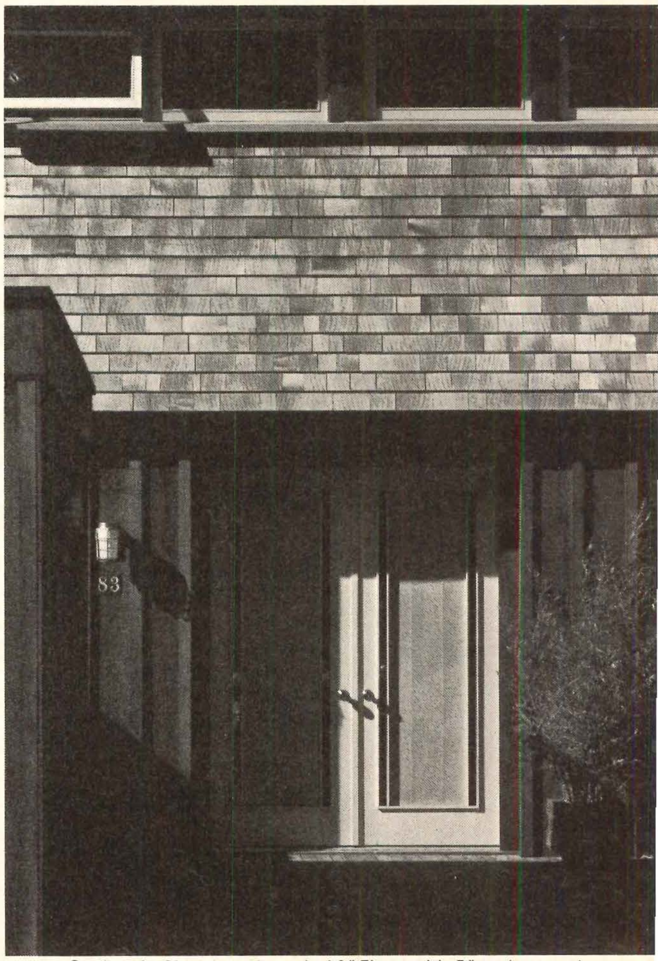
CITY ____________ STATE ____________ ZIP ____________

An architect's own traditional/modern San Francisco Bay home

Architect: Charles Warren Callister.

His material: natural wood and red cedar shingles.





Certigrade Shingles, #1 grade, 16″ Fivex with 5″ to the weather.

West Coast or East, red cedar shingles and handsplit shakes are ideal for salt water locations.

It is no accident that red cedar, in shingle or shake form, is so popular along our seacoasts. Salt water, wind, heat and cold can do their worst. Red cedar's distinctive weathering characteristics and natural protective oils allow it to grow old gracefully—beautifully.

From a practical viewpoint, red cedar gives structures extra insulation and wind resistance, plus a remarkable degree of built-in insurance against the annoyance of time-consuming upkeep problems.

No other material, natural or synthetic, possesses red cedar's ability to convey such a strong feeling of historical continuity, either. To effectively link the rich traditions of yesterday with the quiet sophistication of today.

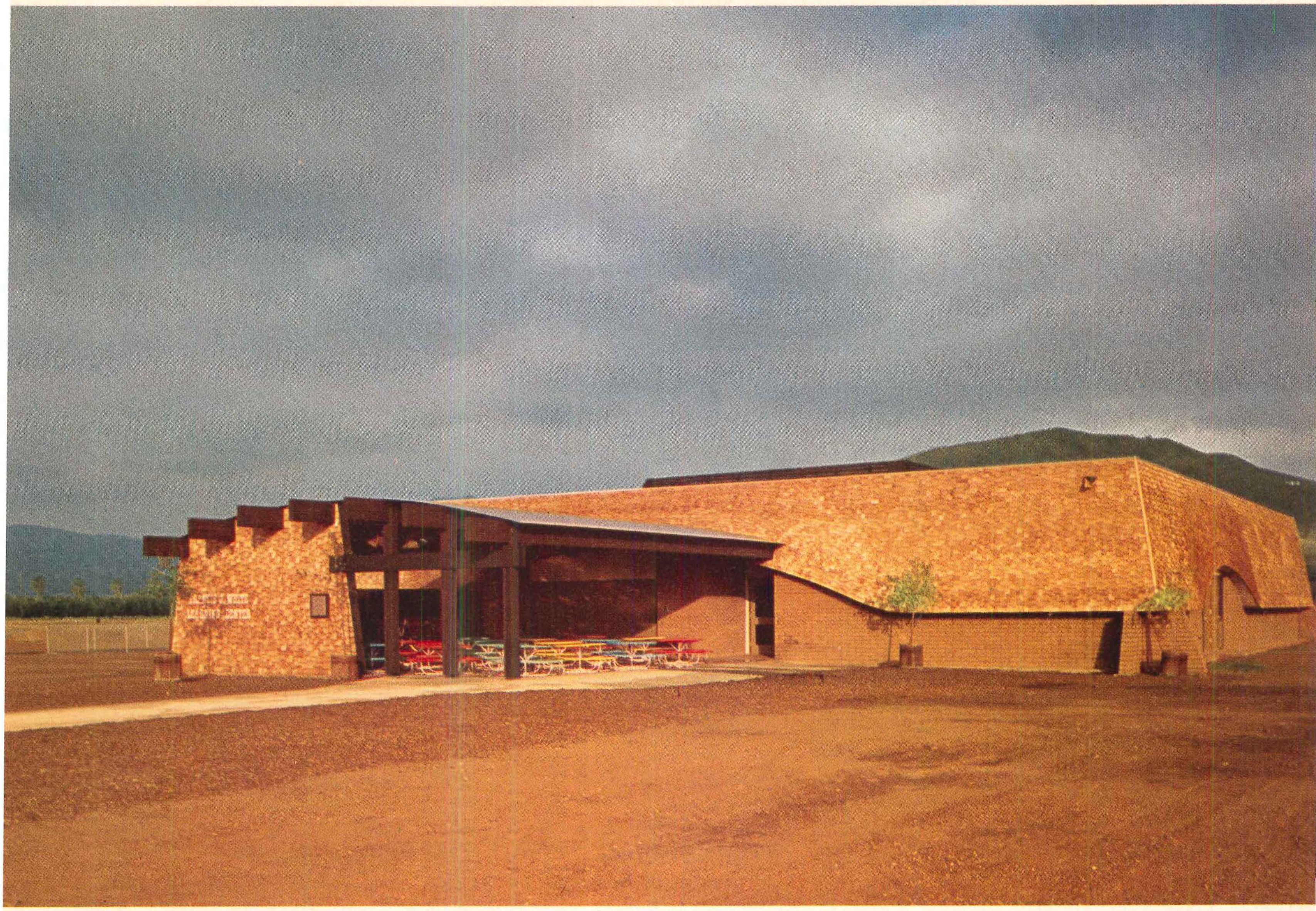
If beauty and practicality are important, next time specify the real thing: Certigrade red cedar shingles. For more information, see our Sweet's catalog listing. Or write: 5510 White Bldg., Seattle, Wash. 98101.

For more data, circle 6 on inquiry card

Red Cedar Shingle & Handsplit Shake Bureau

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

Lennox presents



Francis J. White Learning Center, Woodlake, California. Architect/Engineer: Moring & Hayslett. Roof treatment completely conceals Lennox rooftop equipment.

the case for the air conditioned school

Today, one out of every two new educational buildings is being air conditioned. The figure varies geographically. In southern states, seven out of ten schools are being air conditioned. In New England, three out of ten.

And the cost varies. The John H. Glenn Junior High School, San Angelo, Texas, was air conditioned —heating/cooling/ventilating—at \$1.35 per square foot for the 100,908 square feet. Equipment used was the Lennox Direct Multizone Rooftop System (DMS). Architect: Donald R. Goss Associates. Engineer: Cowan, Love & Jackson, Inc.

By way of comparison, a hot-water/chilled-water system for the same school was bid at \$1.88 per square foot.

The cost is modest in any event. A figure of \$2.00 per square foot for heating/cooling/ventilating, over a 20-year lifetime, represents less than 1/10 of 1% of the total annual educational cost for an average elementary school.

Does air conditioning truly provide a better climate for learning? Research and history are proving that it does. Studies conducted by the University of Iowa show that in addition to the obvious increase in comfort, good thermal environment aids learning to an important and measurable degree. Studies are available on request.*

There are other important reasons for air conditioning a school. For example: freedom of design offered by complete environmental control. Freedom from the need for natural, window ventilation.

Continued . . .

For more data, circle 8 on inquiry card

The low-profile Lennox DMS poses only a minimal screening problem. Example: The "pods" atop the William E. Orr Junior High School, Las Vegas, Nevada. Each conceals up to three DMS units. Architect: Zick and Sharp, in association with Shaver & Co. Engineer: Marvin Shafer.

Continued . . .

the case for the air conditioned school

And through the Lennox DMS rooftop units, with flexible ducts, there is the freedom to move walls, or add them, or eliminate them. And because this is a unitary system, as the building grows, you simply add new units.

Because the Lennox multizone system provides such flexibility in thermal control, it offers exceptional freedom of design, occupancy or change. The system can heat one zone while cooling another. It can, if needed, provide a 100% air change. Thus, the system allows for great variation in occupancy, activity, and orientation—as they affect heat gain or loss.

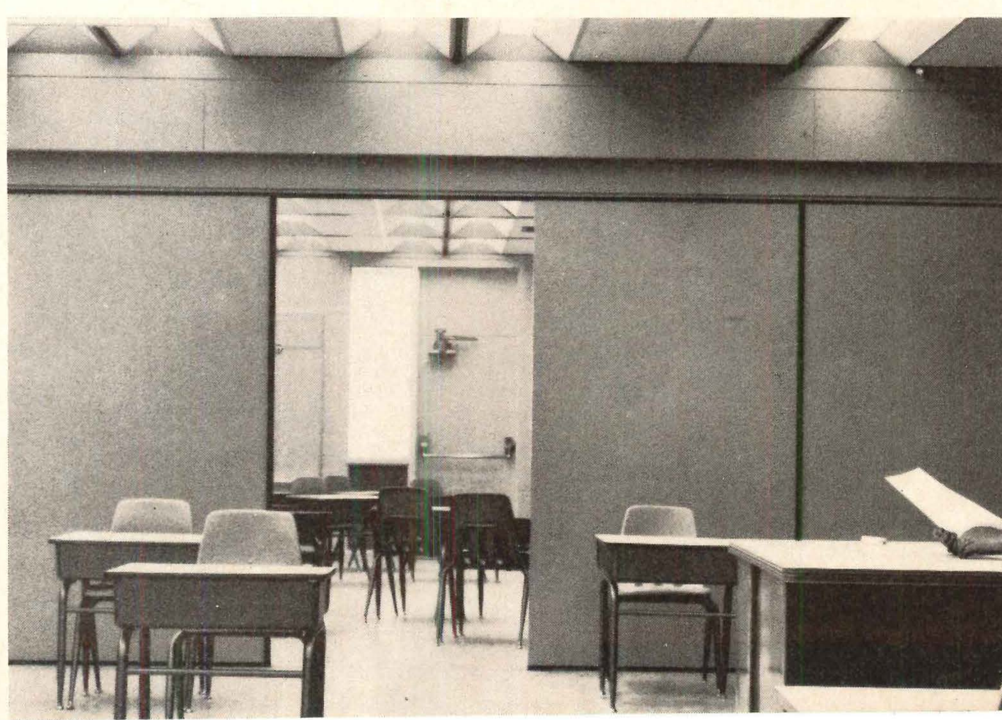
Schools, even in the northern states, tend to need more hours of cooling than heating. This is due to high occupancy, high activity levels, and high heat generation at school age. During cool weather, this cooling demand imposes little cost. A modern multizone system like Lennox will cool free at any outdoor temperature below 57° F.

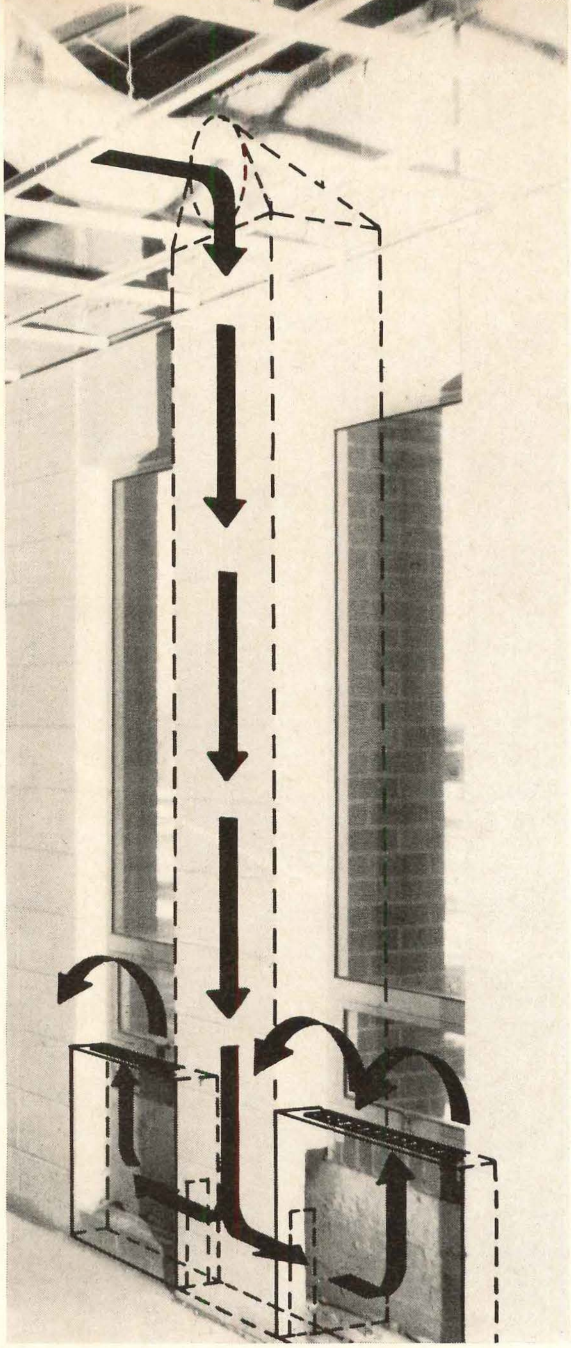
Many factors beyond human comfort justify the modest cost of air conditioning: The summer use of the educational plant. The reduced depreciation of the building. The increased occupancy permissible. The increased capacity of the students to absorb information, thus increasing teaching efficiency.

We have many case studies showing cost comparisons and design and installation data, for schools in differing climate zones. These are available on request. Write Lennox Industries Inc., 491 S. 12th Avenue, Marshalltown, Iowa 50158.

*Reports available: *"Education, Children and Comfort"* and *"The Effect of Thermal Environment on Learning."*

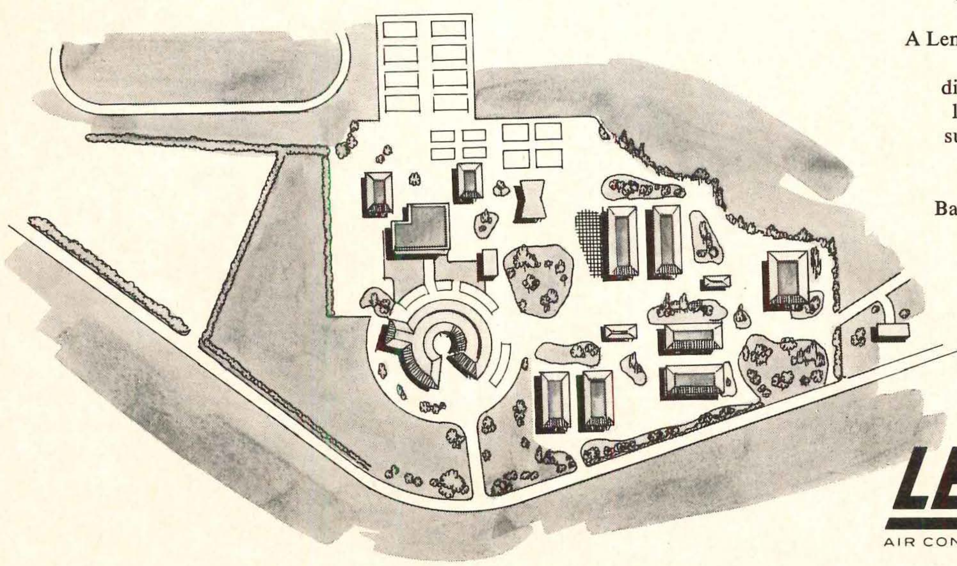
Movable walls, heart of education's new "flexibility" concept, are made possible at Bertha Ronzone Elementary School, Las Vegas, Nevada, by rooftop mounting and flexible ducts which eliminate fixed, wall-oriented ducts, pipes, registers, unit ventilators. Architect: Julius Gabriele, A.I.A.





An outside design temperature of -25° F at Watertown, South Dakota, made it desirable to have perimeter distribution of heat in the Watertown Vocational-Technical School. This was achieved by ducting some 20% of supply air down pilasters into wall ducts. Balance of air was supplied by ceiling ducts. Architects: Harold Spitznagel & Associates; Pope and Robel. Engineer: Harold Spitznagel & Associates.

For heating and ventilating, Barrington Middle School, Barrington, Illinois, chose Lennox DMS units—without cooling—but is adding air conditioning capability one unit at a time. Architect: Cone and Dornbusch, A.I.A. Engineer: The Engineer Collaborative.



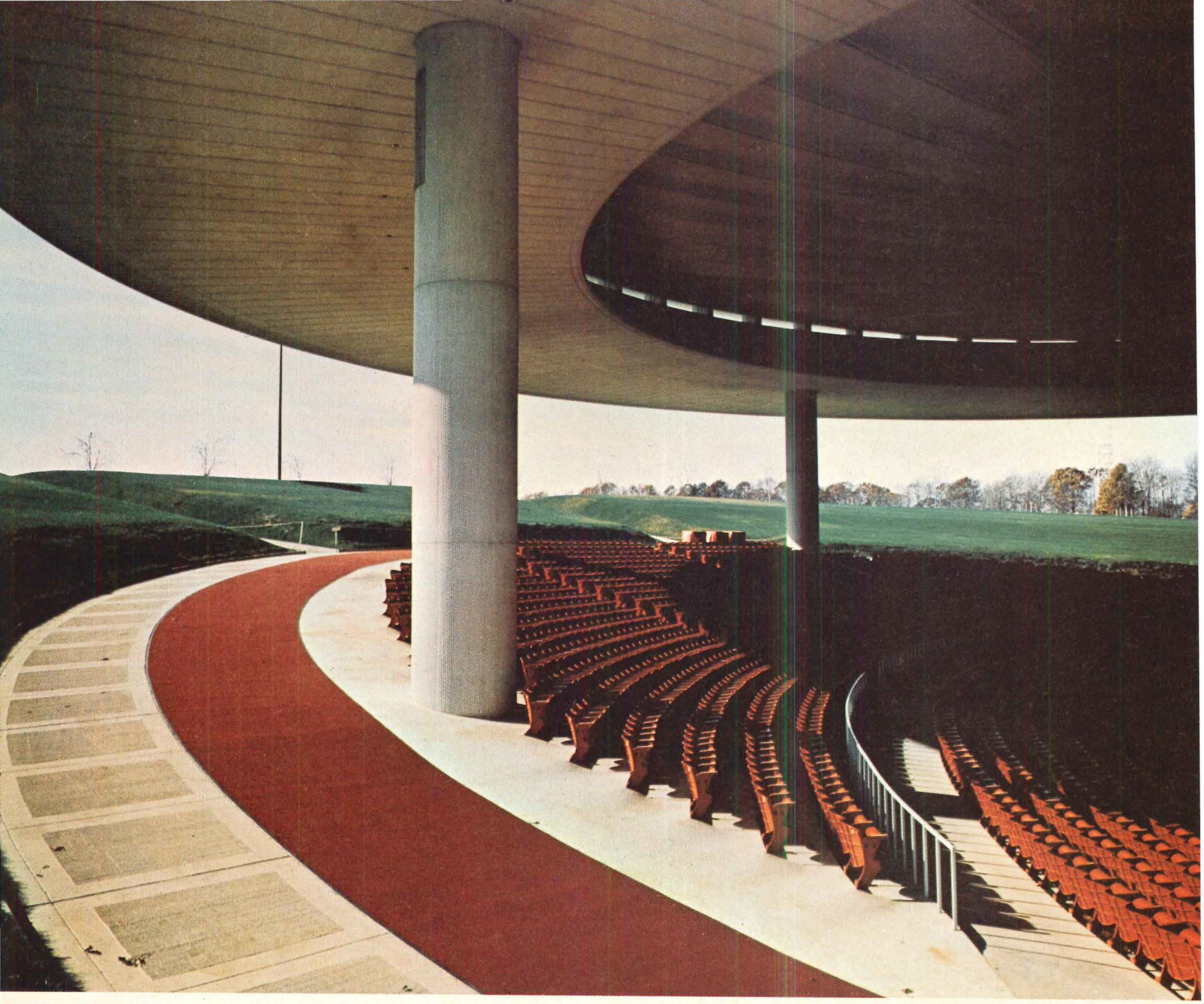
Campus layout for Mission Viejo High School, Mission Viejo, California. A Lennox Direct Multizone System was selected here in preference to the district central system, which such a layout—in the past—has commonly suggested. The per-square-foot cost for Lennox heating/cooling/ventilating: $2.19. Architect: Balch-Hutchason-Perkins. Engineer: Kelly-Stewart-Goldstein.

LENNOX®

AIR CONDITIONING · HEATING

For more data, circle 8 on inquiry card

For more data, circle 33 on inquiry card



NEW HEUGATILE CARPET SQUARES... THE PROBLEM SOLVER IN ACTION

A few months ago, conventional carpeting had covered the floor of Pippie's Restaurant in Hartford, Conn. Problems developed. Lighted cigarettes were carelessly dropped on the carpet and delectable foods and beverages were accidentally spilled.

Then came The Problem Solver with an easy solution to the problems that plague conventional carpeting. His recommendation? New Heugafelt loose-laid, totally-interchangeable carpet squares—one of three fine Heugatile carpet products.

Today, Pippie's Restaurant is carpeted with Heugafelt.

Lighted cigarettes still fall, but Heugafelt shrugs them off without a trace of scorch or burn. Foods and beverages still spill, but Heugafelt carpet squares can quickly be removed and washed under running water. Permanent damage from spilled oil? Just remove the square and replace it in seconds.

Don't you know a restaurant where Heugafelt should be the carpet du jour?

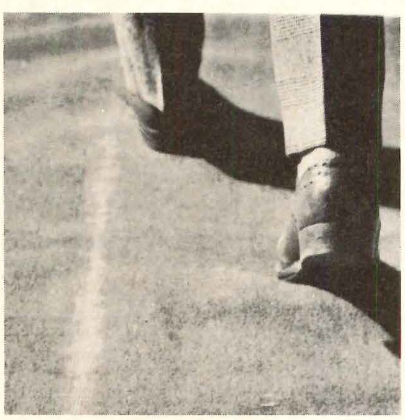
TELL THE PROBLEM SOLVER ABOUT YOUR FLOOR-COVERING PROBLEM!

Write us a brief letter—100 words or less—describing a flooring problem that could not be solved by conventional carpeting. If your problem is selected to be featured in future advertising, your Heugatile carpeting will be installed **free** of charge. Don't wait! Tell us your carpeting problem today! Mail entries to: The Problem Solver, Van Heugten U.S.A., Inc., 185 Sumner Avenue, Kenilworth, New Jersey 07033.

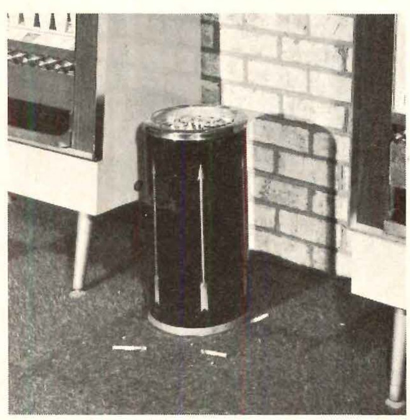
Heugatile carpet squares are unconditionally guaranteed to remain in place . . . will not curl . . . will not buckle . . . will not shift under foot, wheel, vacuum or cleaning machinery when installed according to the laying and maintenance manual.

Everything about new Heugatile is different, even the name. Heugatile (You-Ga-Tile)—the unconventional carpet.

See Heugatile specifications in Sweet's 1969 Architectural and Interior Design Files.



WEAR. This is conventional carpet. But new Heugatile solves this problem. First, Heugatile is longer-wearing by actual tests. Second, Heugatile carpet squares are loose-laid and totally-interchangeable so squares can be rotated —annually, for example—to retard the development of wear patterns.



BURNS. Are cigarette burns ruining your present carpet? Then you need Heugafelt, one of three fine Heugatile carpet products. Heugafelt shrugs off cigarette burns without a trace of scorch! Thus, Heugafelt is ideally suited for installations in restaurants, hotels, motels, stores, banks, and offices.

MAINTENANCE. Heugatile's dense pile keeps dirt surfaced for easy removal by occasional vacuuming. Heugatile drives maintenance costs down! Shampoo Heugatile carpet squares on location with regular rotary shampoo equipment and wet pick-up. Damage a square? Simply replace it in seconds.

HEUGATILE® / *The problem solver*

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BREAKAGE AND SUNLIGHT... A DISPLAY WINDOW'S TWO WORST ENEMIES!

Conquer Both Hazards With Protectopane® U-V!

Breakage and sunlight, a display window's two worst enemies, leave store owners vulnerable to property destruction. Breakage can result in expensive window replacement and loss of merchandise; sunlight can fade expensive display material making it worthless for re-sale. Either way, destruction cuts into profits and store owners lose money!

This needless waste can be avoided with Protectopane U-V! This new glass, specially created for store front windows, provides break-through protection *and* prevents fading due to ultra-violet light!

COMPLETELY TESTED AND APPROVED BY UNDERWRITER'S LABORATORIES!

Protectopane U-V features a clear vinyl interlayer which acts as a repellent to ultra-violet light—lets through only 1% of the ultra-violet rays in the critical region of 380 millimicrons and below; whereas ¼" clear plate glass transmits about 52% of these harmful rays! Protectopane U-V provides color fast protection for draperies, paint, furniture, clothing and other articles behind the glass.

Protectopane U-V is almost totally impervious to break-through. Repeated heavy blows may break or crack the glass, but will not cause it to easily shatter or fall out.

Provide a double shield against display window property destruction! Write Dearborn today for complete details and specifications on Protectopane U-V!

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news in brief . . . news reports . . . buildings in the news

News in brief

Architect Ezra D. Ehrenkrantz was named Engineering News Record's "Construction's Man of the Year." Cited as the man who has made the most significant contribution to the construction field during the past months, Ehrenkrantz was credited as the pioneer of systems construction in the U.S. See next page.

For the first time in the short history of the Turnkey program the services of an architect are being required on any project containing over 16 housing units. This is in keeping with paragraph four of the 1968 Housing Act, which calls for improved design standards in government-aided housing. Previously, a developer was *required* to have an architect only during the initial phases of his proposal. Under the new rules the developer must retain an architect to coordinate the entire development of the site, as long as it contains 16 or more units. Turnkey's target for the current fiscal year is 77,700 units.

Labor officials have begun a campaign to raise $1 billion to invest in low-cost housing to help rebuild city slums. John Evans, director of the A.F.L.-C.I.O.'s recently created department of urban affairs, said he would ask presidents of all 125 A.F.L.-C.I.O. unions to put pension, welfare and other union funds into the labor federation's mortgage investment trust.

The Federal Highway Administration approved redesigned urban freeway plans for Baltimore and New Orleans (RECORD, December 1968, page 36), ending two 20-year-old disputes over the disruption of these cities by highway construction. In both cases opposition was overcome by re-routing the roads. The Baltimore compromise, which halves the size of the city's interior legs of two interstate routes, is regarded as a precedent-setting example of how to civilize the freeway. A team under the direction of Nathaniel A. Owings developed the concept. The New Orleans compromise over the River-front Expressway has resulted in the road being placed below grade, preserving the river view from the French Quarter and the Jackson Square area.

"Building and Humanism" is the theme of an international meeting on town planning and architecture being held in Cannes, France, March 10-16. Major topics to be discussed are: Town Planning and Humanism; Architecture: Teamwork; Architect and Artist; Research; Marketing and Information. A competition resulting in an award for town planning and architecture is open to all participating architects, planners and engineers. For information contact: French Government Tourist Office, 610 Fifth Avenue, New York, New York 10020.

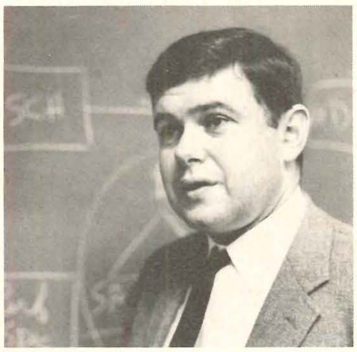
Ralph Grayson Schwarz has been appointed head of the new Urban Design and Development Corporation established by the A.I.A. Mr. Schwarz, previously an executive of the Ford Foundation, will administer the new corporation with the aid of two vice presidents. According to A.I.A. President Kassabaum, the corporation will assist the architectural profession in meeting new urban design demands. Its program will be structured in three broad areas: Transportation as the skeleton for urban form and function; the existing urban fabric; and evolution of a new urban fabric.

The 1969 A.I.A.-C.E.C. Public Affairs Conference will be held in Washington, D.C., March 19-20. Speakers will provide first-hand reviews of key bills affecting design professionals and give a "behind the scenes" look at the Nixon Administration and the new Congress.

The 1969 Awards Program of the Prestressed Concrete Institute is open to registered architects and engineers practicing in the United States and Canada. Entries will be received until May 15. The jurors for this year's program are: George Kassabaum, Frank Newman Jr., Louis Bacon, Robert Hastings, and Ray Affleck. For information write P.C.I. at 205 Wacker Drive, Chicago, Illinois 60606.

The National Endowment for the Arts announced a program of grants in the area of environmental design to be awarded starting in June 1969. Emphasis will be placed on innovative work in architecture, landscape architecture, planning, industrial design, and interior design. Write: The National Endowment for the Arts, Architecture and Design Program, 1800 G Street N.W., Washington, D.C. 20506.

Single, complimentary copies of an illustrated booklet dealing with the architect, his profession, and the national professional society are available upon request to Public Relations, The A.I.A., 1735 New York Avenue, N.W., Washington, D.C. 20006.



An architect becomes ENR's "Construction's Man of the Year"

"EZRA EHRENKRANTZ: PRINCIPAL ADVOCATE OF SYSTEMS BUILDING, WHOSE IDEALS FOR BETTER SCHOOLS ARE FINDING WIDE APPLICATION ACROSS THE NATION"—from a plaque naming San Francisco architect Ehrenkrantz Engineering News-Record's "Construction's Man of the Year."

As practiced by Ehrenkrantz's company, Building Systems Development, Inc. (BSD), a building system hinges on the concept of mass purchasing. In his first project, School Construction Systems Development (SCSD), the mass purchasing power of the state of California was utilized to create a guaranteed minimum market for components necessary to build 13 elementary and high schools. BSD devised the performance criteria for each component and asked manufacturers to develop newly designed components.

The components developed for SCSD have since been used in buildings across the country.

Student architects and planners hope to continue action programs

The National Association of Student Planners and Architects (N.A.S.P.A.), quietly created less than a year ago, is an organization run wholly by students recruited from universities throughout the country. Their goal has been the establishment of a nation-wide program through which students of planning and architecture can offer their skills to poor communities—both black and white—to help deal with problems related to social and environmental improvement.

In May of 1968, with foundation grants of $50,000 (controlled by the students themselves) and with the assistance of 25 VISTA volunteers, N.A.S.P.A. launched a well-coordinated and ambitious series of summer projects. Sixty-four architectural and planning students began working for neighborhood and community organizations in 12 states, with minimum salaries but with a compensating sense of enthusiasm. Their projects included:

BOSTON: sponsored by Urban Field Service. Rollie Thompson of Southern University and Albert Harkness of Harvard designed, did working drawings, and began construction work for the conversion of a church chapel into a gymnasium, as part of a larger effort to transform the entire church property into a community multi-service center.

PIKEVILLE, KENTUCKY: sponsored by Pikeville College. Steve Cram of Cornell began a community recreation program for this impoverished Appalachian town, and aided a local architect in developing a prefabricated housing system for the people of the area.

BIRMINGHAM, ALABAMA: no sponsor. Robert Brown and Leon Humphries of Tuskegee Institute helped alert the black community to the significance of the West Birmingham Model Cities program. Federal approval of the city's application had been delayed due to inadequate participation of area residents during preparation of the plan.

EAST OAKLAND, CALIFORNIA: sponsored by Spanish Speaking Citizen's Allegiance. Craig Brown of Berkeley initiated planning for the development of a rural camp to be used by Mexican-American residents of this city. He may eventually obtain funding for the proposal from the Federal government or a private foundation.

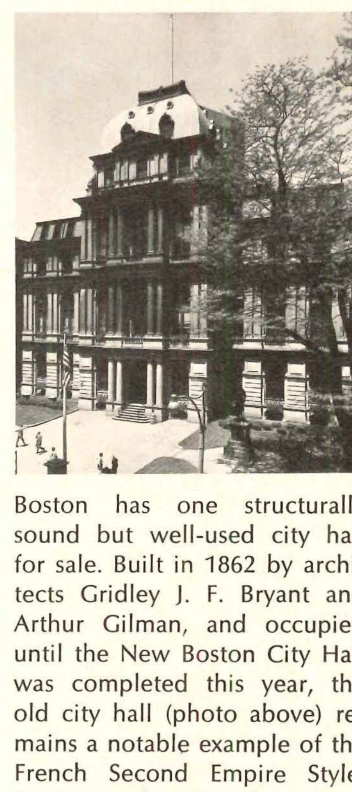
This year, N.A.S.P.A. hopes to continue its role as a catalyst, helping students to create programs of action in the community and of relevance in the schools. Harry Quintana—executive director and a Yale graduate student—reports some progress in getting commitments from various schools towards granting academic credits to those students who develop and carry out this year's summer work. Students from schools throughout the country are now looking for projects, and are concentrating particularly on areas that have Model City's programs now in the planning stages.

However, N.A.S.P.A. needs more than the enthusiasm it already has. Its projected budget is $300,000, which would fund 150 students for 11 weeks in the summer, at $100 per week. And, because projects don't seem to end neatly when school begins and because last year's students devoted long unpaid hours to their projects in the fall, N.A.S.P.A. wants to continue its funding for 18 weeks into the fall semester, at $50 a week per student. As of March 22 of this year N.A.S.P.A. had $15,000 in committed funding from the Rockefeller family and from the New York Foundation.

Of course, last year at this time there was no N.A.S.P.A. at all, so they are ahead of the game. If you want to help, or if you need more information, contact the National Association of Student Planners and Architects, 780 Third Avenue, New York, New York, or phone 212-382-9261. If no one answers, keep trying; that seems to be what N.A.S.P.A. is doing.

—*R.E.J.*

Have any use for one old city hall?



Boston has one structurally sound but well-used city hall for sale. Built in 1862 by architects Gridley J. F. Bryant and Arthur Gilman, and occupied until the New Boston City Hall was completed this year, the old city hall (photo above) remains a notable example of the French Second Empire Style. Sometime this year the Boston Redevelopment Authority will either sell or long-term lease the building. The main requirement for prospective users is that they intend to preserve its architectural character. The Authority will allow changes in the interior, but the facade must remain as is. More details can be obtained from: The Director of Non-Residential Development, Boston Redevelopment Authority, 1108 City Hall Annex, Boston, Massachusetts 02108.

HUD action on Model Cities program expected soon

Housing and Urban Development Secretary George Romney's 30-day suspension of all HUD funding and action on housing and city improvement programs, pending a review by him and his assistants, ends March 4. Meanwhile architects and planners involved in the beginning phases of HUD programs, especially Model Cities planning, await the new administration's approval to go ahead.

Around Washington much guessing is going on as to the fate of the Model Cities program. When the new administration took over, only nine of the 150 communities awarded planning grants had won HUD approval of their plans.

If the administration is intending to take positive action on Model Cities—and it seems possible it will, since in concept the program contains the kind of local control and discretion in the use of funds that President Nixon seemed to favor in his campaign—then evidence in the form of more cities receiving supplemental funds should come quickly. On the other hand, some observers feel that if the administration decides to concentrate its efforts elsewhere, the trend away from the present program will be more subtle.

Reportedly the crucial decision is not whether to continue Model Cities but whether to make the concepts of the program community-wide rather than confined to selected neighborhoods.

At a press conference in February, Secretary Romney expressed the opinion that there would be little or no budget-cutting in the major programs for the cities. He said that Model Cities had been underfunded by the Johnson Administration. Altogether, Congress had appropriated $512.5 million for supplemental Model Cities grants for fiscal 1969; $52.7 million of this amount has already been allocated in nine grants.

The nine Model Cities whose plans have been approved (the first was Seattle on December 23, and the last Boston, January 17) are: Seattle; Smithville-DeKalb County, Tennessee; Atlanta; Huntsville, Alabama; Waco, Texas; Denver; Baltimore; Portland, Maine; and Boston.

Approval for supplemental funds indicates that HUD is satisfied that the community presenting the plan has developed a comprehensive plan for upgrading social, economic, and physical conditions in blighted neighborhoods. With supplemental funds in hand, the community can begin action.

© Ezra Stoller (ESTO)

Non-architecture by non-architects

A team of well-known designers (not including an architect) contributed their work in the development of Porto Theater ("artists' views" above), "a new concept in portable as well as permanent theater construction intended to provide "instant theater, totally equipped" at a cost "as low as $550,000" when "produced in quantity." The developers, aided by a grant from the Ford Foundation, were Donald Onnslager and Jo Mielziner, the theater designers; Cyril M. Harris, the acoustical consultant; and Edward F. Kook, lighting specialist. Structural engineer Lev Zetlin and Syska and Hennessey, mechanical and electrical engineers, were retained as consultants. The concept, intended for arena staging, proposes a molded fiberglass structure 112 feet in diameter and 35 feet high, with a stage 32 feet in diameter and 1022 seats in 12 rows 360 degrees around it. Structural components, stage, seats, lighting and sound equipment and power are "totally integrated" in the design. Erection time, with five skilled and 24 unskilled workers, is estimated at three days. The unit, with estimated weight of 150 tons including all equipment, would be packaged "to fit into one and a half of the new-type cargo planes."

The S.A.H. meets in Boston Henry-Russell Hitchcock is principal speaker

The Society of Architectural Historians held its 22nd Annual Convention in Boston, January 29 through February 2.

Papers on specific fields within architectural history were presented, with slides, during six morning and afternoon sessions. The Saturday morning session on "Early Nineteenth-Century Architecture and its Preservation Problems" was of particular interest, with papers on Georgetown, D. C., the preservation of Faneuil Hall within the context of Boston's Government Center, and three other studies related to preservation techniques.

Professor Henry-Russell Hitchcock's address to Friday night's banquet was a series of reminiscences on American architecture and architectural historicism in the 1930's, with some moving comments on the reemergence, during those years, of Frank Lloyd Wright.

The architectural tours proved to be as popular as they have been with past conventions. There was a Saturday afternoon bus trip through Cambridge, with emphasis on that city's examples of mid-18th, later-19th, and mid-20th century architecture. Following on Sunday was an all-day tour of Salem, concentrating on its 17th-century and Federal-period buildings.

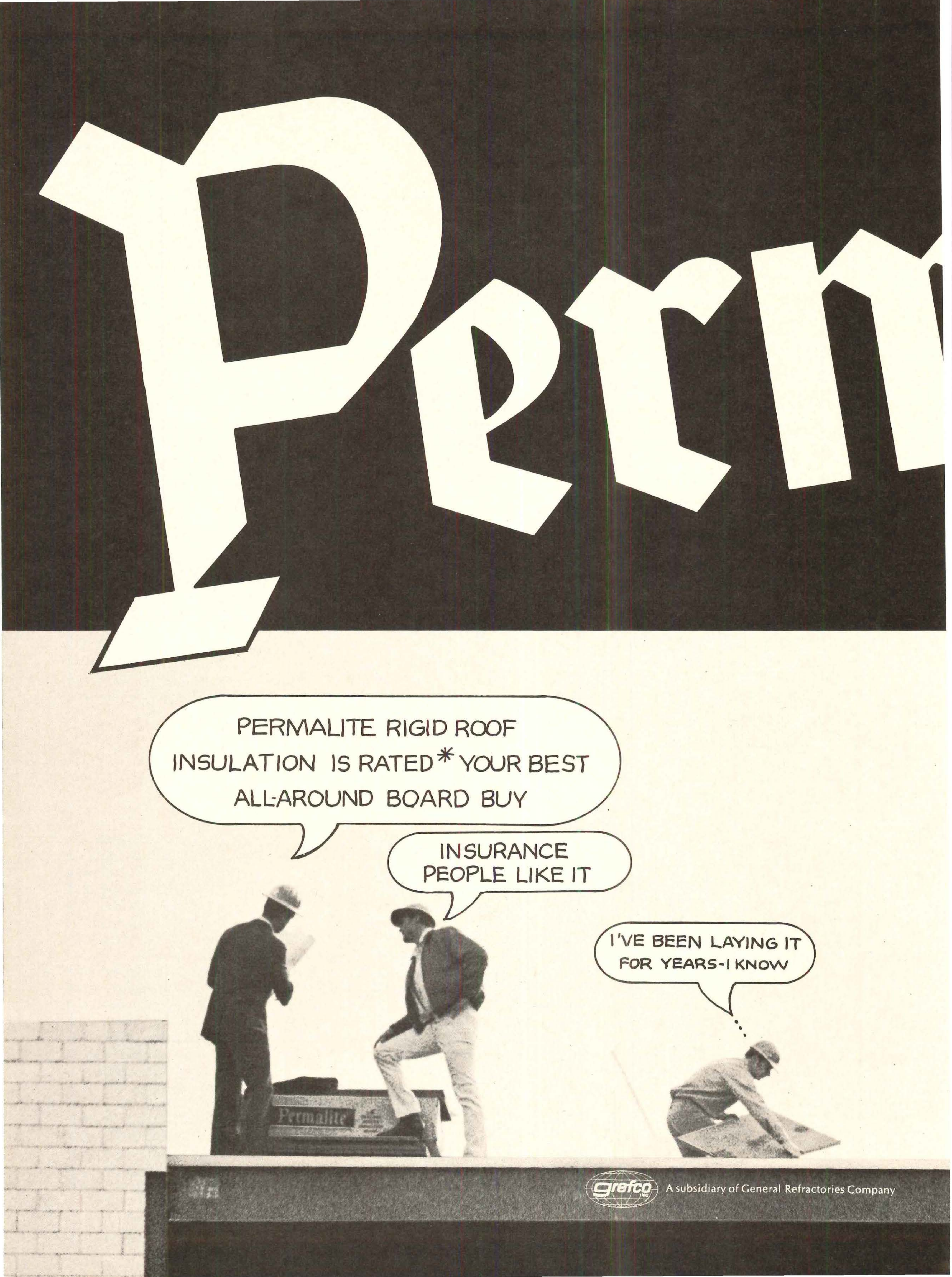
Abstracts of the papers presented at this year's convention can be purchased from the S.A.H. office, 1700 Walnut Street, Philadelphia, Pennsylvania, at $1.00 per copy. —*R.E.J.*

Obituaries

Architect Welton Becket, 66, died January 16 following a brief illness. Born in Seattle August 8, 1902, Mr. Becket went to Los Angeles in 1931 and in 1933 launched a practice that has become one of the nation's largest architectural firms—Welton Becket and Associates, whose architectural landmarks range from the Music Center in Los Angeles to the recently completed Xerox Square in Rochester, New York. In 1950, Mr. Becket was presented with the Honor Award of the VII Pan American Congress of Architects for design and execution of Prudential Square (with his partner, W. Wendeman), and in 1952 he was made a Fellow of the American Institute of Architects for excellence in design.

Kenneth Kingsley Stowell, architect, teacher and editor of ARCHITECTURAL RECORD from 1942 to 1949, died January 19 of a heart ailment in San Francisco, where he had lived since his retirement in 1958. He was 74 years old.

Mr. Stowell, a native New Yorker, was graduated from Dartmouth College in 1916, and in 1921 received a master's degree in architecture at Harvard. He was associate professor of architecture at the Georgia Institute of Technology from 1924 to 1927. He was editor of The Architectural Forum from 1927 to 1935, when he became editor of The American Architect and Architecture. For six years beginning in 1936 he was editor of House Beautiful.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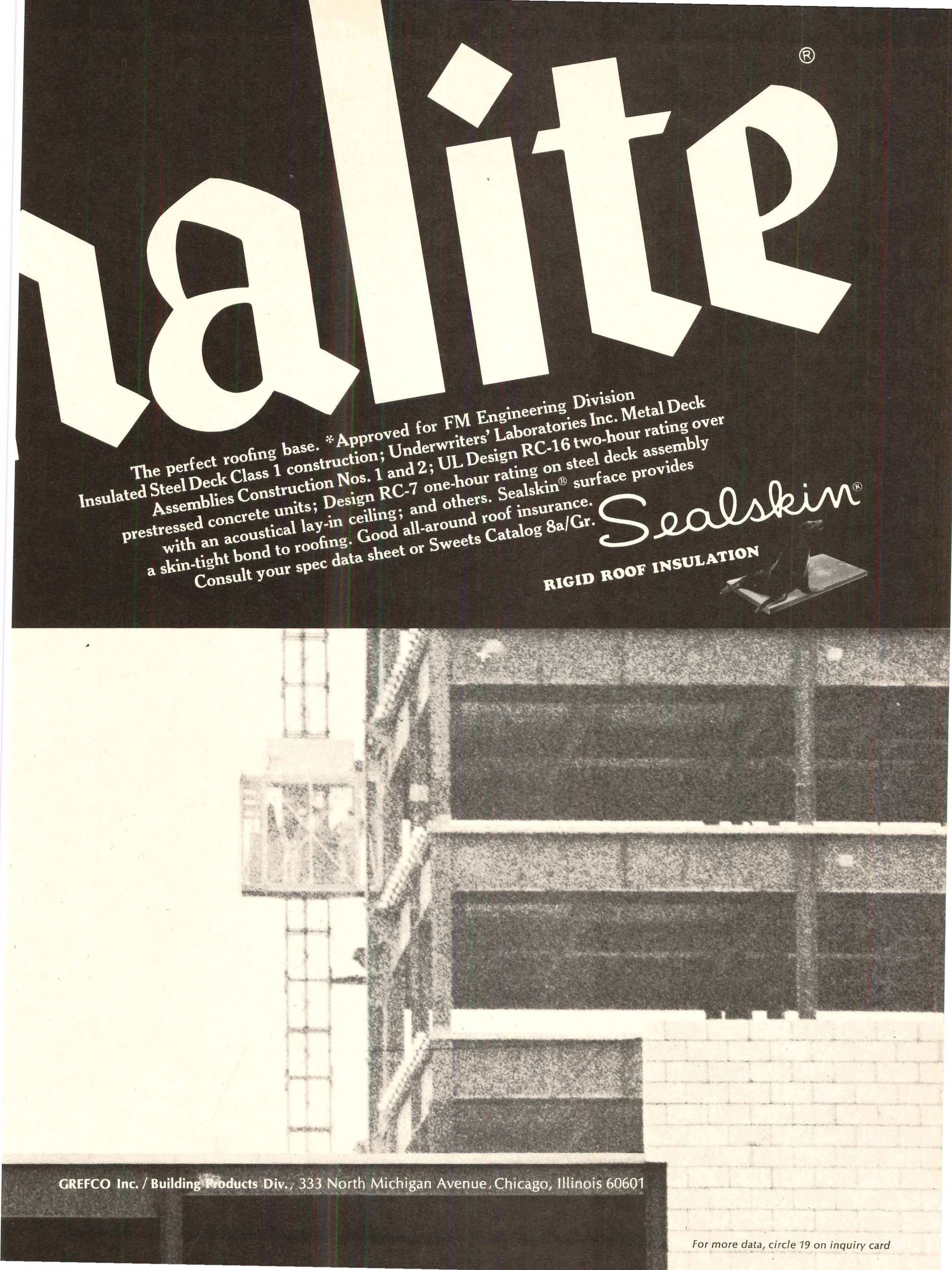
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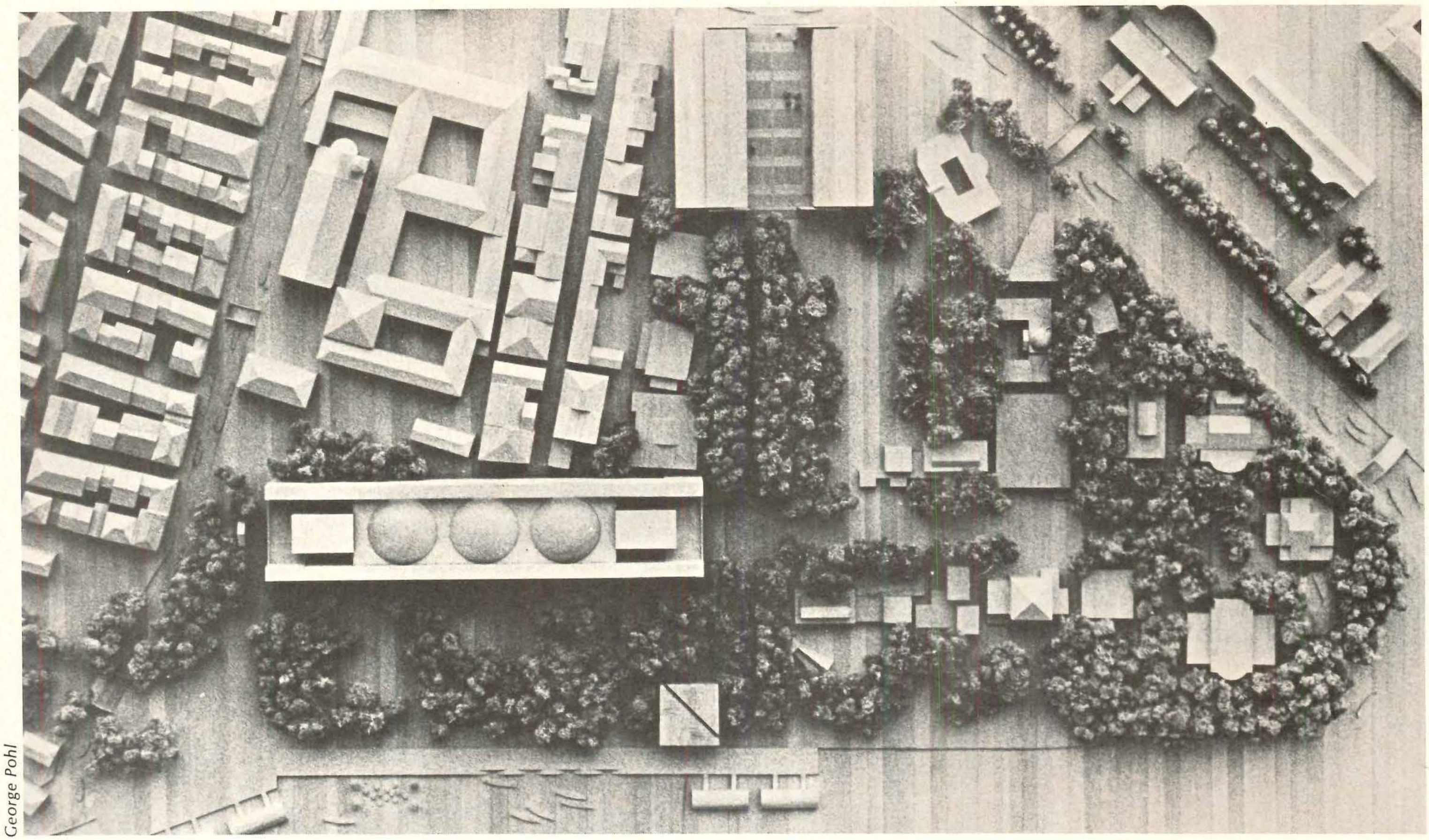
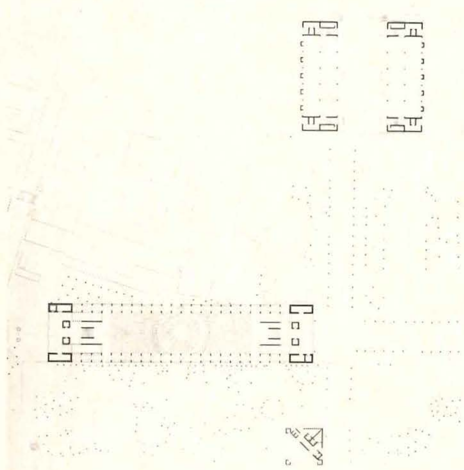
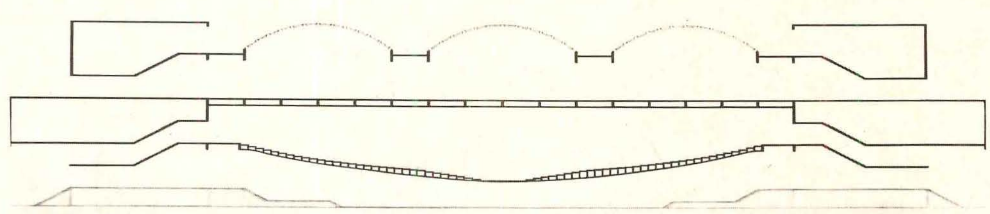
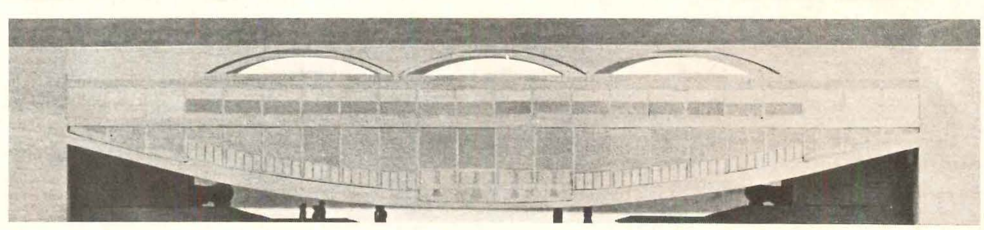


George Pohl







Conference center for Venice, designed by Louis Kahn, is conceived as a new focal point for the city—a new international cultural center and "a tangible contribution to the revitalization of Venice and its heritage" (see editorial, page 9).

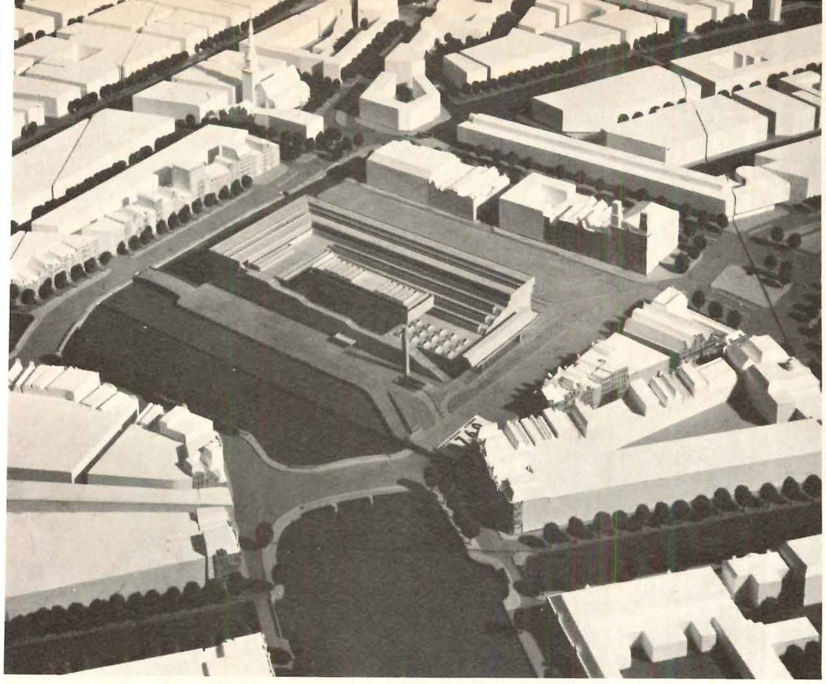
The major building is the Palazzo dei Congressi (section and elevation). This conference hall will be 460 feet long and 100 feet wide. The major conference space, which seats 2,500, is a section of a theater in the round (plan).

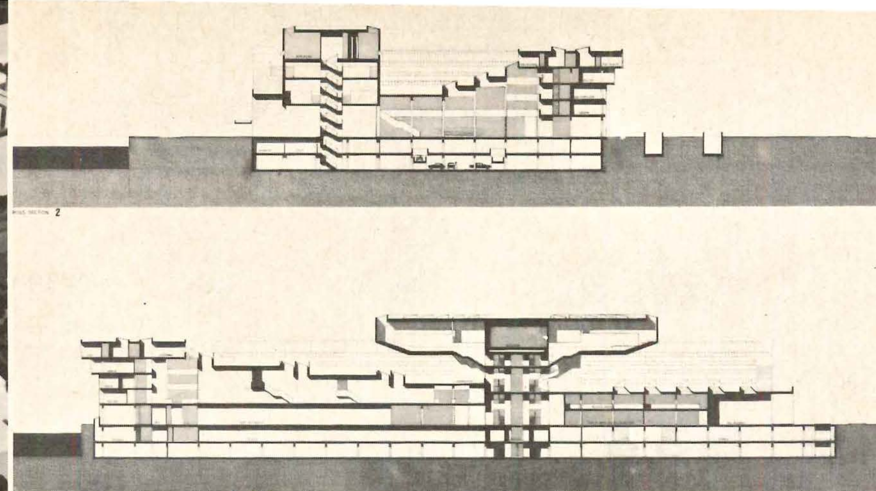
The on-grade level (just below the conference space) is an open plaza; the floor above, a reception hall lighted by three 70-foot stainless steel and glass domes. The roof, divided as a terrace by the domes, should offer beautiful views of the city. The structure will be supported by 15-foot-thick reinforced concrete beams spanning about 370 feet. Spaces within the trusses will provide access to the major spaces, and house support facilities and alcoves for discussions.

Nearby (top in site plan and photo) Kahn proposes a new Biennale building on the site of the existing Italian pavilion. It will consist of two 20-foot by 60-foot sections with workshop-studies, galleries, artists' studios. The court can be enclosed by 50-foot-high doors and covered by an operable metal-framed glass roof.

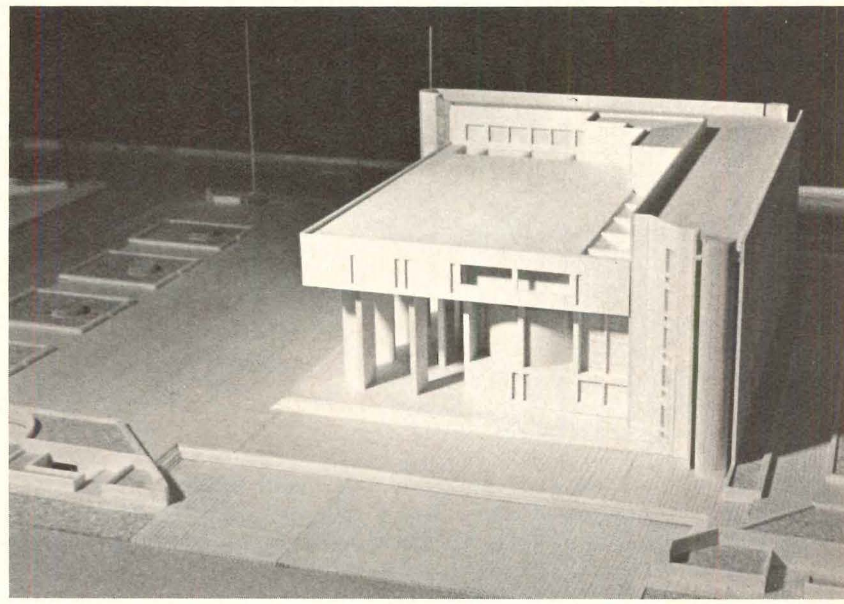
Third building in the new complex is a reception and restaurant building (bottom in site plan), located directly on the Grand Canal.

Financing has not been arranged, but the sponsor—the Venetian Tourist Office—says it will finance the project "with or without government help."

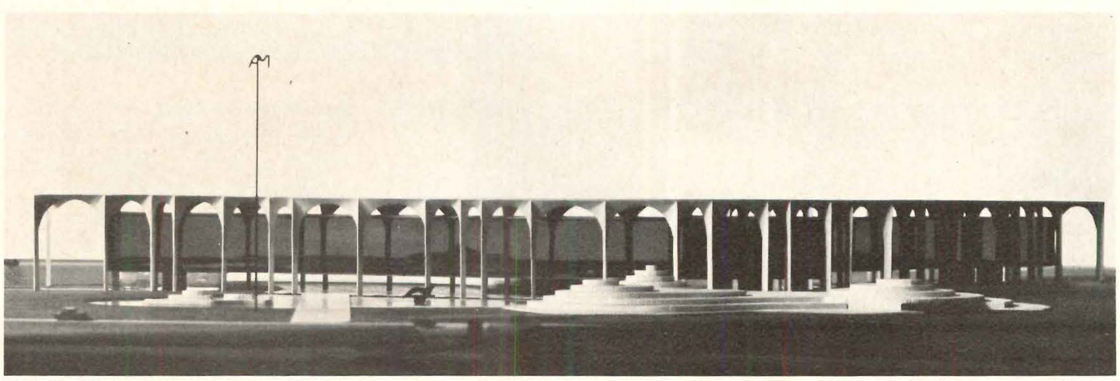


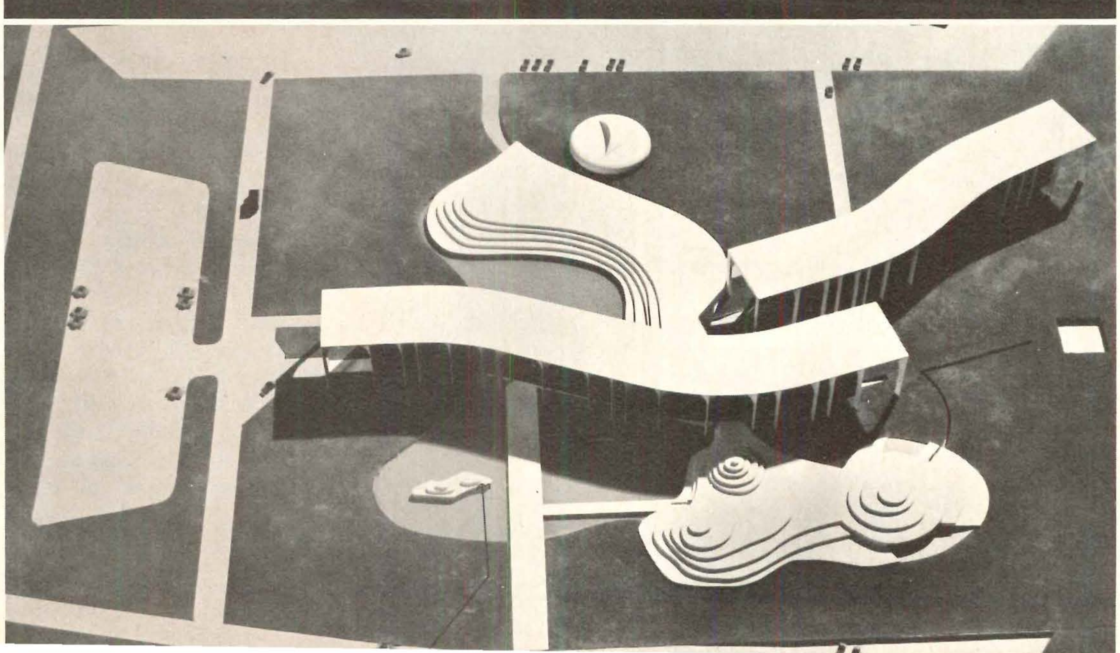


Amsterdam City Hall competition winner is this design by Austrian architect Wilhelm Holzbauer. The reinforced concrete structure—which is boldly skylighted—will have a brick veneer, and brick will be used extensively in the broad stepped-down terraces and river-front pedestrian plaza. At the focal point of the building is a cantilevered section which houses the city government's meeting chambers. In the large L-shaped spaces are a number of meeting rooms, wedding chapels, a restaurant, and offices for municipal officials.



Supreme Court Building for the State of Oregon, Eugene, designed by Architectural Associates, is the winner of a state-wide competition. A five-story L-shaped unit contains general office space, while the central unit containing courtrooms, lobbies, and cafeteria is capped by a 150,000-volume library. Judges: Dean George Gleeson, Oregon State University School of Engineering; Herbert Schwab, former circuit judge and Supreme Court justice; and architects George W. Qualls, Gerard Kallman and Fred Bassetti.



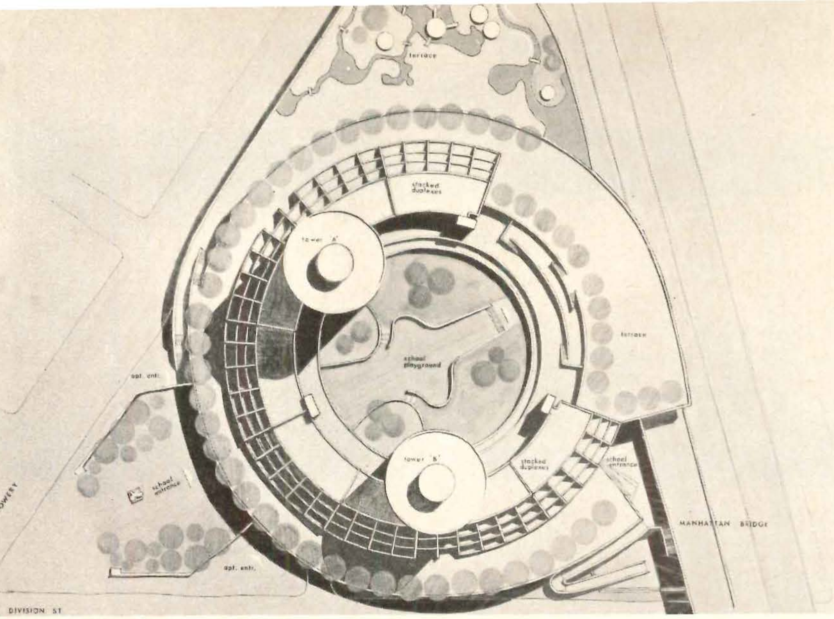


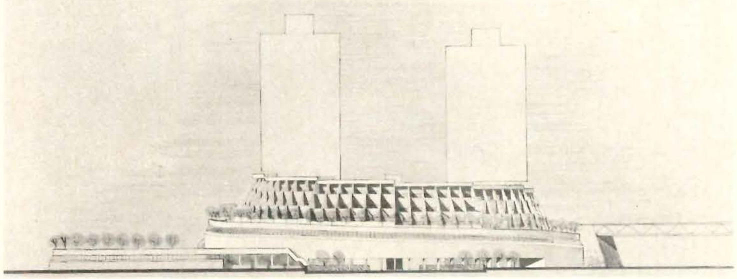
Publishing headquarters—near Milan—for Arnoldo Mondadori Editore, Italy's largest publishing house, was designed by Oscar Niemeyer, with Luciano Pozzo. Niemeyer's design calls for a five-building complex totalling 473,612 square feet of floor space.

The main office building (elevation) will consist of reinforced-concrete arched forms from which the six-level, steel-and-glass enclosed space will be hung. Only one of two such structures (aerial view) will be built at the first stage.

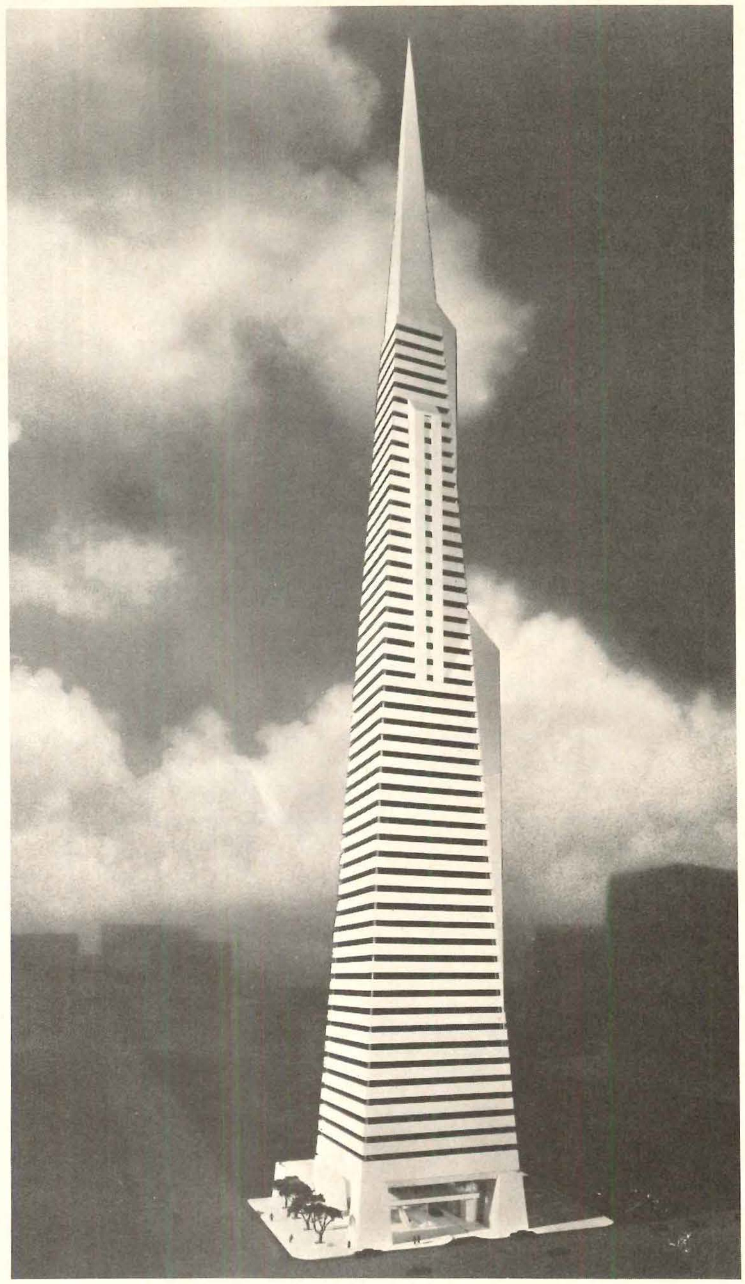
The building in the foreground is the social service building, with, under the three stepped cupolas, a library, a cafeteria, and an auditorium. The stepped building at the rear houses accounting, stock space, and other general services. The company's extensive photographic laboratory is housed in the round building beyond. All of the ancillary buildings are reinforced concrete.

Interior layout and all engineering design are the work of the Mondadori Plant and Building Office, headed by Ing. Giorgio Calanca. Completion date: 1971.

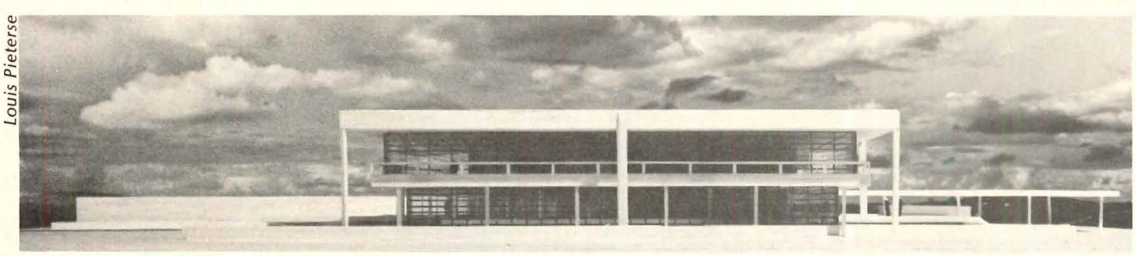




A circular urban complex in New York City will combine (at no cost to the City) a public school with 550 middle-income apartments. Under consideration is the feasibility of wrapping an access tunnel from a nearby expressway around the doughnut-shaped structure. Architects Horowitz & Chun designed three floors of school space and six floors of duplex apartments curving around a school playground. Rising from this base will be two 25-story circular apartment towers.

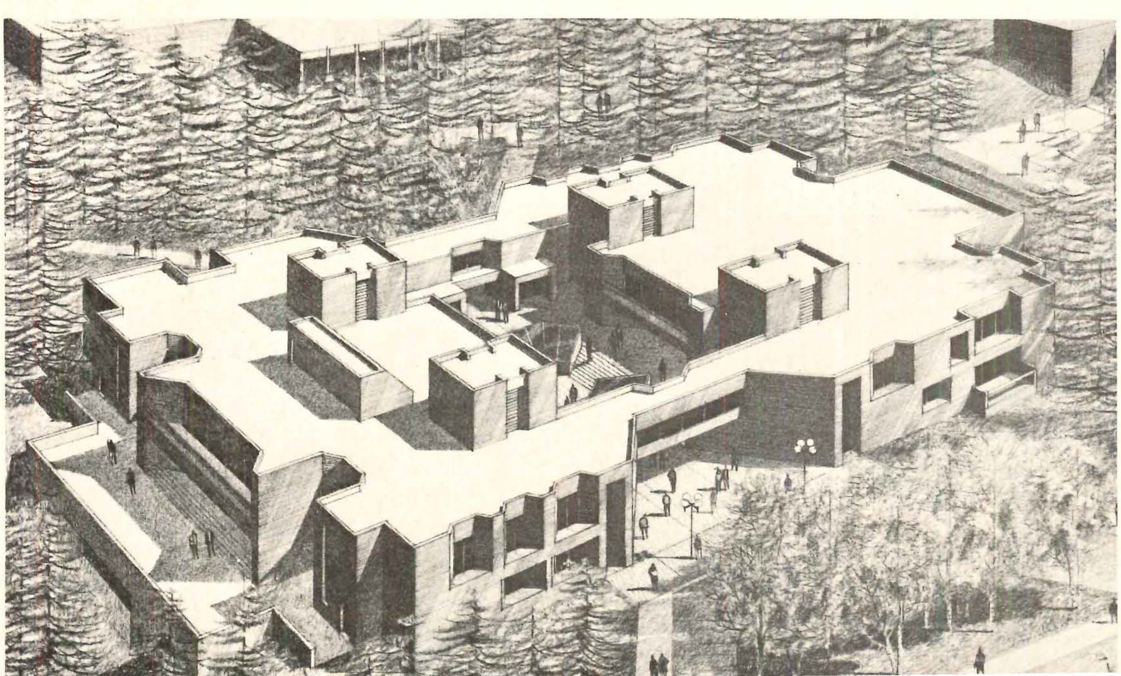


Pyramidal headquarters for Transamerica Corporation, San Francisco, will rise 1,000 feet from the street, with the 55 floors diminishing from 130 feet square to 50 feet square. Architects William L. Pereira & Associates wanted a simple form with minimum skyline obstruction.



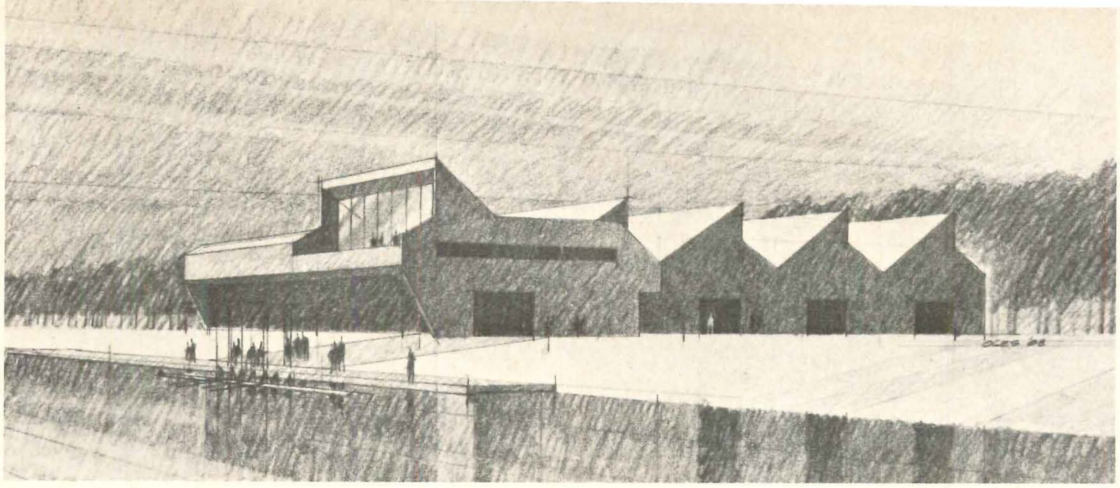
Louis Pieterse

Restaurant building for University College Dublin, Belfield, Dublin, is sited in an artificial hollow that permits a three-story building with the main entrance on the middle floor. The building here, with projecting roof, is the first stage of a two-stage design to allow expansion. Architects: Michael Scott and Partners.

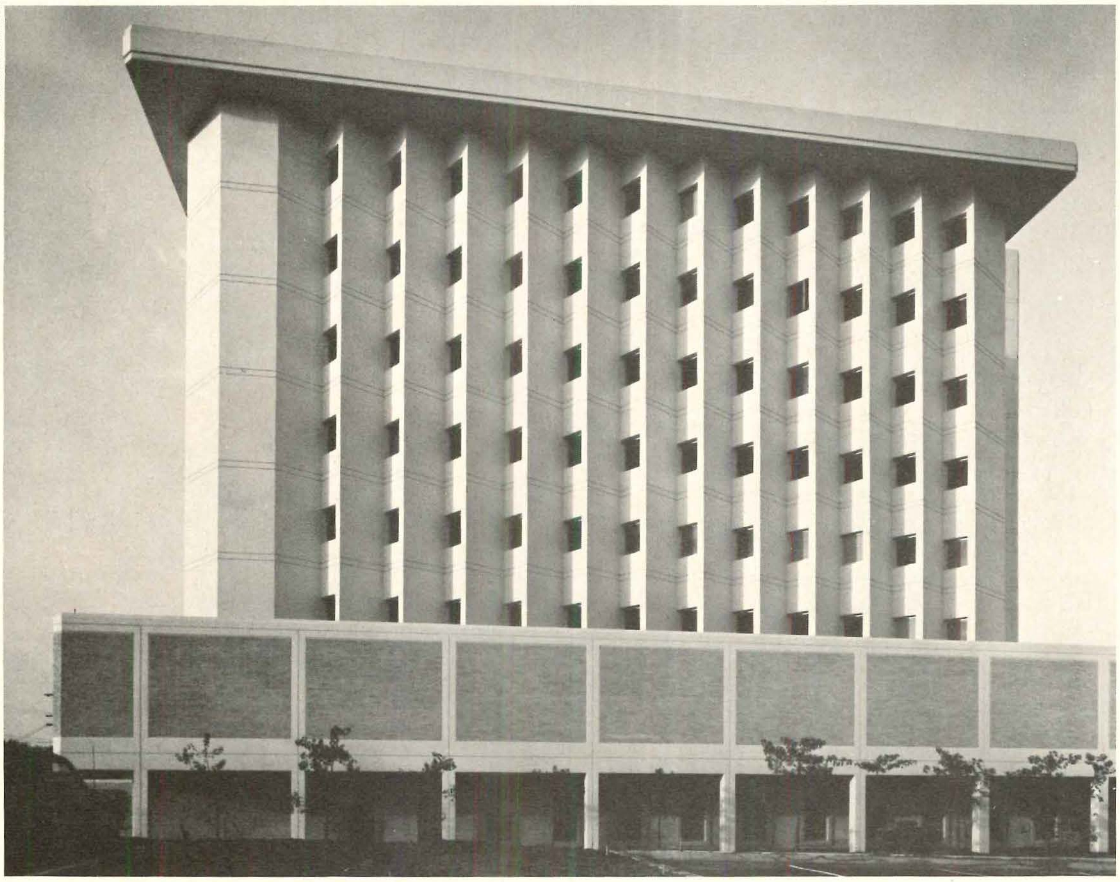


Usdan Student Union, Brandeis University, Waltham, Massachusetts, is designed as a compact, three-level structure of interconnecting wings around an outdoor courtyard. Paired core-towers containing stairs and elevators define the wings and emphasize the individual entrances. Windows are deeply recessed with 45 degree jamb details. Architects: Hugh Stubbins and Associates.

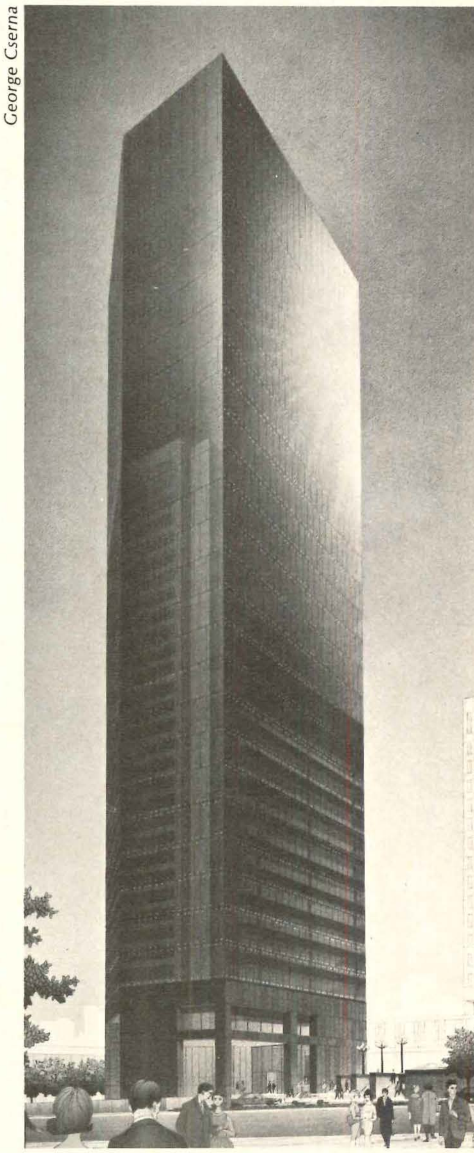
Physical Education Annex, Lowell Technological Institute, Lowell, Massachusetts, which will house crew facilities, is designed as a simple yet forceful structure to stand freely and remain relatively vandal-proof. Clerestory windows are formed of simple wood trusses and a balcony overlooks the race course. Architects: J. Timothy Anderson & Associates Inc.

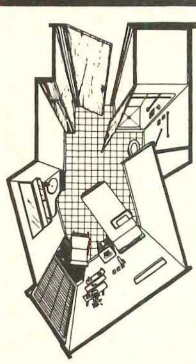


Morris Rand



George Cserna

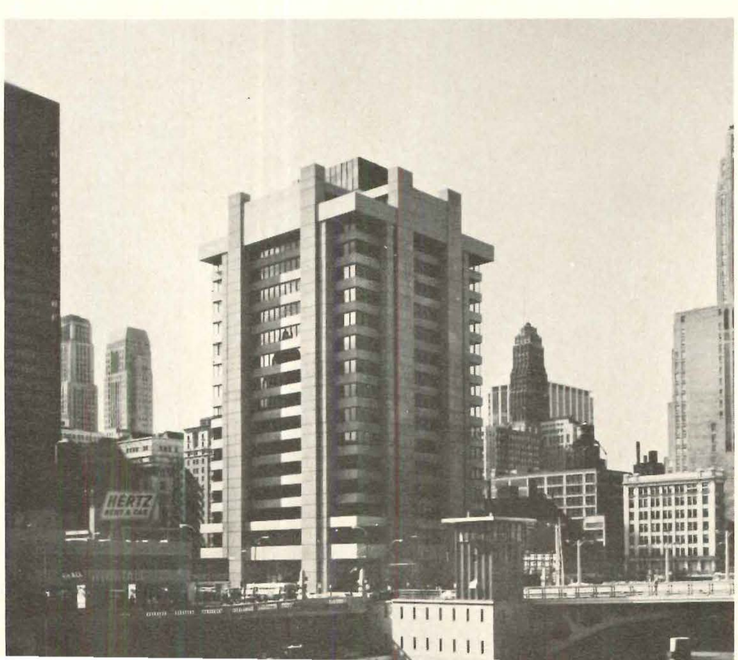


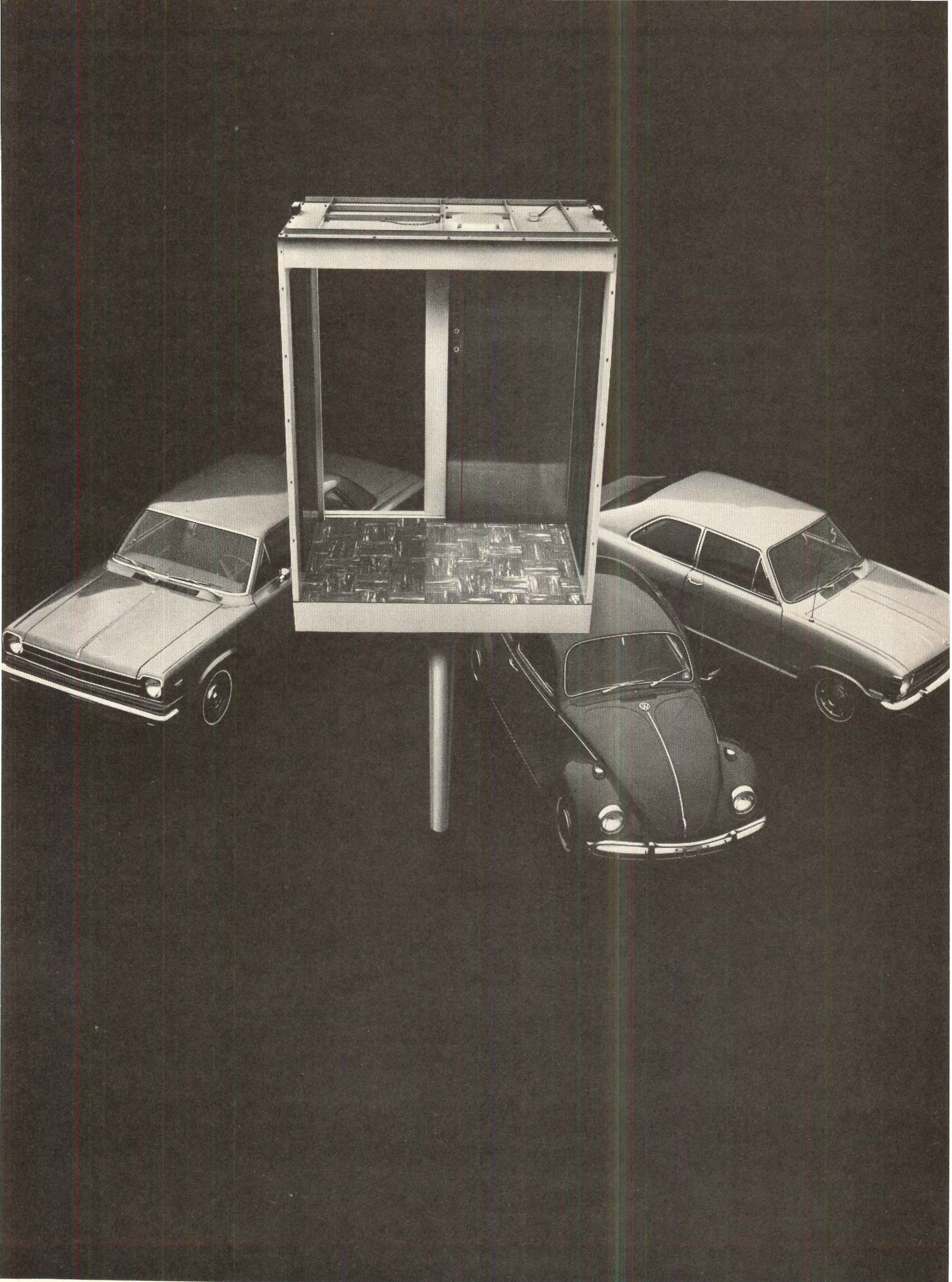


Centinela Valley Community Hospital, Inglewood, California, is the largest all-single room hospital in the U.S. The eight-story structure, designed by Welton Becket and Associates, has 204 bedrooms on six top floors, each with a complete bathroom. Each bedroom is set at an angle to the exterior walls to minimize corridor length. As a result, the sawtooth-shaped exterior walls provide a window at each bedside. The windowless second floor contains operating rooms.

Charles Center Tower, designed by Rogers, Taliaferro, Kostritsky, Lamb, is winner of an office building competition for Baltimore's 33-acre urban renewal project. The irregularly-shaped 23-story building will be sheathed in panels of solar gray laminated glass fastened with faceted stainless steel buttons. Judges: Pietro Belluschi, F.A.I.A., G. Holmes Perkins, F.A.I.A., and David A. Wallace, A.I.A.

Blue Cross and Blue Shield Building, Chicago, is poured concrete with variations in the texture of exposed horizontal and vertical elements. The 15-story office building has bronze-colored window frames and solar plate glass. Architects: C. F. Murphy and Associates.





On the January issue . . .

I have been very much intrigued with your new giant-size magazine. It didn't seem to me that 3/8 in. added on two sides could give you such an extra sense of space on the pages or make the photographs seem so much larger, and I finally went to work and calculated that you have added almost 7 3/4 in. per page by this device. It does seem to make a real difference in the ways that you anticipated, and I noticed also that in your Buildings in the News section, the photographs, which are in any case somewhat small, appeared to better advantage. It was a good idea.

Eliot Noyes
New Haven, Connecticut

I wanted to tell you how much I liked the January RECORD. Briefly said, there's a zip in it that is new and instead of just being formidable (which is how I always felt about it) it's fun too. Your remark about the user as the architect's client in Rex Allen's speech and then Caudill's references to it struck at what I personally think is the most important potential for the profession.

Jim Morgan
New York City

You have a way of presenting precious things preciously. In David Kenneth Specter's "Some Essentials of Successful Urban Space" we were reminded of things important, and you could not have done it more appropriately than you did—with love, quality and some sacrifice. Wonderful!

Jeanne M. Davern's announcement on Issues in Architecture seemed to lose its profound importance in the fine print. In my opinion it deserved a full page in bold type.

You can be complimented on the decision to grow into the more advantageous 9 by 12 size as it was so well demonstrated with your very successful first issue.

Gunnar Birkets
Birmingham, Michigan

The January issue of RECORD is really great. Good urban reporting of interesting designs, beautiful photos, fascinating house. All add up to a most stimulating magazine. Congratulations to you and the editors.

George Cooper Rudolph
Rudolph, Russell & Fleury, Inc.
New York City

I have already received a number of letters commenting about my article in January. Architects do read. Thanks so very much for letting me speak to your readers, particularly in this issue. It's a beautiful format. I hope Issues in Architecture is a success.

William W. Caudill, F.A.I.A.
Caudill Rowlett Scott
Houston

Congratulations on your January issue on urban housing. Of particular interest and delight was the beautiful photographic commentary by David Kenneth Specter. This is a perceptive analysis of public areas and extremely well presented.

Nelson H. Spencer
Dallas

I can't remember when I got as much satisfaction out of a magazine feature as I did in the January "Some Essentials of Successful Urban Space." Beautifully done. Congratulations!

Alfred D. Reid
Pittsburgh

An insignificant compliment to you on your new page size and design—the January issue is a fine job. Your "Essentials of Urban Space" article falls in the "picture worth 1000 words" category. Very nicely done.

We are particularly interested in computer articles, such as in the Office Management portion of the January publication. Our practice is now overwhelmingly oriented to the provision of computer services to fellow architects/engineers, and we ourselves have developed some computer solutions in line with those described in the book review. Again, nice job.

Edward Colbert
Royal Oak, Michigan

The Princeton Report (October)
Jonathan Barnett's otherwise commendable discussion of the Princeton Report is marred by failure to recognize the substance and significance of the reactions of architectural educators at the A.C.S.A. Convention in Portland. Far from being "forgiven" for "peevishness," the Association of Collegiate Schools of Architecture should be commended for its maturity in pointing out the report's shortcomings and for deeming it, in an inspired phrase, "insufficient."

Indeed, many of the criticisms made in Barnett's article, and others equally cogent, were advanced in the A.C.S.A. meetings. For example, Robert Harris pointed out that the report is overwhelmingly and exclusively "task-oriented," i.e. that it sees the architecture school as a sort of super trade-school, rather than a component of higher education. This myopic view Barnett seems not to question, since he cites as evidence of the shortcomings of architecture schools the fact that "no state grants architectural graduates exemption from a registration examination." To say the least it is questionable whether the schools should aspire to such an endorsement, considering the rigidity and legalisms it would inevitably entail.

Even the excellent A.C.S.A. discussion, presented somewhat apologetically but reasonably intact in the September A.I.A. Journal, failed to call attention to the fact that the whole mid-section of the Princeton Report (the six-times-six-times-six part) deals with problems which concern the profession more directly than they do the educators. Others, notably Herbert Swinburn, have arrived at similar conclusions by systems analysis, and Swinburn, in my opinion, served up a tastier stew with considerably more meat in it.

Another of Mr. Barnett's implied criteria for educational success is his negative interpretation of the "extraordinarily high attrition rate" of architecture schools. Assuming that, as he says, two-thirds of an entering class fails to graduate "on schedule" this may indicate a variety of things, not all of them bad. If the architectural "drop outs" go on to earn liberal arts degrees, it may simply show that their interest in architecture was insufficient to carry them through the more demanding professional aspects of the curriculum. In such cases, we may be creating just the kind of understanding and appreciation of architecture that A.I.A. is striving in other ways to bring about.

The major weaknesses of the Princeton Report, as Barnett points out, are its failure to give us new information on architectural education as it is, and its failure to relate the problems of the profession to other parts of the educational system—notably, but not merely, the engineering schools. Its major strength lies in calling for a much more flexible curriculum, "jointed," "open ended," and even open at both ends—so as to enable the student to get his cultural exposure first and professional training later or vice-versa if so inclined.

Many of us in A.C.S.A. are disposed to feel that rather than become more profession-oriented, architectural education must become more truly student-oriented. The student, his needs and desires and almost unpredictable future, are central to every educational problem. At best, he is a shadowy figure in the Princeton Report, and this, above all, is what must be corrected in future attempts of its kind.

Henry Wright
Director, West Central Region
Association of Collegiate
Schools of Architecture
Washington, D. C.

I do, as Professor Wright suspects, share the belief of the Princeton Report that the professional portion of an architect's education should be "task-oriented," although I wouldn't necessarily choose that particular phrase. It is hard to see what else today's architectural curriculum offers. It certainly does not meet the standards of any other

more letters on page 59

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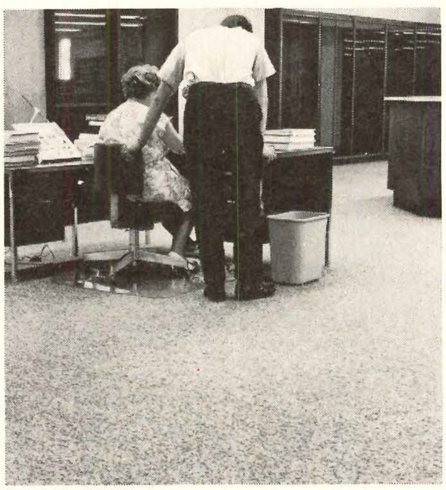
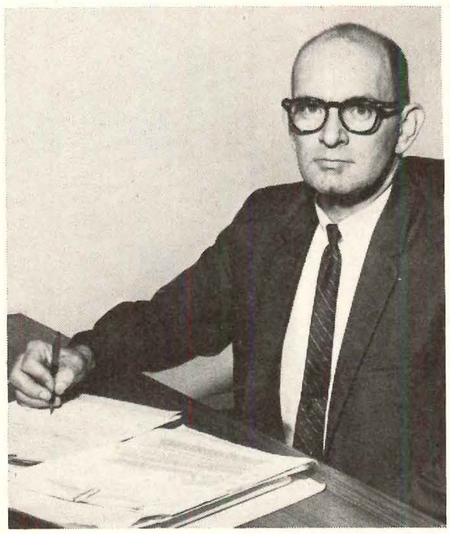
"How do you like your newly carpeted college?"

A tape-recorded interview at Jefferson College, Hillsboro, Missouri

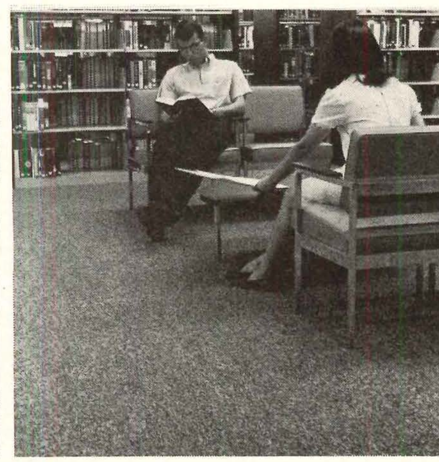
Rose Ann Sanders, Secretary, Dean of Admissions. "We have quite a few parents and students who come to see the college, and it makes quite an impression as soon as they step into a corridor that's carpeted. I'm sure the students enjoy it, and I know in our office it cuts down noise."

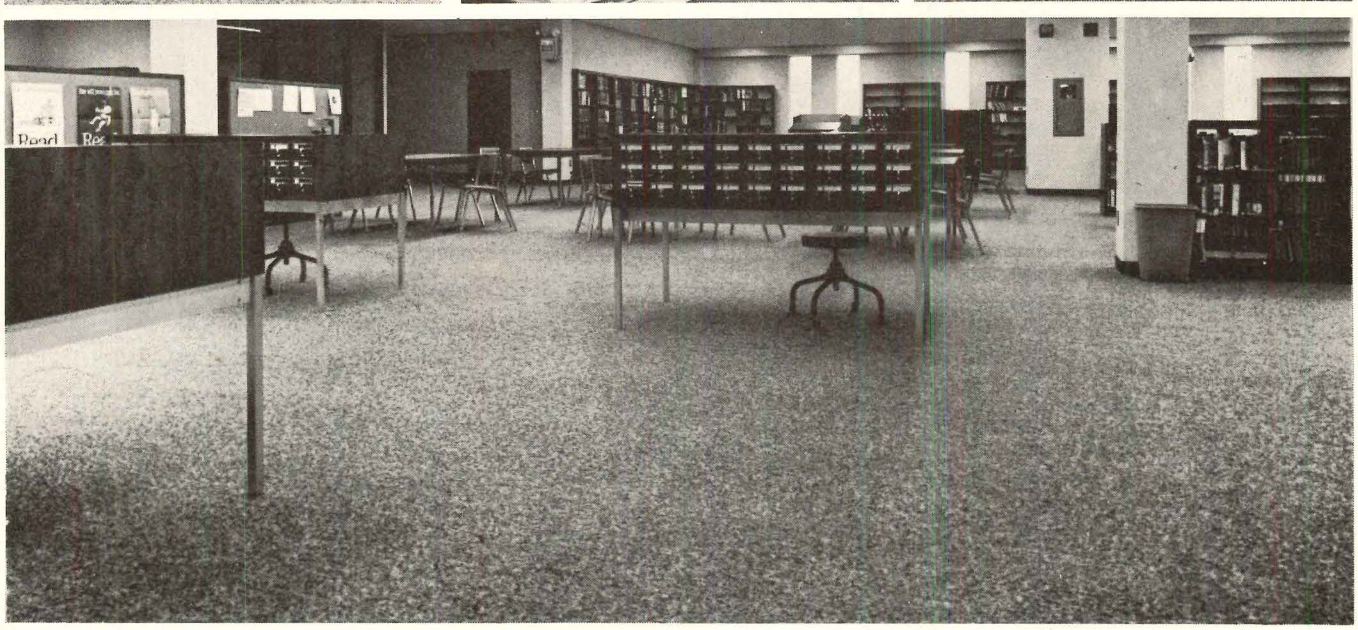


M. F. Long, Business Manager, Jefferson College. "If you view carpet in terms of dollars and cents, there's no doubt we should have carpet in future buildings—in classrooms and corridors. There is not the maintenance required and when you evaluate the cost on a daily basis, there's no doubt that it is more economical than tile or other hard materials."



Robert Ross, Student Counselor. "I've found a decided change in atmosphere since we've had carpeting. It's easier to work with students. There are no distractions. I think the best part is that it adds a certain air of sophistication to all the offices and to the college."





Bill Severe, President of Student Body. "I would like all the buildings that could practically have carpeting, to have it. In the halls and classrooms, I think it would really be nice."

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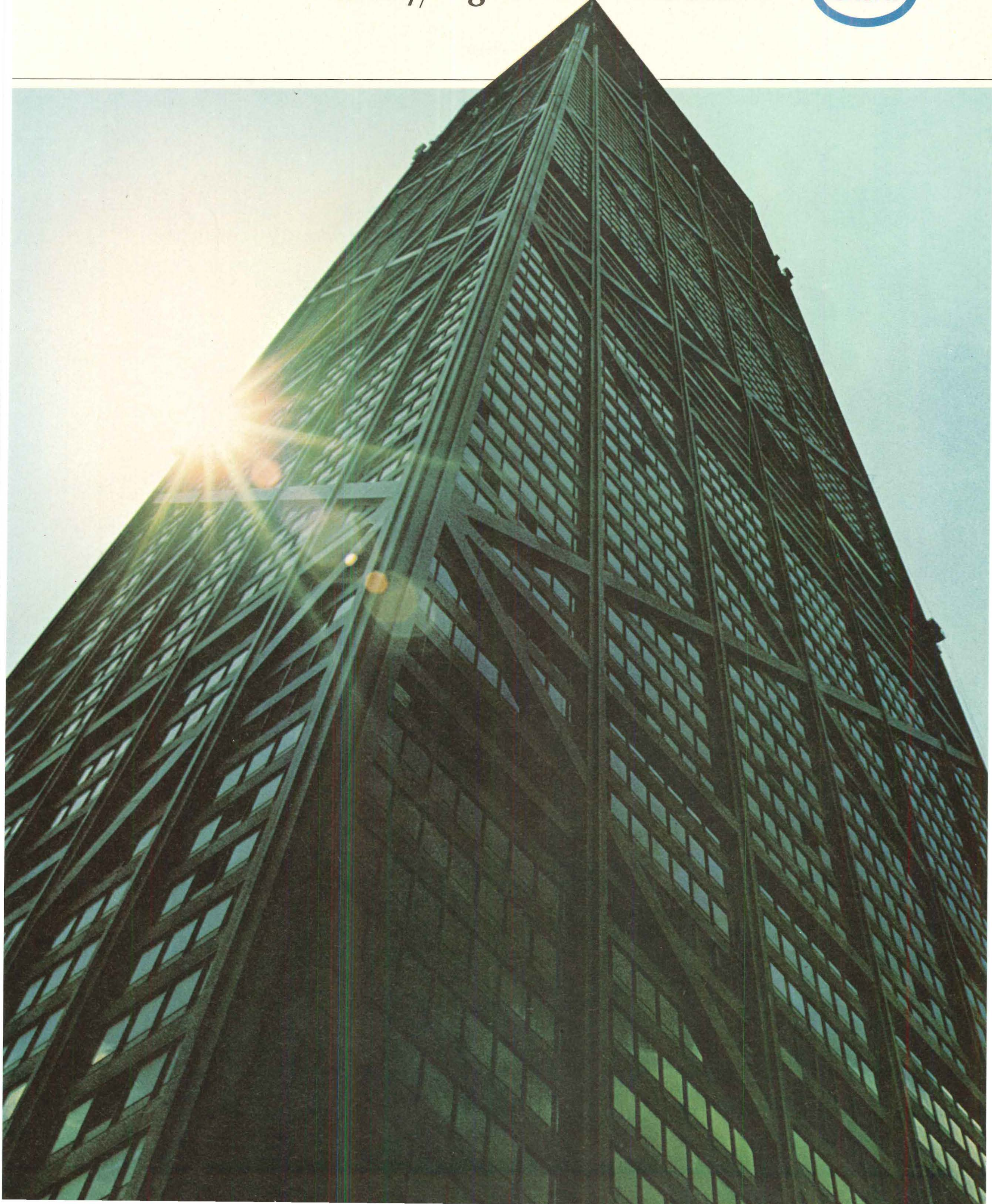
Elastomers in Industry/Engineered Construction

ENJAY



Butyl tape seals every pane of glass in new 100-story Chicago landmark

When the John Hancock Center is completed this year, this unusual structure, combining both residential and commercial space, will be the world's second tallest building.

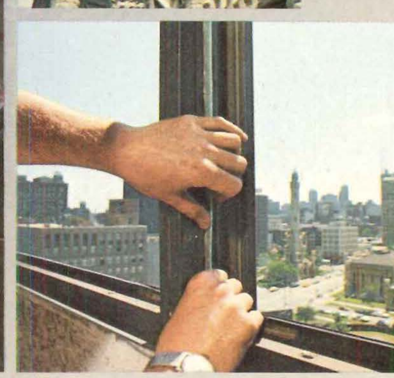
Every one of its 11,459 panes of bronze-tinted glass will be installed with glazing tape made of Enjay Butyl rubber.

The tape is easily and safely applied around the window frame, from the inside. The window is pressed against the tape and inside channels are snapped into place.

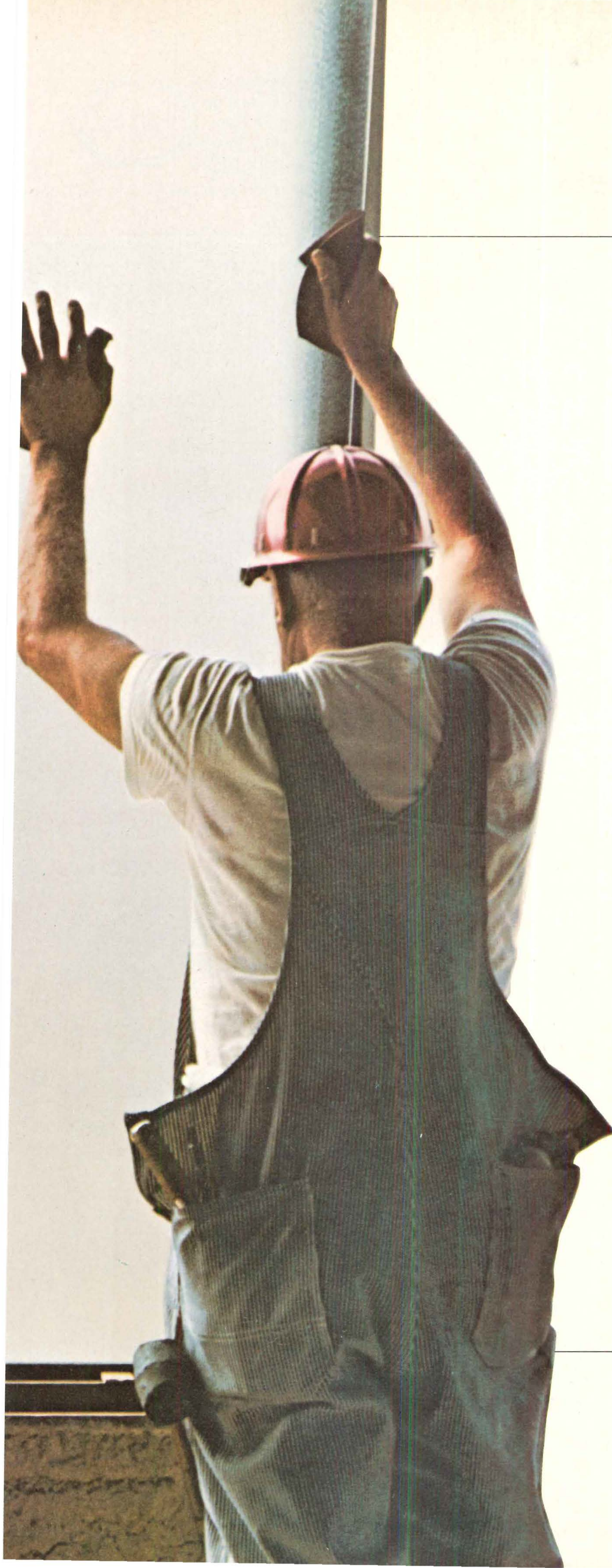
The result is a permanently weatherproof seal that shuts out the coldest blasts the Windy City can produce.

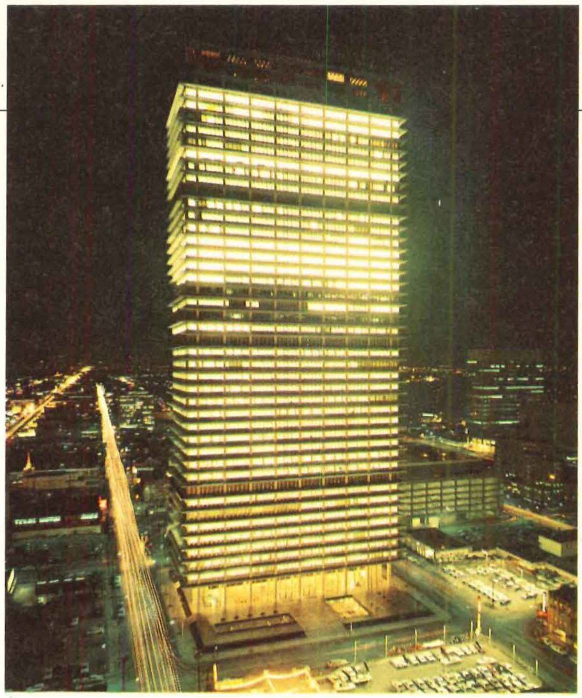
Use of this one-step Butyl tape glazing system eliminates back-up sealants and clean-up time, cuts the cost of window glazing for large buildings by 50-60%.

Owner/Developer: John Hancock Mutual Life Insurance Co.
Architect: Skidmore Owings and Merrill.
Glass and Glazing: National-Hamilton, Division of Bienenfeld Glass Corp.
Tape Manufacturer: Protective Treatments, Inc. Dayton, Ohio



Butyl tape easily unrolls from roll, adheres quickly to window frame. Workers set large pane in place over tape for quick, weathertight seal.





After 8 years, Butyl rubber membrane still provides perfect water seal for foundation

The entire foundation and subsurface portion of the Humble Oil & Refining Company building in Houston, Texas is encased in a one-eighth inch thick sack made of Enjay Butyl rubber. Approximately 230,000 sq. ft. of Butyl sheeting was needed for the job.

Installed in 1960 when the building was erected, this waterproof boot of Butyl still keeps the three-level basement of the building dry and leak-free.

The water table at the building site is 35 feet above the bottom of the Butyl membrane, so the lower 35-foot portion of the building is normally completely surrounded by water.

Workmen installing 20′ x 90′ Butyl sheets to form watertight sack before foundation was poured.

Butyl sheeting material manufactured by Carlisle Corporation, Carlisle, Pennsylvania.

For more data, circle 24 on inquiry card

Enjay Chemical Company
Synthetic Rubber Division
Adhesives Intermediate Dept.
60 West 49th Street
New York, New York 10020

ENJAY

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Use a partition system that adapts to changing office needs- in a hurry!

Quick Change partitions save trouble with design flexibility.

With some movable partitions, you're stuck with whatever design (good or bad) the manufacturer came up with.

But not with Masonite Quick Change movable partitions.

Their variety provides the design flexibility needed to give every building interior its own personality.

For instance, there are ceiling-high and cornice-high Quick Change partitions. Low rail and glazed rail versions. Flush post and feature post models.

Then there's a variety of Royalcote woodgrain finishes to choose from. And decorator colors too. We'll even leave the hardboard panels unfinished so they can be custom finished on the job.

In short, Quick Change partitions save trouble with design flexibility.

Quick Change partitions save trouble with easy installations.

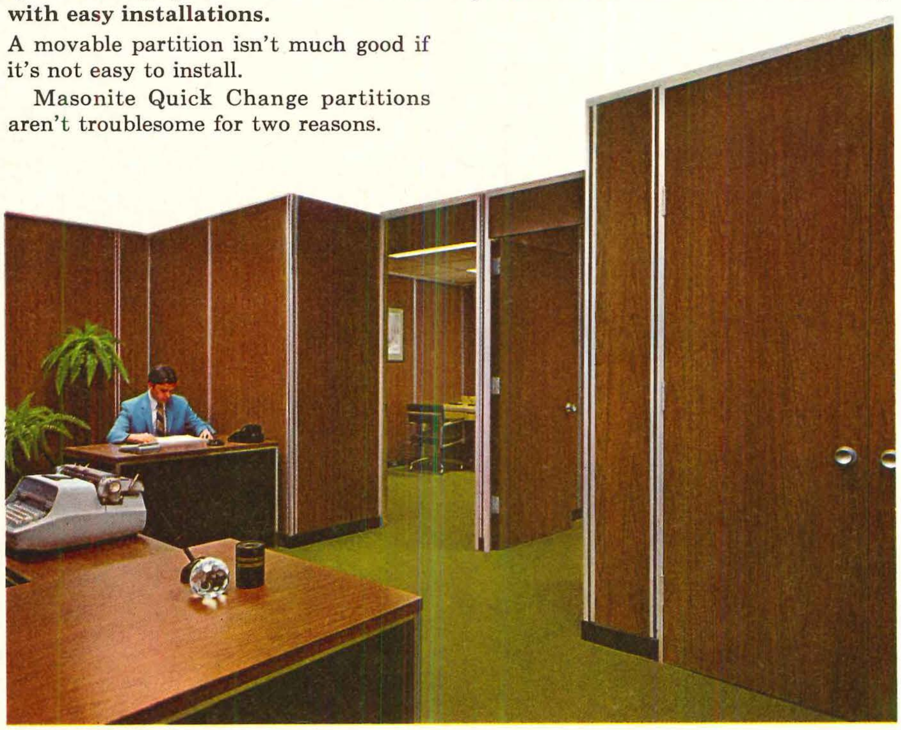
A movable partition isn't much good if it's not easy to install.

Masonite Quick Change partitions aren't troublesome for two reasons.

First, our partitions are designed specifically for quick, economical installation with a unique friction fit that minimizes labor and parts.

For example, a straight ceiling-high partition wall can be run almost any length without the use of mechanical fasteners.

Second, we have professional Partition Representatives located around the country. They're the experts with the training, equipment, and experience to do a fast, clean installation job.



Quick Change partitions eliminate problems with quick changes.

The whole idea of movable partitions is that they be movable. If they're not; if moving them creates more trouble than they're worth, what's the use?

As the name implies, Quick Change changes quickly. A few screws here, a nut or bolt there, and the whole partition system can be easily disassembled. Then it can be moved to another place and reassembled just as easily. And as sturdily as ever.

If you'd like to know all the details of how to eliminate a lot of trouble, ask a Masonite Partition Representative about our Quick Change partitions.

Or just send the coupon to us.

MASONITE CORPORATION

MASONITE CORPORATION Dept. AR-3
Box 777, Chicago, Illinois 60690

☐ Please send me your literature on Masonite Quick Change movable partition systems.

☐ Please have your representative call.

Name________________ Title________

Company________________________

Street__________________________

City____________ State________ ZIP______

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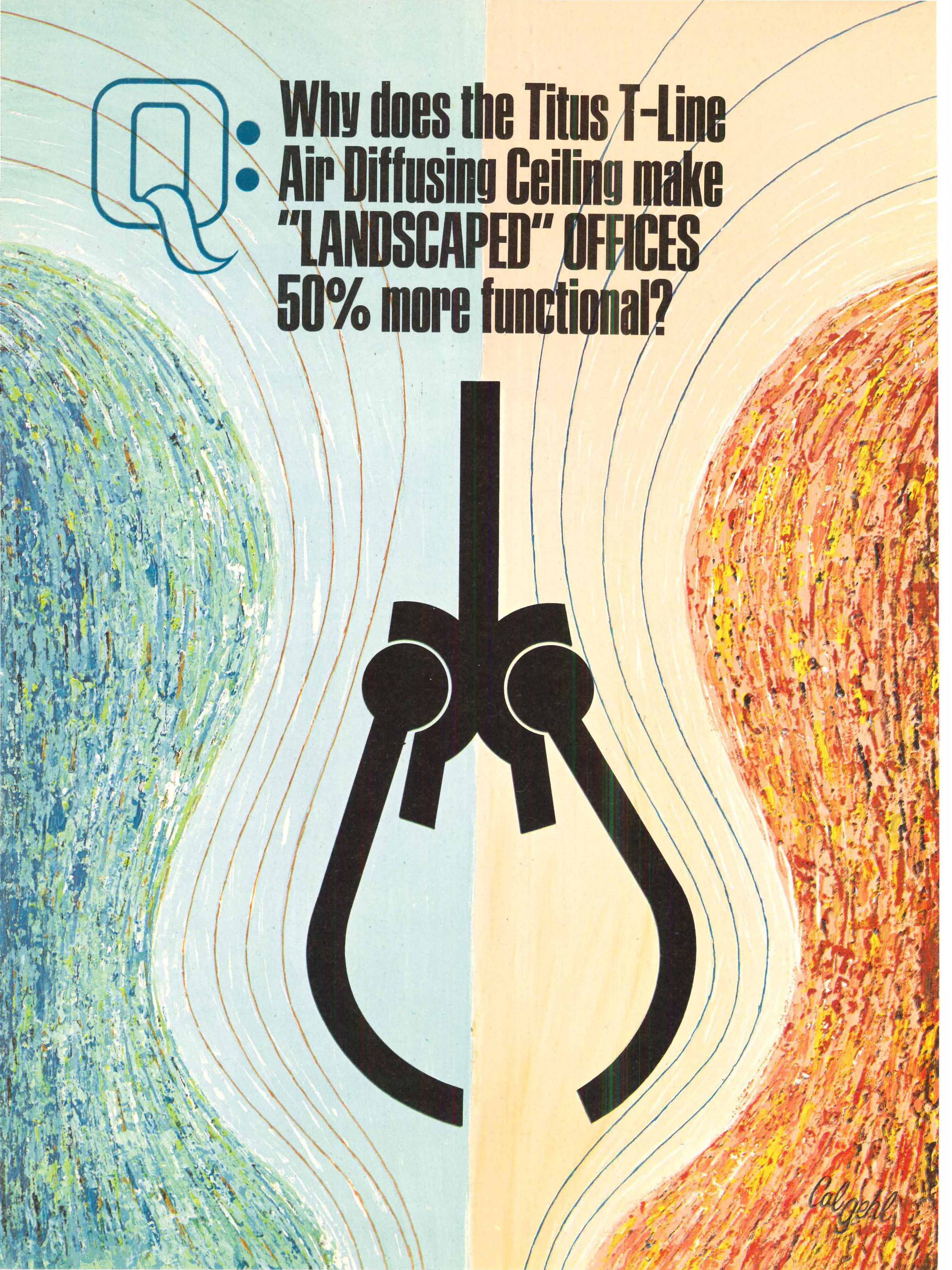
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Why does the Titus T-Line Air Diffusing Ceiling make "LANDSCAPED" OFFICES 50% more functional?


Bright ideas
You see them here. You see them there. You see them everywhere... those thrifty, space saving Bradley Washfountains. That's because Washfountains are used throughout modern schools. In washrooms. Corridors. Shops. Gyms. Labs. Classrooms. Kitchens. Cafeterias. Faculty lounges. Dormitories. Why are Washfountains so popular? Compare them to ordinary lavs. Washfountains cost less to install, use less water, require less space. And they're foot operated, so they're much more sanitary. Available in the widest choice of models, colors, and compositions. Bradley Washfountains—the brightest ideas in modern schools. See your Bradley representative. And write for latest literature. Bradley Washfountain Co., 9109 Fountain Drive, Menomonee Falls, Wisconsin 53051.
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from Bradley!
BRADLEY

continued from page 47

kind of education, so that, if it is not "task-oriented" it is nothing.

I also cannot help continuing to believe that a high attrition rate is an index of failure on the part of the school. If architectural education is a process of weeding out all those who are not "gifted" and "highly-motivated"—in other words, restricting education to the students best able to teach themselves—the student is quite justified in regarding the curriculum as little more than an obstacle course. Judging from some of the manifestos coming out of today's embattled architectural schools, this is precisely the way many students do regard the formal education they are being offered. It seems doubly unfair to put such a strong burden of proof on the student when none of his elders can agree on what architecture is, or how it should be taught.

—Jonathan Barnett

Noise Control

Your Special Report No. 8 (September) bears down on problems which already are sources of major dissatisfaction and which promise to affect an ever increasing fraction of the population as this country moves at a constantly accelerating pace toward the inevitable end point of a majority of apartment dwelling citizens.

Articles such as the report carry to architects and builders in a well-organized, concise and readable form a message which they really need to hear if they are going to meet the real problems head on and solve them satisfactorily. Congratulations.

T. Mariner, Manager
Physics Research Unit
Armstrong Cork Company

Joys of residential architecture

Thank you, thank you, thank you, for the great, great presentation of my work in the November issue. I have received a number of congratulatory letters from friends throughout the country. I sincerely hope that this article will stimulate more architects to seriously consider specializing in residential architecture.

Preston M. Bolton, F.A.I.A.
Houston

What about the residents?

Your article concerning tourist planning for the State of Hawaii makes a strong plea for environmental quality and preservation. Although no fault can be found in such a fine goal, the question arises as to what plans have been prepared for the residents of Hawaii. Planning for their life habits, customs, and needs seems overshadowed by tourist boom planning. Both elements must be reconciled in a plan for the young state, tourist-oriented though it may be.

Virginia Hickman, Planner
Wilbur Smith and Associates
Columbia, South Carolina

If you like acoustical ceilings with a monolithic appearance, here's a beautiful thought.

PPG Performance Glass lets you cut your client's heating and cooling costs before he starts heating and cooling.

Check what it did for Westinghouse and Equitable Life.

By recommending PPG Performance Glass for the total-electric Westinghouse Building—owned and operated by The Equitable Life Assurance Society of the U.S.—the design team was able to realize significant and immediate savings in the cost of heating and air conditioning equipment.

The savings are quite distinct from the reduced operational costs which Performance Glass helps make possible throughout the life of the building.

Solarbronze® *Twindow,*® a PPG Performance Glass, was chosen for use after a series of computer studies on glazing costs, mechanical system costs, rentable area, and return on investment.

The design team found distinct advantages in *Solarbronze Twindow.* This insulating glass will help level off peak heat energy variables. Achieve a completely altered mechanical equipment load. Reduce required air quantity. Result: a more uniform level of operation and higher level of occupant comfort.

Put the financial advantages of PPG Performance Glass to work for your clients. Contact a PPG architectural rep for technical data or write: PPG Industries, One Gateway Center, Pittsburgh, Pa. 15222.

Architect: Harrison & Abramovitz & Abbe.

PPG
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For the sake of distinction, plan ahead with Russwin customized keys

A key is a key is a key is a key.
But the distinctive design of Russwin Customized Keys
can add prestige throughout your buildings.
Sure . . . they may cost more.
But really . . . you couldn't buy from a nicer bunch of guys!
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Division of Emhart Corporation, New Britain, Conn. 06050.
In Canada – Russwin Division of International Hardware.

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OFFICES OPENED

Robert I. Abrash, A.I.A., Architect has recently opened an office at 11404 Washington Plaza West, Reston, Virginia.

Jon Barry Allen, formerly with **Thomas E. Stanley Architects,** has announced the opening of **The Office of Jon Barry Allen Architects,** 35 West 53 Street, New York City.

Bonsignore Brignati Goldstein and Mazzotta Architects have announced the opening of an additional office at 9 Maiden Lane, New York City. Their present Hicksville, New York, office remains at 550 Old Country Road.

Robert W. Evans, Architect has opened offices for the practice of architecture at 1111 A Street Building, Tacoma, Washington.

John M. Johansen, Architect has opened an office at 201 East 34th Street, New York, with **Ashok M. Bhavnani,** associate, at its head. **Charles A. Ahlstrom** has been made an associate and is now in charge of the firm's New Canaan, Connecticut office, which remains at 18 Cherry Street.

Tylman A. Moon, A.I.A., Architect has recently opened an office at 122 Main Street, Flemington, New Jersey.

NEW FIRMS, FIRM CHANGES

Jan Bendetson has become an associate of the Hartford, Connecticut and Valley Forge, New York firm, **Lee & Crabtree Associates, Architects.**

Harry E. Botesch, A.I.A. has announced the addition to the firm of **Leonard G. Nash, Architect,** as a partner. The Everett, Washington firm is now known as **Botesch, Nash & Associates, Architects and Engineers.**

George A. Hartman, A.I.A. and **Clark Teegarden** are now partners of **Bindon & Wright, Architects,** Seattle, and the name of the expanded partnership has been changed to **Bindon/Wright & Partners.**

A. Robert Bliven, A.I.A. has joined **Ellis/Naeyaert Associates, Inc., Architects and Engineers** of Warren, Michigan, as a project manager.

The architectural firm, formerly **William E. Blurock and Associates,** is now known as **William Blurock & Partners, Architects Planners.** The firm is located in Corona Del Mar, California.

John Desmond, F.A.I.A. and **Lewis E. Miremont, P.E.** announce the association of **William C. Burks, Architect** as a partner in their Baton Rouge and Hammond, Louisiana, firm, and the change of the firm name to **Desmond—Miremont—Burks Architects—Engineers.**

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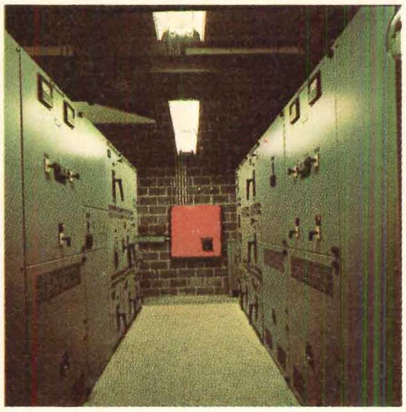
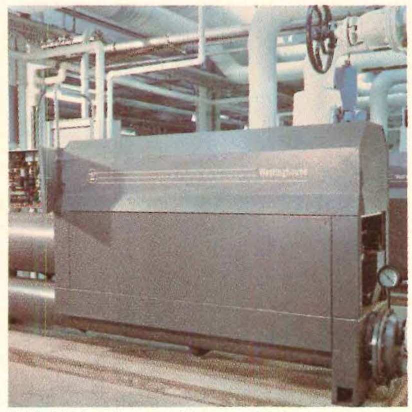
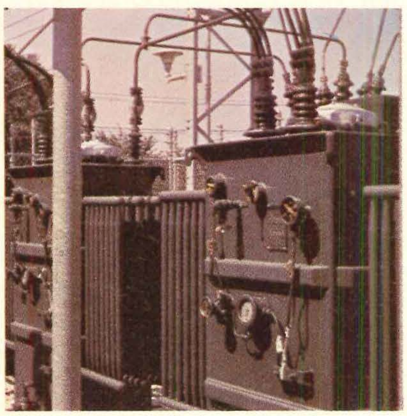


Safe, compact panelboards and switchboards

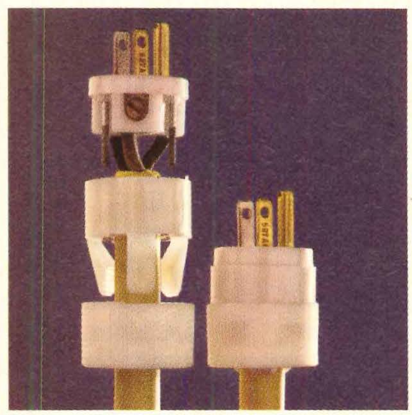


Reliable heating, cooling, ventilating equipment

Easily-maintained laminate surfaces

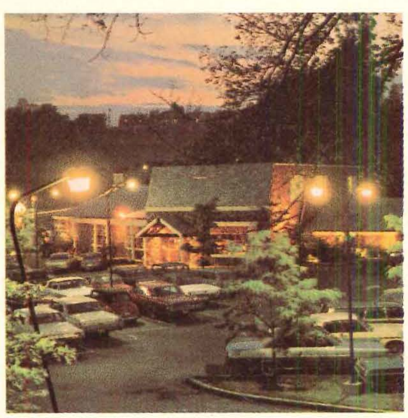


Efficient power distribution equipment

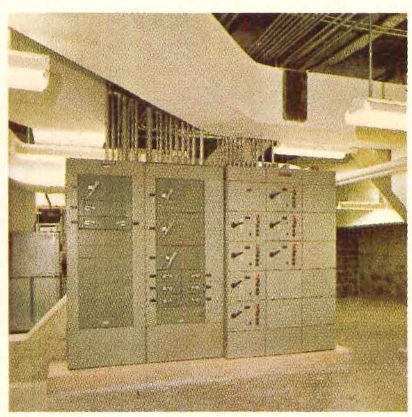


Modern wiring devices and wall switches

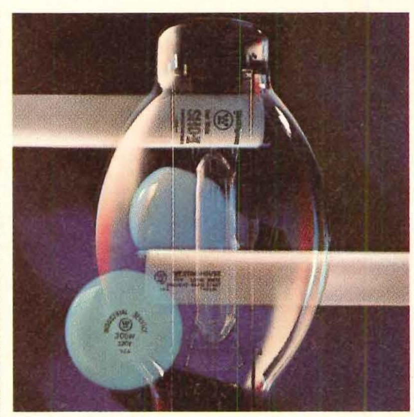
Elevators, electric stairways to move people



Modern indoor and outdoor lighting fixtures



Compact, reliable control centers



Lamps for every need

There's a better way to build...with Westinghouse

Fact: Westinghouse makes more products and systems for construction, offers more services, than any other company in the world.

Everything electrical, of course. Distribution equipment, lighting, wiring devices. Everything to heat, cool, clean and move air.

Plus vertical and horizontal transportation. And vertical and horizontal Micarta surfaces for interiors. And water coolers and appliances.

Westinghouse also provides computerized electrical and mechanical systems studies . . . and other services.

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if it's Westinghouse

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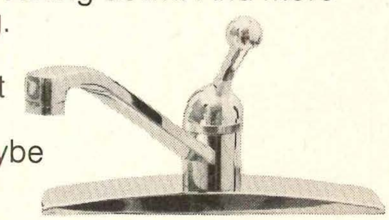
Who do you think handles our handles the most?

Or any faucet handle for that matter.

The household faucet handler is the one who contends with laundry, dirty kids and dishes day in, day out. And we figure there are just two things she needs to know about faucets. How good they look and how well they work.

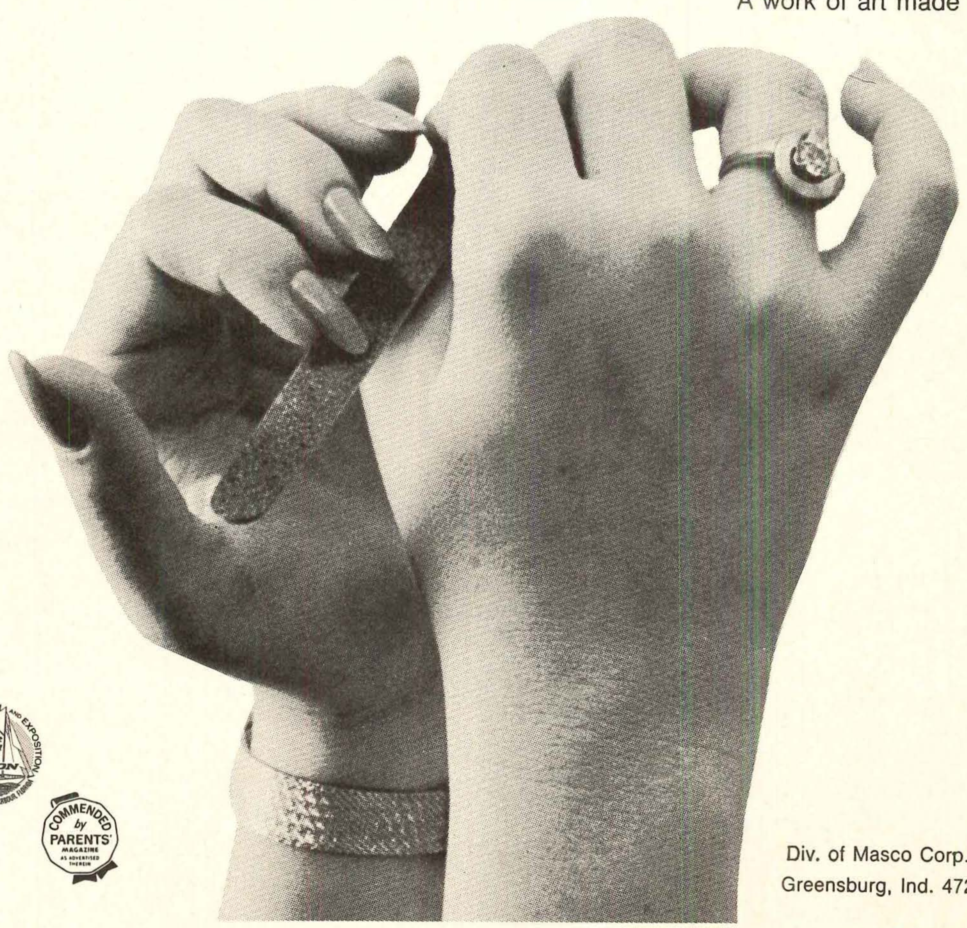
The first is handled. Housewives can plainly see how good our Delta faucets look. And we're currently handling the second question. In women's magazines and on the Joey Bishop TV Show. By telling her that with only one moving part, a Delta single handle ball faucet has less chance of breaking down. And more chance of lasting.

And once the household faucet handler gets our message . . . maybe it would be wise for you to be handling our handles, too.



DELTA FAUCET

A work of art made to be handled



Div. of Masco Corp.,
Greensburg, Ind. 47240

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Westinghouse Mark IV Elevators will help lease your building, even before the foundation is in.
Elevators are as essential to tenants as lighting, heating and air conditioning. A Westinghouse Mark IV System can convince them they'll get good service.
Take prospective tenants on a test ride in another Mark IV installation. Show them how waiting time is cut by at least 30% over conventional systems. And how the Digital Demand Computer automatically matches service to demand. At rush hours. Off hours. Any hour.
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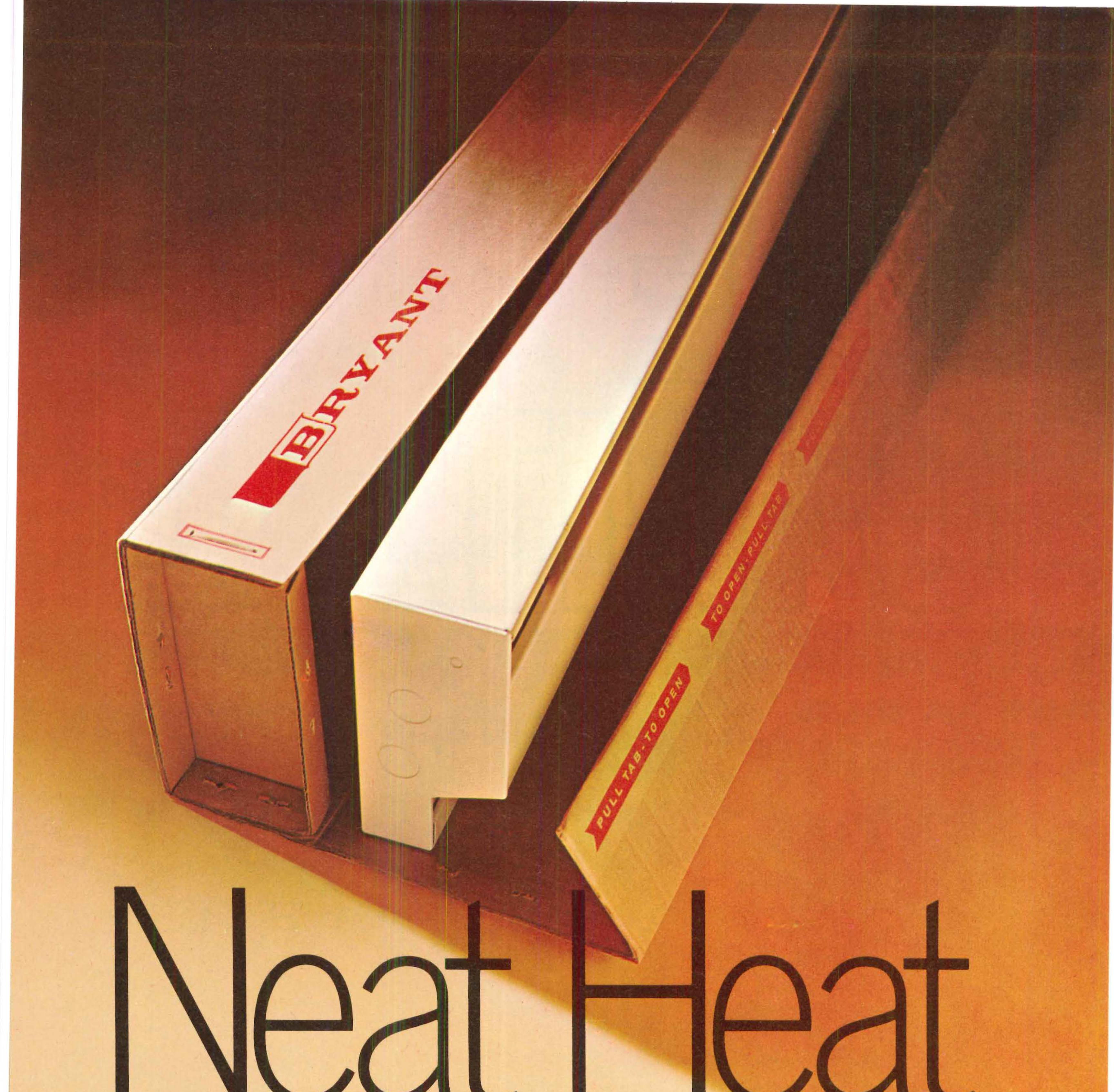
Westinghouse Elevator Division, 150 Pacific Avenue, Jersey City, N.J. 07304.
You can be sure... if it's Westinghouse.
To help you build it better... Mark IV Elevators give all floors equal service.



Neat Heat

New electric baseboard heat from Bryant.

NEAT PACKAGING: Start with the carton. A tear tape zips it open fast. And it can slip over the installed unit to protect against paint and plaster during final construction.

NEAT INSTALLATION: The heater cover snaps off by hand. The large wiring boxes at both ends have ½'' knockouts at bottom, end and side, with lots of room to connect leads. Pre-punched mounting holes line up with studs.

NEAT APPEARANCE: The installed unit has no exposed screws, wiring or sharp edges. The die-cast end pieces are rigid and dent proof, while the specially formulated paint resists scuffs and scratches. A 50-pound youngster can stand on the center of the unit.

NEAT DESIGN: The three-inch top helps keep walls clean by diffusing heated air. It also keeps objects from dropping into the heater. A full-length thermal cutout automatically shuts off the unit in case of air blockage. And the Corox® heating element is guaranteed for five years.

Bryant "Neat Heat" units come in 2, 3, 4, 5, 6, 8 & 10-foot lengths, in both low and optimum density. An exclusive, neon night-light can fit into the wiring box cover at either end. Thermostat kits, decorative grills and other accessories are available. J99018

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To help you build it better... the clean warmth of electric baseboard heat.

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Moistop is 7 plies strong.

Polyethylene film can be easily punctured by abuse.

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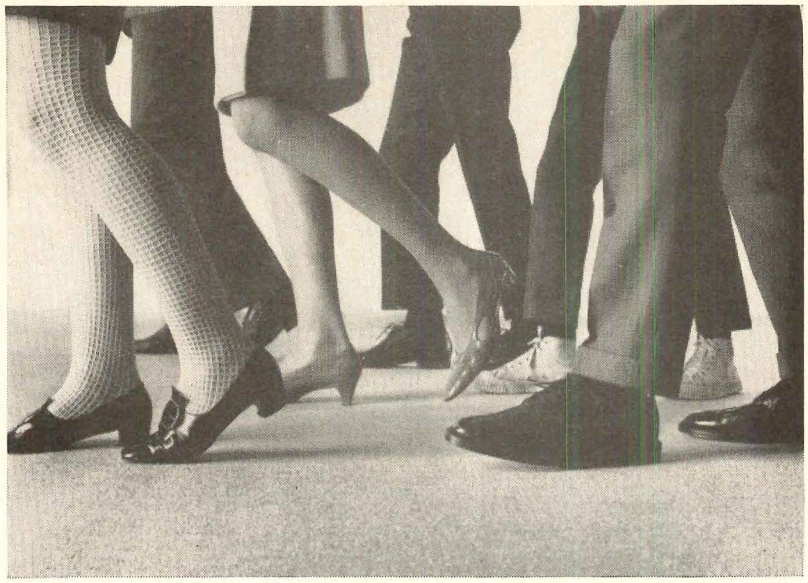
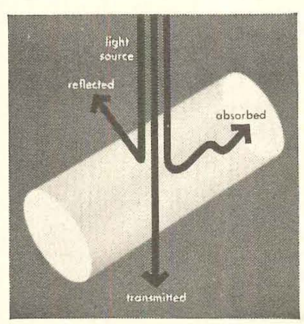
Computer helps us

Keyweld concrete reinforcement fits the space and the specifications—in one layer or two—in sheets or rolls. There's a minimum of waste and cutting time—and practically no engineering supervision needed.



Antron® picks up just as much day-to-day soil as any other carpet fiber. But you'll never believe it.



"Antron" fiber balances light to look clean.

"Antron" is the surprising fiber from Du Pont that keeps its new look longer than seems possible—and keeps the appearance level of the busiest buildings at their highest.

Even light colors look clean longer, because Antron* nylon minimizes the appearance of soil. Some carpet fibers are transparent, so you see not only the dirt on the side facing you, but the dirt on the opposite side is magnified. "Antron" is different. It is specially structured to be opaque. It controls absorbed, reflected and transmitted light to minimize the appearance of soil.

And because "Antron" is a nylon, it's the most durable carpet fiber made. Carpets of "Antron" resist crushing and pilling and are easy to clean.

When you combine all these benefits, you end up with carpets that need less frequent cleaning and keep their new look longer. Carpets with pile of "Antron" deliver a long term saving. And *that's* something you *will* believe!

"Antron" is the optimal carpet fiber for high traffic areas and is available in a wide variety of contract styles from leading mills. For a free brochure on "Antron" (and Du Pont's other contract fibers) write: Contract Carpet Specialist, Du Pont Company, 308 East Lancaster Ave., Wynnewood, Pa. 19096.

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Better things for better living . . . through chemistry

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Glaverbel's high manufacturing standards result in glass with fewer defects, greater regularity. But even more—it is glass that can give unlimited scope to the imagination. A kaleidoscope of designs and styles. A spectrum of colors. An infinity of applications. Glass specifically created to meet—and surpass—the requirements of today's users. *Cultivated* glass.

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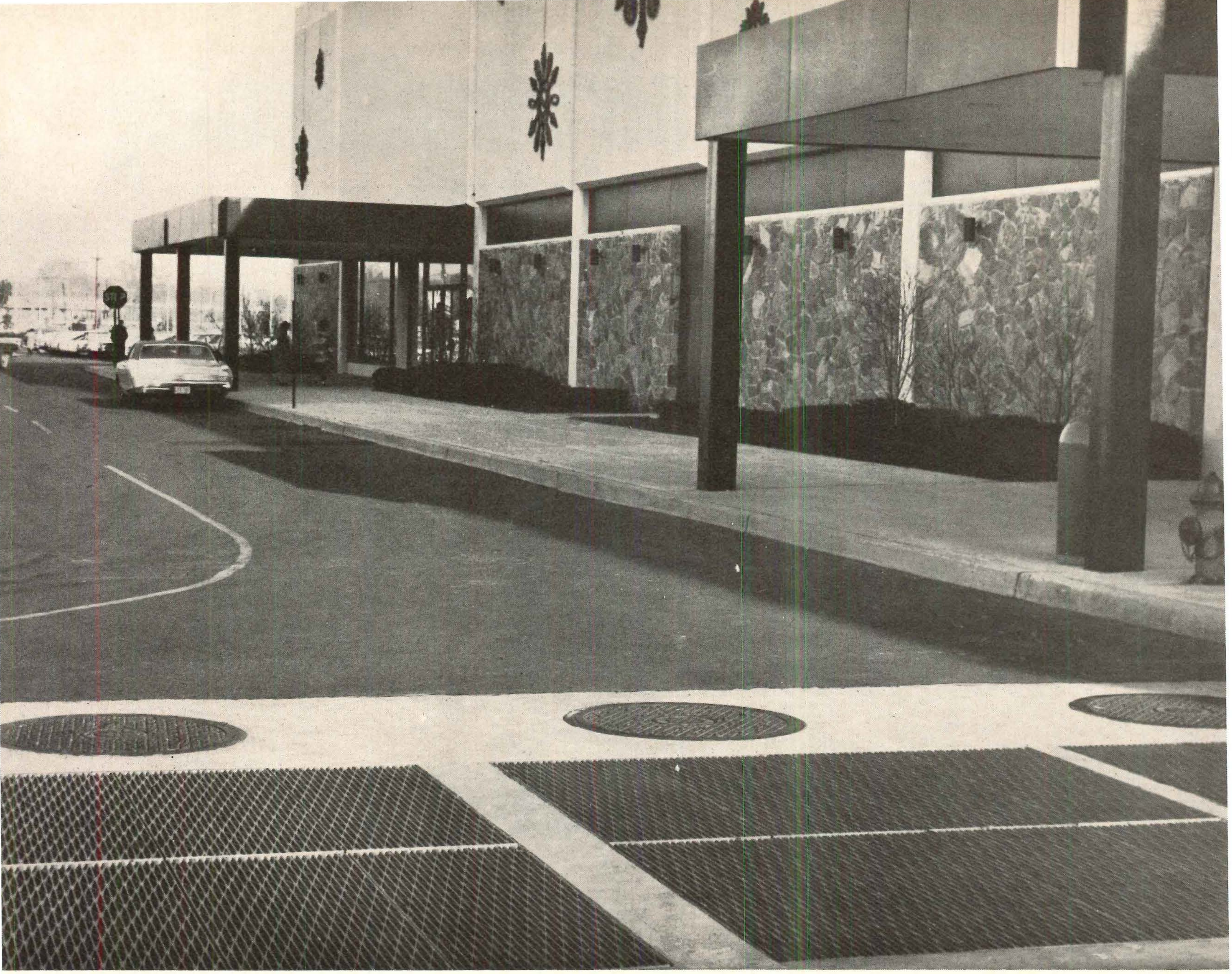


F. W. Dodge weighs strength in 1980 construction market outlook

Five years have gone by since the last F. W. Dodge analysis of long-term construction trends. Even though the current performance varies only slightly with the total projected at that time, there is nevertheless a need for a new look ahead.

Two major forces have developed in the past five years that are re-shaping construction trends. One was the interruption of growth of many types of construction resulting as a side-effect of the Vietnam war. The other new force was the belated recognition of the urgency of urban problems. Major programs, involving billions of dollars of construction in the decade ahead, were enacted in the past few years.

As in previous long-term analyses, the construction market is measured here by total spending—in both constant and current dollars—for all new construction put in place. Unlike the annual *F. W. Dodge Outlooks,* where the object is to anticipate the amount and type of construction to be contracted in the months immediately ahead, the emphasis here is on underlying rates of growth and on the shifting composition of the construction market. Thus, while contracts for new construction, with their built-in lead time, are most suitable for dealing with *short*-term changes in construction demand, this *longer*-range analysis focuses on the results of those contracts—the quantity of construction created and the amount spent for it.

A detailed reconciliation of construction contract value and expenditures for construction put in place is available on request. Briefly, the essential difference between these two measures of the construction market is that the value of completed work includes certain types of construction not reported through the bid-contract system. Some examples are: construction performed for corporations by their own employes (force work); farm construction; changes in project design and specifications after the initial contract; minor residential and non-residential additions and alterations; certain fees; and work done in Alaska and Hawaii. These items amount to about one-fourth of the total construction put in place.

Finally, it should be kept in mind that these projections represent *trend* values. The estimates shown for 1975 and 1980 make no provision for the year-to-year cyclical deviations from trend that will always be present. These problems are the ones that are best dealt with in annual construction forecasts.

All dollar values and per cent changes cited in the text are expressed in constant (1967) prices, unless otherwise indicated.

Hampered growth marked construction in the sixties

Construction growth so far in the decade of the sixties has been a mixture of large increases in commercial markets, consistent growth in public construction, and sharply fluctuating behavior in residential building, with little net gain. On balance, the industry has grown about half as fast as the economy as a whole in the past eight years—and over a third of this growth took place in 1968 alone.

The depressed housing market was largely responsible for construction's lag. After averaging over 1.5 million units a year in the 1950's, housing starts in the last nine years averaged a little over 1.4 million units a year, in spite of a 15 per cent growth in total population. The value of residential construction in 1968 barely equalled that of 1960, after price adjustments. Two factors were largely responsible for this sluggish performance: In the early years of the decade, new family formations declined as the "depression babies" came of age. Then, just as demand was beginning to pick up, the credit squeeze of 1966-67 drove housing output to its lowest point in twenty years. This decline was accompanied by an important shift within the housing market. Apartments, which accounted for only 22 per cent of total starts in 1960, increased their share of new housing to almost 40 per cent in 1968.

Nonresidential building fared somewhat better. The capital investment boom of the mid-1960's carried the 1968 level of industrial construction 75 per cent above that registered at the beginning of the decade. Rapid growth in white collar employment spurred recent gains in commercial construction, and educational building benefitted from sharply rising college enrollments. In total, the price-deflated value of business and institutional construction jumped almost 50 per cent between 1960 and 1968.

Community facilities construction, prodded by outlays for the interstate highway program but held back by sluggish demand for municipal sewer and water facilities, has risen about 25 per cent since 1960, after price adjustment.

Some of the forces that shaped the construction markets of the 1960's will continue to be important in the next decade. Others will develop, sometimes replacing and sometimes reinforcing the old ones. The impact of this changing environment on construction through 1980 will be discussed in the following pages.

ARCHITECTURAL BUSINESS THIS MONTH

Potential could double GNP in the decade ahead

By 1980, the U.S. economy is expected to generate a Gross National Product valued at more than one and one-third trillion dollars in today's prices. If costs grow at the same two per cent annual rate of the past decade, 1980 output will be valued at one and three-quarters trillion dollars—more than twice the present amount.

An economy this size calls for 4.3 per cent annual average growth in real output, compared with the 3.9 per cent rate of gain experienced since the end of World War II. Such an increase over already substantial growth rates implies that some important changes will be taking place in the next decade.

The experiences gained from the successes and failures of monetary and fiscal policies during the fifties and sixties will help to avoid periods of recession as deep as those in 1948, 1954, and 1958. Although the economy bounced back vigorously from each of these dips, some output was lost for all time. This had a negative effect on average growth rates for the two decades now drawing to a close.

A greater degree of stability in the economy and improvements in education, research and technology are expected to raise the annual gain in productivity to three per cent in the 1970's—20 per cent more than in the past 20 years. This gain will more than offset a reduction in weekly hours worked and a slightly lower rate of growth of the labor force.

- *Consumer spending:* Consumers are expected to provide the major thrust to the economy during the coming decade. Increased outlays for goods, services and housing will stimulate growth at all levels of economic activity. As in recent years, spending on food, clothing and other nondurables will trail the total, while purchases of services and durable goods will increase at almost a five per cent annual rate. Unlike the experience of the 1960's, though, gains in outlays for housing are expected to exceed even the gains in purchases of goods and services.
- *Government activities:* Government spending will increase at about a 4.2 per cent annual rate during the next 12 years, a figure which greatly understates the likely importance of Federal, state and local programs to overall economic activity. Defense spending, which presently accounts for over 40 per cent of total government outlays for goods and services, is likely to decline as a share of the total during the 1970's. On the other hand, spending for domestic social programs, including welfare, roads, schools, hospitals, and urban redevelopment is expected to increase by an average of over 6.6 per cent each year. The impact of these programs will be felt in all sectors of the private economy.
- *Capital spending:* Business spending for new plant, equipment and inventories will grow just slightly below the increase projected for the over-all economy. Automation and obsolescence will continue to provide incentives to modernize and re-equip. On the other hand, an increasingly larger share of future growth in capacity will come from the greater efficiency of new equipment. This means that investment will not need to grow at quite the same rate as output in the 1970's.
- *Population changes:* Changes in the size and distribution of population will exert a great deal of influence on economic activity in the forecast period. Total population will be expanding at a considerably slower rate than it has in the postwar years—about 1.3 per cent each year, compared with an average of 1.7 per cent in the 1945-1967 period. Unlike the earlier period, however, most of the growth will come from a jump in the 20 to 35 year age group and a new baby boom toward the end of the period. This means growth will be concentrated in the main producing and buying portions of the population, rather than in the dependent unproductive groups, as was the case in the fifties and early sixties.

What does all this mean for the construction industry? Total construction expenditures reached a peak of 13.5 per cent of national output back in 1950. Since then, it has declined steadily, with few interruptions, to a 9.6 per cent share in 1967.

The outlook for 1980 is for a construction market valued at $130 billion, with the industry's share of GNP picking up slightly from the 1967 level.

Business demand is force for construction growth

Most business firms undertake new construction projects to satisfy one of three basic needs: provide additional capacity to handle expanded volume of business; update facilities for more efficient use; or replace buildings that have been destroyed, made obsolete or converted into other uses. All three factors will enter into the growth of the various types of business construction in the seventies.

- *Manufacturing buildings and utilities:* In order to satisfy the projected demands for goods, industrial production will have to jump more than 40 per cent by 1975 and almost 80 per cent by 1980. Capacity won't have to grow quite that much, since some excess exists right now, and more efficient production methods will cut down on the amount of plant and equipment needed to produce a unit of output. Replacement needs and anticipated expansion should stimulate a 45 per cent growth in construction of industrial buildings between the unusually high level of 1967 and 1980. Outlays for utilities are expected to rise 75 per cent, as they catch up with business and consumer needs, and as conversion to nuclear generating facilities is accelerated.
- *Stores and warehouses:* Total selling space in retail stores has increased at only about two-thirds the rate of gain in sales in recent years, reflecting a trend toward larger, more efficient stores. With total retail outlays expected to increase at a 4.2 per cent annual rate through 1980, construction of new stores and warehouses should rise about 55 per cent between 1967 and 1980.
- *Offices:* Construction of new office space currently is riding the crest of a three-year wave of expansion. Although the rapid increase in white collar workers in recent years has created some backlog in demand, it is doubtful that the current rate of increase can be maintained. Since present construction activity exceeds *new* demand and the growth of office employment is expected to slow down, spending for new office buildings in 1980 is expected to top the 1967 level by only 25 per cent.

Total business-oriented construction, including types not discussed separately, should jump about 50 per cent between 1967 and 1980, with the rate of growth picking up during the last half of the next decade.

Family demand for housing may reflect new patterns

Residential construction in 1980 will be influenced by at least three important trends: rising family formations; shifts in migration; and greater government commitment to housing.

New household formations will provide a major boost to housing. The annual increase in families and individuals living in separate quarters already has moved up from the 890,000 average of the early 1960's and is expected to reach 1.2 million by 1975 and climb to 1.3 million by 1980. At the same time, the number of families with young children—a major market for single-family homes—will rise dramatically, accounting for half the gain in total households in both periods. On the other hand, the gain in singles and newlyweds—the major markets for apartments—will drop rather sharply after 1975, reflecting the slowdown in birth rates since 1955.

Migration trends will provide less of an impetus to housing than they have in the past. A continuation of the farm-to-city movement of the past decade, for example, would leave the country with practically no farmers by 1980. Moves between cities will continue, of course, but these have a smaller impact on the total demand for housing.

Government programs already existing or recently enacted include stepped-up construction of public housing; rent supplements to encourage private construction of low-income rental units; and interest rate subsidies for low-income home ownership. The HUD Act of 1968 calls for some form of aid in the construction of six million public-aided units and a total of 26 million new and rehabilitated dwelling units in the next decade.

These and other factors going into the demand for new housing add up to a substantial gain from the levels we have become accustomed to in the past couple of decades. Most of the increase will take place between now and 1975, when total shelter demand, including mobile or manufactured homes, should total 2.5 million units. A small further gain will take starts to the 2.7 million level by 1980.

Demand for rental units will continue to grow through the early seventies. After that, however, the rapid increase in families with small children will revive the demand for owner-occupied houses. By 1980, three fourths of the new housing will be built for the traditional single-family market.

School enrollment drop may curb institutional demand

Demand for institutional buildings arises from two main sources: changes in enrollments, patients or memberships; and shifts in social priorities and standards. Trends in business conditions tend to be of secondary importance, since costs are borne largely by public funds or contributions.

▪ *Educational building:* Elementary school enrollments will reach a peak in 1970 then *drop* 600,000 a year through 1975 and another 250,000 a year through 1980, if projected population trends hold. High school attendance will rise through 1975, then *fall* about half a million by 1980. The college population will grow throughout this period, though at a reduced rate toward 1980. Thus, most construction for new capacity will be at the college level, while the reduced volume of building at the lower levels will reflect migration trends and an upgrading of facilities. On balance, total educational construction in 1980 is expected to be about 15 per cent below the 1967 level.

Construction of dormitories will benefit from rising college enrollments, but since a larger share of future gains will be at nonresidential and community colleges, dormitory building will fall short of gains in total college construction.

▪ *Hospitals:* Construction of health facilities will be influenced by two opposing trends. On the one hand, the rate of hospital admissions will continue to go up in response to higher incomes, medicare and expanded medical knowledge. On the other hand, the average length of stay will decline, due to changes in hospital procedures and improved medical practices. The resulting growth in patient-days will average about three per cent a year. Add to this the need to bring many hospitals up to modern standards, and construction outlays should increase about 50 per cent between 1967 and 1980.

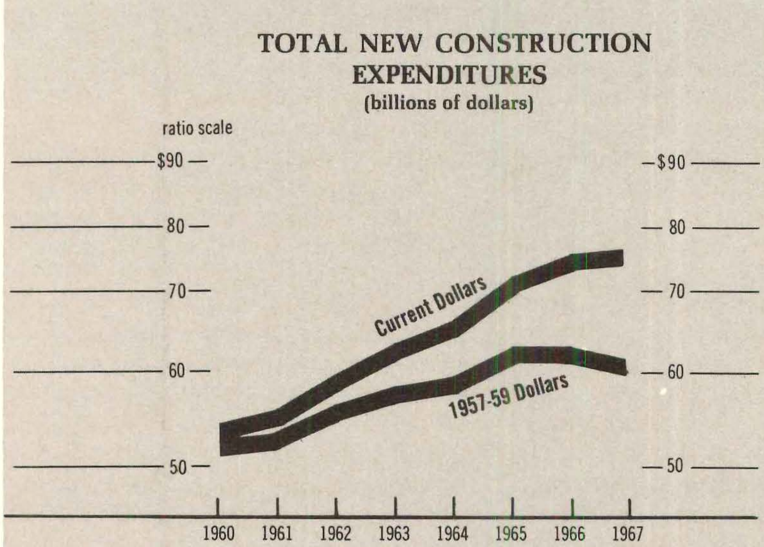
▪ *Religious buildings:* Membership in religious congregations has been increasing at almost the same rate as population in recent years, and this trend may be expected to continue. Construction of religious facilities has been on a virtual plateau, however, reflecting both tight credit conditions and the recent weakness in residential building. With improvements in both these areas by 1980, religious building is expected to rise about 35 per cent above the 1967 level.

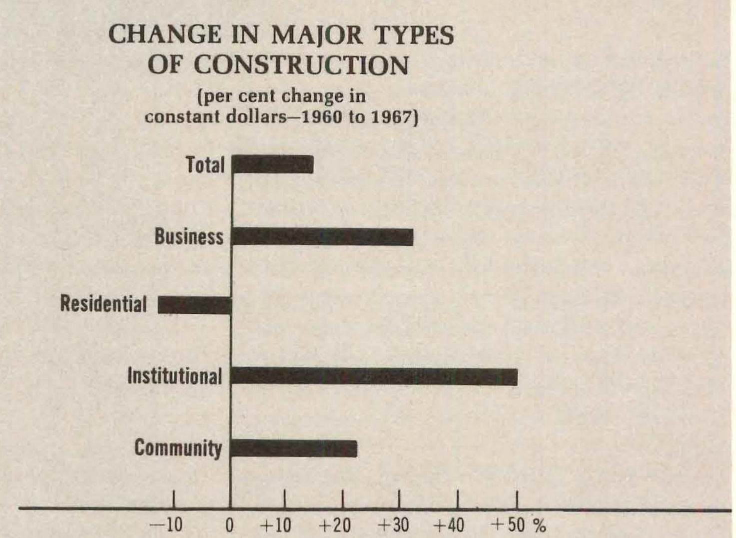
Community demand is great but politics may control

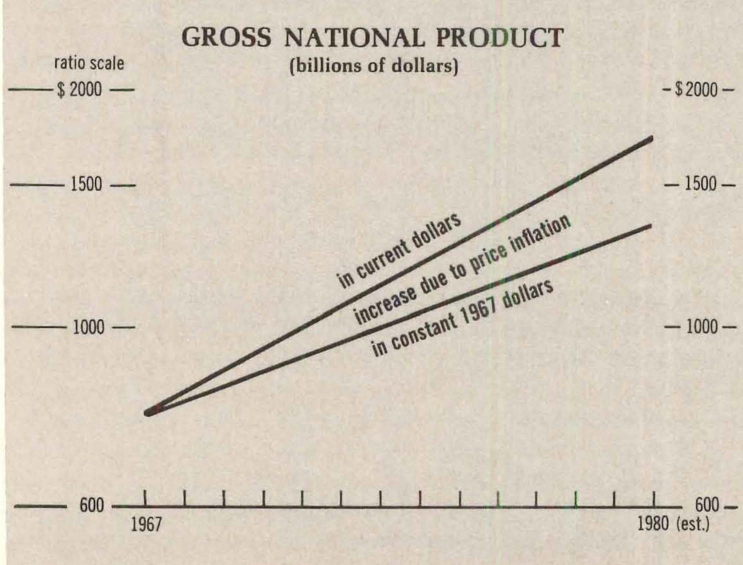
It is difficult to forecast the long-term outlook for construction of community facilities on the basis of ordinary supply and demand conditions. The current extent of long-deferred needs means that total outlays in any given year could be many times the highest level yet recorded without creating over-capacity. There are many other public needs that must be satisfied from the same resources, however. Spending programs, therefore, are based more on political decisions than on economic factors.

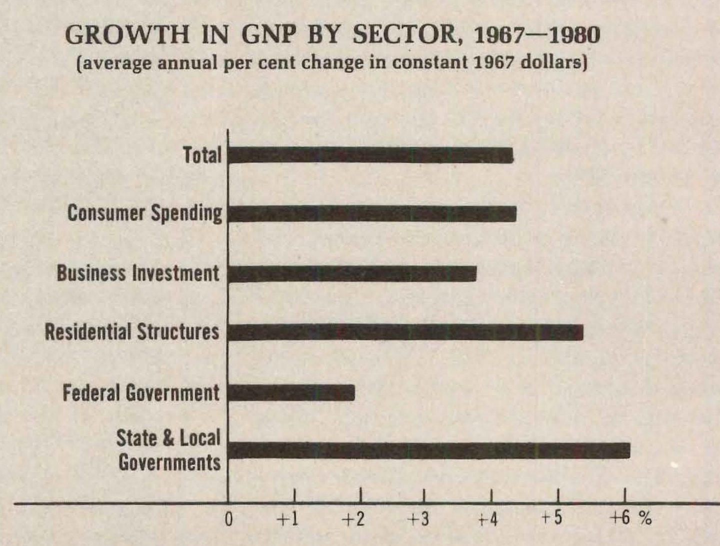
The increasing emphasis being placed on the problems of the city, air and water pollution and transportation indicate that public construction needs will receive more attention in the next decade than they have in the past.

▪ *Highways and other transportation:* About









40 per cent of the 41,000-mile interstate highway system remains to be completed, with a projected cost of $30 billion. The Department of Transportation estimates that additional mileage equal to the interstate system will be needed by 1985, most of it in urban areas. The cost of these roads and other programs between 1972 and 1985 has been estimated at $225 billion.

In order to provide the kind of roads needed to maintain the type of transportation system on which our economy is based, outlays for highway construction are likely to jump 125 per cent by 1980.

Mass transit is bound to receive a great deal more attention in the next decade, but it is unlikely that major spending programs will be underway much before 1980.

▪ *Sewer and water systems:* The Federal government has begun to show a marked interest in developing sewer and water facilities, both as an attack on the growing problem of water pollution and as a stimulus to unemployment in depressed areas. Just filling basic needs would require about $66 billion in total outlays during the next 14 years—about three times the amount spent in the last 14 years. Although this goal may not be achieved, it is likely that the volume of construction will jump over 150 per cent.

Total community facilities construction, including public buildings and dams and reservoirs, is expected to double by 1980.

New methods and money needed to fill 1980 demand

So far, the potential 1980 *demand* for new housing, office buildings, schools, roads and other types of construction has been outlined. Like all economic activities, however, the achievement of these goals depends upon equating the supply and demand. This means there must be enough management, labor, and materials to undertake the anticipated level of construction; that costs will be held within reason; and that there is enough credit to finance 1980's new construction.

▪ *Labor force growth:* One of the more favorable trends for the economy as a whole in the seventies will be the growth of the labor force. The post-war baby boom will be translated into a population "bulge" in the 20-30 year age group. The total labor supply will grow at a 1.7 per cent annual rate—well above the 1.4 per cent growth rate of the sixties and the 1.2 per cent rate of the late fifties.

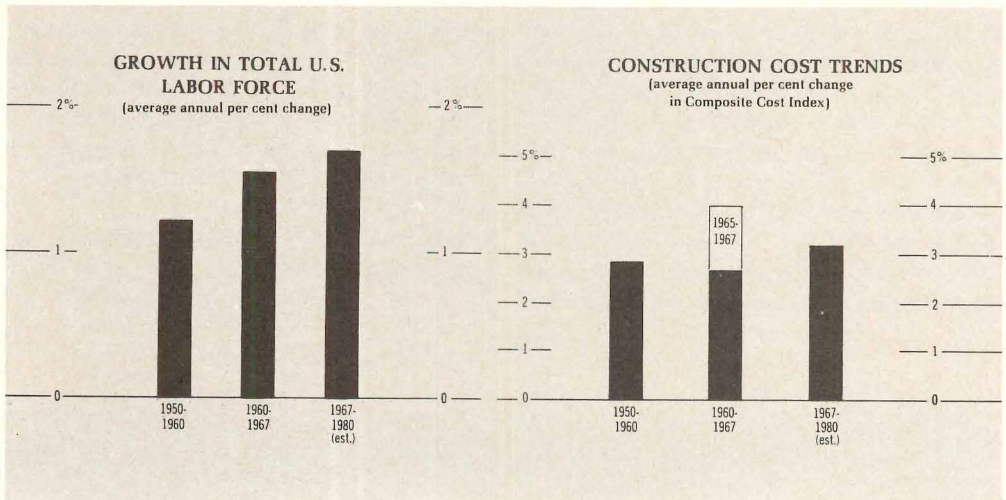
If the current trend in output per construction worker continues, the industry will need to increase its employment at almost twice the rate at which the labor force will be growing in order to achieve the level of output projected for 1980. However, with demand expanding so much faster in the next decade, there is likely to be less industry resistance to the use of labor-saving materials and methods. Furthermore, there will be a shift toward those types of construction that require less labor per unit of output. Housing, which will provide much of the growth in construction demand, offers especially good opportunities for the use of manufactured sub-assemblies.

It still will be necessary for the industry to bid for a larger share of the nation's labor force in the seventies. Even with a more efficient use of scarce building skills (including more year-round employment and further substitution of off-site labor through prefabrication) the supply of construction labor is expected to be a limiting factor on the industry's capacity in the seventies. This is one reason why it is estimated that the ambitious goal of 26 million housing starts in the next 10 years may fall short by three to five million units or possibly more.

▪ *Materials:* The expected growth of construction in the seventies—substantial growth in residential and community facilities building, smaller gains in commercial and industrial construction, and modest increases in outlays for institutional building —will mean that heavy demands will be placed on the production of most building materials.

These, in turn, will result in rising materials costs which will hasten the development of substitutes—but restrictive building codes will tend to impede their acceptance.

The ability of the building materials manufacturing industry to achieve the level



CONSTRUCTION MARKET ESTIMATES / 1975 and 1980

Value of Construction (billions of dollars)	Constant 1967 Dollars: 1967 actual	1975 projected	1980 projected	annual rate of change	Current Dollars: 1975 projected	1980 projected	annual rate of change	projected annual increase in costs
non-residential building								
Commercial	$ 7.0	$ 8.3	$ 9.8	2.6%	$ 10.8	$ 14.9	6.0%	3.3%
Manufacturing	6.5	7.9	9.5	3.0	9.6	13.1	5.5	2.5
Educational	7.0	5.0	6.0	−1.2	6.8	10.0	2.8	4.0
Hospital/Health	2.0	2.6	3.0	3.2	3.6	5.0	7.3	4.0
Public	2.2	3.1	3.7	4.1	4.0	5.5	7.3	3.1
Religious	1.1	1.4	1.5	2.4	1.8	2.3	5.8	3.3
Miscellaneous	2.8	3.5	4.2	3.2	4.4	6.2	6.3	3.0
TOTAL	$28.6	$ 31.8	$ 37.7	2.2%	$ 41.0	$ 57.0	5.5%	3.2%
residential buildings								
One- and Two-Family Homes	$14.6	$ 22.0	$ 28.0	5.2%	$ 2.79	$ 41.1	8.3%	3.0%
Apartments	4.7	10.8	10.0	6.0	13.7	14.7	9.2	3.0
Additions and Alterations	4.4	6.8	9.0	5.6	8.6	13.2	8.8	3.0
Nonhousekeeping	1.3	1.8	2.1	3.8	2.4	3.3	7.4	3.5
TOTAL	$25.0	$ 41.4	$ 49.1	5.3%	$ 52.6	$ 72.3	9.5%	3.0%
TOTAL BUILDINGS	$53.6	$ 73.2	$ 86.8	3.8%	$ 93.6	$129.3	7.0%	3.1%
nonbuilding construction								
Streets, Highways & Bridges	$ 8.5	$ 13.9	$ 19.5	6.6%	$ 19.8	$ 34.6	11.4%	4.5%
Utilities	7.0	9.8	12.2	4.4	11.5	15.8	6.5	2.0
Sewer/Water Supply	2.3	4.6	6.1	7.8	6.1	9.5	11.5	3.5
Other Nonbuilding Construction	4.7	5.9	6.9	3.0	7.5	10.1	6.1	3.0
TOTAL	$22.5	$ 34.2	$ 44.7	5.5%	$ 44.9	$ 70.0	9.1%	3.5%
TOTAL CONSTRUCTION	$76.2	$107.4	$131.5	4.3%	$133.5	$199.3	7.7%	3.2%
demand groups								
Business	$21.0	$ 26.7	$ 32.2	3.3%	$ 32.8	$ 45.1	6.1%	2.6
Consumer Housing	23.7	39.6	47.0	5.4	50.2	69.0	8.6	3.0
Institutional	10.9	10.1	11.8	0.6	13.7	19.3	4.5	3.9
Community Facilities	20.6	31.0	40.5	5.3	41.8	65.9	9.3	3.8
TOTAL	$76.2	$107.4	$131.5	4.3%	$138.5	$199.3	7.7%	3.2%

of output projected for 1980 will depend partly on the industry's technological advancement and partly on its ability to stimulate the adoption of flexible and uniform building codes.

- *Costs:* Construction costs consistently have outrun general price increases in the postwar period. In the 1957-67 decade alone, average construction costs jumped almost 30 per cent, while consumer prices rose only 16 per cent and the wholesale price index remained virtually unchanged. Building materials prices rose, on average, only five to 10 per cent during this period, while labor wage rates jumped about 50 per cent. At the same time, because of small gains in the output of its workers, the construction industry has had to expand its work force almost as fast as its output.

Looking to 1980, it is likely that construction costs will continue to increase faster than the general price level, although the spread may not be as great as it has been in the past few years. Labor costs are expected to continue their rapid ascent as bidding for scarce skilled workers remains heated. Partly offsetting this will be a trend toward greater use of manufactured components and other labor-saving techniques.

Over-all construction costs are expected to rise an average of 3.2 per cent a year through 1980, compared with a 2.9 per cent average rate in the sixties. This will result from stepped-up increases in costs for most building types being partly offset by the changing mix of construction in favor of housing, where unit costs are lower.

- *Financing construction:* In 1967 the total cost of the year's construction was financed by about $25 billion in government funds, including state and municipal bonds; by $20 billion in mortgages on both residential and non-residential buildings; and by about $30 billion in other corporate and individual cash flow, including bonds, bank loans, savings and cash. Looked at another way, about $15 billion was directly invested by individuals and business firms from cash and retained earnings; an equal sum came from government tax revenues; and the remainder—some $45 billion—was obtained from the capital market.

The availability of financing for construction depends largely upon the size and growth of the capital funds market and on the strength of competition from non-construction uses of these funds, including mortgages on *existing* buildings, inventories, machinery, consumer durables, etc. The size of the capital funds market depends, in turn, upon the volume of personal savings, corporate profits and government investment and loan policies.

Looking to 1980, it is estimated that of a total demand for new construction of nearly $200 billion (in 1980 dollars), $35 billion will be supplied directly from the tax revenues of governments at all levels. An additional $30 billion in cash and business retained earnings will be available for construction, leaving a total of about $135 billion in funds to be raised in the capital markets to finance 1980's construction.

Projected income, savings, government revenue and corporate profits trends point to a capital market of $225 billion by 1980, compared with the present total of about $90 billion. Construction needs, then, will equal 60 per cent of these funds, compared with about 50 per cent right now. Mortgage financing requirements for new and existing buildings will rise from a quarter to almost a third of capital market funds. This increase from present levels will be taking place at a time when consumer installment needs, other business requirements, and expanded government programs also will be greater, relative to available funds, than they are at the present time. This means that money available for construction might fall short of projected needs by $20 billion or more, unless capital markets expand faster than has been indicated and unless more investors can be attracted to construction-related market instruments.

An increase in the rate at which individuals save, a reduction in taxes, or improved corporate profits would all add to the pool of investible funds. Recent actions to improve the secondary mortgage market and to attract large investors offer hope that greater progress will be made toward easing this market in the next decade.

Summary: a great 1980—if wise heads prevail

Construction was the stepchild of a prosperous economy during much of the sixties. While total national output was growing at an annual average rate of 4.7 per cent, exclusive of price changes, the value of construction put in place increased at a rate of only 2.3 per cent.

Most of the problem was in housing. In the opening years of the decade, demand fell as the rate of family formations declined. Then, just as this situation was reversing itself, the Vietnam war-related credit shortages of the past three years took their toll on potential housing construction. Thus, a prolonged period of below-potential residential building offset many of the substantial gains being recorded by other construction sectors.

Looking to 1980, total construction is again expected to keep pace with overall economic growth. With an average annual growth of about 4.3 per cent, the demand for new construction should rise to over $130 billion by 1980, in 1967 dollars. If inflationary trends follow expected patterns, this amount will rise to almost $200 billion.

Once more, housing will exert an important influence on the trend of total construction—this time, in a *positive* direction. Public construction also will be a major factor, increasing its share of total outlays from less than a third to almost 40 per cent.

- **Business** demand for building is expected to increase at a 3.3 per cent annual rate, with substantial gains in utilities and store building offsetting more modest growth in industrial and office construction.
- **Housing** demand is expected to grow at a 5.4 per cent annual rate. The rate of new family formation will pick up sharply from current levels, and many government programs are aimed at replacing ghetto housing.
- **Institutional** building requirements are expected to rise at a modest 0.6 per cent annual rate. Enrollment trends suggest a lessened demand for new educational buildings, while hospital construction should continue to increase in response to changing needs.
- **Community facilities** construction, responding to larger government domestic expenditures and increasing demand for better roads and other public facilities, could increase at a 5.3 per cent annual rate.

These growth rates represent realistic trends, rather than idealistic goals, taking into consideration limitations in the supply of labor, materials and credit. If the volume of projected construction is to be realized, however, progress must be made in the more efficient use of labor; the adoption of new techniques, materials and more flexible building codes; and the development of additional sources of credit to the construction market.

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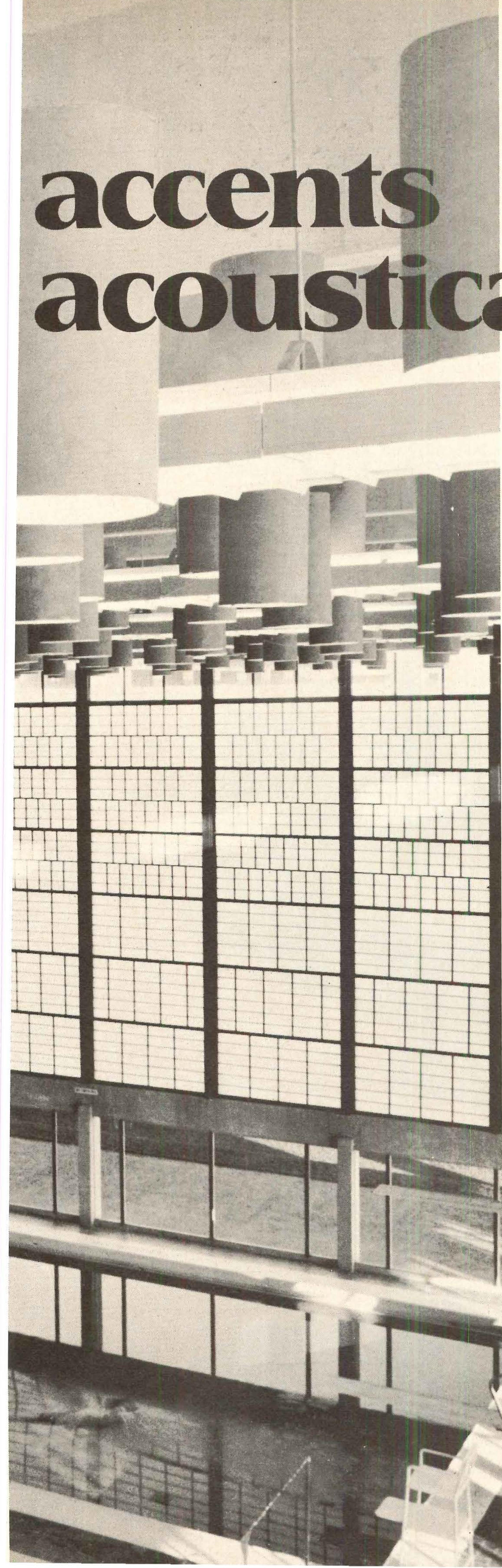

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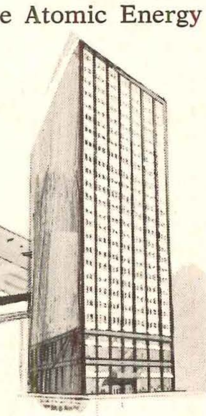

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INDEXES AND INDICATORS

William H. Edgerton
Manager Dodge Building Cost Services
McGraw-Hill Information Systems Company

MARCH 1969 BUILDING COST INDEXES

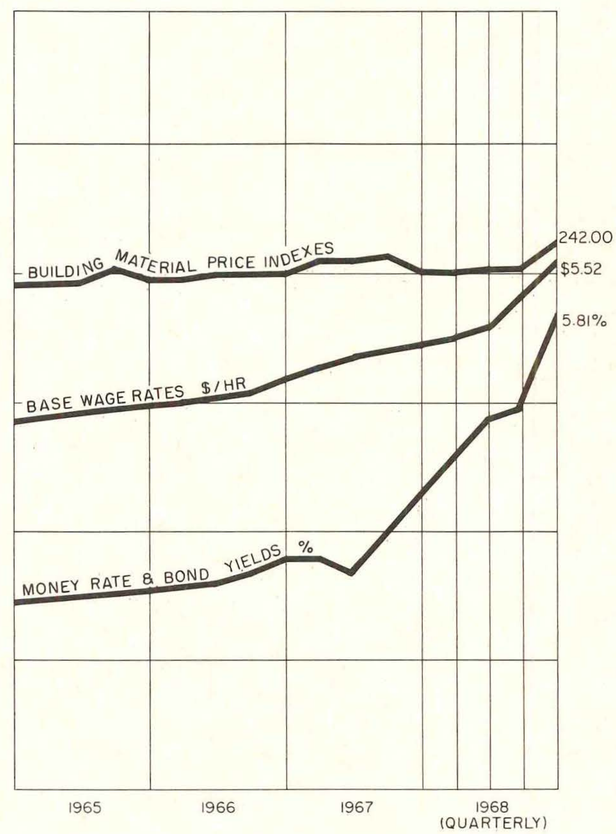
1941 averages for each city = 100.0

Metropolitan area	Cost differential	Current Dow Index residential	Current Dow Index non-res.	% change year ago res. & non-res.
U.S. Average	8.6	300.2	319.8	+4.95
Atlanta	7.4	347.8	368.9	+5.47
Baltimore	7.9	298.0	317.0	2.94
Birmingham	7.4	272.0	292.4	3.70
Boston	8.4	266.5	282.1	4.47
Chicago	8.9	328.5	345.5	3.40
Cincinnati	9.1	295.5	314.1	7.27
Cleveland	9.8	319.8	339.9	5.95
Dallas	7.7	280.9	290.1	5.63
Denver	8.2	301.8	320.1	4.14
Detroit	9.4	315.0	330.7	5.79
Kansas City	8.3	269.2	284.9	5.20
Los Angeles	8.4	302.6	331.1	3.88
Miami	8.5	298.7	313.6	7.99
Minneapolis	8.7	295.7	314.3	3.67
New Orleans	8.0	273.2	289.5	5.62
New York	10.0	309.3	332.7	2.95
Philadelphia	8.6	293.6	308.2	3.96
Pittsburgh	9.2	282.7	300.6	7.76
St. Louis	9.1	293.6	311.1	4.39
San Francisco	8.7	388.6	425.1	6.13
Seattle	8.5	272.1	304.1	3.57

Differences in costs between two cities may be compared by dividing the cost differential figure of one city by that of a second; if the cost differential of one city (10.0) divided by that of a second (8.0) equals 125%, then costs in the first city are 25% higher than costs in the second. Also, costs in the second city are 80% of those in the first (8.0÷10.00=80%) or they are 20% lower in the second city.

The information presented here indicates trends of building construction costs in 21 leading cities and their suburban areas (within a 25-mile radius). Information is included on past and present costs, and future costs can be projected by analysis of cost trends.

ECONOMIC INDICATORS

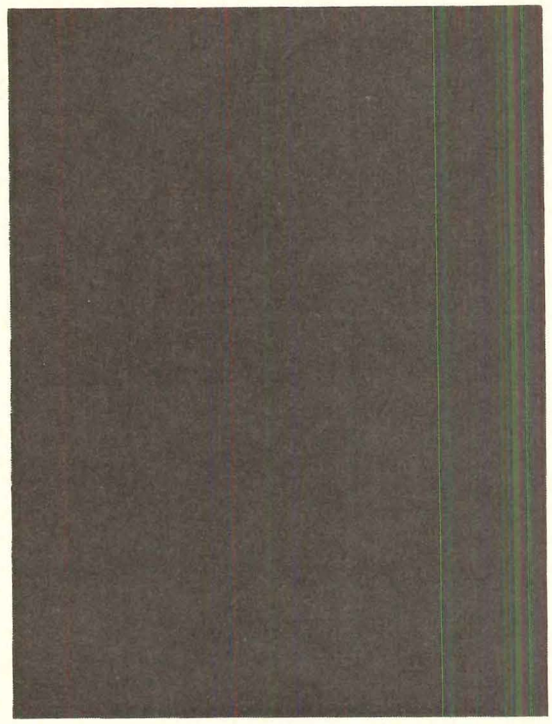


HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

1941 average for each city = 100.00

Metropolitan area	1960	1961	1962	1963	1964	1965	1966	1967 (Quarterly) 1st	2nd	3rd	4th	1968 (Quarterly) 1st	2nd	3rd	4th
U.S. Average	213.5	264.6	266.8	273.4	279.3	284.9	286.6	292.7	293.7	295.5	297.5	301.5	302.6	309.3	314.9
Atlanta	223.5	294.7	298.2	305.7	313.7	321.5	329.8	332.4	333.4	334.6	335.7	345.6	346.7	352.3	364.2
Baltimore	213.3	269.9	271.8	275.5	280.6	285.7	290.9	290.4	291.5	294.9	295.8	302.9	304.1	307.9	311.4
Birmingham	208.1	249.9	250.0	256.3	260.9	265.6	270.7	272.9	274.0	273.8	274.7	278.5	279.5	283.6	288.4
Boston	199.0	237.5	239.8	244.1	252.1	257.8	262.0	262.9	263.9	264.8	265.7	269.3	270.3	276.3	278.2
Chicago	231.2	289.9	292.0	301.0	306.6	311.7	320.4	320.4	321.3	327.3	328.4	329.4	330.0	338.7	340.4
Cincinnati	207.7	257.6	258.8	263.9	269.5	274.0	278.3	278.7	279.6	287.3	288.2	291.4	292.5	301.8	309.8
Cleveland	220.7	265.7	268.5	275.8	283.0	292.3	300.7	300.0	301.3	302.6	303.7	316.5	318.3	330.7	334.9
Dallas	221.9	244.7	246.9	253.0	256.4	260.8	266.9	267.6	268.5	269.5	270.4	272.3	273.4	281.0	287.2
Denver	211.8	270.9	274.9	282.5	287.3	294.0	297.5	297.6	298.5	304.0	305.1	304.9	306.0	311.7	317.0
Detroit	197.8	264.7	265.9	272.2	277.7	284.7	296.9	298.0	299.1	300.1	301.2	309.2	310.4	315.5	326.8
Kansas City	213.3	237.1	240.1	247.8	250.5	256.4	261.0	260.8	261.9	263.4	264.3	267.5	268.5	277.2	281.0
Los Angeles	210.3	274.3	276.3	282.5	288.2	297.1	302.7	303.6	304.7	309.0	310.1	312.0	313.1	319.3	323.7
Miami	199.4	259.1	260.3	269.3	274.4	277.5	284.0	283.4	284.2	285.2	286.1	293.1	294.3	304.5	309.6
Minneapolis	213.5	267.9	269.0	275.3	282.4	285.0	289.4	292.0	293.1	299.2	300.2	300.0	301.0	309.0	310.6
New Orleans	207.1	244.7	245.1	248.3	249.9	256.3	259.8	262.3	263.4	266.7	267.6	270.6	271.6	273.9	285.5
New York	207.4	270.8	276.0	282.3	289.4	297.1	304.0	309.4	310.6	312.5	313.6	315.9	317.0	320.6	324.9
Philadelphia	228.3	265.4	265.2	271.2	275.2	280.8	286.6	287.1	288.1	292.8	293.7	293.3	294.2	300.9	304.6
Pittsburgh	204.0	250.9	251.8	258.2	263.8	267.0	271.7	272.2	273.1	274.1	275.0	293.0	284.2	291.3	297.0
St. Louis	213.1	256.9	255.4	263.4	272.1	280.9	288.3	290.3	291.3	292.3	293.2	293.7	294.7	303.6	306.8
San Francisco	266.4	337.4	343.3	352.4	365.4	368.6	386.0	388.1	389.2	389.6	390.8	396.4	398.0	401.9	415.6
Seattle	191.8	247.0	252.5	260.6	266.6	268.9	275.0	276.5	277.5	282.6	283.5	286.2	287.2	291.6	296.1

Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city for one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0÷200.0=75%) or they are 25% lower in the second period.



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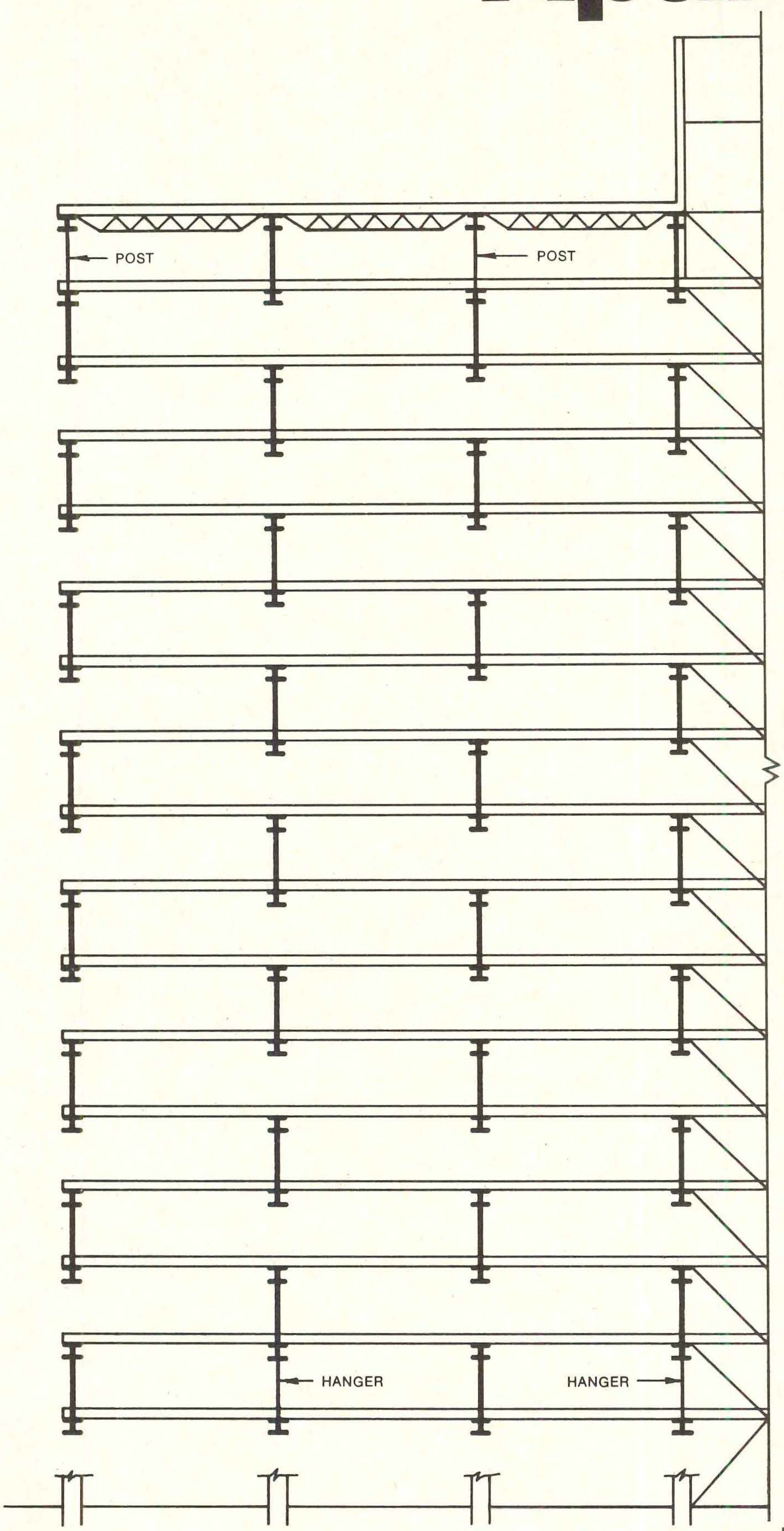
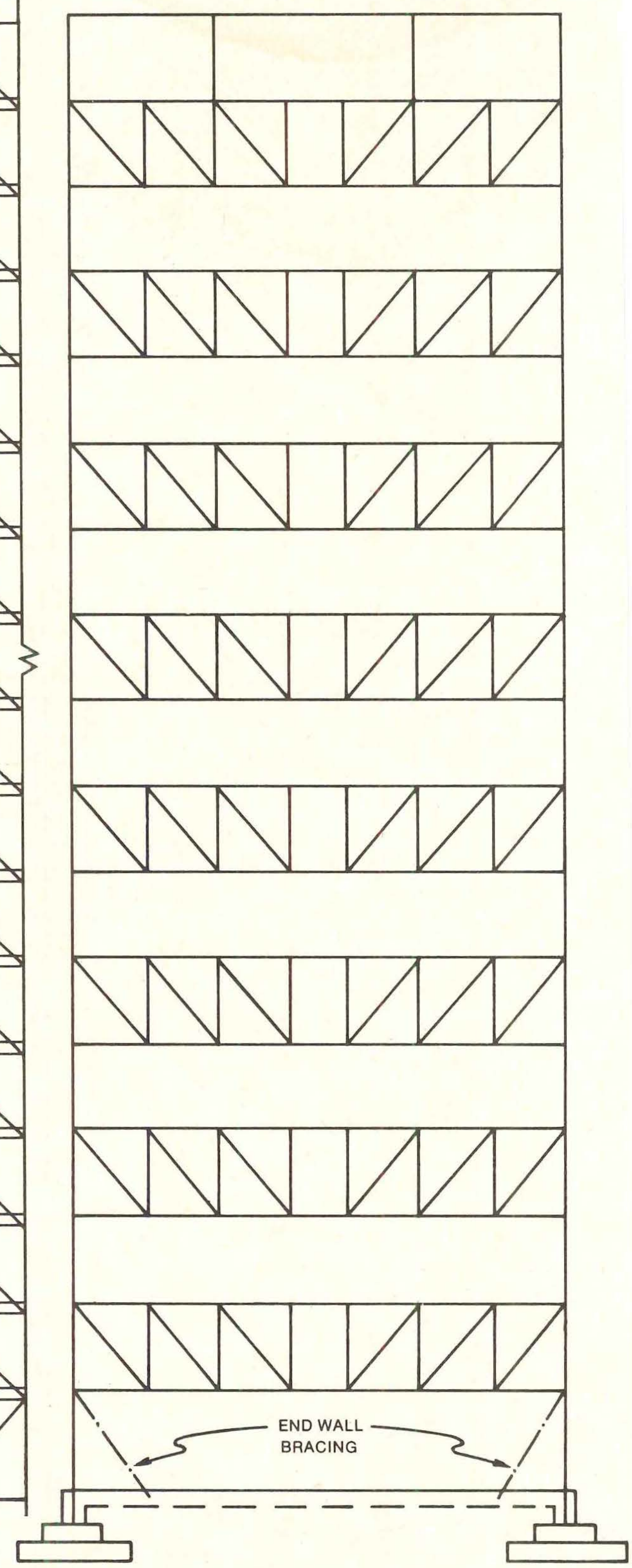


Half longitudinal section:
staggered trusses.



Cross section:
(Note corridor space in center of truss.)

continued from page 66

A. G. Odell, Jr. & Associates, Architects, have named **Frank J. Clark, III** an associate in the firm.

J. W. Nairn and **R. J. Jackson** have been admitted to the partnership of **Crooks, Michell, Peacock & Stewart,** Chatswood, Australia-based engineers and architects. Associateships in the firm have been accepted by **J. May, K. McGlynn** and **P. J. Oom.**

Robert E. Earnheart, A.I.A. is now an associate of **Loewenstein, Atkinson and Wilson, Inc., Architects and Engineers** of Greensboro, North Carolina.

Three architects have been appointed vice presidents at **A. Epstein and Sons, Inc.,** Chicago-based architectural and engineering firm: **Wayne C. Bryan, Edward Paul** and **Charles J. Schoeler.**

Erchul, Tanida, Hart & Associates is the name of a new architectural, planning and engineering firm formed by **J. Thomas Erchul, A.I.A., James Murry Hart, A.I.A.** and **Junichi Tanida, A.I.A.,** of San Diego. The firm's offices are in the San Diego Trust and Savings Bank Building.

Richard W. Eschliman, formerly senior associate with **Ireland & Associates, Architects & Planners,** has opened an office for the general practice of architecture under the firm name, **Richard W. Eschliman, A.I.A., C.S.I., Architect.** The new firm's address is 1601 West Fifth Avenue, Columbus, Ohio.

George M. Ewing Company, Architects, Planners, Engineers of Philadelphia has appointed architect **Dongkyu Bak** as an associate.

H. Griffith Edwards recently retired as partner in the Atlanta architectural firm of **Edwards and Portman,** and the firm continues as **John Portman and Associates, Architects and Engineers.** Mr. Edwards will serve the firm as consultant.

David T. Kahler and **Gordon R. Pierce** have been elected vice presidents in **The Office of Fitzhugh Scott, Architects, Inc.,** of Milwaukee. The firm has subsequently merged with two consulting engineering firms, **Ketchum-Konkel-Barrett-Kickel-Austin,** Denver-based structural engineers; and **Wilber Smith & Associates,** urban planners and engineers, to form a new group known as **The Fitzhugh Association.**

M. Paul Friedberg & Associates, Landscape Architects and Urban Designers, New York, has recently appointed five new associates: **James F. Balsley, Richard W. Dickinson, Joseph Gates, Seymour Katzman, P.E.** and **Dean McClure, A.I.A.**

Frost Associates, New York, has announced the appointment of **Rachelle Bennett, A.I.A.** and **Alan B. Goldsamt, A.I.A.** as associates in the firm.

Harrison D. Goodman, P.E., is now an associate of the New York consulting engineering firm, **Joseph R. Loring & Associates.**

continued on page 249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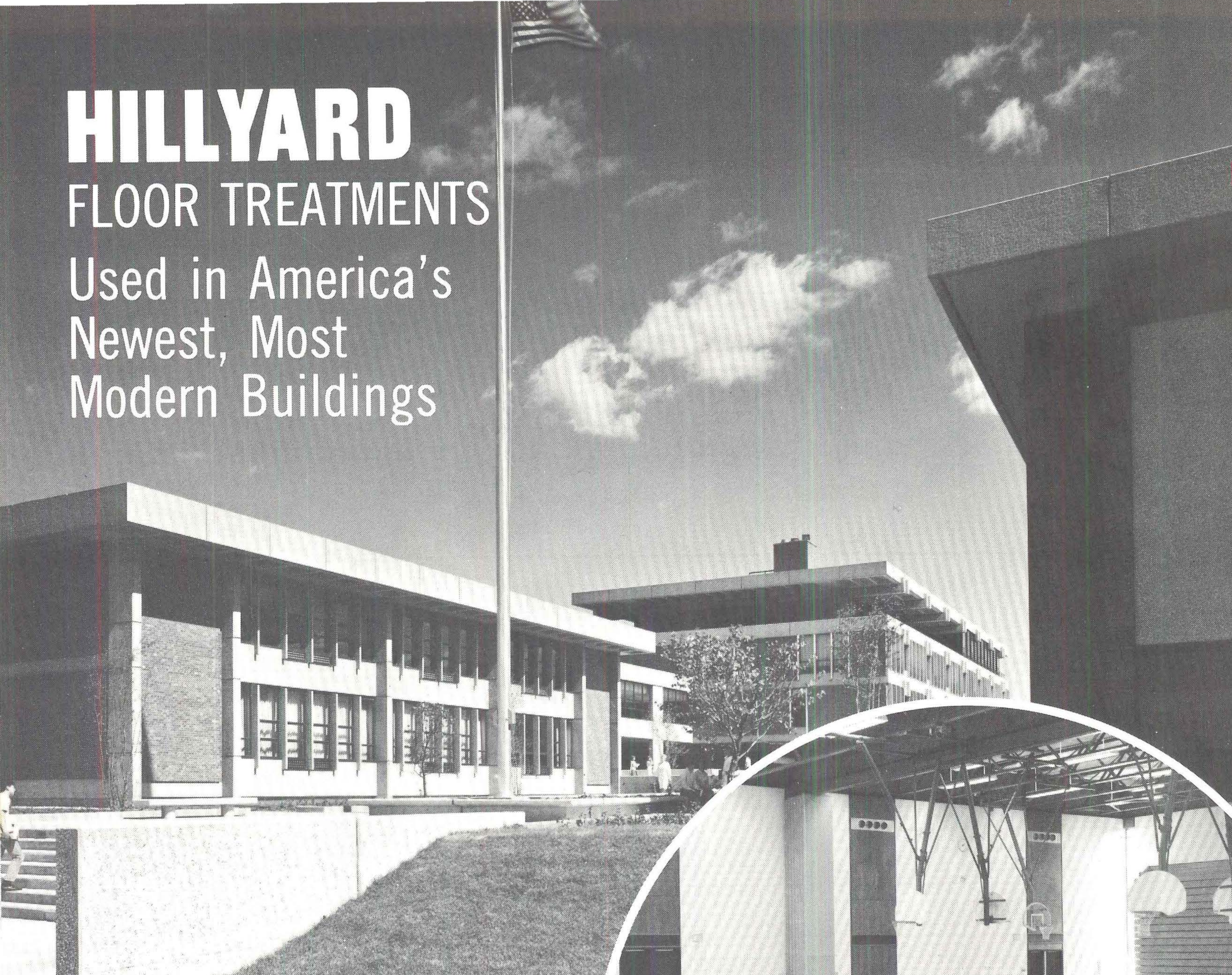
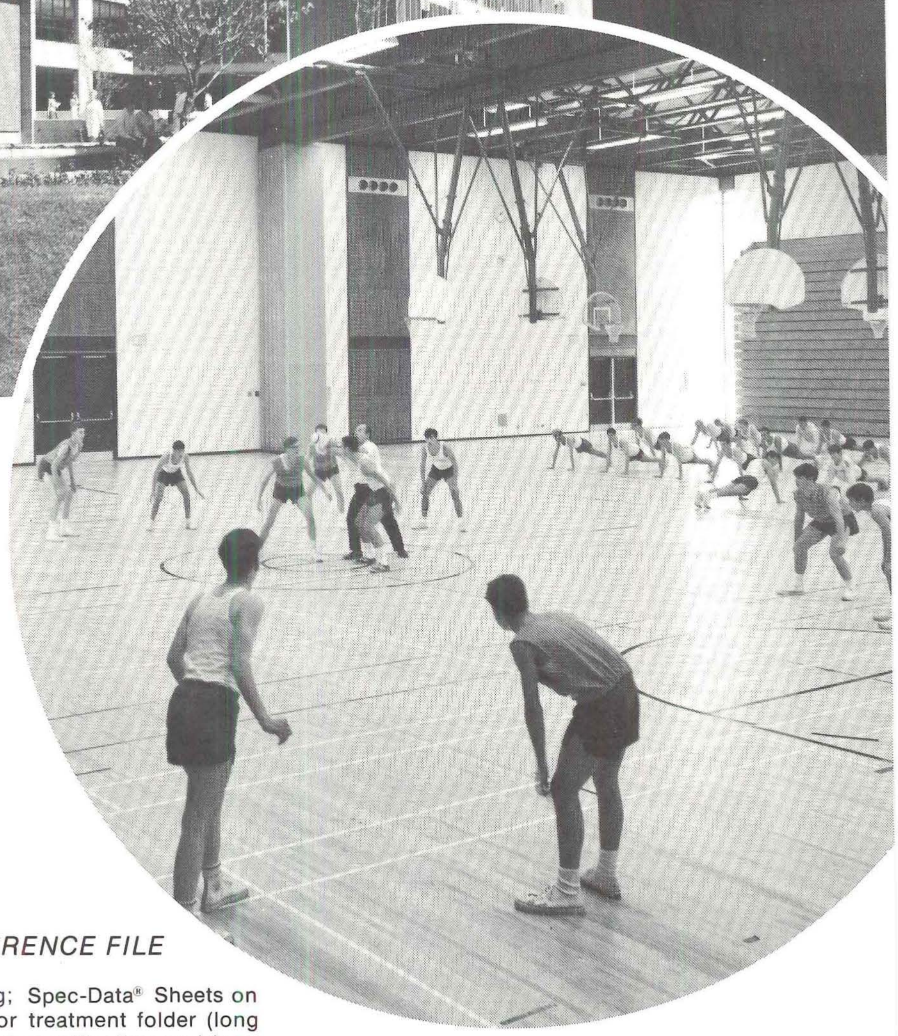


Campus type New Trier Township High School-West at Northfield, Illinois. Architects: The Perkins & Will Partnership, Chicago, White Plains, N.Y., and Washington, D.C.; and the Architects Collaborative, Cambridge, Mass.



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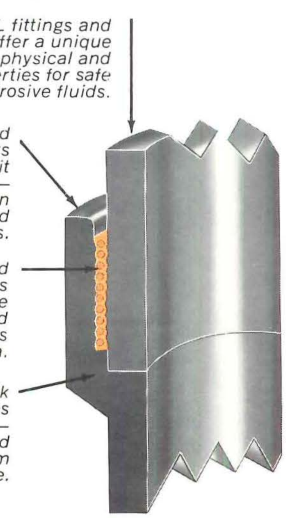

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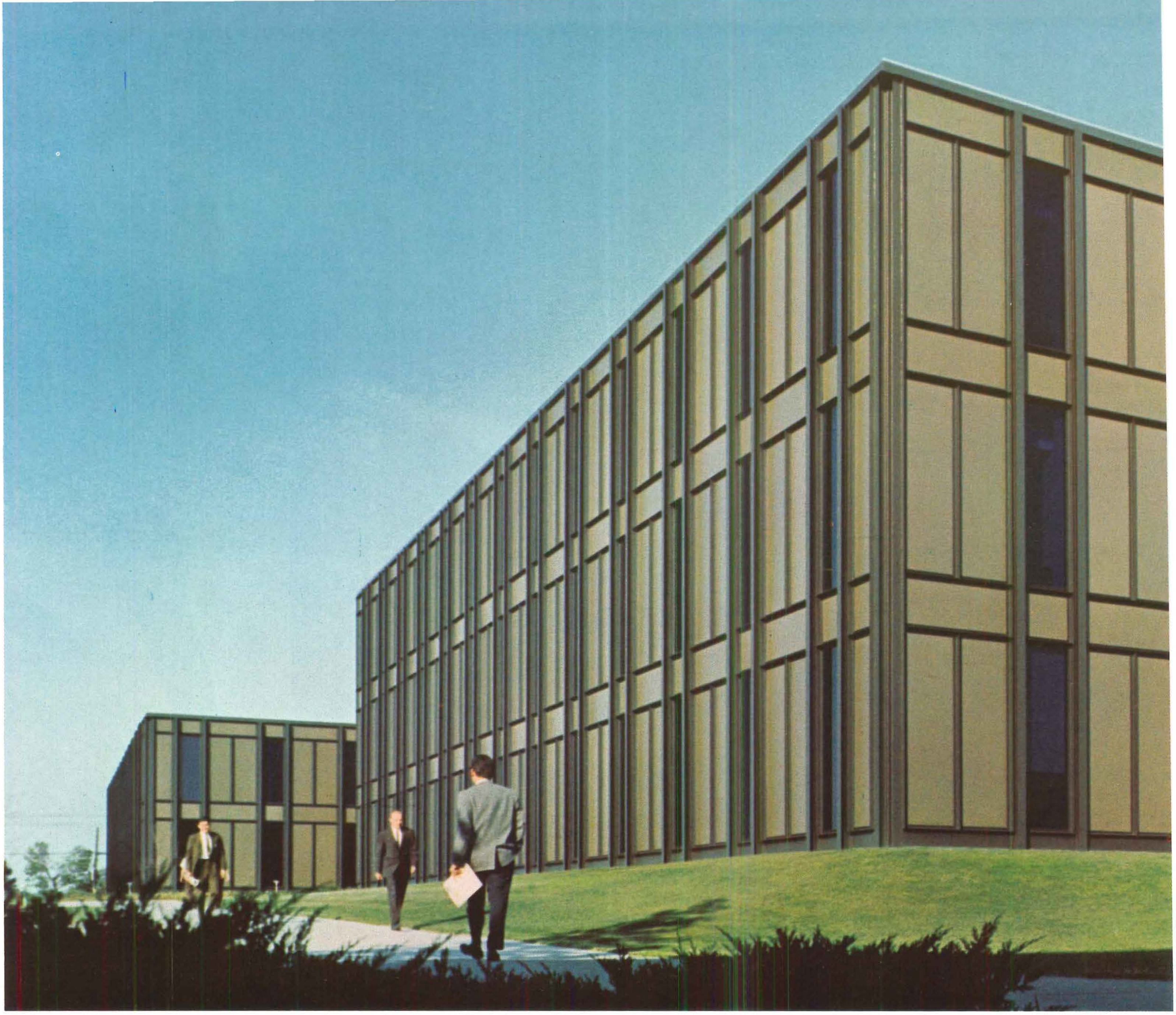

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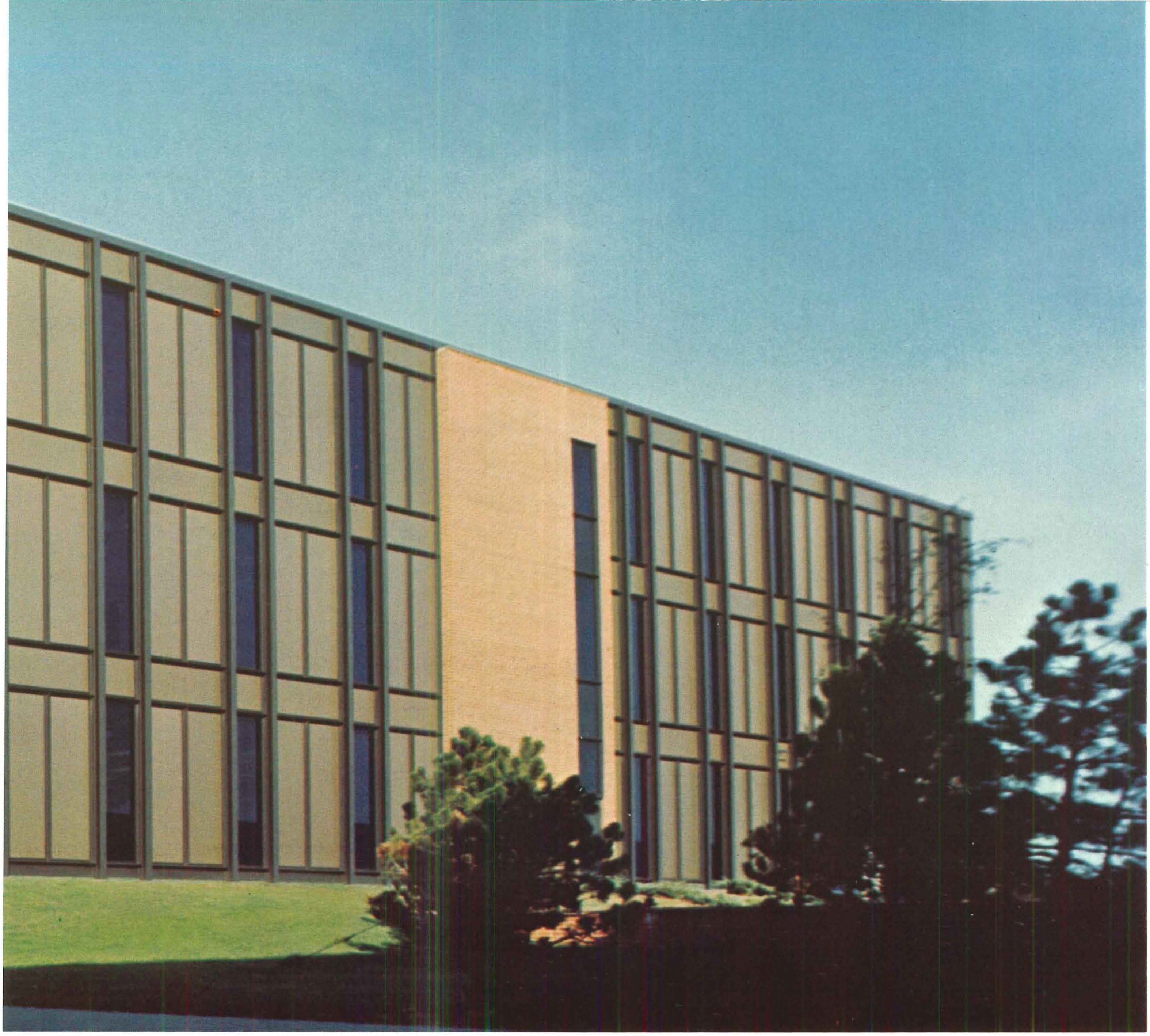

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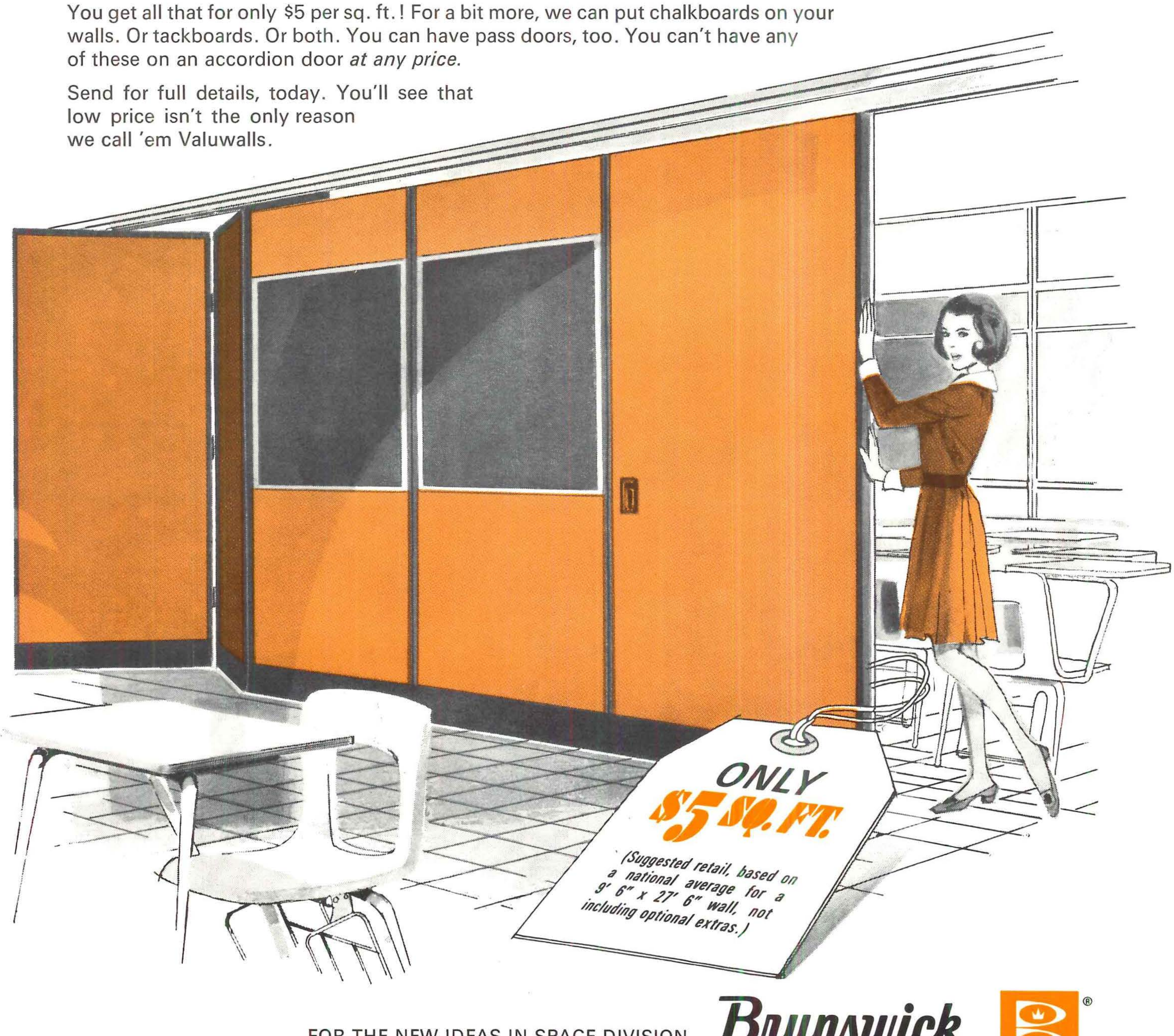

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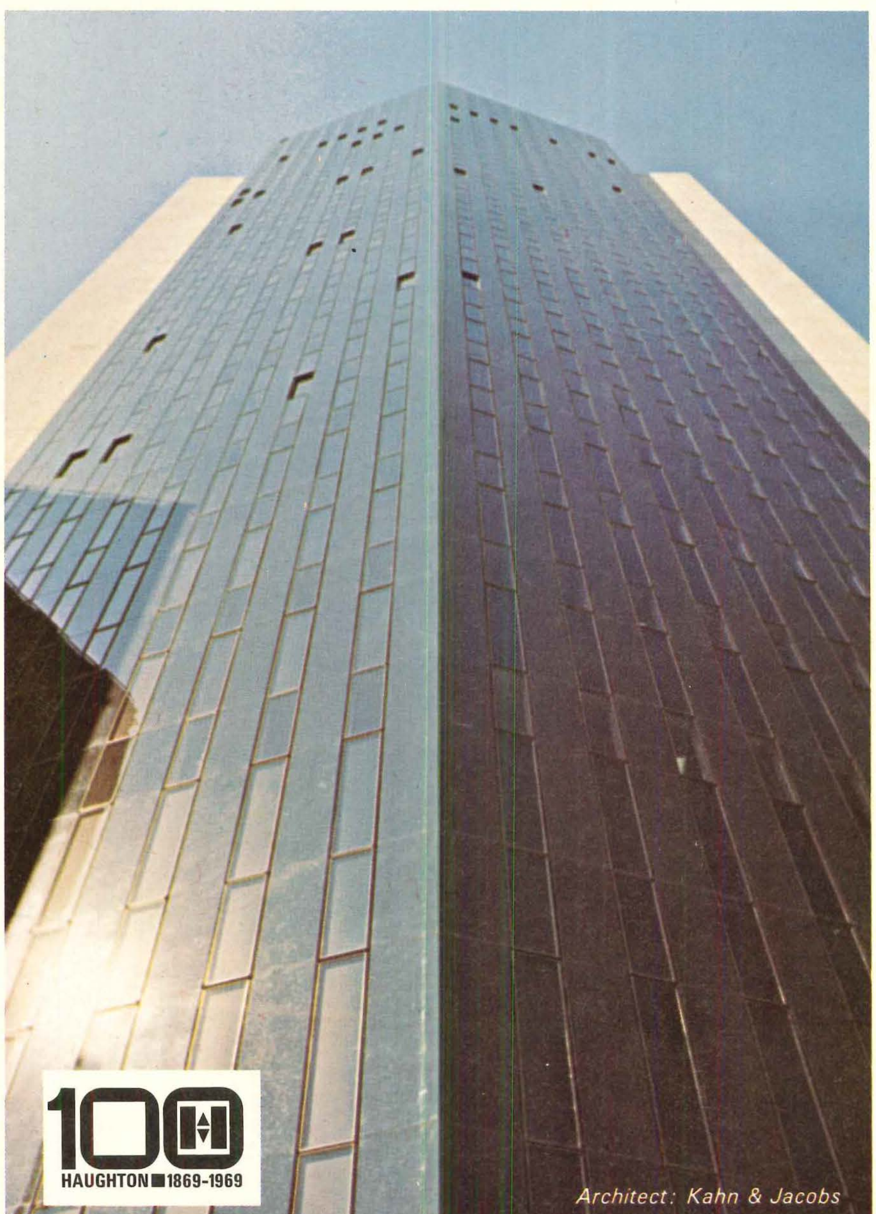
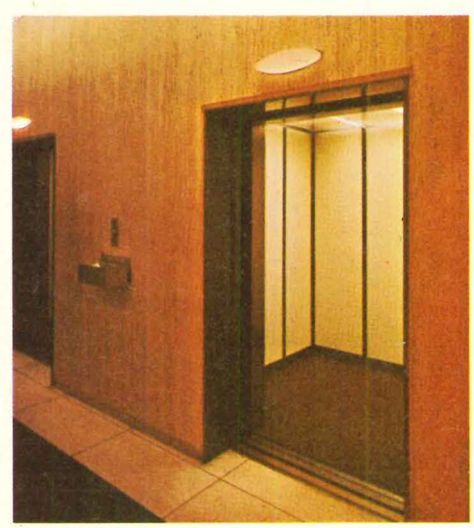


Architect: Kahn & Jacobs



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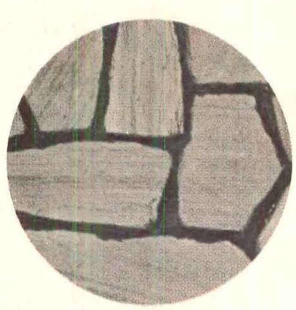

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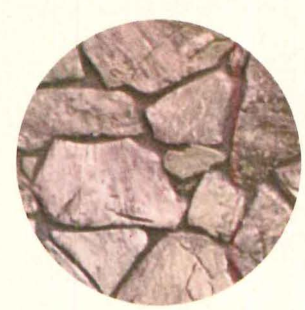

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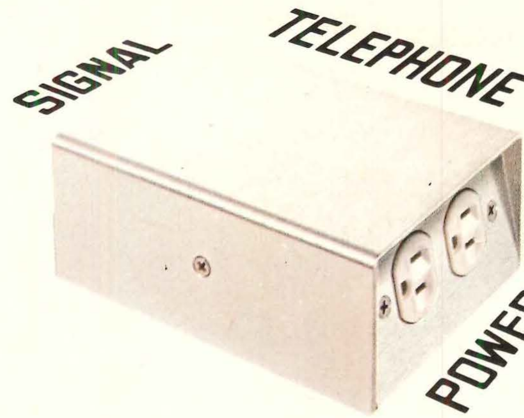

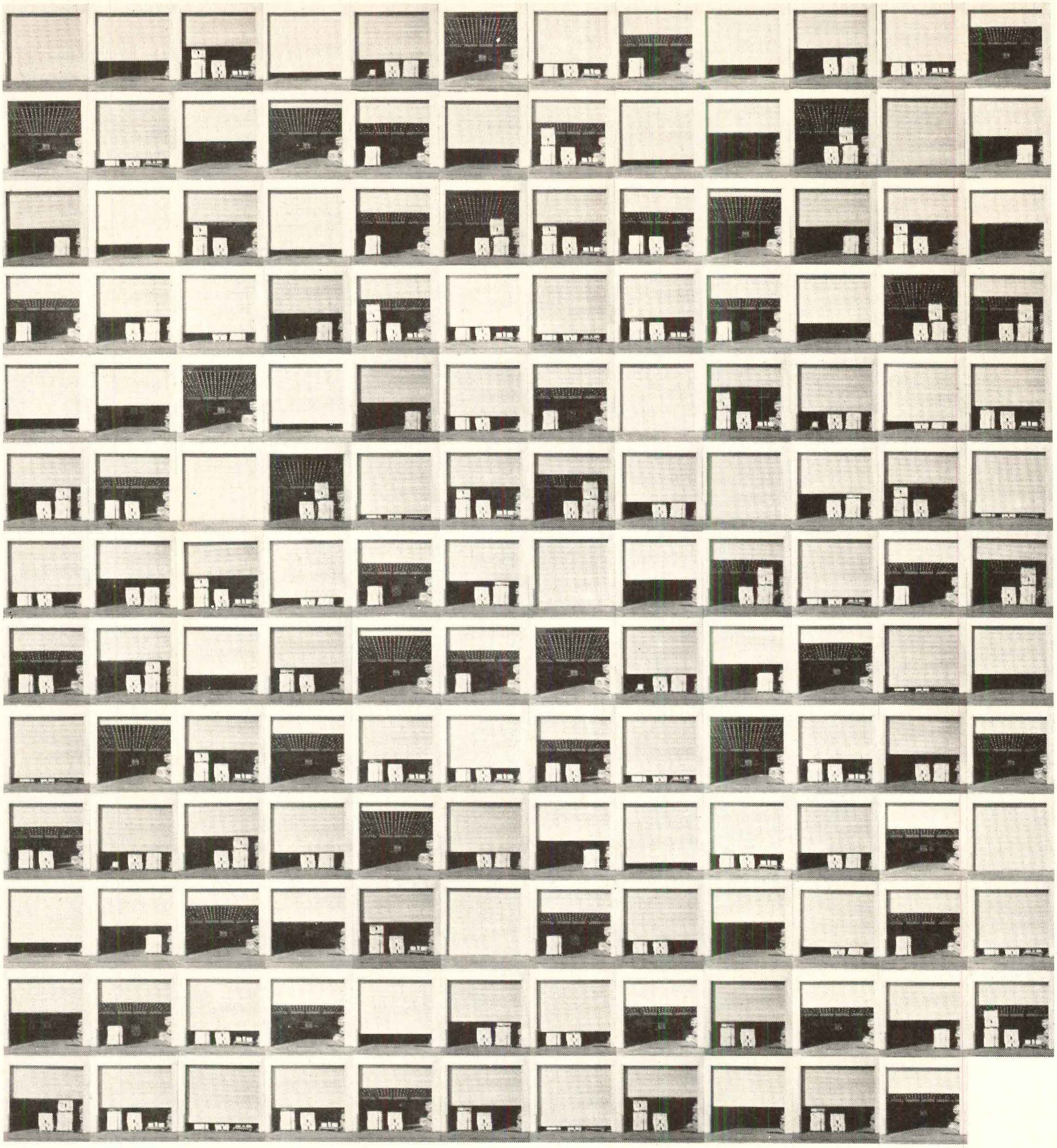

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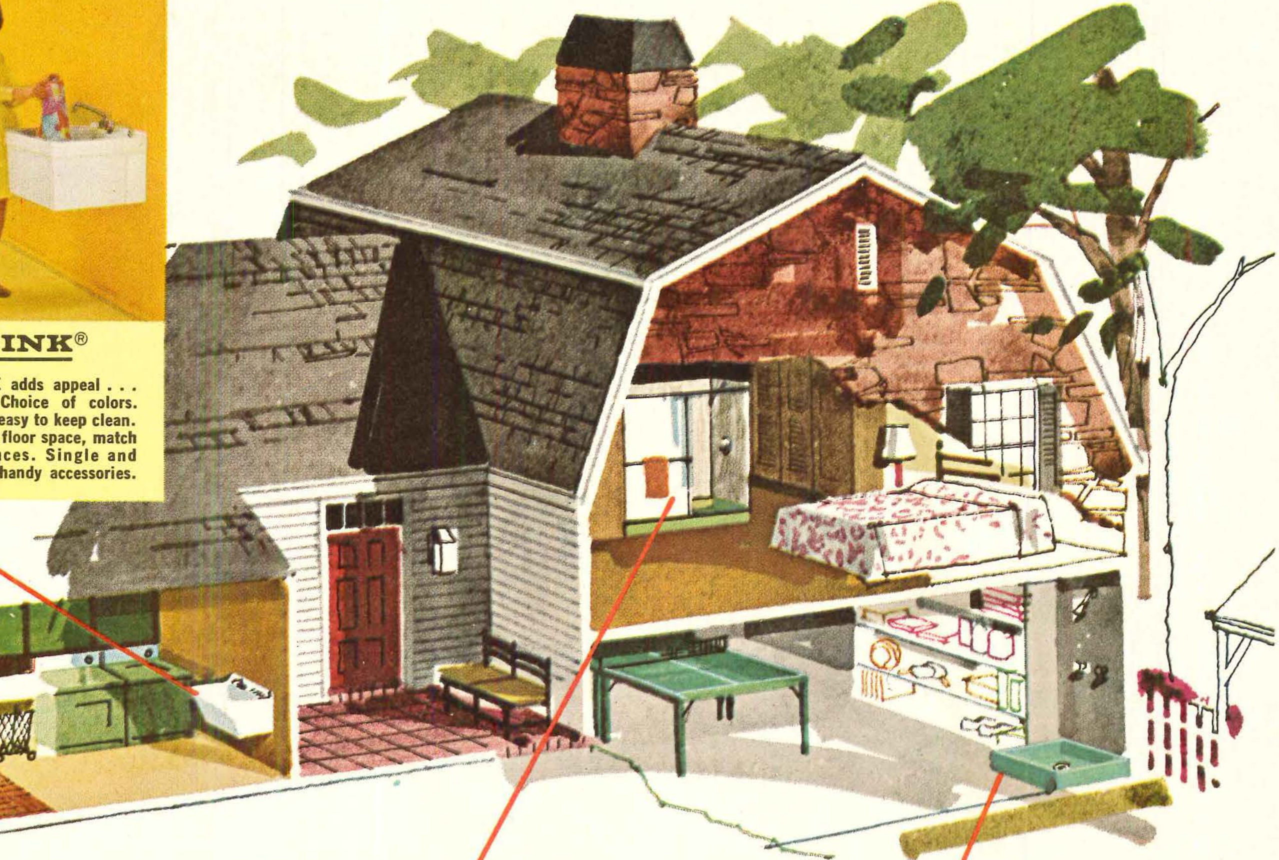

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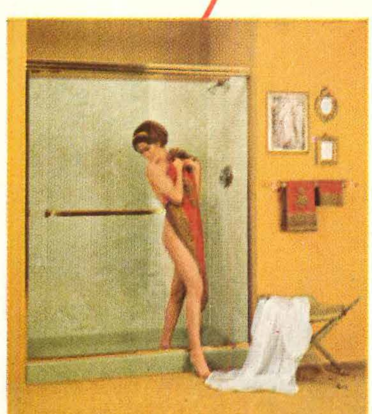

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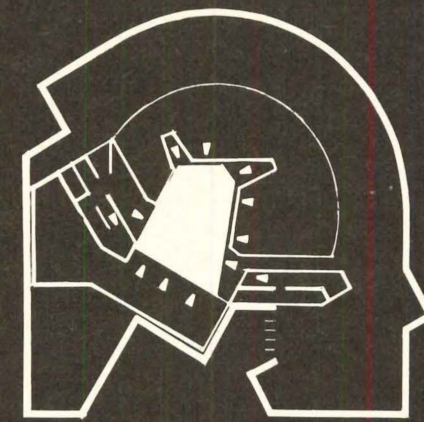
AN ARCHITECTURE OF AWARENESS FOR THE PERFORMING ARTS



by Hugh Hardy

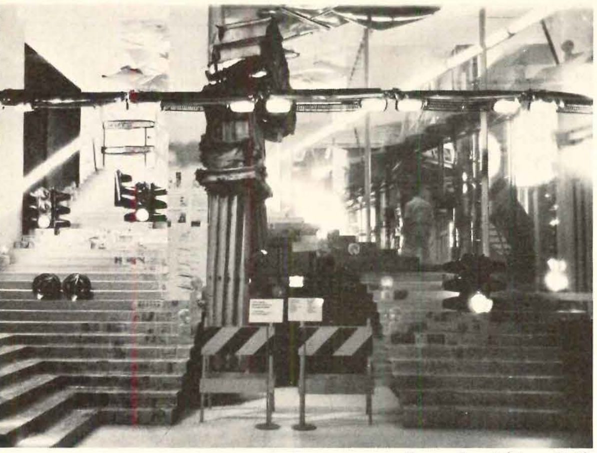
Architect Hugh Hardy of Hardy Holzman Pfeiffer Associates has designed and built several theaters which lend themselves admirably to the more experimental, avant-garde forms of theatrical production. In the article that follows, illustrated by his own work, he predicts trends in the performing arts, suggests how these new movements can be shaped or reinforced by architecture, and provides a context by which his own firm's work, including the recently completed Cincinnati Playhouse, can be understood and evaluated.

Theaters are built to define and intensify the audience-performer relationship. If they fail to make this relationship more immediate and more intense, they suffer a basic fault. Currently, most new theaters make a clear architectural distinction between audience and performer, but it is worth noting that at the avant-garde extremes of environmental theater differences between the two are being quickly erased. Both audience and performer participate in the action, both determine its form. So far such ideas have been greeted with modest acceptance, and environmental theater has been content to "perform" in bus terminals, railroad stations, garages, and the street.

In the past, ballet, opera, symphony and theater were complete and ordered forms of expression which had clearly defined limits. It was therefore appropriate that their architecture should place audience and performer in a series of specifically separate rooms.

Contemporary explorations in the performing arts are challenging the traditional forms of expression, however, leading to a softening of the traditional limits between audience and performer. Such changes follow naturally from our environment. Twentieth-century America is proceeding in all directions at once. It is a fragmented mixture of variety, absurdity, and brutality. Everyone knows that the Split-Level-Colonial-Ranch-House is real, and so are dancing beer cans, high-rise cemeteries, and girls with rabbit ears. Therefore, a truly contemporary expression in either the performing arts or architecture grows from an environment beset by conflicts between dissimilar realities. Because this society is a permissive polyglot which, at the same time, makes Williamsburg and the Saturn V moon rocket more perfect, the traditional forms of both architecture and the performing arts now seem a lifeless imposition.

Unfortunately, the phenomenon of the multi-million-dollar cultural center has obscured the importance of the audience-performer relationship by containing it within monumental structures dominated by size and luxury. Magnificent halls are



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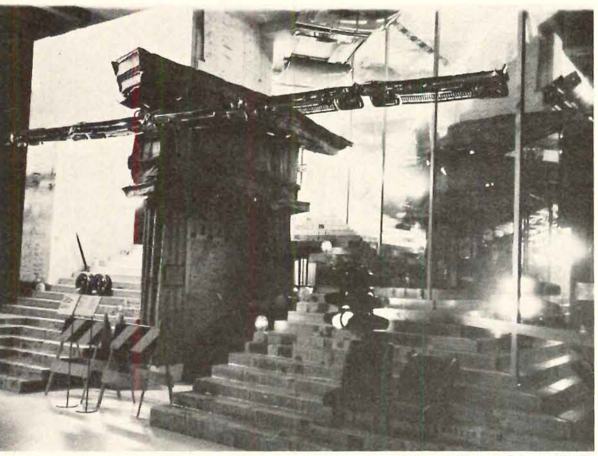
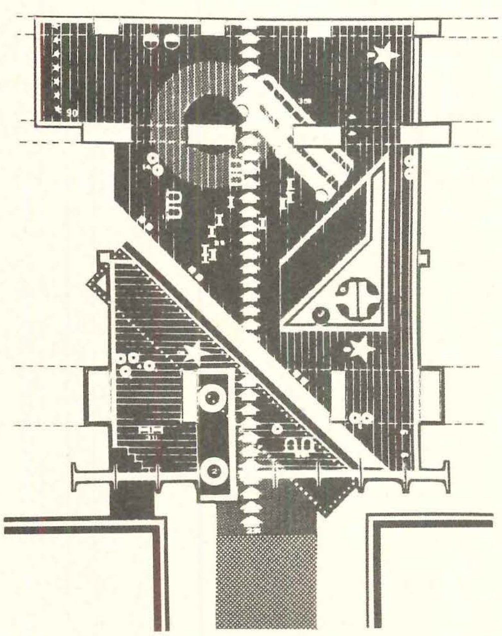


Home Furnishings Daily



1. Environmental experience, 14th Triennale di Milano, Italy (1968).

constructed to enshrine the highest standards of traditional art forms. This requires great expenditures of time and resources. (Lincoln Center represents an investment of $165.8 million dollars in construction alone. Its Los Angeles equivalent has taken eight years to achieve.) In addition, the quest for perfection has made these monuments peculiarly inflexible in the face of new ideas. Nevertheless, an increasing number of ambitious communities are choosing monumental architecture to symbolize their dedication to the performing arts, and this has tended to overemphasize ceremonial and ritualistic audience patterns and not their relationship to the stage.

But new approaches to staging may well grow to demand a legitimate architectural solution. If so, the intensification of the audience-performer relationship will require the conscious use of spatial ambiguities and random relationships far beyond any we have seen. An indication of this can be seen in the environmental experience of the 14th Triennale (Italy, 1968) in which spectators controlled light by their movements and became themselves an architectural element as they moved across ambiguous staircases and the overlapping images of transparent mirrors. (1)

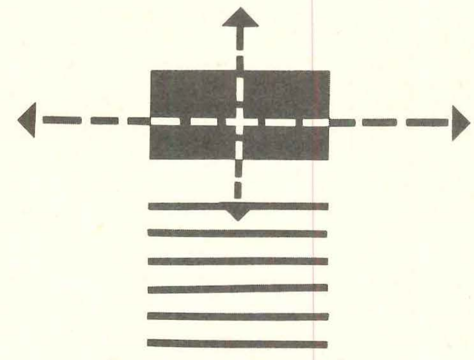
For the present, however, the architect most often chooses to make a formal distinction between audience and performer, and to make participation between the two psychological, not physical. Basically there are three relationships from which to choose: Frontal, Arena and Thrust. (2)

In the Frontal relationship the actor moves back and forth, or up and down in front of a scenic background. This form works well for plays that emphasize verbal language. The actor's face (up to a distance of 65 feet) is made particularly important, and the background against which it is seen offers vast possibilities for pictorial enhancement. Sometimes the separation between audience and stage is ceremonially acknowledged by a frame or proscenium, but it is the placement of the audience before the performer, not the presence of a proscenium, which defines the Frontal relationship.

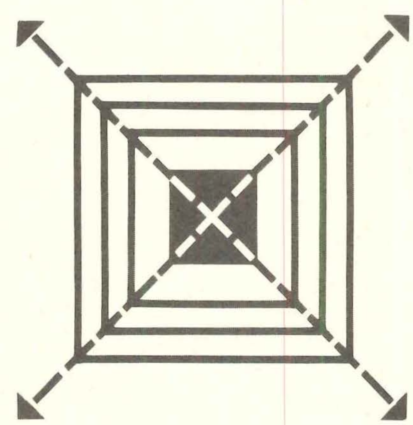
The Arena relationship requires the performer to move, and emphasizes the three-dimensional actions of his body. This is how people gather to watch the circus, a prize fight, or a balloon ascension. It requires that the performer move to be understood, and it emphasizes the actions of his body. Scenery must be abstracted and simplified in order not to block sightlines from the audience.

The Thrust relationship presents the actor as a freestanding element in relation to a scenic background that identifies location. Stage productions in this relationship become three-dimensional and require a variety of actor entrance possibilities.

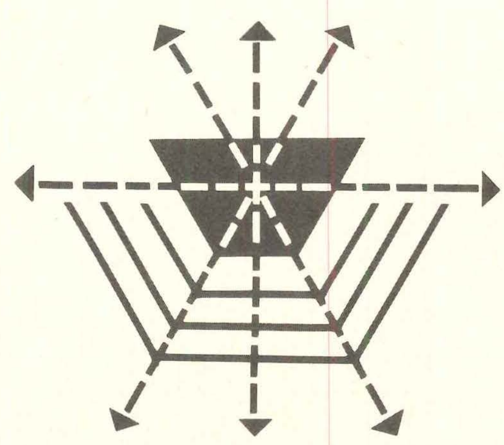
Attempts to make a flexible theater that changes the relationship between audience and performer are best accomplished



FRONTAL

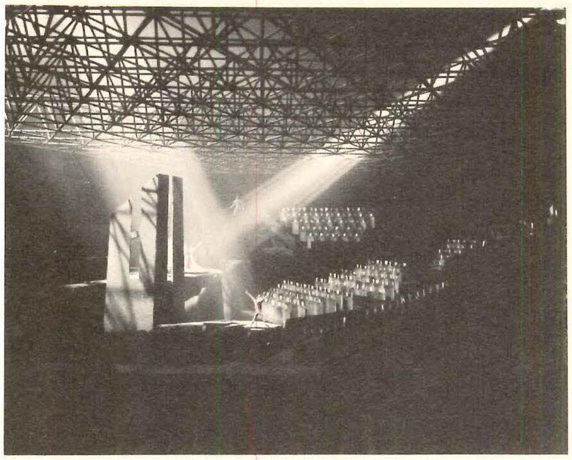


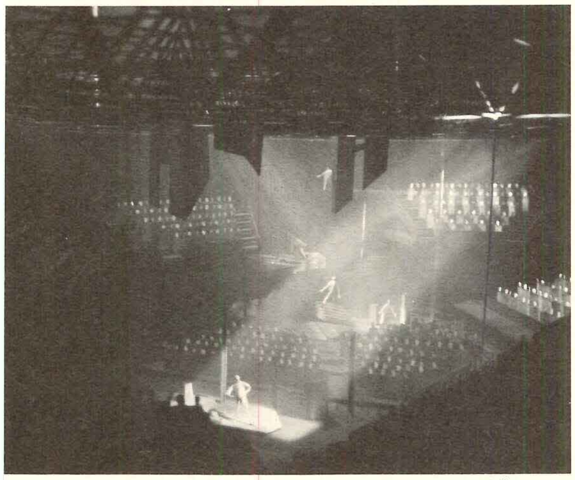
ARENA



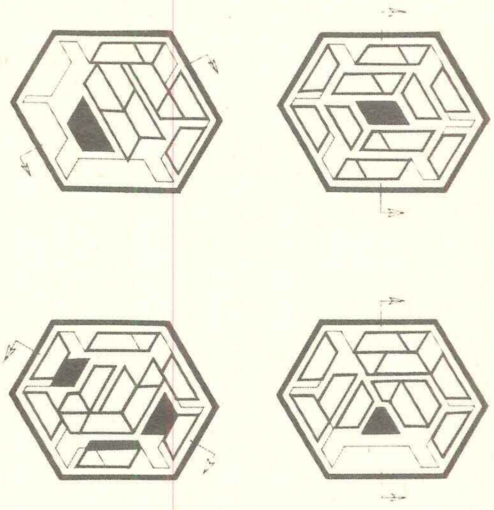
THRUST

2. The three basic audience-performer relationships.





Gil Amiaga



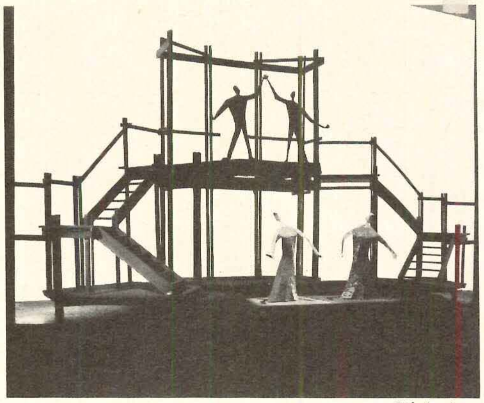
3. Space Theater (1965).

at a small scale (less than 500 people). The Space Theater (1965) places the entire audience in movable seating fragments which combine into a variety of relationships. (3) The toll in machinery, expense, and enclosed volume of such solutions is high—unless seating capacity is small. For audiences of more than 500 it is wisest to design for a flexibility of use which permits the stage director and scene designer leeway to explore a variety of production techniques within a fixed relationship. Since endless variations on the three basic relationships are possible, it is essential that the architect first clarify how the audience will meet the performer before using his skill to intensify their union.

In the theater it is the stage director Tyrone Guthrie who has most successfully challenged tradition. An early example of his influence was seen in the inaugural season in 1962 of the APA (Association for Producing Artists) at the McCarter Theater Performing Arts Center, Princeton, New Jersey. A two-level unit platform and exposed stage lighting over the front rows of seating made it possible to unite audience and performer, despite the restrictions of a proscenium theater built in 1929. Entrances to the platforms were provided from all sides, below as well as above. The forward thrust of this stage made action a freestanding event which moved through open space instead of against painted scenery. But it is interesting to note that despite the bold advance of this stage, the relationship between audience and performer remains Frontal, not Thrust. (4) It was not until 1963 with the opening of the Tyrone Guthrie Theater in Minneapolis that a more complete architectural solution was achieved. Since then, other major buildings such as the Vivian Beaumont (1965) and The Mummers Theater project (1968) have shown the influence of Guthrie's ideas.

The attempt to unite audience and performer creates a conflict between dissimilar architectural requirements. The auditorium belongs to the audience and is made into an environment of flattery for their delight. The stage is a work place best serviced by straightforward utility. Its placement in the auditorium requires the accommodation of the gross hardware of lighting instruments, the yawning stare of entranceways, and the machinery of scenery. In an attempt to resolve the demands of this rude intrusion into their otherwise harmonious designs, architects have often chosen to hide this embarrassment behind flaps, in holes, and between fins. Great ingenuity and expense are spent in these solutions, but it would seem more appropriate to accept the conflict between the needs of the audience and those of the performer and transform it into the raw material of an architectural solution.

As architects, our firm has therefore chosen to use an architectural language that acknowledges the unlikely juxtapositions of the contemporary environment, and uses their random order to make an architecture



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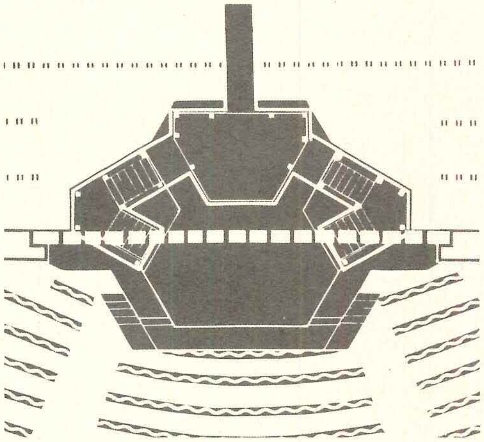
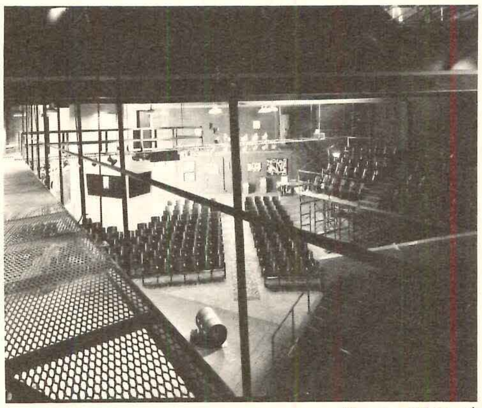
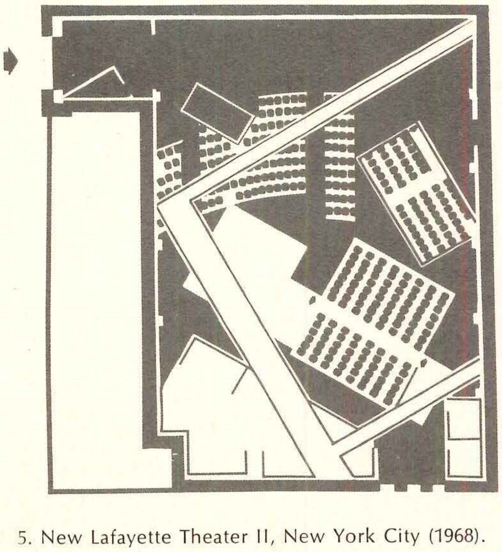


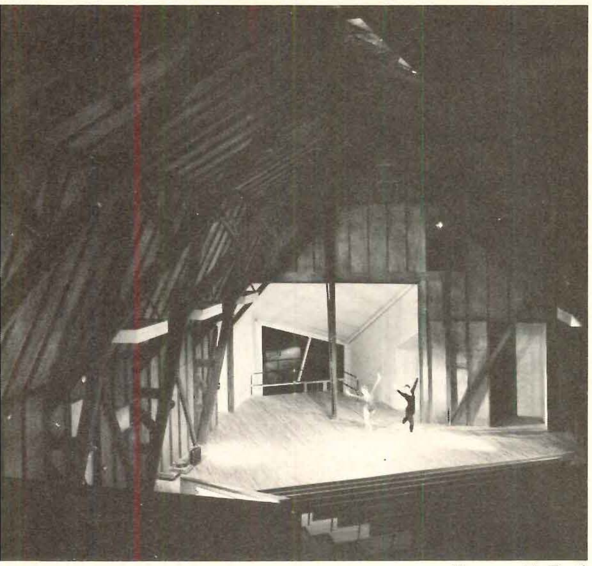
4. Festival Stage Unit (1962) for the McCarter Theater Performing Arts Center, Princeton, New Jersey.



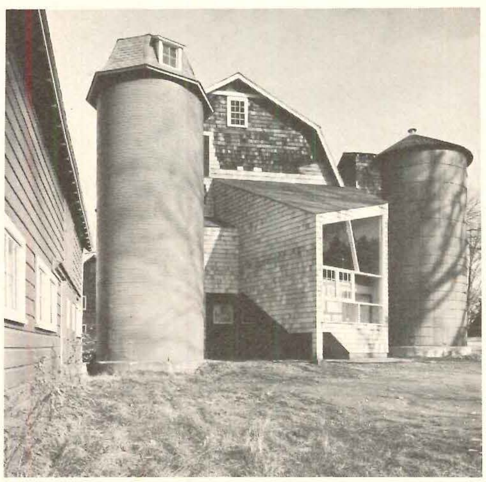
Norman McGrath

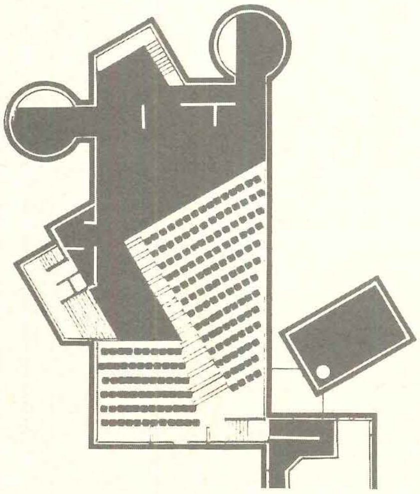


5. New Lafayette Theater II, New York City (1968).



Norman McGrath





6. Simon's Rock Arts Center, Great Barrington, Mass. (1966).

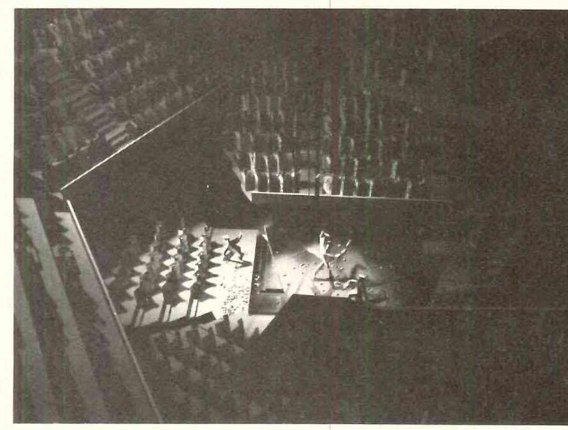
based on awareness of disparity. Dissimilar elements are combined to form a fragmented whole more appropriate to this society than traditional concepts of order. An architecture of awareness accepts all the disparate parts of the performing arts at once, no matter what their material or purpose. In the New Lafayette Theater II, a community theater for Harlem built in 1968 that emphasizes the Thrust relationship, we chose to make participants aware of great variety. Glazed tile, expanded metal, marble, corrugated plastic, concrete, plywood, and light bulbs are all used to form the room. (5)

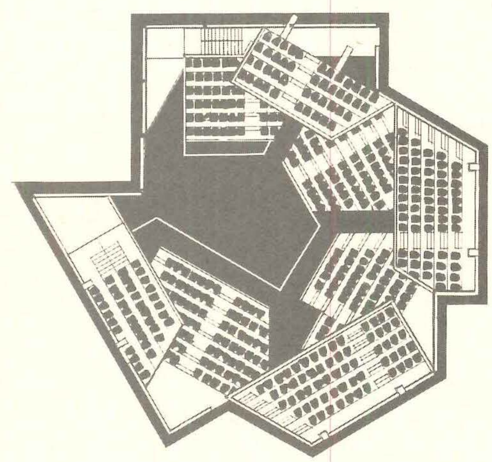
Like the numbered dot drawings for children which do not stand complete until the dots are connected to form a picture, we invite the observer to participate in this process. We encourage his involvement by consciously creating ambiguities which can only be resolved by his actions. The elements of design are placed not in harmony, but in opposition to one another.

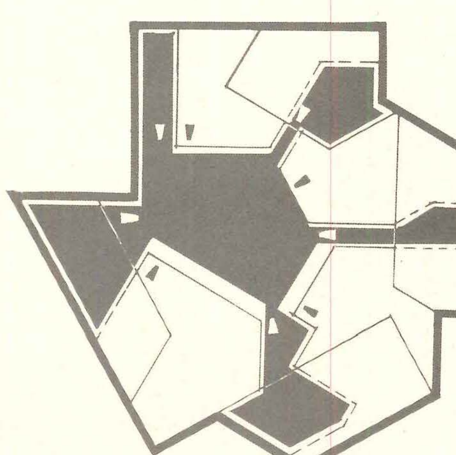
At the Simon's Rock Arts Center (a dairy barn complex converted into a theater, gallery, and studios in 1966) the audience-performer relationship is Frontal and the educational program is based more upon movement than speech. Therefore, the audience is placed into the rectilinear volume of the old hayloft on a diagonal which insured the greatest possible dimension for stage movement. Stage extensions are placed on the building to reinforce the diagonal and to provide a greater variety of entrances. This change from conventional planning causes a more immediate confrontation between audience and performer because the performance space seems to cut off and limit the audience, while the audience seems to advance upon the performer. (6)

The theater of the University of Toledo Performing Arts Center, designed in 1965 in the Thrust form, has no central focus of attention. Each fragment of audience seating is placed at a different level and a different angle of vision, which permits the action to seep in from all corners of the room. Not only are the audience and performer made aware of a direct confrontation, but the audience is made more aware of itself. This theater generates stage productions which must actively address themselves to their audience. Actor and spectator alike share in the contradiction of intensifying their union by being taken apart. (7)

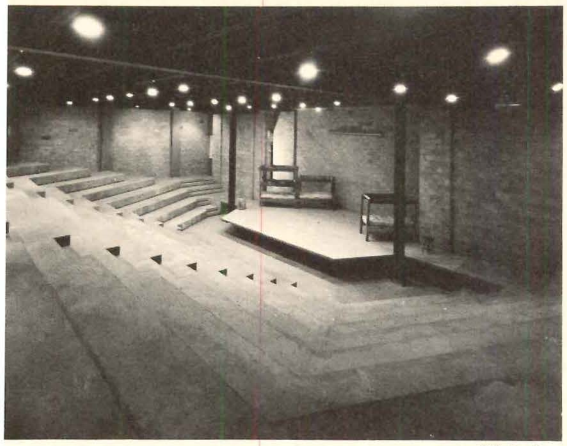
The Playhouse in the Park, designed as a Thrust relationship in 1957, confronts the audience with an asymetrical playing area. The centerline of the stage is not the centerline of the seating bowl. But in addition, the right-hand side of the audience, being higher above the stage, is in a different relationship to the performance than the audience groupings on the left. Thus the performing area cuts through the seating bowl off-center and leads to entrances that cut through the audience at different angles. The audience is again actively related to the stage. (10)



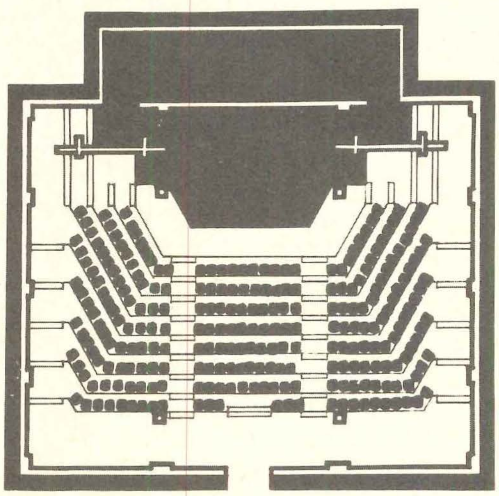




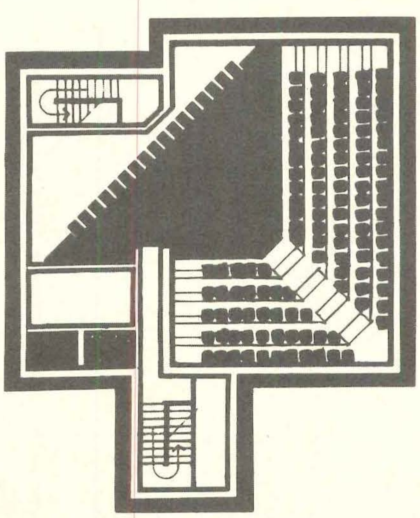
7. University of Toledo Performing Arts Center Toledo, Ohio (designed in 1965).



Gil Amiaga



8. Darrow School, New Lebanon, N.Y. (1963).

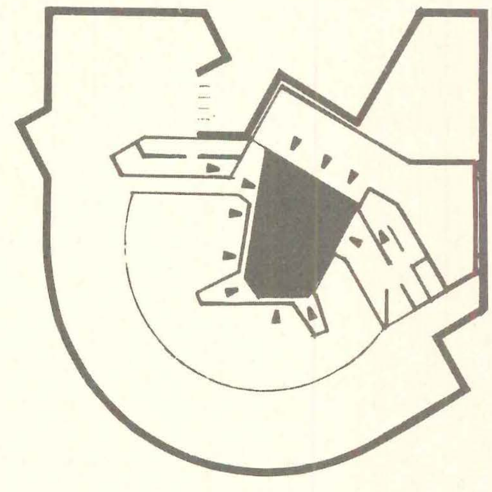


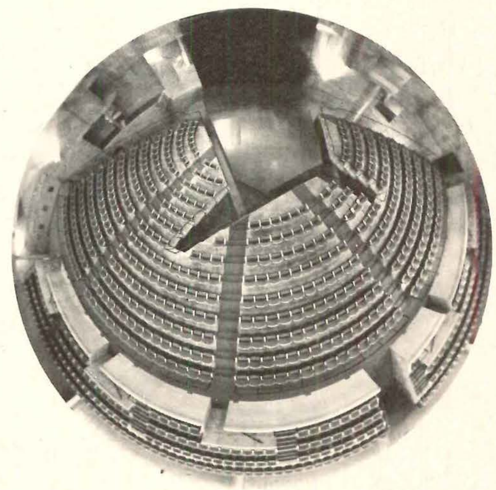
9. Kenan Center, Lockport, N.Y. (designed in 1968).

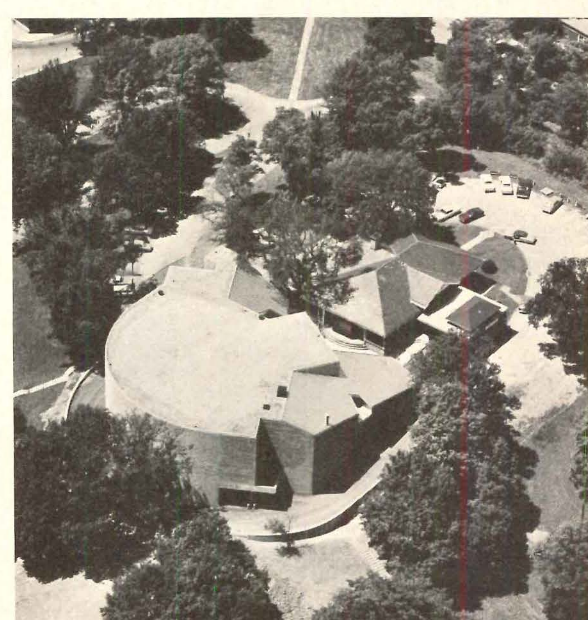
Aside from placing the audience and performer in opposition, other contrasts are possible within the theater. Displaying no embarrassment about utility, the University of Toledo will build its seating in chunks of raw concrete with fascias bristling with the black shapes of stage lighting equipment. All of this is in contrast to the rich and fuzzy contours of upholstered seats and carpeted aisles. The ceiling of the Playhouse in the Park aligns the main trusses, the exposed mechanical ducts, and the suspended lighting catwalk within separate rectilinear grids. The result is an opposition of elements which gives variety and vigor to an otherwise straightforward Thrust relationship. In addition, it allows lighting equipment to be placed wherever the production demands, without apology. At the auditorium of the Darrow school, the contrast is between the room and the production. Exposed steel columns and unpainted concrete are more effective than an opulent interior. (8)

Another opportunity to place elements in opposition comes with the contrast of the present with the past. In Cincinnati, the existing Victorian shelter house of the original Playhouse in the Park was acknowledged as an integral part of the over-all design of the new theater. But while the new playhouse is respectful of its surroundings, no attempt is made to accommodate the intricate details of one century with the straightforward choices of another. At Simon's Rock new elements are added—not to replace the old, but to complement them. With the exception of removing old stanchions, all existing fenestration, structure and materials remain intact in order to make clear the farmyard origin of this complex. At the same time, all the new elements are frankly stated in geometries which are not common to such structures. The New Lafayette Theater acknowledges its origins as a movie house by retaining a portion of the original seating and contrasting two other groups of seating fragments against it. One floats overhead as part of an expanded metal catwalk, the other is contained in a ceramic tile boat. The theater of the Kenan Center makes a Frontal relationship because of the placement of the audience at the perimeter of a carriage house and the positioning of a stage and scenery loft diagonally through the existing trusswork. (9)

In order to insure that the stage production can most effectively move through the auditorium of a contemporary theater, it is essential to provide a variety of entrance possibilities for the actor. The declining interest in peep-show theater has made an actor's motions as important as his speech cadence. Entranceways can also be used for lighting positions and the projection of scenic effects. At Simon's Rock there are six basically different ways to enter the stage. By contrast the traditional proscenium has three: from the left, from the right, and down from the center. In Toledo the theater has nine different directions of entry, in the Playhouse there are twenty-four.





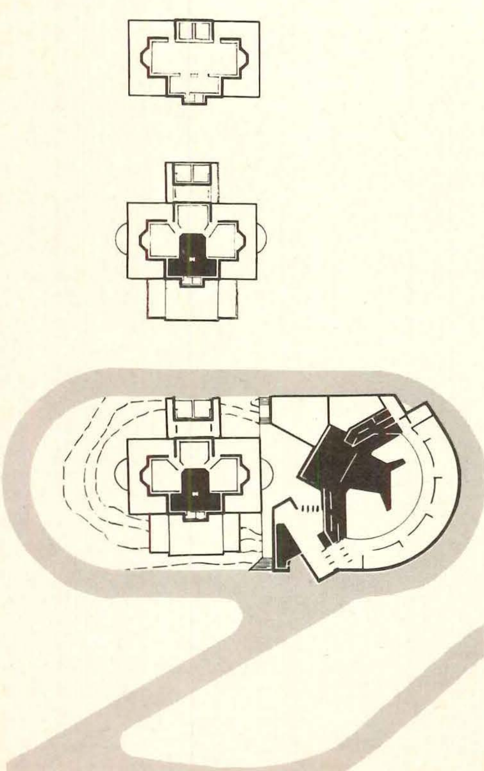


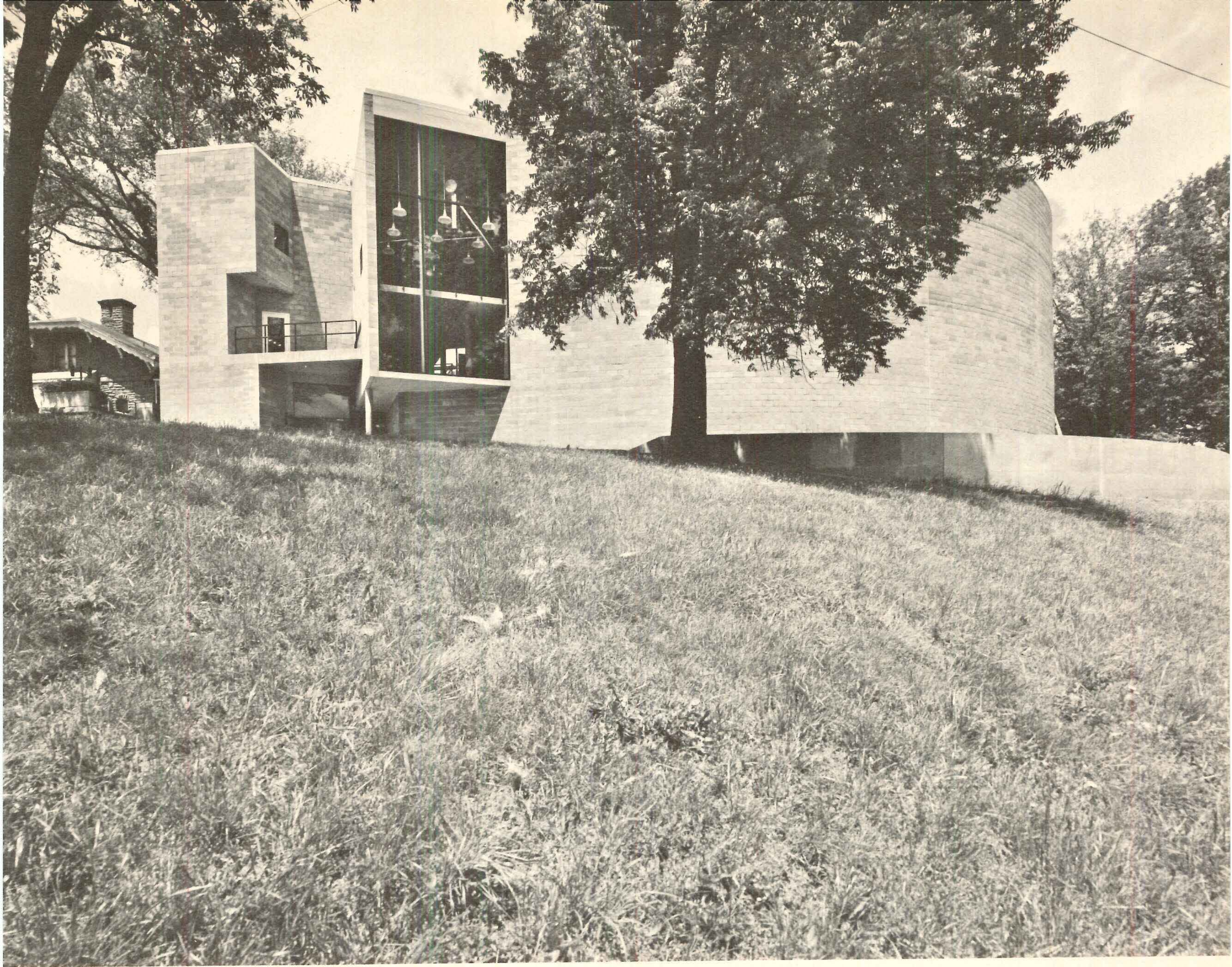
10. Playhouse in the Park, Cincinnati, Ohio (1968).

Since the performing arts are so much a part of the night, another important consideration is the use of artificial light as an element of architectural design. The bluish-white brilliance of the bare fluorescent tube makes a fine contrast with the warm glow of the incandescent bulb, and we have exploited this in the Playhouse lobby. Here the angular geometries are emphasized by vertical lines of fluorescent light applied to mirrors, horizontal lines of fluorescent light applied to the carpeted ceiling, and these in turn are contrasted with horizontal patterns of clear glass incandescent lights. At Simon's Rock bare tubes are used to outline the new additions against the existing trusswork, and incandescent spheres oppose these at random. This calligraphy of light can be used to reinforce the composition of a space or to transform it. In the Playhouse auditorium the audience first sees the room lit by incandescent warehouse floodlights which shine up at the overlapping patterns of the ceiling. Together with an arc of exposed incandescent bulbs, these lights emphasize the volume of the room. When these lights are dimmed and the stab of stage lighting appears, the room is transformed and only the stage has importance. Outside in the small plaza, blue airport lights are used to enliven the space and give orientation to the audience movement.

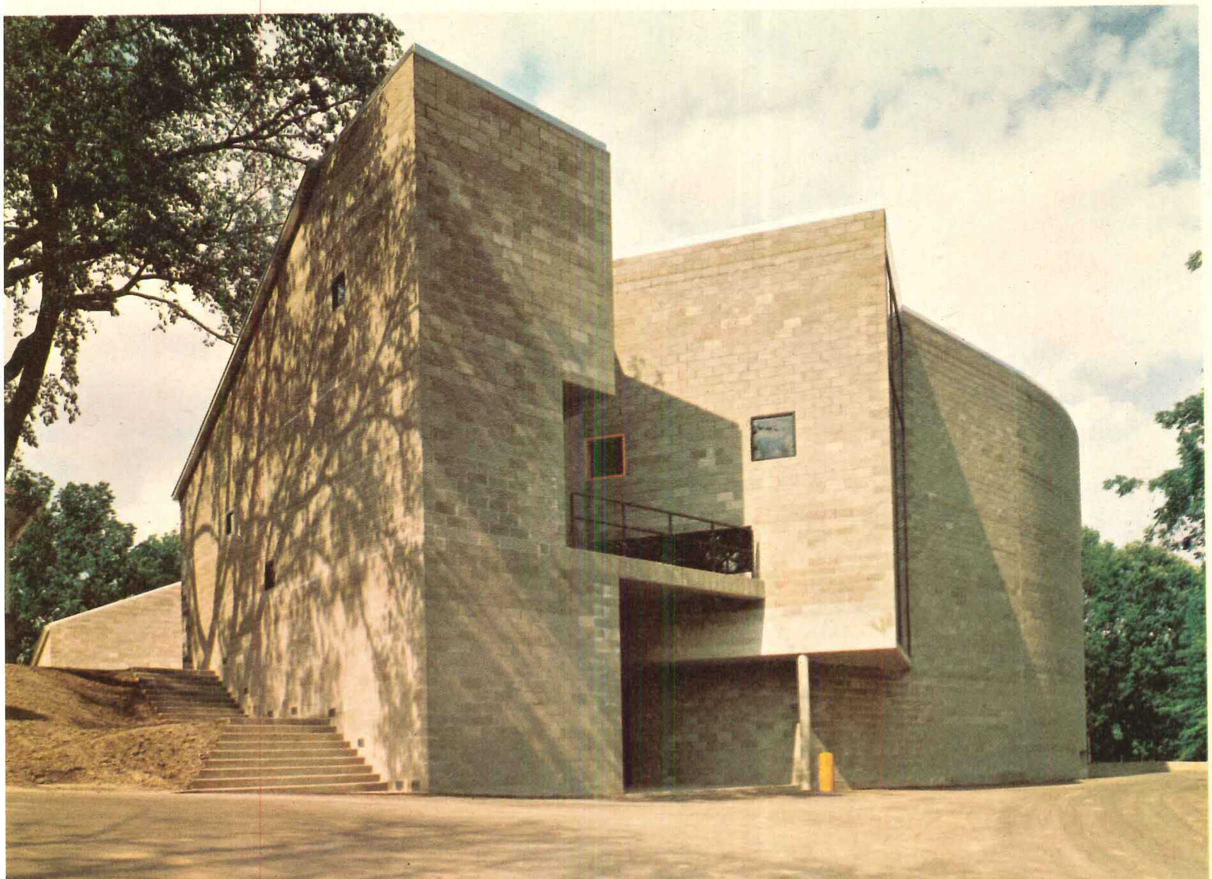
All of these designs are based upon the theater's basic confrontation between audience and performer and represent an attempt to heighten this event without imposing physical limits that are too strict, too uncompromising. Since the programed use for all contemporary structures, whether housing venerable institutions or new activities, is so quickly made obsolete by change, it seems wise to emphasize essentials.

CINCINNATI'S PLAYHOUSE IN THE PARK



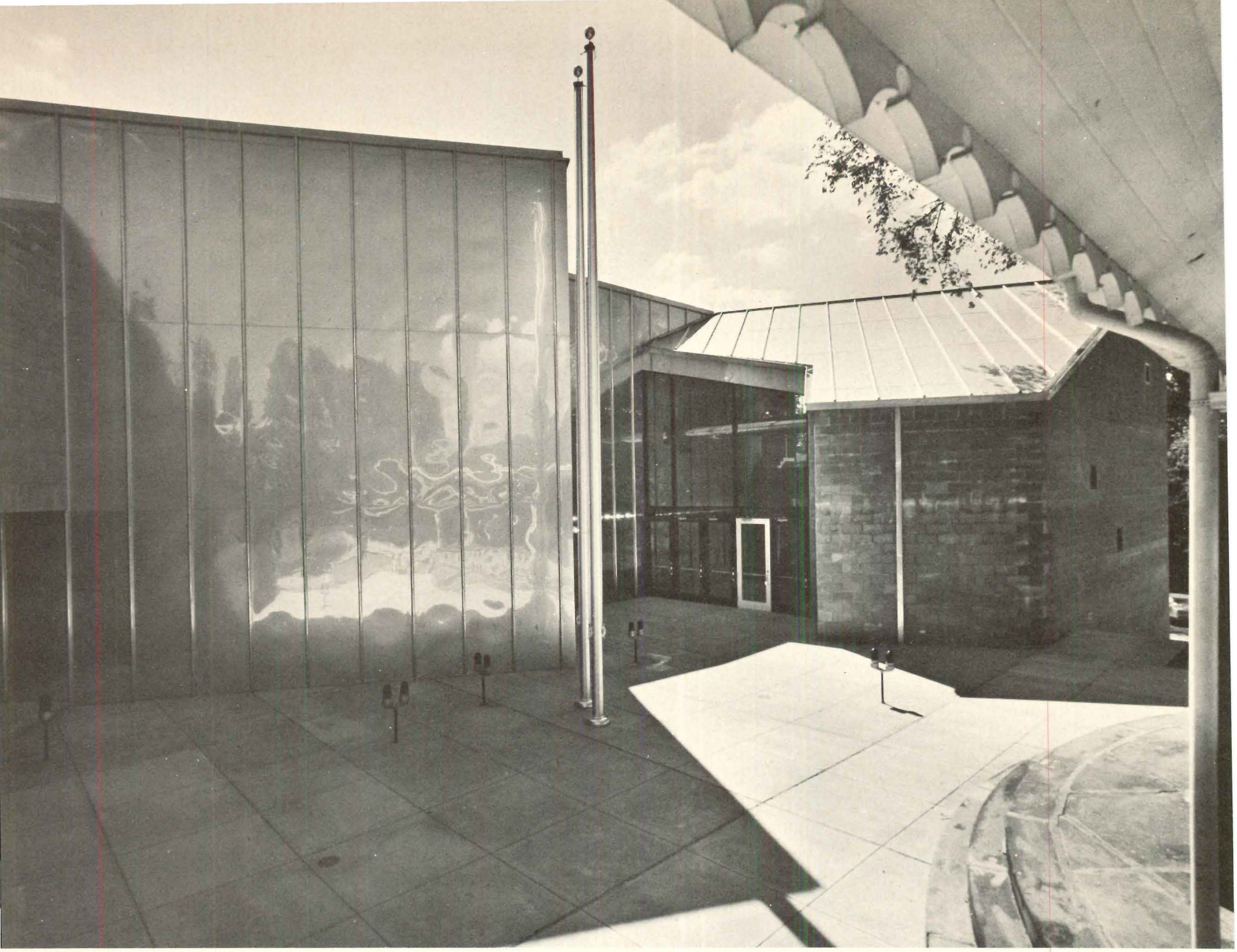


Norman McGrath photos



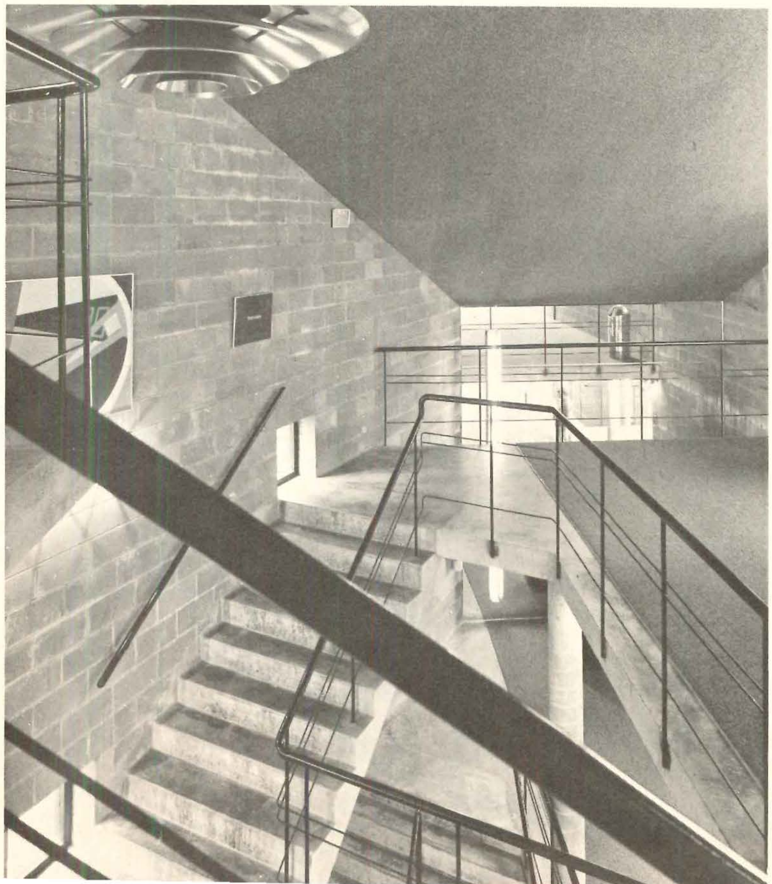
The site of the Robert S. Marx Theater is a grassy knoll located in Eden Park. The new 672-seat playhouse is the final phase of a five-year development plan. The three plans (opposite page, left) show the growth of the center since its beginnings in 1963: phase one—a thrust stage with 225 seats was built within a 94-year-old Victorian shelter house, and public facilities and an art gallery were added; phase two—administrative space and an outdoor terrace for chamber music were included; phase three—funds were raised entirely from the community and the $970,000 theater shown on these pages constructed. Costs were kept to $1,443 per seat (theaters with more luxurious public spaces but comparable production facilities are costing several times that.

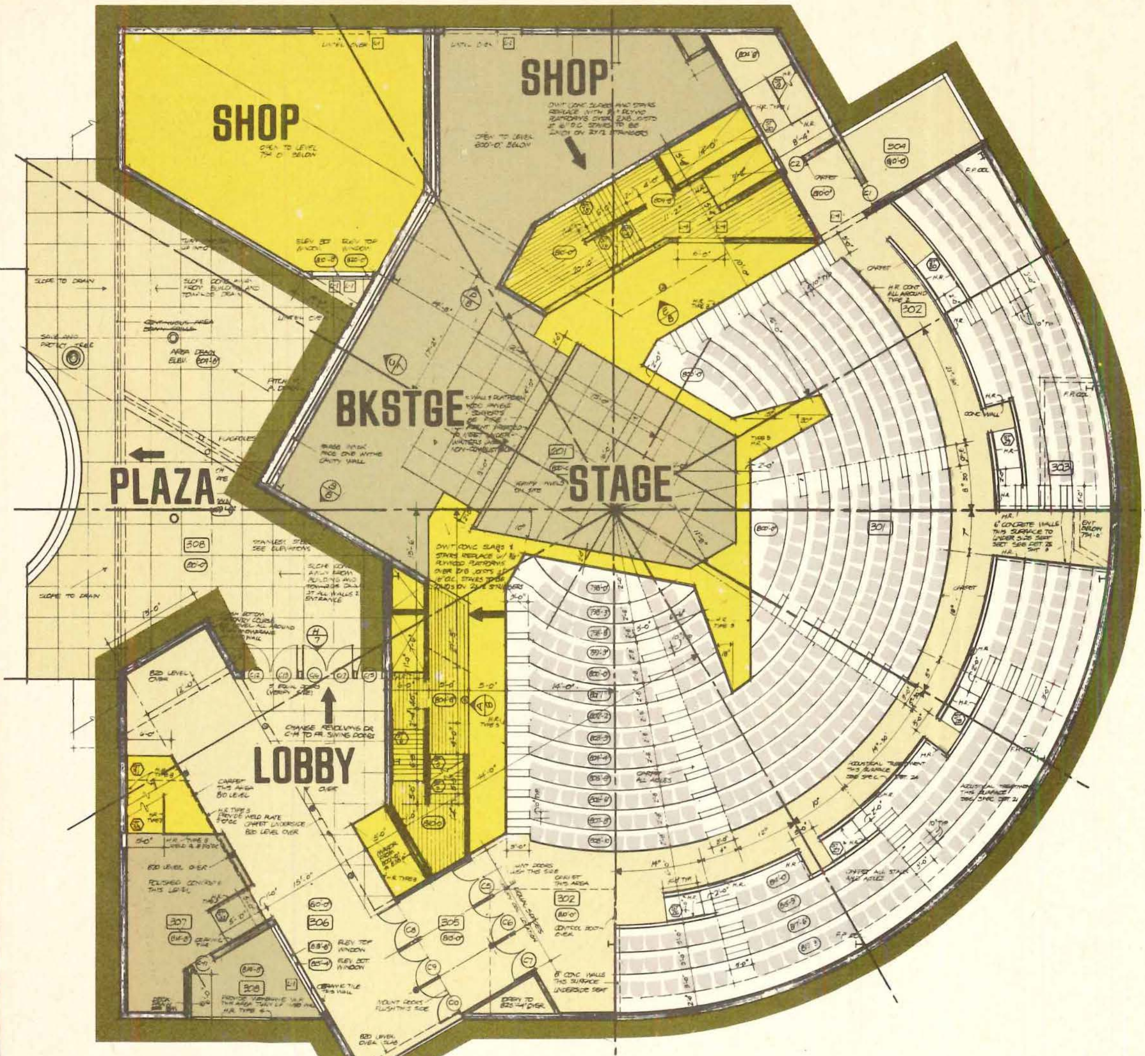
The photograph at far left shows the main approach. Steps lead to a small plaza. The photographs on this page reveal the building's true size, which can be seen only from the downhill side. The walls are loadbearing.



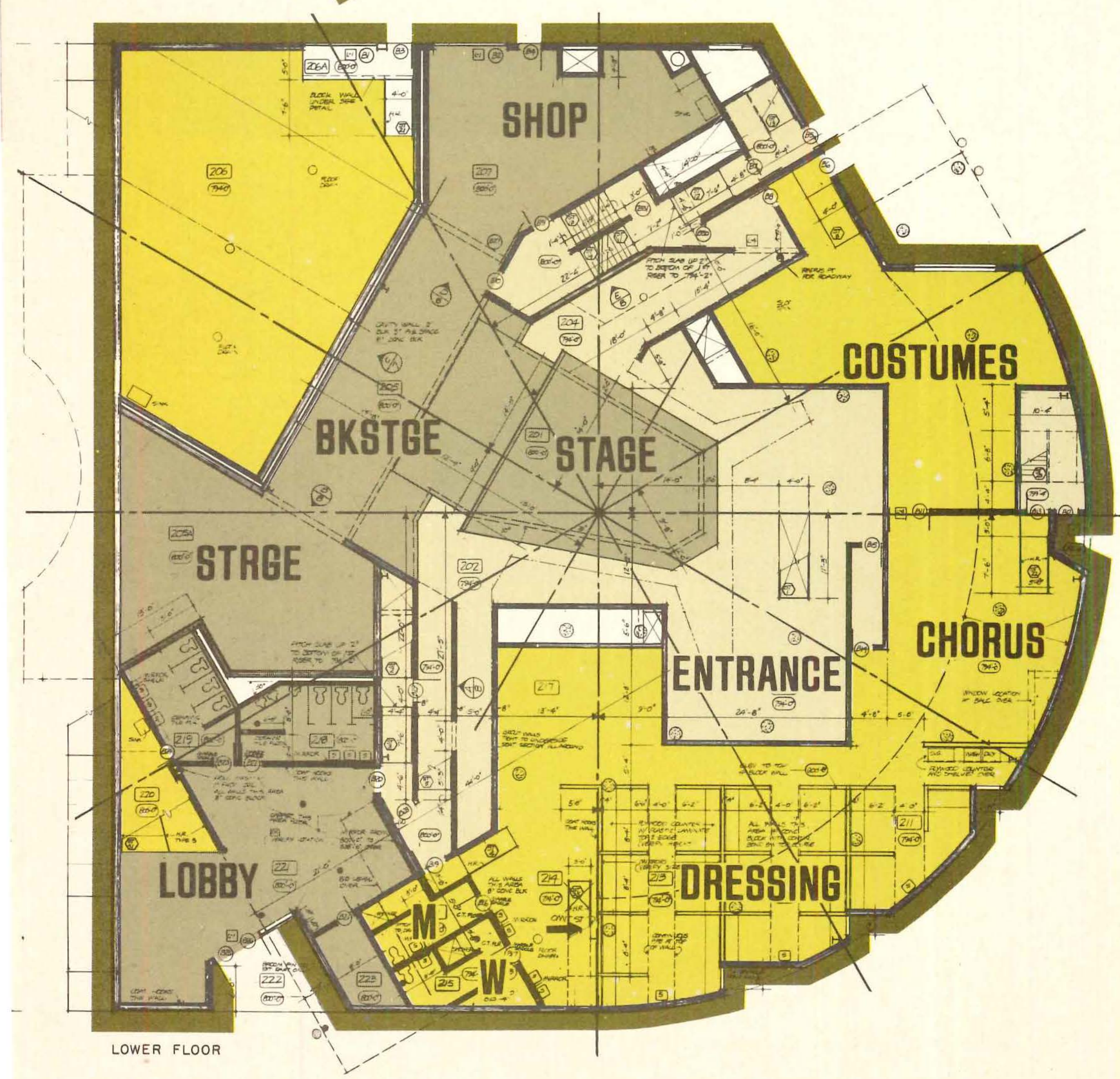
Where it faces the plaza the new building appears small and in scale with its Victorian neighbor. The stainless steel roofs slope gently downward to reduce the height of walls which enclose the upper portion of lobby, backstage and shop areas. These walls, also of stainless steel, are a reflective surface presenting a shimmering, ever-changing image of the Victorian pavilion and the movement of people across the plaza. Airport taxiway lights of the standard beautiful blue, used in combination with incandescent bulbs in exposed porcelain sockets and wire cages, light the plaza at night. Architect Hardy has the pop artist's knack of taking familiar and prosaic objects and using them in fresh ways. For the first time these objects become beautiful or curious or funny —but as used by Hardy they are never wholly capricious. They serve their functional purpose as well, or better, than more standard, less inspired choices.

The five-level lobby is another diverting exercise in the transformation and exaltation of the mundane, and as such is an appropriately contemporary background for theater-goers. If in the future, as fashions change, this lobby is left as it is (as it should be), it will stand as an unrepentant period piece of the late sixties. Lowly ducts and air diffusers, hidden or screened until now, have become works of sculpture in stainless steel. Clusters of chrome-shielded fluorescent tubes, usually semi-concealed, are here exposed in all their nakedness in great vertical chandeliers (see cover). Even incandescent warehouse floodlights are used. Mirrors become a means to fracture space, to dissolve its edges and to create unexpected visual relationships and juxtapositions. And carpet is on the ceilings as well as the floors. Again this is no mere caprice. The carpet effectively lowers the noise level in this lobby during intermission.



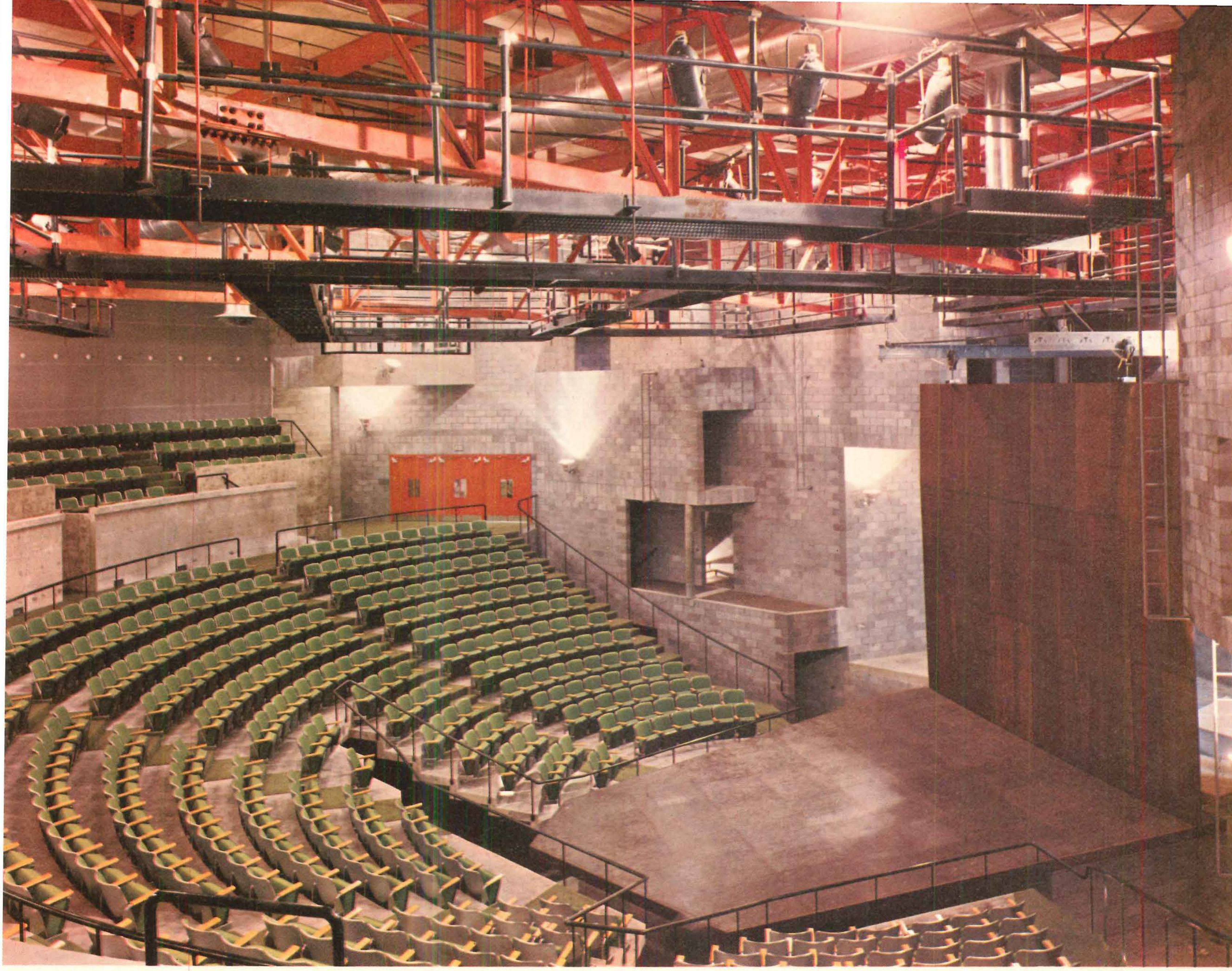


MAIN FLOOR



LOWER FLOOR

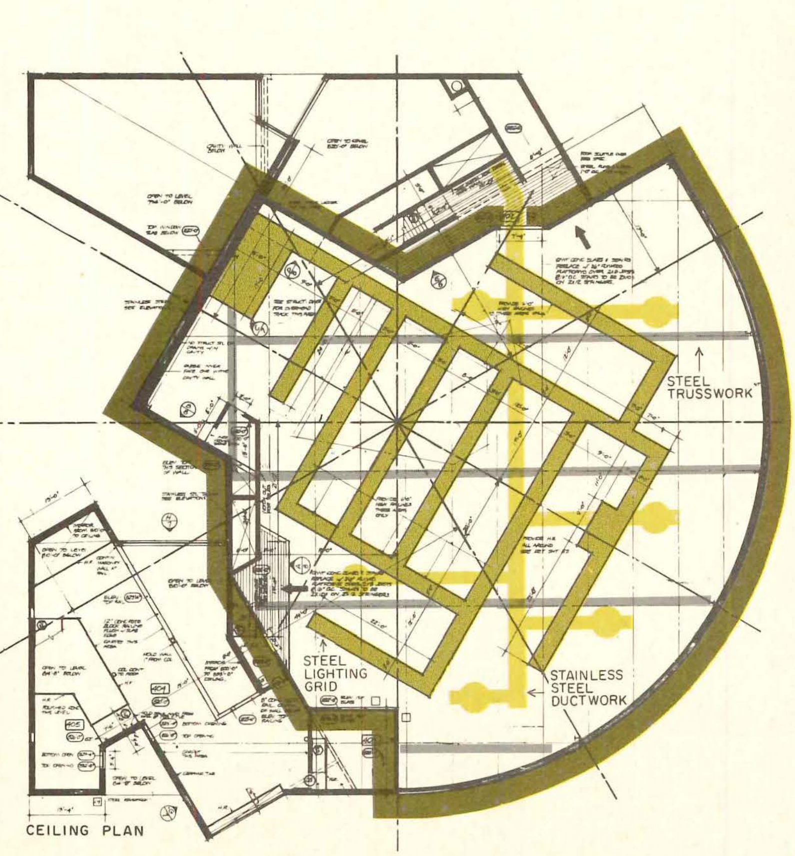
The asymmetrical thrust stage can be entered by the actors from any one of twenty-four points to accommodate the style of production favored by theater director Brooks Jones. According to architect Hardy, Jones had strong ideas from the beginning about what he wanted to do: "Brooks had thought through the style of production and the relationship of the audience to the performers and what the quality of the room was supposed to be and do. He wanted what we call the 'bookend' concept, which to us means that when you are in a big amphitheater room you don't look at the stage wall straight on, you look down at the floor and the back wall. What you see is the floor and the wall together. Included within the audience's sightlines are the sidewalls, which we did not want to treat as decorative surfaces to attract attention to themselves. We tried to make these walls work for the performance to give as many ways as possible to get onto the stage. Every conceivable means of entry to

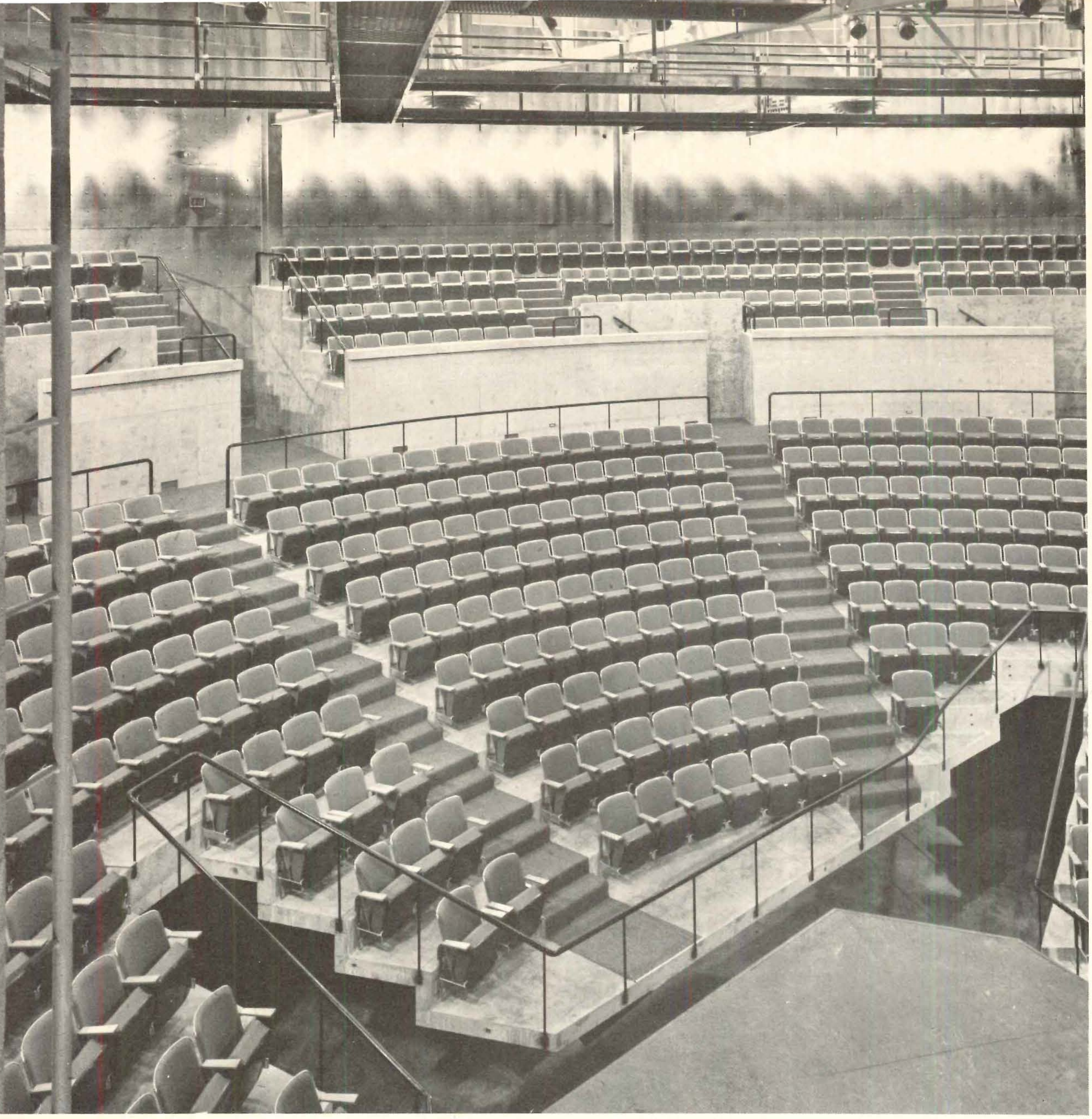


that magic space was provided, and that's the reason why there are all those levels and holes and projections.

"In the beginning Brooks was opposed to an asymmetrical stage, but we as architects disagreed. Our point was that once you put a performance into a room with an audience, the performance becomes a three-dimensional thing which depends on movement as much as speech. There should be the opportunity to move in all sorts of ways which an asymmetrical stage provides. This led to the decision to surround the stage with a pit giving access at any point on its perimeter, not just from the vomitories. In Brooks' style of production actors and audience do not intermix—he thinks this demeans the actor. He wants actors to be larger-than-life-sized people. This was a further reason for cutting the stage off from the audience. The seating bowl doesn't touch the side walls either, except at the points where the audience enters and exits.

"Above all, we wanted to



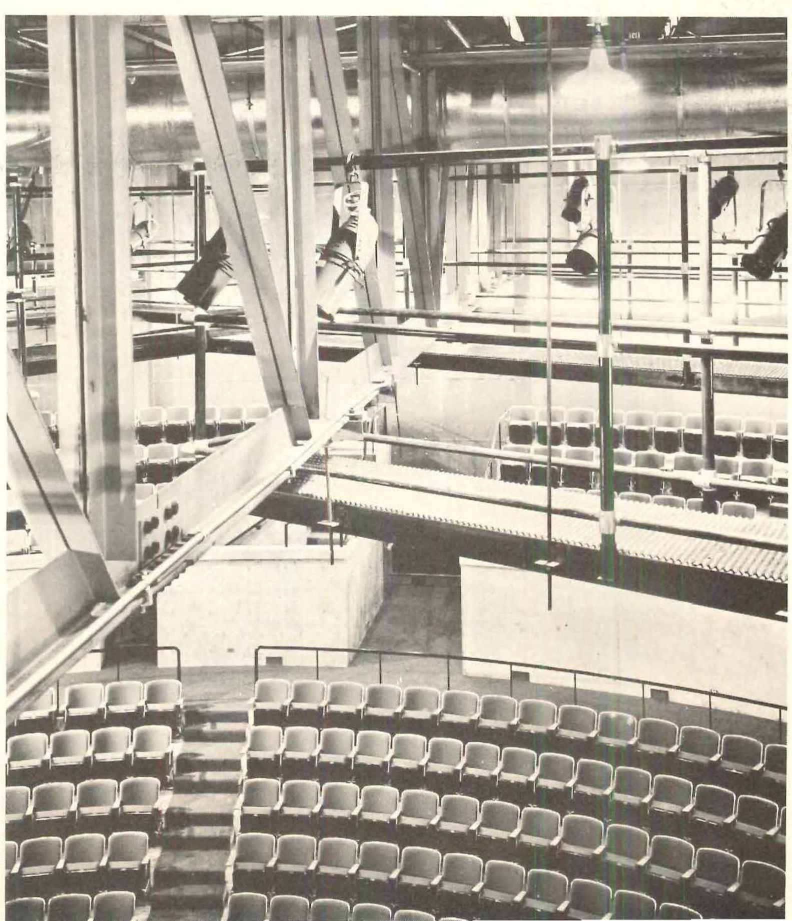


make sure that the auditorium had the quality of hard 'backstageness'—that the only space to be soft and fuzzy would be where the audience sits."

To this end the architects not only exposed the building's structural and mechanical systems to full view within the auditorium, but also all the elements which are necessary to theater work. Lighting positions, catwalks, ladders—all are thoroughly revealed.

Upholstered seats with carpeted aisles and the audience itself provide the necessary sound dampening.

ROBERT S. MARX THEATER, Cincinnati. Owner: *Playhouse in the Park Corporation*. Architects: *Hardy Holzman Pfeiffer Associates;* supervising architect: *Robert Habel-Hubert M. Garriot Associates;* structural engineers: *Miller-Tallarico-McNinch & Hoeffel;* mechanical engineers: *Maxfield-Edwards-Backer & Associates;* acoustical engineers: *Robert A. Hansen Associates;* contractors: *Turner Construction Company*.

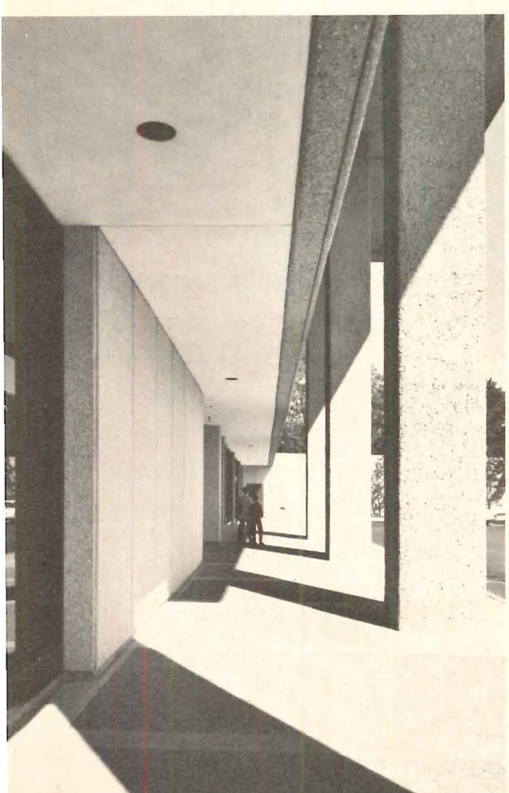


A SUBURBAN OFFICE BUILDING BY TAC—DESIGNED AS FOCAL POINT AND LANDMARK

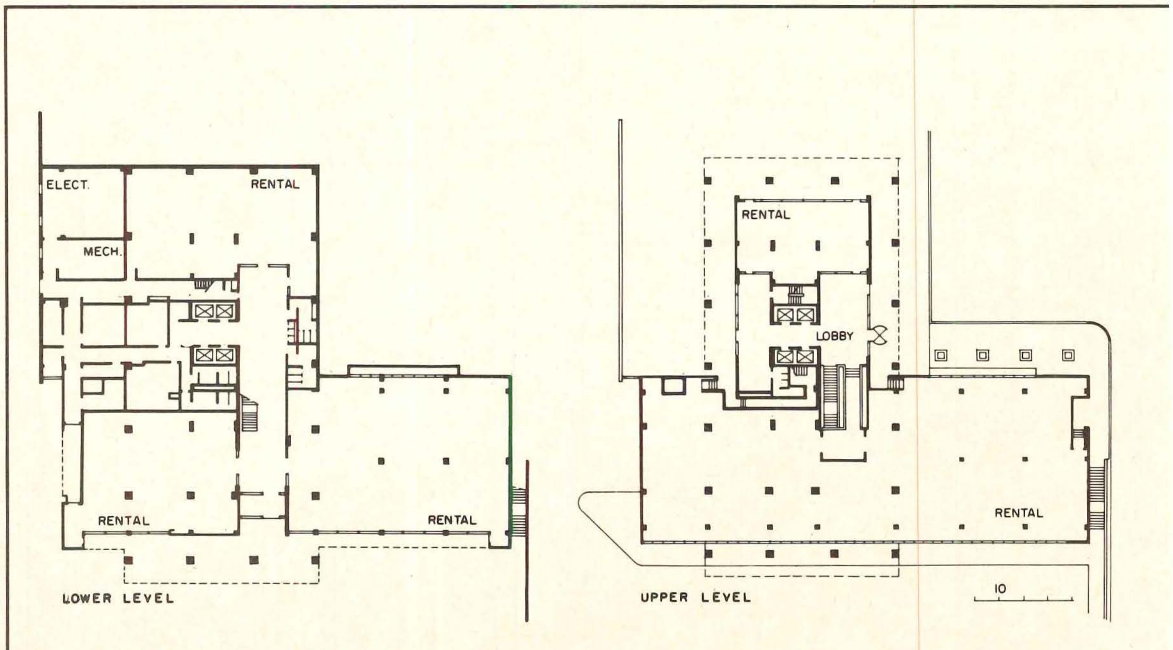
© *Ezra Stoller (ESTO) photos*

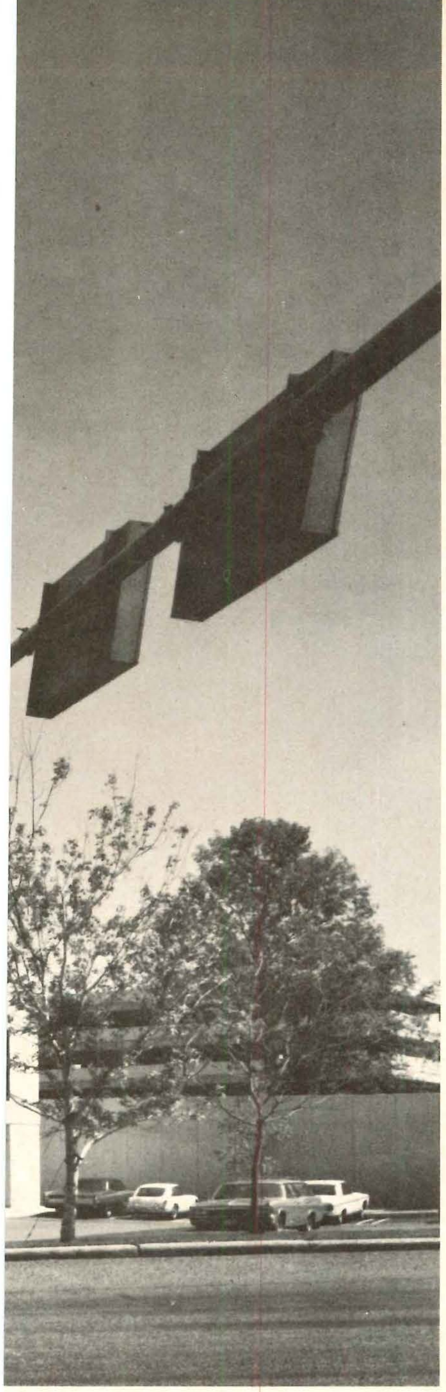
Walter Gropius, TAC's principal-in-charge of this 12-story commercial office building and garage complex in the business section of Cleveland's Shaker Heights, believed that on this particular site a vertical focal point was essential. He successfully challenged the local zoning ordinance, which restricted building heights to 40 feet, and received a waiver from the planning commission to build a tower rather than a low-rise structure. TAC also designed a low-rise complex, just in case, and both schemes were ready at the same time for presentation to the client, the mayor and the town council. The high-rise scheme was accepted at once, so that the low-rise scheme was never presented at all. Said Gropius: "A major traffic junction of seven streets, a conglomeration of surface parking areas and a maze of overhead wiring, poles and trolley car lines created visual confusion for the pedestrian. The site had no landmark to give direction to the observing eye. A bold proposal was needed and was fortunately accepted, because of the good mutual understanding shared by the owner, the architect and the authorities. The finished building establishes new relationships for the further development of the total neighborhood."

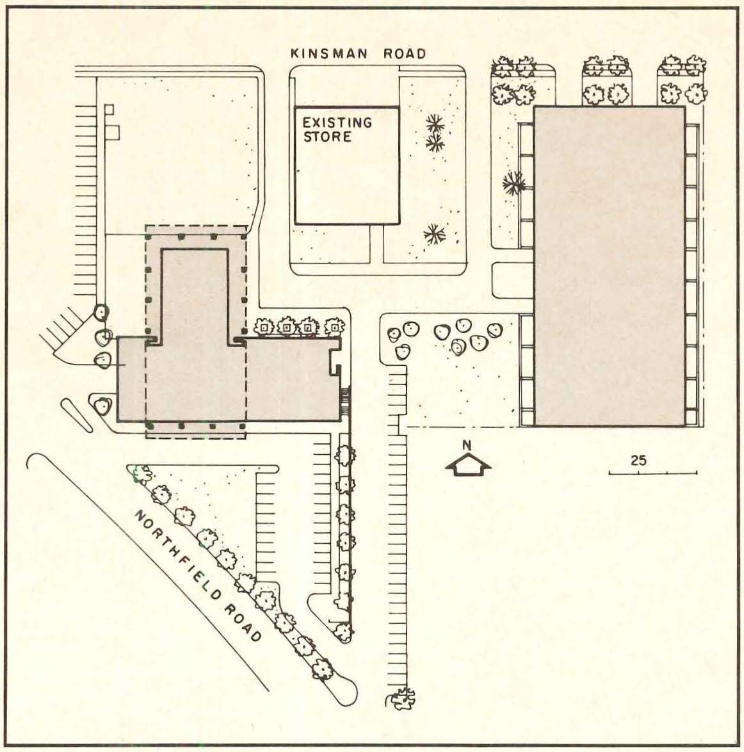
TOWER EAST, Shaker Heights, Ohio. Owner: *Tower East—Frank H. Porter, general partner.* Architects: *The Architects Collaborative Inc.—principal-in-charge: Walter Gropius; associate-in-charge: John F. Haynes; project architect: Michael Prodanou; designer for Avco-Delta interiors: Jack Chun;* structural engineer: *Paul Weidlinger;* mechanical and electrical engineers: *Byers, Urban, Klug & Pittenger;* lighting consultants: *William M. C. Lam & Associates.*



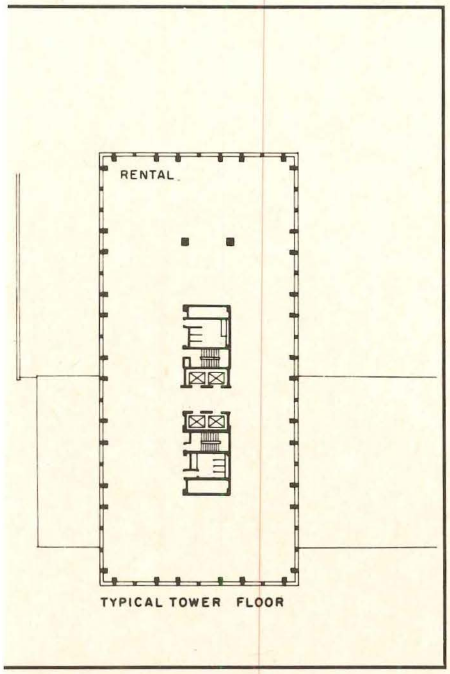
The 10-story rectangular tower is divided into three bays on the narrow side and six bays on the wide. Tucked beneath the front half is a two-story element with the main entrance lobby, shops and a restaurant on the second floor. Shown above is the building as it appears from the off-street parking area, approaching the lower level entrance.



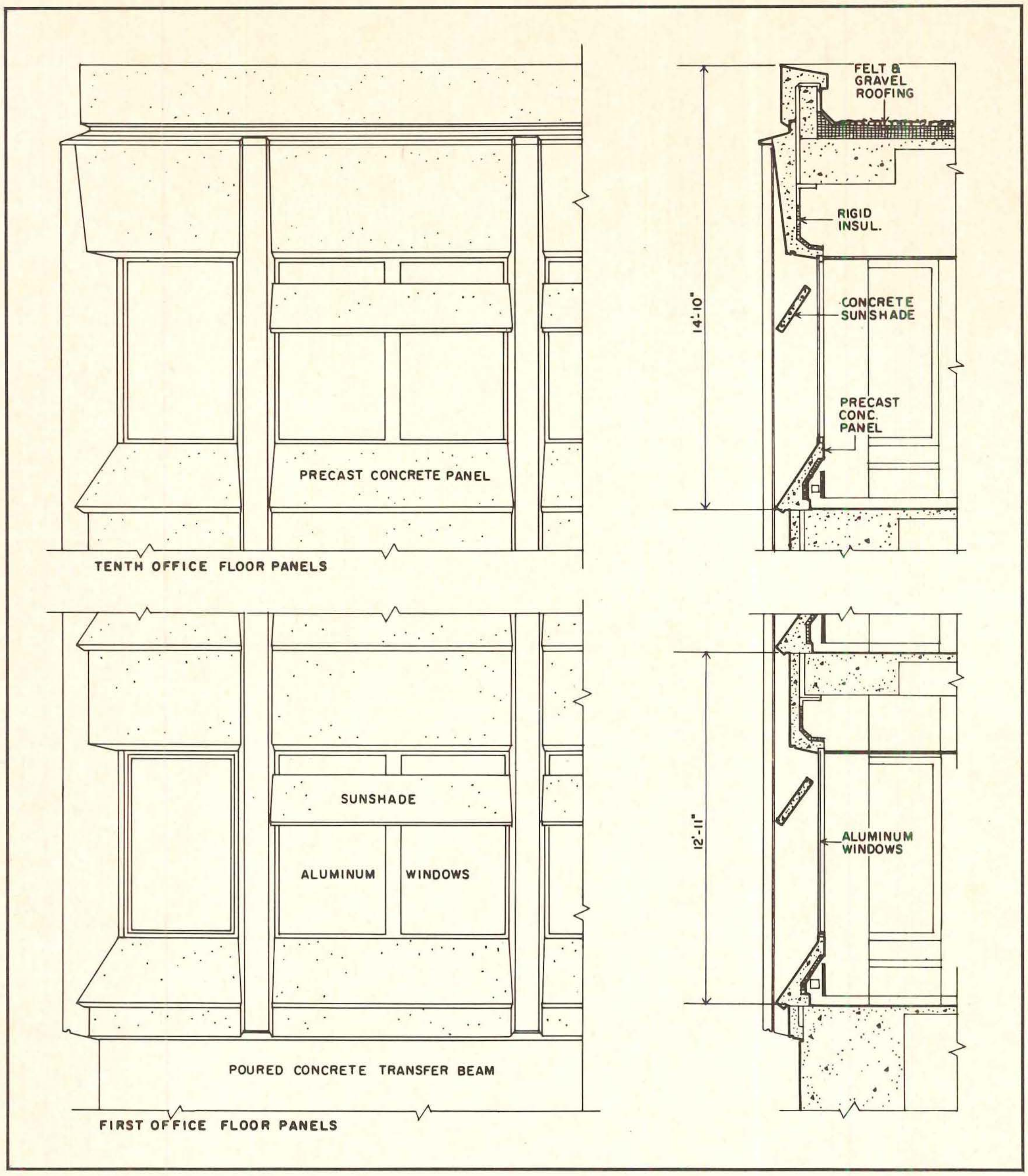


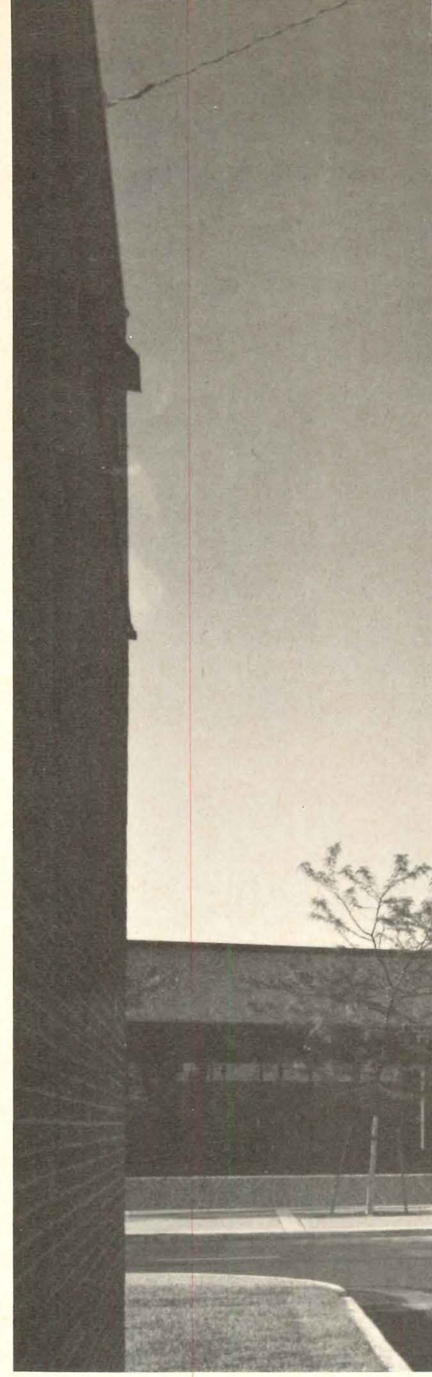


The site plan at left shows the first stage of construction, which does not include a four-story second stage building with ground floor shops and services to replace an existing store. It will span the entrance driveway and form a visual as well as circulation link between the tower and the six-story, 600-car garage. The latter will eventually have two floors added to increase its capacity to 800 cars. The major intersection for which Tower East becomes the focal point occurs at the juncture of Kinsman and Northfield roads to the west, but not shown on the plan. A service station at this triangular point has upgraded its appearance in response to the standards set by Tower East.

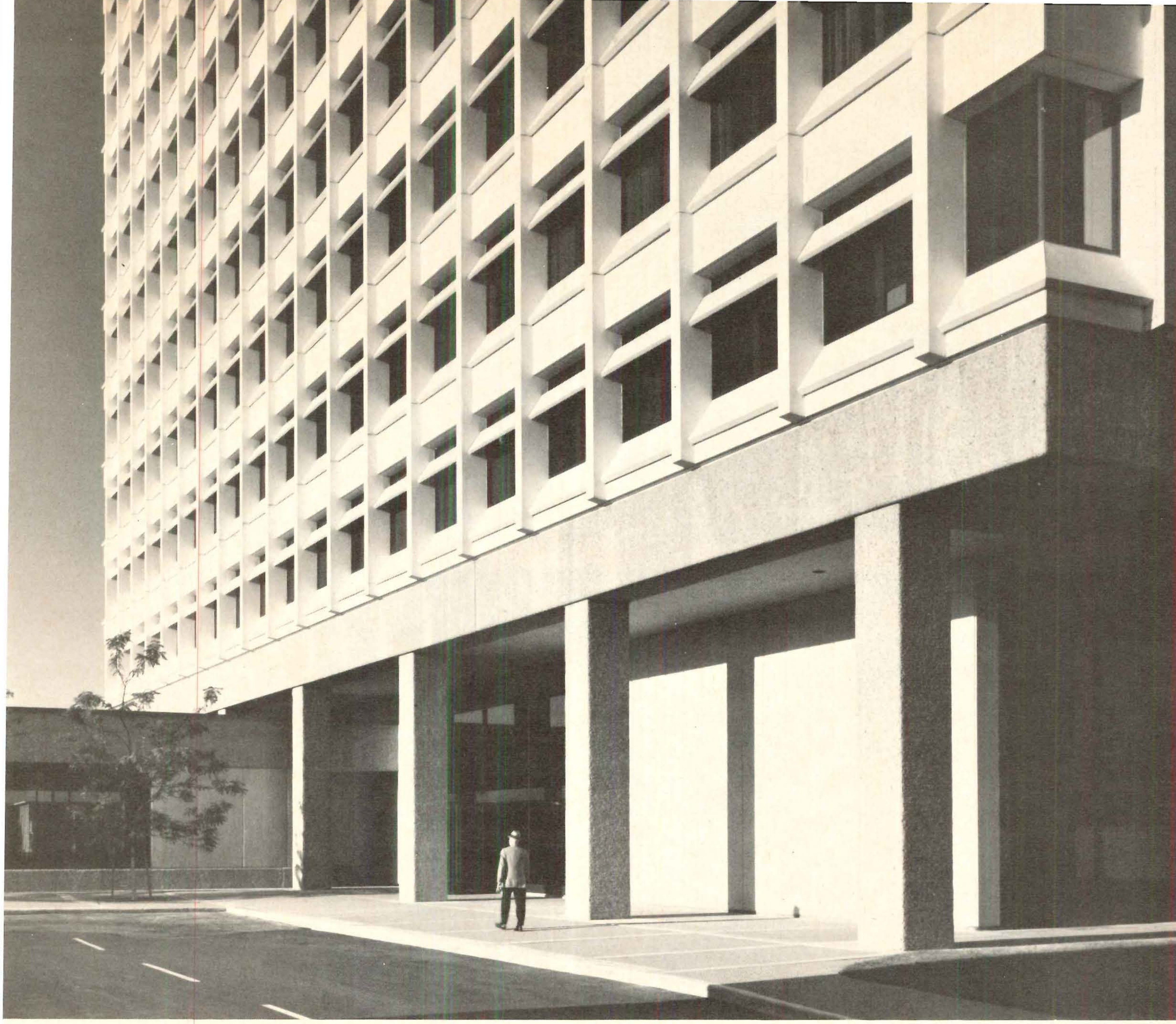


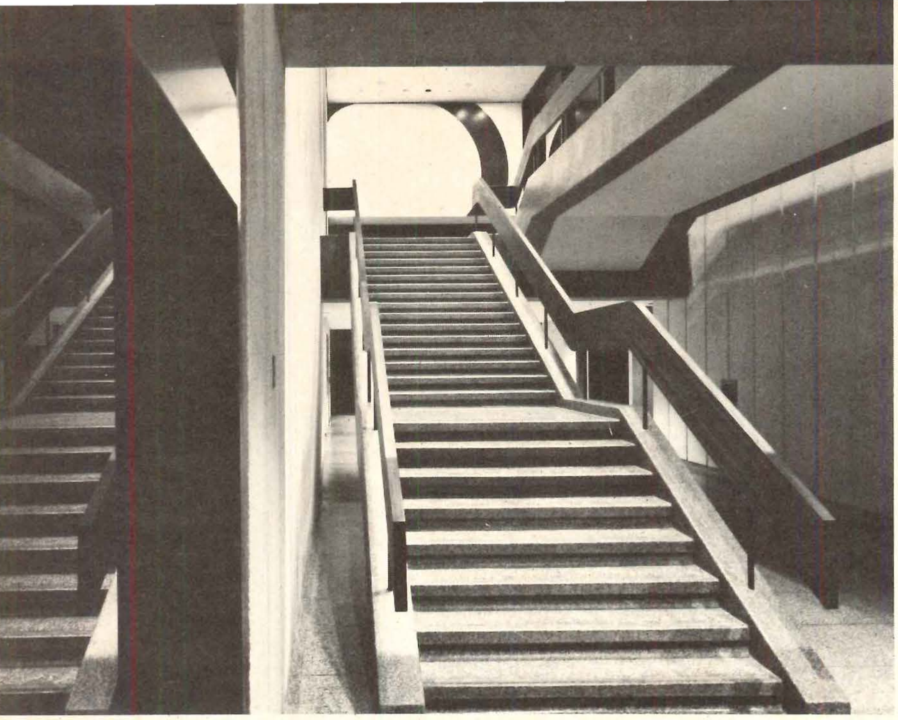
TYPICAL TOWER FLOOR

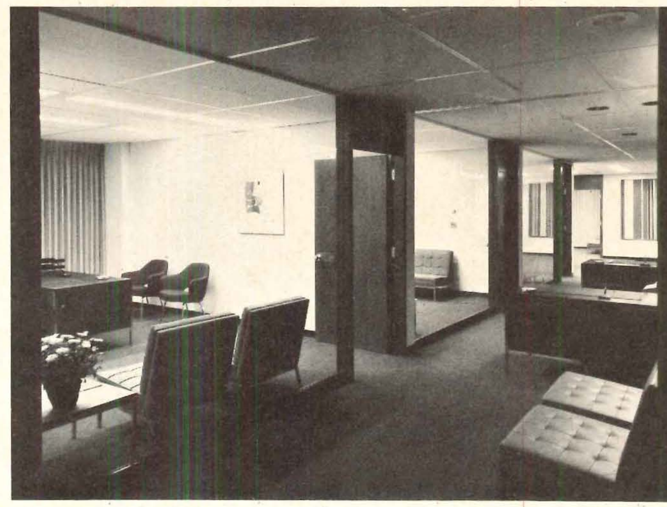


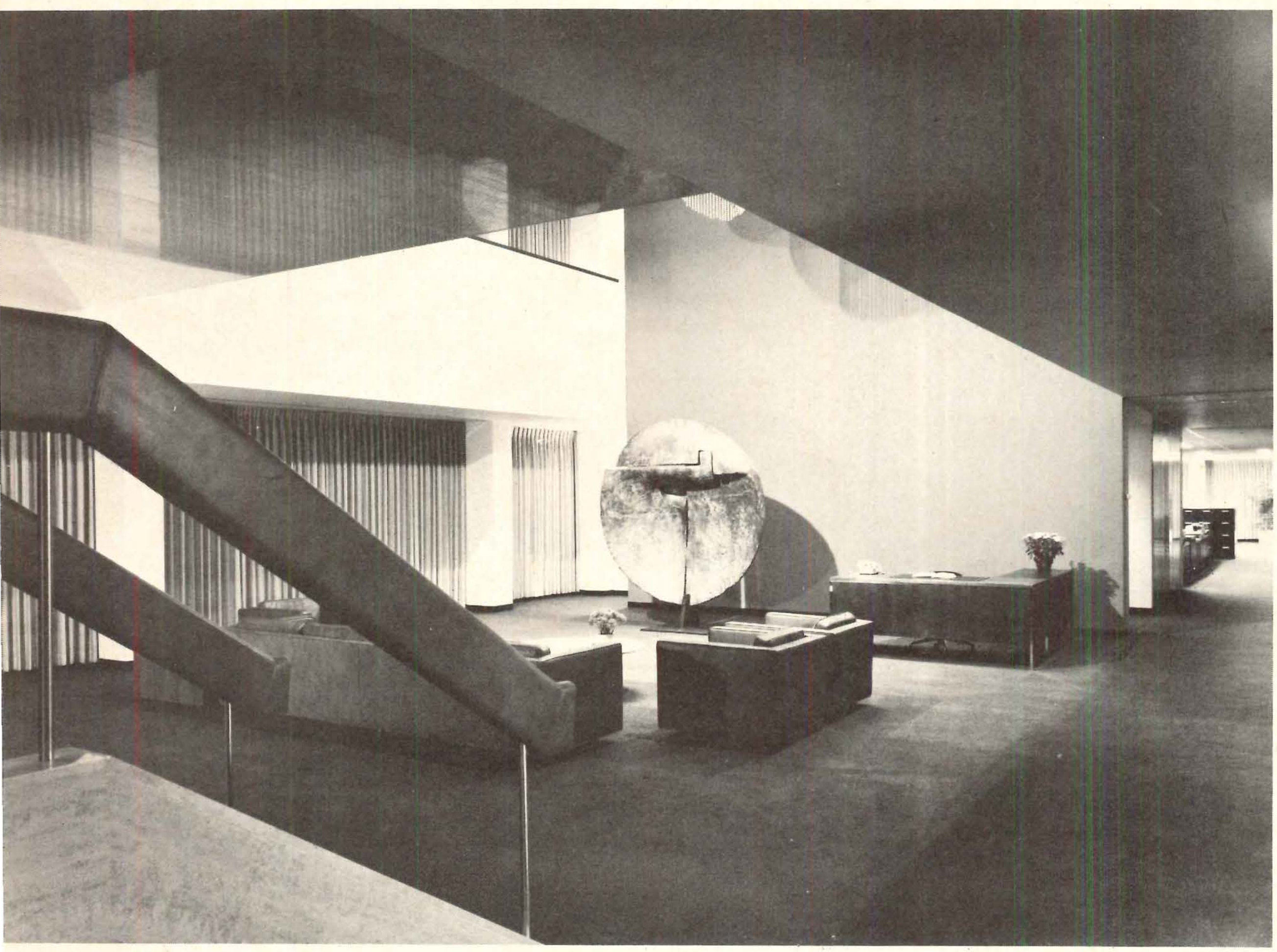


The main entrance facade at the upper lobby level is shown in the photographs at left and above. The low element contains a restaurant and shops. The structure of the building is a reinforced concrete skeleton with a one-way joist system using 30-inch wide metal pan forms. Only two interior columns stand in the rentable area of each floor, otherwise the floors are supported from the building core to perimeter columns. Exposed poured-in-place concrete is sandblasted with rustication strips to separate the pours. Tower facades are of precast panels made in fiberglass forms to obtain a glossy, smooth finish. White cement and white silica were used to obtain a pure white color. The glare-reducing slanted shades, shown from the inside in the photographs (right), are an integrated part of the precast panel. Windows are of dark gray heat absorbing glass. No shades or blinds are needed.



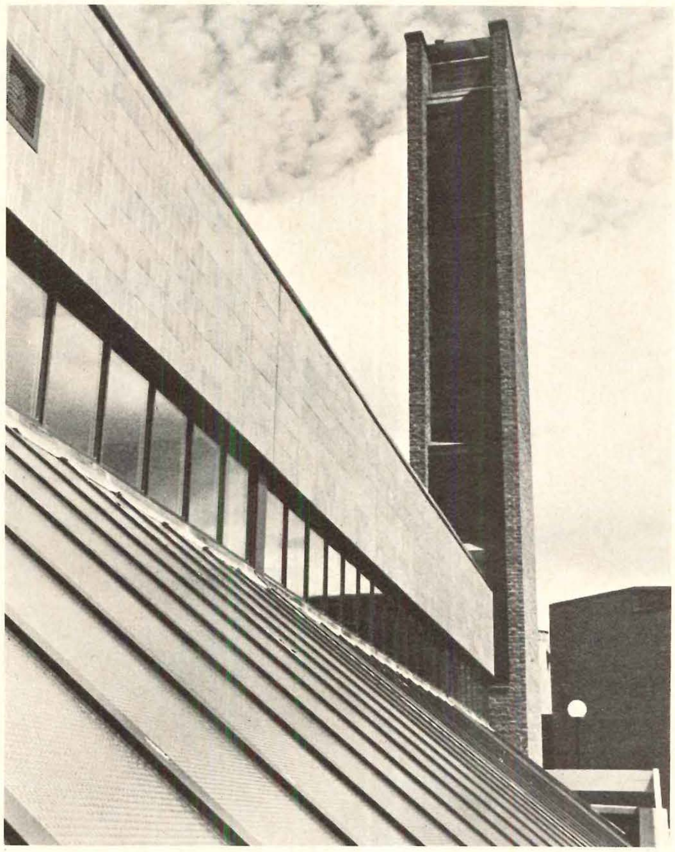


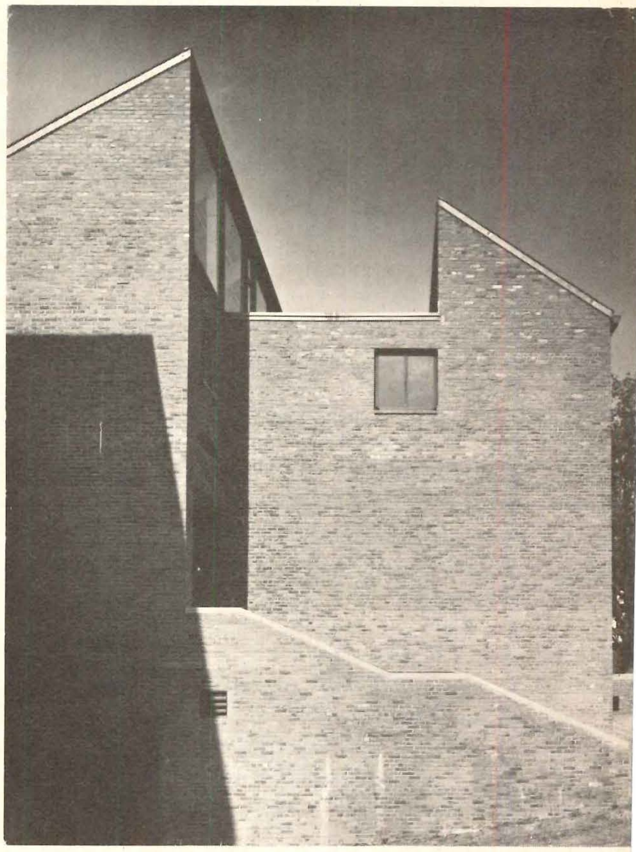




In addition to public circulation spaces (top left) and the management offices for Tower East, Gropius did the interiors for Avco Delta, one of the building's major tenants and the occupant of the top five floors. TAC built three-dimensional models of all executive and administrative areas (top right) and studied every detail of lighting, color and furniture, including wastebaskets, pencil holders and clocks. The focal point of this tenant's space is their two-story reception area, shown above.

Phokion Karas





Left: Thomas A. Stewart and Auburn Vocational Schools, Peterborough, Ontario by Craig, Zeidler & Strong. Right: Arts/Music building for St. Mark's School, Southborough, Massachusetts by Peirce & Pierce.

SCHOOLS PLANNED FOR CONTINUITY AND CHANGE

Architecturally, schools have been increasingly beset by the profound new changes in educational theory and practice—and some remarkable innovations have been devised to house these changes and provide for the flexibility needed. But, all too often, such designs have crystalized into a certain sameness, with a disquietingly temporary air of a strip shopping center for education. A lot of reactions to this are already in evidence, and great efforts are being made to improve the general teaching environment as well facilitate its functional requirements. But what is also drastically needed is a bolder, more vigorous approach to design which would give us schools with more of a sense of permanence and durability, schools that would be strong symbols of the value and importance of education. The two schools shown here—one big, one small—approach some of these qualities.

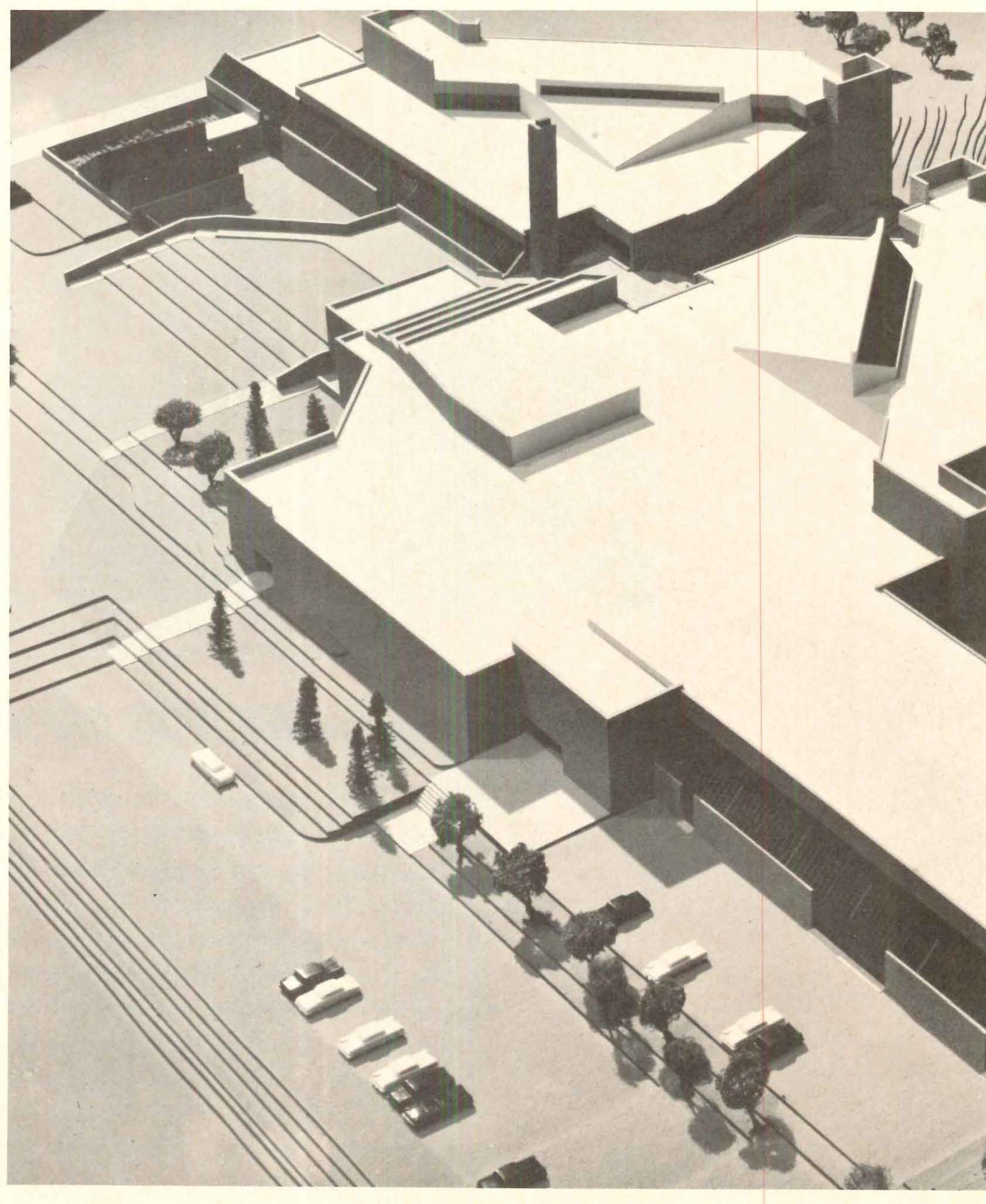
Two separate schools form a unified teaching complex

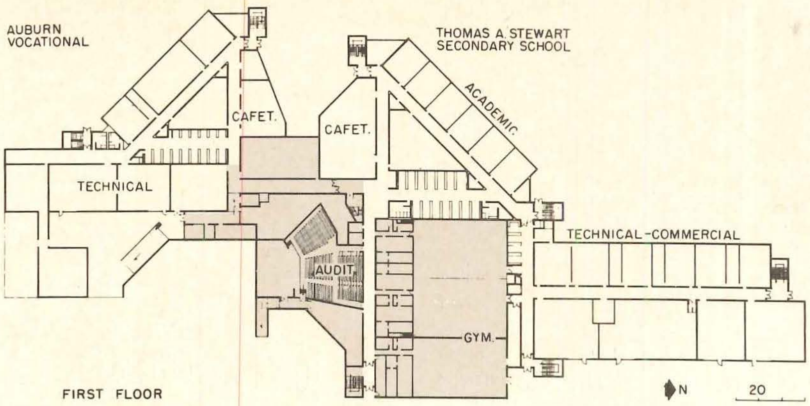
In a period when the big school versus little school argument has been strong, Peterborough, Ontario, has come up with a direct and sensible solution. Two new secondary schools—separate in the educational programing and supervision they desired—were needed in the area. But at the same time, it was conceded that certain joint facilities would save money, and simultaneously allow better development of those facilities: joint mechanical and caretaking functions offered better service for less, as did the central cafeteria-kitchen. Three gymnasia, which also serve both schools, offered no direct saving, but offered far better facilities for each school. And due to the combination, it was possible to add a much-needed auditorium to the project.

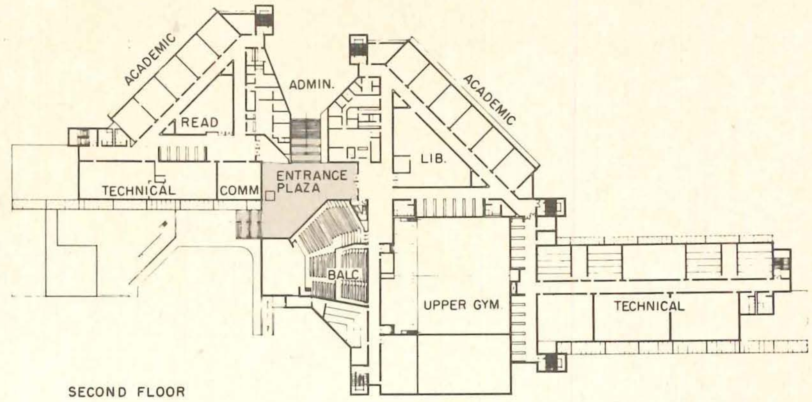
A sloping site, overlooking the Otonabee River, was used to great advantage to make the scheme work. From the entrance road at the high level of the land, the two schools are visually and administratively distinct; each has its own entrance off a central plaza. On the lower level, the schools meet and become one building, which also has outside access at the lower grade. All automobile and service traffic is kept to the upper level, and major instructional spaces are oriented to the river view on the opposite side. Each of the schools is centered around a triangular-shaped library expressed on the roof as the "symbol of education."

The over-all design of the schools is forceful, effective, and has a great sense of permanence and durability. Window areas have been minimized in classrooms to an eye-height view strip.

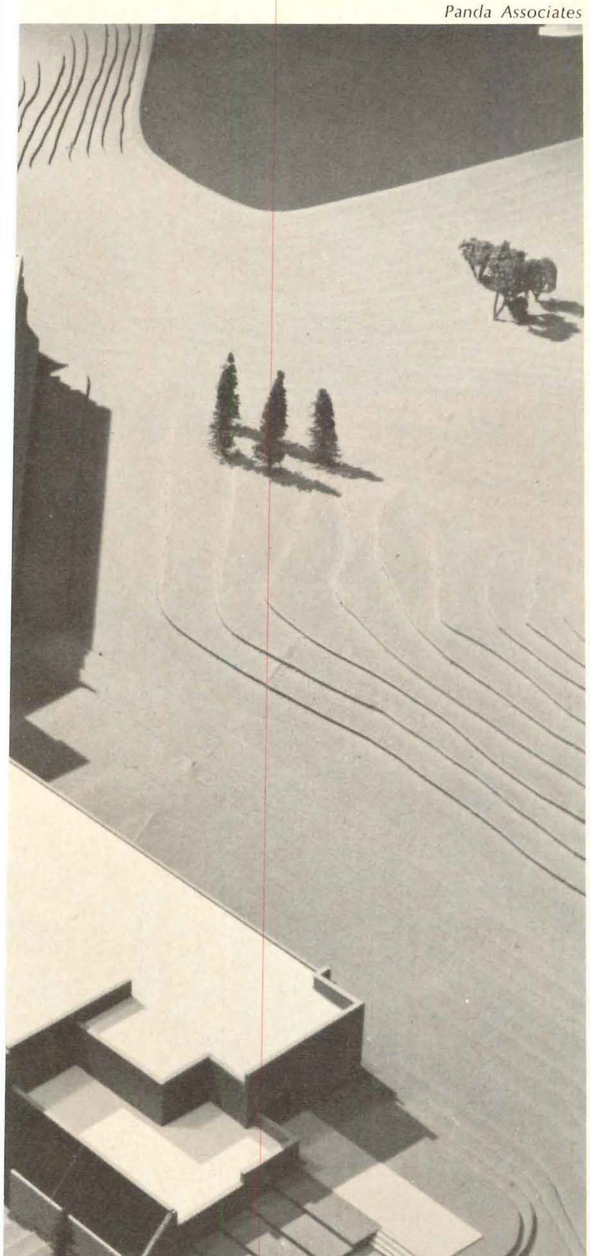
THOMAS A. STEWART AND AUBURN VOCATIONAL SCHOOLS, Peterborough, Ontario. Architects: *Craig, Zeidler & Strong;* engineers: *Flanagan & Black (mechanical); G. Dowdell & Associates (structural);* contractor: *M. Sullivan & Sons.*



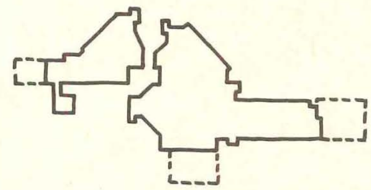


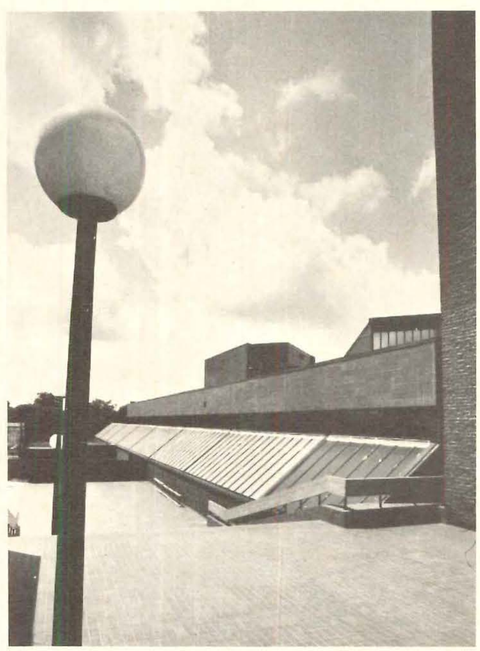


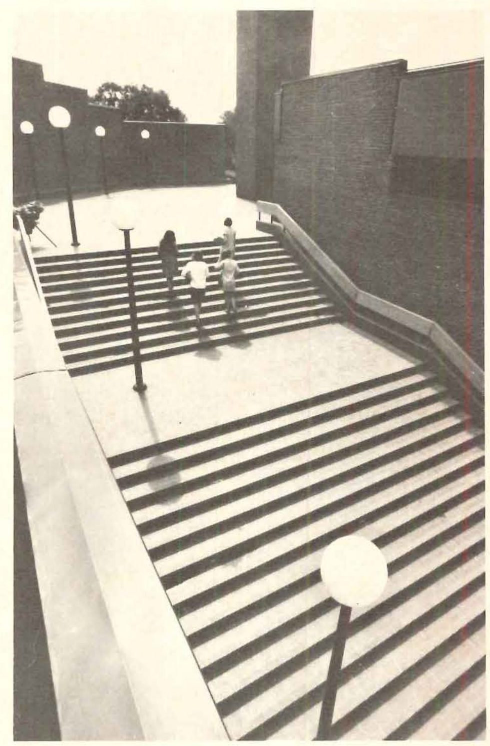
At the lower level, the two schools are joined, and share certain common facilities: gymnasia, auditorium, services and kitchens. An entry plaza on the second level distinctly separates the schools on this main floor. There is a third level of classrooms in each. Expansion is planned as shown on the inset diagram.

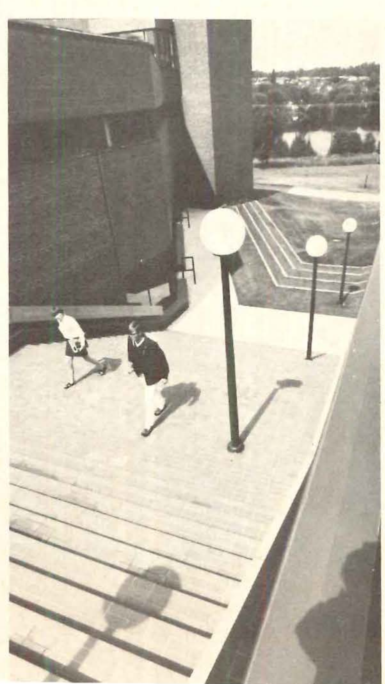


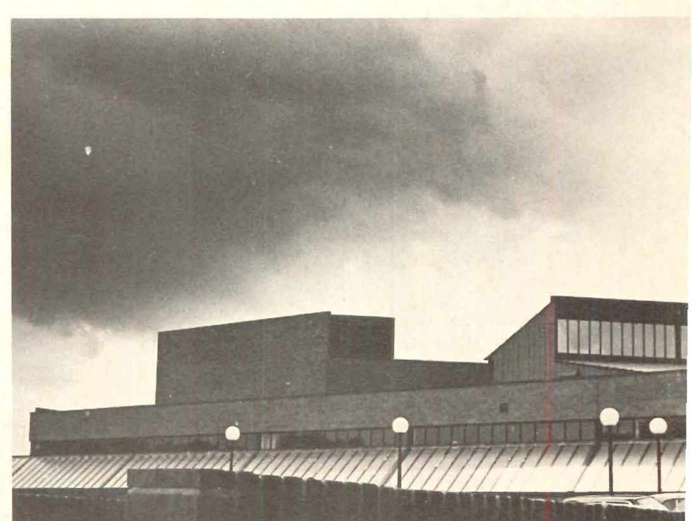
Panda Associates

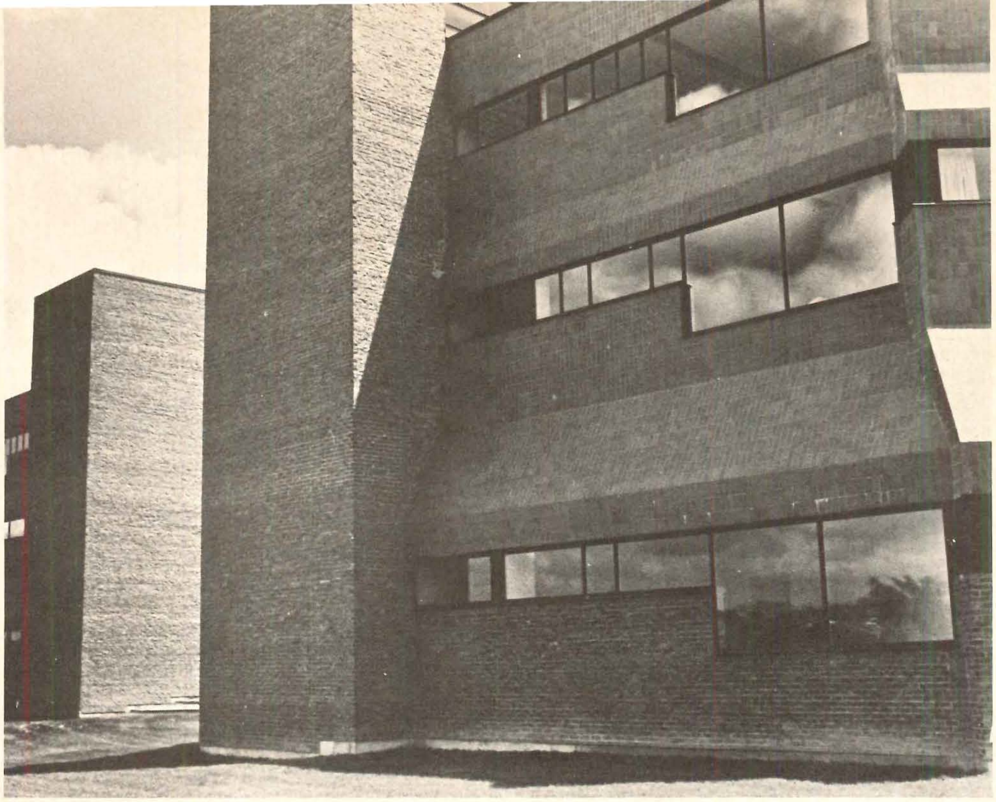








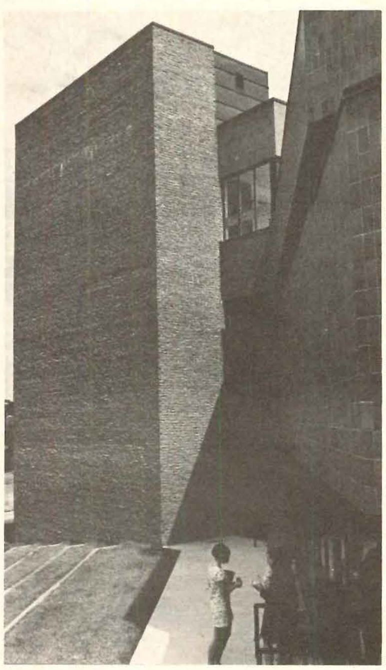


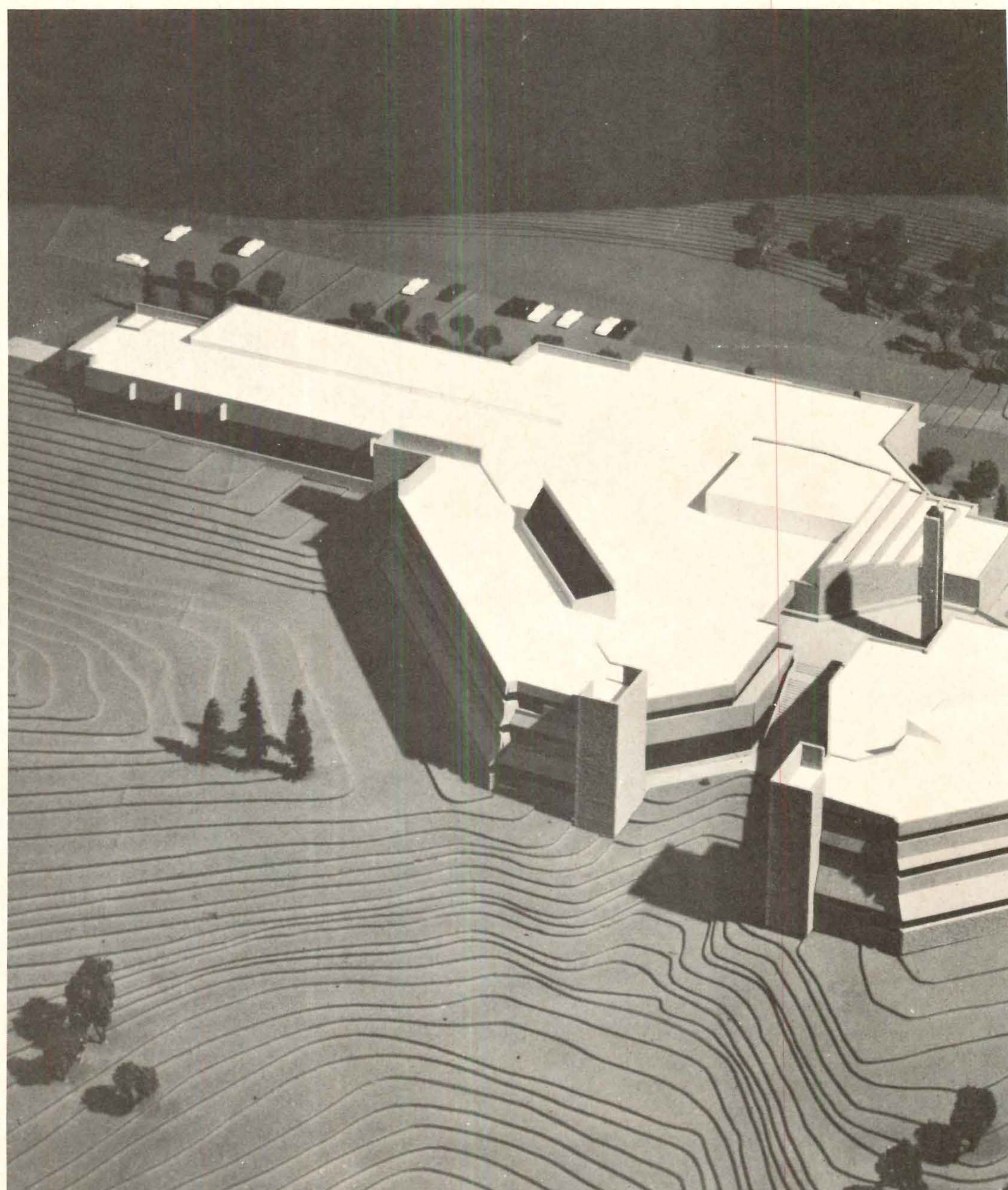


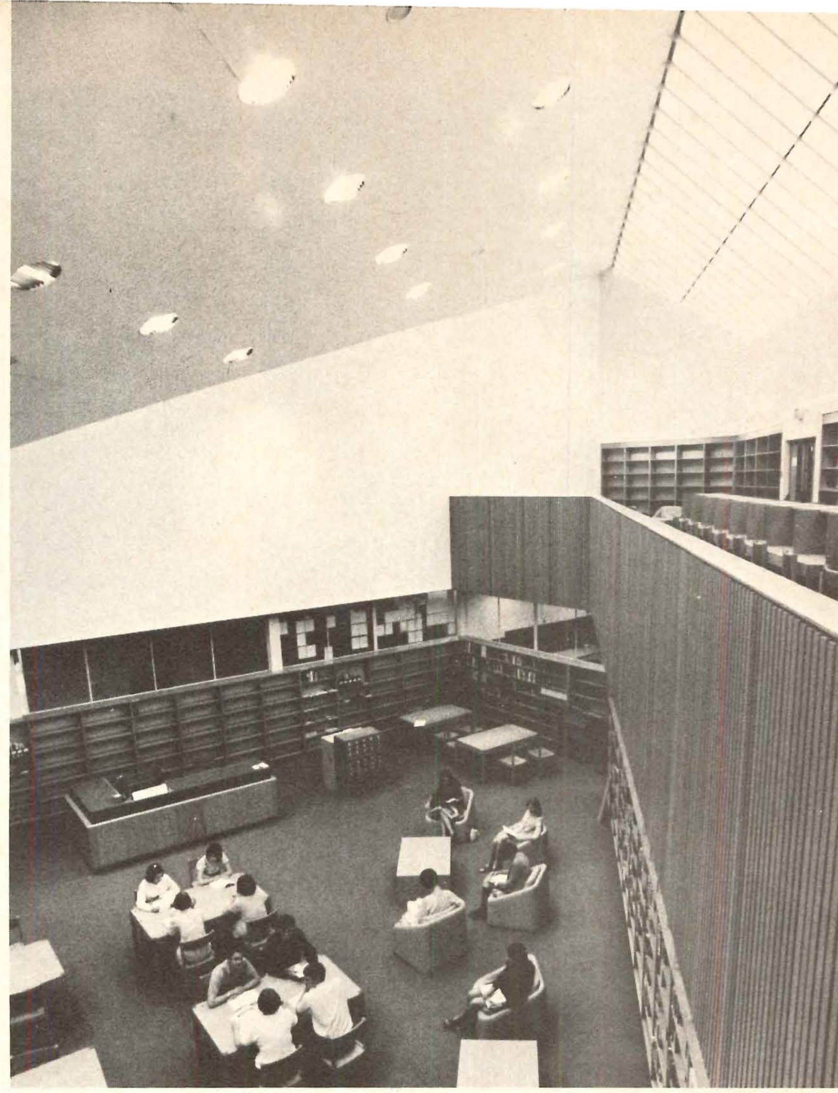
A variety of teaching spaces are provided in each school, with a large-scale lecture area for 150 persons, classroom lecture areas for about 30, seminar areas for about 10, and individual study carrels in each of the large libraries. The auditorium is divisible into three areas: two for 150 students, and one for about 350. Teachers' work rooms have been provided with spaces for individual work or team preparation. The entire complex is air conditioned by use of thermal re-heat systems in connection with an electrical heat pump.

The structural system of the school is a simple modular steel frame, clad with brick on all areas where the masonry materials reach the ground, and with quarry tile above window areas; both materials are of the same color, a light grayish-brown.

The schools have been planned with an eye for future change and expansion. All classroom partitioning is flexible, and can be changed into spaces for any number of students, within the limits of the basic module. The end result is a bold, vigorous architectural complex.







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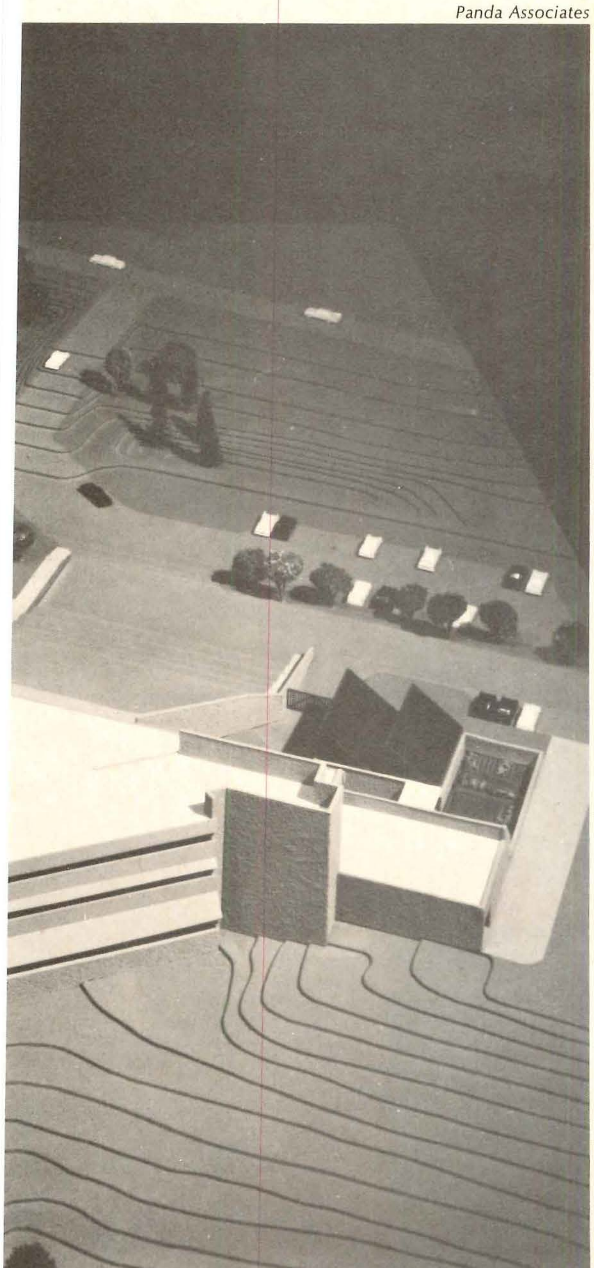
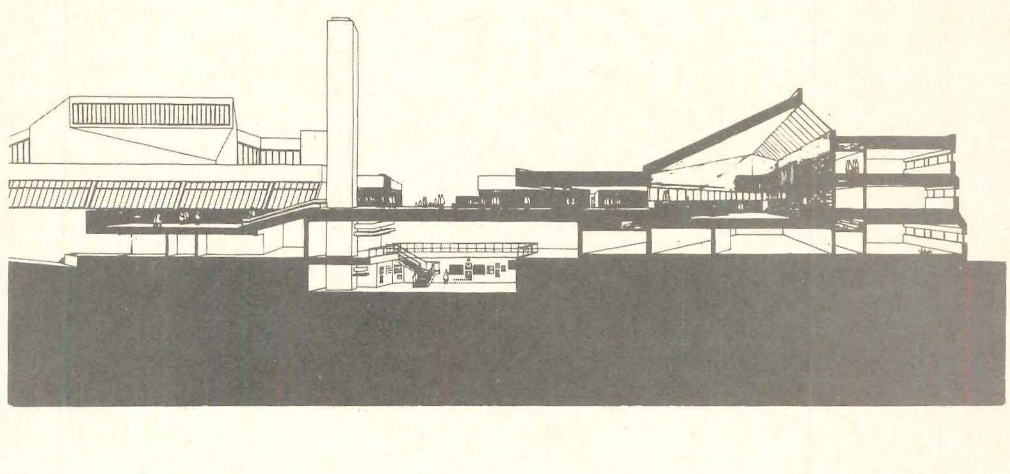
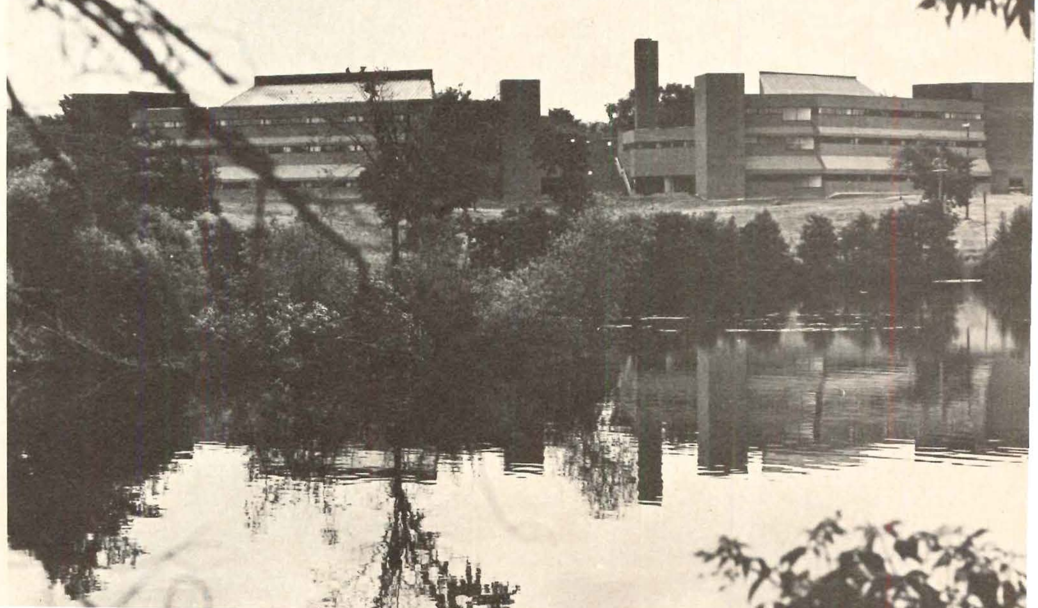
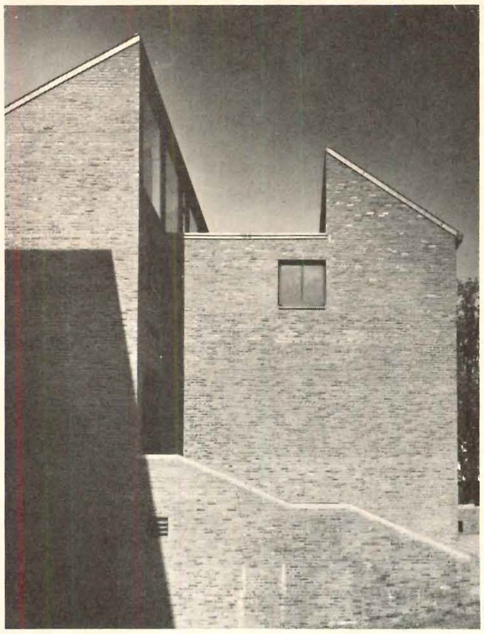








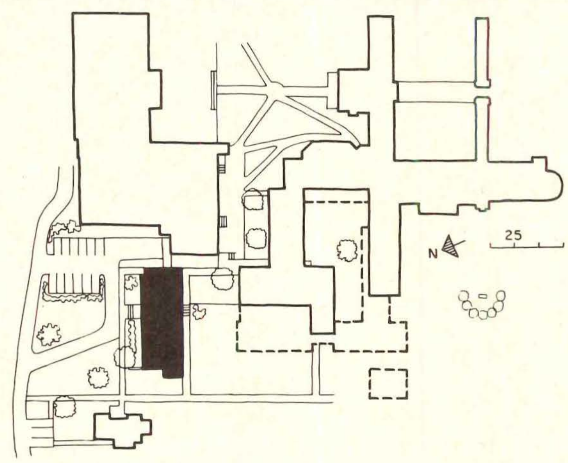
New art and music building enlivens established school

Contemporary architecture's growing maturity is becoming most obvious in examples, as here, where a fresh new building is added to an existing school—enlivening and enhancing the environment, and at the same time continuing the mood of the older structures.

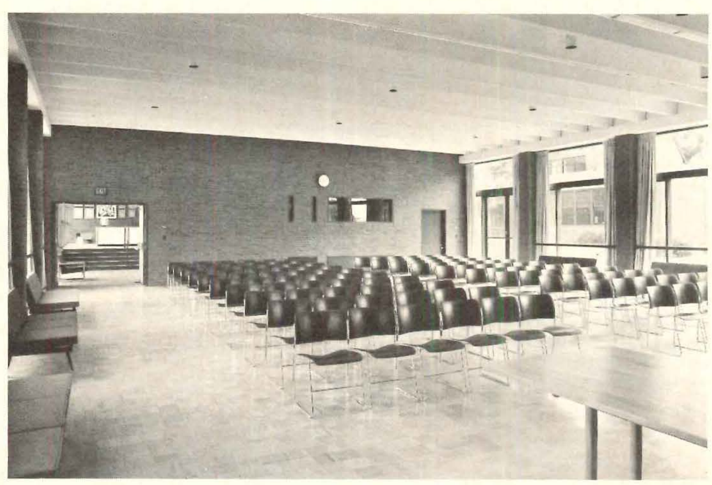
In 1965, St. Mark's School's centennial year, architects Peirce & Pierce were commissioned to prepare an expansion and development plan providing for the school's needs of the next 25 years, and which envisioned a modest increase in the 240-student enrollment. The original buildings, designed by Henry F. Bigelow in the 1890's, gathered all academic and residential functions in one many-winged structure, which the school finds highly satisfactory and wishes to preserve. As completed, the development plan calls for expansion of the library and science facilities by extending the west wings of the existing building, and a separate art and music building, shown here, which is located close to the stage house and the science wing, and placed to create pleasant courtyards.

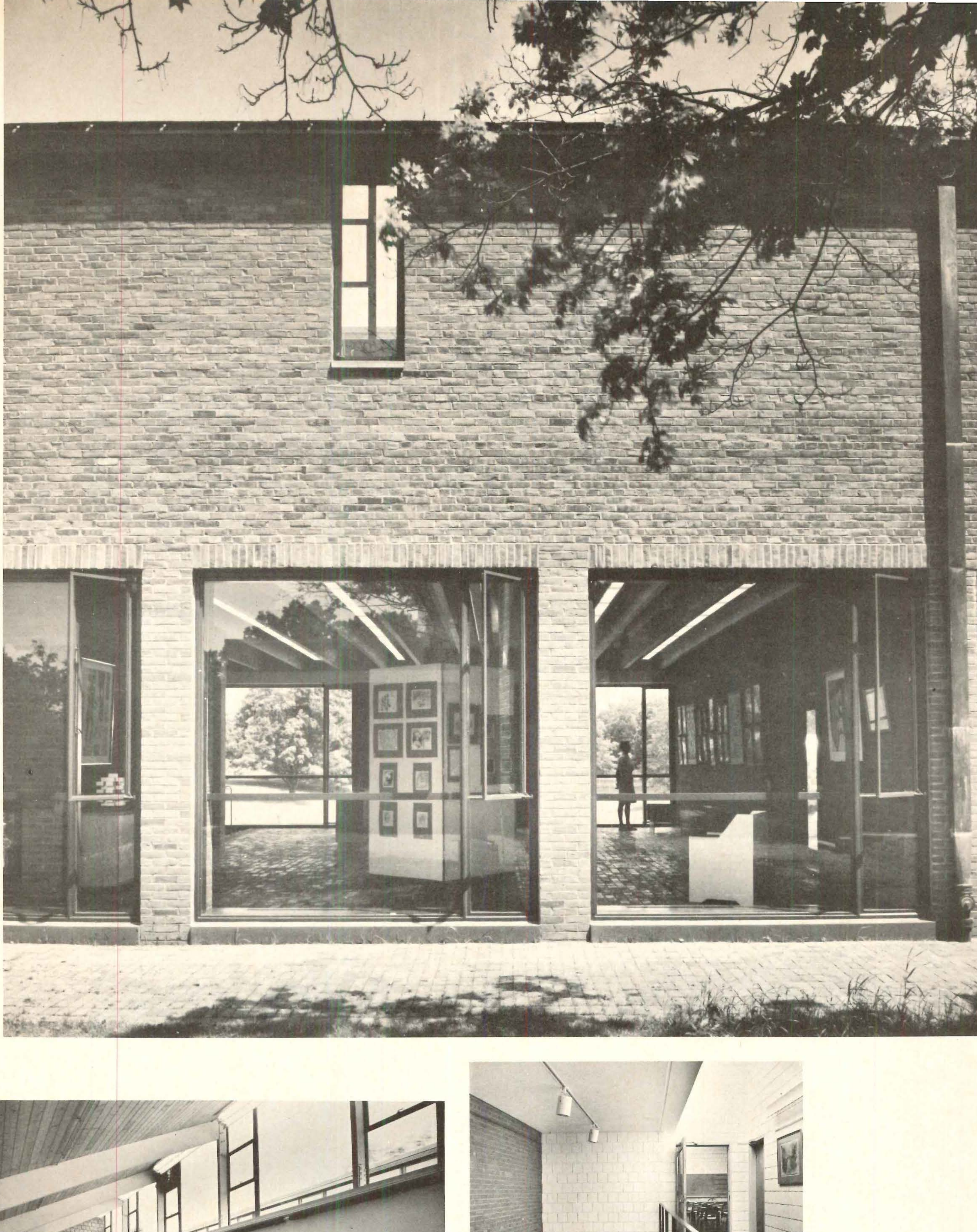
The architects comment that "the lusty Tudor of Bigelow's design combined brick, stucco and sandstone, topped with soaring slate roofs. Later additions had been anemic reflections of the Tudor original with Georgian overtones. The exterior of the new building endeavors to recapture in contemporary form and detail the richness and vitality of the Tudor original, and with a strong recall in the use of the building materials." The result fulfills their aims.

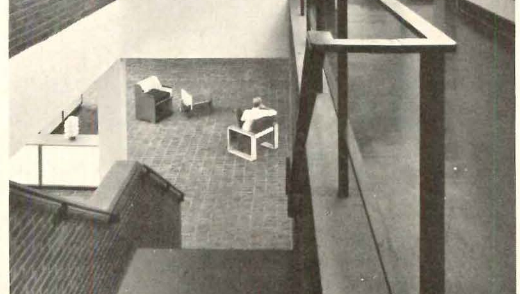
ARTS/MUSIC BUILDING, ST. MARK'S SCHOOL, Southborough, Massachusetts. Architects: *Peirce & Pierce—John W. Peirce, partner; Robert Kramer, associate-in-charge*; engineers: *Souza & True (structural); Ray B. Stevens (mechanical); John J. McEvoy (plumbing); Thompson Engineering (electrical)*; contractor: *Richard Sewall.*



The first unit of the master expansion plan (left) to be built, the art and music building deftly combines lightness and openness with a great sense of permanance and continuity. The bold design of the roofs was calculated to flood the upper floor with daylighting in studio areas.

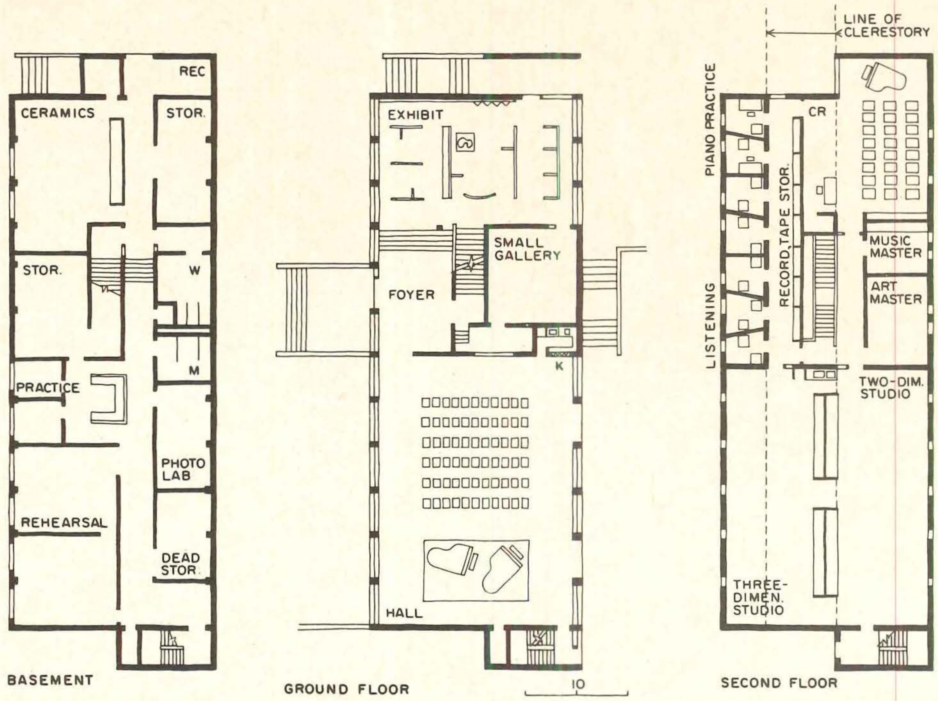




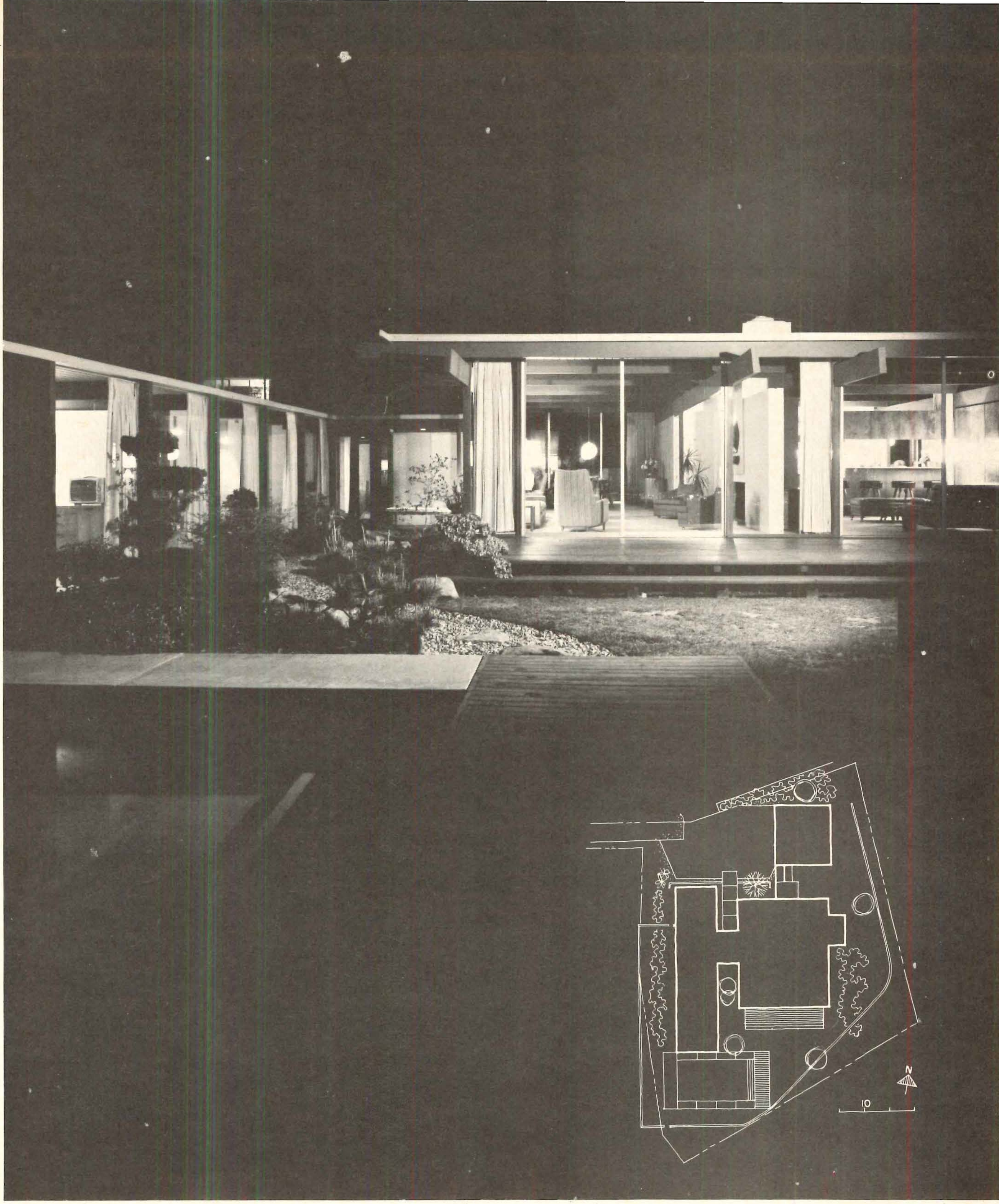


St. Mark's School's new art and music building uses precast girders and T-beams under a plank roof supported on laminated wood beams. The waterstruck brick exterior is laid in English bond and colored mortar, as are the original buildings of the school. Redstone trim recalls the limestone of the older units and the blues and greens of the new slate are similar to the original roofs.

As can be noted from the plans, the basement floor is mainly used for workshops, practice rooms and exhibition storage. The main floor provides a connected series of open spaces used by the entire school and available to the neighboring community for a variety of gatherings, exhibits and musical performances. The top floor contains the principal instruction areas for the art and music departments. At one end is the major art studio, with north and south facing monitors to provide diffuse or direct light as desired for painting or sculpture. A library for tapes lines the corridor.



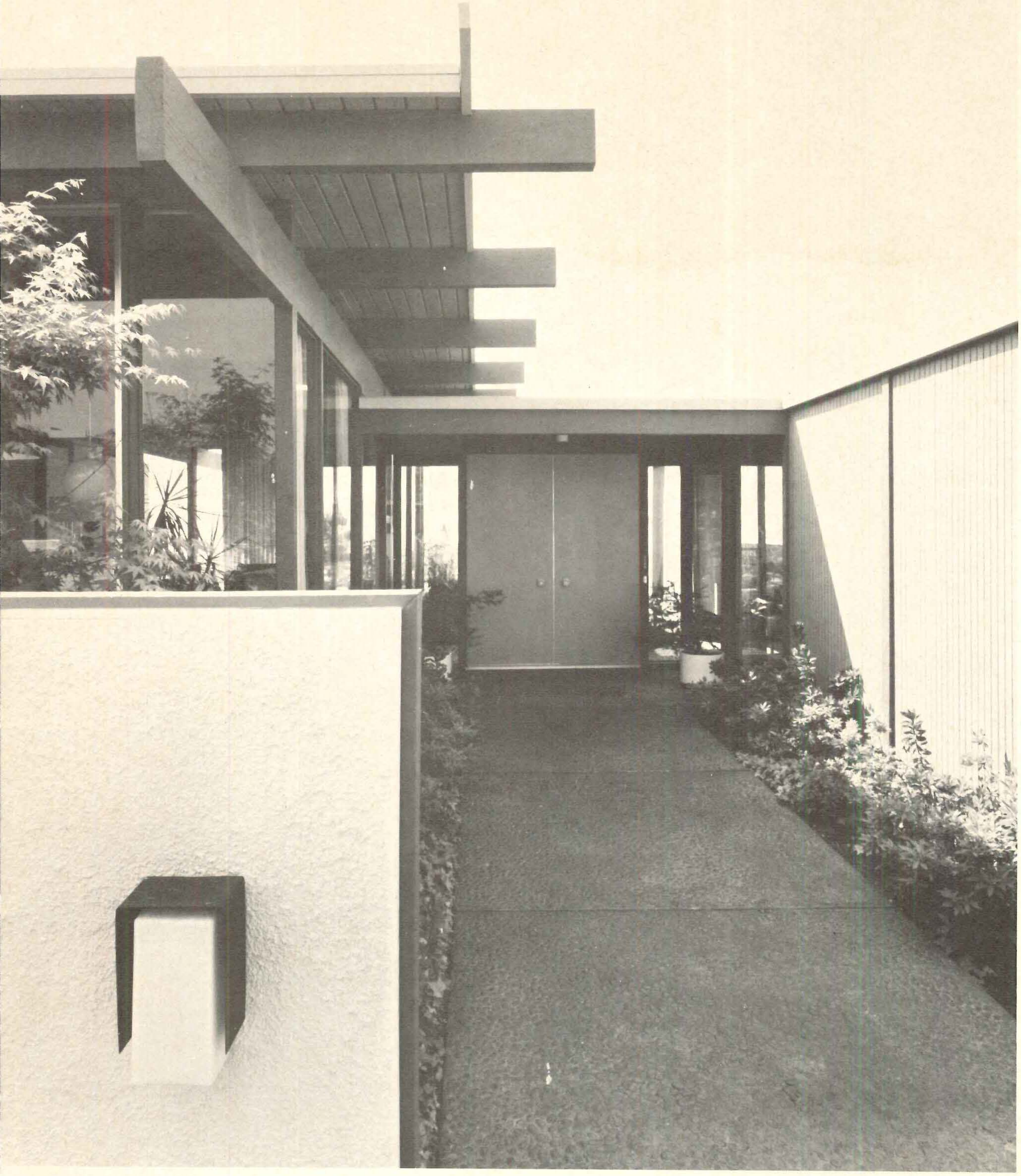
Richard Gross photos

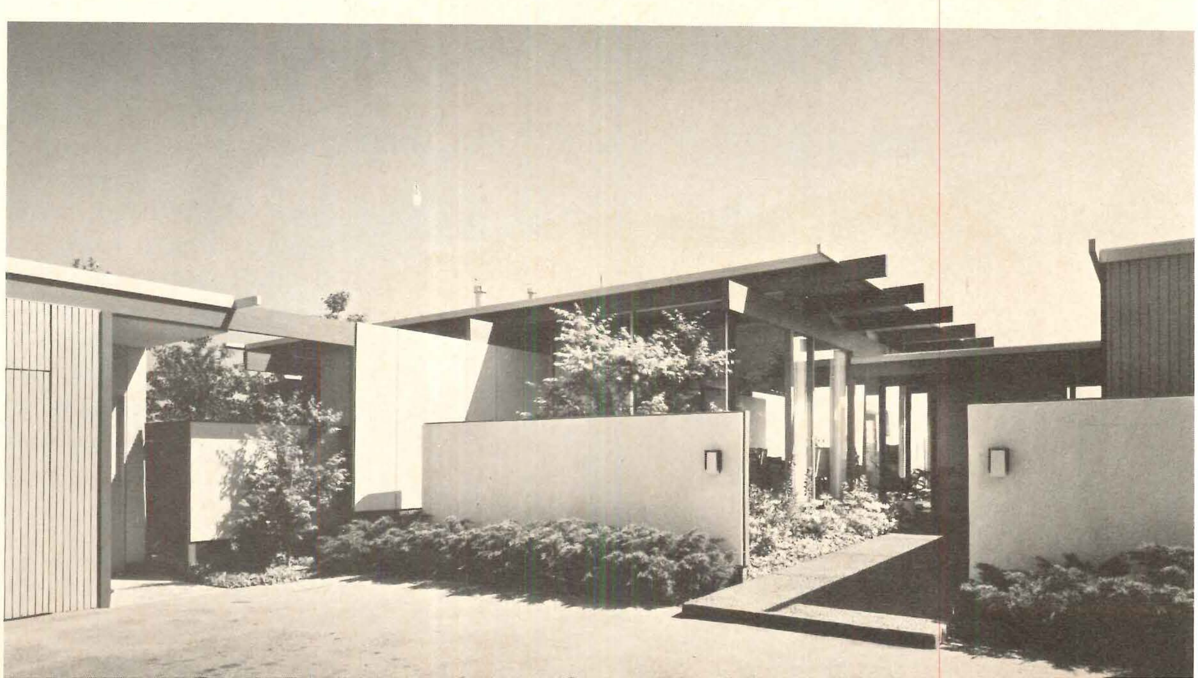


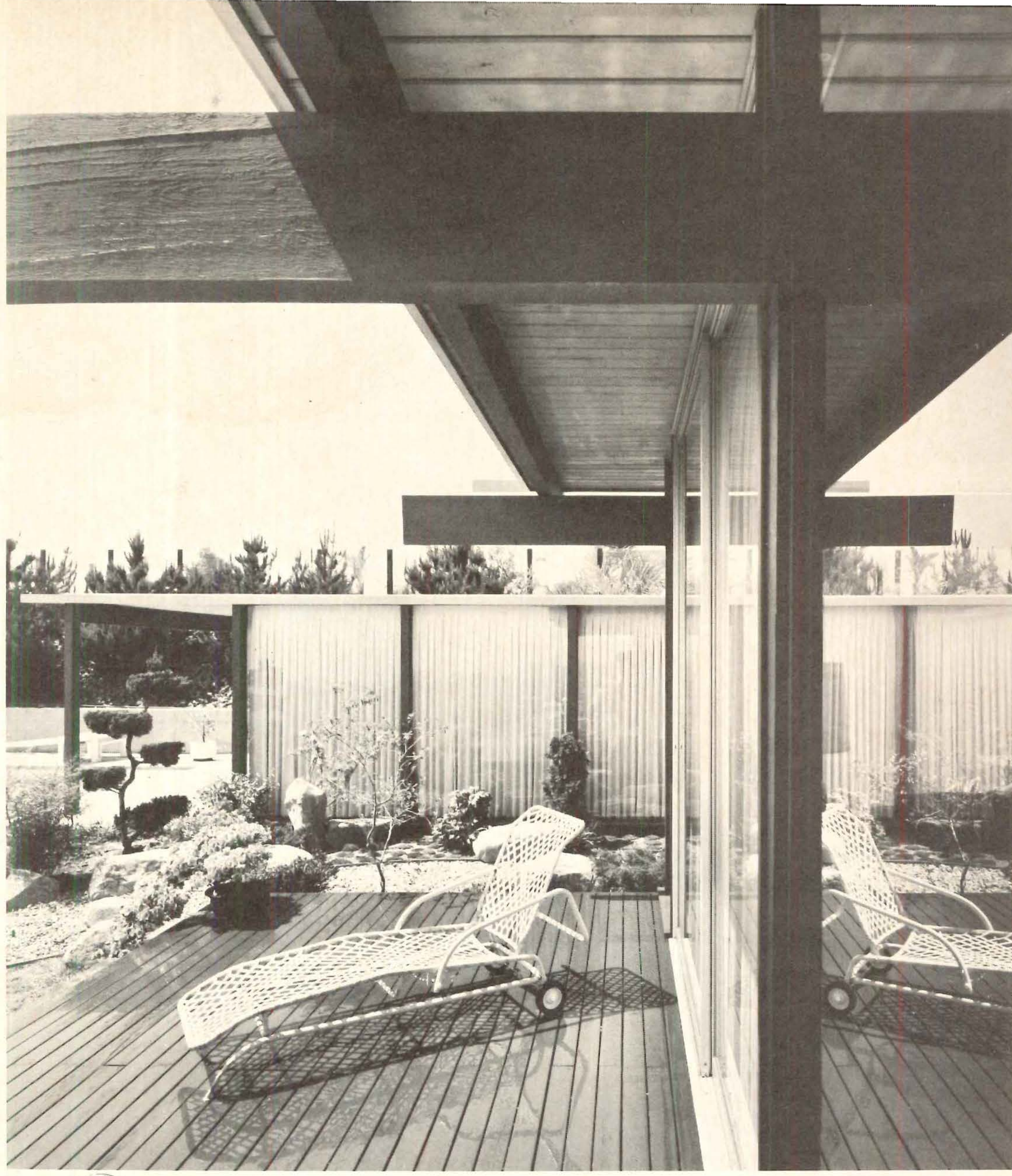
A CALIFORNIA HOUSE IN TRIMLY HANDSOME POST-AND-BEAM STYLE

A post-and-beam structure in the California-modern tradition is used skillfully in this spacious house for a small suburban lot in the Santa Monica mountains. The major living areas are oriented with decks and pool to overlook a fine view (photo above). Here, as throughout, architecture, landscape and site combine to offer informal living with a dramatic flair for an active four-member family. The great variety of indoor and outdoor relationships and outlooks has been both created and controlled by skillful structural technique, whose surprising simplicity can be noted above. But the major architectural challenge—all-too-common a problem, and here, uncommonly well met—was to complete the sizeable house within a $40,000 budget—and complete it without skimping on good materials and good craftsmanship essential to this kind of strong, exposed-structure design.

MULLIKIN HOUSE, West Los Angeles, California. Owners: *Mr. and Mrs. Harry Mullikin;* architects: *Dorman/Munselle;* engineer: *Joe Kinoshita;* landscape architects: *Dorman/Munselle;* contractor: *Donald Buhler.*



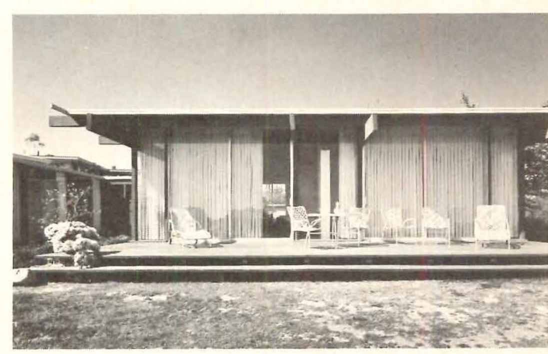


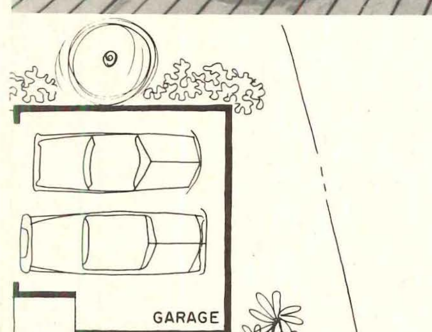


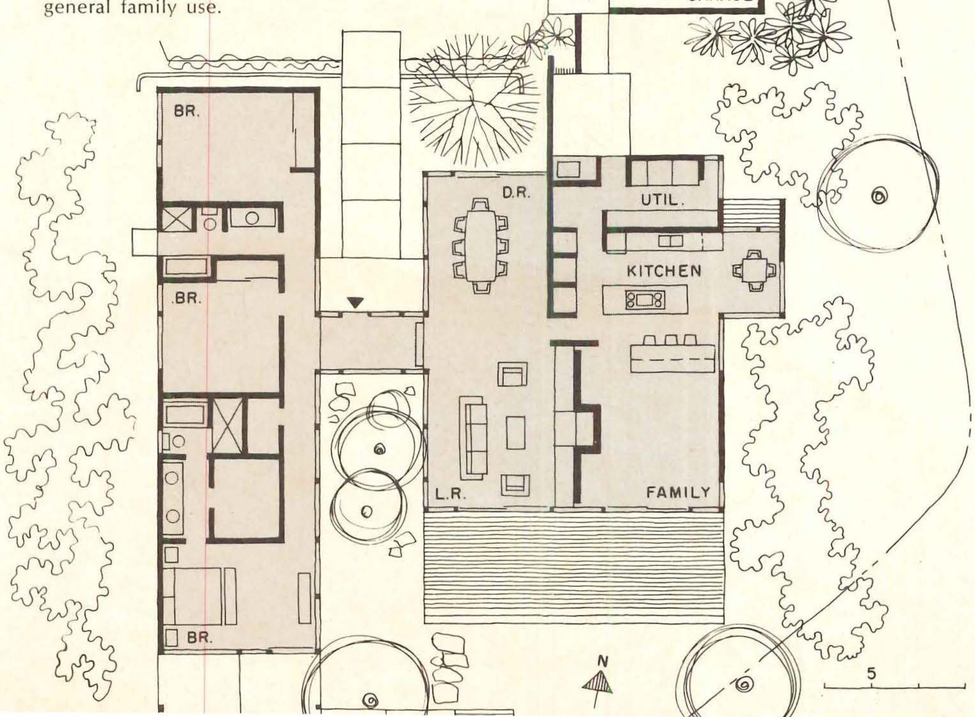
The house is well placed on a difficult "flag-shape" lot, and shares a motor court with another house close by. Thus the entrance side (photos to the left) is screened off and somewhat formal, with large glass areas reserved for southern exposure and outlook to the rear. Small gardens are created behind stucco baffle walls in the front.

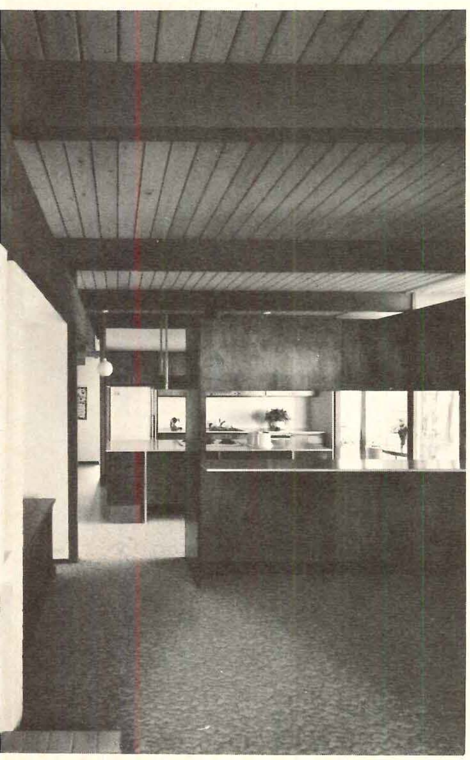
A basic "H"-shaped scheme zones bedrooms from activity areas, provides an entry easily accessible to both, and admits light and air throughout. This simple three-part plan suits the structure well, and is effectively framed by it. Exposed beams are handsomely finished, logically placed on a seven-foot module, and always expressive of spatial organization—often dramatically so. Note especially the walkway and entry. In living areas, open planning reinforces glass walls for an over-all flow of space. Freestanding elements—white-brick fireplace and walnut cabinets—interplay with the strongly exposed redwood structural members while effectively zoning functions.

The family includes two teenagers, and since all do frequent entertaining, both space and privacy had to be assured. In the living wing, teenagers can snack and watch television without disturbing (or being disturbed by) parents entertaining in the more formal living area, or the whole wing can work together with outdoor decks and pool for large-scale parties and general family use.



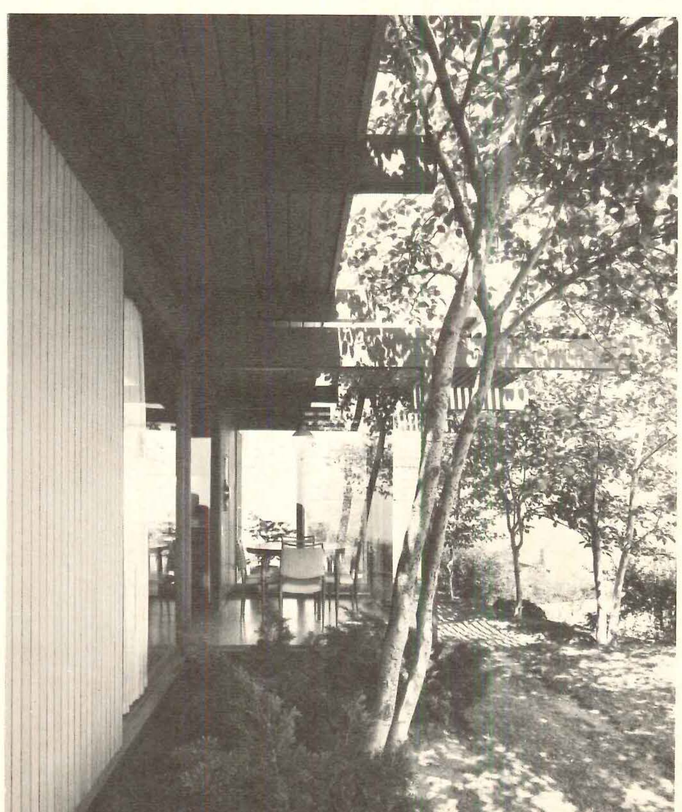






The outdoors pervades this house, but there is also a great sense of shelter. Living and kitchen areas borrow space from each other and from the outside, and are easily accessible but clearly separated in an open plan. The family room, in foreground of the photo above, has a pass-through counter into a spacious but compact island kitchen. This, as shown in the large photo, opens as well onto the glass-enclosed breakfast alcove, shown also in the photo from the garden, right.

Redwood beams, exposed redwood tongue-and-grooved sheathing, plaster, and slab floors compose the materials of the house. Walks are beachstone aggregate. Cabinets are walnut. Heating is forced air.



MATRIX OF MAN, SIBYL MOHOLY-NAGY

reviewed by Percival Goodman

URBAN LIFE IN HISTORY, AND OUR OPTIONS TODAY

Obviously in a short review, justice can't be done to the scholarship, intelligence and wit that went into this book. So take my word, it is a gold mine for those like myself whose curiosity is not satisfied by plans and birds-eye views, but who want to be inside the place.

We get a sketch of the 46,602 speculative tenement buildings in ancient Rome (despite zoning, one *insula* was 100 feet high while its walls were less than one-and-a-half feet thick, "resulting in incessant collapses and shoring up of the sagging walls with thick beams, which obstructed the narrow streets"), giving a rather different picture than the standard reconstructions I was brought up on. Or we get a view of an imperial money raiser, a *Vespasian;* in this case a two-holer complete with dolphin decorations, all, I suppose, carved out of travertine.

Professor Moholy-Nagy's sharp tongue is evident enough. "Has 20th-century man really cut loose from the orbit of Rome?" she asks. "Albany, the capital of the State of New York, was thrown into chaos by the construction of a monumental central mall —part Timgad and part Taj Mahal—connecting in a reciprocal vista the revered architectural aberrations of America's architectural past."

The illustrations are superbly chosen and are not the stock examples seen in books of this kind. I don't find a list of credits for the photos, so one suspects that many are Moholy-Nagy originals.

I could go on, (and would like to) discussing the book's obvious merits, but I have a bother started by the introduction, soothed by the history and erupting in the conclusion.

In *Matrix of Man,* Professor Moholy-Nagy juxtaposes examples of everything from Ur to plug-in and fits man's environment into categories—geomorphic, concentric, linear and clustered. She finds that: "most decisive of all, cities, like mankind, renew themselves unit by unit in a slow time-bound metabolic process." Like Brazilia or urban renewal? Considering the substandard state of 800,000 dwelling units, the filth and pollution, the bad planning, crime, dope addiction and assorted hangups, I have difficulty in understanding how she can dedicate her book "to Manhattan Island my inspiration and my love." Perhaps the fact that she calls the current urban crisis the current "urban crisis" (I presume the quotation marks mean *so they say)* explains it.

The introduction suggests that we have not severed our ties with historic continuity, so I presume that the difference between gun powder and the H-Bomb is merely quantitative; that the computer is merely an elaborated abacus; and that a luxury society exists with less than 25 per cent of the population engaged in productive work is not extraordinary. In short that these things fit a "slow time-bound metabolic process," instead of representing a mutation equal to that made when agriculture was first invented.

I couldn't agree less with the author: I think the humanist has every reason for his pessimistic, though not necessarily self-destructive, diagnosis when he looks at the available tools and those who wield them.

The conclusions reached in this book are called options, and option is defined for our convenience as "the exercise of a power of choice, an alternative." I don't honestly find any choice in the options presented, though some are called geomorphic, some concentric, etc. I find I can live geomorphically stacked-up against the side of a cliff as proposed for a vacation town in Malta or Telegraph Hill in San Francisco or in Zug, Switzerland. I can live stacked-up concentrically as proposed by architect Konwiarz for Hamburg or Ratigen in Germany. I have a linear option of living stacked-up in Montreal, lower Manhattan or Brooklyn. If I don't like these, I have the alternative of stacked-up living according to modular or clustered options in Siberia, Colombia or Manhattan. Does this give us a power of choice? If this is the lesson taught by a study of urban environments, we have good reason for pessimism.

"This is a book about faith in the historical city" is the first sentence in *Matrix of Man;* and because I associate the author with Germany, I was reminded of a 1931 essay by Jung. I wonder whether she might recall a passage in it: "An honest profession of modernity means voluntarily declaring bankruptcy, taking vows of poverty and chastity in a new sense and—what is still more painful—renouncing the halo history bestows as a mark of its sanction. To be 'unhistorical' is the Promethean sin, and in this sense modern man lives in sin." Everything that Jung said about modern man is the antithesis of the author's descripiton of 20th century man drunk with science and technology. Precisely the "pseudo-modern" that Jung castigates is the man who would be snug living in the offered options. Since Professor Moholy-Nagy also castigates such men, how then can she believe that modern man will accept the filing cases provided as options?

A study of the University at Nanterre, site of several student uprisings in France, gives the answer. "Architectural incompetence . . . or sadism?" asked one reporter. "On one side the campus is literally overhung by a vast cliff of low-cost housing, a wall of mean living literally blots out the horizon . . . there are no common rooms, no cultural facilities . . . segregated residential blocks for boys and girls facing each other across a no-man's land, shabby and scarred." No wonder someone scribbled *"Violez Votre Alma Mater."* Who is modern man? My guess is that you'll find him (and her) among the students of Nanterre, of Paris, San Francisco and Prague as well as at Columbia and Pratt. These folk are amused by Bucky Fuller, but they are learning from Kropotkin—even if they don't know his name—that self-help and mutual aid may yet save us.

MATRIX OF MAN: An Illustrated History of Urban Environment, by Sibyl Moholy-Nagy. An analytical study of cities of the past and the urban environments which they created. Emphasis has been placed on what these cities can tell us about how we live today, and the choices we might create in the future. Professor Moholy-Nagy has organized the study around four basic city plans which seem to recur in history: the geomorphic, the concentric, the orthogonal, and the modular.

Frederick A. Praeger, 111 Fourth Ave., New York, New York 10003. 317 pp., illus. hard cover, $15.00.

Percival Goodman, F.A.I.A., is a practicing architect in New York City and a professor of Urban Design at Columbia, where he has been teaching for 22 years. In collaboration with Paul Goodman, he has written Communitas, *an influential book on urban life.*

reviewed by Edgar Tafel

EUROPE'S FIRST KNOWLEDGE OF WRIGHT

In the fall of 1932 some 35 of us—eager recent architectural graduates, or dropouts from the then-Establishment that was still harking back to the Beaux-Arts—all descended upon Taliesin in Wisconsin and the Taliesin Fellowship was born.

It was tacitly understood that each apprentice was privileged to rummage in a storage space under the living room, to avail himself of a copy of whatever water-stained remnants there were of both the loose Wasmuth portfolio sheets and the smaller *Ausgeführte Bauten*. Frank Lloyd Wright had gone to Europe in 1910 to prepare the drawings for the great portfolio, and then returned to Wisconsin to build Taliesin near Spring Green. He had apparently undertaken the distribution of these volumes in America, but they had not been distributed: in 1915, in Chicago during the building of Midway Gardens, he received the shattering news of the fire that destroyed Taliesin, and in that tragic holocaust only a very few undamaged copies of these publications had been spared.

Five years ago Horizon Press published the huge portfolio in facsimile; and now, with corrections of all dates and names and a splendid preface by Edgar J. Kaufman, Jr., they have brought out the first English edition of the earliest book ever published on Wright's work. One result of the fire was that America knew virtually nothing of these revolutionary works. As Kaufman points out, the *Ausgeführte Bauten* was Europe's first window on the then-completed works of Wright. The incalculable impact of that vision is now universally recognized; and, turning these evocative pages, we can see the prophetic nature of these early works such as the concrete Unity Temple, the Larkin Building, the Robie House and others. (There is a valuable photo showing Unity's framework.) In general this book reveals the great emerging pattern that Wright later called "architecture—the mother of the arts—as a way of life."

In 1952, Rudy Bruner and Ben Raeburn of Horizon Press, Paul Grotz, Ezra Stoller and I met to discuss ways and means to effect a continuity of publication of Frank Lloyd Wright's work. As a result of this meeting Horizon Press, through Ben Raeburn's devotion, interest, and sense of history, has thus far published 14 Frank Lloyd Wright volumes. Mr. Raeburn became one of Mr. Wright's dearest friends and had promised him to publish and also to bring back into print all of his work. To me, as almost each FLW building is a landmark, this edition of *Ausgeführte Bauten* is a landmark of publication. Reproduced faithfully, it shows many projects heretofore unseen: an exhibition of Frank Lloyd Wright's architecture in the Chicago Art Institute, with stained glass models, furniture, floral arrangements, sculpture, drawings, photographs and plans of many little-known buildings.

There is the Williams house of 1895, almost English in feeling, with its two-story roof with dormers. Mr. Wright often said, with a characteristic twinkle, that this house was the first and last occasion when he would mix large fieldstone with brick. This soon became a fad of others. "I always recognize my mistakes and don't repeat them but my imitators go right on making my mistakes."

The first River Forest Tennis Club—burned, as Mr. Wright said, because he hadn't headed off the wood rafters from the chimney flue.

The Heurtley house, 1902, one of FLW's finest early houses (at one time occupied by his sister Jane)—with the living room, dining room and kitchen on the second floor. Later these elements on the second floor were to be the main theme of his Coonley house, 1908, also shown here in detail in its pre-altered form.

The floor plan of the D. D. Martin house (Buffalo, 1904) is an exquisite abstraction; and the remarkable interior photographs of this renowned house show the Wright-designed "barrel" chairs. The Martin house was recently saved by the efforts of the State University Construction Fund. I am honored by having the commission to rehabilitate it.

The unique details shown here of the Larkin Building interiors reminded me of my visit there with Mr. Wright. I remember his pointing up with his cane to where two globular sculptures had been, saying: "One fell off one day and almost killed an employee. . . . I never should have put them there anyway."

Edgar Kaufman in his introduction says: "This book may now in some ways affect American architects and their art. In the right hands it may be grafted onto current practice as a sprig of rich, cultivated olive is spliced into a wild stock rooted in the soil. One element supplies survival, the other adds quality. This book might be such a cion." Exploring the more than 200 illuminating photographs and plans in this seminal volume, I feel it is just such a cion.

FRANK LLOYD WRIGHT: THE EARLY WORK, a reissue of Ausgeführte Bauten, first published by Wasmuth, Berlin, 1911. Horizon Press, 156 Fifth Avenue, New York, N.Y. 10010. 143 pp., illus., $15.00.

Edgar Tafel is a practicing architect in New York City. He worked from 1932 to 1941 with Wright and the Taliesin Fellowship, supervising construction during those years of both "Falling Water" and the Johnson Wax Building.

OTHER BOOKS

L'ESPRIT NOUVEAU, edited by LeCorbusier. This reprinting gathers into eight volumes the 28 undated "periodicals" titled *L'Esprit Nouveau,* first published in Paris at irregular intervals between 1920 and 1925. The reprinting is a major contribution to scholarship, and brings to a wider public first-hand accounts of conflicts which dominated the "heroic era" of modern architecture.

DaCapo Press, 227 West 17th Street, New York, N.Y. 10001. Numbers 1-28, 8 books illus., $15.00 a book.

THE SOURCES OF MODERN ARCHITECTURE AND DESIGN, by Nikolaus Pevsner. This book is a clear account of its topic and follows the historical precedents previously established by Professor Pevsner.

Frederick A. Praeger, 111 Fourth Avenue, New York, N.Y. 10003. 216 pp., illus. Hard cover, $7.50.

WORLD ARCHITECTURE 4, edited by John Donat. This is the latest book in a series intended as yearly surveys of, and commentaries upon, current architecture around the world. The first two numbers (*World Architecture 1 and 2)* were frankly surveys. *World Architecture 3* also carried a thematic format, being subtitled *"Art and Technology: toward a third culture."* "Place and environment" is the theme of *World Architecture 4*. It is a vague juxtaposition of words, which the individual buildings and urban planning concepts in the book fail to clarify. Nonetheless, the book (and the series of books) is a serious and useful survey of current esthetic vocabularies.

Viking Press, 625 Madison Avenue, New York, N.Y. 10022. 215 pp., illus. Hard cover, $16.95.

NEW DANISH ARCHITECTURE, by Tobias Faber. An analysis of postwar Danish architecture, from single-family dwellings to city planning. Professor Faber attempts to identify stylistic trends within the period, with photographic documentation. Text in both German and English.

Frederick A. Praeger, 111 Fourth Avenue, New York, N.Y. 10003. 220 pp., illus., $17.50.

HOTELS: AN INTERNATIONAL SURVEY, by Herbert Weisskamp. The author predicts that in the current hotel boom, two kinds of hotels will become dominant. Book includes 44 international solutions to "the modern hotel problem."

Frederick A. Praeger, 111 Fourth Avenue, New York, N.Y. 10003. 212 pp., illus., $20.00.

MATHEMATICS IN ARCHITECTURE, by Mario Salvadori. Designed to be a basic textbook for courses in mathematics offered by departments of architecture. It teaches applied rather than theoretical math, and all illustrative problems are derived from the fields of architecture.

Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632. 173 pp., $7.50.

BUILDING TYPES STUDY 394

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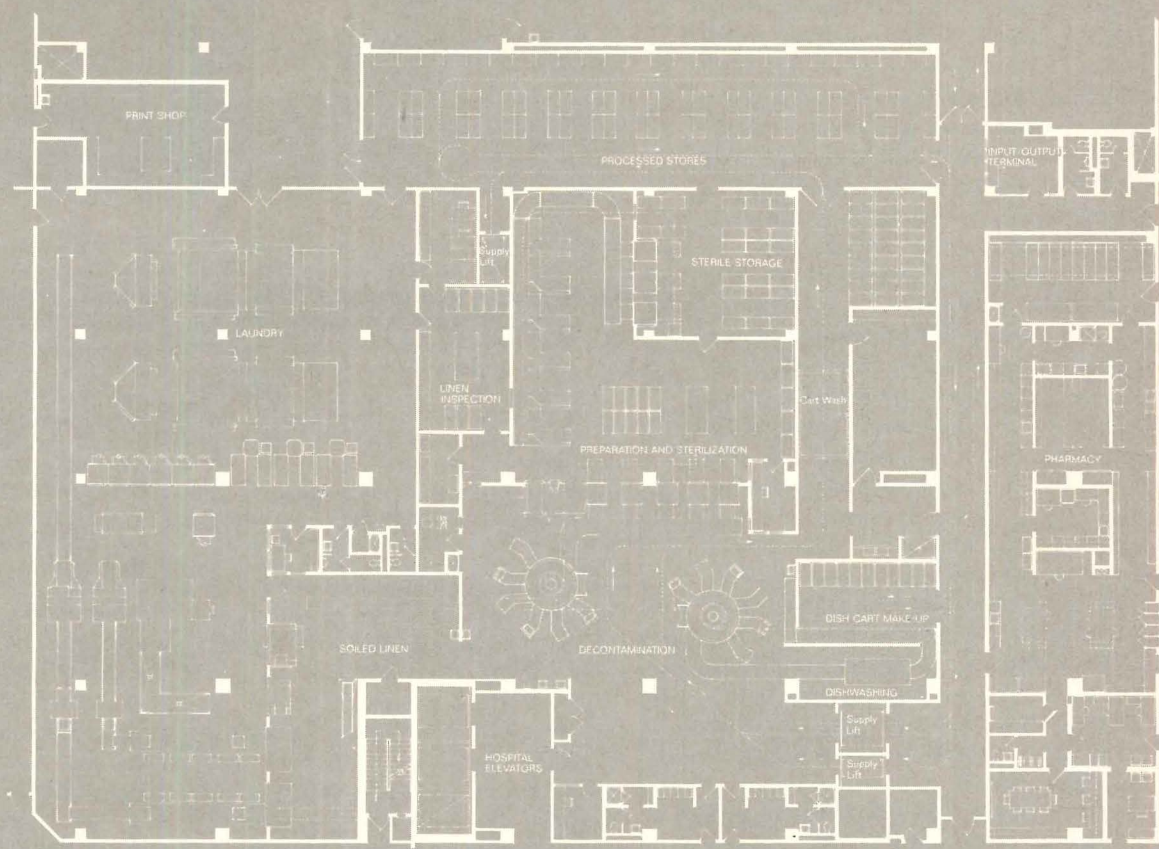
HOSPITAL AUTOMATION



Part plan of service level, Fairfax Hospital
See page 153

As the cost of medical care increases, even to the point where health insurance companies are beginning to contemplate disqualifying hospitals that cannot control their rates within reason, architects, consultants and administrators of hospitals are turning more and more to the techniques of industry for cost control. Since the largest component of medical care cost is in personnel costs, the search for control turns to mechanical automation and electronic aids to communication and operation in order to convert more work-hours to patient care.

Hospitals have been compared to industrial plants in many of their aspects. That is, they depend on the convergence of a great variety of materials and personnel upon the task of producing well people. This human end product, of course, is one important difference between a hospital and a factory. While the essentials of transport and technology are similar, the overlay of stringent requirements for asepsis, complex medical procedures, professional staff training, and even the simple comfort of both patients and staff creates a huge but extremely sensitive problem for all approaches to automation. A second important difference is in the economics of the investment, as reviewed on following pages.

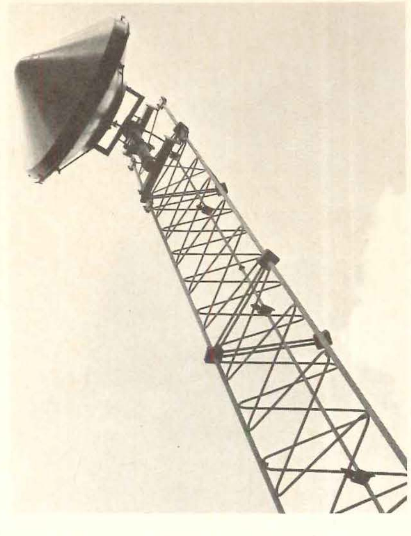
—*William B. Foxhall*

Considering the whole problem of automation to be roughly divisible into components dealing with communication, physical transport, and administration in the business sense, it is apparent that some of these components have had the attention of sophisticated technology for many years. The devices of doctors' in-out registry, paging, and nurses' call signals, for example, have had a long and continuous development. Similarly, business machines are not new to hospital administration. Even such transport systems as pneumatic tubes reached a high degree of reliability many years ago. The essential difference today is that all of these devices must now be united in a single thrust toward over-all efficiency, and they are further interlocked with the emergence of computerization and sophisticated electronic guidance of automatic transport.

Jess Kaufman, vice president of the hospital division of Executone, Inc. underscored the need for interaction among the disciplines in his summary of results of the 1968 series of seminars on medical facilities conducted by the Producers Council in 50 U.S. cities. "Out of these meetings," he said, "has evolved the need for more comprehensive review of the operation of health facilities including traffic flow studies, transportation studies and communication studies, which must become an integral part of the architectural, engineering and over-all operational planning of a medical facility. In a nutshell, the medical facilities of our nation must take a leaf from industry's book and automate, using all the technology that is available to them."

Mr. Kaufman is one who takes his own advice. He views the role of his company (essentially a manufacturer of communications devices) as inextricably bound to the basic over-all programing and design phase of a hospital. Communications among nurses, patients, physicians and the various diagnostic and treatment departments, he says, require early analysis in setting up the physical aspects of the institution. While a separate program for communications is possible, and in fact may be essential, it must relate at a professional level to the specifics of the over-all program. This interplay involves not only verbal and signal communication, but also the degree of monitoring, entertainment and security surveillance systems the hospital chooses to provide.

John L. Ryan, vice president of Gordon Friesen International, also makes the point that automation of any hospital calls for early and creative engineering. Further, since available proprietary systems for automation are not usually compatible (and perhaps not even comparable), there must be great flexibility in approaches to contracting. Quality control, he points out, is diluted in the bidding system unless the various systems are bid as such by the suppliers on the basis of a functional specification and the eventual contracts are negotiated. While a functional specification theoretically could be bid by a local contractor, any resulting multi-manufacturer system could pose severe maintenance problems. Furthermore, says Ryan, any contract awarded should stipulate that there would be a program of personnel training on the part of the manufacturer and a shakedown operation period before opening of the hospital.



Honeywell photos

A microwave system uses cone-shaped antennae towers to link Doctors Hospital in downtown Columbus and its Doctors West satellite 11 miles away. The system will send and receive television and FM radio transmissions simultaneously over 11 channels, giving both facilities access to all lectures, demonstrations, X-rays, facsimiles of records, dictation and paging services. The savings in travel expense and man-hours are more than substantial. A computerized control center now using telephone lines for transmission will be tied into the system in the near future. From the center console, a single operator can watch over hundreds of items of mechanical equipment as well as regulate 160 different temperatures, pressures and humidities throughout both hospital complexes. The system flashes an immediate warning if any critical variable goes off-normal or if the microwave transmission fails. As shown above, only a few pushbutton controls are necessary, since building systems have been classified into schematic units. By pressing a certain combination of coded buttons, the operator can flash any one of 19 schematics currently in use on the screen. The system can potentially handle 100 schematics. In manpower savings alone, Richard Christensen, assistant administrator of engineering and maintenance, figures the $65,000 center will pay for itself in two years.

The role of the computer is emerging as an active one not only in the business administration of the hospital but also in treatment and transport procedures, as described in pages which follow.

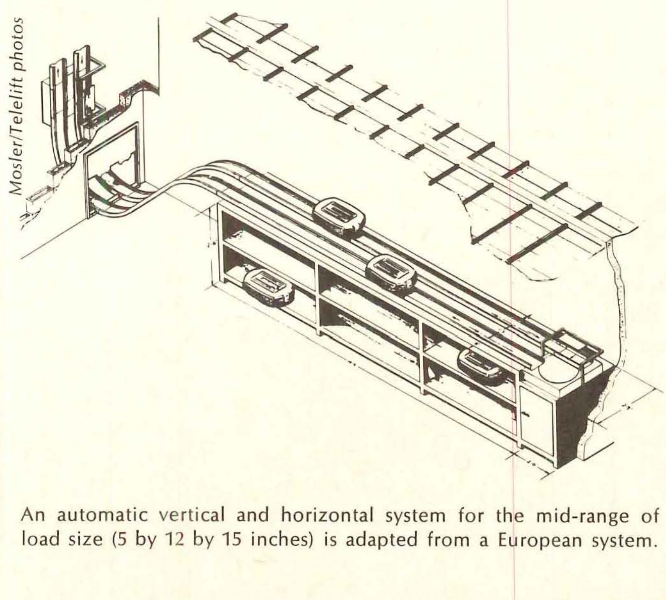
As with all urgent and rapidly developing technologies, the state of the art of integrated hospital automation presents an unstable base for confident decisions at any given point of commitment to one system or another. Roger Mellem offers a sober and professional review in the following columns, and Robert Hegardt projects the potentials of emerging techniques into possible developments of the future.

Mellem is cautiously hopeful in state-of-the-art survey

Large sums of money have been spent with mixed success on the development of electronic, automated aids to health care. While successes have been a blessing, observes Roger Mellem [1] in a recent survey, the failures are often very difficult to remove or correct. One large and puzzling problem, Mellem notes, resides in the fact that some planners champion with evangelistic zeal a few automated systems that in the eyes of others are gross failures. But somehow we come up with some very excellent buildings and systems despite a few faults. Some of those faults develop simply through the giant steps of progress made in the relatively short time from inception to construction of a building.

[1] Architect Roger C. Mellem, formerly director of the division of design and construction of the American Hospital Association, has recently joined the staff of Metcalf and Associates, architects of Fairfax Hospital, page 153.

Mosler/Telelift photos



An automatic vertical and horizontal system for the mid-range of load size (5 by 12 by 15 inches) is adapted from a European system.

To combat this built-in obsolescence, there is a great need for better communication among planners, builders and administrators of hospitals. One encouraging effort of this kind was carried out in December 1967 through a conference organized by the National Academy of Engineering. Participants from all parts of the United States were people involved directly in planning, construction and delivery of health care. The National Academy of Sciences published a report of that conference in a book titled *Costs of Health Care Facilities* (Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418). The report cautioned that automatic distribution systems in hospitals are still under development, are considered to be an art, and do not automatically save money. Obviously, they should not be simply "dropped into" existing buildings and expected to perform as they would in a building designed especially to support their operation. The report also stated that preliminary data from time-study analyses made in several hospitals of the Veterans Administration indicate that automated material-handling and food-handling systems *may* be more expensive for the VA to operate than are manual systems.

The increasing cost of manpower now stands at approximately 70 cents of each dollar spent on delivering health care, Mellem reports. Thus, the construction cost of hospitals, even highly automated ones, is completely overshadowed by the daily cost of patient care. If technology can develop the *right* kinds of automated systems to effectively reduce the manpower cost and improve the delivery of health care, the cost of installing and maintaining those systems will be relatively insignificant in comparison to the spiraling costs and deteriorating quality of care implicit in the status quo.

Mellem argues, however, that many new mechanical transport systems are put on the market before they are fully developed. For example, *none* of the existing systems appears to satisfy *all* of the following criteria of good design: silence of operation, appearance, fire safety, a high degree of independence from human handling, durability, low maintenance and inherent cleanliness if not fully aseptic design. Considering the high price tags on some of today's systems, lower costs don't seem out of the question and would be warmly welcomed, although first-cost is scarcely one of the determining criteria if all others listed above are met.

Automated systems in use today include the following: 1) pneumatic tube systems; 2) automatic dumbwaiters; 3) cart systems that run on wheels; 4) conveyor systems that carry either tote boxes or cart-size containers; and 5) linen and trash systems utilizing chutes or tubes operated pneumatically. By some stretching of the imagination and design, one could apply the term "automatic" to gravity chutes and tubes—unsophisticated as they are. One could also add to the list a new laundry system, recently introduced to this country from Germany, which utilizes a relatively long tube for the transporting of linen from the "dirty" end of a large laundry to the "clean" end, all the while washing, extracting and partially drying the linen without its once being touched by people in the laundry. It is then deposited one piece at a time near the ironing machines for ironing, if necessary. (see plan, pages 149 and 154.)

Pneumatic tube systems quickly deliver mail, messages, orders, medical records, bills, instruments, and pharmaceuticals. Some systems utilize very large oval tubes, measuring approximately 6 by 18 inches. But there are also very small tubes serving patient rooms as well as the various departments.

Although quite different from the pneumatic principle, there is another new way of electronically transporting medical records. This is via an electronic scanning device that scans medical records at high speed and retrieves the record requested from file stacks. Another system scans information more slowly from remote bulk storage space.

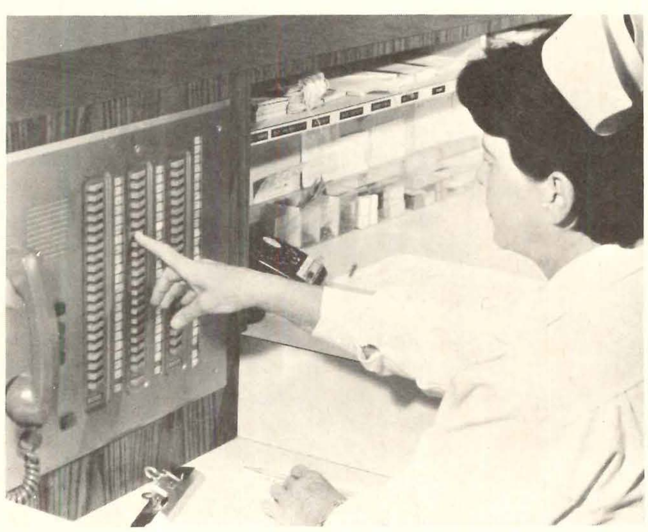
Today, automatic dumbwaiters operate at considerably higher speeds than in years past. They have also been "educated" to a degree that allows tote boxes to be automatically injected into the conveying cabs and automatically ejected at the predetermined destination.

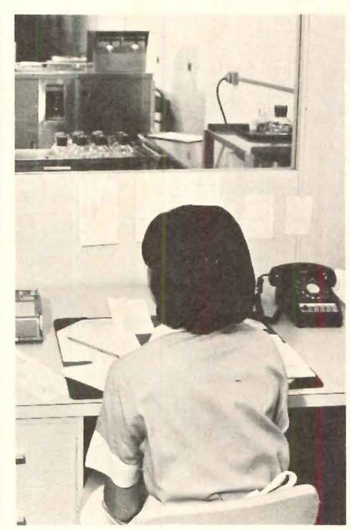
Systems that automatically move carts horizontally and vertically are currently receiving much attention in many countries. One such system utilizes a totally-enclosed, stainless steel cabinet that measures approximately 2 feet wide, 4 feet high, and 4 feet long. It contains retractable wheels on which the cabinet is propelled once it has been removed from the electronically-controlled, battery-powered carrier. This carrier has its own wheels and is guided by concealed, underfloor wiring which can direct it horizontally and through vertical conveyors. There are no slots or mechanical guides exposed which might be sources of contamination. The carriers can also be removed from the electronic guidepath and manually directed, as described in the Fairfax installation, page 153.

Another type of automated cart utilizes a monorail guidance system. The carts move from a horizontal direction to a vertical direction via pinion drives. The cabinet is suspended from the drive by a yoke in a manner that keeps the cabinet in the same vertical axis at all times so that even liquids could be transported in open containers.

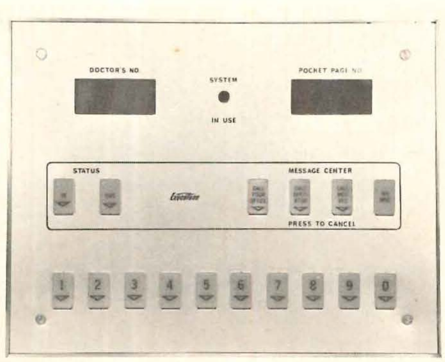
Still another monorail system can transfer a cart to a specially-designed, relatively small freight elevator to accommodate vertical movement. In all of the systems a remote indicator tells appropriate staff that a cabinet or cart has arrived at the station expected.

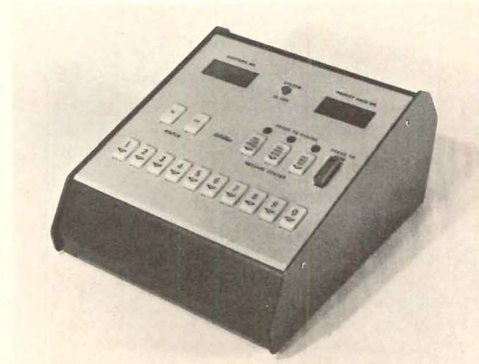
Other conveyor systems utilize tote boxes that are labelled or coded magnetically so that the boxes reach proper destinations. The boxes are conveyed via horizontal belts that guide them to vertical conveyors. Usually the boxes are color-coded





Unified communication begins with the hospital program and affects the architect's plan and his options. Nurse-patient and station-to-station intercom (above) is linked to doctors' registry (below) and basic traffic of all systems and personnel.





Executone photos

to indicate whether they are for soiled or clean purposes and to indicate their appropriate home stations.

Few institutions have been built using pneumatic tubes for transporting linen or trash, but several are currently under construction. They offer good selectivity as to final destination of either "product," which is in all instances contained in plastic bags to eliminate some of the obvious problems inherent in a dual-use system.

There is considerable discussion about comprehensive, area-wide planning for health care institutions, the philosophy of which will not be discussed here except to mention that it helps to resolve some of the over-all planning problems that tend to keep costs high. Results of this comprehensive planning have indicated to some institutions the wisdom of joining together in providing better service facilities for the care of patients and at less cost than isolated planning will allow. Therefore, it is not difficult to imagine that one of the results of coordinated planning will be that institutions will create far-ranging services to be shared among themselves, as have indeed been started by many and demonstrated to be successful. It is conceivable, therefore, that automated systems can—and probably should—extend beyond the walls of individual institutions and interconnect several. Considering the current overburdening of existing surface transportation and delivery systems, something new has to be devised to overcome the obstacles of delivery and communication. The microwave system shown on page 150 is a step in this direction.

The art of automation in hospitals as yet can only partially take the place of human functions. Perhaps, Mellem concludes, it is better not to expect that the human touch stands any chance of disappearing from the natural habitat of T.L.C.

Special Meanings in Computer Jargon

On line refers to a computer system whereby, through the use of information input/output terminals, the central processing unit can be queried, its stored information retrieved and/or changed to meet changing circumstances.

Real time refers to the capability of the system to respond to an inquiry or to act upon an order within the meaningful lifetime of the phenomenon requested. More simply stated: when queried at about 9:00 A.M., "What time is it?", and the answer is received at about 2:00 P.M. as "9:01 and 36 seconds", the response to the request was not made during the meaningful lifetime of the phenomenon.

Remote control refers to the ability to have input/output terminals located at various distances from the central processing unit, with each terminal simultaneously being able to have access to, and control of, that central processing unit.

Operating computer system refers to the concept that the computer is not simply: a) a filing system, b) an oversized bookkeeping machine, c) a printing press, or d) a communications device. Rather, when properly programed, it is a combination of all of these things. Its program must accept and process critical actions made by authorized personnel. These actions in turn are recorded for the immediate use of other departments. Thus, the institution is *operated* through the computer.

Hegardt urges unified supply as key to future design

From an architect's viewpoint, said Robert Hergardt[2] in a recent talk, the plan of a hospital is essentially the solution of a highly complex problem in logistics. This problem consists of: handling and disposal of medical and other supplies and wastes; the travel paths of patients, visitors, materials and various kinds of personnel; and the systems criteria for air, water, gases, electricity, waste disposal, communications, and others. In short, the flow pattern and floor plan resulting from the solution of logistic requirements is a graphic representation of the activities to be performed, and it further reflects the administrative structure which directs and supports those activities.

The administrative tool that is having the greatest impact on interdepartmental structure—as well as helping to shape the architectural configuration of medical facilities—is the on line, real time, remote control, operating computer system. (Those terms have special meaning as shown in the box.) Hegardt supports this view as follows.

The computer comes into its full capacity for service only when basic management decisions are made regarding central purchasing and handling of supplies and the use of disposables. While the advantages of central or group purchasing are generally accepted, the advantages of central processing and disposition of materials—under the direction of a single department of supply services—often go unrecognized or are bypassed to appease existing, entrenched hierarchies in charge of decentralized materials processing.

Even the pharmacy, although it can be considered as a separate, highly specialized, multi-faceted supply and consulting service, should be an integral part of the central industrial facility—especially when it is linked to computerized operation.

In a hospital (or group of hospitals) where all departments rely on a single central purchasing, processing and supply service and the daily materials requirements for each individual department have been determined, a fully programed, on line, real time computer system would be a key factor in control of the flow of merchandise. The following procedure is based on existence of a central bulk warehouse space and one or more preparation and issuing warehouse areas according to Hegardt's outline.

1. A shipment of, say, bulk foods arrives at the loading dock of the bulk warehouse, palletized to the institution's dimensional standards.
2. The bill of lading will be checked against a copy of the original order—furnished by the computer's input/output terminal in the warehouse control office.
3. A sample of the product is removed, labeled and sent to the hospital's quality control laboratory.
4. The computer is requested to indicate available pallet positions in the warehouse. The operator then assigns one or more of these positions, logs the merchandise to be stored into the computer and marks the shipment "quarantine." The pallets are then mechanically transported to the assigned storage rack positions.
5. Upon receipt of a computer-transmitted signal from the quality control laboratory, the materials will be released from "quarantine" or ordered "return to vendor."
6. Upon receipt of a computer-transmitted request for merchandise needed in the preparation and issue department, the input/output terminal in the bulk warehouse indicates the position of the oldest pallet containing that material and frees that rack position for receipt of a new shipment. Then the ordered materials will be moved to the issue department.
7. Upon receipt of a computer-transmitted request from the packaging and/or processing department, the same transaction described above for the issue warehouse will be used, except that materials processed or packaged may be re-entered in a holding inventory if they are not distributed immediately.
8. When a specific material has been withdrawn from the warehouse in sufficient quantities to reach a pre-established minimum level, the computer alerts purchasing that it is time to re-order and gives all pertinent data on the material.

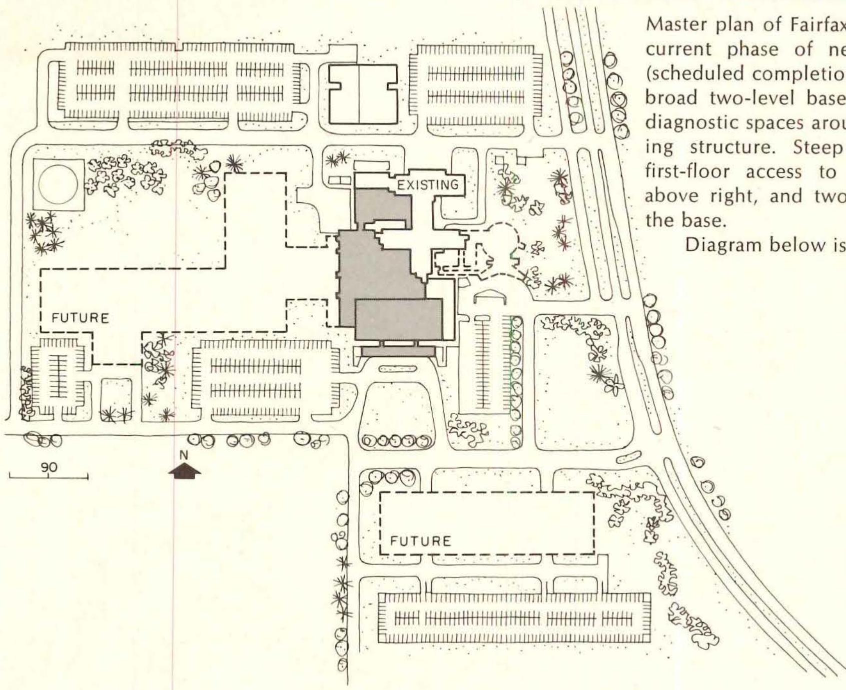
The architectural and administrative implications of random-access-warehousing, as described above, are that about 40 per cent more material can be stored in the amount of space required for conventional warehousing, with a considerable reduction in handling labor.

When the issue warehouse is stocked either directly from the bulk warehouse or from the packaging and processing area, all materials arrive on rolling shelving. In this area, merchandise, kits, instrument sets and other materials are transferred to modular "exchange carts." Each cart is stocked to pre-determined inventory levels to fill the needs of the various using departments to which they are sent. Again, the computer terminals relay the orders and the completed carts are logged into the using terminals as they leave the issue warehouse. When materials are used, carts are returned through a decontamination area where reusable items are processed.

In this "hospital of the future," dispensing of medications can also be handled from the central industrial facility by way of remote control dispensers of single dose or unit-of-use medications, even though the pharmacist who controls the dispensers is not only physically removed from the nursing station but is also operating several stations at the same time. Such systems are under development, and an advanced approach to the ultimate computerized system is described in the report on Providence Memorial Hospital, page 156.

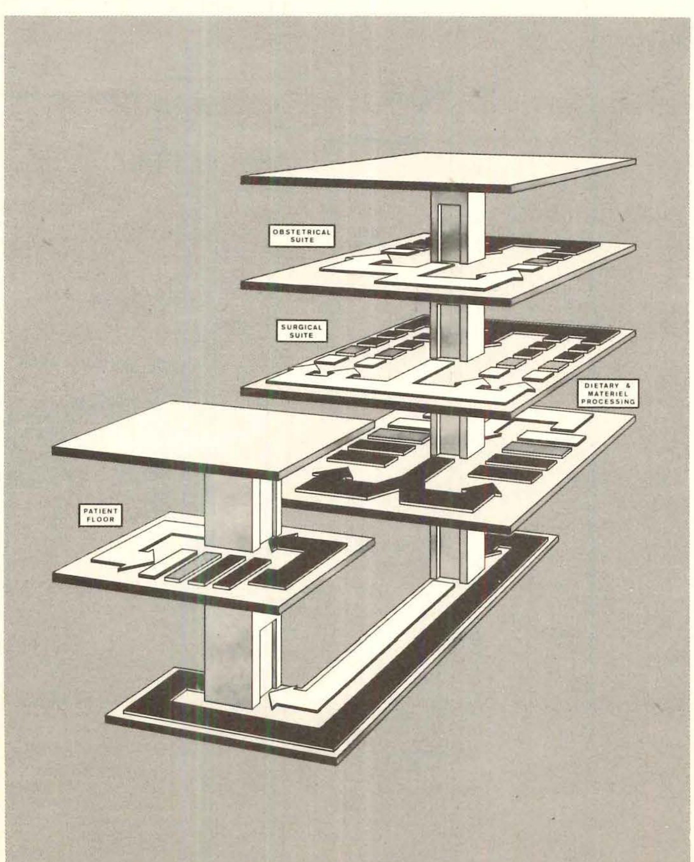
[2] Architect Robert W. Hegardt, while with The Office of Max O. Urbahn, reported in detail the computerized systems and potential of Meadowbrook Hospital (RECORD, October, 1966). He is now vice president of Paramed Inc., developing systems especially in unit-dose, computer-linked hospital pharmacy services.

Fairfax expansion is designed around a driverless cart system



Master plan of Fairfax Hospital shows current phase of new construction (scheduled completion: 1969) fitting a broad two-level base of service and diagnostic spaces around ells of existing structure. Steep grade permits first-floor access to nursing tower, above right, and two-level access to the base.

Diagram below is schematic only.



Feasibility of installing the electronic tracking spoor for self-propelled carts in an existing building as well as in a new addition was a factor in selection of the automation system at Fairfax Hospital in Falls Church, Virginia. Now nearing completion is a new base-plus-nursing-tower expansion that will increase capacity from an existing 300-bed H-plan building (see master plan at left) to an interim 540 beds. Full acute-care capacity will be reached when the two top floors of the new 10-story tower (now shelled in) are fitted and completed for occupancy. Fifth floor of the tower is a mechanical floor. Future extensions shown in the master plan will house another 500 beds and include psychiatric and extended care facilities. All buildings will be linked by the cart system.

Supply centers for the whole complex were located in the new building and an automatic distribution system was proposed as a means of making personnel time more available for direct patient care. Any distribution system which could serve both old and new sections had to offer maximum flexibility in both horizontal and vertical transport. It had to be able to reach out at every appropriate floor level and preserve as much as possible of its automatic character from building to building. Installation of mechanical tracks or tubes in the old building would have been physically and economically impractical.

In addition to directional flexibility, the automatic system would have to meet two other imperative criteria. First, it would have to be capable of handling the endless variety of sizes, shapes, quantities and degrees of urgency that characterize hospital commerce. Second, it would have to virtually guarantee against cross-infection between the two basic streams of clean and soiled supplies that exist in every hospital. The schematic diagram at the left visualizes some of the problem.

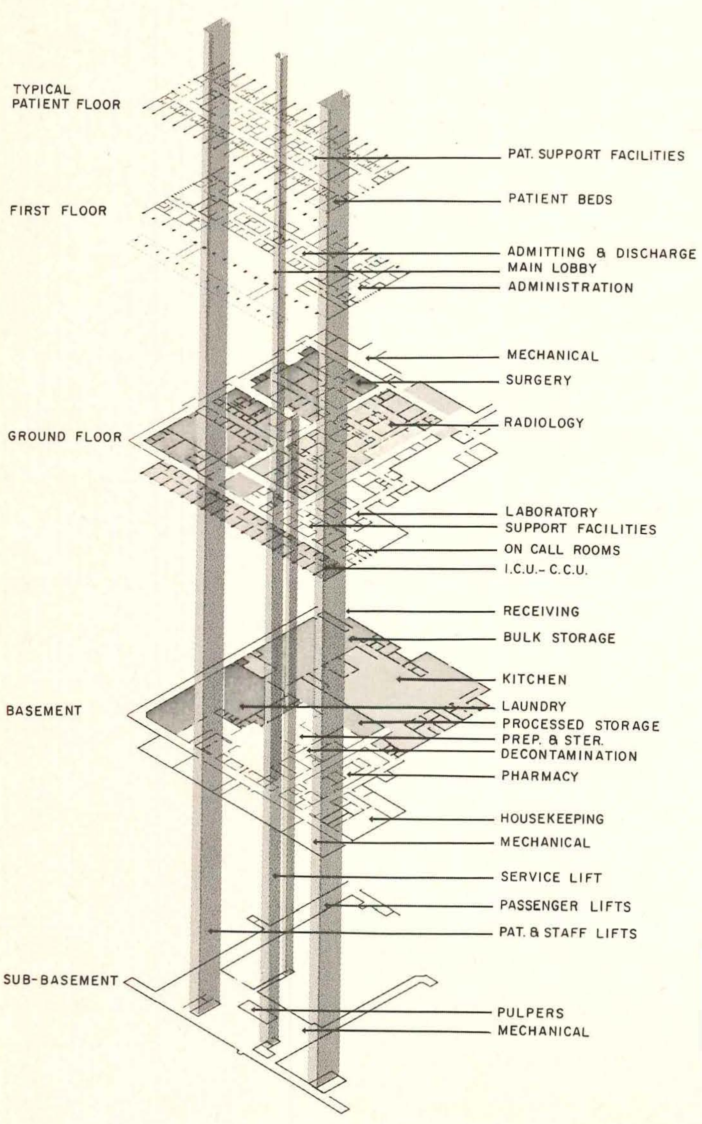
The solution worked out at Fairfax combines the advantages of three basic systems: a sophisticated electronic communications system, a pneumatic tube system and a self-propelled automatic cart system. It is the third, keyed as it is to proprietary turntable and conveyor equipment in the decontamination area and to a recent German introduction of continuous-process laundry equipment, that has most strongly affected basic decisions in planning as illustrated on following pages.

In developing the cart system, architects and administrators, in consultation with the AMSCO technical planning service, borrowed from industry the principle of electronic guidance for self-propelled pallets by a network of wires or tapes embedded in the floor. Each pallet can be programed at a loading station (central supply, for example) by pushing buttons on its driving console. It then follows the guidance network to its programed destination—taking the system's own small elevators when a change of level is called for. When it arrives at its automatic station (in a nursing floor utility room, for example) it can be led off the network by a handle for distribution of its contents.

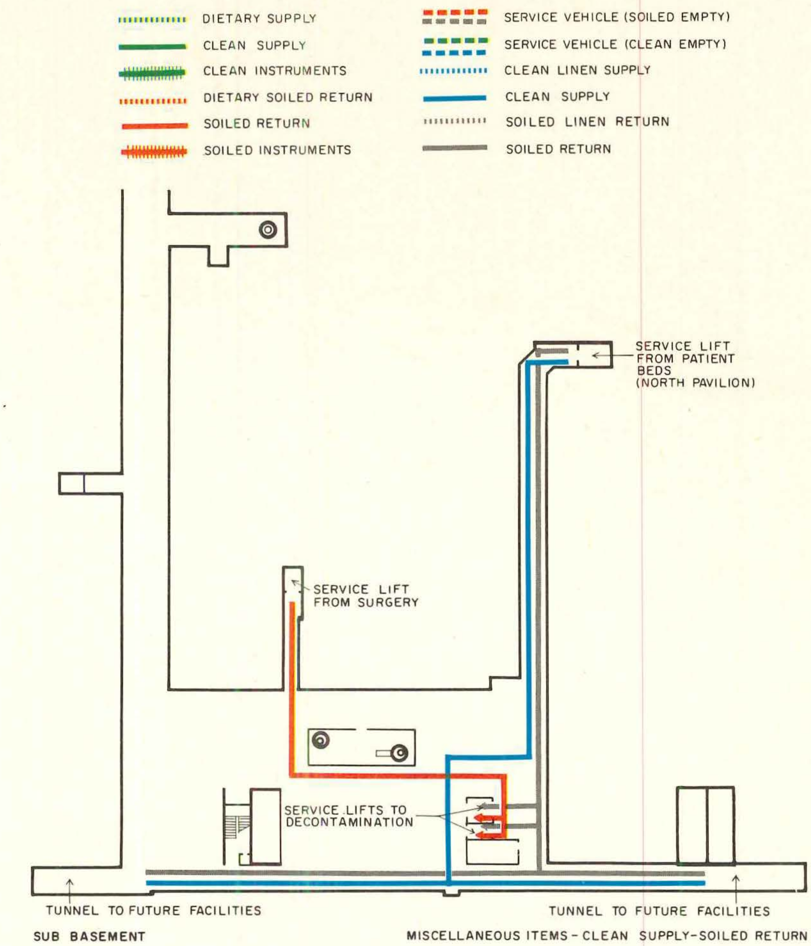
A series of fully-enclosed stainless steel containers was developed for supplies, food service, medications, etc. These have their own retractable wheels and ride piggy-back on the motorized pallets. The receiving station then has the option of sending the pallet on about its business. The containers give added insurance against cross-infection, since each cart and container goes through a sterilizing wash before it is re-used.

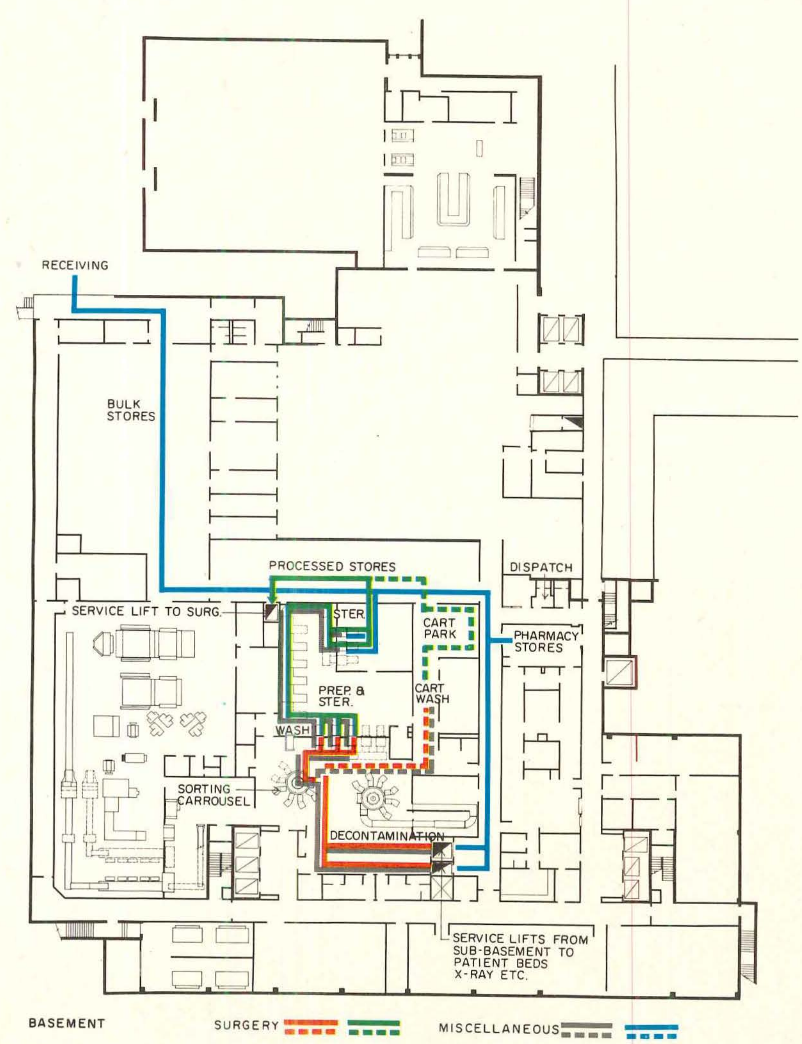
Costs of the system are not low—although extensions of the network to existing and future buildings are relatively simple. Allowing one cart per 25 beds, the Fairfax system will cost on the order of $1 million, but the saving in manhours is estimated to amortize the excess over manual systems in four or five years.

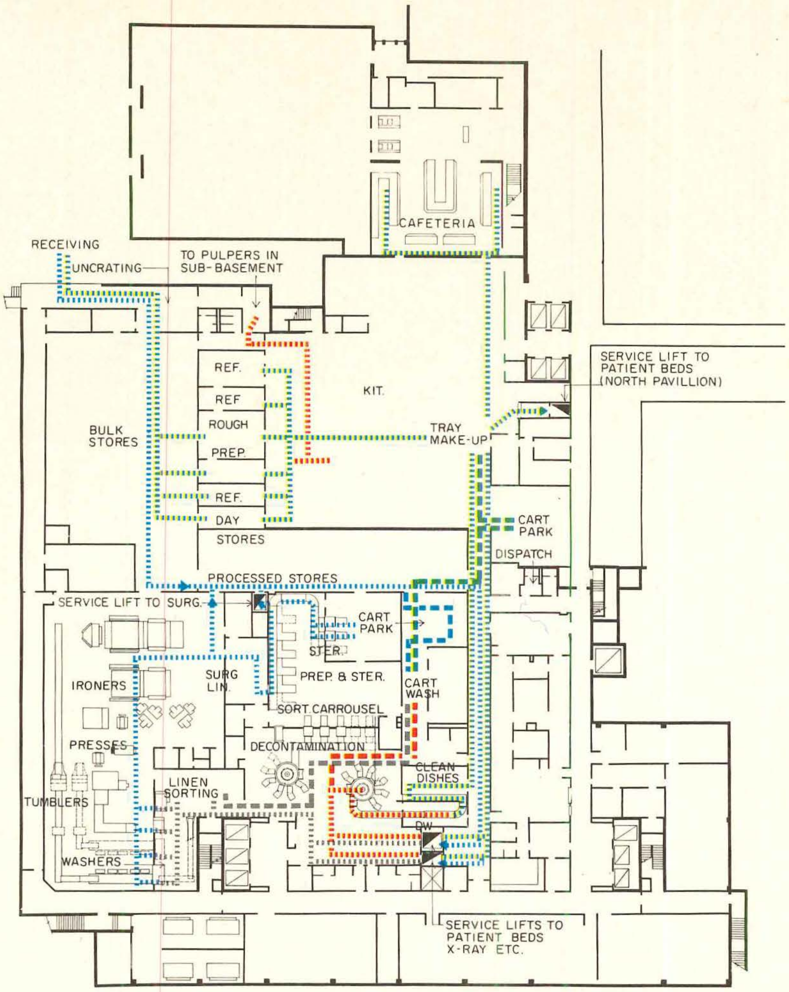
FAIRFAX HOSPITAL, Falls Church, Virginia. Owner: Fairfax County Hospital and Health Center Commission. Architects and engineers: *Metcalf and Associates—William H. Metcalf*, partner-in-charge; *Donald J. Neubauer*, structural engineer; *Gerald F. Oudens*, design associate; mechanical and electrical engineers: *Henry Adams, Inc.*; civil engineers: *Patton, Harris & Foard*; landscape architect: *William H. Potts*; hospital consultant: *James A. Hamilton Associates, Inc.*; cost control and CPM: *McKee-Berger-Mansueto, Inc.*; general contractors: *John A. Volpe Construction Company*.



SYSTEMS KEY



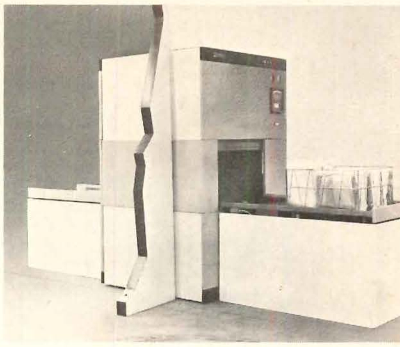


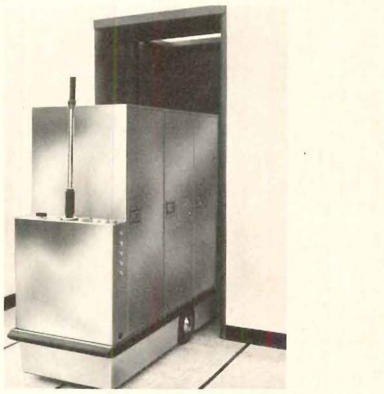


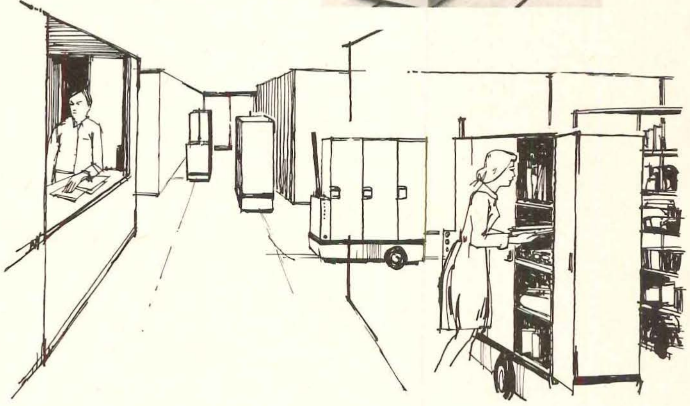
BASEMENT DIETARY LAUNDRY

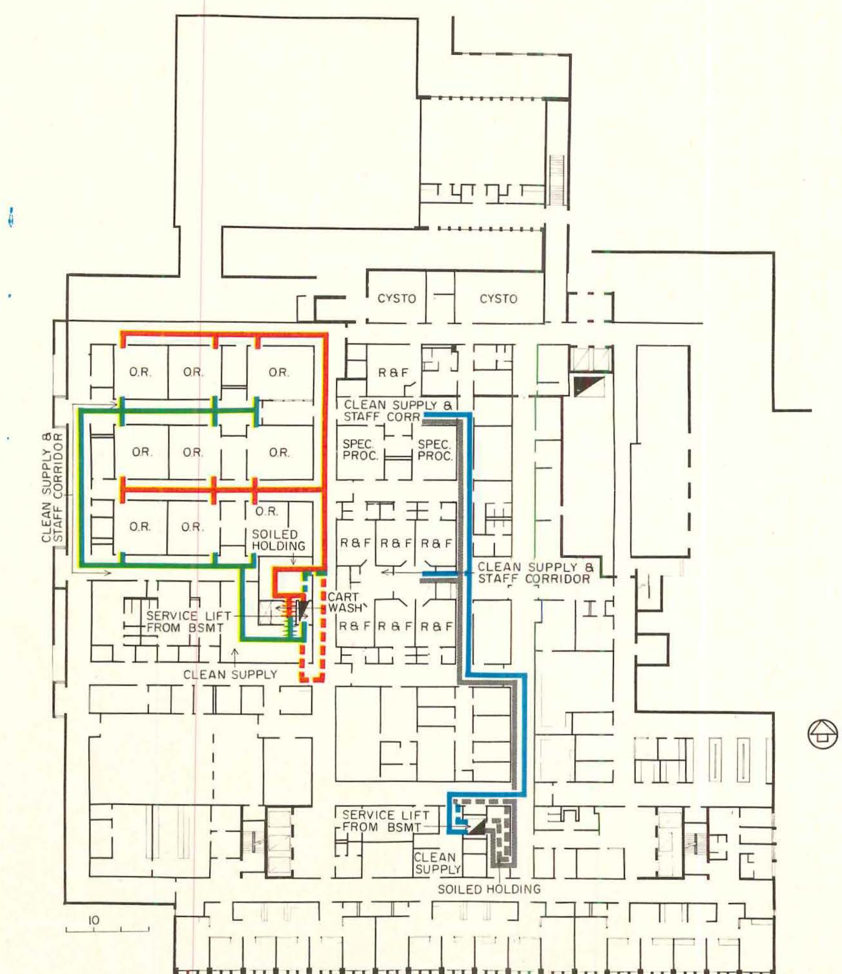
Traffic patterns are of first priority in any layout for self-propelled carts, regardless of the ample controls and safety devices built in. Pallet and container make a moving vehicle 25 inches wide by about 5 feet square, so there is enough room for passing and foot traffic in the standard 8-foot hospital corridor. Nevertheless, the separation of clean and soiled containers, the coding of stations and the allowances for turning, washing and standby are critical. At the same time, the juxtaposition of certain related departments may be less imperative, since no manhours are involved in transport. Hence the traffic studies shown here.

The system is linked with waste disposal in the sub-basement, opposite, and to utensil sorting and washing equipment, above right. Upright handle on the cart flexes to horizontal and becomes a manual steering arm.

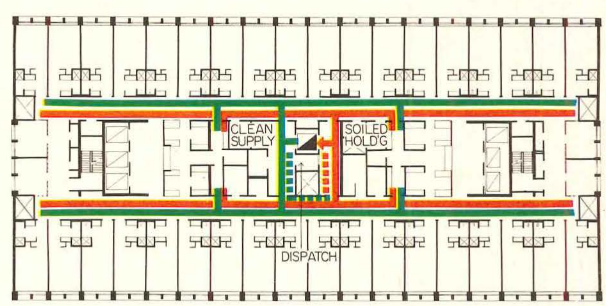




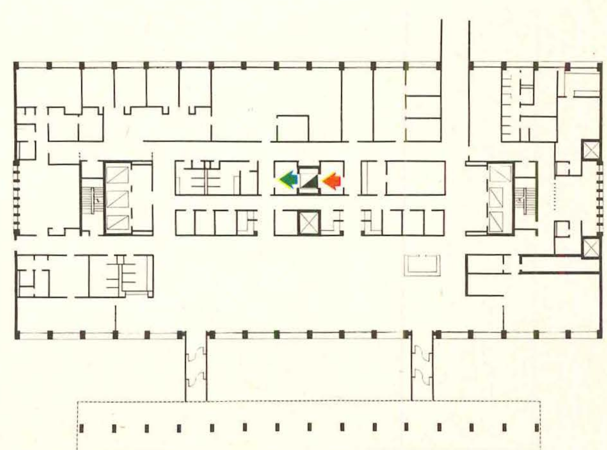




GROUND FLOOR RADIOLOGY SURGERY

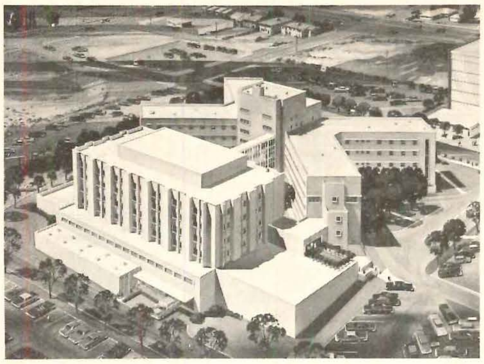


TYPICAL PATIENT FLOOR CLEAN SUPPLY AND SOILED RETURN



FIRST FLOOR

Computerized intercom a factor in new tower design for Providence



The need to expand the 272-bed capacity of El Paso's X-shaped Providence Memorial Hospital, designed in 1952 by Carroll, Daeuble, DuSang and Rand (RECORD April 1952, pages 200-203), gave those same architects, and administrator Robert Byrne an opportunity to re-examine the efficiency of the old facility and to evaluate various layout and communication arrangements in the light of current practice and technology. The result was a determination to take advantage of a new computerized information system in bridging distances between the old building and a wholly new base-plus-tower structure.

The five-story Sam Young Tower will house an all-new and expanded surgery department on the ground floor—close to remodeled emergency, X-ray, laboratory and pharmacy departments in the existing building—with 134 all-private patient rooms on three floors above. Layout of the patient room was the result of years of study, during which three mock-ups were built and refined.

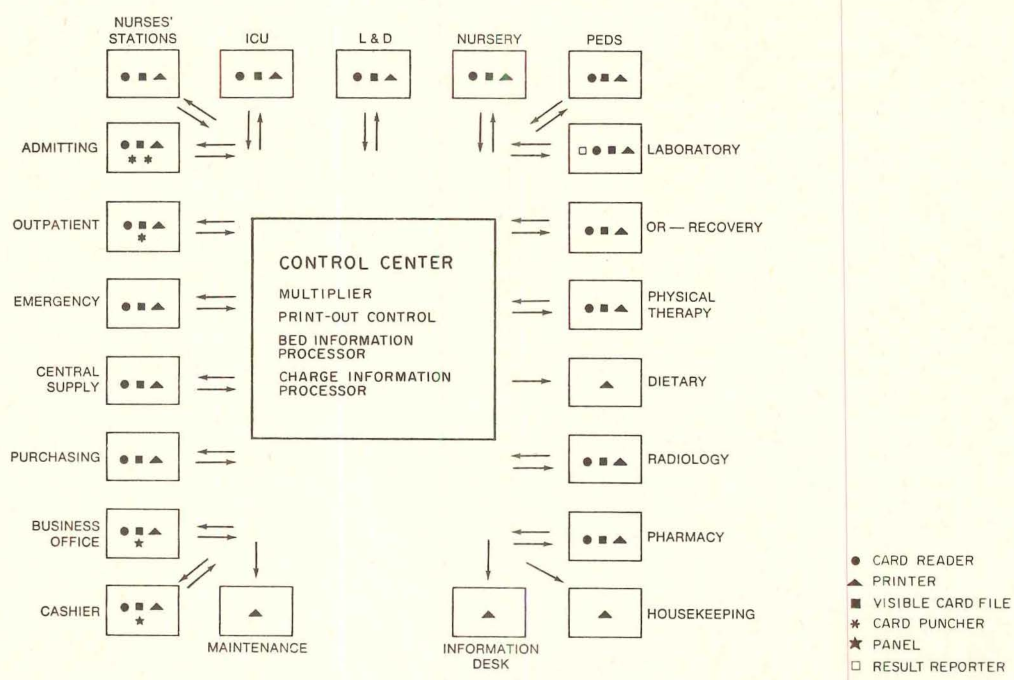
To facilitate inter-departmental communication and lessen paperwork burdens of personnel, the inclusion of a totally-integrated data collection system was considered highly desirable in terms of both economy and improved patient care. Administrators chose the Total Hospital Information System developed by Medelco. Using compact integrated circuits, the system connects all sections of the hospital, automatically delivers primary and secondary orders within 25 seconds, and enters all patient charge information. The chart at right shows the complement of equipment at each station.

The system uses punch cards, and is thus highly flexible, since any change in procedure can be incorporated simply by making new cards. Two types of edge-punched cards are used. One is the patient information card, which is typed and punched when a patient is admitted and kept on file at the nurses' station on the patient's floor. The other is the order information card, which contains information necessary to order one type of product or service. A set of these cards is kept on file at each department or station where that product or service might conceivably be ordered, as shown in photo (1) below.

To order a specific service, the nurse or clerk at the initiating station unlocks the card reader with her personal key (2). This procedure identifies her as the initiator of the transmission. She then inserts the patient's card and the order information card for the service required. The computer control center receives the message, checks for errors, and determines whether it should be sent to only one department or to several—in addition to being stored for retrieval by the accounting department.

In the case of an X-ray order, for example, the message is printed out on a teletype printer in the lab. If a special diet is required before the procedure, the same message is printed out as a secondary order in the dietary department. Radiology personnel respond to the order by transmitting back a scheduling message to the patient's floor. If pharmaceuticals will be required before or after the procedure, a copy of the doctor's prescription will be dispatched to the pharmacy by pneumatic tube. In the pharmacy, a nurse then inserts the patient's card and the order information card corresponding to the prescription into the card reader (3) which prints out a label complete with patient's name, medication and administering directions. Label and order are then checked against the prescription for errors by personnel (4). This saves the pharmacist the chore of preparing labels himself—a task which previously took up 40 to 45 per cent of his time. He simply fills the prescription and dispatches the medication (5).

Results of X-ray reading or any laboratory tests will be immediately transmitted through the originating nurses' station for entry into the patient's record (6). Once every 24 hours, the business office calls for a standard data retrieval for the billing department of all charge information for the preceding day, organized by patient (7). Because the system uses integrated circuits, the processor for the entire operation is so compact that it can be fitted into a closet (8).



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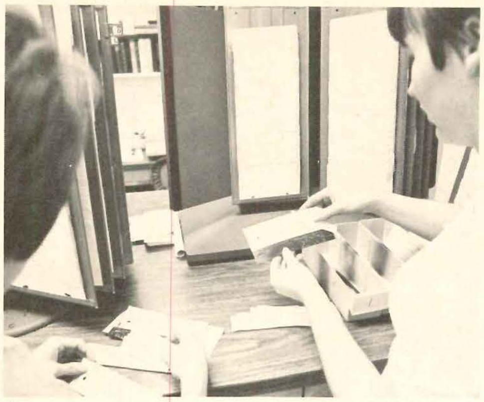

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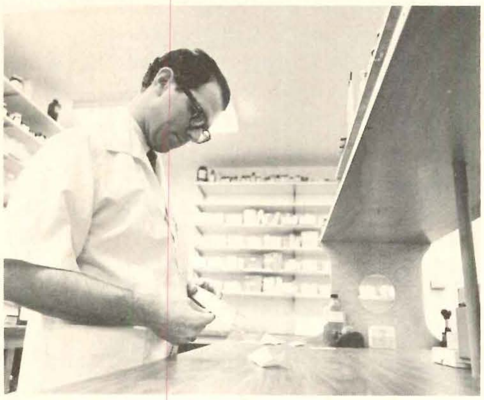

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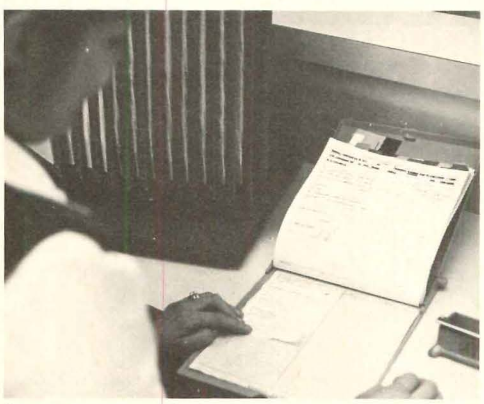

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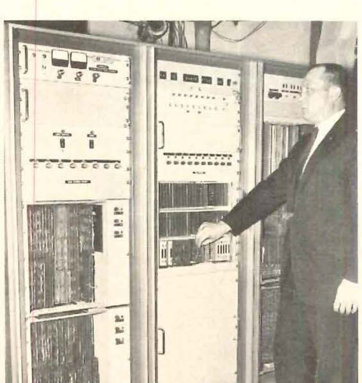
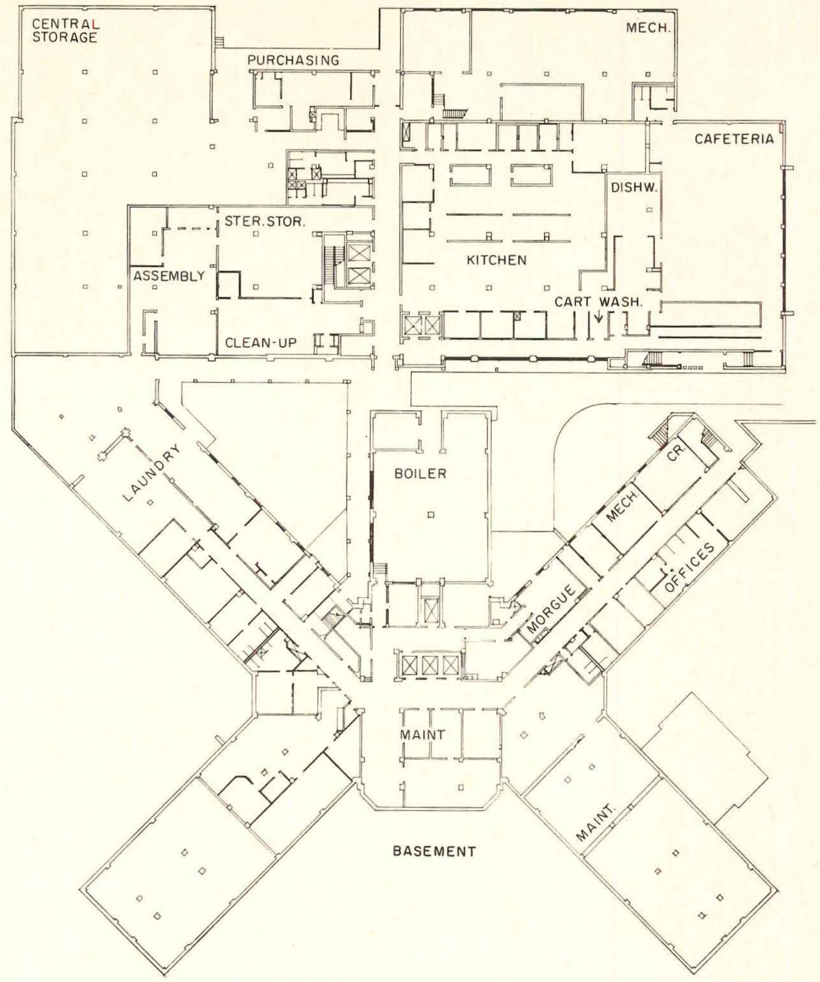
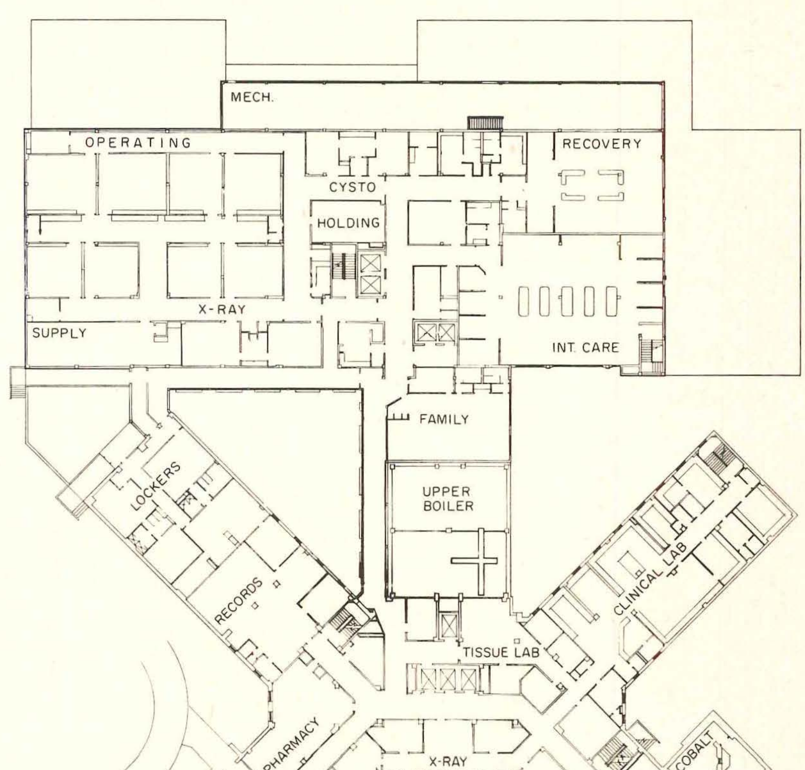
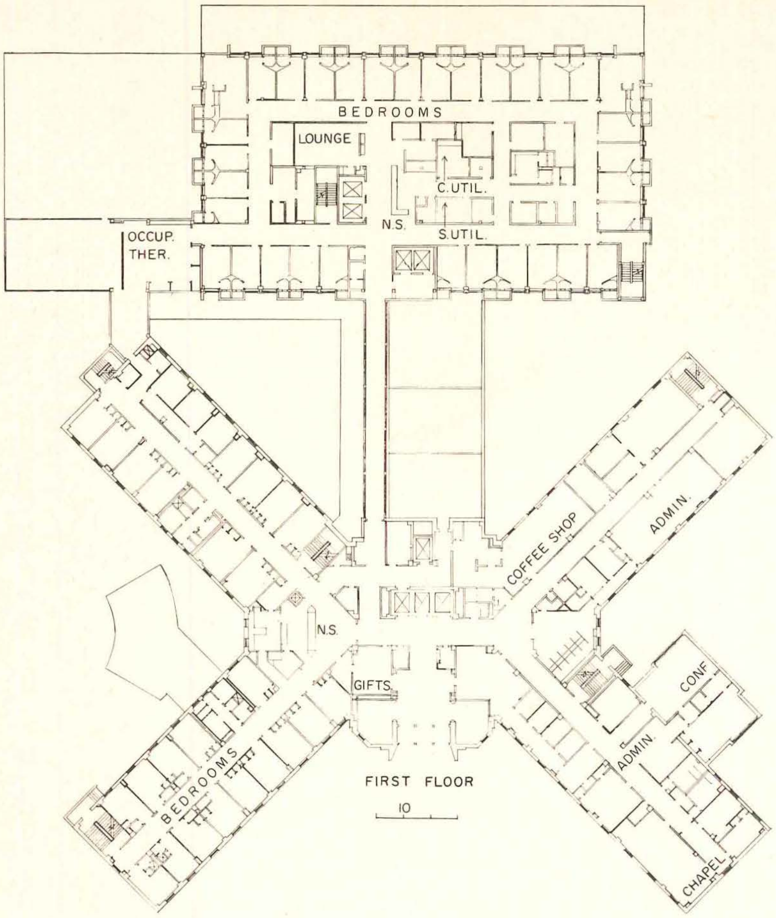



CENTRAL STORAGE
PURCHASING
MECH.
CAFETERIA
DISHW.
STER. STOR.
ASSEMBLY
KITCHEN
CART WASH.
CLEAN-UP
LAUNDRY
BOILER
CR
MECH
OFFICES
MORGUE
MAINT
MAINT.
BASEMENT

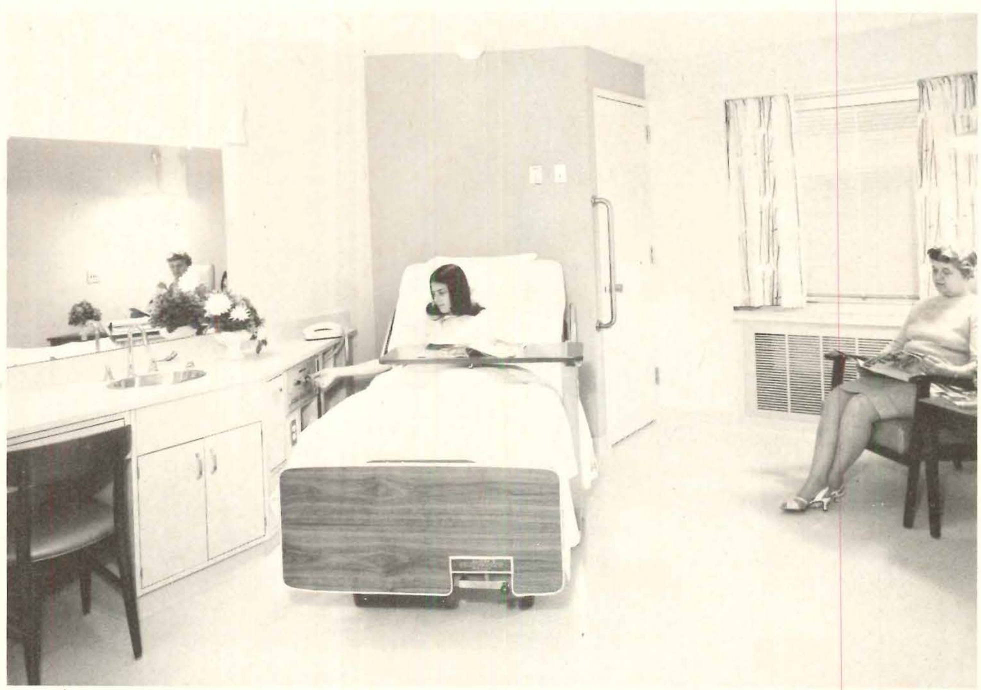

MECH.
OPERATING
RECOVERY
CYSTO
HOLDING
X-RAY
SUPPLY
INT. CARE
FAMILY
LOCKERS
UPPER BOILER
RECORDS
CLINICAL LAB
TISSUE LAB
PHARMACY
X-RAY
COBALT
X-RAY
EMERGENCY
N.S.
PHY. THER
GROUND FLOOR

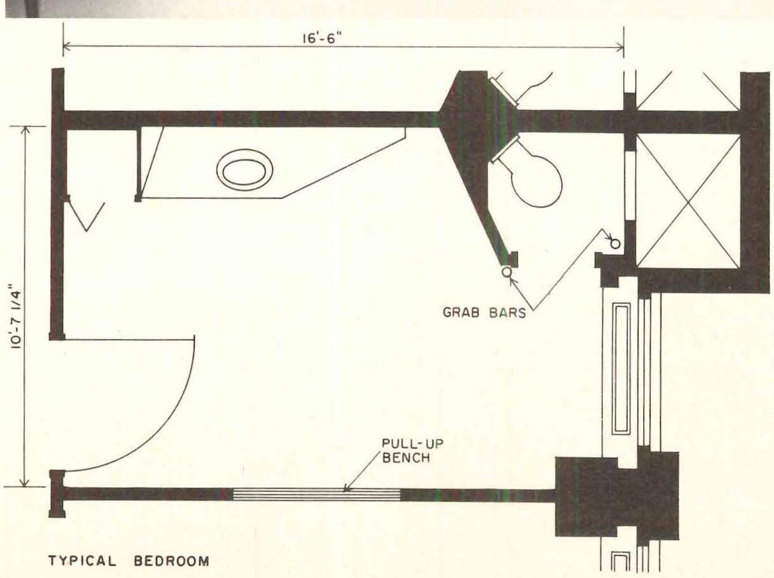


Full-size mock-ups for the all-single-patient rooms in the Sam Young Tower permitted extensive experimentation with room size and layout before plans were made final. The patient's bedside console unit is convenient from either reclining or sitting positions. It includes a dressing table, lavatory with running ice water, nurse call system and controls for lighting, TV and radio. The toilet room, directly behind the patient's bed, is equipped with two grab bars. On the opposite wall there is a fold-up recessed bench for flowers or additional visitors.

Room lighting consists of two bullet lights—one at the head of the bed for reading, the other just beyond the foot of the bed. This combination provides excellent light for any type of treament the doctor or nurse has to perform. The light at the foot of the bed is controlled from a dimmer at the door so that the nurse can turn it up slightly to check the patient.

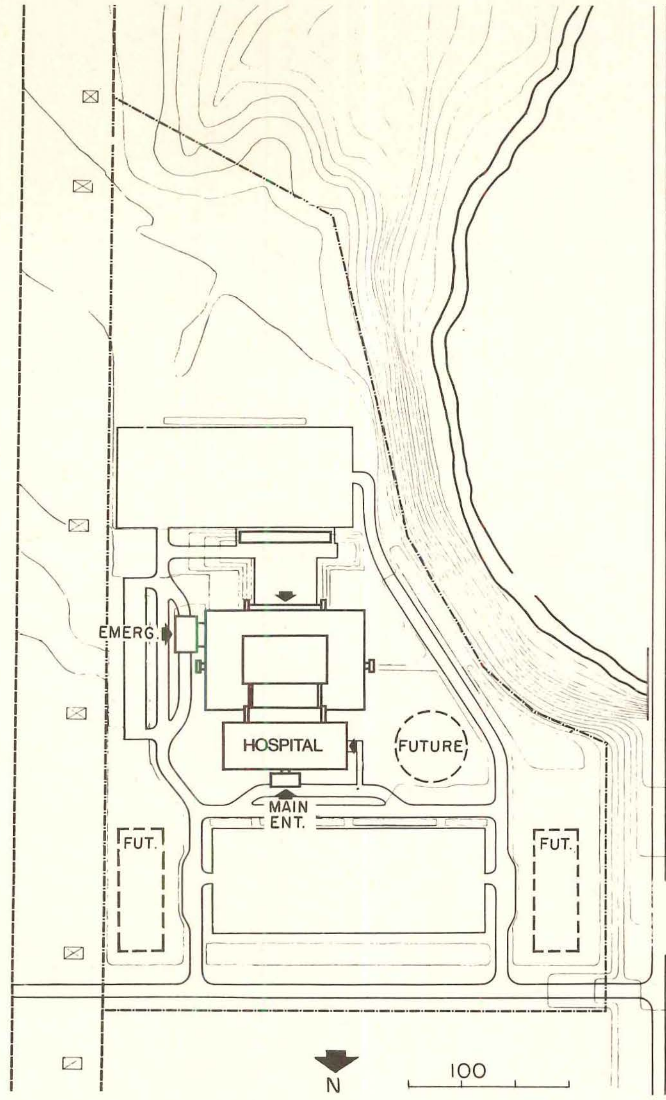
SAM YOUNG TOWER ADDITION TO PROVIDENCE MEMORIAL HOSPITAL, El Paso, Texas. Architects: *Carrol, Daeuble, DuSang and Rand;* mechanical and electrical: *Leo L. Landauer and Associates;* hospital consultant: *Everett Jones;* contractor: *Robert E. McKee.*



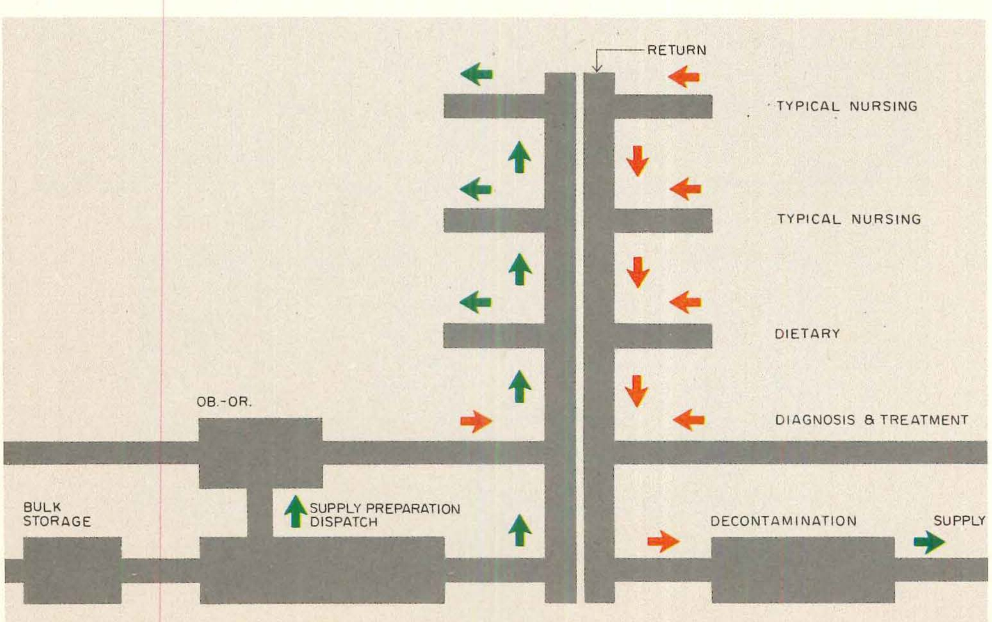


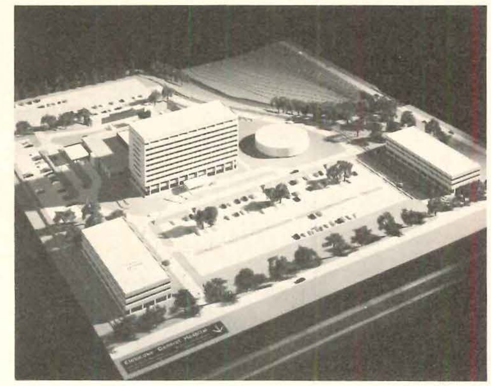
TYPICAL BEDROOM

New Canadian hospital is structured for an overhead monorail system



Master plan of Etobicoke Hospital envisions future medical office and educational buildings creating a full medical teaching center. Schematic section of the automatic cart transport system, below, shows separation of clean and soiled supplies.





Etobicoke General Hospital in the northwestern area of Metropolitan Toronto, planned for completion in 1970, is designed to accommodate an overhead monorail distribution system. An acute treatment hospital of 500 beds, it is master-planned to become, with the completion of future medical offices, extended care and educational facilities, a fully integrated health center.

Carl C. Hunt, administrator, was a ready ally of architects John B. Parkin Associates and consultant Gordon Friesen in their wish to incorporate many advanced ideas in hospital design. Among these are: 1) a combined obstetrical delivery and surgical suite, currently considered a research project; and 2) an automatic cart transport system in which an overhead monorail carries electronically controlled conveyances for medical and linen supplies and for waste and soiled goods to and from all points in the hospital.

In another innovation emerging in modern hospital design, the traditional nursing station is replaced by an administration communications center, coordinating nursing activity in the four zones into which each floor is divided. Each floor zone has a team conference center. In this way nurses can be closer to patients at all times. The administration centers will also centralize the pneumatic tube system installed for rapid distribution of all paper forms, medical information and medications.

The building is composed of two basic sections: a two-level service and surgical base section, at the front of which rises an administration and nursing tower of twelve stories. Total area is 410,000 square feet. Both portions of the building are served by the automatic cart transport system, which penetrates each of the two sections of the building with elevators to outlets at all levels.

Receiving dispatch and storage of goods is centralized on the first level (see plan, next page) where a monorail, circulating through the decontamination, processing, linen and supply areas, conveys trucks, each measuring 2 by 4 by 5 feet, to and from two elevators which are operated by remote control. One elevator delivers new and sterilized goods to designated areas of the hospital, while the other transports garbage and soiled materials directly to the decontamination area for sorting and automatic disposal.

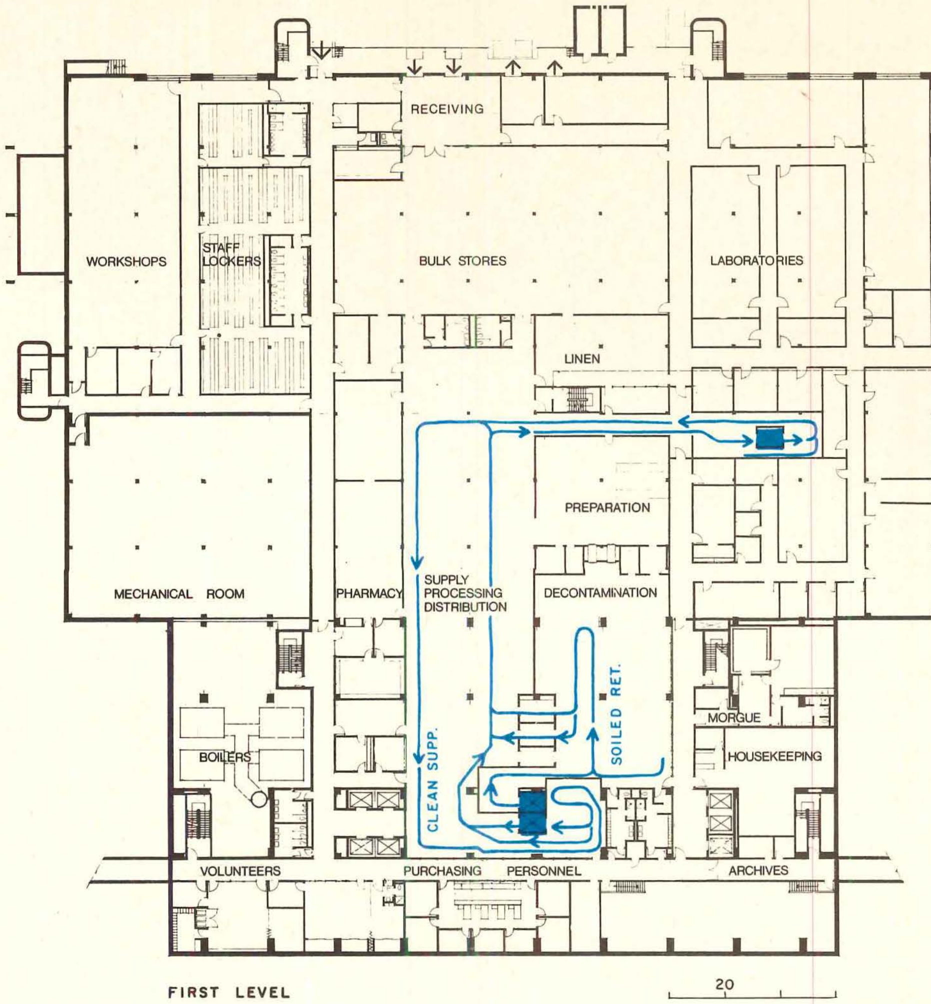
When one of the carts has been ejected automatically into a receiving room on a designated level, it can await further distribution by a supply technician. With central surveillance of cart locations and outlets in all areas of the hospital, the system can supply either on urgent demand or according to regular routine of the hospital.

The monorail system serving the kitchen on the third level of the tower has been installed to accommodate future use of convenience or pre-packaged foods. When such foods are more readily available in the area, the cart system will distribute pre-cooked frozen meals to service rooms or galleys on each nursing floor where they will be heated in microwave ovens and served directly to patients.

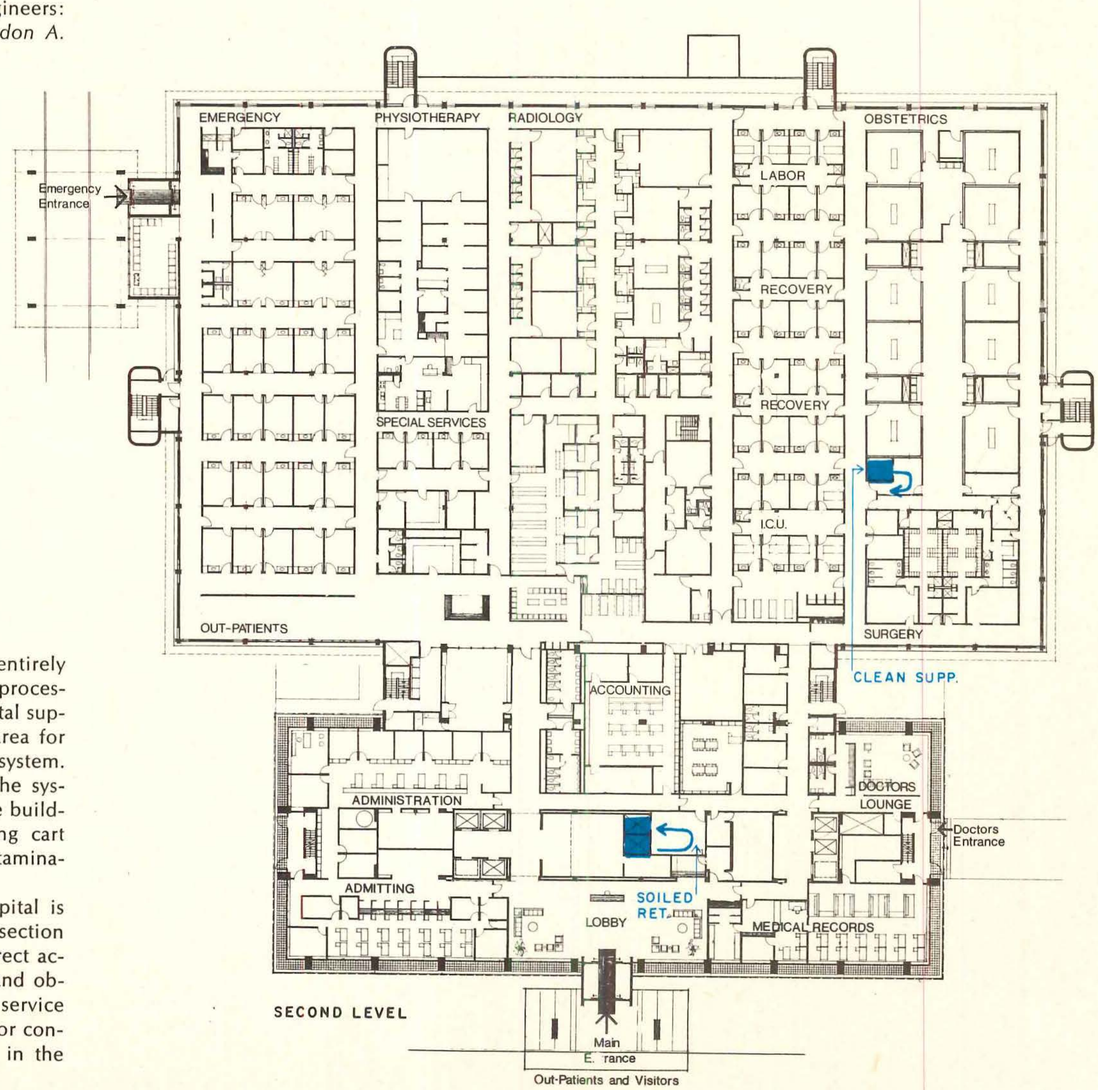
Other central mechanical systems, not necessarily innovative at Etobicoke, include a vacuum cleaning system piped to all levels, and a central oxygen and vacuum system piped to all treatment and patient rooms.

A dual-duct air conditioning system is zoned for year-round service to all areas, and six separate air supply plants assure uninterrupted service.

ETOBICOKE GENERAL HOSPITAL, Borough of Etobicoke, Toronto, Ontario. Architects and engineers: *John B. Parkin Associates;* consultants: *Gordon A. Friesen International, Inc.*



FIRST LEVEL



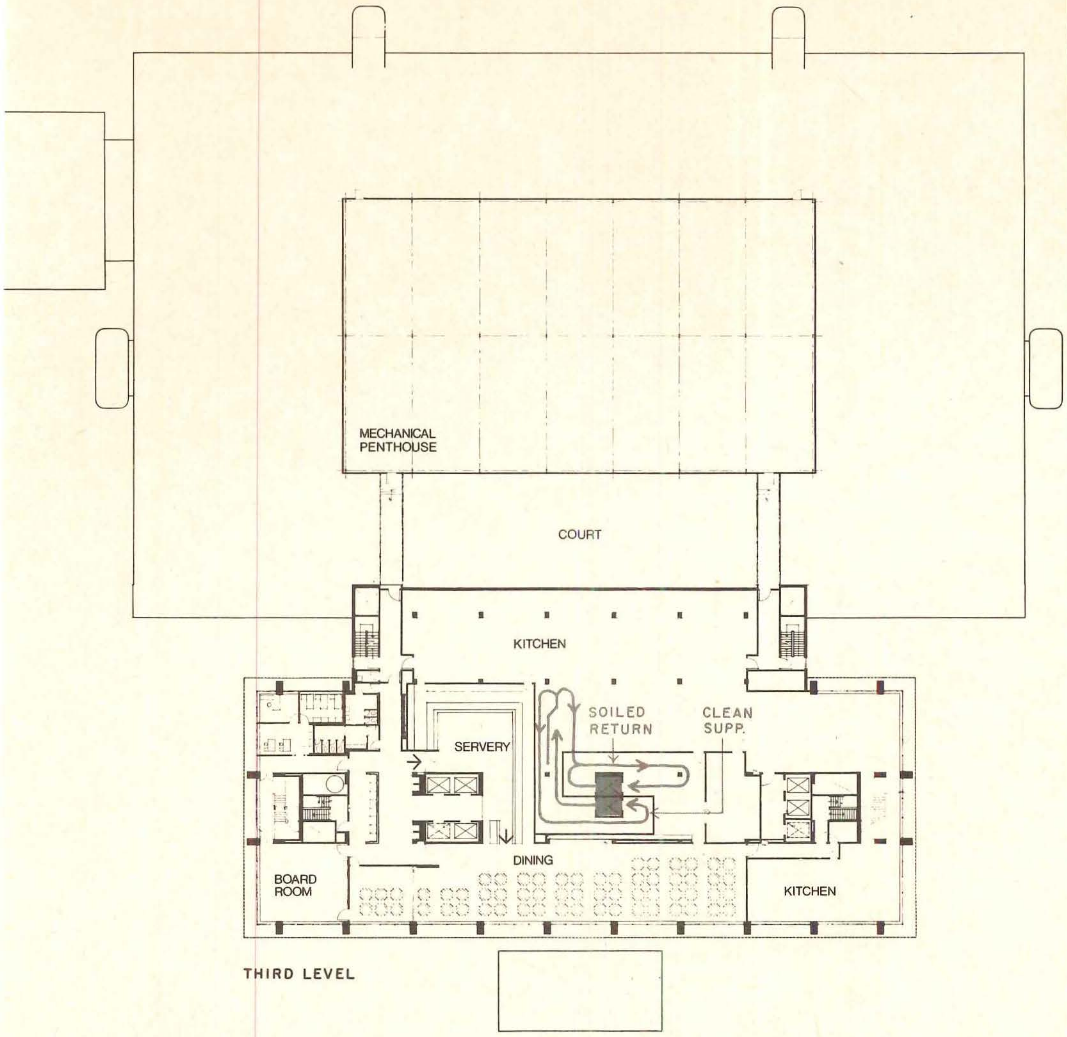
SECOND LEVEL

First level of the building is entirely devoted to receiving, storage, processing and maintenance of hospital supplies. It is the central depot area for the automatic cart transport system. The double elevator serving the system in the tower section of the building assures that each returning cart proceeds through the decontamination area.

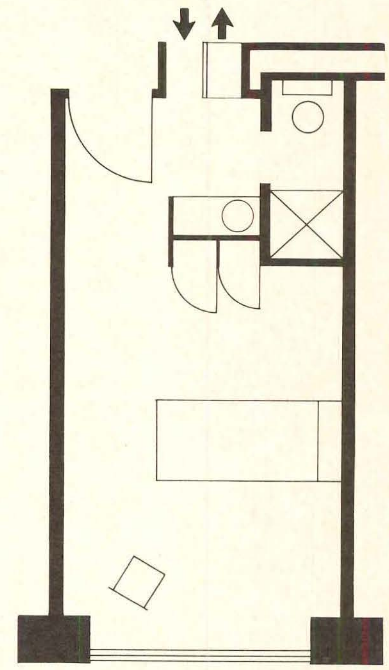
Main entrance to the hospital is at the north end of the tower section on the second level, giving direct access to admitting, outpatient and obstetrical-surgical areas. Food service on the third level is designed for conversion to convenience foods in the future.

The well-known Friesen Nurserver penetrates from corridors to service alcoves in patient rooms. This vertically divided, double-access pass-through permits loading and storage of a daily complement of clean supplies for each room and a scheduled pick-up of soiled materials from corridor access to the other chamber of the Nurserver. Each patient room at Etobicoke has a toilet, wash basin and shower.

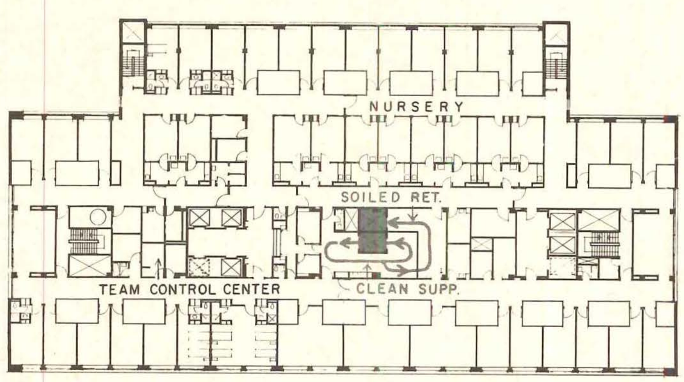
Sketches below, not specifically for this hospital, show general aspect of the monorail system.



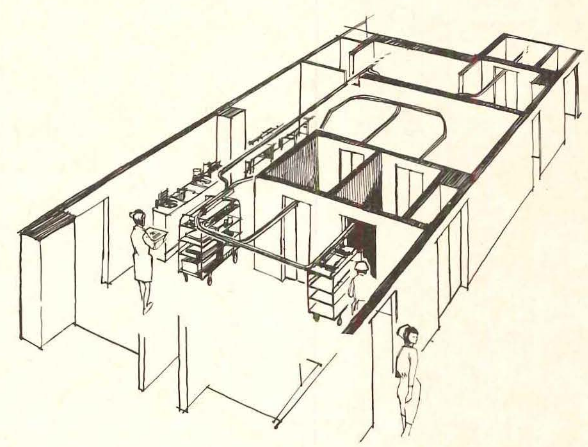
THIRD LEVEL

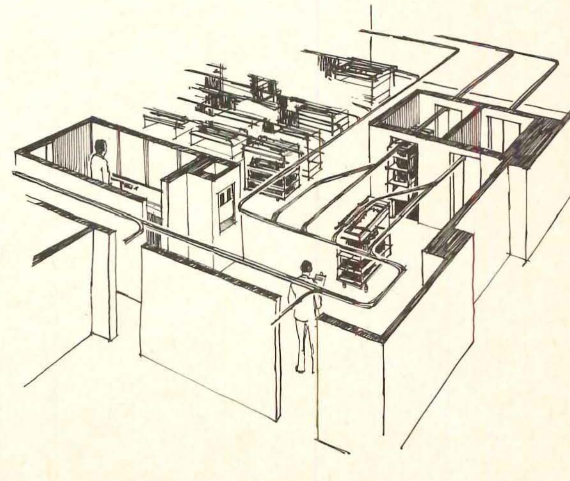


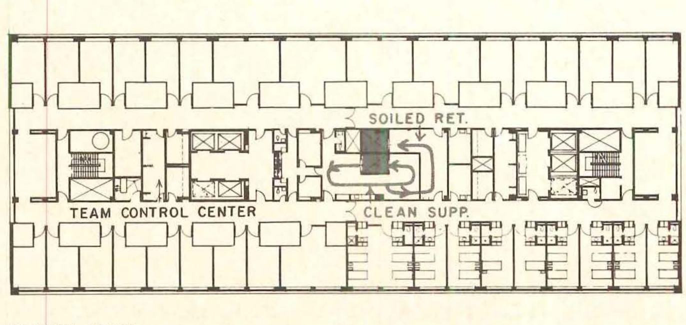
TYPICAL BEDROOM



FOURTH LEVEL (MATERNITY)







TYPICAL LEVEL

Continuous conveyor systems adapted to Nebraska Methodist

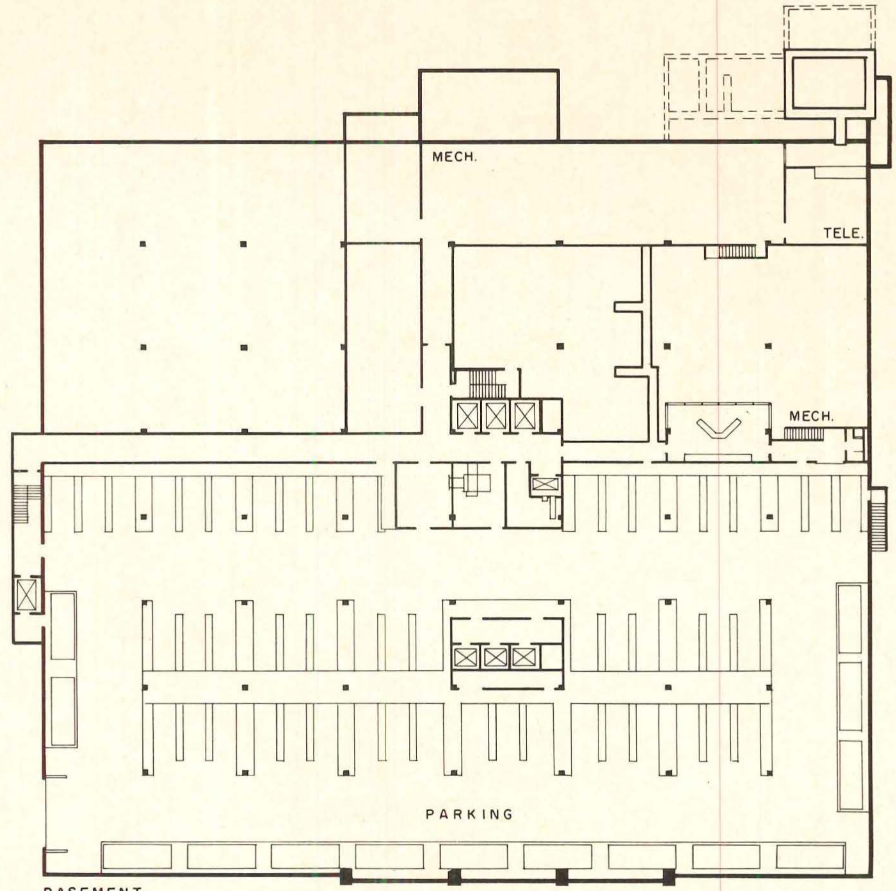
Nebraska Methodist Hospital in Omaha was designed by architects Henningson, Durham and Richardson with careful attention to exterior expression of the separate functions in the operating base and nursing tower, and with unusual emphasis on interior design. The goal: to develop a residential or hotel-like aspect, especially in public spaces, as shown on page 164. Mechanical systems conveying foods and supplies, while adhering to tried and successful devices rather than new inventions, take full advantage of the vertical stacking of supply and delivery stations of the separate systems.

The sloping site, although it presented problems in the construction of the large, three-level base building, offered advantages of grade entrances to each of the three primary levels.

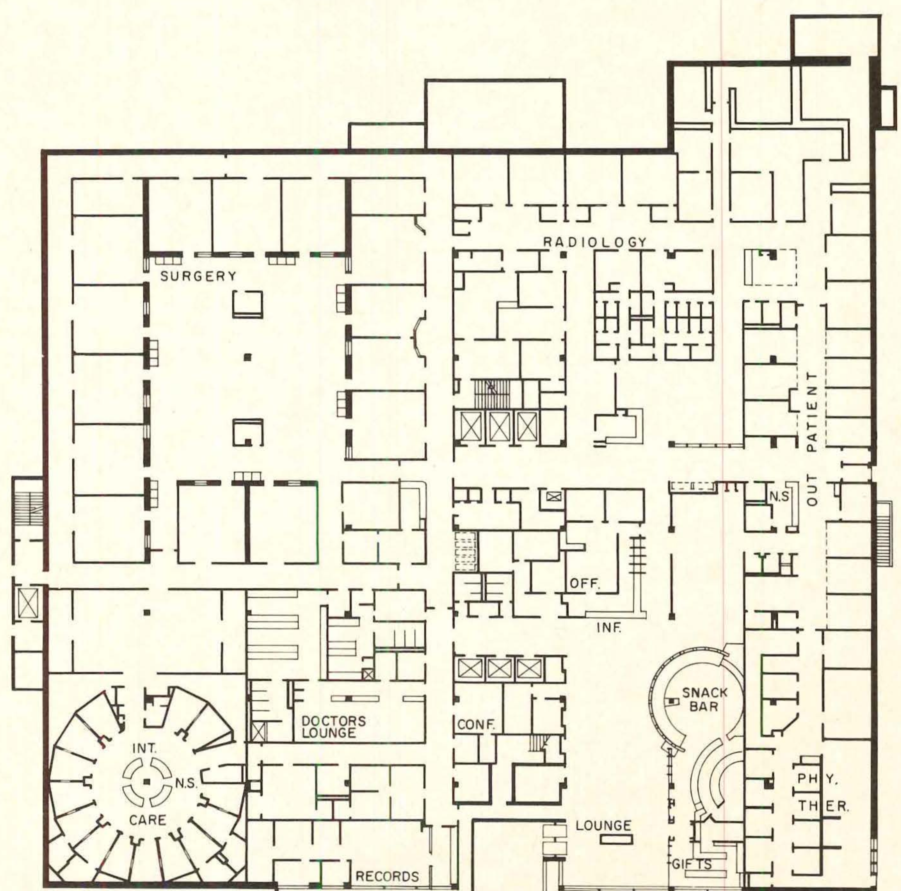
Basic transport systems for materials in the hospital include a bank of three bed-size service elevators and a separate bank of three public elevators which serves the parking level on the first floor lobby and administration area on the second floor as well as nursing floors in the tower above. A so-called selective vertical system (photos opposite) is contained in a vertical shaft passing through central dispatch and clean-up on the second floor and serves five nursing levels above and surgery below at clean and soiled utility rooms. There are separate machines and sub-shafts for clean and soiled materials, which are carried in covered plastic tubs 16 by 22 by 8 or 12 inches. A dietary tray conveyor system handles food service, and a pneumatic tube system provides transport for records and some medications at nurses' stations and major departments.

While the selective vertical system is limited to some extent by the sizes of the containers, it has been found that most hospital packs can be assembled within the limits of available tubs. Large bulk items are handled by the service elevators. The system does avoid some of the operational problems of complex horizontal distribution systems. This essentially vertical system was found conveniently adaptable to the stacked configuration at Nebraska.

The dietary tray conveyor system moves horizontally from the tray make-up line (photo at bottom, opposite) and vertically to

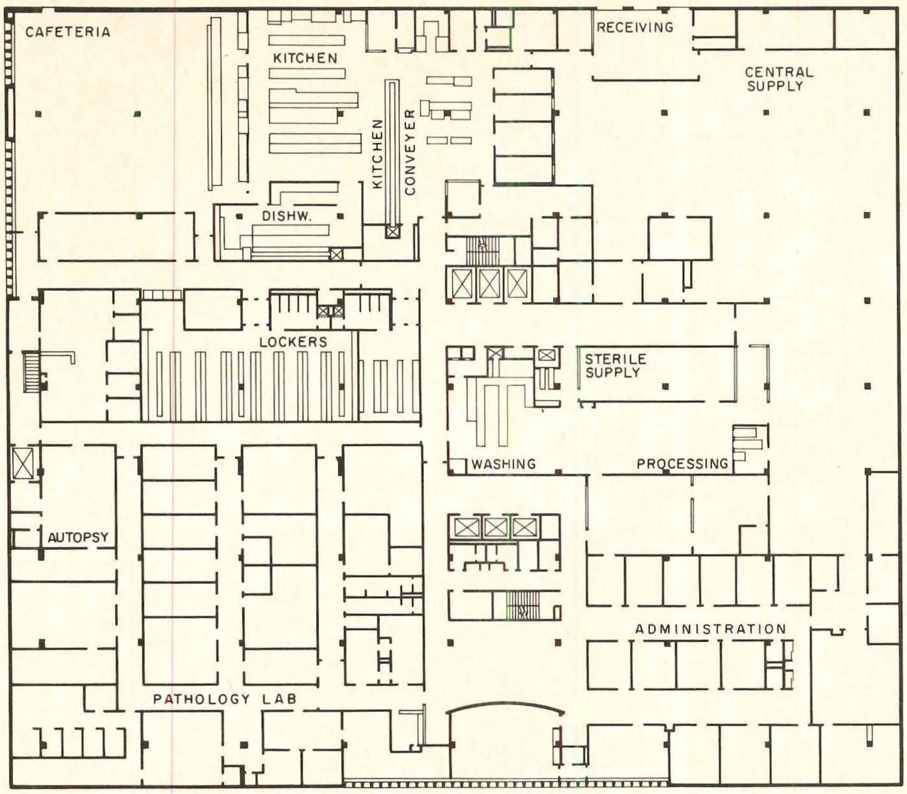


BASEMENT

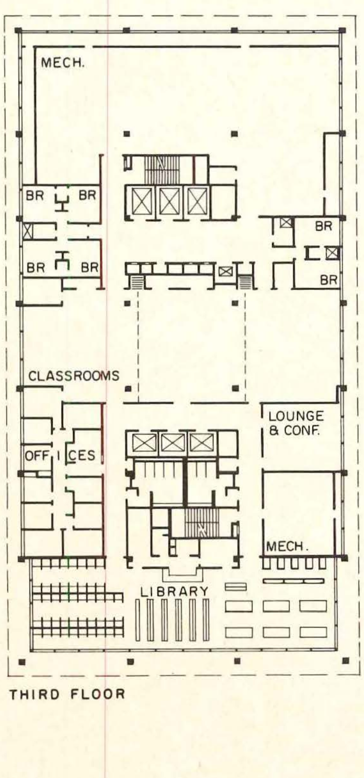


FIRST FLOOR

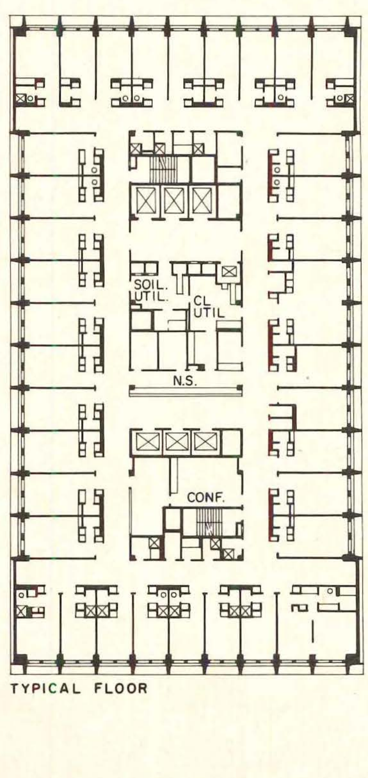
Plans below show that there is driveway access to the basement, which contains staff parking, boiler plant and pick-up rooms for trash and soiled linen. The first floor has the main entrance and emergency and employes entrances all on grade. Vertical transport systems in the hospital permit this floor to carry related departments of intensive care, surgery, radiology and physical therapy. The intensive care unit is a circular arrangement of individual patient rooms around a four-way-access nursing station. Supply services, kitchen, laboratories and administration are on the second floor with grade access to the receiving department adjacent to central stores and food stores at the back of the base.



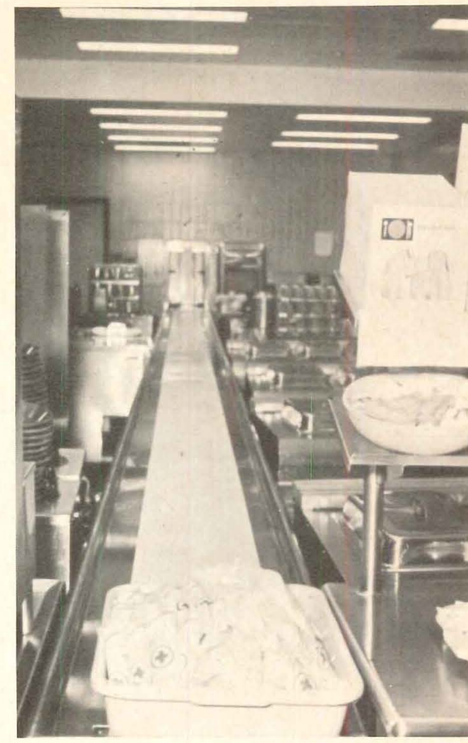
SECOND FLOOR



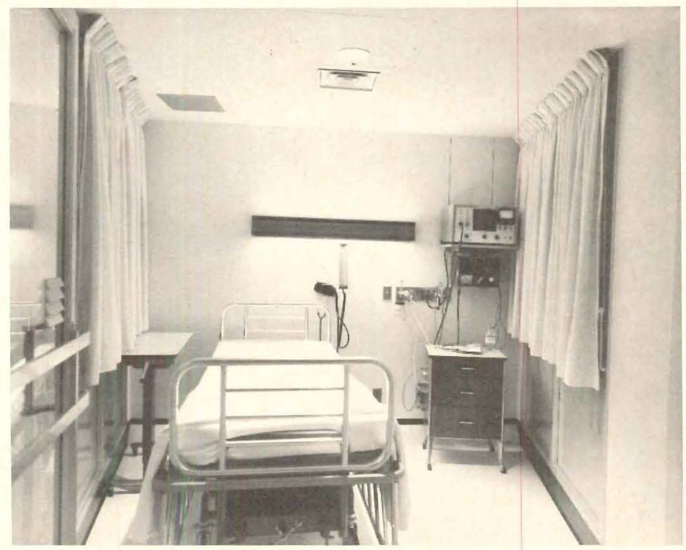
THIRD FLOOR



TYPICAL FLOOR



The selective vertical system transports glass fiber reinforced plastic tubs measuring 16 by 22 by 8 inches. Tubs have latched covers and magnetic panels which are electronically coded at sending stations with a signal for automatic ejection at designated receiving station. Receiving stations in clean utility rooms are provided with accumulator ramps where tubs are deposited. After contents are removed, tubs are transferred to an adjacent soiled return utility space. The soiled return system delivers all tubs to an accumulating spiral ramp in central clean-up, where about thirty tubs can be gathered for batching of the clean-up operation. Bottom photo is of kitchen tray conveyor.



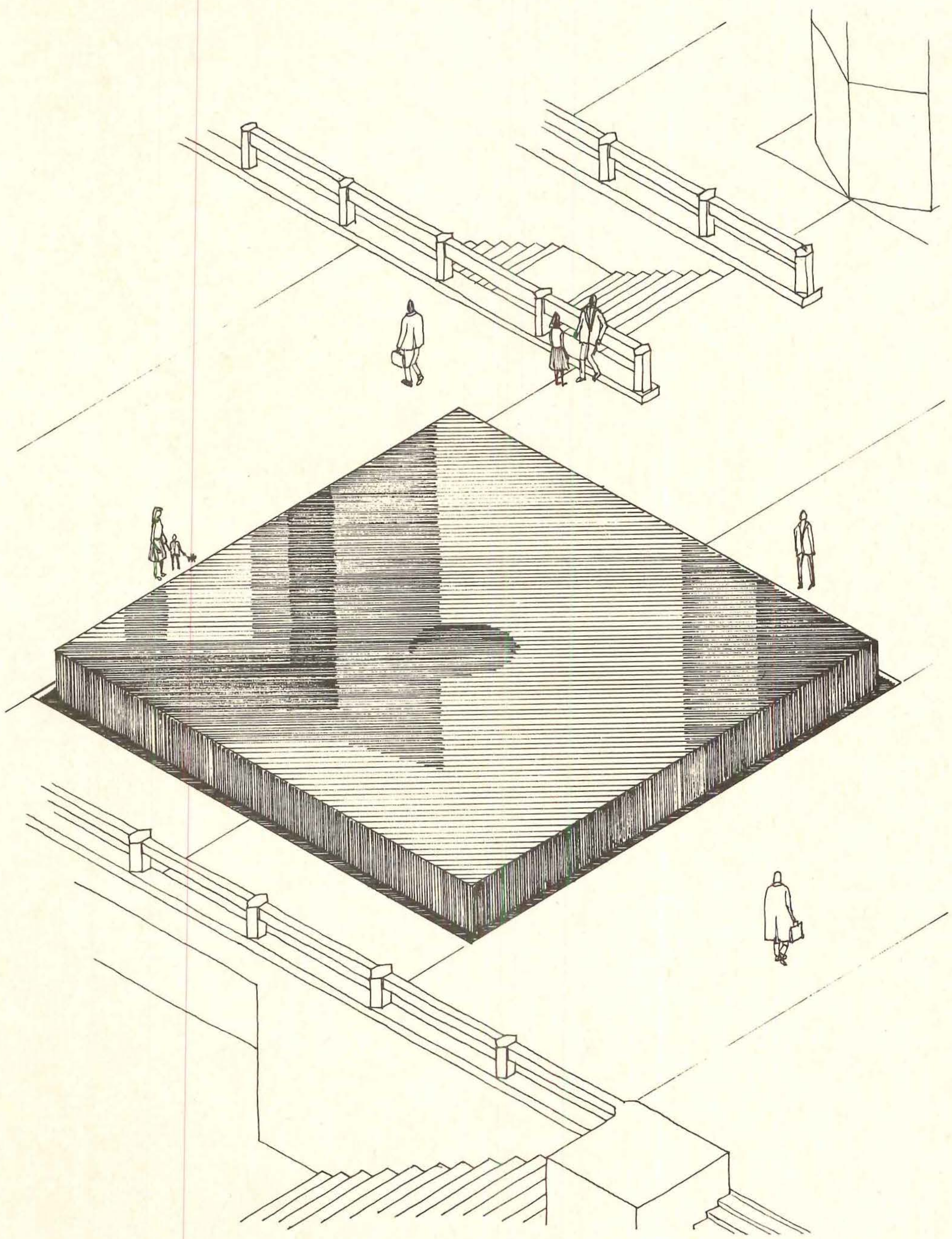
receiving stations in service lobbies on each of the nursing units. There are soiled tray depositories at adjacent locations on nursing floors, from which trays are returned to a scraping belt in the dishwashing room which also receives trays returned from the employes cafeteria. The system is programed from sending stations but is not selective as to destinations of individual trays. That is, the dietary complement for each floor must be batched. By use of a heated pellet under hot dishes and by organized operation of receiving staff on each floor, the system gets trays to patients in palatable condition. While more discipline in handling is required than in some cart systems, this system has been working well and has reduced the labor inherent in most manual food service systems.

Automation does not imply that the approach to design is totally industrial. The human involvement in hospital processes calls for the kind of attention to interior design of both public and patient spaces shown on this page.

NEBRASKA METHODIST HOSPITAL, Omaha, Nebraska. Architects: *Henningson, Durham & Richardson, Architects-Engineers* and *E. Todd Wheeler & The Perkins & Will Partnership* associated architects.

Fountain scale model serves as an engineering design tool

by Richard Chaix, senior associate, Beamer/Wilkinson & Associates, Consulting Engineers



Fountain for plaza of Bank of America World Headquarters in San Francisco is a shallow pool with water falling from all four sides, forming a vertical sheet of water that "bends" the corner. Base of the pool is a 24-in.-high granite skirt.

Design of decorative fountains has increasingly involved the use of bold, abstract water forms and large quantities of water. The concept often involves ideas that are totally new and untried, and the mechanical systems to create the water forms are not readily apparent. Quite often, communicating the concept to the engineer is the greatest problem of all.

A program of hydraulic testing can resolve most of these problems, and our firm has conducted test programs using a garden hose, a submersible pump in a swimming pool, and even a fire hydrant. Present concepts have, however, outgrown these "backyard" facilities and dictated the need for a complete, full-scale hydraulic testing facility such as is available at the University of California, Berkeley campus, and the Richmond Field Station. These facilities and the collective academic talents of the faculty and staff are available to private organizations through "aid to industry" contracts. Our first major use of these facilities was in connection with Lawrence Halprin's design for the fountain at the new Bank of America World Headquarters building in San Francisco. The unusually simple water effect belies the complex design problem that the fountain presented. The fountain is essentially a 34-ft-square, black granite slab, elevated 30 in. above the surrounding granite plaza paving.

A 24-in. vertical granite skirt extends about the entire perimeter, giving the slab mass the appearance of "floating" in the 36-ft-square opening in the plaza paving. The top surface is a very shallow pool (4 to 5 in. deep) with water falling from all four sides, forming a vertical sheet of water around the perimeter. The four corners are to present an unbroken sheet and the surface of the pool is to be sufficiently tranquil to serve as a reflecting pool.

The problems associated with implementing the concept were known to be formidable—if not completely impractical. The major areas of concern included:

1. Introducing to the shallow fountain surface pool the 5,000 to 6,000 gallons per minute required to produce the waterfall effect without disturbing the "reflecting pool" quality of the surface.

Though there was some doubt about the possibility of creating a waterfall with "square" corners, hydraulic engineers at the University of California at Berkeley accomplished the feat by curving the weir at the corner in section and elevation (see drawings of weir corner condition across page). Away from the corners the weir is a simple wedge. Several corner designs were tried—such as large radius drop, notching, spout. The final configuration (across page) was tested in a full-size corner.

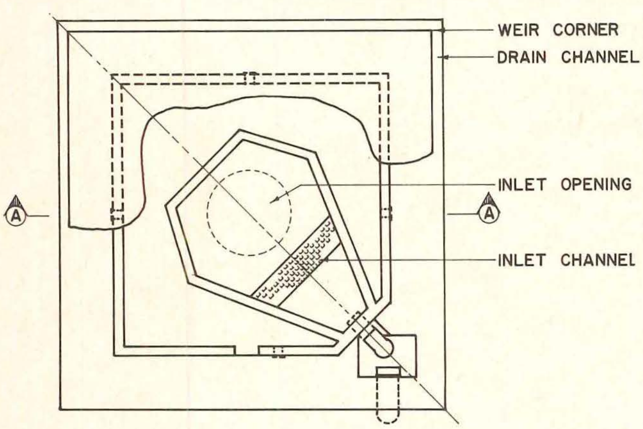
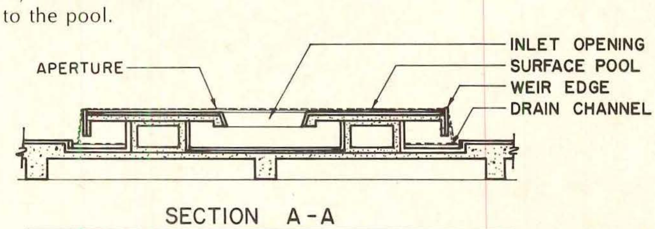


FIGURE 1: FOUNTAIN PLAN AND SECTION

To minimize chances of surface ripples, inlet channel was designed in a pear shape, had baffles on 4-in. centers to diffuse the inlet stream, and had a circular opening to the pool.



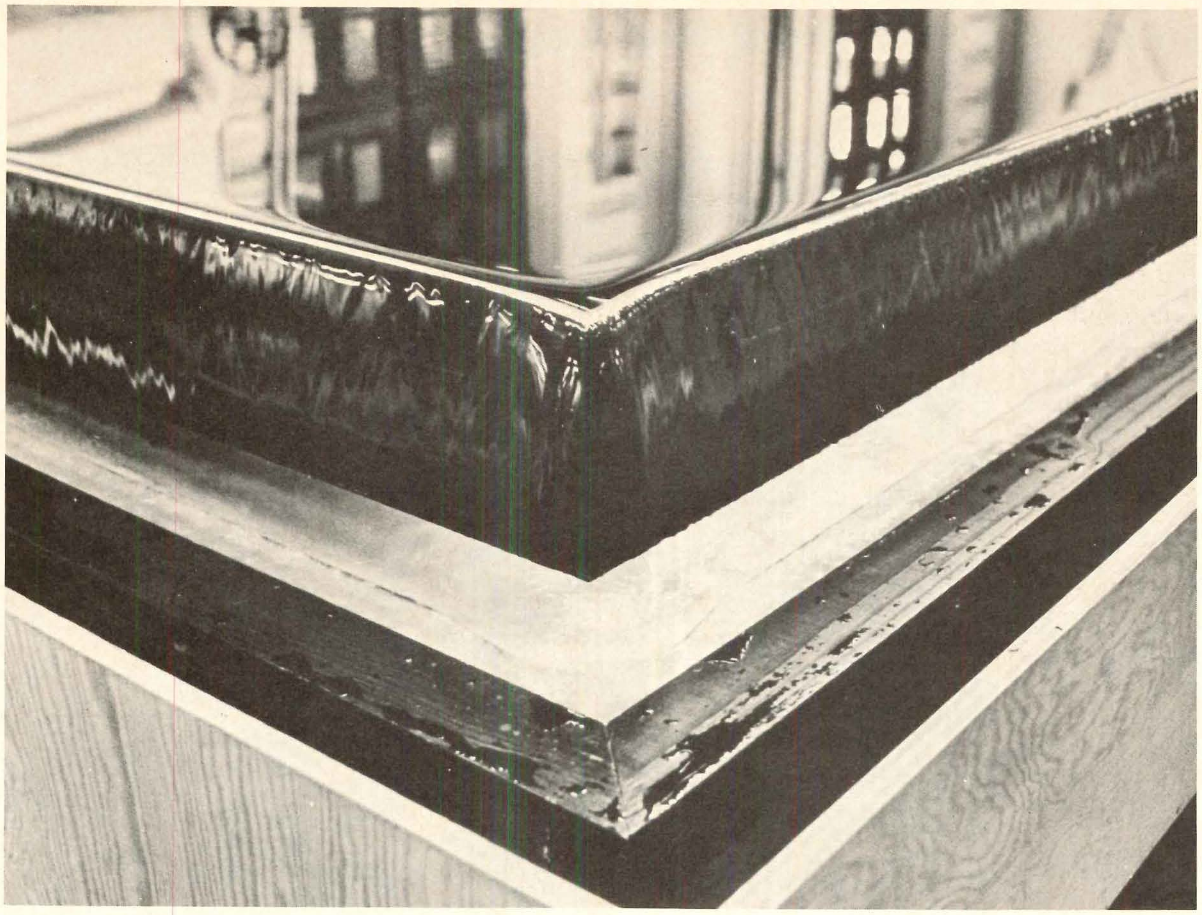
2. Draining and recirculating 5,000 to 6,000 gpm without the benefit of a retention pool. The only available depth for this was 9 to 12 in. between the sloped plaza paving and the plaza structural slab. The elevations were already set, and it was not possible to depress the structural slab.
3. The piping and duct shafts were already located and spaces utilized, and it was not practical to relocate them, as all piping and duct work had been detailed and architectural drawings were essentially complete. The fountain piping and equipment had to be located in "leftover" space.
4. No one concerned with the fountain design had seen a "waterfall with square corners," and most were somewhat skeptical as to the possibility of producing an unbroken sheet at this intersection.
5. The 52-story bank building and the surrounding buildings and hilly terrain promised to produce strange and severe wind conditions, and even though the area was mocked up and wind tunnel tested at the University of Colorado, no one could be sure of the velocity or direction at the fountain location; therefore the fountain should be relatively stable in moderate winds.

At the outset, it was decided that a program of consultation and testing should be arranged for resolution of those problems that were purely hydraulic in nature. Several preliminary conferences with Professor H. W. Iverson at the University of California, Berkeley, clearly indicated that the most logical approach to the design problem was construction of a model, to the largest scale practicable, to determine emperically the optimum design for the inlet channel and opening, the surface pool, the weir edge and corners and the drain channel.

Further conferences determined that windborne spray would probably not present a serious problem, but it was decided to use the fountain model for wind testing also, using fans to simulate a range of wind velocities to 25 mph.

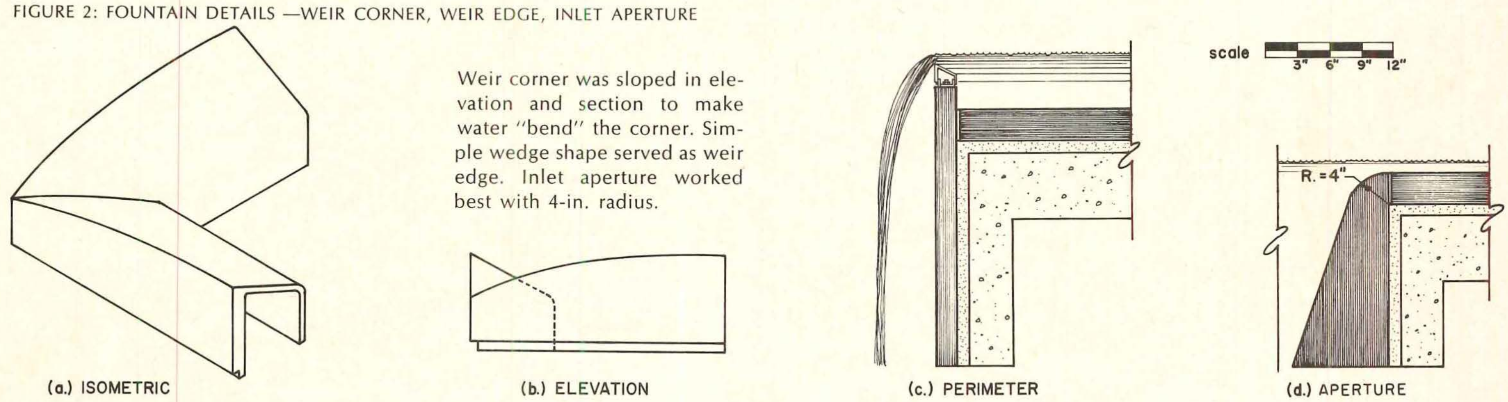
Prior to construction of the model, the following basic design parameters were established for the fountain:

1. *Inlet channel and opening:* Since the only available space for pump discharge piping was the northwest corner of the fountain, a pear-shaped channel emanating from that point would be used. Diffusion of the inlet stream to prevent disturbance of the reflecting pool would be accomplished with a series of vertical baffles spaced 4 in. on centers and arranged across the inlet channel normal to the flow of water. A circular inlet opening would be used in order to give the water the best possible chance of rising to the pool surface without a ripple. An 8-ft diameter was selected to provide flow to the surface at a rate of less than 0.25 ft per second.
2. *Weir edge and corners:* The basic weir would be modeled in wood to allow whittling at the corners, and an adjustable weir height used to permit changes in surface depth.
3. *Drain channel:* Test width would be determined through a series of backwater curve calculations, which determined that the minimum allowable channel width would be 5 ft.
4. *Flow rate:* Test flow rate would be predicated on the fountain having 1 in. of water



The model was built to ¼ scale. All components were scaled down, as were flow rates, in order to accurately represent the full-scale fountain. After water flows over the weir it is collected in a drain channel at the base of the fountain and returned to the pump. Of major concern to the designers was introducing water to the pool without creating any ripples in the surface. This was accomplished by a special inlet design (across page). Further, they wanted no "welling" at the surface. Tests showed this could be done with a 5-in. pool depth and with a 4-in. radius for the inlet aperture (below).

FIGURE 2: FOUNTAIN DETAILS —WEIR CORNER, WEIR EDGE, INLET APERTURE



Weir corner was sloped in elevation and section to make water "bend" the corner. Simple wedge shape served as weir edge. Inlet aperture worked best with 4-in. radius.

above the weir edge at all times, with a normal flow rate of 5,100 gallons per minute, adjustable to a maximum of 6,000 gpm.

5. *Model size:* It was decided that to properly model and evaluate the above listed items, it would be necessary to build the fountain model to ¼ scale.

The basic model was constructed of ¾-in. marine plywood over a rigid frame, shimmed to true level after placement. All components were accurately scaled down, as were flow rates and corresponding fluid velocities, faithfully representing the future full-scale fountain.

Periodic reviews of the model for final design decisions were to be conducted by the associated firms (architects Wurster, Bernardi and Emmons, Inc., and Skidmore, Owings & Merrill; associated for the fountain is Lawrence Halprin & Associates) responsible for the Bank of America project. Initial tests were without baffling and with the weir edge removed, to allow analysis of the flow pattern. Based on this flow pattern, Professor Iverson designed a "best guess" baffle system, and by patiently adding and deleting baffles, optimum diffusion was attained.

The next task was to determine the minimum surface depth that would preclude "welling" at the inlet aperture. Each increment of depth up to 5 in. made a substantial improvement, whereas gains beyond that point were negligible. The depth was set at 5 in. Several contours were tested for the inlet aperture, and the best results were obtained with a 4-in. radius at the top slab (Figure 2d).

The weir edge testing was begun with the idea of using the simplest possible weir profile to prevent cluttering the very simple fountain form. The simple wedge form tested first (Figure 2c) proved to be very satisfactory and was adopted as the final form. Several different corner designs were attempted, including large-radius drop, notching, and even a spout arrangement.

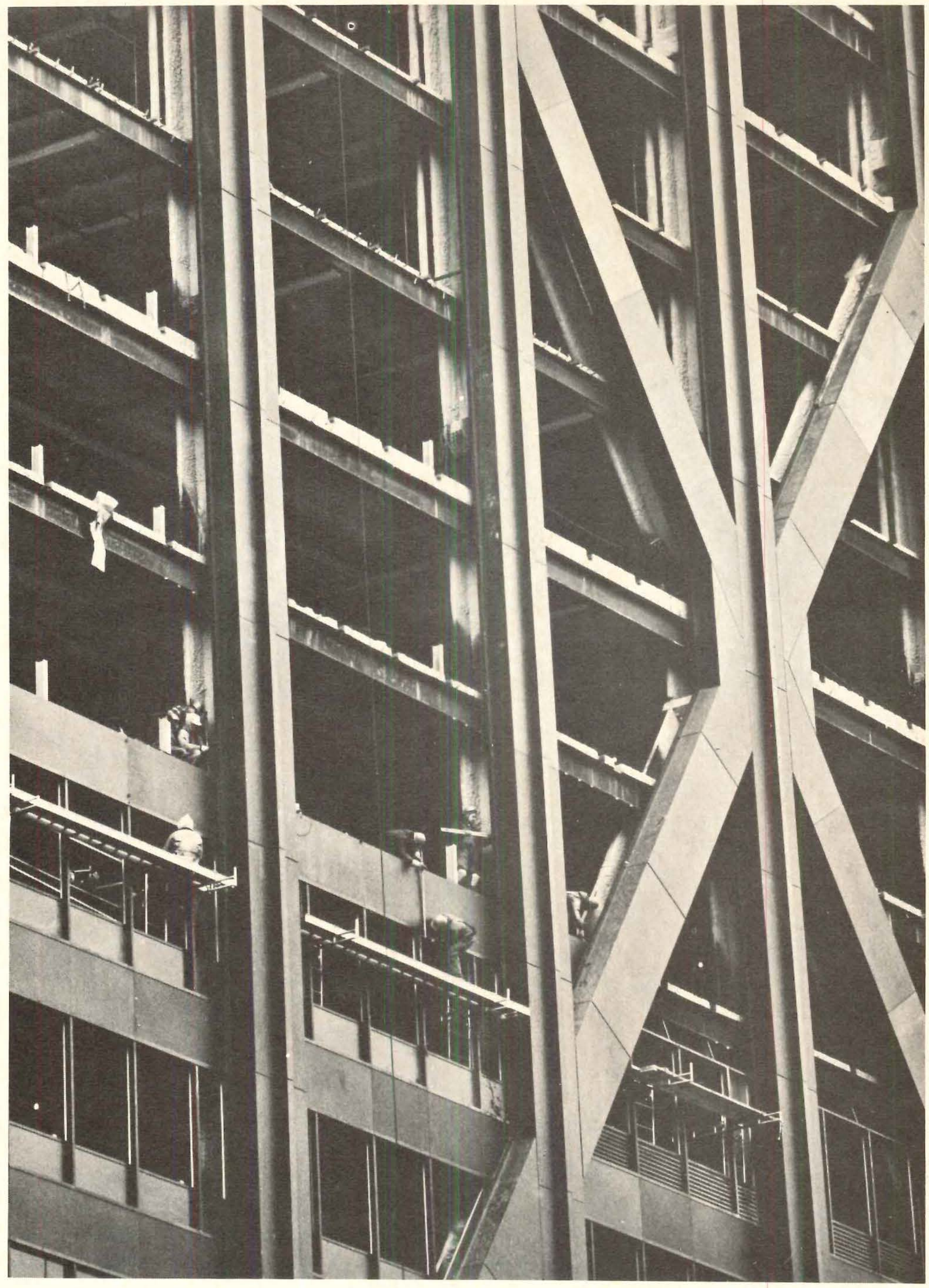
While all of these produced reasonably satisfactory results, Professor Iverson felt a full scale corner should be built to properly resolve the ultimate corner configuration. With this accomplished the final corner configuration was set. (Figure 2a and 2b). The final corner was projected back to the ¼ scale model (it was exaggerated somewhat on the model to compensate for the high surface tension of the wooden weir) and the drain channel was added to the bottom of the model, with the elevation at each corner correctly representing the complex slope of the plaza paving.

The remainder of testing was devoted to detailing of light sources, effect of wind, effect of increased and decreased flow rates, and, in general, everything anyone would or could logically question.

The true value of the program to architect and engineer alike cannot be stated too strongly. For a dollar cost equal to about three percent of the fountain construction cost, we were assured of optimum design for all elements of the fountain, as well as a package which performed to the complete satisfaction of the architect, and afforded him the opportunity to make visual assessments of the fountain elements individually and in aggregate, and thus optimize the esthetic impact.

Insulated aluminum covers sheathe John Hancock building

The unique, tapered steel box that forms the structure of the 100-story John Hancock Center in Chicago had to be clothed in an insulated skin to prevent movement that otherwise would result when outdoor temperature rises and falls. Temperature change was a factor because the structural frame, with its diagonals which take both vertical and wind loads, is expressed as part of the architectural esthetic, putting the frame out in the open.

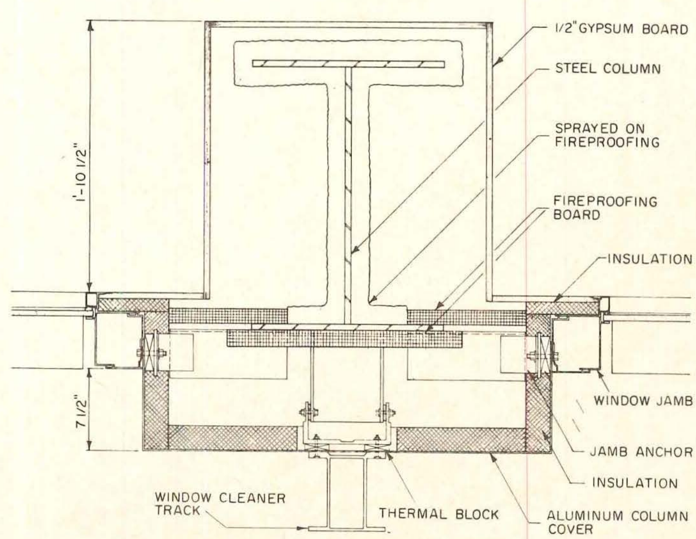


Aluminum skin is a principal feature of the exterior of the building, outlining the main structural members that trace a striking design on the faces of the building. If these "exposed" members had been left uninsulated, temperature variations would have caused the steel frame to expand or contract. Compensation may be effected by providing expansion jointing—but when a structure rises about 50 stories, such jointing may greatly increase the cost and reduce the efficiency of the building.

After the basic architectural design of the building had been worked out, architects Skidmore, Owings & Merrill were faced with the need for an integrally insulated cladding material that would satisfy simultaneously the engineering requirements of the structure and the esthetic values desired. The engineering requirement was to maintain beam-center temperature of the steel at 69 ± 1F under an 87 F differential. Materials evaluation included consideration of aluminum, steel, limestone, brick and precast concrete. Weight factors associated with a building of this height immediately eliminated all materials except aluminum and steel considering such factors as durability; ease of fabrication, erection and maintenance; esthetic contribution; and cost.

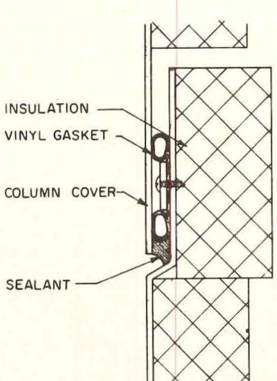
All aluminum finishes were considered, including natural processed and painted aluminum and various anodized finishes. They were evaluated on the basis of published performance specifications and upon their esthetic compatability with the structure and its environment. Weatherability, uniformity and resistance to flaking and chipping were the principal criteria. A high-density anodized finish was selected. Black was chosen for the column cover cladding, bronze for the window framing. Colors ranging from light bronze through black were evaluated.

The insulating capability of the column cladding is of vital importance to the functioning of the building, since even moderate temperature changes in the exterior columns can create serious structural and partition problems. The unit is designed so that the center of the vertical and diagonal steel beams are maintained at a temperature of 69 ± 1F when a temperature differential of 87 F (from −13 F to 74 F) exists across

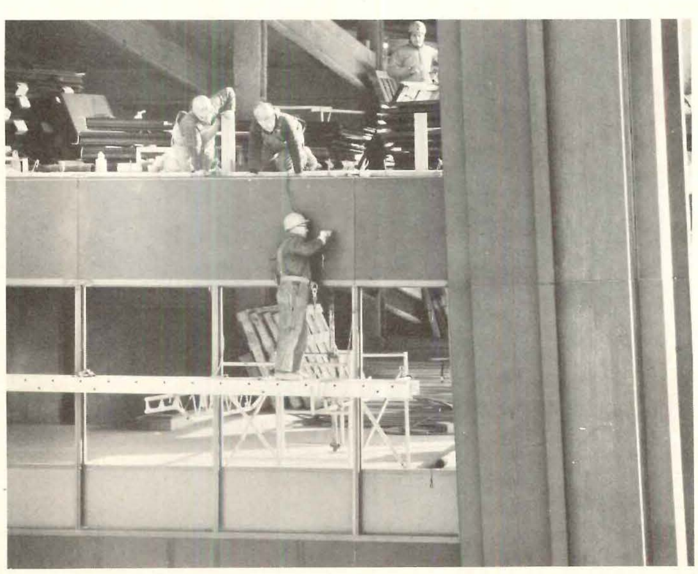


Steel skeleton of the 100-story-high John Hancock building in Chicago is clad in gray anodized aluminum. A critical function of the column covers was to maintain temperature of the structural members at 69 ± 1 F to avoid problems that would result from expansion and contraction caused by change in the outdoor temperature. For this reason, the vertical, diagonal and major horizontal covers were insulated with 2 in. of urethane insulation. The corner columns were, however, insulated with 4 in. of urethane because of the greater exposure and size of these columns. The steel frame is fire-protected by sprayed-on asbestos material.

To demonstrate that the insulated cladding could maintain proper temperature, a column mock-up was made with the exterior side sealed in a chamber that could be cooled to produce an 87 F differential. Thermocouples were installed on the cladding unit and the column.



COLUMN COVER SPLICE



an external face and internal wall of the building. Because temperature control is so important, the cladding suppliers successfully carried out prolonged and extensive testing of the cladding's insulating capabilities with full-scale mock-ups to prove the design's ability to maintain specified limits.

The cladding units vary in size depending on their location in the building. The vertical column covers at the base of the building are 4 ft-6 in. wide and 18 in. deep. At the top of the building (the 100th floor) they are 2 ft-6 in. wide and 5½-in. deep. All the column units are built in one-story lengths, which vary depending on the floor-to-floor height. The typical office floors from the 4th floor through the 36th floor are 12 ft-6 in. Apartment floors are an average of 9 ft-3 in. There are actually three different floor-to-floor dimensions within the apartment area with the group from the 46th through the 54th floor being 9 ft-6 in., the 57th floor through the 73rd floor being 9 ft-3 in., and the 76th floor through the 90th floor being 9 ft-0 in. The other floor heights varied depending upon their use and location within the building. The longest column covers were used on the 44th floor, which is the sky lobby. These are 15 ft-10 in. long. The column covers from the 2nd floor to the 21st floor were made from 3/16-in.-thick sheet aluminum. The column covers for the 5th floor, complete with insulation, closure extrusions and window cleaner track, weighed approximately 430 pounds. A single column cover at the 98th floor, being made of ⅛-in. sheet of a smaller size but including the same window cleaner track and closure extrusions, weighed 215 pounds.

There are approximately 4,200 cladding units. This includes all covers for the vertical columns, diagonal columns and major horizontal covers occurring at the 2nd, 21st, 38th, 56th, 75th, 92nd and 100th floors. These horizontal covers differ from the vertical and diagonal column covers only by modifications of the side extrusions.

The aluminum sheets were brake-formed into the channel shape cover using a 16-ft long brake press. At the upper end of each of the covers the sheet material was offset 9/16-in. to provide an overlapping joint into the cover above. This joint was designed to include a double-sealing tubular vinyl extrusion and a primary sealant. Extruded adaptors are attached with conventional threaded connectors on each side of the column cover to accept the window and spandrel units. This extrusion incorporates provision for a double line of sealant between the extrusion and the column cover itself. (See description of temperature and weather-proof testing.)

On the face of each vertical column cover is a large window cleaner track extrusion. This extrusion was attached after the anodic finish was applied to both the track and the column cover. The vertical, diagonal and horizontal covers were insulated with 2-in. thick urethane foam. The corner columns, due to the greater exposure and larger size, were insulated with 4-in. urethane. All of the insulation material was attached to the vertical column covers with aluminum insulation nails, applied with a stud welder.

Test procedures for wind and rain resistance

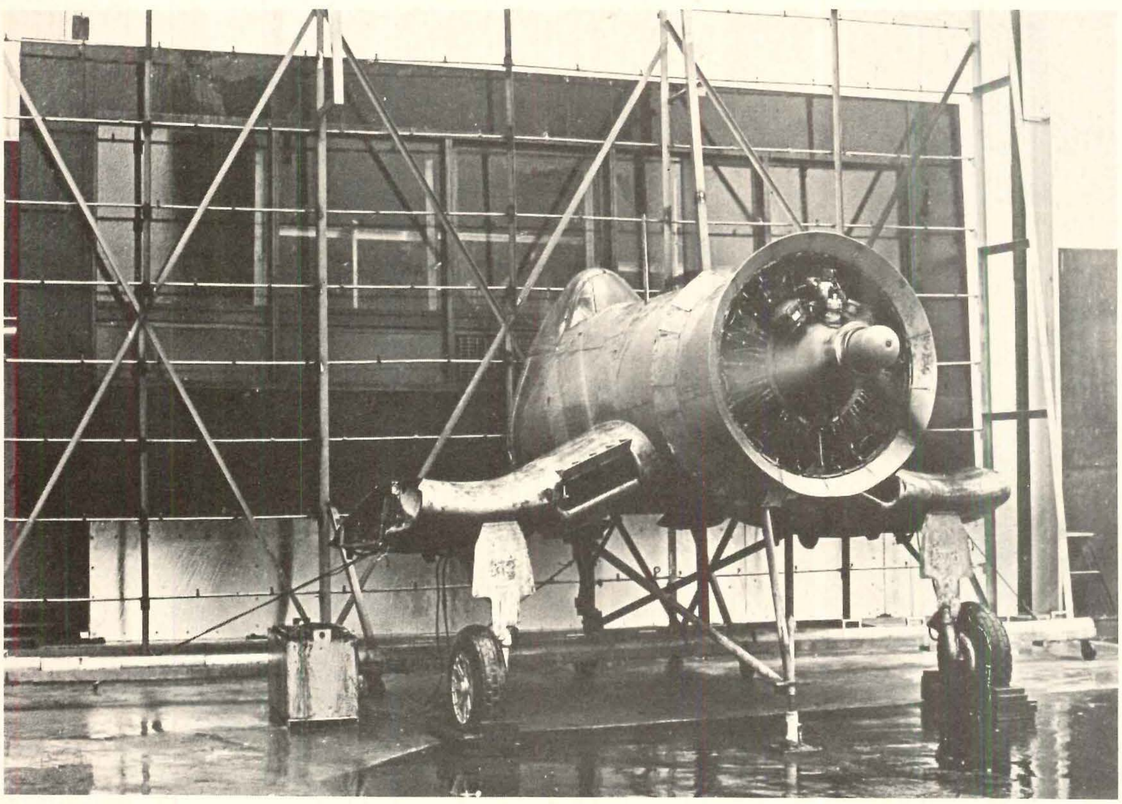
The wall system was fully tested to assure rain and wind resistance. Earlier, however, a 1/300 scale aluminum model of the John Hancock Center, as well as models of all buildings within a 1000-ft radius of the center, were wind-tunnel tested to ascertain drag and gust coefficients and static wind pressures on the surface of the building at different heights, and with the simulated wind coming from any direction. There were pressure orifices at a number of points on all faces of the model to detect both positive and negative pressures. Static wind pressure from all directions was found to be affected significantly by the turbulence caused by the surrounding buildings, and as a result pressures were considerably lower than had been calculated for unhindered flow.

In order to produce wind velocities up to 135 mph and to simulate the effects of a rain storm more severe than Chicago is ever likely to experience, a World War II Navy Corsair fighter plane—minus its tail and most of its wings but retaining its 2100 hp engine driving—was used to simulate the wind. For the test, a replica of a section of the aluminum and glass curtain wall was used. Engine speed was increased until a wind of approximately 100 mph blew steadily on the curtain wall assembly. At this point, jets of water located in front of the assembly were turned on, creating the rain-storm effect. The throttle was advanced to produce wind gusts with a velocity up to 135 mph for 10 minutes.

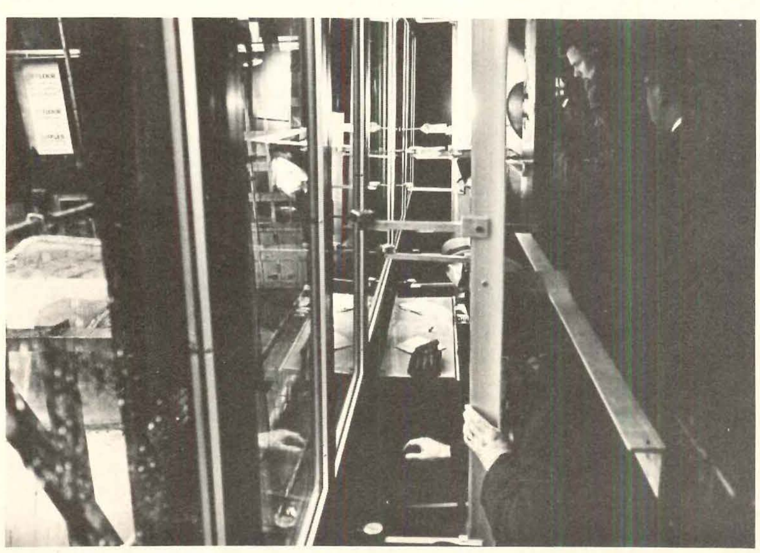
The inner surface of the curtain wall was kept under observation under spotlights to assure that there were no leaks during the rain-storm test. It is not anticipated that the panel would ever have to withstand these conditions in actual service.

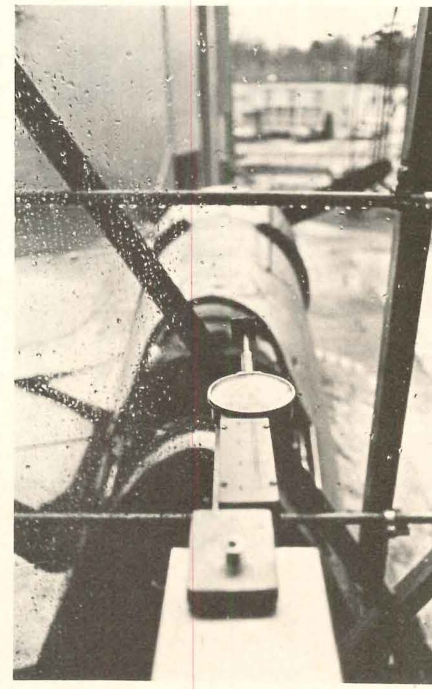
In order to simulate wind loading of another sort, the test chamber behind the curtain wall assembly is equipped with a vacuum pump, permitting partial evacuation of the chamber. In another test, the chamber was pressurized, making the curtain wall flex outwards as it would under the suction created by winds parallel to the building surface, or in the lee. In these tests, wall deflection was measured by dial gauges.

To demonstrate that the aluminum insulated cladding could maintain beam center temperature at 69 ±1 F, a column mock-up was prepared with the exterior side of the column sealed in a chamber, which could be cooled so as to produce the 87 F temperature differential. Thermocouples were attached at various points of the cladding unit assembled to a column sample to monitor temperature of the outer and interior surfaces and primarily of the steel column. The column assembly tested was 5-ft high by 2 ft, 10-in. wide and measured 3-ft in depth.



A mocked-up section of wall was tested for its integrity against wind-driven rain and for deflection resulting from wind speeds as high as 135 mph. The wind was produced by the engine from a World War II Navy Corsair. After the engine was producing a 100 mph wind, water jets were turned on to create the rainstorm effect. The test chamber behind the curtain wall assembly can be partially evacuated by a vacuum pump; or, on the other hand, it can be pressurized. The latter test demonstrates the effect of suction forces on the glass created by winds parallel to the surface, or on the leeward side of the building. Dial gauges were used to measure the deflection.





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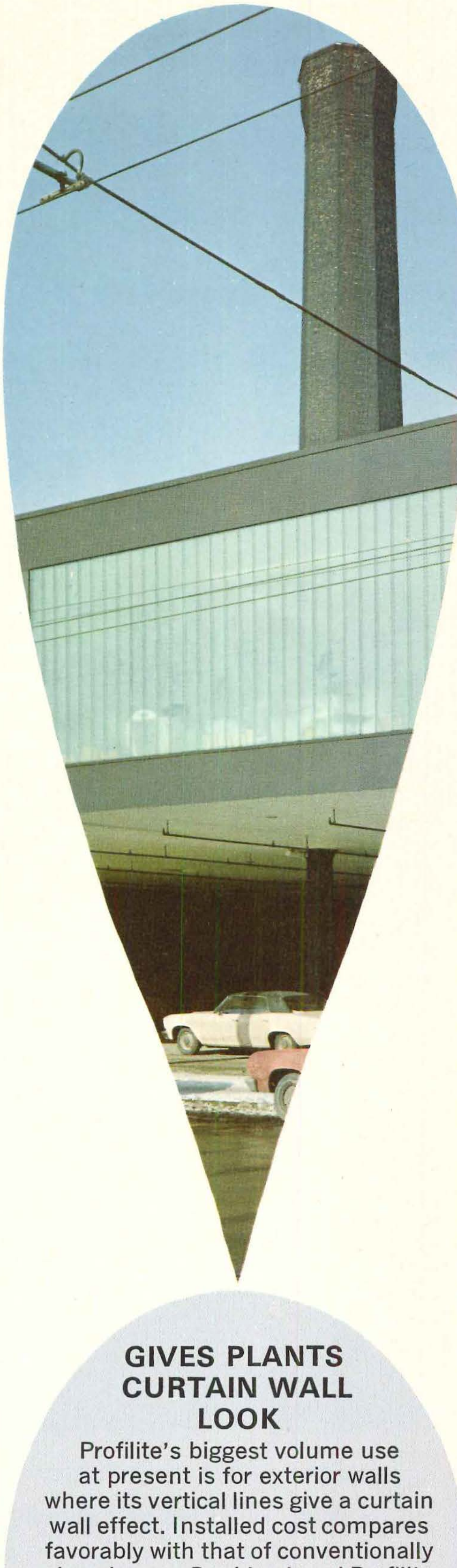

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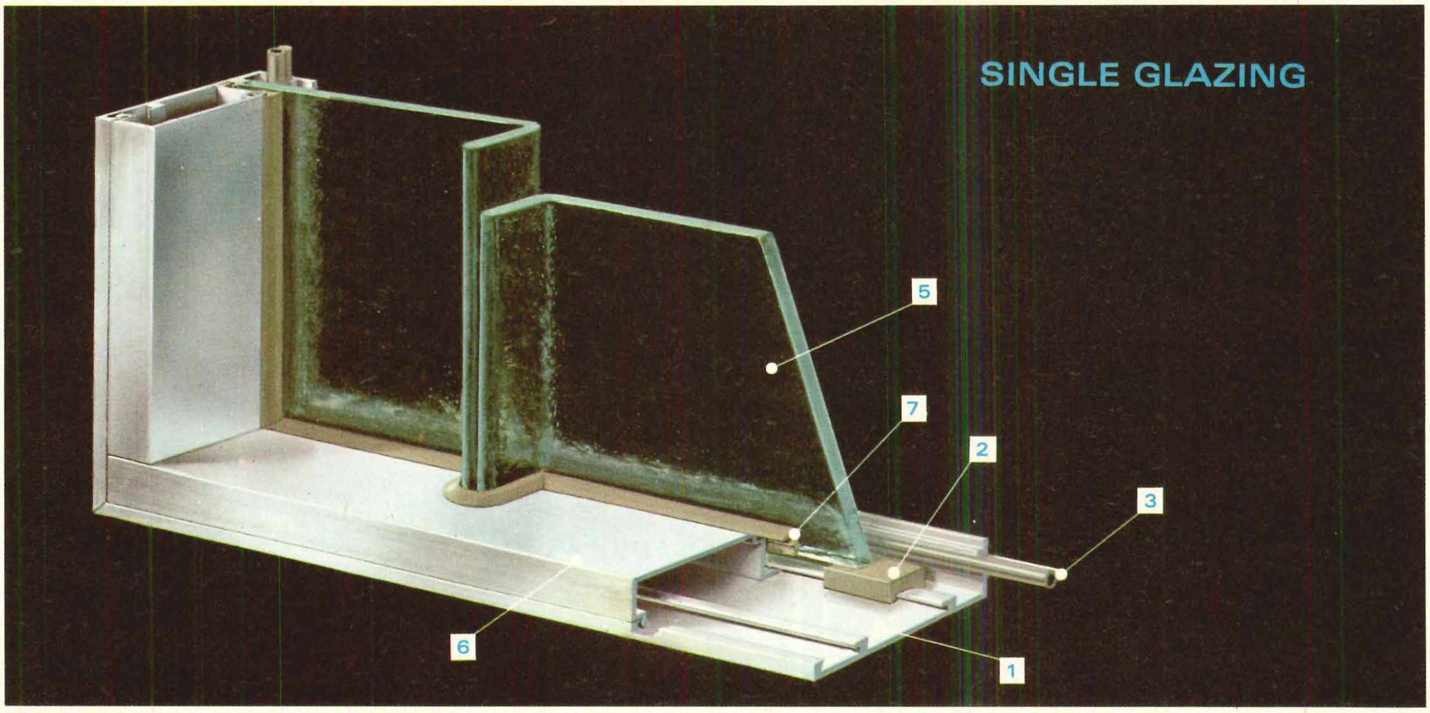

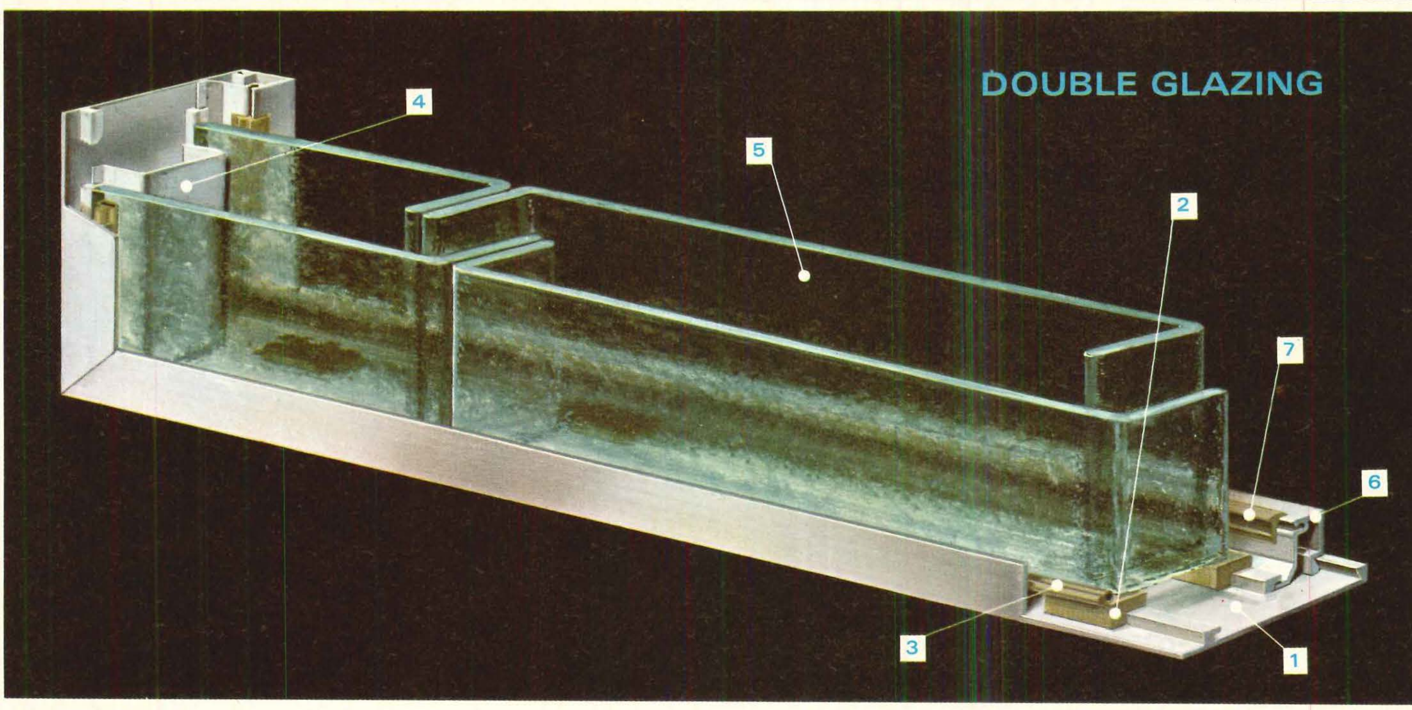

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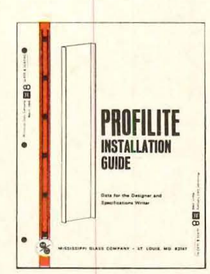

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Foamed plastic pans work as forms, insulation and ceiling

The inventor of a new system of polystyrene pans for forming concrete floor structures has demonstrated savings in both time and money in their use for additions to a courthouse in Marianna, Arkansas. Reason is that the pans are not removed, but stay in place to serve as a semi-finished ceiling. Originally the two courthouse additions were designed as bar-joist structures. Bids were in excess of available funds, and by going to the concrete structure formed by the polystyrene pans, costs were reported to have been cut by $4,600.

The new lightweight pans, known as *Insul-forms*, are made of expanded polystyrene, with molded density being about 1 lb per cu ft. Obviously they can be carried easily by workmen. And since they are made of foamed plastic, they serve well as thermal insulation.

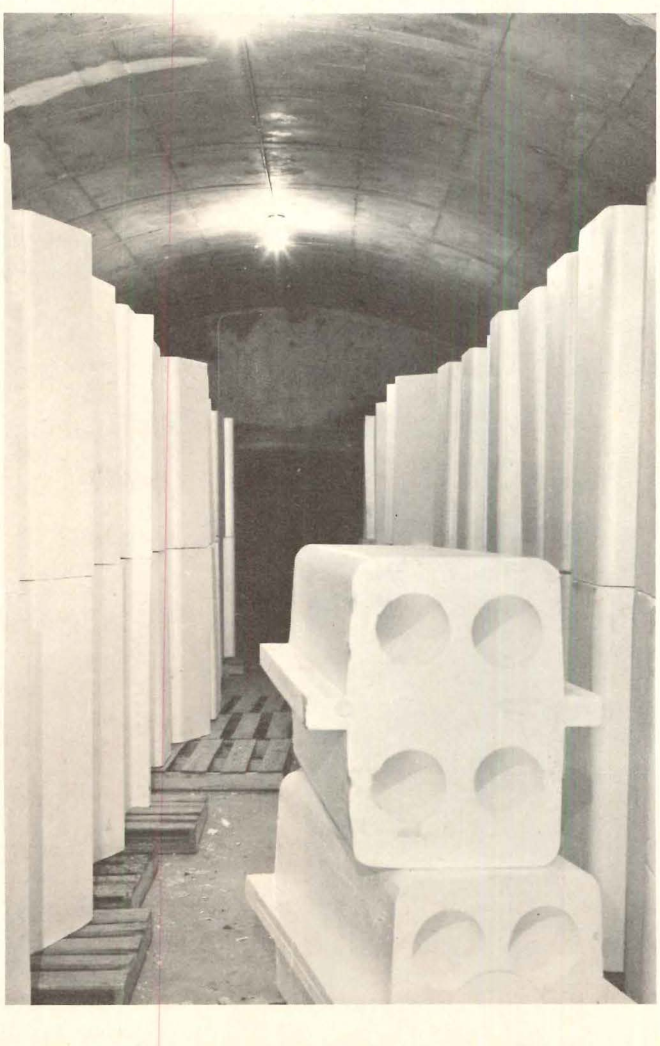
In the Arkansas courthouse application, workmen took five days to shore, deck and set the pans for a 3,000-sq-ft area. This was longer than anticipated, according to the inventor, William B. Rollow, because the pans were fabricated according to plan dimensions, and in some places the span was slightly longer than the plans indicated by as much as half an inch. To compensate, strips of polystyrene had to be cut to fit the extra space. In the future, Rollow's company, Rol-Ko Insul Products, Inc. of Little Rock, will make pans longer than would be indicated by the plans, and the pans that need trimming will be cut to fit on the job.

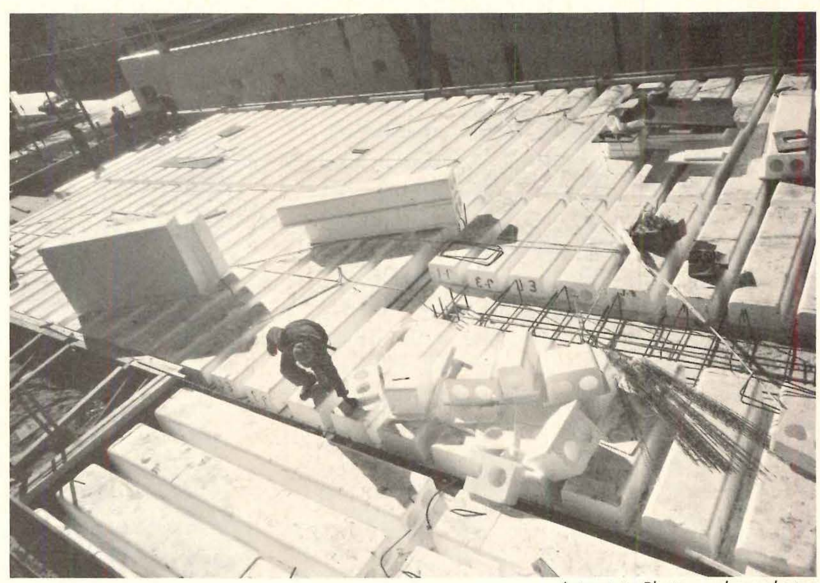
Insul-forms are produced in double molds in 4- to 12-ft lengths. They are heat treated in ovens at 140 F for seven days before being milled and fabricated to job specifications. For the courthouse, which has a 4½-in. slab, 12-in. pans were fabricated with 4-in. diameter voids. The one-way joists of the concrete floor system were spaced on 24-in. centers.

The foam will not take oil-based paint, but can be finished with any latex-type paint and some texturing finishes. These materials bridge the joist portions of the pan so that they do not have to be taped or bedded.

Ceilings in the courthouse additions were finished with plaster and, in some cases, acoustic plaster.

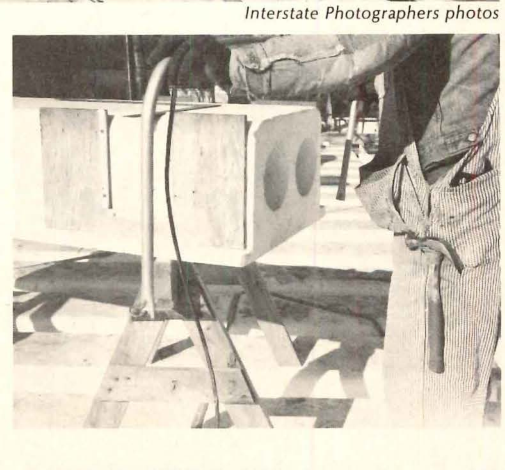
Workmen on the job, hestitant at first to walk on the pans, were soon convinced of the foam's strength. The contractor had some problems with breakage, however. Lips that form soffits of joists sometimes can be broken in handling, and workmen should be cautioned not to be rough with the foam pans. Also, there has been some trouble



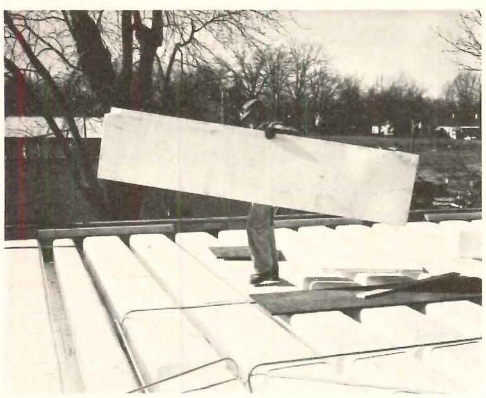


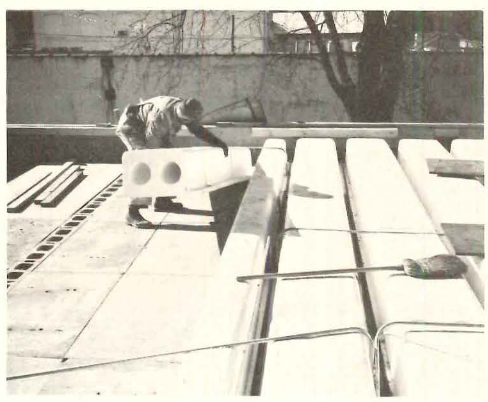
Interstate Photographers photos

Foamed polystyrene pans are produced in double molds, and are heat treated at 140 F before milling and fabrication. Ends could be "cut" by using a jig and a hot wire cutter as shown in the photo, right. Some of the trimmed ends can be seen in the photo, above. The pans are made in lengths up to 12 ft and have 4-in.-diameter voids. The one-way joists for the slab are spaced 2 ft on center. Pans are left in the construction to form a semi-finished ceiling.



Photos below show how easily one man can carry and place the foamed polystyrene pans. The pans were set atop sheets of plywood, supported by simple shoring, as can be seen in the photo at the bottom of the page. After the pans were in place, reinforcement for the one-way joists and for supporting beams was set in the conventional manner. Conduit was run where required. An electric soldering gun with knife attachment could be used by an electrician to "cut" a space for conduit in the foam soffit of the joist. Furthermore, plumbers could use a hot wire "cutter" to slice off the "lid" of one of the pans for temporary access to the 4-in. voids in order to use them as pipe chases. The "lid" would then be glued back in place.





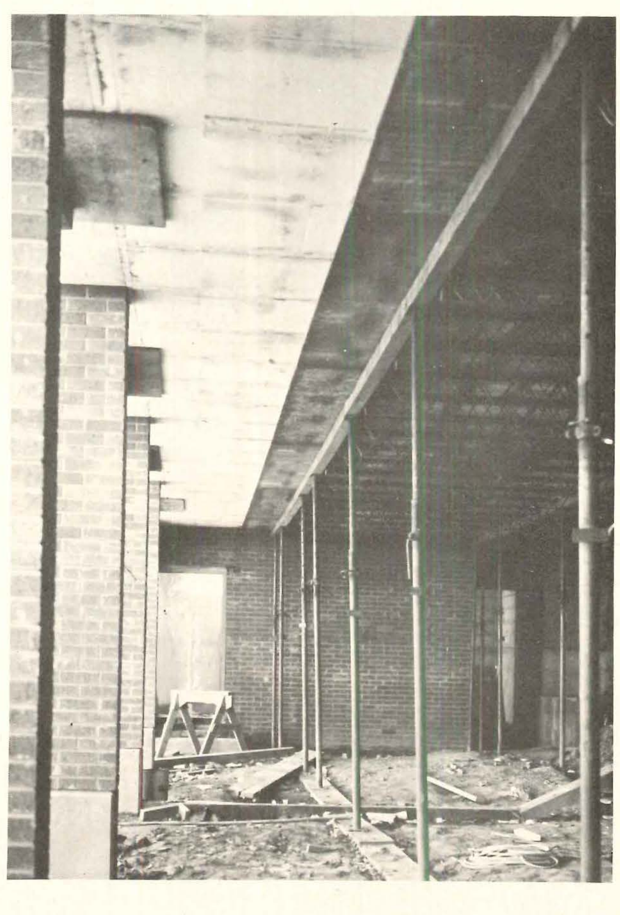
with the wind blowing the lightweight pans off trucks. If a piece of foam is broken off, however, it can be easily glued back in place.

The inventor has also developed a set of "cutting" tools—a hot-wire cutter and an electric soldering gun with knife attachment—to trim and modify the pans. The hot-wire tool is used to cut the lid off the foam pan to allow the plumber to use the void in the pan as a pipe chase. The lid is then glued back on the pan. The soldering gun makes it possible for the electrician to "cut" a space for a conduit in the foam soffit of the joist.

Architect for the courthouse additions is F. Eugene Withrow, Little Rock.

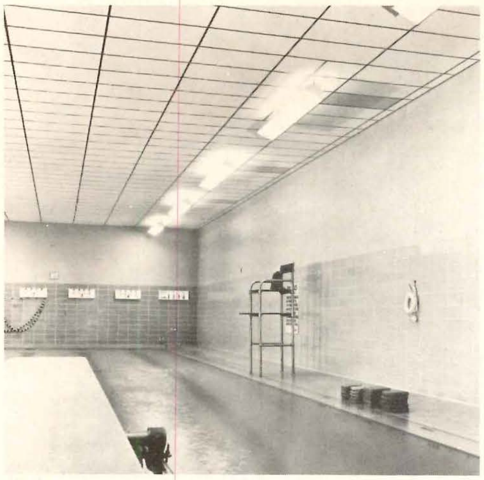
General contractor is Jack Morgan Construction Co., England, Arkansas.

COMPARATIVE COSTS (per square foot)	Bar Joist	Steel Pans	*Insulforms*
False work	0	.12	.12
Setting	.20	.12	.08
Roof deck setting	.06	0	0
Rental	0	.15	0
Pan cost	0	0	.55
Steel cost	.80	.08	.08
Insulation	.15	.15	0
Drop ceiling	.50	.50	0

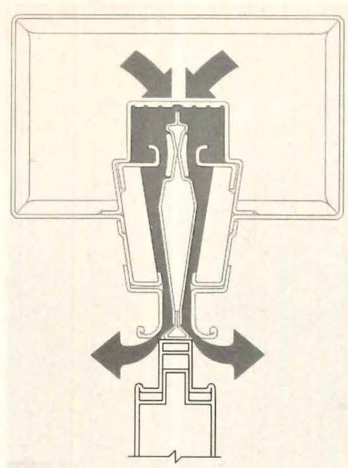


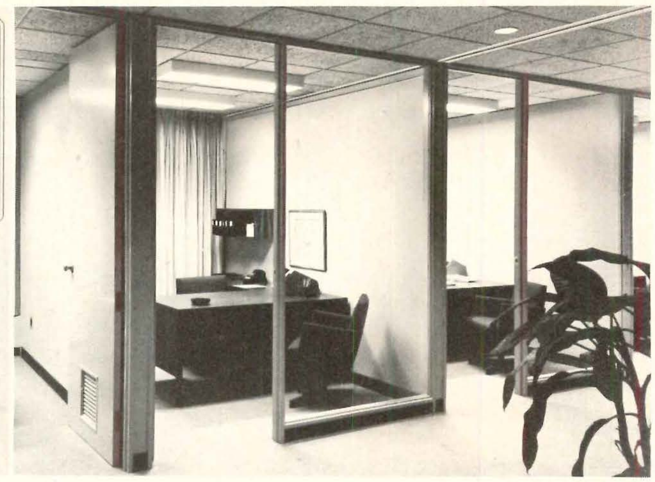
Shoring and plywood have been taken down in the vicinity of brick pilasters, showing how the pan ceiling looks prior to finishing. Cracks between the pans are bridged by the finishing material.

For more information circle selected item numbers on Reader Service Inquiry Card, pages 217-218

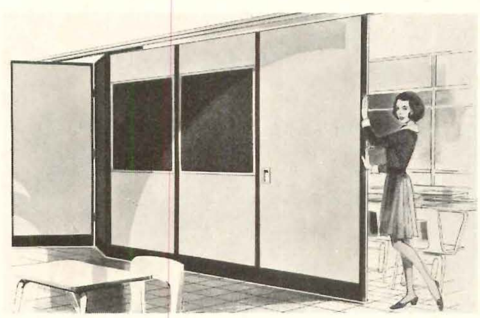


SOUND CONTROL / Glazed total ceramic acoustical panels are recommended for indoor swimming areas because they control noise and are dimensionally stable in high humidity. ▪ The Celotex Corporation, Tampa, Florida. *Circle 300 on inquiry card*



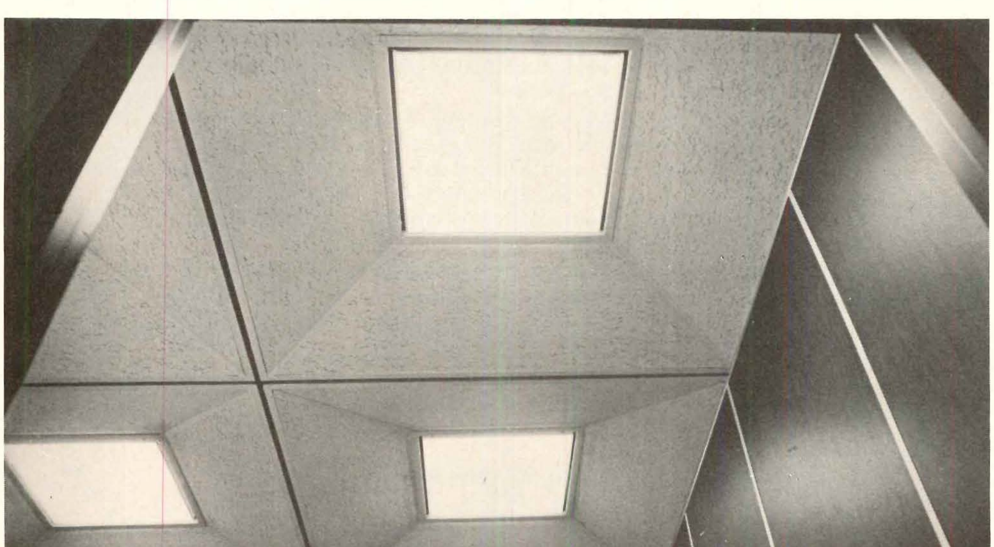


AIR CONDITIONING / Two streams of supply air, each under independent automatic control, are discharged in opposite directions from parallel diffuser openings of *Dual Moduline Weathermaster* units. This arrangement, plus a diffuser section only three inches wide, permits the single-duct variable volume ceiling terminals to be located directly above partitions to serve adjoining spaces with unequal cooling loads. ▪ Carrier Air Conditioning Company, Syracuse. *Circle 301 on inquiry card*



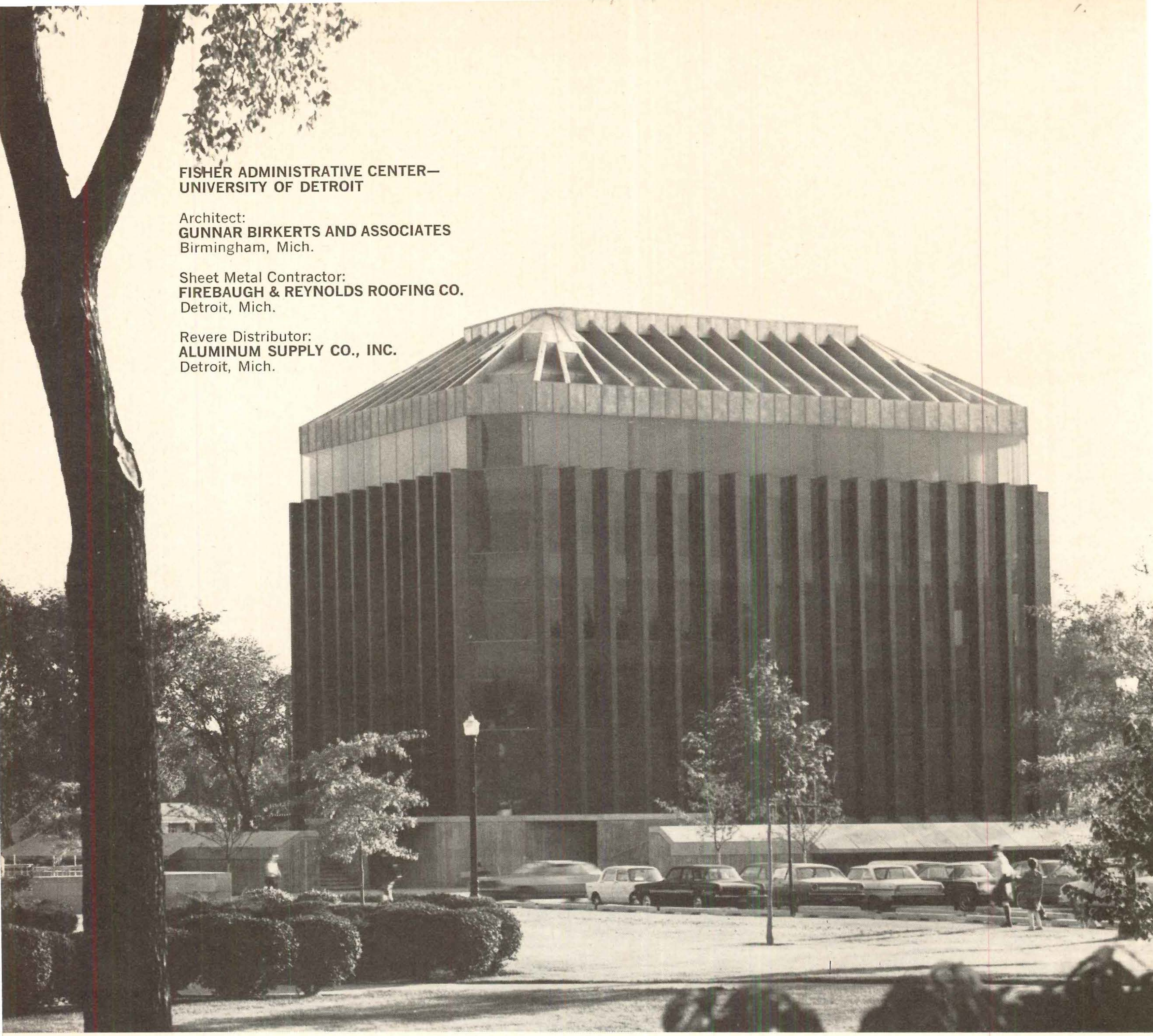
FOLDING WALLS / *Valuwalls,* which can be installed for $5 per sq ft, comply with NSSEA Class C acoustical requirements. ▪ Brunswick Corporation, Kalamazoo, Mich. *Circle 302 on inquiry card*

INDOOR ATHLETIC LIGHTING / A modified fluorescent luminaire from the *Power-Lux* series provides high-level illumination, while not "blinding" a player who has to look up. It is shown here in the world's largest indoor tennis stadium at the University of Wisconsin's Madison campus. ▪ Lighting Products, Inc., Highland Park. Ill. *Circle 303 on inquiry card*



INTERIOR SYSTEMS / The *Interior Systems Division* has been formed to provide a single source for systems-engineered building interiors. As such, the division will promote, furnish and install modular design systems such as the ceiling and walls shown here. ▪ Keene Corporation, New York City. *Circle 304 on inquiry card*

more products on page 180



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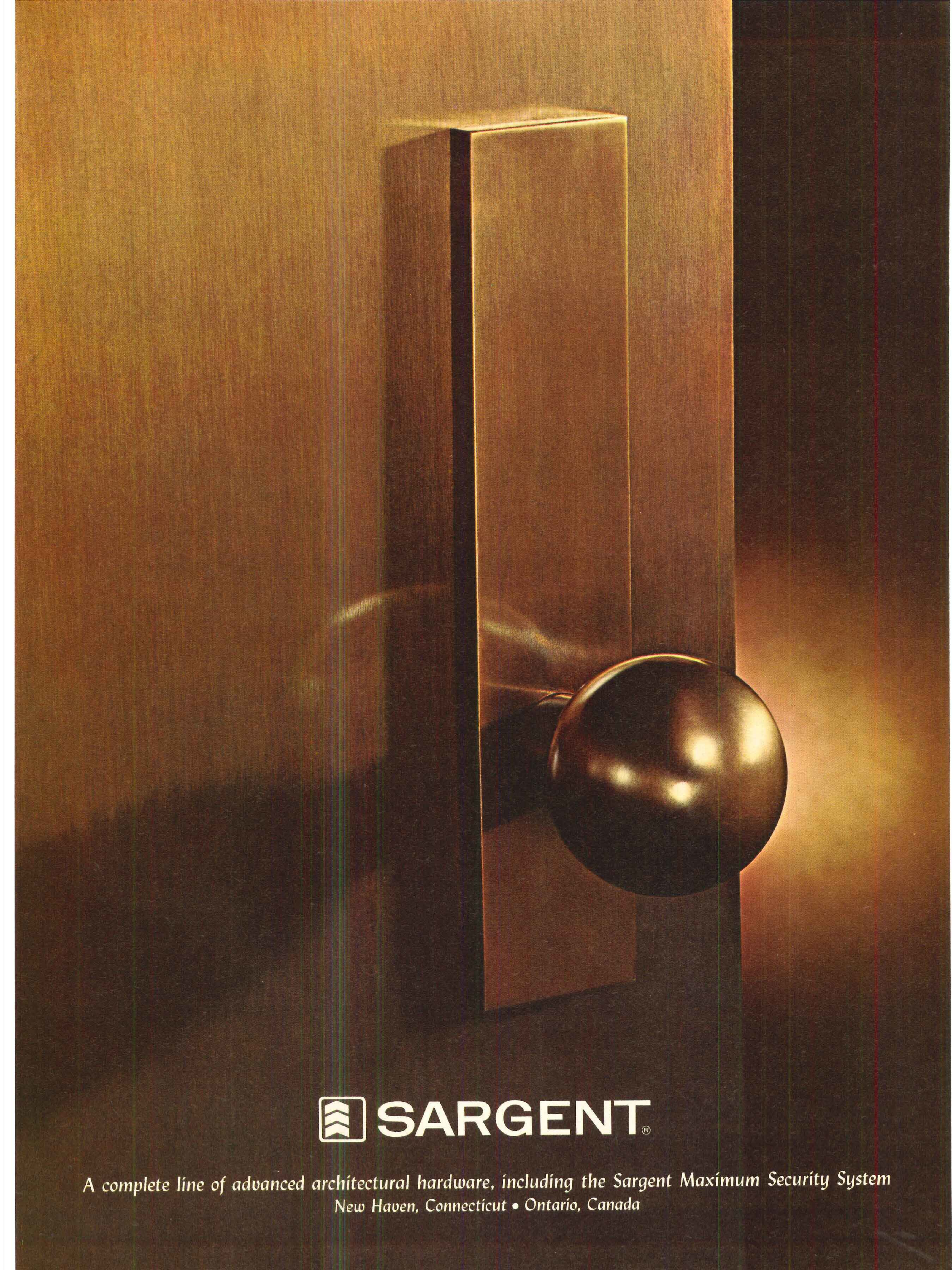
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continued from page 177

STEEL INTERIORS / Steel with designs recessed into the surface has been used for the lobby of One Oliver Plaza in Pittsburgh, designed by William Lescaze and Associates. The *Intaglio* (engraved) finish has a fern-like pattern that may be used with different materials and colors. ▪ Allegheny Ludlum Steel Corporation, Pittsburgh.

Circle 305 on inquiry card

LUMINOUS CEILING / The *Lightframe* ceiling, a shadow-free inverted T-bar grid, was adapted into the total design of the new May Company department store in Montclair, California, designed by Welton Becket and Associates. The ceiling, using 12 specially-coffered, luminous 16-ft-sq simulated skylights, provides soft, warm colors over the courtyard and entire second floor. Each skylight contains a 6-ft-sq ornamental pyramid rising from the center. ▪ Integrated Ceilings, Inc., Los Angeles.

Circle 306 on inquiry card

VERTICAL BLINDS / White shade-cloth vertical blinds give the look of greater breadth and height to a long, narrow office, in which the ceiling has been dropped to provide built-in lighting overhead. The blinds also give important light control to the large glass areas. ▪ Window Shade Manufacturers Association, New York City.

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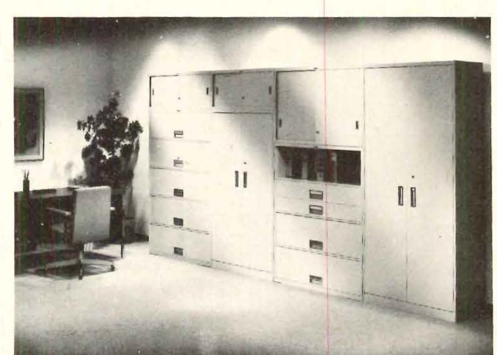

STORAGE WALL / A storage wall system combines units for filing with storage cabinets for supplies and personal belongings. By using various combinations, a personalized storage wall can be designed. ▪ Steelcase, Grand Rapids, Mich.

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more products on page 196

For more data, circle 73 on inquiry card

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With New Orleans Blue, the bath goes bright, bold...and anything but ho-hum. A new Kohler color... pure as the note from a blues cornet. New Orleans Blue joins the other Kohler blues: Cerulean, a delicate pastel... and Blueberry, a deep accent. It's the rebirth of the blues.
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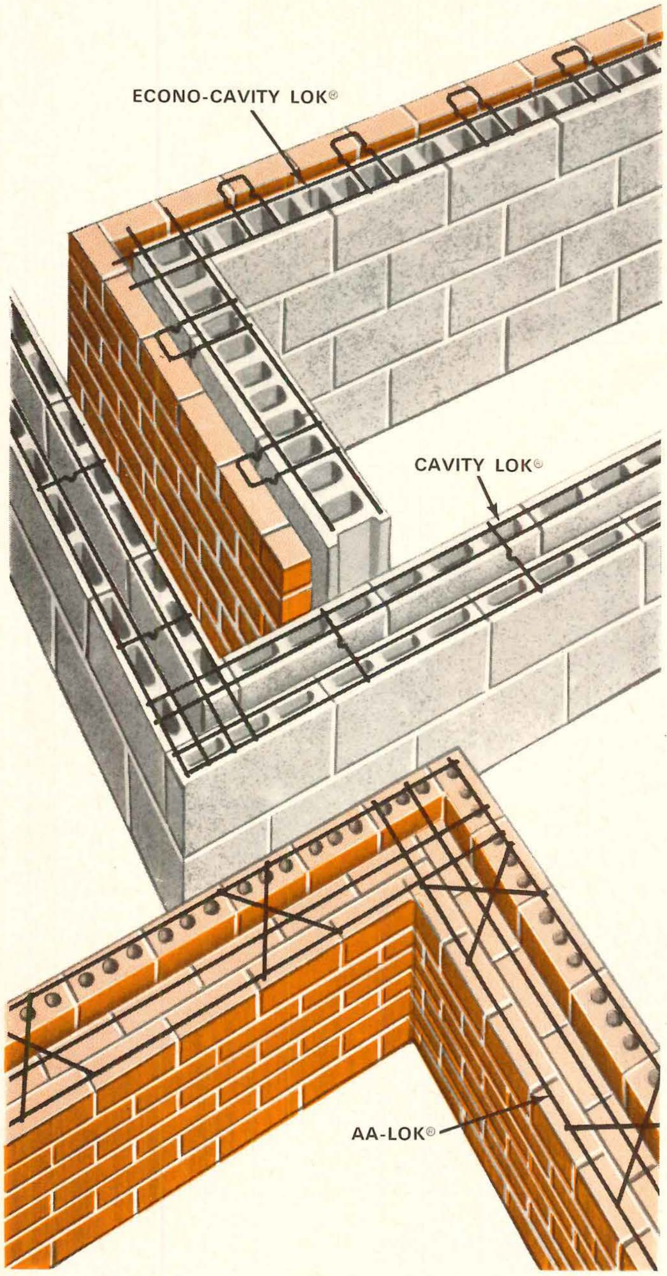

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You can be sure if we ever hear of anyone who needs a good architect, we'll recommend you.

Sincerely,
Mary S.
Mary Sharp

Almost *half* the women who work use tampons rather than sanitary napkins. So next building you build, specify Bobrick's built-in *dual vend* machines for dispensing both Kotex® Napkins and Kotex Tampons. You may not win an award for it, but you'll sure win the hearts of a lot of gals. Send for our free catalogue of vending machines available. Or see Sweet's File No. $\frac{23a}{Ki}$ or Bobrick's File $\frac{25e}{Bo}$.

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Commercial Department, Neenah, Wisconsin

*The names may be fictitious, but the gratitude isn't.

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Or that big new resort
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And get quality that
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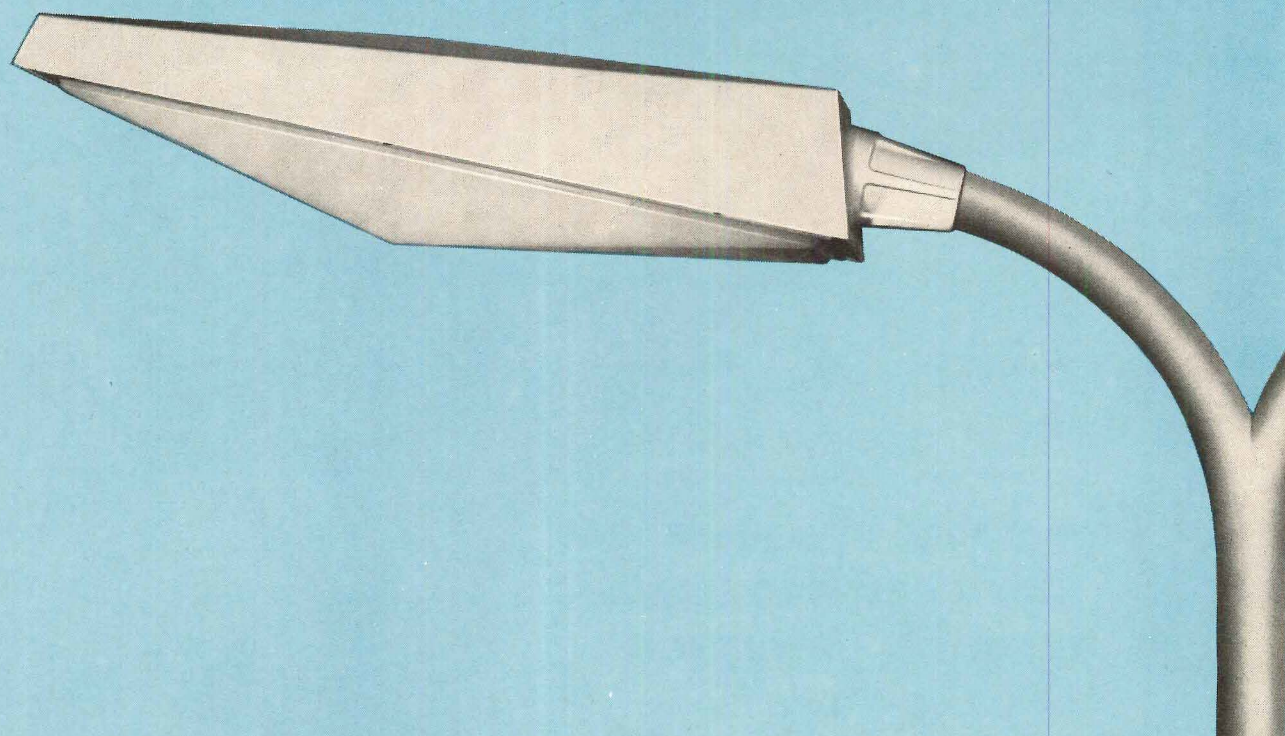

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DURABILITY
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PERFORMANCE
Ballasts are integral, factory wired class H, insulated HPF regulated type.

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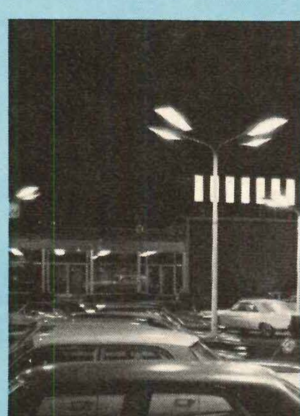
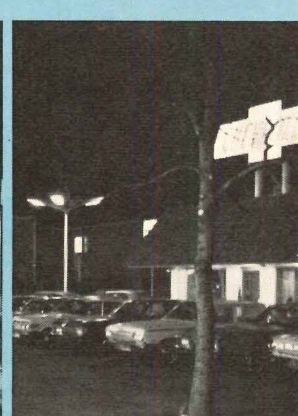
Installation is fast, easy. Internal barrier type terminal board. Just connect supply leads. Fixture is operational.



PARKING



MERCHANDISING

MALLS

SECURITY

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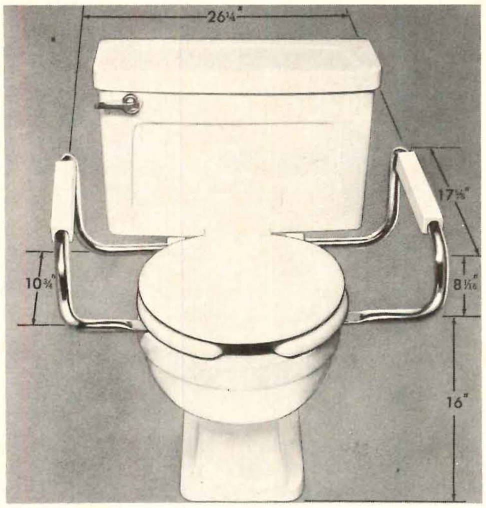
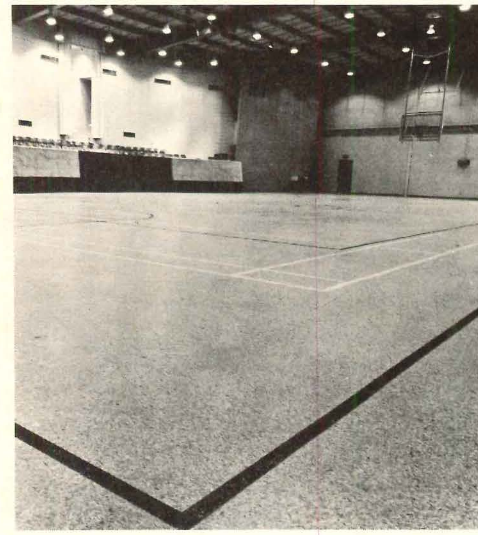


BATHROOM SEAT FOR HANDICAPPED / This completely portable seat converts any conventional water closet into an aid for physically handicapped persons. When the cover is closed, unit can be a helpful dressing stool. ▪ Beneke Corporation, Columbus, Miss.

Circle 309 on inquiry card

FLOORING / A new seamless resilient flooring is said to be "attactive enough to hold church services on, yet durable enough for playing basketball." This flooring is said to "almost never need waxing and will often last the building's lifetime without replacement." The *Porette-1000* system, designed to withstand impact, chipping, cracking,



curling and moisture, requires only one coat of *Pytrol*, the thermal-curing topcoat. ▪ Hallmark Chemical Company, Dallas.

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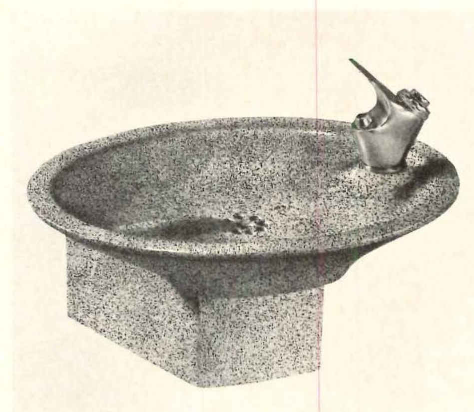

MATCHED DRINKING FOUNTAINS / Fountains made of polyester and stone that can be matched to any color are designed for both exterior and interior use. They are reported to resist cracks, stains, and discoloration. ▪ Western Drinking Fountains, Inc., Fremont, Calif.

Circle 311 on inquiry card

VERSATILE DESK / The *Omega* desk series includes a table and either, or both, of two caster-based pedestal storage units that slide beneath it. ▪ Stendig, Inc., New York City.

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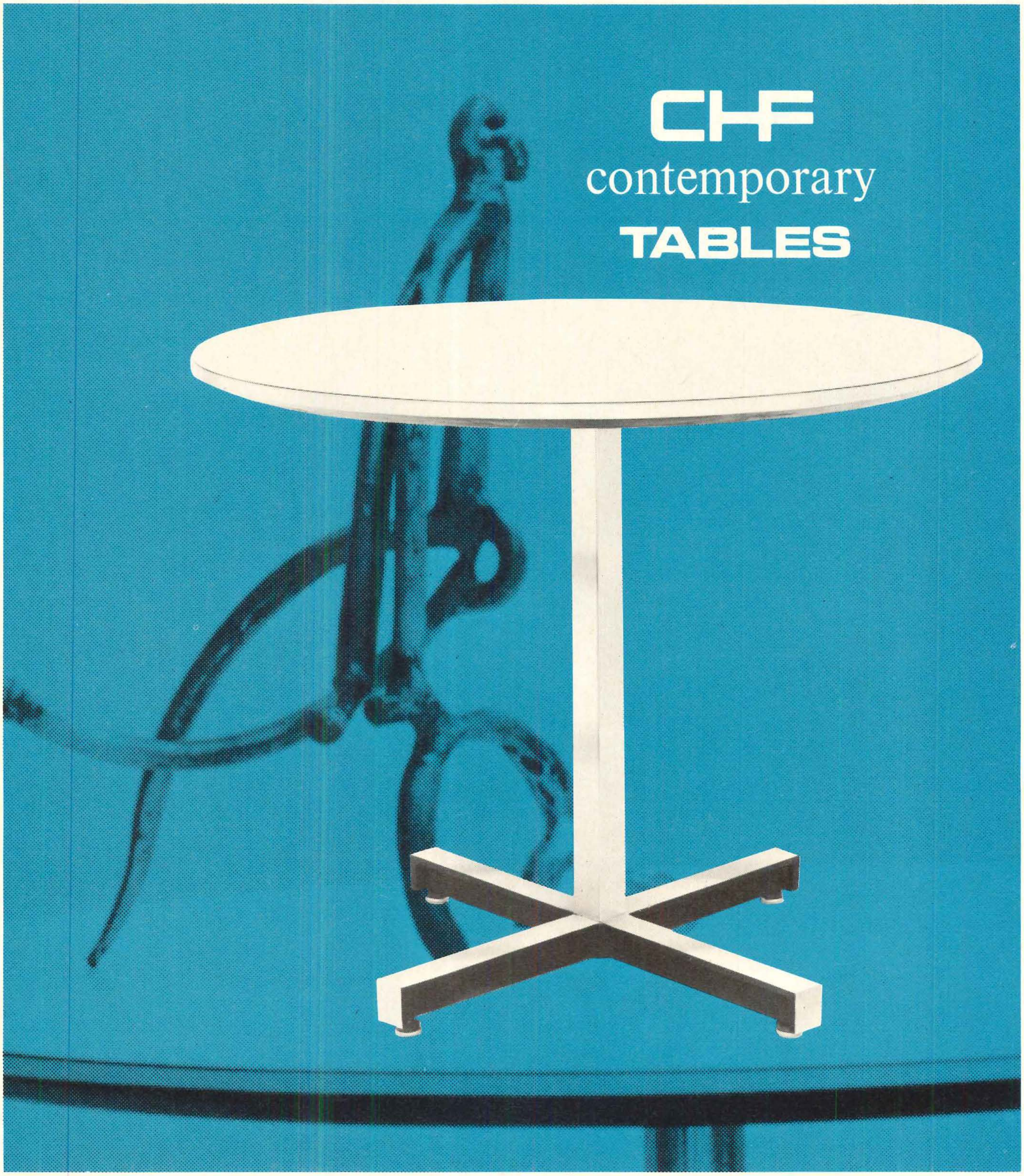
more products on page 204



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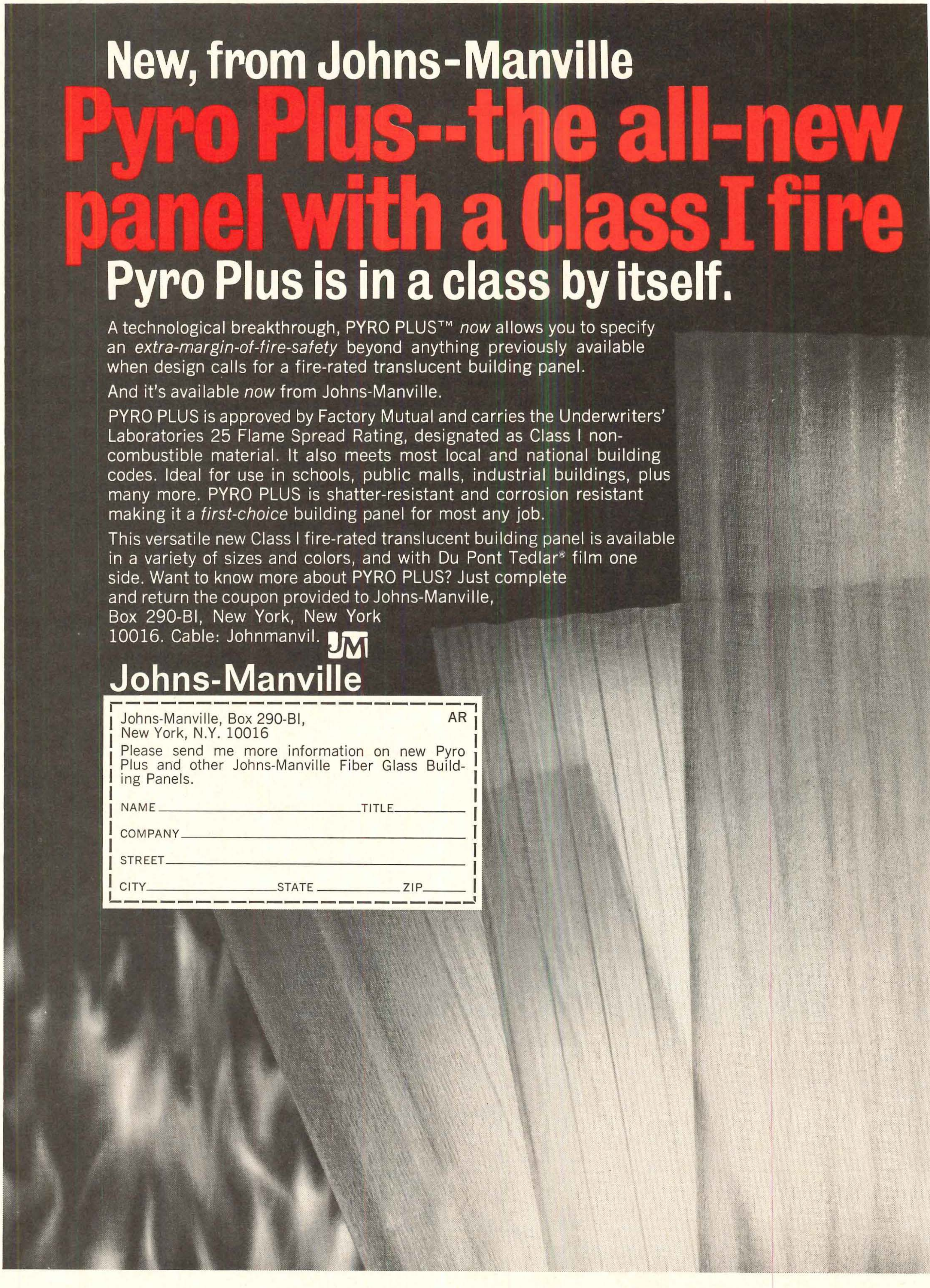
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PYRO PLUS is approved by Factory Mutual and carries the Underwriters' Laboratories 25 Flame Spread Rating, designated as Class I non-combustible material. It also meets most local and national building codes. Ideal for use in schools, public malls, industrial buildings, plus many more. PYRO PLUS is shatter-resistant and corrosion resistant making it a first-choice building panel for most any job.
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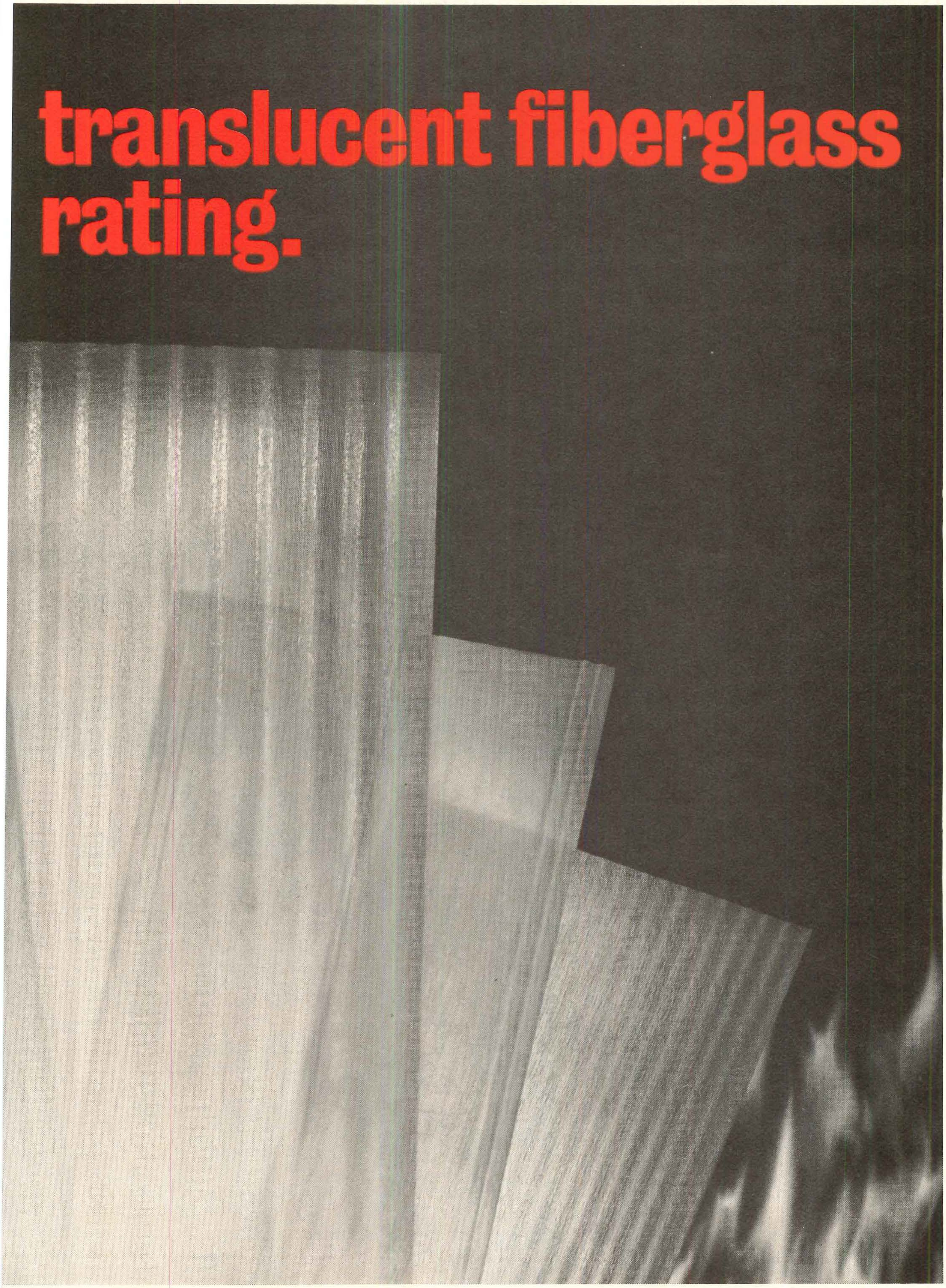

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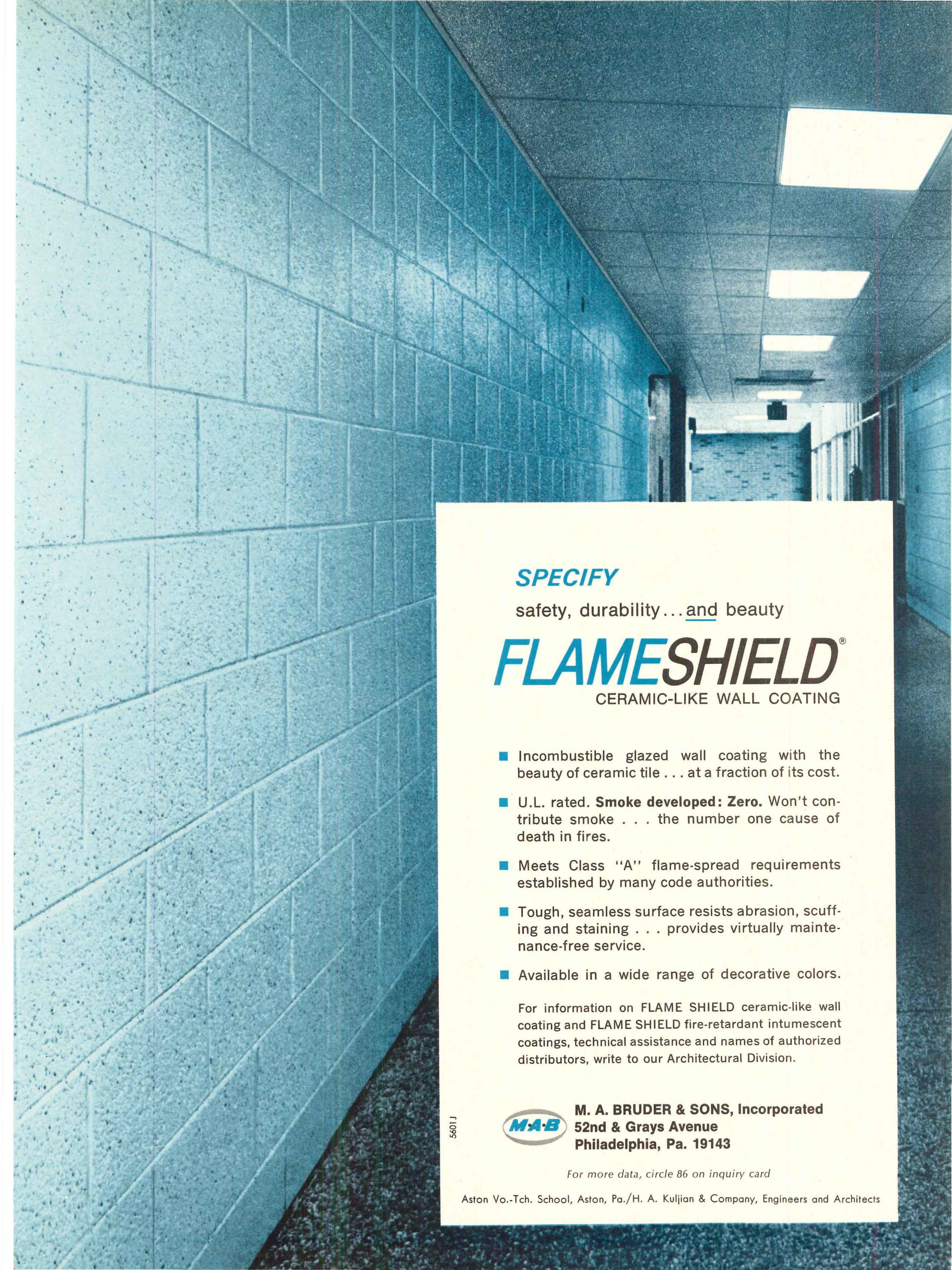

Aston Vo.-Tch. School, Aston, Pa./H. A. Kuljian & Company, Engineers and Architects

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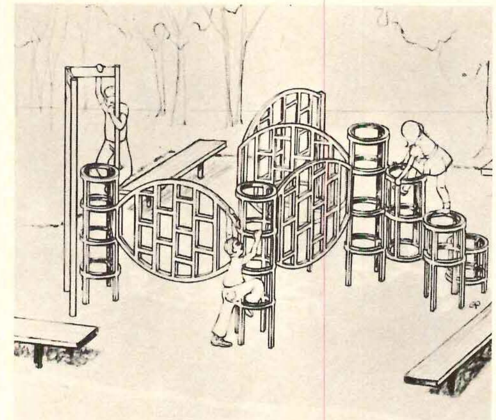

PLAY EQUIPMENT / Based on a principle of socially-imaginative play within a series of related structures, the *Playscape* allows up to 20 children to work out continuous games within as little as 380 sq. ft. Equipment is reported to need little repair and maintenance, to require no adult supervision and to be economical. ▪ Playground Corporation of America, Long Island City, N.Y.

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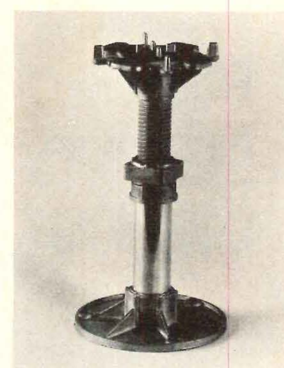

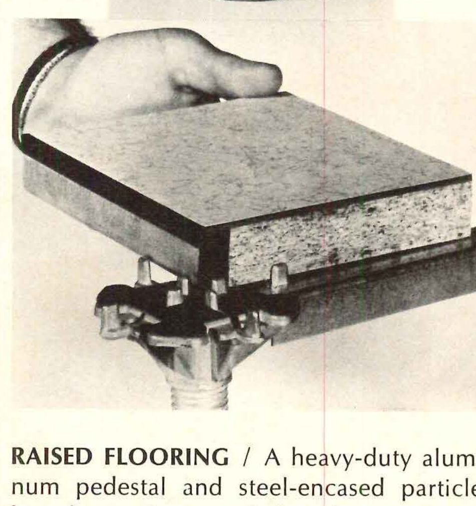

RAISED FLOORING / A heavy-duty aluminum pedestal and steel-encased particleboard panels are designed to increase strength and durability in raised flooring, while dampening noise transmission. The pedestal automatically locks in place at any height, and each 24-in.-sq panel will support a 1000 lb concentrated load and a 250-lb-per-sq-ft distributed load with a 4-to-1 safety margin. ▪ Westinghouse Architectural Systems Department, Grand Rapids, Mich.

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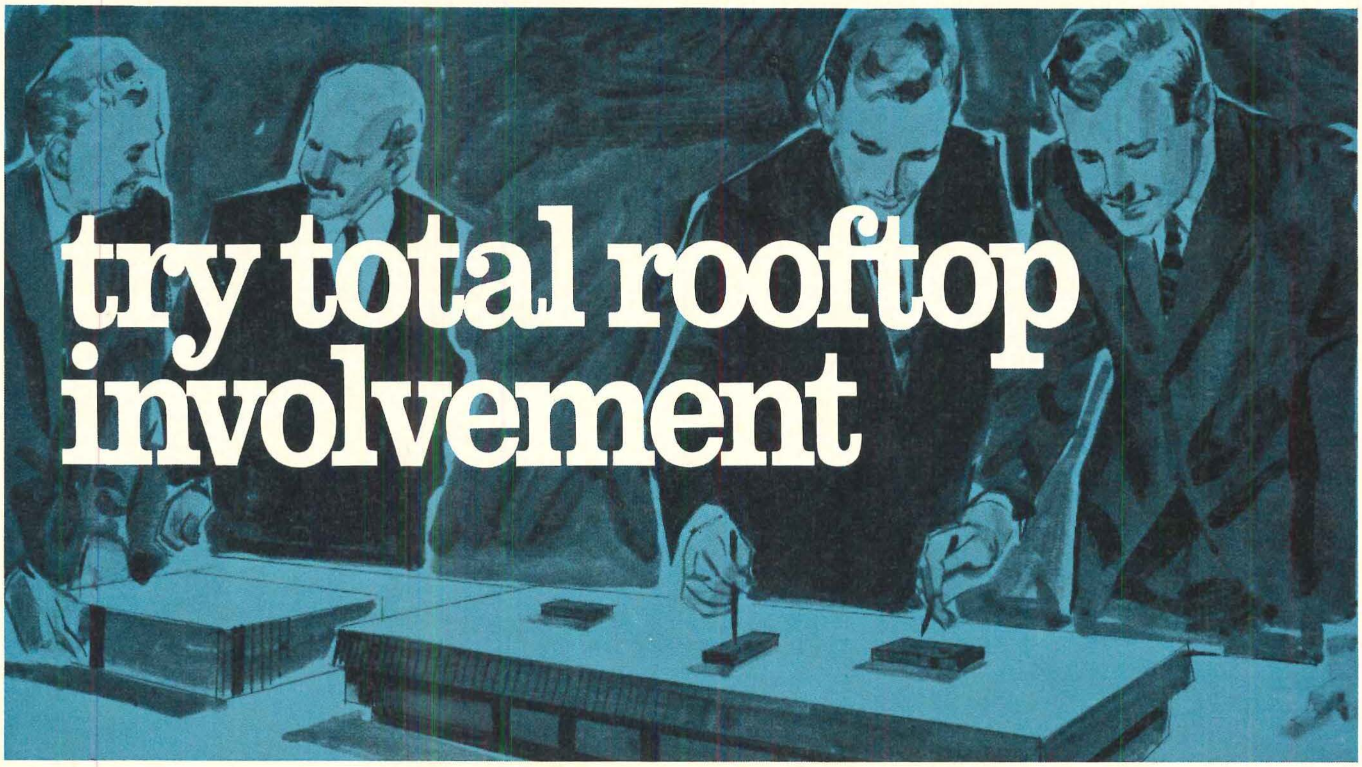

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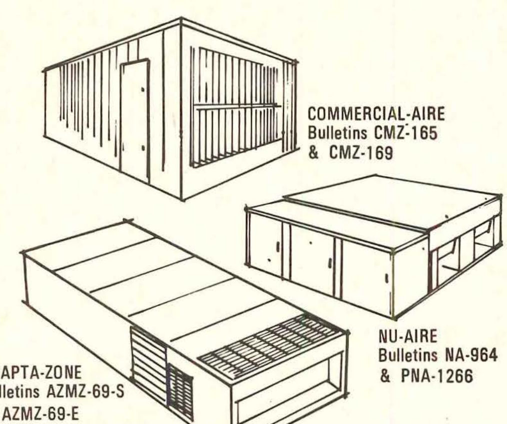
Central-station heating, cooling, ventilating? Let Mammoth get involved with their Commercial-Aire, Adapt-Aire or new Adapta-Zone rooftop equipment. These units are flexibly designed and engineered to provide precise control of all the environmental air control functions—heating, cooling, ventilating or any combination—in from one to 23 zones . . . and with the exact capacities you require.

If yours is a problem of make-up air, Mammoth is ready to get involved with its Nu-Aire line of direct gas-fired equipment—rooftop units in low-line or penthouse configurations made to maintain favorable environmental conditions in any size industrial or commercial plant.

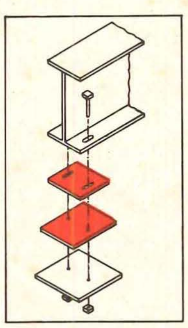
There are 350 Mammoth representatives in 85 offices in the United States and Canada ready . . . and fully qualified . . . to get totally involved in your rooftop environmental air control problems, and each of them backed by a company with 20 years' experience in the rooftop business. Get in touch with the Mammoth man nearest you, or write Mammoth for a detailed response to your inquiry.



MAMMOTH
TOTAL ENVIRONMENTAL AIR CONTROL
Industries, Inc.
13120-B County Road 6 • Minneapolis, Minn. 55427

For more data, circle 89 on inquiry card

THIS NEW BUILDING USES 34 SETS OF BEARING PADS MADE WITH TEFLON* TO RELIEVE STRESSES AND STRAINS OF CHANGEABLE ST. LOUIS WEATHER



Shown at the left is the simple principle of expansion joints surfaced with TEFLON fluorocarbon resin. Two surfaces of low-friction TEFLON slide against each other, allowing free lateral movement to accommodate all thermal expansions and contractions as well as stresses due to storms.

The 154,000-square-foot J. C. Penney store in St. Louis is well equipped to withstand the extreme and sudden temperature changes characteristic of this city's weather. It uses 34 sets of sliding bearing plates surfaced with filled TEFLON resin at various types of load junctions: steel beam to steel beam, steel beam to steel column top seat, steel beam to steel column bracket and steel beam to masonry wall. Each bearing plate supports from 9,000 to 39,000 pounds; pressures range from 200 to 400 psi. Deformation and creep are virtually immeasurable and will not affect the long-term performance of the pads. Coefficient of friction of filled pads under normal loads is below 0.10. There is no stick-slip. The sliding surfaces of TEFLON will not corrode or "freeze", and mechanical properties are unaffected by weather or aging. Expansion bearings were designed by Kenneth Balk & Associates, structural engineers, St. Louis.

Cost? Significantly lower than that of any sliding bearing with remotely comparable performance.

It will pay you to look into the advantages of bearing pads of TEFLON for your next architectural or bridge-building application. For further details, write: Du Pont Company, Room 7305, Wilmington, Del. 19898

*Reg. U.S. Pat. Off. for Du Pont fluorocarbon resins and film.

DU PONT REG. U.S. PAT. OFF. **TEFLON**®
fluorocarbon resins

For more data, circle 90 on inquiry card

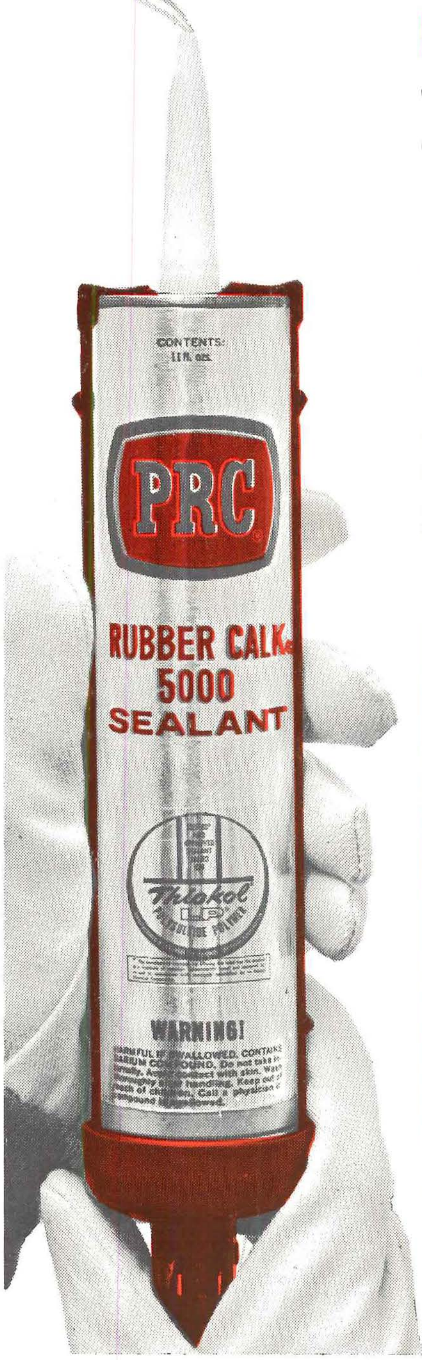
For more data, circle 91 on inquiry card ➧

TESTED*
AND
APPROVED
SEALANT
BASED
ON
Thiokol™
LP™
POLYSULFIDE POLYMER
MANUFACTURED BY LICENSEE OF THIOKOL CHEMICAL CORPORATION

* The manufacturer warrants by affixing this label that this product is a duplicate of materials independently tested and approved by — and in accordance with standards established by — Thiokol Chemical Corporation.

One-Part Polysulfide PRC Rubber Calk® 5000 Sealant

• NO MIXING • EASY TO APPLY • NO TIME LOSS • CONSTANT UNIFORMITY



Now . . . you can specify a one-part *polysulfide sealant* featuring the Thiokol* Seal of Security.

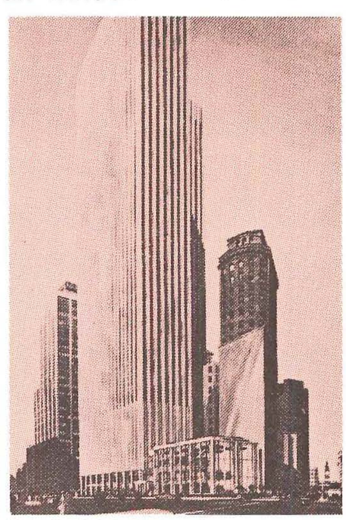
Packaged for immediate use, Rubber Calk™ 5000 Sealant offers the long term performance demanded when *sealing joints subject to structural movement, including metal curtain wall panels, marble pre-cast facings and section joints in tilt-up construction.* It is also ideal for *all window glazing and metal settings.*

Combining ease of application with exceptional resistance to the ravages of time, this outstanding product retains its adhesion and elasticity in all weather extremes. Six standard colors: white, black, aluminum-gray, ivory, limestone and gray.

Write for catalog and color chart today.

*Registered Trademark of the Thiokol Corporation

WILSHIRE TRIANGLE CENTER
BEVERLY HILLS, CALIF.
Architect: Sidney Eisenstat, AIA
Curtain Wall Panels: Soule Steel Co.
Sealant Contrs: Security Builders



WELLS FARGO BUILDING,
SAN FRANCISCO, CALIF.
Architects: John Graham & Company, Seattle, Wash.
Curtain Wall/Sealant Contrs: Cupples Products Corp., St. Louis, Mo.

ANCHORAGE FIRST NATIONAL BANK
ANCHORAGE, ALASKA—D. Cuddy, Pres.
General Contractor: Walsh & Company, Anchorage
Sealant Contrs: Fentron Industries, Seattle, Wash.

PRODUCTS RESEARCH & CHEMICAL CORPORATION

Corporate Offices & Western Manufacturing Division, 2919 Empire Avenue, Burbank, Calif. 91504 (213) 849-3992
Eastern Sales & Manufacturing Division, 410 Jersey Avenue, Gloucester City, N.J. 08030 (609) 456-5700
Manufacturing and Sales Facilities Maintained in Ontario, Canada

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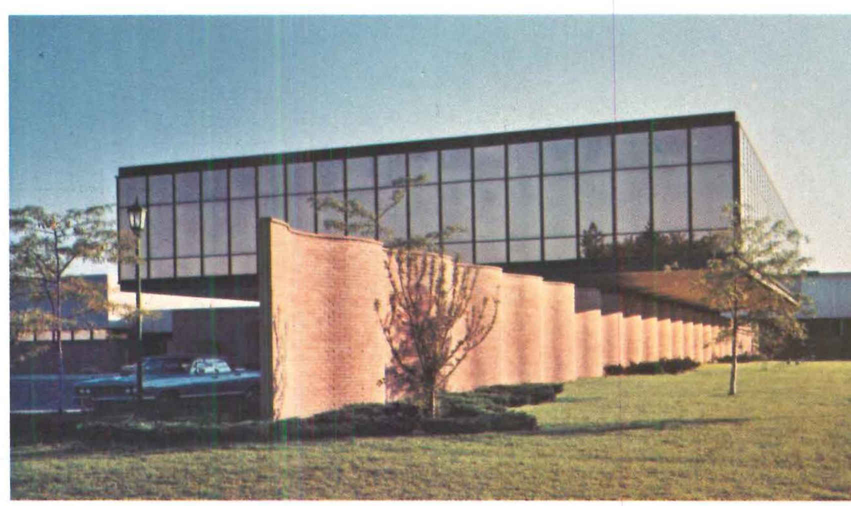
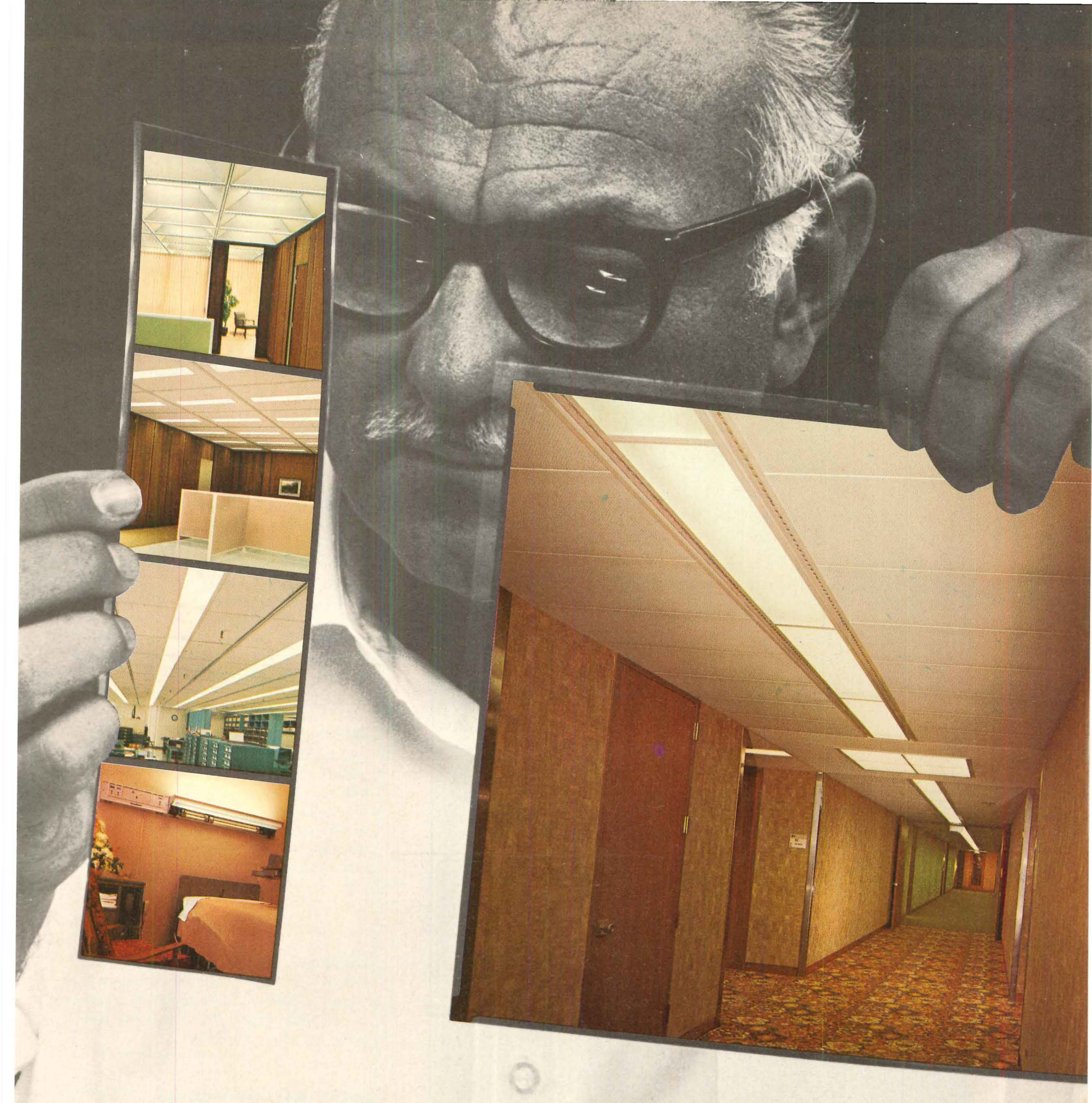
Manufacturing and Research Facility for Teledyne Systems Company, Northridge, California
"This building successfully combines space and function in a cohesive complex. It provides a feeling of openness to the outside and relates nicely to its environment."

Alcoa Building, San Francisco, California
"Here is a landmark structure which introduces a handsome bracing system to the San Francisco skyline. The structural system produces an interesting facade and provides stability against wind and earthquakes. It is ideal to this geographical location."

C. Thurston Chase Learning Center of Eaglebrook School, Deerfield, Massachusetts
"Steel and masonry are used well together to create a warm environment for learning that maintains the human scale and avoids an institutional feeling."



Ford Automotive Safety Center, Dearborn, Michigan
"The architect effectively used counterpoint to combine the strong discipline of this building with the soft form of a serpentine brick wall which pleasantly extends the building into the landscape. The use of materials is very skillful and very simple. The result is truly twentieth century."



Sunbeam is the versatile giant of the ceiling system business.

Look, the big picture shows C.F. Murphy Associates (A&E) Mercy Hospital project in Chicago.

Just like all Sunbeam systems, this #IS4000 unidirectional linear installation integrates all environmental comforts. Precision, customized illumination. Quiet Modu-Flo® linear air distribution. Almost endless modular flexibility.

But, now look into one of the patient rooms. The smaller picture (bottom) shows Sunbeam's Centron system, a consolidated patient room lighting and service center. That's versatility!

So, while Sunbeam was an innovator of the coordinated architectural ceiling system, they are also a vanguard in the medical field.

Plus, Sunbeam offers more ceiling system design possibilities than any other company. The smaller pictures (from top) show a few examples: Vaulted #IS5000 system, bi-directional modular #IS1000 system, and the unidirectional modular #IS2000 system.

Your Sunbeam representative can be of enormous assistance. Write Interior Systems Division or Medical Equipment Division, Sunbeam Lighting Company, 777 E. 14th Place, Los Angeles, California 90021 for your copy on "Concepts of the Interior Environment."

It tells the giant's versatility story like it is.

Sunbeam Lighting Company

For more data, circle 94 on inquiry card

OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Inquiry Card, page 281-282.

OFFICE FURNITURE / The *Departure* series, which is conceived so that components of varying material and color may be placed together, transferred to other areas, or be constantly reoriented, is presented in a color booklet. ▪ Designcraft Metal Manufacturing Corp., Carlstadt, N.J.
Circle 400 on inquiry card

LOUVERS / A 34-page booklet has been prepared "to assist architects and engineers in selecting louvers that are compatible with today's modern architectural concepts, and yet provide the necessary functional performance data for use in conjunction with mechanical air distribution systems." ▪ Airstream Products Co., Inc., Philadelphia.
Circle 401 on inquiry card

GLASS / "Glazing Sizes" is an eight-page brochure that helps to determine recommended maximum glazing sizes for various thicknesses of the more popular forms of glazing. "Wired Cast Glass" is a revised publication that shows the functional advantages of wired glass when used to resist or retard the spread of fires or to prevent personal injury. ▪ Pilkington Brothers Limited, Lancashire, England.
Circle 402 on inquiry card

BRITISH VINYL / *Stormur TF* is a *Tedlar*-faced vinyl wallcovering that resists dirt, impact, discoloration and abrasion and is particularly applicable in hospitals, industrial buildings and other heavy-traffic areas. A four-page folder contains samples of the ten textures and print designs, which are manufactured in England and stocked in the U.S. ▪ J. M. Lynne Co., Inc., Westbury, L.I., N.Y.
Circle 403 on inquiry card

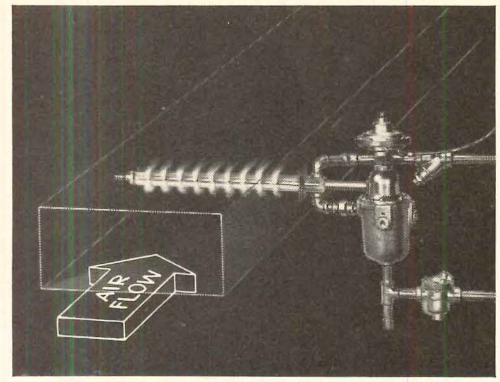
LIGHTING / The fall issue of "Lighting Solutions" is a 12-page periodical that reviews current lighting system design in a variety of building types. ▪ Holophane Company, Inc., New York City.
Circle 404 on inquiry card

SOLAR HEAT TRANSMISSION / The effect of sun on glass block installations is outlined in a two-page study. ▪ Glass Block Institute, Pittsburgh.
Circle 405 on inquiry card

ATHLETIC LOCKERS / A 16-page booklet should help in selecting the right full-ventilated zinc-coated locker for every purpose. ▪ DeBourgh Manufacturing Co., Minneapolis.
Circle 406 on inquiry card

* *Additional product information in Sweet's Architectural File*

more literature on page 224



Armstrong "Dry Steam" Humidifiers introduce water vapor into the air flow to provide accurately controlled relative humidity.

7 reasons why architects should be concerned with humidification

1. *Human Comfort*—When air is dry, normal moisture evaporates from the skin more rapidly and produces a feeling of chilliness, even with the temperature at 75°F or more. Nose and throat membranes tend to feel uncomfortably dry without adequate humidity.

2. *Personal Health*—Research indicates that some disease-causing bacteria that thrive in very dry or very moist air die quickly at relative humidities of 45% to 55%.

3. *"Shock" Reduction*—Irritating and uncomfortable shocks from static electricity discharge are reduced as relative humidity approaches 50% or more.

4. *Preservation of Furnishings*—Moisture loss from wood panelling, furniture and fixtures in dry air can lead to material deterioration in the form of glued joint failure, checking, shrinking and cracking.

5. *Dust Control*—Maintenance of adequate relative humidity reduces the formation of dust and helps reduce its settling out.

6. *Safety*—Adequate relative humidity helps prevent the accumulation of static electricity which, in a potentially explosive atmosphere, could be hazardous.

7. *Production Efficiency*—In operations where machines generate static electricity or where "static-prone" materials such as paper, films, plastics, etc., are handled, controlled humidification can substantially reduce or eliminate the static problem.

Good reasons all why controlled humidification is a very important (if not essential) consideration in the development of any building. You can find out more about it in *The Armstrong Humidification Book,* a comprehensive handbook on humidity control for industry, institutions and commercial buildings. Write for your copy today to . . .

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812 MH

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Your number for dependability. Strong, functional and stylish. One of many utilitarian door closers from Corbin. It typifies the beauty, quality and dependability built into all Corbin products.

Your Corbin distributor can furnish you with complete data on this design, or write P. & F. Corbin, Division of Emhart Corporation, New Britain, Connecticut 06050. In Canada—Corbin Lock Division, Belleville, Ontario.

CORBIN ®

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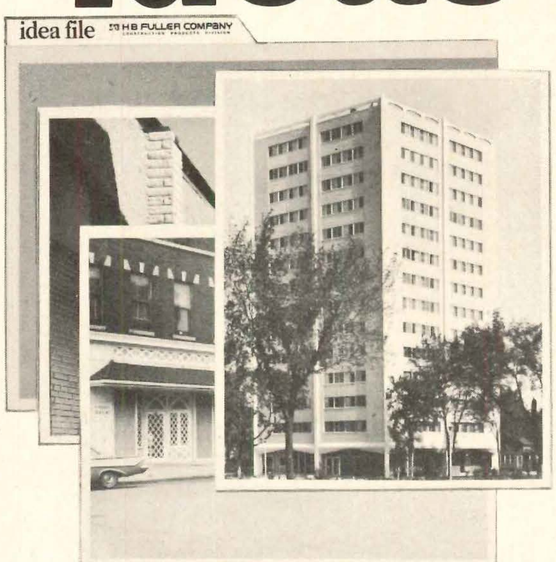
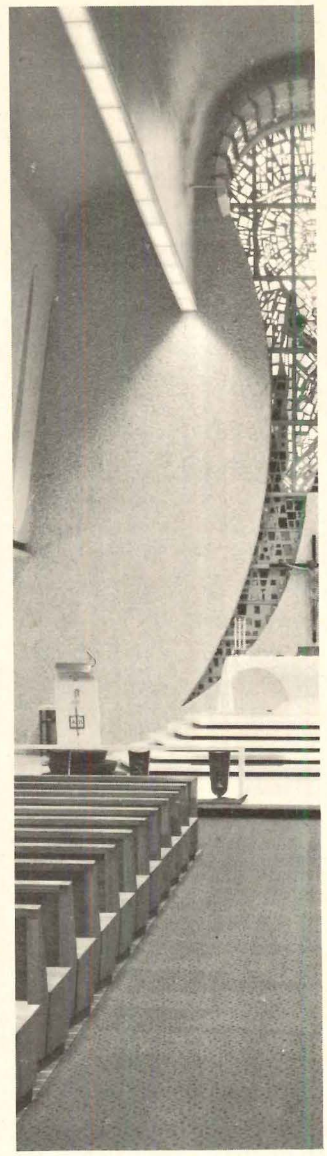
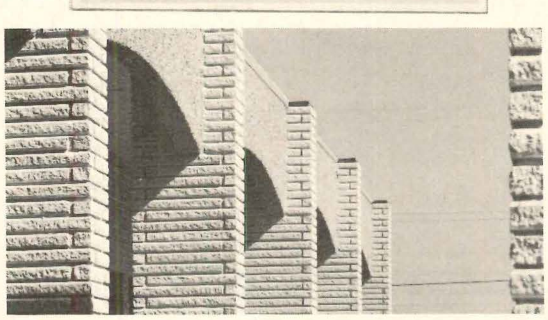
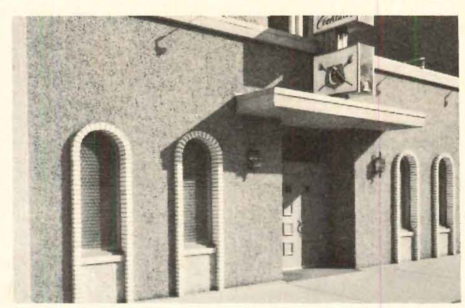

idea file
H B FULLER COMPANY



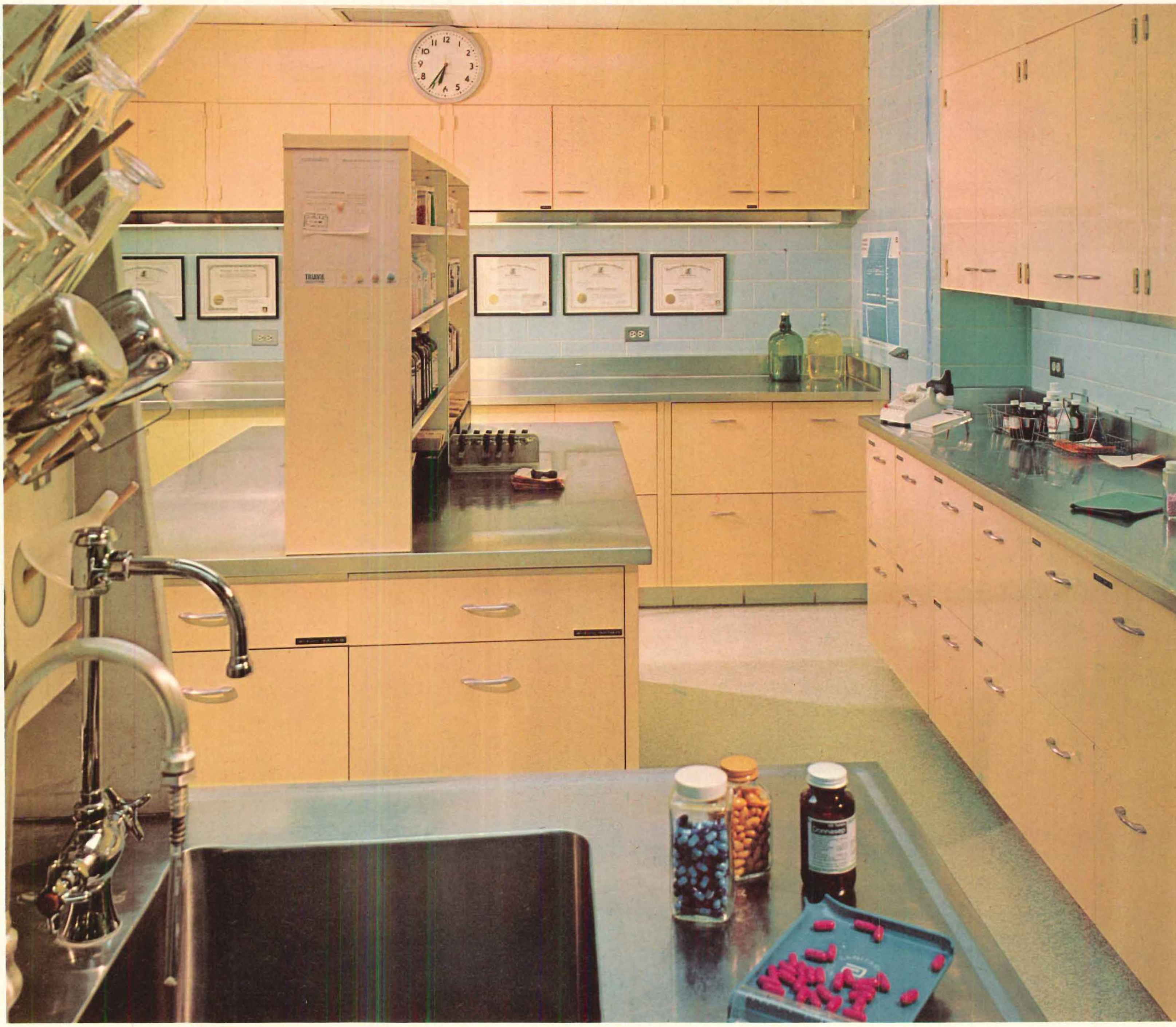




"St. Charles"® HOSPITAL CASEWORK

. . . custom-blends efficiency with lasting beauty

Creating an air of spaciousness beautifully—yet efficiently—in a new hospital or remodeling project is a matter of putting the specialized experience and talent of St. Charles to work. Here is custom-designed casework to answer unique, specific requirements as in this pharmacy or any area of the hospital. For a lifetime of convenience, economy and easy maintenance, call on St. Charles.



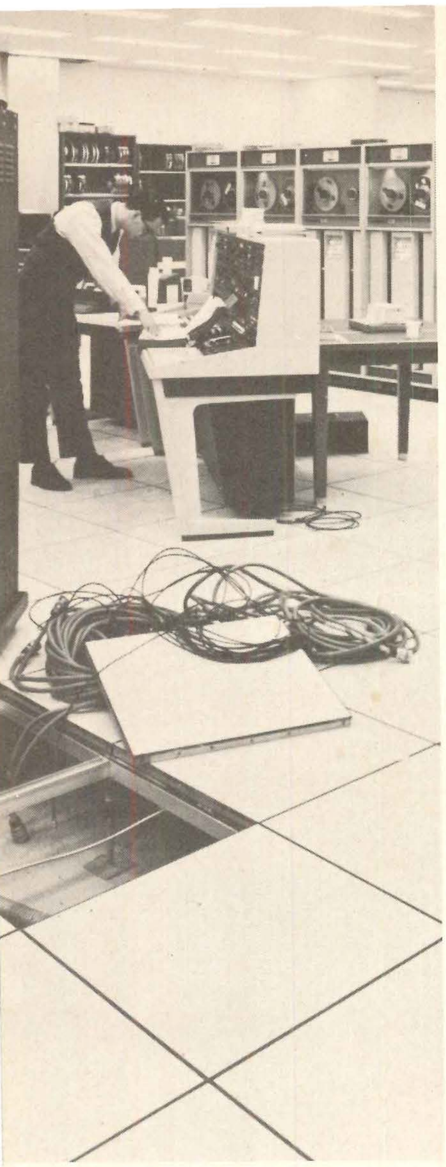
StC

HOSPITAL CASEWORK DIVISION

St. Charles Manufacturing Company, St. Charles, Illinois

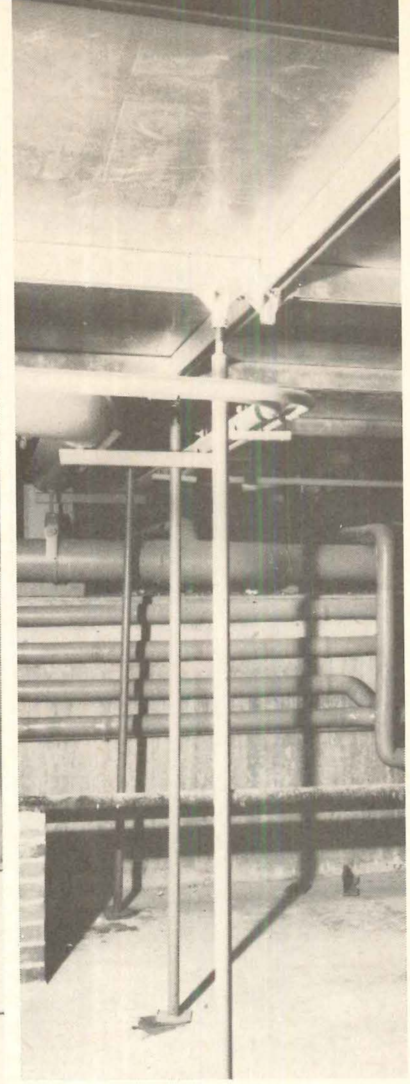
30 YEARS OF LEADERSHIP IN CREATING CUSTOM CASEWORK

Write Dept. 200 for our "St. Charles Hospital Casework" Catalog

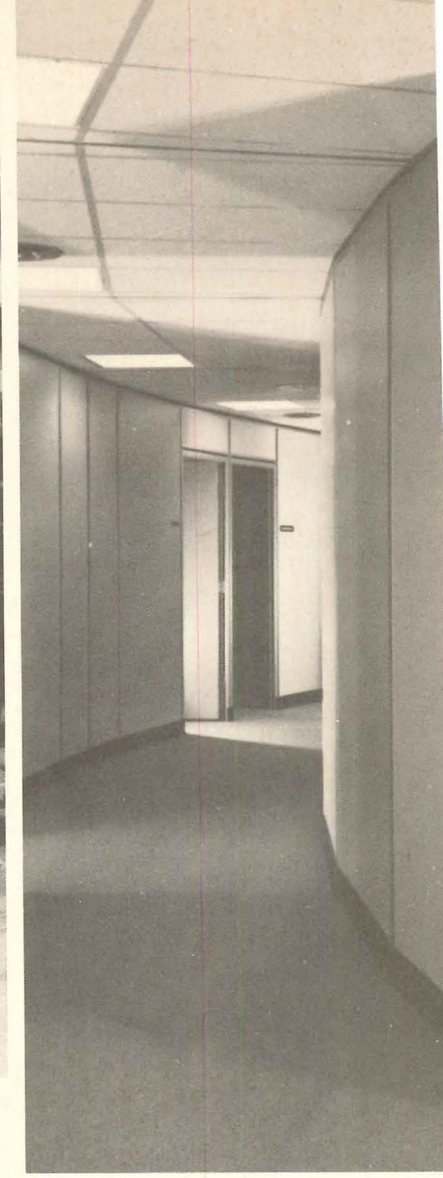


The idea started with computer rooms. Elaflor's vinyl plenum seal combined with Liskey-Aire modular air conditioning units gave highly effective under-floor cooling circulation while panels lifted out easily for instant access to utilities and cabling.

Now, see what it's done for a laboratory area. Electrical, water, gas, air, and drainage lines are completely concealed, yet completely accessible for repair or alterations. Lines can be brought up anywhere, even the middle of the room for full design freedom.



Lowered ceilings are a commonplace technique in renovation work. But here, they raised the floor. This avoids ripping out, provides an ultra-convenient place to run utilities. A simple way to even up different levels varying from inches to feet.



Elaflor provides ultimate flexibility for general office space. Utility and communications lines can be altered at a moment's notice, and with Liskey Spacemaker Movable Partitions, office areas are equally flexible. Floor panels available in tile or plush nylon carpeting.

Solve a design problem with Liskey Elaflor, the only complete elevated flooring system.

Only Liskey offers complete freedom of design. Three basic suspension systems . . . rigid grid, removable stringer, or stringerless. Three floor panels . . . die-formed steel, steel-clad/wood core, or extruded aluminum. No need to substitute or compromise, pick the system that best solves your problem.

See our section in SWEET'S or write for our AIA file of detailed specifications.

LISKEY
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Baltimore, Maryland 21240
Phone: 301/796-3300

For more data, circle 101 on inquiry card

SMITH WALLS
in place...by design

Graphic Systems Division Plant of RCA, Dayton, New Jersey
Architect: Vincent G. Kling and Associates, Architects, Philadelphia, Pa.
General Contractor: Hughes-Foulkrod Construction Co., Philadelphia, Pa.

This Smith Wall is used in a distinctive canted design. It is equally suitable for an industrial building . . . office . . . school . . . or store. Its versatility, as with any Smith Wall, is limited only by the imagination of the architect.

Design freedom in Smith Walls starts with the metal configurations. Twenty different basic profiles are available, including flat panels. And that's only the beginning. You can add Smith decorative mullions to your design to provide unusual and interesting architectural effects. And you can choose from a wide range of colors and finishes to blend or contrast with the surroundings.

When you specify Smith Walls in place you get more than just design freedom. You get a Single Responsibility installation. Smith personnel design, fabricate, deliver and erect Smith Walls . . . to your specifications . . . to your customer's satisfaction.

For complete information, consult your Sweets' File or write today to:

SMITH

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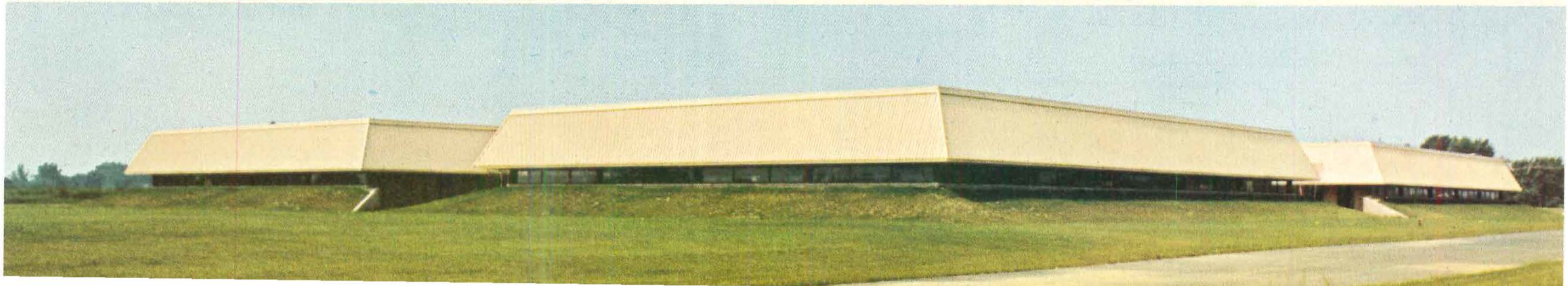


continued from page 216

CEILING SYSTEMS / The September/October edition of "Tone," a journal of interior design featuring ceiling systems, presents "the systems approach to school design and construction." The 18-page color booklet shows five schools. ▪ Armstrong Cork Company, Lancaster, Pa.
Circle 407 on inquiry card

SEATING / Two 12-page catalogs furnish photos and information on medical-surgical seating and bio-mechanical seating. ▪ Ajusto Equipment Company, Bowling Green, Ohio.
Circle 408 on inquiry card

CONCRETE TENDON STRAND / Ten-page technical pamphlet describes *LOK-STRESS* strand for prestressed concrete tendons. Strand has low stress losses due to minimum relaxation on physical properties and design criteria. ▪ CF&I Steel Corp., Denver.
Circle 409 on inquiry card

LIMESTONE / "New Developments in Indiana Limestone" illustrates a few new methods for using limestone. ▪ Indiana Limestone Institute of America, Inc., Bloomington, Ind.
Circle 410 on inquiry card

COMMERCIAL FURNITURE / A contract seating collection includes chairs, sofas, tables, ottomans and benches of special interest for lounge and reception areas. ▪ The Troy Sunshade Company, Troy, Ohio.
Circle 411 on inquiry card

COLORED LABORATORY FURNITURE / An 82-page color catalog contains illustrations and specifications for the interchangeable steel modules of *Contempra,* a line of full-color furniture. ▪ Fisher Scientific Company, Pittsburgh.
Circle 412 on inquiry card

ELECTRIC DESIGN / "Determining the Feasibility of All-Electric Design," the latest in a series, is a 24-page booklet that includes two studies in detail. ▪ National Electrical Contractors Association, Washington, D.C.
Circle 413 on inquiry card

WALL SYSTEM / A no-girt wall system, to fill the need for clean, dust-free interior walls with simpler framing, is the subject of a 20-page booklet. ▪ The Binkley Company, Warrenton, Mo.
Circle 414 on inquiry card

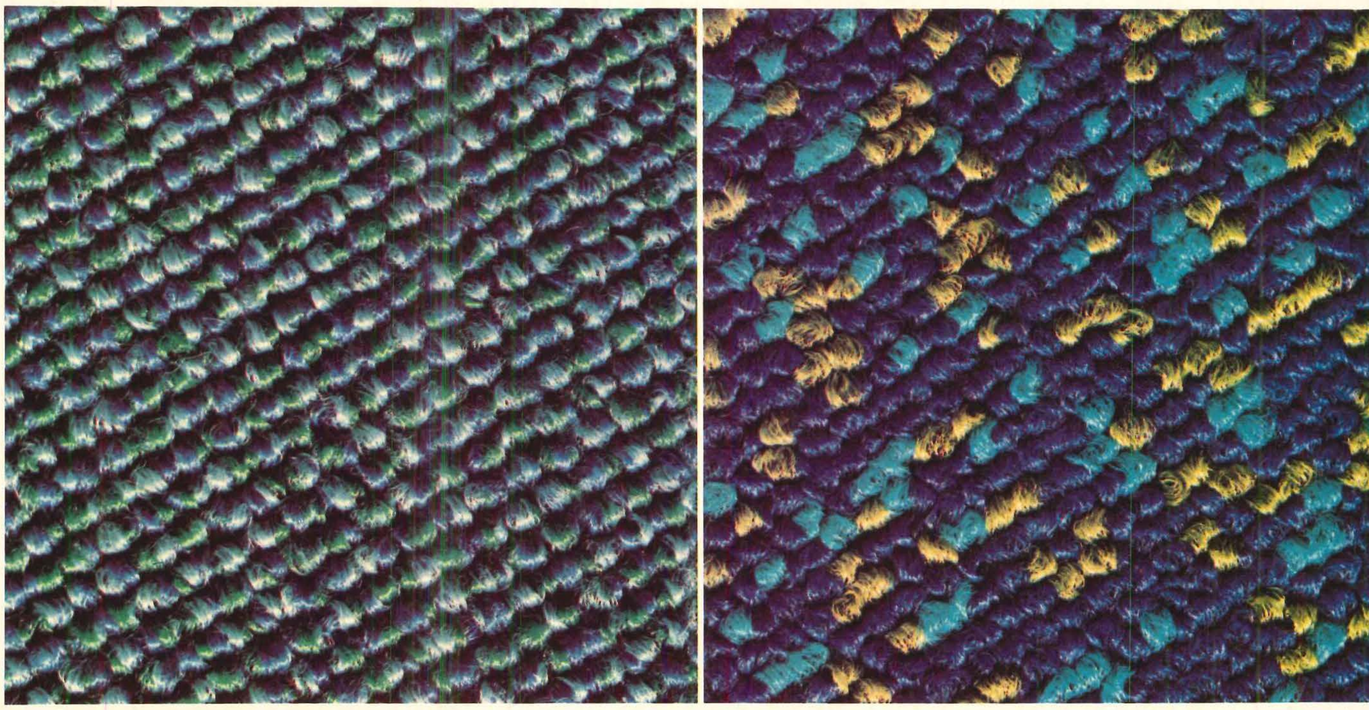
DOORS / Two catalogs present many kinds of commercial-industrial doors, including rolling doors. ▪ Overhead Door Corporation, Dallas.
Circle 415 on inquiry card

* *Additional product information in Sweet's Architectural File*

more literature on page 230

Institutional carpet doesn't have to look old fashioned. Ours doesn't.

(And it's anti-soil, too.)



Ours is Constellation. Super-tough, application-proved, anti-soil Densylon® with a new look. Up to now, you had little choice. Old-fashioned tweeds. Residential patterns that looked good but couldn't stand the wear. Or expensive, one-of-a-kind orders that took all kinds of time and money. Now there's Constellation. Beautiful enough to use anywhere. Tough enough to take the heaviest traffic. With 16 color combinations in stock. Or any custom combination you want. In the same price range as ordinary institutional carpet. All because we're CCC—world's largest manufacturer of commercial and institutional carpet systems. Find us in the Yellow Pages or mail this coupon.

Commercial Carpet Corporation
10 West 33rd Street, New York, N.Y. 10001
Attention: Mr. Walter Brooks Dept. AR-3

☐ Please have your representative call on me.
☐ Please send portfolio and Constellation swatches.

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Title__________ Phone__________
Organization__________
Address__________
City__________ State__________ Zip__________

CCC

Programs, and products to make them work.

For more data, circle 105 on inquiry card

Kern Plaza, El Paso, Texas *Architects: Fouts, Langford and Associates, El Paso, Texas*

Create an oasis with PLEXIGLAS®

A tranquil oasis for weary shoppers was created practically and with economy in this shopping center with a series of transparent domes of PLEXIGLAS acrylic plastic.

A new solar control color of PLEXIGLAS filters the sun's heat and glare from the daylighted area. The bronze PLEXIGLAS used transmits 27% of visible light and filters 65% of total solar energy, providing maximum comfort.

The skylight assembly spans 26′ and is 104′ long. It consists of 104 individual domes, each measuring 4′ by 8′. The light weight and rigidity of PLEXIGLAS plus sound engineering of the frame permit the assembly to be self-supporting.

PLEXIGLAS has year-round resistance to weather, breakage and discoloration. It is an approved safety glazing material.

PLEXIGLAS offers many advantages for daylighting any type of building. For more ideas and data on PLEXIGLAS, send for our brochure, "Transparent PLEXIGLAS Solar Control Series".

Plexiglas is made only by ROHM AND HAAS
PHILADELPHIA, PENNSYLVANIA 19105

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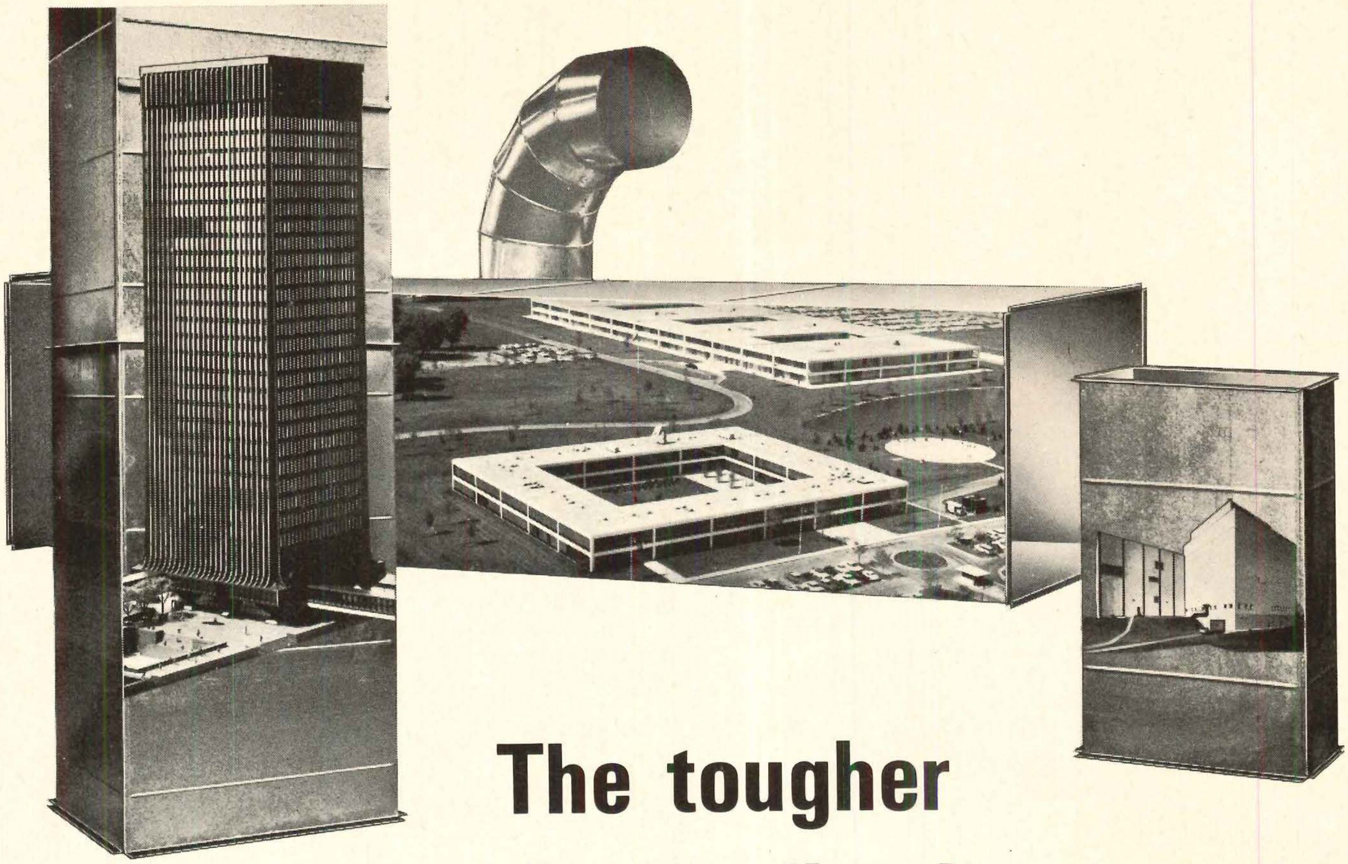
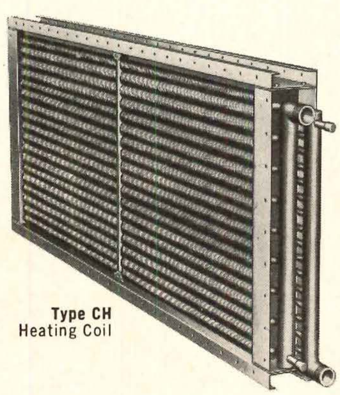


The tougher the application... the more the specs fit AEROFIN



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Heat-transfer coils have been our *one* — our *only* business for over 45 years. Designing and engineering coils into today's sophisticated comfort conditioning systems calls for a lot of coil capability.

Aerofin objectively evaluates every vital collateral factor: stainless steel, copper, aluminum tube construction — single or multiple rows — surface and circuitory selection — fin-spacing efficiencies — preheat or reheat applications — fluid fouling tendencies — freeze-up hazards — space-saving considerations — and header designs for banking in stacks or connecting to duct work.

Whether it's hundreds of coils for job-site system-assembly or a single replacement — Aerofin gives you *maximum performance.* Get customized coil climate control help from Aerofin's national network of sales specialists.

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Lynchburg, Virginia 24505

Aerofin is sold only by manufacturers of fan system apparatus. List on request.

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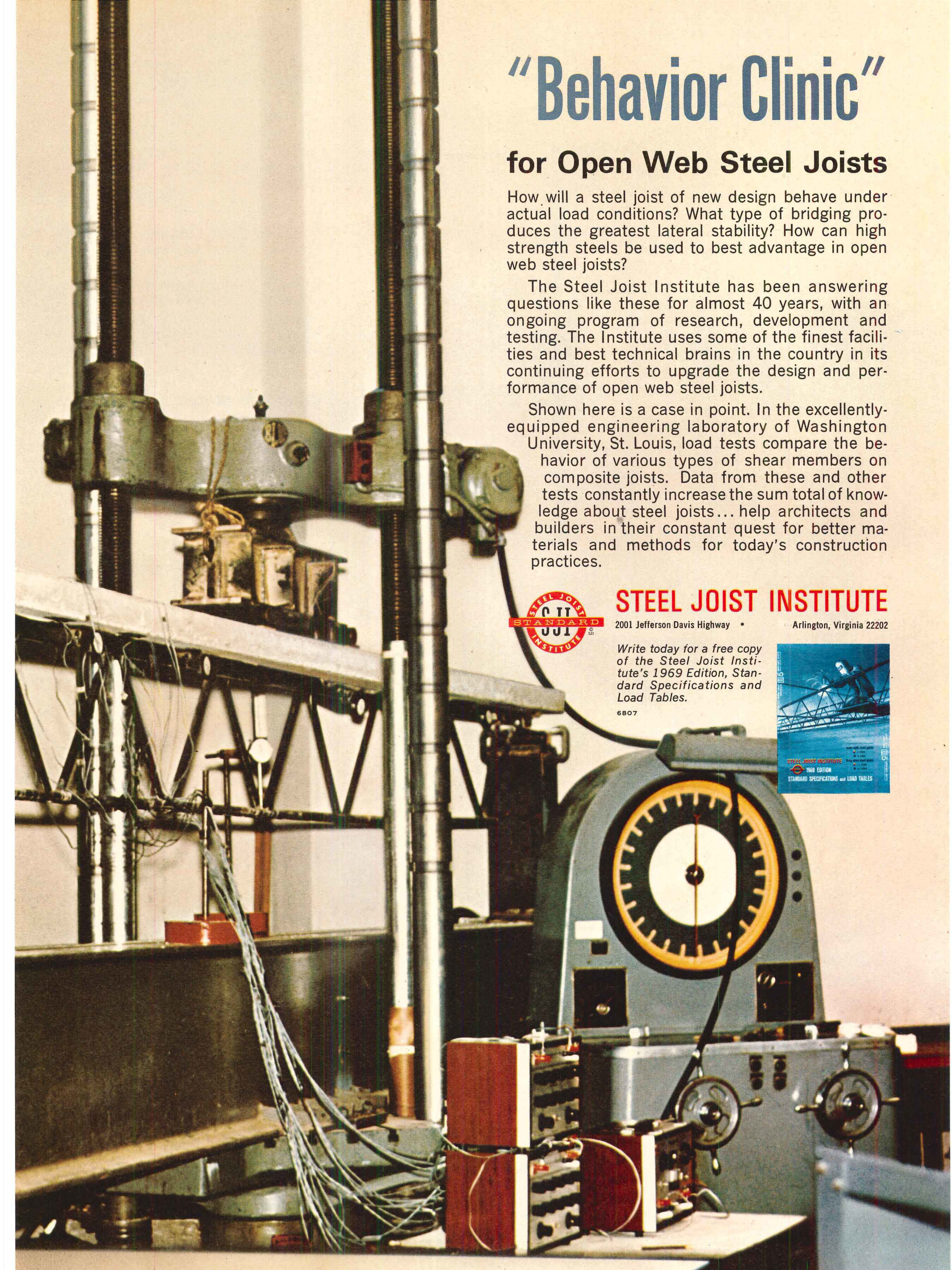
"Behavior Clinic"
for Open Web Steel Joists
How will a steel joist of new design behave under actual load conditions? What type of bridging produces the greatest lateral stability? How can high strength steels be used to best advantage in open web steel joists?
The Steel Joist Institute has been answering questions like these for almost 40 years, with an ongoing program of research, development and testing. The Institute uses some of the finest facilities and best technical brains in the country in its continuing efforts to upgrade the design and performance of open web steel joists.
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STEEL JOIST INSTITUTE
1969 EDITION
STANDARD SPECIFICATIONS and LOAD TABLES

continued from page 224

METAL PANEL SYSTEMS / An illustrated catalog contains physical property tables, specifications and details of exclusive design features of *INSUL-LAP* urethane insulated panels and *INTER-LAP* non-insulated panels. ▪ Glaros Products, Inc., Pittsburgh.

Circle 416 on inquiry card

WALL PANELING SYSTEM / A 12-page brochure contains a complete color chart of 15 woodgrain patterns and 32 solid colors and patterns available in *Videne* (a product that incorporates a thermo-plastic film surface laminated to a panel of hardboard or other substrate). ▪ Modern Laminates, Inc., Holland, Mich.

Circle 417 on inquiry card

BEAMS AND DECKING / Color brochure describes advantages of modern post and beam construction using laminated wood products. ▪ Potlatch Forests, Inc., San Francisco.

Circle 418 on inquiry card

TRANSLUCENT PANELS / "Facts about Daylighting with Translucent Panels," a six-page report that presents a series of cost studies, indicates that significant savings in both heating and cooling costs are possible. ▪ Filon Division, Vistron Corporation, Hawthorne, Calif.

Circle 419 on inquiry card

ELECTRIC HEAT / "Join the Dependable World of Flameless Electric Heat" is an eight-page brochure describing basic equipment and accessories. ▪ Lennox Industries Inc., Marshalltown, Iowa.

Circle 420 on inquiry card

FIRE PUMP / Three types of Underwriters Laboratories-listed and Associated Factory Mutual-approved fire pumps are the subject of a well-illustrated, 32-page color bulletin. ▪ Peerless Pump Hydrodynamics Division, FMC Corporation, Los Angeles.

Circle 421 on inquiry card

CEILING SYSTEMS / A 40-page *Acousti-Celotex* ceiling systems manual provides specifications, sound absorption coefficients, and normalized attenuation factors. ▪ The Celotex Corporation, Tampa, Fla.

Circle 422 on inquiry card

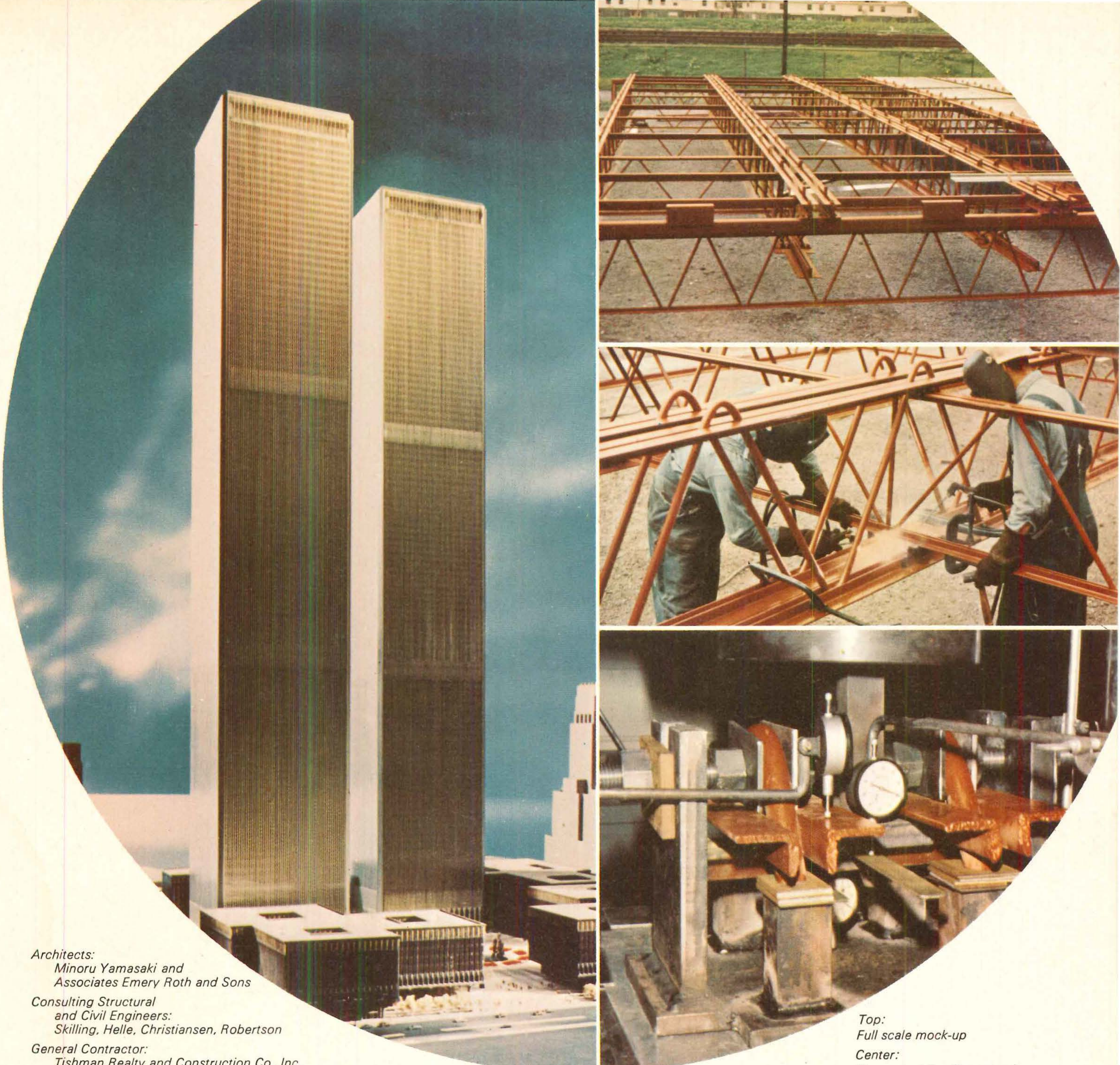
WALKWAY COVERS / An eight-page color brochure pictures applications of aluminum marquees, walkway covers and *Decor-Wall* panels. The interlocking design has no exposed fasteners. ▪ Howmet Corporation, Mesquite, Tex.

Circle 423 on inquiry card

* *Additional product information in Sweet's Architectural File*

more literature on page 238

For more data, circle 111 on inquiry card ➧



Architects:
Minoru Yamasaki and
Associates Emery Roth and Sons

Consulting Structural
and Civil Engineers:
Skilling, Helle, Christiansen, Robertson

General Contractor:
Tishman Realty and Construction Co., Inc.

Owner:
The Port of New York Authority

Top:
Full scale mock-up

Center:
Pre-assembling floor panel

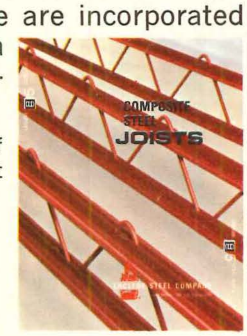
Bottom:
Testing of components

Laclede Composite Trusses for the Floor System of the World's Tallest Buildings

Pioneering research and development on composite steel joists and concrete floor systems has culminated in the use of Laclede quality controlled welded trusses in the World Trade Center now being constructed by the Port of New York Authority in lower Manhattan. More than 25,000 tons of Laclede composite type trusses will be used in this $600,000,000 complex with its twin 110-story tower buildings. Laclede product development staff worked in close cooperation with the project's architects and engineers on the application of special resistance welded trusses for the composite floor design.

Tests on full scale truss components conducted at Laclede's laboratory and in the structural research laboratory of Washington University in St. Louis provided assurance that all design requirements are exceeded. Steel cells for in-floor electric and telephone service are incorporated in the composite system as a part of the 20′ x 60′ preassembled floor panels.

Send for your free copy of a new Composite Joist Catalogue.



Steel

LACLEDE STEEL COMPANY

Saint Louis, Missouri

Programmed for Progress in Modern Steelmaking

6854

For more data, circle 112 on inquiry card

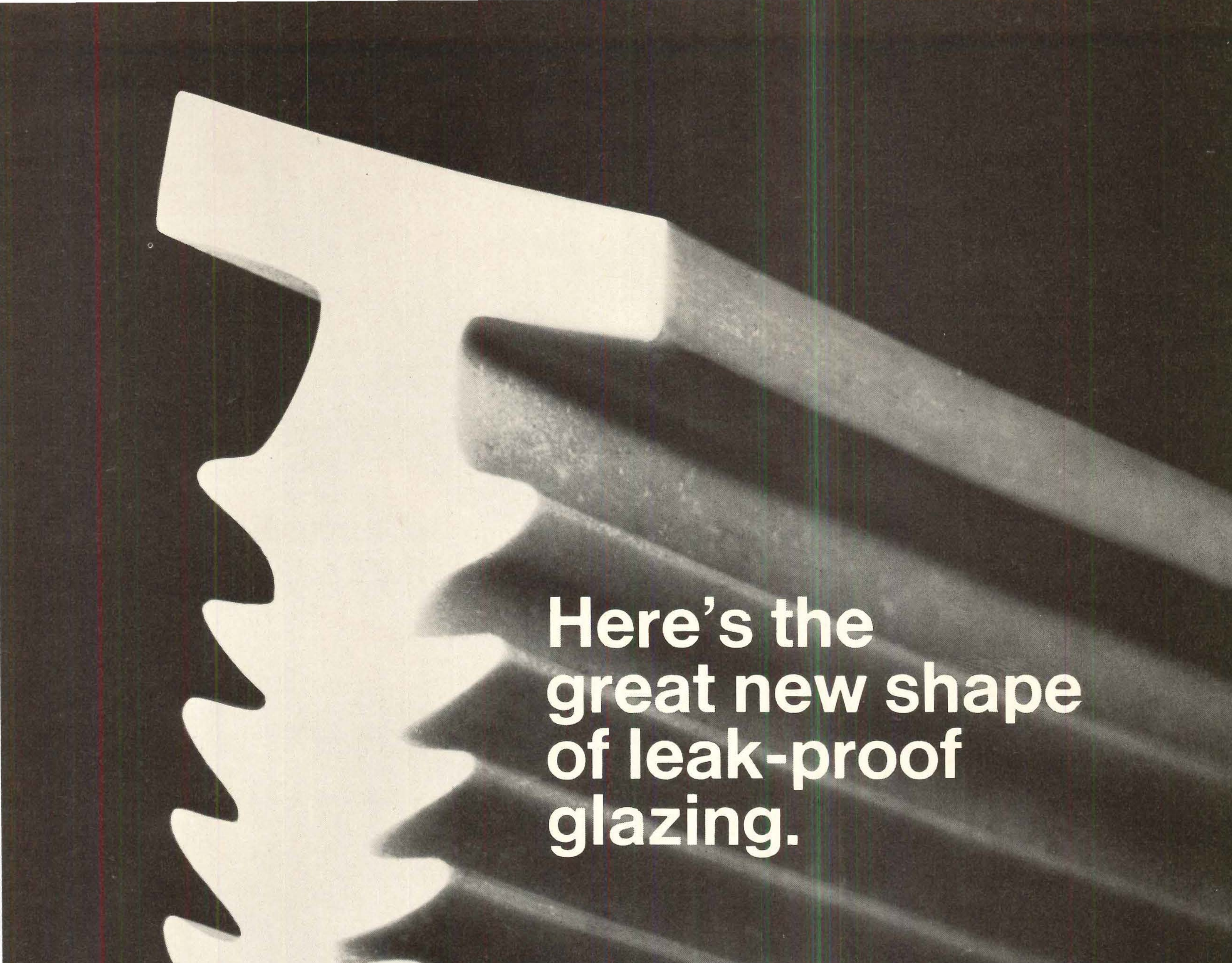
Double egress!

Von Duprin UL listed Fire Exit Hardware for double egress fire doors. No mullion. No coordinator. No astragal on "B" and "C" label doors!

Here's a newly-listed fire door application—double egress doors with Von Duprin 88 vertical rod Fire Exit Hardware. You never need an astragal on "B" and "C" label doors—only on "A" label doors—and you never need a mullion or a coordinator on *any* door. That's news, because you do need astragals, mullions and coordinators with all other fire door applications. But that's Von Duprin, the *only* complete line of Fire Exit Hardware! *Von Duprin, Inc. · 400 W. Maryland St. · Indianapolis, Ind. 46225 · Von Duprin Ltd. · 903 Rue Simard · Chambly, Que.*

Von Duprin®

For more data, circle 113 on inquiry card



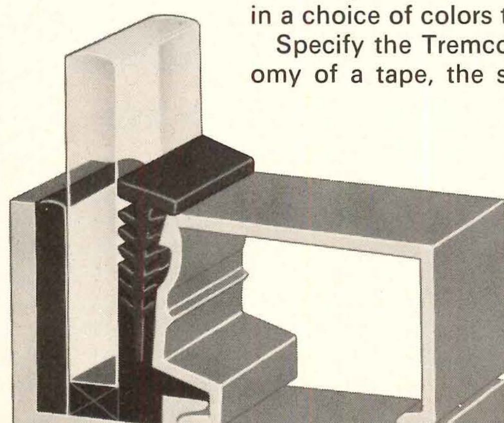
So unique it's patented.

This exclusive Tremco Vision Strip digs its fins into a layer of Mono Sealant for a secure barrier against moisture. On the outside, Tremco 440 Tape adheres firmly to the glass for another tight seal.

Together, these three components of the Tremco Glazing System give windows 100% leak-proof security for twenty years or more. Besides, they look great. Sightlines stay clean and uniform with tape and vision strip that come in a choice of colors to match your sash.

Specify the Tremco Glazing System and you've got the economy of a tape, the security of a sealant, and the attractiveness of gasketing for any sash you choose. Your Tremco man can help you add the finishing touches to most sealant specifications. His professional assistance—*and* Tremco's forty years of sealant experience—can help you design enduring beauty into any application.

Want more information? Ask us to send your Tremco man. He's got a color-sample kit so you can see our great new shape right in your office.



U. S. Pat. 542,681.
Canadian Pat. 777,537.

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THE TREMCO MANUFACTURING COMPANY
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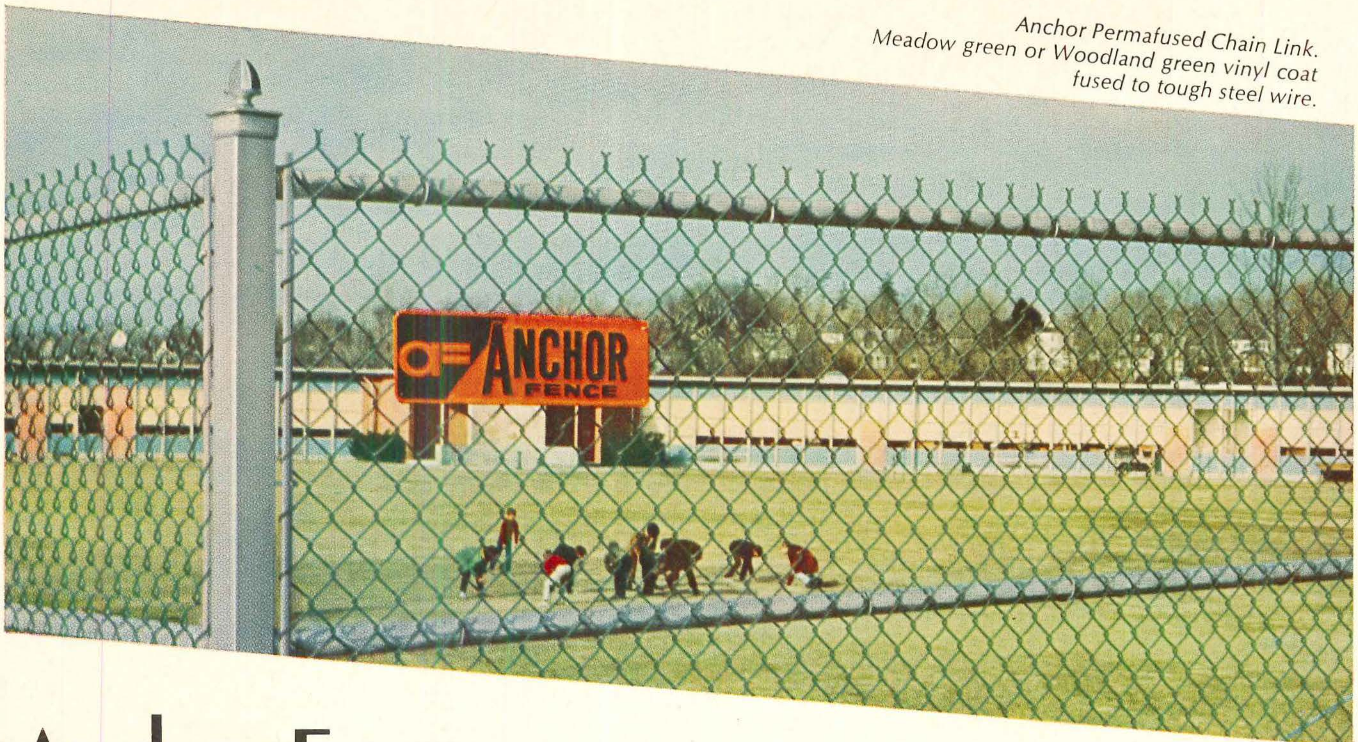
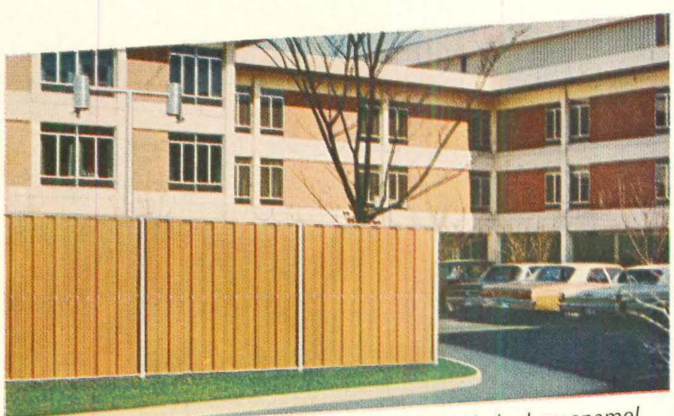
Anchor Permafused Chain Link.
Meadow green or Woodland green vinyl coat
fused to tough steel wire.



ANCHOR® FENCE: colorful, positive protection.

Protection . . . plus color . . . from Anchor; it's a whole new era in concept and design. Colorful chain link: Permafused® with two shades of green vinyl coating. Chain link is also available in aluminum or galvanized steel. In attractive colors, Anchor Board-on-board Privacy fence protects, conceals and adds style. Anchor Railing Systems enable you to put decorator color or natural aluminum where you want it . . . balconies, entrances, stairs, traffic control, indoors or out. Find out what Anchor's colorful protection can do for you. Mail coupon for free 12-page booklet.



Anchor Privacy Fences: In a wide variety of baked-on enamel colors. Protection plus concealment.

Anchor all-aluminum railing systems are ideal for balconies, stairways, entrances; even rooftops and sundecks.

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Organization__________

Street__________

City__________ State__________ Zip__________

Please list applications that interest you: Chain link for__________

Anchor Privacy for__________ Railing systems for__________

Thank you.

For more data, circle 116 on inquiry card

◀ *For more data, circle 115 on inquiry card*

continued from page 230

ALUMINUM EXTRUSIONS / A 162-page hard-cover book, *Aluminum Extrusions in Architecture,* describes the principles of using extruded aluminum shapes. The basic factors involved and numerous combinations of function and appearance are illustrated in 250 line drawings and photos. Company letterhead requests for free copy; otherwise: $6. ▪ Kaiser Aluminum & Chemical Corporation, Oakland.

STEEL / "Cor-Ten High-Strength Low-Alloy Steel for Architectural Applications" presents technical data along with application photos of art and architecture. ▪ United States Steel Corporation, Pittsburgh.

Circle 424 on inquiry card

REDWOOD / "Durability of Redwood" is a four-page, revised technical data sheet presenting a comparative analysis of 11 woods commonly used in construction. ▪ California Redwood Association, San Francisco.

Circle 425 on inquiry card

STEEL JOISTS / A 12-page color catalog gives design data, load tables and technical information on open web steel joists for composite construction. ▪ Laclede Steel Company, St. Louis.

Circle 426 on inquiry card

WATER COOLERS / A 32-page reference catalog illustrates the 1969 line of electric water coolers, drinking fountains and fountain accessories. An application chart shows how drinking water requirements may be determined for various types of service. The catalog lists complete dimensional data for fully recessed, floor model and wall mounted electric coolers and accessories; pedestal, wheel chair, wall mounted, free-standing and oval fountains; cafeteria and institutional units; remote water cooling units; mounting frames; and ventilating panels. ▪ The Halsey W. Taylor Company, Warren, Ohio.

Circle 427 on inquiry card

DOORS AND GRILLES / A 1969 catlog presents comprehensive architectural details on rolling metal doors, rolling grilles, rolling shutters and sliding grilles. The products are available in steel, aluminum, stainless steel and bronze. ▪ Cornell Iron Works, Inc., Wilkes-Barre, Pa.

Circle 428 on inquiry card

EPOXY FLOORING / A four-page brochure covers four primary epoxy floor systems: *Tuff-Lite* epoxy terrazzo floor matrix; *Tuff-Lite* epoxy conductive terrazzo floor matrix for hospitals; *Tweed-Tex* epoxy ceramic granule floors; and epoxy floor topping for high-wear industrial areas. ▪ H. B. Fuller Company, St. Paul.

Circle 429 on inquiry card

ALUMINUM GLOSSARY / "Nomenclature for Aluminum Mill Products" is a 16-page booklet with 335 definitions covering sheet and plate, extruded shapes, tubular products and related mill products. ▪ Aluminum Association, New York City.

Circle 430 on inquiry card

SURFACING / A four-page, color brochure reproduces many examples of aggregate and pebbletex surfacings with many illustrations showing the actual size. ▪ Finestone Corporation, Detroit.

Circle 431 on inquiry card

DAMPERS / A 21-page booklet is an authoritative presentation of planning and buying data on custom-crafted air control dampers required on commercial, industrial and marine installations. The booklet deals with 17 different types of dampers. ▪ The American Warming and Ventilating, Inc., Toledo, Ohio.

Circle 432 on inquiry card

DRAPERIES / An eight-page brochure deals with fabrication, pattern design, interior design considerations, installation and hardware. ▪ Edwin Raphael Co., Inc., Holland, Mich.

Circle 433 on inquiry card

* *Additional product information in Sweet's Architectural File*

more literature on page 246

For more data, circle 118 on inquiry card


After 4000 successful deliveries, we can help bring your new-born building to life with a standardized automation system.
The birth of every new building is an awesome event. For architect and owner alike. It's reassuring if the people involved in bringing your building to life have had lots of experience.
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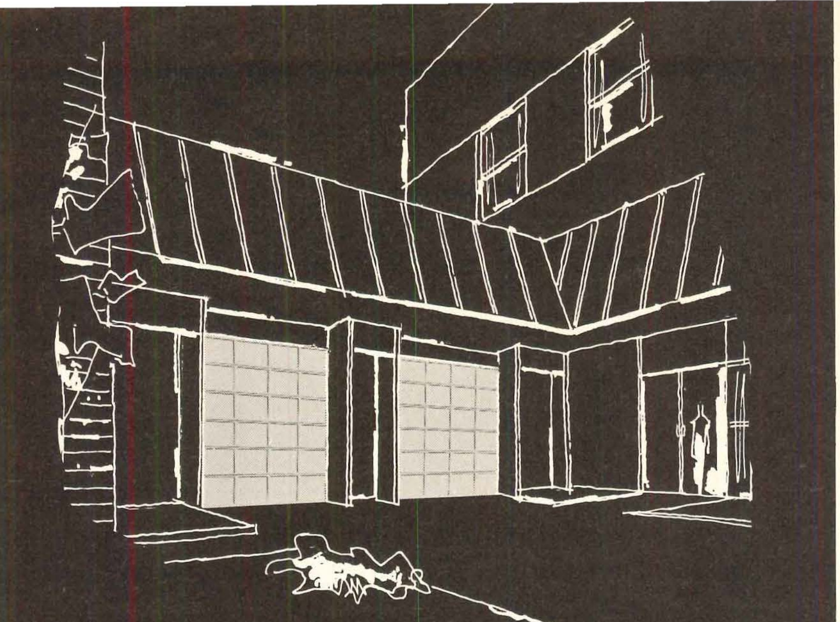
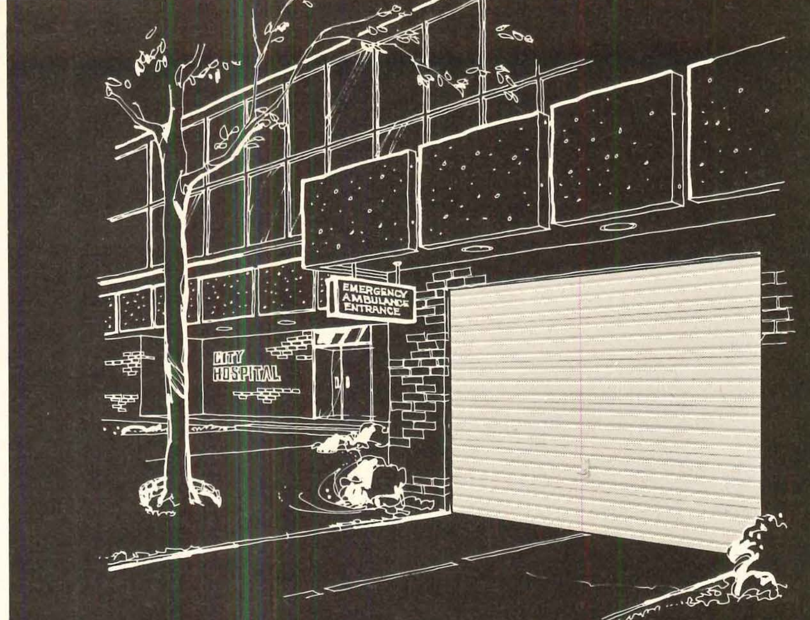
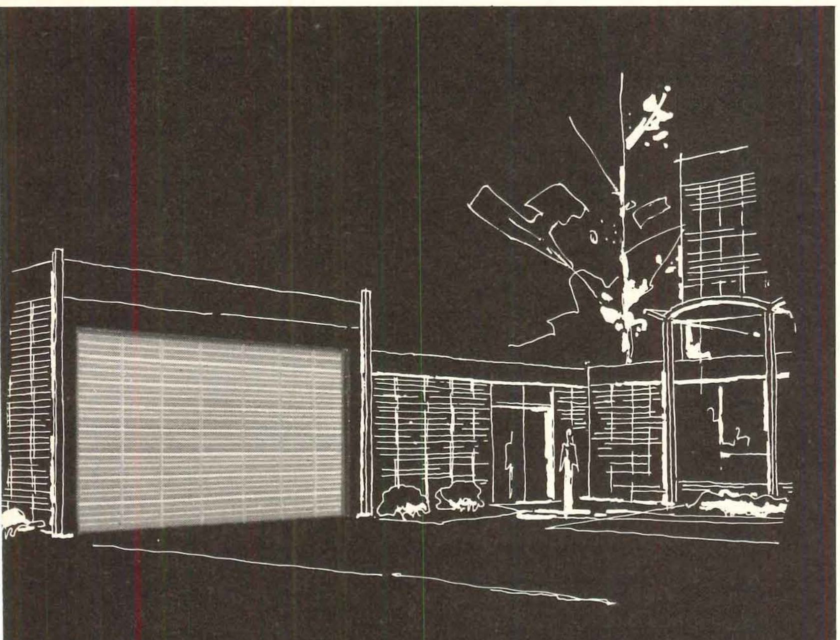


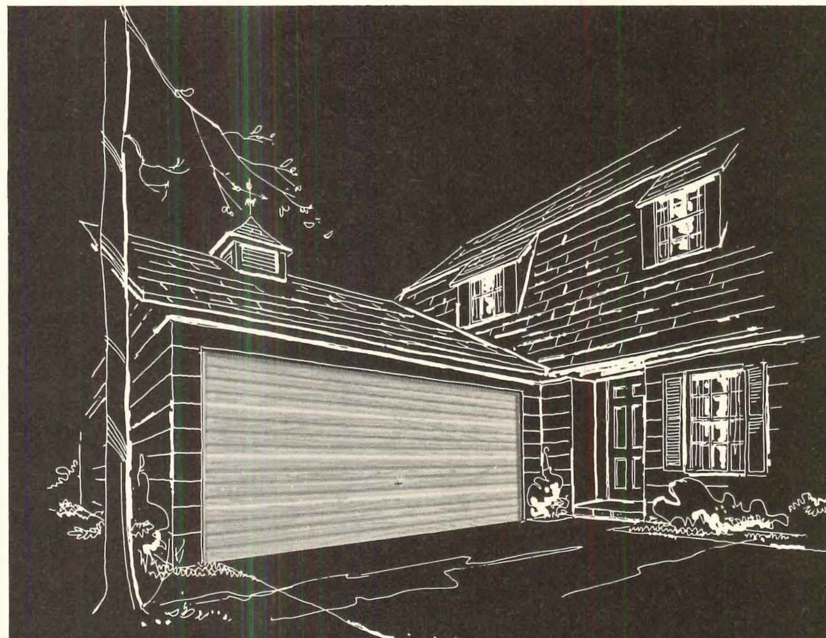
WOOD PANEL — CHOICE OF MANY DESIGNS



FILUMA ALUMINUM PANEL — PREFINISHED WHITE



FILUMA — CHOICE OF WHITE, TAN, GREEN



WOOD GRAIN FILUMA — LOOKS LIKE WOOD

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☐ Lots more! More styles. More sizes. More design freedom. Wood panel doors, Filuma® fiberglass panel doors, Filuma aluminum panel doors (mix with fiberglass panels, if you wish). Frantz Filuma doors are available in any commercial/industrial size up to 24 feet wide and 20 feet high. For extra excitement in residential design, there's our Wood Grain Filuma door . . . the easy-to-clean, lightweight fiberglass door that looks like wood. How's that for design freedom? And Frantz builds more quality features into a door. Pressure Sealed* fiberglass panels are weather tight. Spring Door Holders automatically press door against head jamb to seal out drafts. Or the famous Multi-Function Security Lock that operates from either side . . . inside without a key. Like to hear more about the *more* door (and there's a lot more to tell)? See our catalog in Sweet's Architectural or Light Construction files. Or call your building materials dealer. Or write.

* U.S. Patent Nos. 194094, 414699, 3169612

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WORLD FAMOUS FOR QUALITY GARAGE DOORS

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STANDARD STEEL DOORS AND FRAMES

Preferred by V.I.P.'s of APARTMENT Construction

TENANTS in today's modern apartments enjoy the look of quality . . . the feeling of security.
OWNERS profit by maintenance-free door openings . . . the "moving parts" of the building.
ARCHITECTS look to Fenestra for freedom of design and maximum utilization of space.
CONTRACTORS appreciate the local availability and ease of installation.

The PENN PLAZA apartments shown here satisfied these varied needs by using Fenestra standard steel doors, frames, Fen-Dry drywall frames and Fen-Fold steel bi-fold closet doors. Of course, Fenestra doors and frames are ideal for *any* building. It costs no more . . . probably less to have the finest. Take advantage of this convenient local service by calling your Fenestra distributor. He's listed in the Yellow Pages. Or write Fenestra for literature.

For more data, circle 120 on inquiry card

FENESTRA
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DIVISION OF THE MARMON GROUP, INC. (MICHIGAN)
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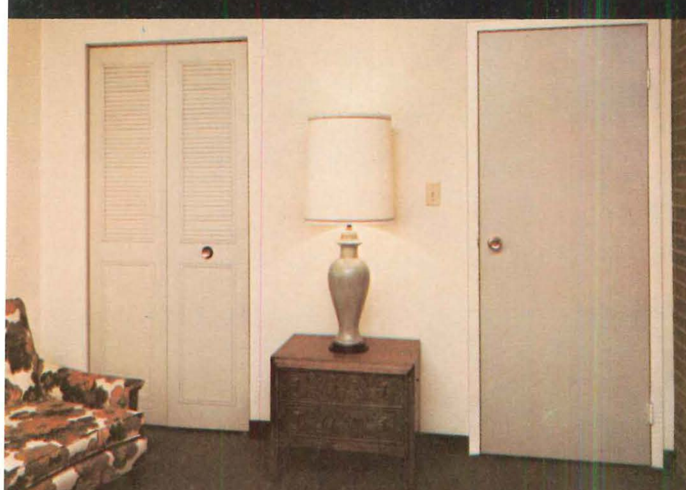
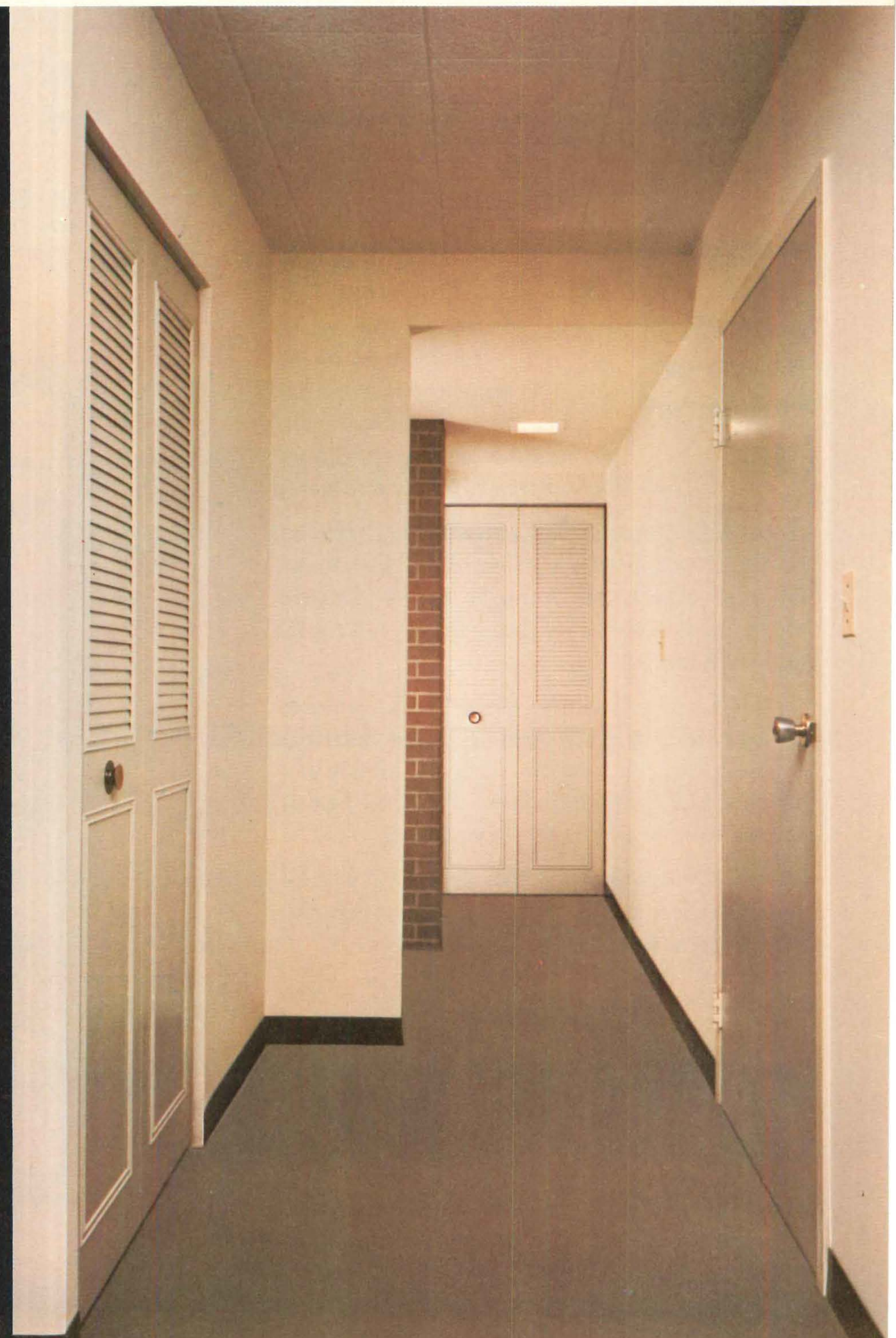
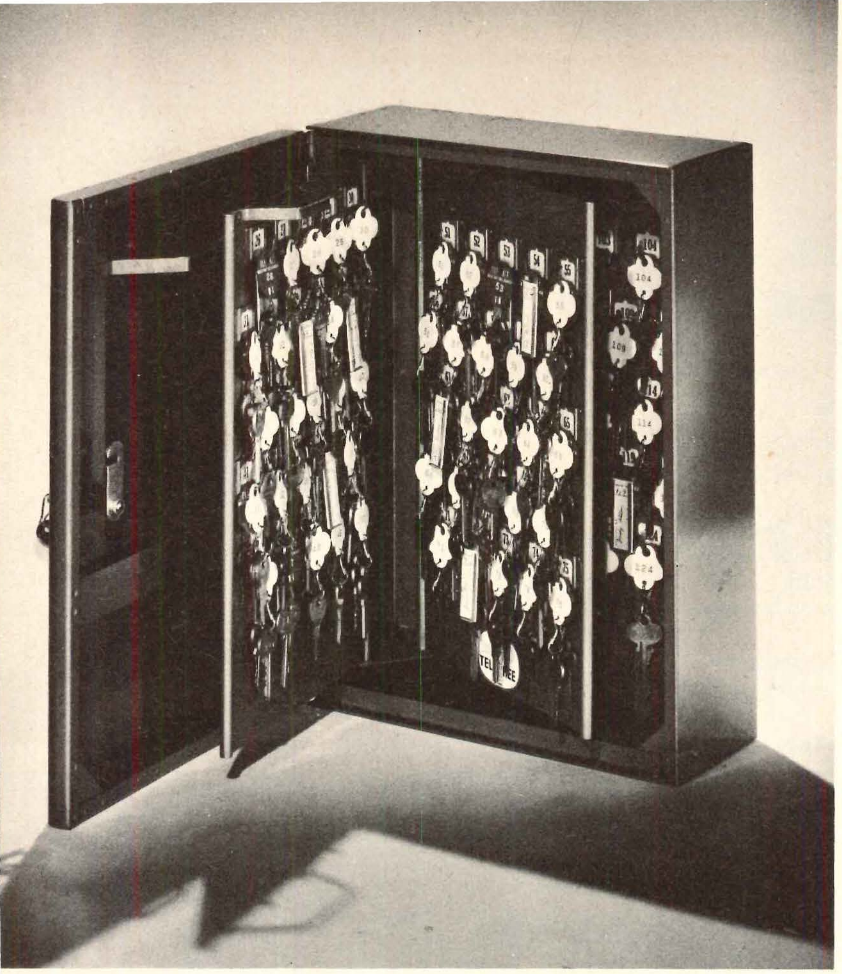
FENESTRA IS LOCAL EVERYWHERE

PENN PLAZA APARTMENTS, PITTSBURGH, PA. • ARCHITECT — TASSO G. KATSELAS • CONTRACTOR — NAVARRO CORP.







Should all your clients' security be your concern?

You may be specifying a TELKEE key control system for some hospitals, schools and industrial complexes; but overlooking it on buildings where there are only a few locks.

A TELKEE system of key control is so simple, so relatively inexpensive, with so many advantages for your client, that it ought to be included whenever your hardware specifications call for 20 locks or more.

TELKEE means security, economy, convenience for *every* lock in every building . . . for restricted areas, storage of valuable supplies, confidential files, for any item with a lock. TELKEE guards against key loss and costly lock rekeying.

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Specify a

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SYSTEM OF KEY CONTROL

T-704

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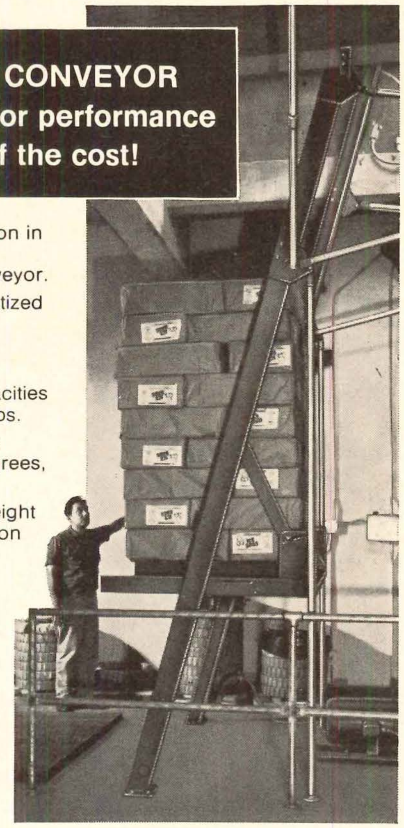
Moto Flow CONVEYOR

Freight elevator performance at a fraction of the cost!



- Approved for installation in new buildings or old; classified as freight conveyor.
- Moves bulky and palletized loads to and from mezzanines as well as between floors.
- Four models with capacities from 2000 lbs. to 6000 lbs.
- Operates at any angle between 30 and 70 degrees, indoors or outside.
- Does the work of a freight elevator at a small fraction of the cost.
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Strong is the company that architects take their projection lighting problems to.

Strong specializes in

SPOTLIGHTS, MOTION PICTURE LIGHT SOURCES, SLIDE PROJECTORS

To assist architects in planning the requirements of auditoriums, schools, colleges, universities, hotels, theatres and arenas, Strong will gladly send you free informative brochures and specification sheets. Typical data includes foot candle readings and diameters of spots at various throws, projection table with screen sizes and focal length of lenses, power requirements and mechanical dimensions.

The Strong

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A SUBSIDIARY OF THE SINGER COMPANY

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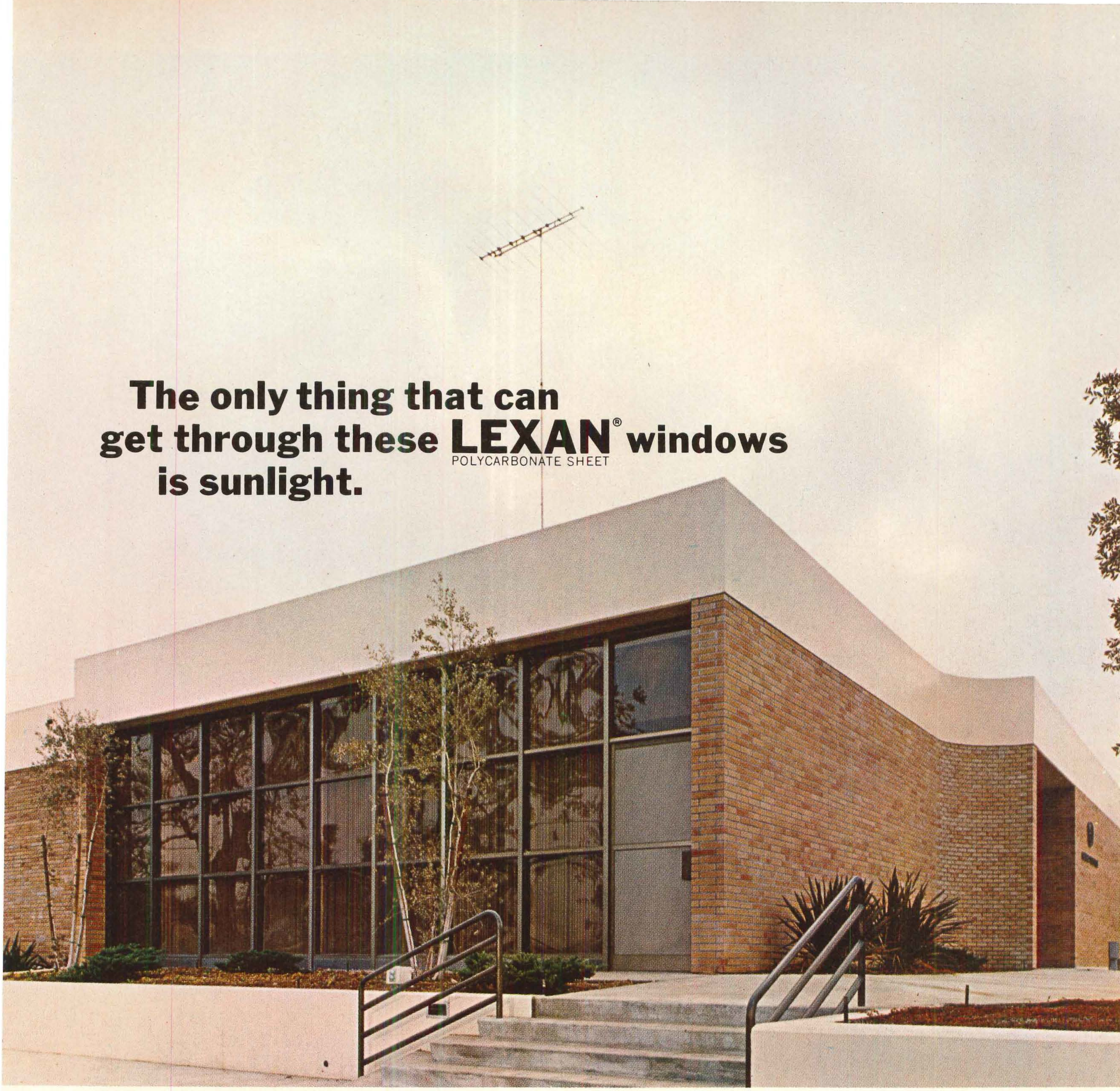

Companies that live in glass houses learn to take the breaks as they come. Not so with General Telephone Company of California. They are protecting complex communications equipment with unbreakable, solar tinted LEXAN SHEET for glazing.

LEXAN just won't break. Thirty times tougher than cast acrylic, it shrugs off rocks, bricks, baseballs. It doesn't crack, chip or shatter even if a bullet penetrates it. Easily cut to any shape, LEXAN SHEET is installed with non-hardening sealing compounds.

All clear? If not, we'll be happy to send you complete data. Just return the coupon...or phone, of course.

LEXAN®

Clear as glass...tough as metal

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Please send me more facts about unbreakable LEXAN SHEET for glazing.

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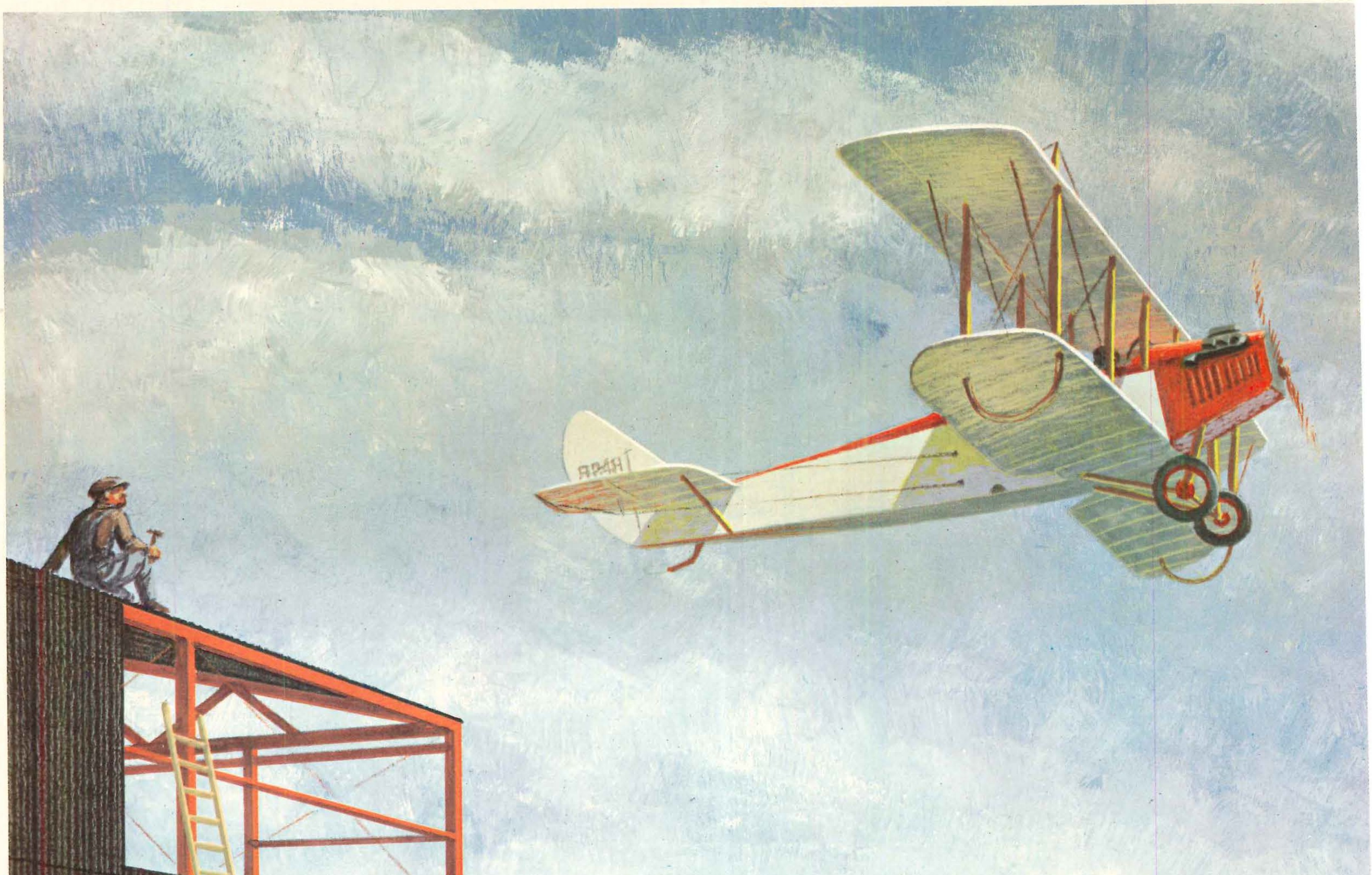

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AIR TRANSPORTATION

Meant Wire Wheels and Wind in Your Face . . .

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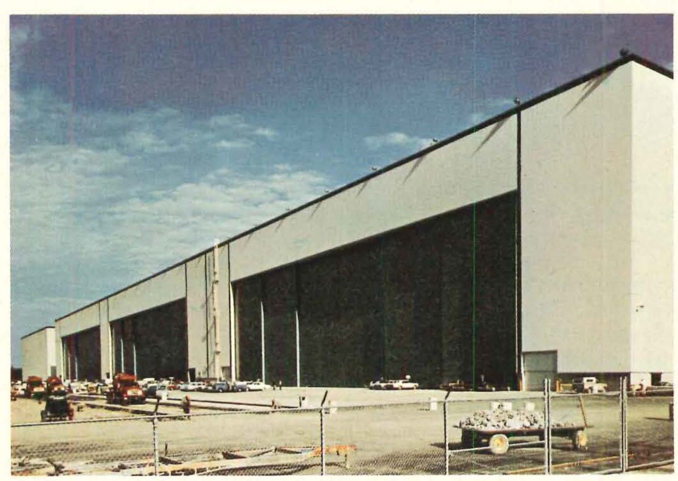
was providing ground support for an infant industry.

As early as 1917, Robertson products were finding enthusiastic reception in a totally new building market —Air Transportation. Over the years, Robertson's ability to provide the finest in wall, roof and floor systems has continued to keep pace with the air transport industry's changing demands.

Under one contract, H. H. Robertson Company can offer responsibility for design technical assistance, engineering, manufacturing, shipment and erection of its products. We call it our SINGLE RESPONSIBILITY policy, and it is backed by the resources of a world-wide organization, with 16 manufacturing plants and sales offices and agents in 60 countries.

If you are planning new buildings—for airport or manufacturing facilities—put Robertson's 50 years of experience to work for you. Use the coupon or write for further information.



747 FINAL ASSEMBLY BUILDING, THE BOEING COMPANY,
Everett, Wash.; Austin Associates, Designers
The Austin Company, General Contractor
ROBERTSON GALBESTOS WALLS

H. H. Robertson Company

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Yes, I would like to have more information on the application of Robertson products in the air transportation field.

NAME

COMPANY

ADDRESS

CITY, STATE, ZIP

continued from page 238

COPPER / Methods for the more effective and attractive use of copper in contemporary roofing, fascias and related applications are detailed in a series called "Creative Design in Architecture." The first four-page bulletin covers design and installation of copper fascias; the second, standing seam roofing; and the third, batten seam roofs. A subsequent bulletin will cover copper gutters. ▪ Copper Development Association, Inc., New York City.
Circle 434 on inquiry card

HOSPITAL SPECIALTIES / An eight-page booklet features a surgical scrub station, available with either single, double or triple bay. Additional items include various dispensers and drawer-type cabinets. ▪ Watrous Incorporated, Bensenville, Ill.
Circle 435 on inquiry card

RAISED FLOORING SYSTEMS / A 12-page bulletin gives dimensions, specifications and installation details on raised flooring systems. The bulletin describes the freestanding, drop-in grid and rigid grid systems. Details are given on a highly adjustable, positive-locking pedestal that acts as the basic supporting member in all three systems. ▪ Weber Architectural Products Division/Walter Kidde & Company, Inc., Grand Rapids, Mich.
Circle 436 on inquiry card

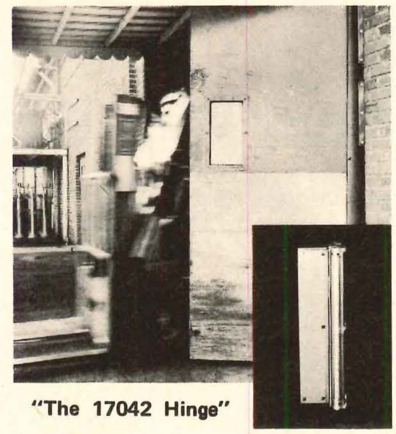
WATERPROOFING / A four-page brochure gives the case history use of *Synthacalk GC-5* on the new Pet, Incorporated building housed within St. Louis' civic center urban redevelopment area. ▪ Pecora Chemical Corporation, Philadelphia.
Circle 437 on inquiry card

HARDWARE / A 16-page catalog describes a full line of architectural hardware including the *150 Series Powerglide* door closer and *1800 Series* mortise locks. ▪ Sargent & Company, New Haven.
Circle 438 on inquiry card

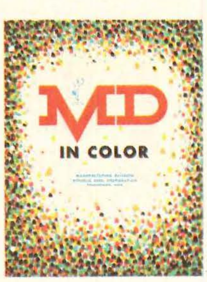
ELECTRICAL RACEWAYS / The 1968 edition of the *Steel Electrical Raceways Design Manual* serves as a guide for installation of steel raceways in a variety of buildings. The 102-page manual includes changes that appear in the 1968 edition of the National Electrical Code. Raceways covered include rigid steel conduit, electrical metallic tubing, and flexible steel conduit. ▪ American Iron and Steel Institute, New York City.
Circle 439 on inquiry card

WALLPAPER / A 12-page color brochure presents 12 collections and illustrates various installations. ▪ Imperial Wallpaper Mill, Inc., Cleveland.
Circle 440 on inquiry card

* *Additional product information in Sweet's Architectural File*



The 18 standard colors of Republic CRYLCOAT* windows, and 329 ways of blending them with the rest of your building.



The colors are as close as we can match them in ink (you'll really have to see our actual paint samples, which we'll be happy to show you).

CRYLCOAT is a thermosetting acrylic finish, baked on steel phosphatized in five stages. It's protected against sun, wind, and weather. And its smooth surface shuns dirt and grime, leaving maintenance at absolute minimum.

The 329 ways of blending CRYLCOAT colors with present building materials are in the report we'll send you when you mail us this coupon. It was prepared for us (and you) by a nationally known color authority.

We not only show you our true colors, we'll help you use them aesthetically.

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REPUBLIC STEEL MANUFACTURING DIVISION

YOUNGSTOWN, OHIO 44505

Send your new Republic CRYLCOAT Steel Window catalog featuring your Color Harmony Chart.

Name____________________

Title____________________

Company____________________

Address____________ City________

State____________ Zip________

For more data, circle 126 on inquiry card

continued from page 96

James M. Graham, Paul W. O'Shea and **August P. Wisnosky, Jr.**, engaged in the practice of architecture and planning, have established a new firm, **Graham, O'Shea and Wisnosky, Architects,** located at 222 South Fifth, Springfield, Illinois.

Frank S. Grosso was recently made a full partner in the Rochester, New York firm of **Richard J. Handler/Frank S. Grosso, Architects, Engineers, Planners.**

Lyle B. Hallett, A.I.A., has joined **Ewing Miller Associates,** architects, planners and engineers of Terre Haute, Indiana, as associate in charge of the firm's new urban planning department.

William Hamby and **Albert Kennerly,** partners of the architectural firm of **Fordyce Hamby & Kennerly** announce that **Lloyd H. Slomanson** has been appointed a general partner. The firm is now known as **Hamby, Kennerly & Slomanson.**

Clyde R. Heuppelsheuser, architect, has announced the formation of a new firm, **Heuppelsheuser Associates, Architects.** The new firm remains located in the Fort Worth Club building, Fort Worth.

William G. Karson and **Leonard W. Besinger Jr.** announce the formation of **Karson Besinger and Associates,** Architects, Planners, Creative Consultants. The new firm is located in Carpentersville, Illinois.

James A. Kilgore, A.I.A. has been appointed architectural department chief of **Harley, Ellington, Cowin and Stirton, Inc.,** Detroit-based architectural and engineering firm.

A new architectural firm has been formed by **J. Arvid Klein, A.I.A.,** with offices at 14 West 55th Street, New York City.

Thomas C. Lehrecke, A.I.A. and **Joseph L. Tonetti, A.I.A.** announce the formation of **Lehrecke & Tonetti, Architects.** The new firm is located at 502 Carnegie Hall, New York City.

Carl Luckenbach, A.I.A., Almon J. Durkee, A.I.A., Frank E. Arens, A.I.A. and **Kenneth W. Gunn, A.I.A.** are principals of a new architectural firm, **Luckenbach/Durkee and Associates, Inc.,** located at 287 East Maple, Birmingham, Mich.

Willis R. McClarty, Architect announces the addition of a partner, **James H. Silverthorn, A.I.A.** The firm's architectural practice continues at 545 108th Avenue, N.E., Bellevue, Wisconsin, under the new name of **McClarty & Silverthorn, Architects.**

David Margolf, A.I.A., is now associate director of the New York office of **John Carl Warnecke, F.A.I.A., Architect.**

Theodore A. Monacelli, architect, has been elected vice president and principal of **Ecodesign, Inc.,** city and regional planners, landscape architects and design consultants of Cambridge, Massachusetts.

Jim D. Morelan, A.I.A. is the name of a new architectural firm located at 41 East Main Street, Los Gatos, California.

continued on page 266

For more data, circle 127 on inquiry card

DAP Inc. General Offices: Dayton, Ohio 45401 SUBSIDIARY OF *Plough, Inc.*

☐ Please send Technical Data Bulletins on DAP One-Part Flexiseal and Two-Part Flexiseal polysulfide sealing systems.

☐ Have representative call on me.

name__________ title__________ firm__________

address__________ city__________ state__________ zip__________

Outstanding field applications prove that DAP Flexiseal polysulfide polymer sealants deliver the dependable sealing performance needed in dynamic or moving joints. After 20 years and more, Flexiseal still gives watertight, airtight protection . . . long after most other types of sealants have broken down. This ability to withstand severe construction joint movement frees you to express new design concepts.

Now DAP offers *two* Flexiseal polysulfide systems. One-part Flexiseal is a new, improved compound with tenacious adhesion and sealing performance superior to ordinary one-part polysulfides.

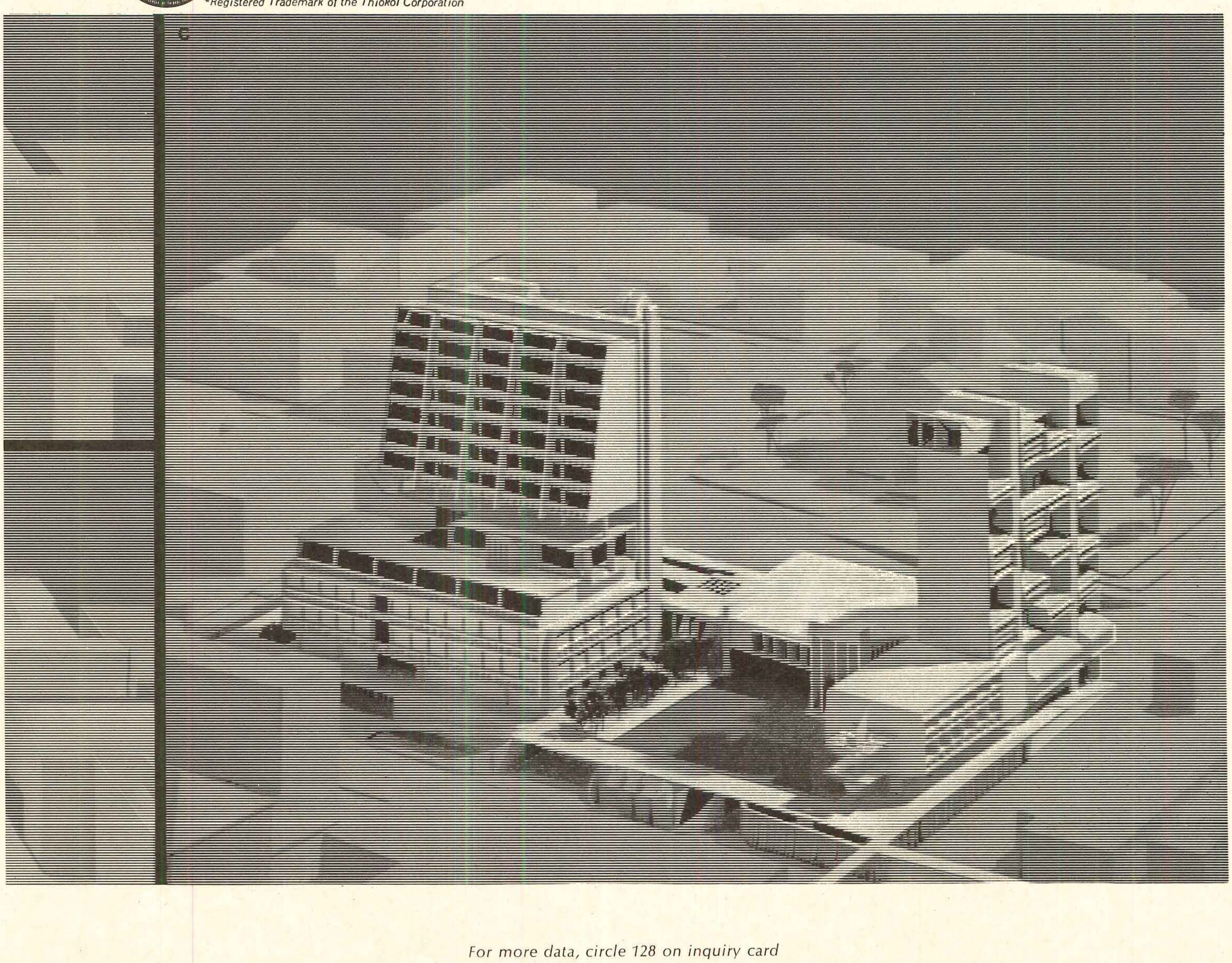
Two-part Flexiseal features balanced modulus—adhesion is always greater than cohesion—for permanent, positive seals. For technical information on these Thiokol "Seal of Security" approved sealants, please send coupon.

DAP®
ARCHITECTURAL SEALANTS

Thiokol LP POLYSULFIDE POLYMER

Proved by time and the Thiokol* Seal of Security

*Registered Trademark of the Thiokol Corporation



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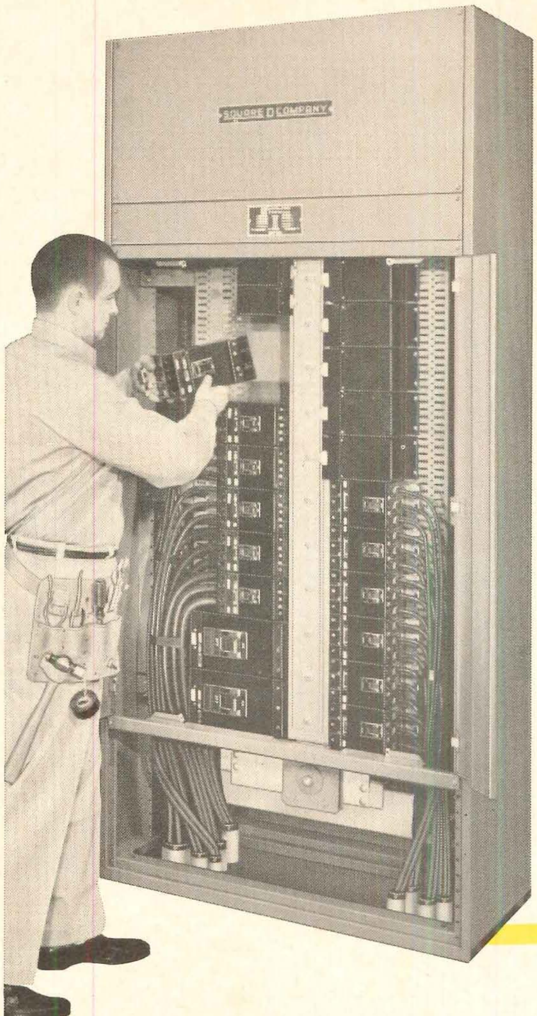
THIS SPACE CONTRIBUTED BY THE PUBLISHER AS A PUBLIC SERVICE

Help yourself with a checkup. And others with a check. **American Cancer Society**®



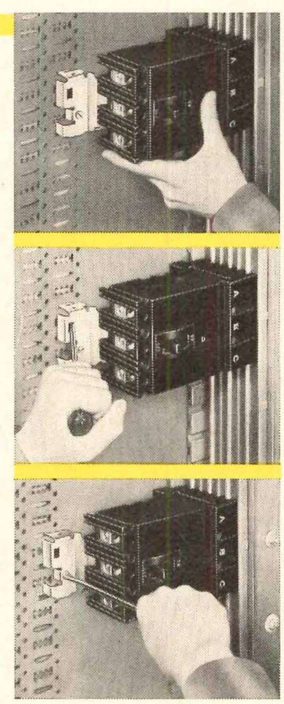
New I-LINE® switchboards assure unmatched flexibility, maximum safety

The versatile and safe **I-LINE** design pioneered by Square D in power panelboards now has been applied to switchboards.

New **I-LINE** switchboards have vertically stacked bus bars which make it possible to mount any combination of circuit breakers on the bus structure. Although **I-LINE** breakers are factory-installed on a new switchboard, additional breakers can be added quickly and easily. Simply plug them right on the bus bars. Replacing or installing a breaker takes only minutes compared to two hours or more for older designs.

The new **I-LINE** switchboard is designed for maximum safety. Stacking of the bus bars isolates most live parts and there is additional safety in the Square D "dead front" design. It has "integrated equipment rating" —which assures that the combination of bus bars, circuit breaker and insulation has been tested and proven for its short circuit bracing, interrupting capacity and temperature rise under load.

Circuit breakers for **I-LINE** switchboards (either bolt-on or plug-on) are the same as those for **I-LINE** panelboards and are as near as your stockroom or Square D distributor. Call your nearest Square D man for a proof-positive **I-LINE** demonstration. Or write us for full details. Square D Company, Dept. SA, Lexington, Kentucky 40505.



Breakers install in minutes. Position the unit, lever it in place, screw down tight.

SQUARE D COMPANY

Wherever Electricity is Distributed and Controlled

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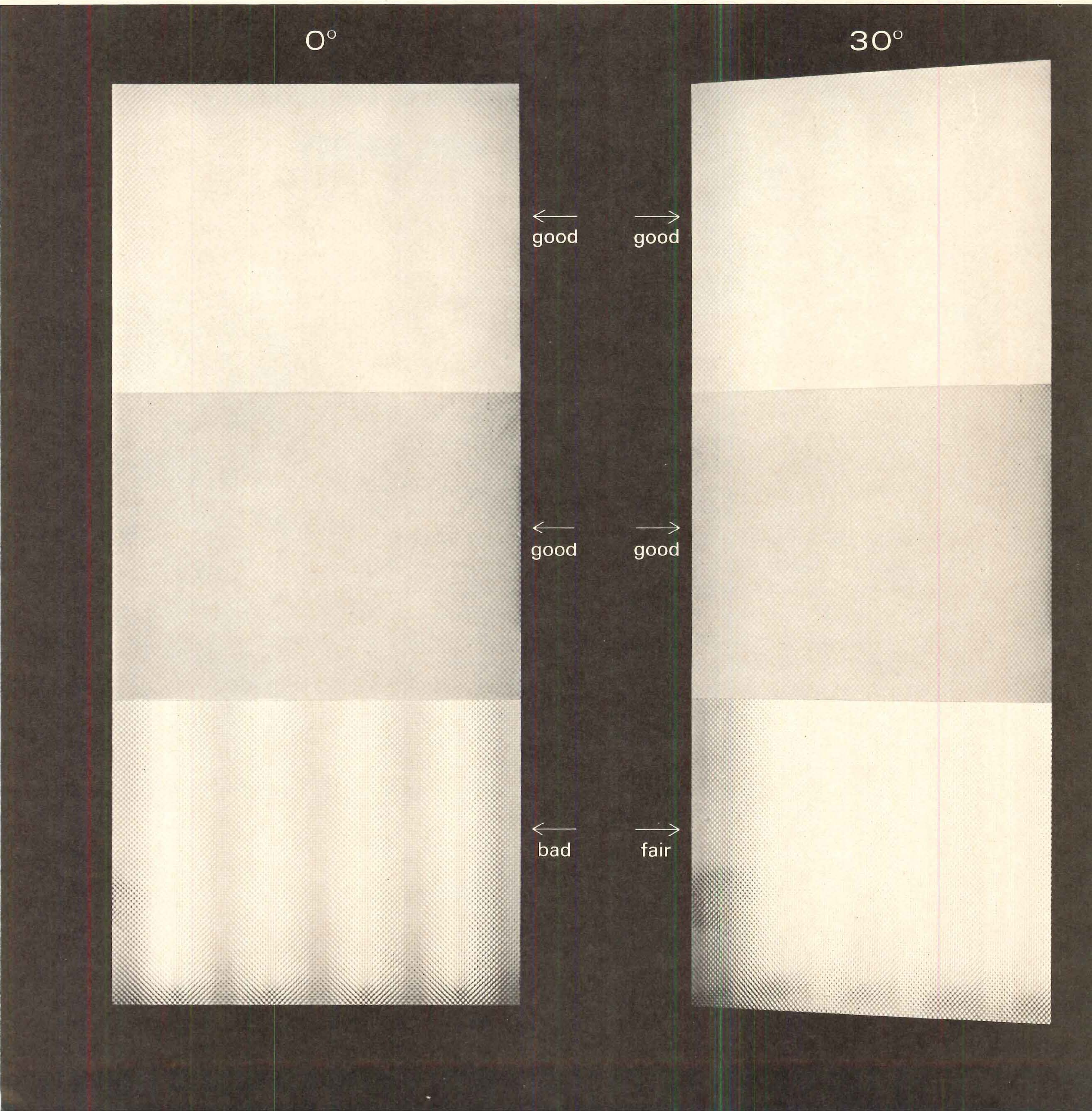
NOW! FOR THE FIRST TIME–

Control reflected glare



THE GREAT

KEYSTONE CONTROVERSY

SHOULD THE KEYSTONE AUTOMOBILE CLUB'S NEW PHILADELPHIA HEADQUARTERS BUILDING HANG DRAPERIES, VERTICAL BLINDS OR LEVOLOR RIVIERAS?

THAT WAS WHAT 5 EXPERTS HAD TO DECIDE.

INSTEAD OF ARGUING, THEY HUNG TWO OF EACH, ON DIFFERENT WINDOWS, FOR A PERIOD OF SEVERAL WEEKS.

FROM THE START LEVOLOR RIVIERAS HAD THE EDGE. NOT ONLY DO RIVIERAS CONTROL LIGHT, HEAT AND PRIVACY PERFECTLY, BUT THEIR SLIM (1 INCH WIDE) SLATS AND "INVISIBLE" TAPES MADE THEM UNOBTRUSIVE.

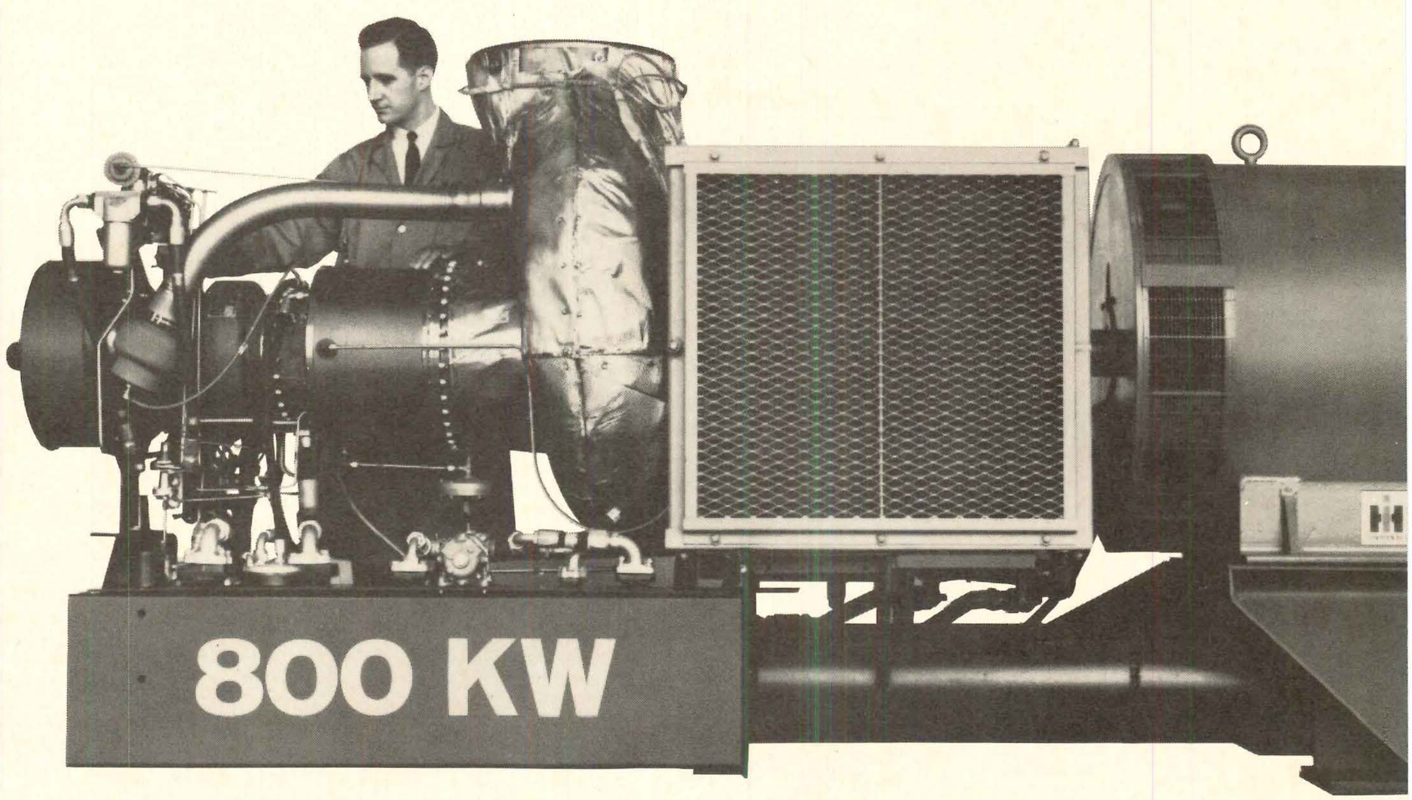
CONTROVERSY? NO MORE! THE EXPERTS CHOSE LEVOLOR RIVIERAS UNANIMOUSLY.

LEVOLOR RIVIERA

THE SLIM-SLAT BLIND THAT DOES JUSTICE TO YOUR DESIGN.

ARCHITECT: ALEX EWING & ASSOC.
LEVOLOR RIVIERA INSTALLATION BY: REINHART, INC.
FOR COMPETE DETAILS ON THESE AND OTHER SPECIALIZED BLINDS WRITE TO:
LEVOLOR-LORENTZEN, INC.
722 MONROE STREET,
HOBOKEN, NEW JERSEY 07030

First low-cost 800 kw gas turbine



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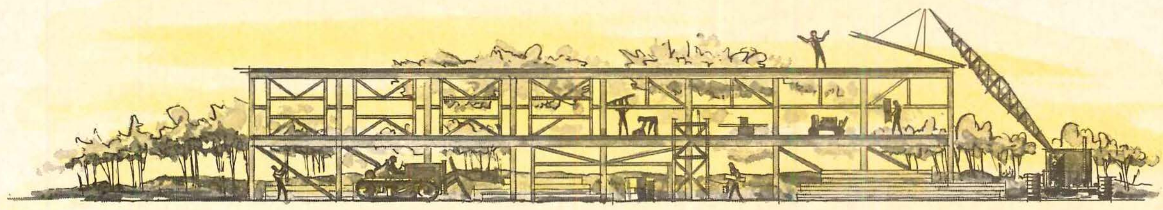
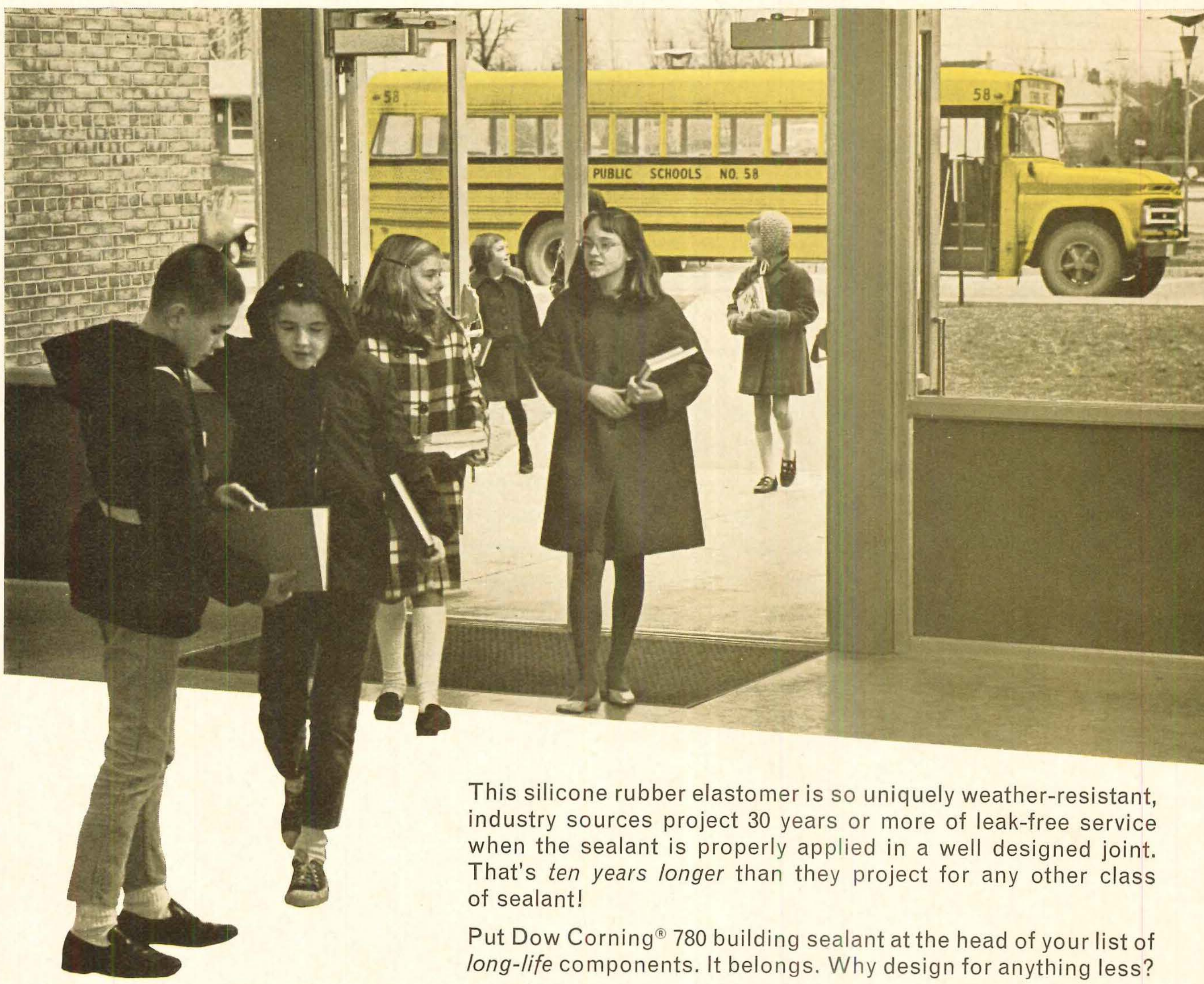


GOING UP

Another SCHOOL sealed with Dow Corning 780 building sealant

COMING UP

30 years of freedom from leaks!



This silicone rubber elastomer is so uniquely weather-resistant, industry sources project 30 years or more of leak-free service when the sealant is properly applied in a well designed joint. That's *ten years longer* than they project for any other class of sealant!

Put Dow Corning® 780 building sealant at the head of your list of *long-life* components. It belongs. Why design for anything less?

See Sweets for Dow Corning 780 building sealant; check into Dow Corning® 781 building sealant for nonporous surfaces. They're both extra long life. Or drop us a line for FREE DEMONSTRATION SAMPLE and full particulars. Address Dow Corning Corporation, Dept. 8410R, Midland, Michigan 48640. Offer good only in U.S.A.

DOW CORNING

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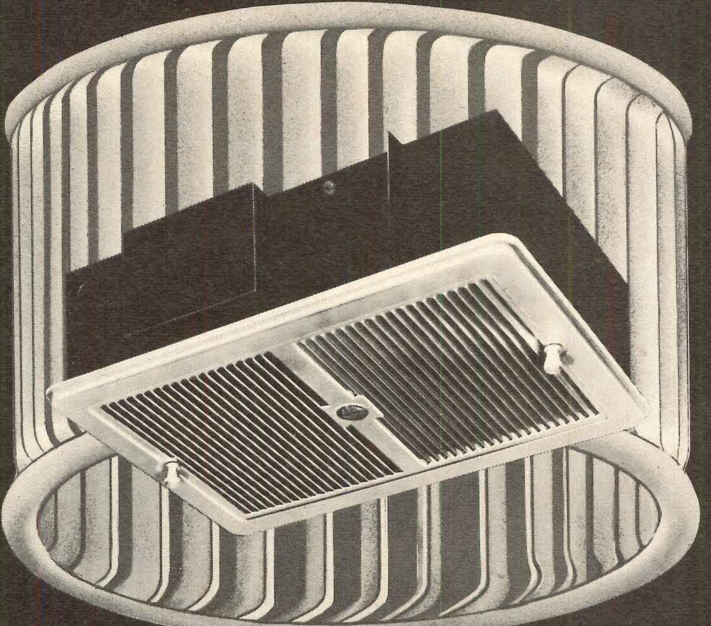
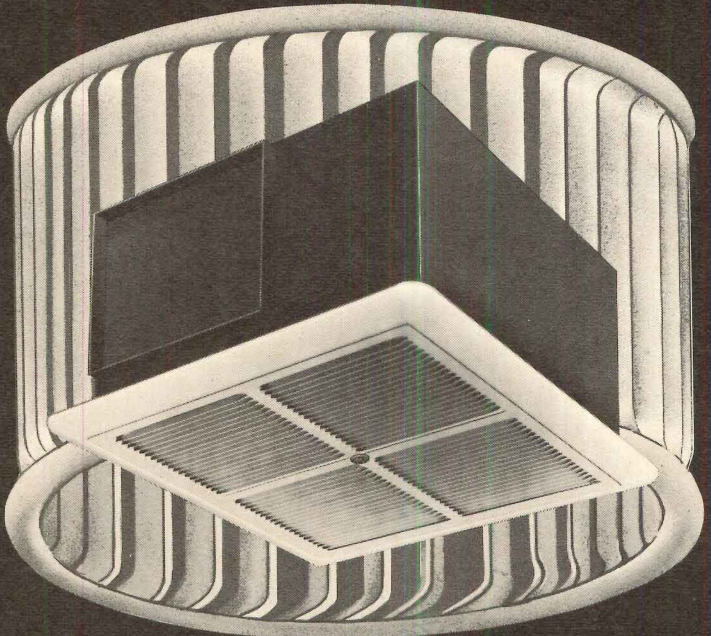
Quiet!

With Trade-Wind QT Ventilators





The quietness of the remarkable Trade-Wind QT Ventilators is achieved through the use of a single over-sized wheel turning at a low speed. The minimal motor vibration is dampened out at the source through the use of special motor mount assemblies. The heavy gauge housing is virtually free of vibration.

For maximum QUIET, specify QT:
V-QT-90: 90 CFM at 0.1″ static pressure
Chrome grille.

V-QT-200: 190 CFM at 0.1″ static pressure
V-QT-300: 285 CFM at 0.1″ static pressure
V-QT-400: 425 CFM at 0.1″ static pressure
Neutral beige enamel grille.

Write for details. *Trade-Wind by* **THERMADOR**

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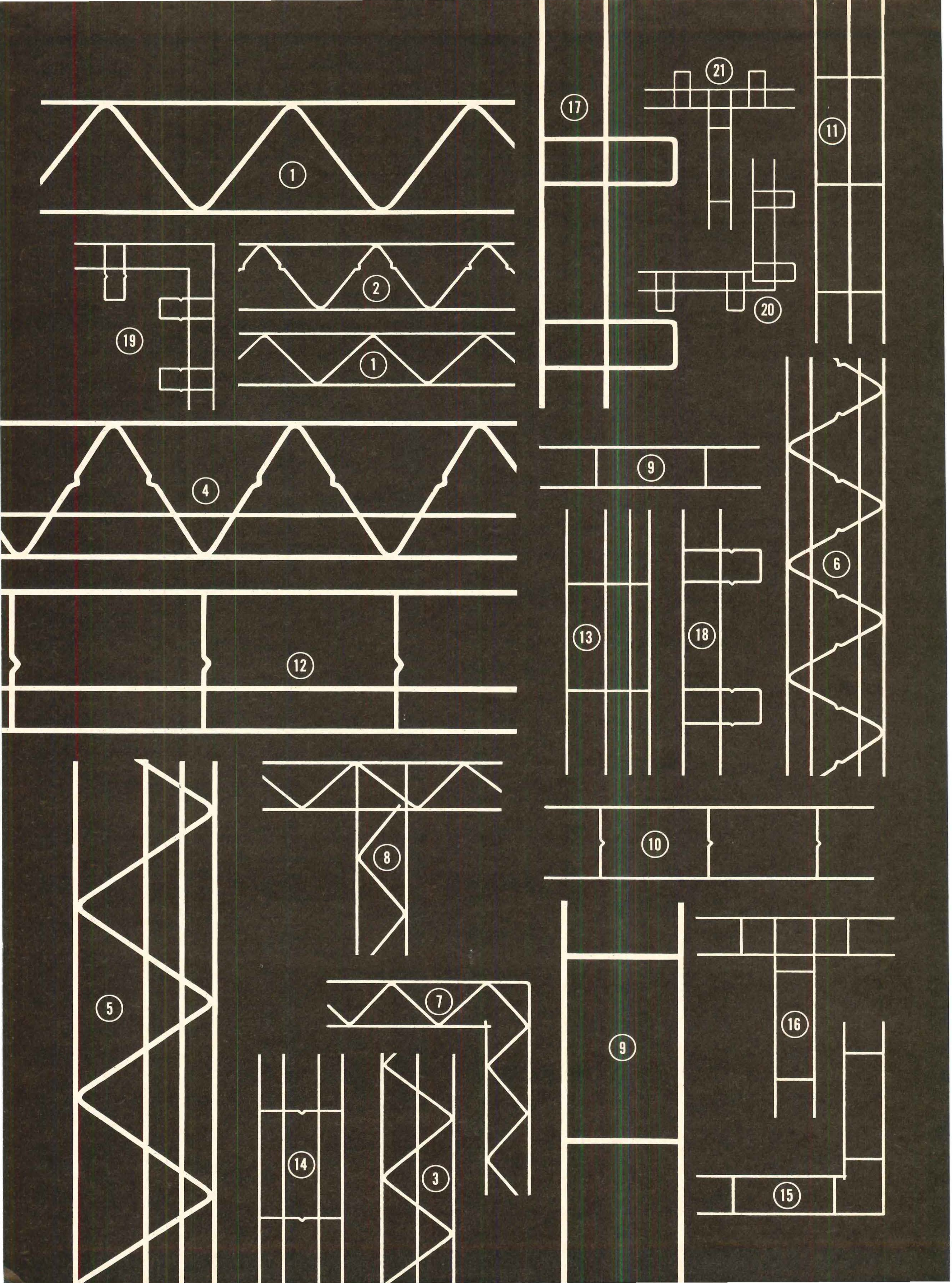
Division of Norris Industries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How to stop people in your buildings from being glared at

PPG Feneshield® fabrics: the environmental-control drapery system

With scientifically-rated FENESHIELD fiber glass drapery fabrics you can bounce glare from sunlight, sky, other buildings, and metal or water surfaces right out of the room. Natural light still filters through. Eyestrain is eliminated. Room occupants are more comfortable and efficient.

With the FENESHIELD fabric rating system, you can choose fabrics scientifically to cut solar heat up to 65%, modify or improve a view, and even improve interior sound control. Your building will retain the clean lines of your original design concept. In addition, FENESHIELD fabrics cost less to maintain than mechanical shading devices.

For documentation and additional data, read our book about FENESHIELD fabrics. Mail the coupon.

PPG makes the yarns only, not the fabric.

PPG INDUSTRIES, Fiber Glass Division
One Gateway Center, Pittsburgh, Pa. 15222

Fiber Glass PPG INDUSTRIES

DEPT. 107, PPG INDUSTRIES, FIBER GLASS DIVISION
One Gateway Center, Pittsburgh, Pennsylvania 15222

I'd like to know more about PPG Feneshield fabrics.

☐ Please send me your new booklet.

☐ Please send me names of authorized Feneshield fabric representatives.

NAME

TITLE

COMPANY

STREET

CITY

STATE AND ZIP

continued from page 249

Jeffrey A. Ornstein, Registered Architect, is now affiliated with **Ames Bennett, A.I.A., Architect** as an associate of the firm located at 361 South Country Road, Palm Beach, Florida.

William H. Ostermayer, architect, is now an associate member of **The Ballinger Company, Architects and Engineers,** Philadelphia.

Roy J. Pallardy and **Seth T. Evans** have formed the new firm, **Pallardy—Evans and Associates, Architects—Planners,** 210 E. Dunklin St., Jefferson City, Missouri.

Four new associate partners have been elected to the Miami firm of **Pancoast/Ferendino/Grafton/Architects.** They are: **Edgar Baldwin, Jorge L. Delgado, R.A., Jose Feito, A.I.A.** and **J. Bruce Spencer, R.A.**

Cesar Pelli, Architect, has joined the firm of **Victor Gruen Associates** as partner in charge of design.

Philip L. Porter, A.I.A. has recently been made an associate in the Atlanta architectural firm, **Jovl/Daniels/Busby.**

Abba A. Tor, senior associate in the New Haven, Connecticut and New York City consulting engineering firm, **Henry A. Pfisterer & Associates,** has been named partner of the firm, and **Walter D. Shapiro** has been named senior associate. The firm's name is now **Pfisterer, Tor & Associates.**

Edward J. Portka, architect, has recently become a partner of **George M. Ewing Company, Architects, Planners and Engineers.** Mr. Portka is based in Philadelphia.

Leonard Pullan has been named an associate and director of production at **Mayer and Kanner,** Los Angeles architectural and planning firm.

The Santa Fe, New Mexico firm, **Philippe Register, A.I.A., Architect,** announces a newly formed organization headed by **Philippe Register** as president; **Terence W. Ross,** vice-president; and **James A. Brunet,** director. The new firm, **Register, Ross and Brunet, A.I.A. Architects and Engineers** remains located at 215 Washington Avenue. A branch office has been established at 519 Douglas Avenue, Las Vegas, New Mexico.

Kenneth A. Roe, P.E. and **Joseph R. Pniewski, A.I.A.** have formed a partnership, **Roe Associates, Architects—Engineers.** Offices are at 700 Kinderkamack Road, Oradell, New Jersey.

Henry Steinhardt, A.I.A. has been appointed director of urban design and planning of the Seattle firm, **N. G. Jacobsen & Associates, Inc., Consulting Engineers.**

James S. Swan, architect, has been appointed director of educational services and project administrator for **Eberle M. Smith Associates, Inc.**

Tarapata—MacMahon Associates, Inc., Architects, Engineers, Planners and **Glen Paulsen & Associates, Inc., Architects,** recently merged to become **Tarapata—MacMahon—Paulsen Associates, Inc.** The firm continues at Tarapata—MacMahon's 1191 West Square Lake Road, Bloomfield Hills, Michigan address. **Marion F. Yuhn, A.I.A., R. Jerome Chamberland** and **Fritz K. Homann, A.I.A.,** have recently become associates.

Robert C. Tast, A.I.A. has been appointed an associate with the Great Neck, New York firm of **Colasono and Petrides, Architects and Planners.**

Richard C. Marshall and Chester Bowles, Jr., Architects, A.I.A. have named **Richard S. Teramoto, Architect** as associate.

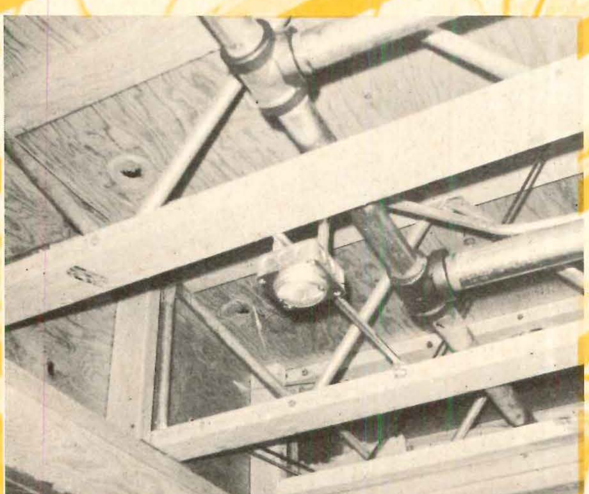
Leonard M. Tivol, A.I.A. is now an associate in the firm **Chan/Radar and Associates.**

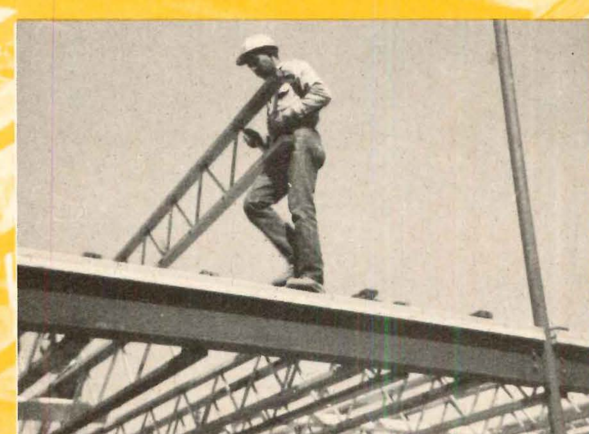
Jules Gregory; Diehl, Miller, Busselle and **Tectonic Associates** have announced the merger of their professional practices to create a partnership of architects, engineers and planners. The new firm, entitled **Uniplan,** is located at 4 Chambers Street, Princeton, New Jersey. Principals are: **Jules Gregory, A.I.A.; Landon M. Proffitt, A.I.A.; John R. Diehl, A.I.A.; Frank E. Miller, A.I.A.; Alfred Busselle, A.I.A.; Donald Pantel, A.I.A.; Thomas F. Bliss, P.E.; Robert A. Hanle, P.E.** and **Henry G. Eisengrein, P.E.**

A new architectural-engineering office, **Richard D. Walker A.I.A., P.E.** has opened at 154 East 9th Street, Durango, Colorado.

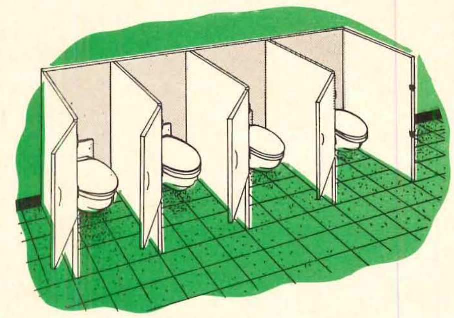
David C. Hamme, architect and **Narendra Juneja,** landscape architect are now associates of the Philadalphia firm, **Wallace, McHarg, Roberts and Todd, Architects,**

continued on page 270



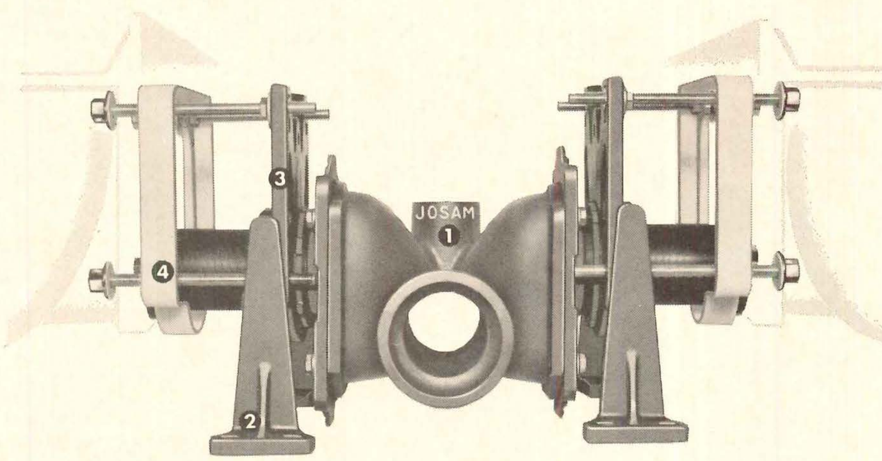


if you "value-evaluate" the restrooms you will install off-the-floor fixtures



Evaluation of the savings in maintenance, space and materials makes off-the-floor fixtures first choice for modern restrooms . . . and they allow for greater freedom in the selection of floor materials.

if you "value-evaluate" the installation you will use JOSAM UNITRON® CARRIERS



1 common vent
saves chase space . . . reduces the number of connections

2 buttress foot
Provides maximum strength . . . saves installation time

3 invertible carrier body
Fits all types of toilets . . . saves handling time

4 positioning frame
Simplifies alignment . . . saves time

separate fitting and carrier
more adaptable . . . save revision time

Evaluation of all the features offered by Josam Unitron Carriers provides the reasons why they should be your first choice for off-the-floor installations. Copied in various ways by other types, only the Josam Unitron Cărriers offer all the features, the adaptability and the quality that cut installation costs.

If you evaluate the overall savings you will find that Josam Unitron Carriers provide a better job at lower costs every time!

For further information write for Manual F-5.

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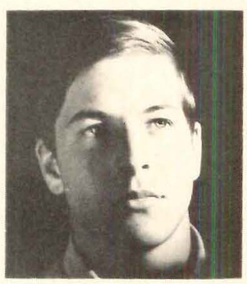
Success is something you can't leave a son



In today's complex and specialized world, success depends more and more on whether he gets a college education.

But he may not be able to get one unless the nation's colleges can answer some serious questions: How to cope with rapidly increasing student enrollments? How to keep the quality of education constantly improving with more modern laboratories, better libraries, new classrooms? How to attract able new faculty members?

Your support will help colleges answer these questions . . . help them make your son ready for his world.

Give to the college of your choice.

COUNCIL FOR FINANCIAL AID TO EDUCATION

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advertising contributed for the public good

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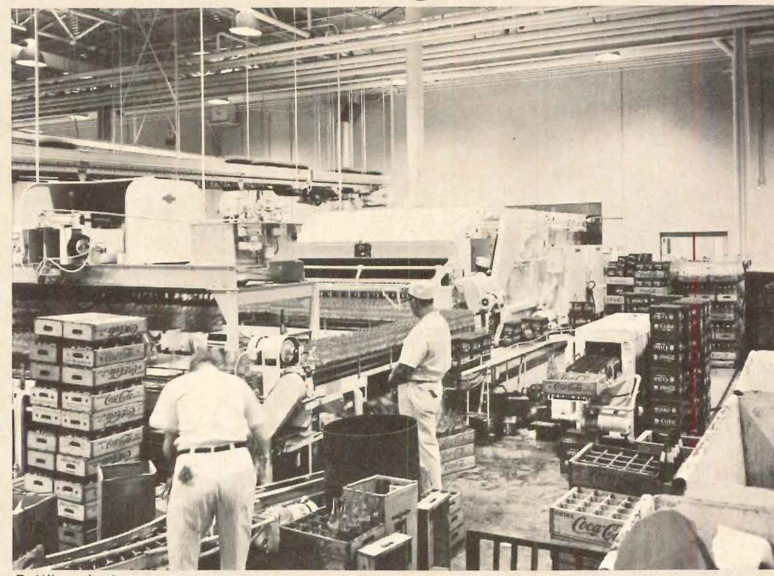

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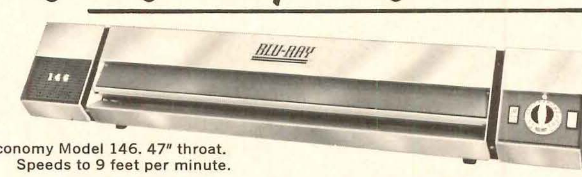

Economy Model 146. 47" throat.
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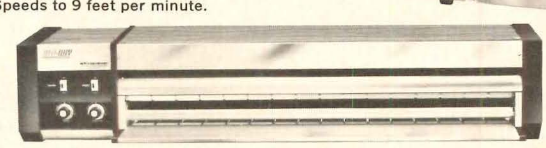

Workhorse Model 842. 42" throat.
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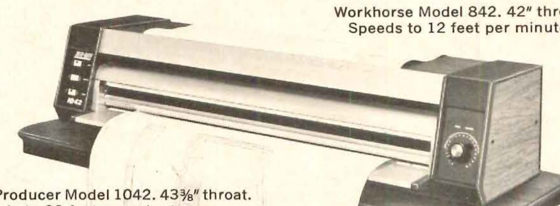

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continued from page 266

Landscape Architects, City and Regional Planners.

Roy W. Fowler, Robert B. Wright and **Kenneth L. Wuest** are associates at **Wilsey & Ham,** San Mateo, California-based engineering, planning, and architectural firm.

Wilkes & Faulkner Architects of Washington, D.C. announce that **Stephen J. Zipp** has been appointed an associate.

NEW ADDRESSES

Ashley, Myer and Associates Inc., Architecture, Planning, Environmental Design, 14 Arrow Street, Cambridge, Massachusetts.

John Hans Graham and Associates, 1767 P Street, N.W., Washington, D.C.

Griffith—Kendall, Architects, 714 Second Avenue, Des Moines, Iowa.

Victor Gruen Associates, Architecture, Planning, Engineering, (East Coast headquarters), 257 Park Avenue South, New York City. The West Coast offices remain at 6330 San Vicente Boulevard, Los Angeles.

Richard D. Kaplan, Architect, 150 East 52nd Street, New York City.

Charles Luckman Associates (New York City office), 521 Fifth Avenue, New York City. The firm also maintains offices in Los Angeles, Boston and Phoenix.

Haarstick Lundgren and Associates Inc., Architects, Engineers, Hamm Building, St. Paul, Minnesota.

MLTW/Moore Turnbull, Pier 1½ The Embarcadero, San Francisco.

Julian Neski, Architect, 29 East 61 Street, New York City.

The Perkins & Will Partnership, (White Plains office) One North Broadway, White Plains, New York.

Warren Platner, Architecture, Design and Interior Design, 31 State Street, North Haven, Connecticut.

Eli Rabineau, Architect, 78 Stoneleigh Road, Scarsdale, New York.

Rose, Beaton, Corsbie, Dearden & Crowe Architects and Engineers, One North Broadway, White Plains, New York. The firm's office at 1270 Avenue of the Americas, New York City remains at that location.

Paul Rudolph, Architect, 54 West 57 Street, New York City.

Sylvan R. Shemitz and Associates, Lighting Consultation & Design, 145 Orange Avenue, West Haven, Connecticut.

Robert H. Simpson, A.I.A., 341 East 79th Street, New York City.

Smith, Hershey, Malone & Norton, 2480 Browncroft Blvd., Rochester.

Hobart D. Wagener Associates, Architects, 737 29th Street, Boulder, Colorado.

Wright, Jones & Wilkerson Architects, 22 East Cary Street, Richmond, Virginia.

For New, more compact Apt. Fan Coil Units
LOOK TO THE LEADER...McQUAY®

Compact McQUAY AVD APARTMENT SEASONMAKER® fan-coil units at Pumpkin Hill Apts.—designed for concealed installation within a room or hall closet.

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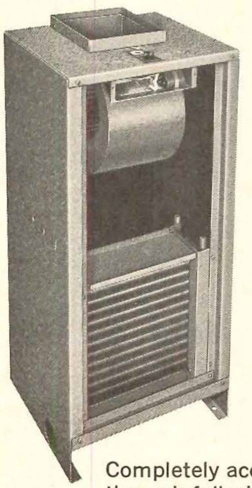
CONTRACTOR: John A. Quinn, Inc.
McQUAY REPRESENTATIVE: B & W Company, Inc., Wash. D.C.

WASHINGTON'S PUMPKIN HILL APT. COMPLEX DID!



Pumpkin Hill, in suburban Washington, D.C., includes hundreds of garden-type apartments, from two to large four-bedroom units. An air conditioning challenge! Perfect solution? New McQUAY AVD APARTMENT SEASONMAKER® fan-coil units—unique concept in modern air conditioning. The AVD FAN-COIL UNIT gives wanted economy and individual apartment control—yet with ultra-quiet, high performance comparable to central station air conditioning. There's a unit for any size apartment; 600 through 2000 cfm, each with famous McQUAY rippled fin coils in a selection to match the specific cooling and heating load. A wide range of optional accessories gives complete flexibility. Contact your McQUAY, INC. representative or write direct.

Completely accessible . . . entire unit serviceable through full width access. Factory wired; merely run power to unit's junction box.

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McQuay, INC.

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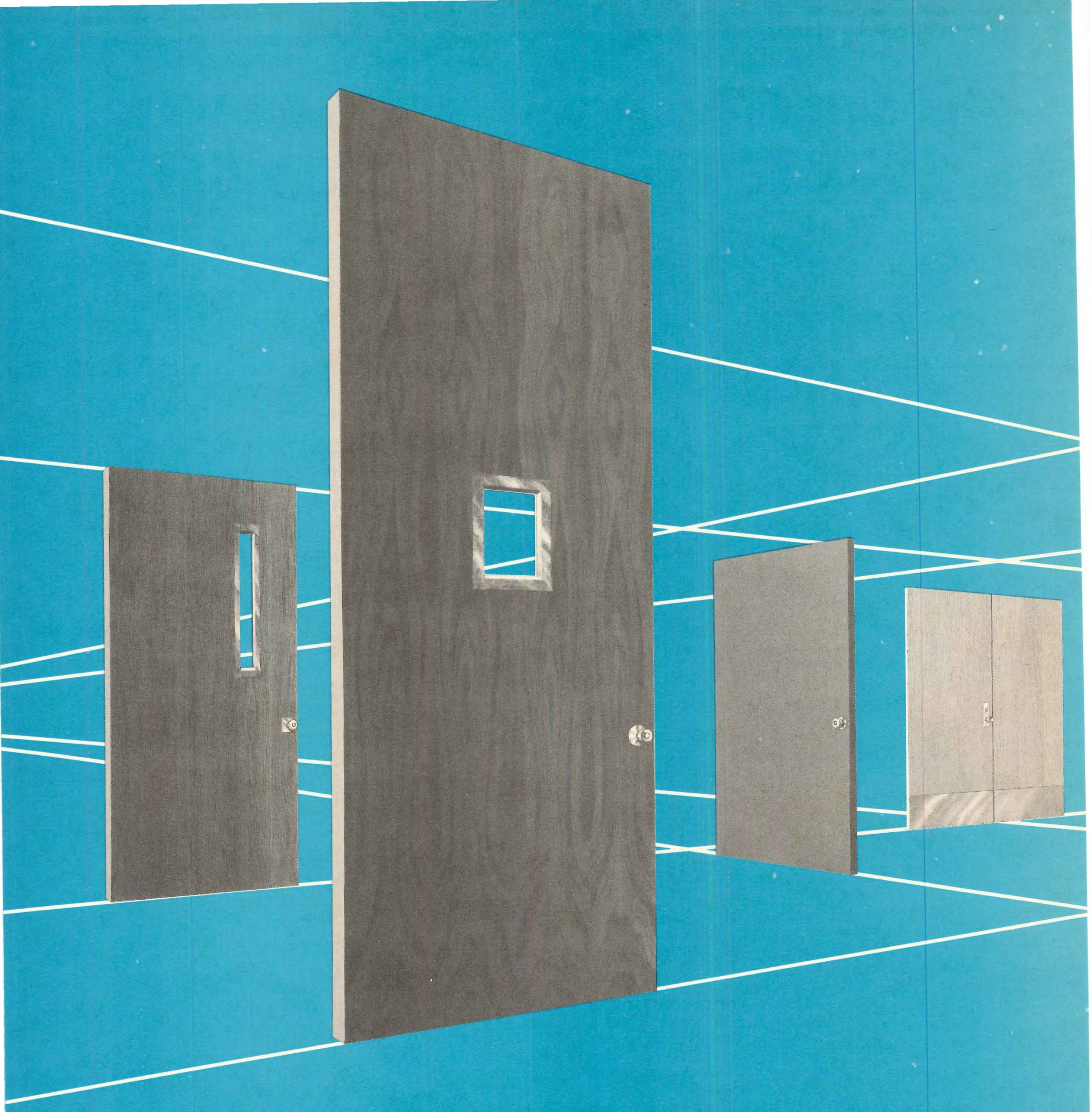

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We make wood fire doors you just can't find anywhere else in the world.

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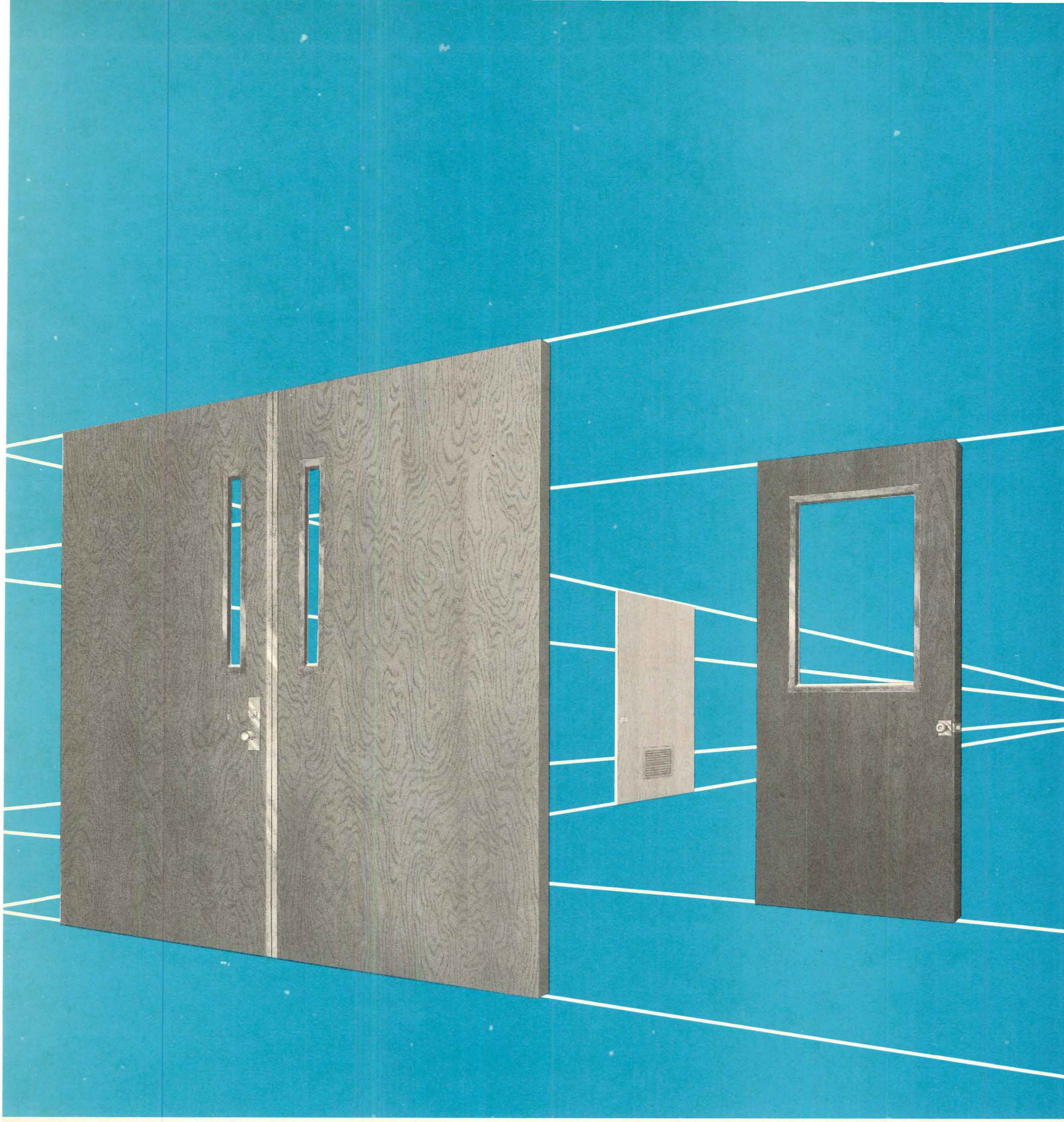
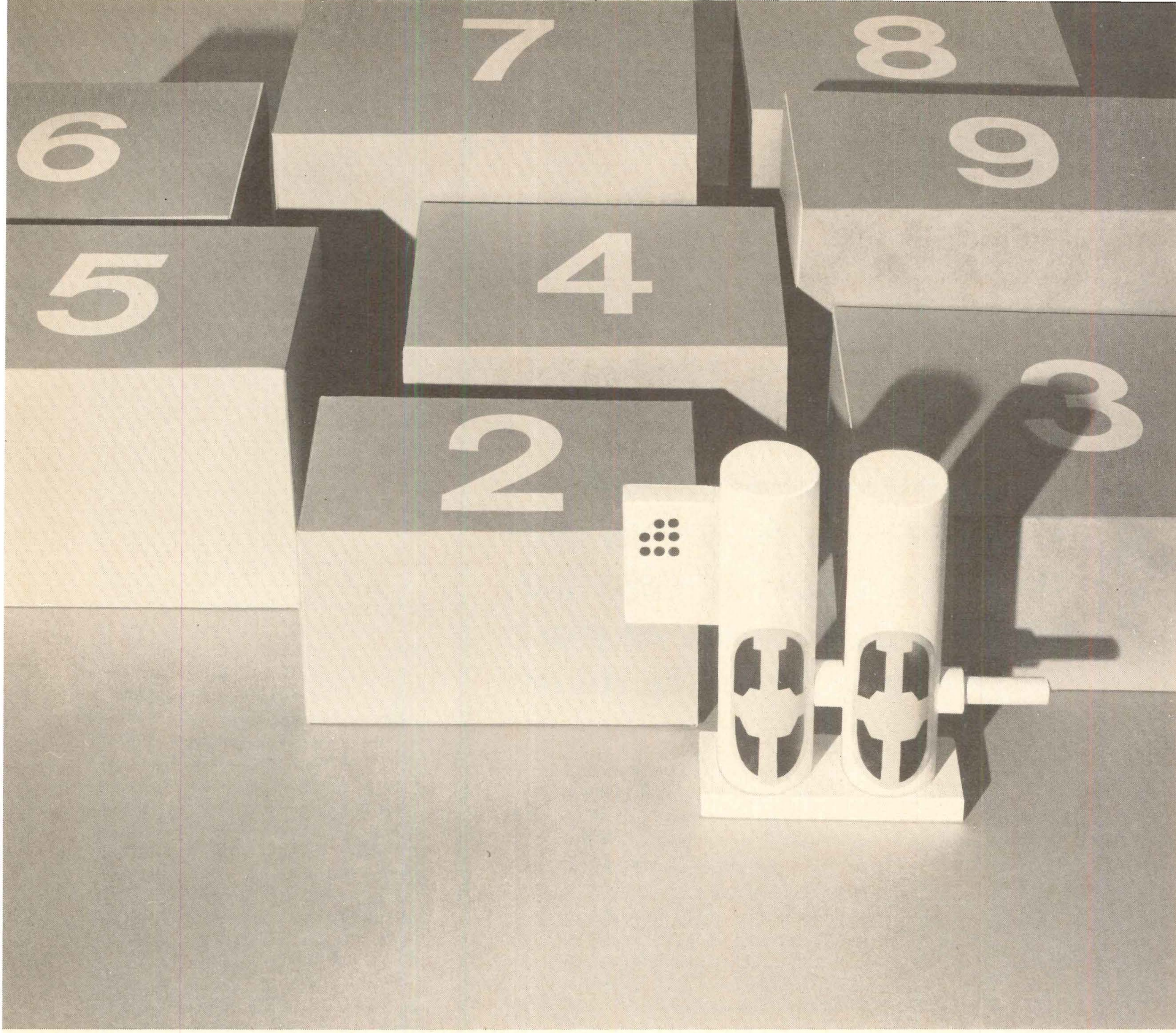
Or 10-foot-tall doors with 1 or 1-1/2 hour ratings. Or 8′ wood doors with a 3/4-hour rating.

And the biggest pair of doors in the business — big enough to fit an 8′ x 8′ opening, and rated at 1-1/2 hours.

If there are other tight requirements, see us. We have the most versatile line of permanently identified flush doors





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It would . . . if you can't answer "Yes" to this question . . . "Am I doing the job I ought to be doing in the one publication that's strong enough to do the job alone?"

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Typically the prime objective of advertising in the building market is to get architects and engineers to specify certain products into the buildings they design. One of the hurdles advertisers must overcome is that architects and engineers are among the busiest and most sought after groups of people in this country. Small in number they control through their specification practices, the selection of virtually every product that goes into our nation's buildings. As a result they are deluged with magazines of all shapes, sizes and quality. Direct mail, catalogs, folders, brochures and salesmen flood into their offices. They can't and don't pay attention to them all. Under these circumstances how can you hope to get their attention? It's simple. Do what they do and cut out waste and duplication. Go where they find value. Take the available dollars and do your advertising in Architectural Record. Our editors already have their full attention and this cuts your work in half. Make the rapport we've spent 76 years building with the profession work for you.

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Strong copy and layout . . . while the basic strength of your copy and layout depends on the talent of your specialists, it's possible to enhance these elements through the use of four-color. Architectural Record is now offering substantial color premium discounts, similar to the traditional frequency discounts.

Thus by buying only the Record you get a double barrelled discount, your ads look better and you get the higher readership scores that come with color.

Consistency . . . the concept of consistency in impact advertising involves planning over a period of years not just months. Although the benefits seem obvious it is one of the hardest elements to sell to top management. In our experience the best way to achieve its acceptance is through the careful application of the other three elements — dominant space units, maximum frequency and strong copy and layout. Apply these three principles effectively and the advantages of consistency follow naturally and rewardingly.

WHY RECORD?

That's where you'll find the active architects and engineers. Record subscribers handle over 90 per cent of the dollar volume of all architect-designed nonresidential and large residential building. This is a fact documented by a continuing state-by-state check of the activity of architectural firms. We compile the number of projects, the types of projects and the dollar volume as reported by F. W. Dodge. Then we compare this construction activity to the Record's subscriber galleys to determine our market coverage.

Thirty-eight such state-wide checks during a recent 12-month period reveal a coverage of the market that has great significance for advertisers. Here are some of the key findings . . . over 95 per cent of school dollar volume is in the hands of Record subscribers . . . over 90 per cent of the apartments . . . over 95 per cent of the hospital market. The significance to advertisers is that there is a single publication in the architectural field which alone is strong enough to carry their advertising message. Clearly one publication is enough if it's the Record.

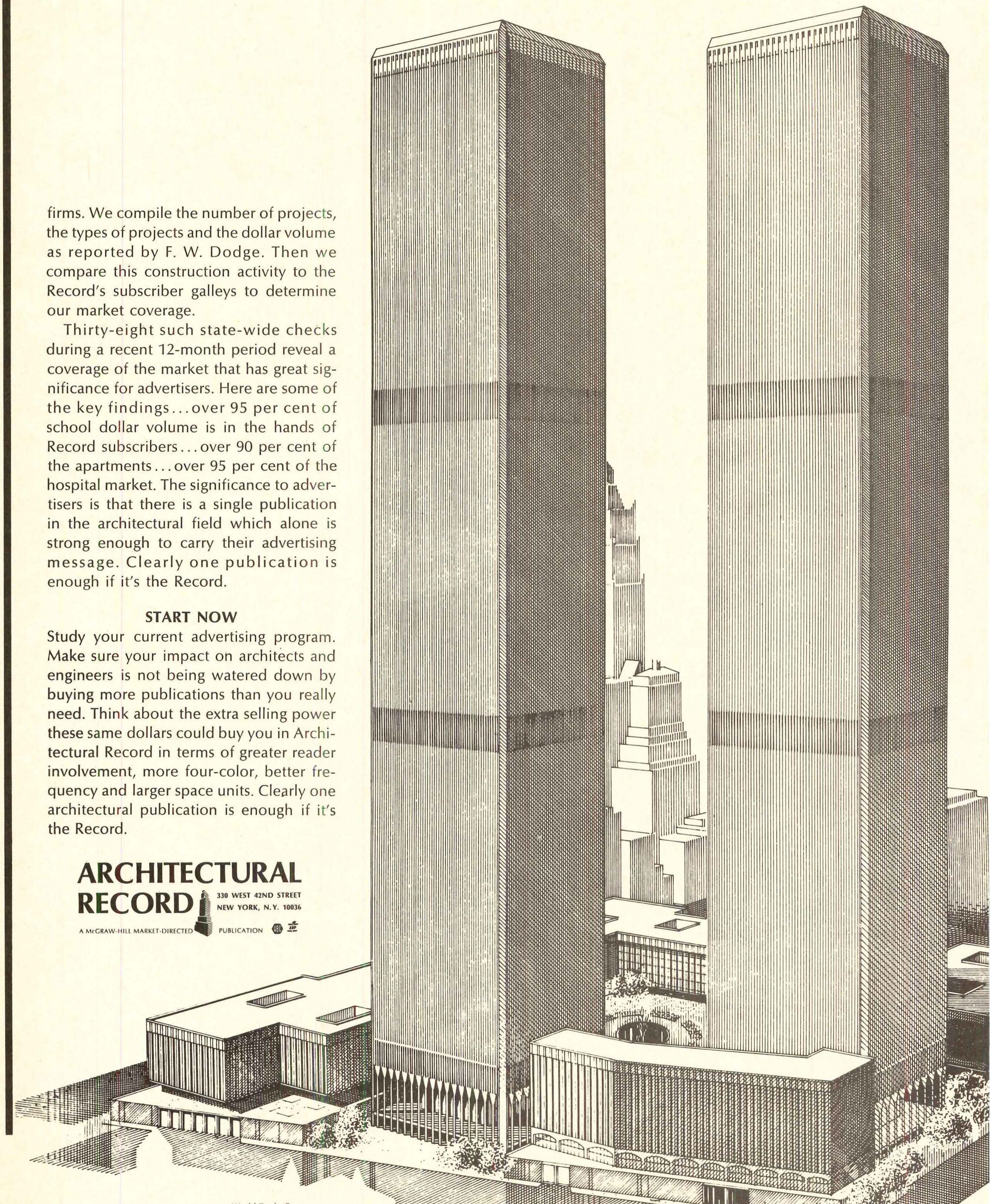
START NOW

Study your current advertising program. Make sure your impact on architects and engineers is not being watered down by buying more publications than you really need. Think about the extra selling power these same dollars could buy you in Architectural Record in terms of greater reader involvement, more four-color, better frequency and larger space units. Clearly one architectural publication is enough if it's the Record.

ARCHITECTURAL RECORD

330 WEST 42ND STREET
NEW YORK, N.Y. 10036

A McGRAW-HILL MARKET-DIRECTED PUBLICATION



World Trade Center,
New York, New York
Architects: Minoru Yamasaki & Associates
Engineers: Worthington, Skilling, Helle & Jackson
Drawing by Davis Bité

ADVERTISING INDEX

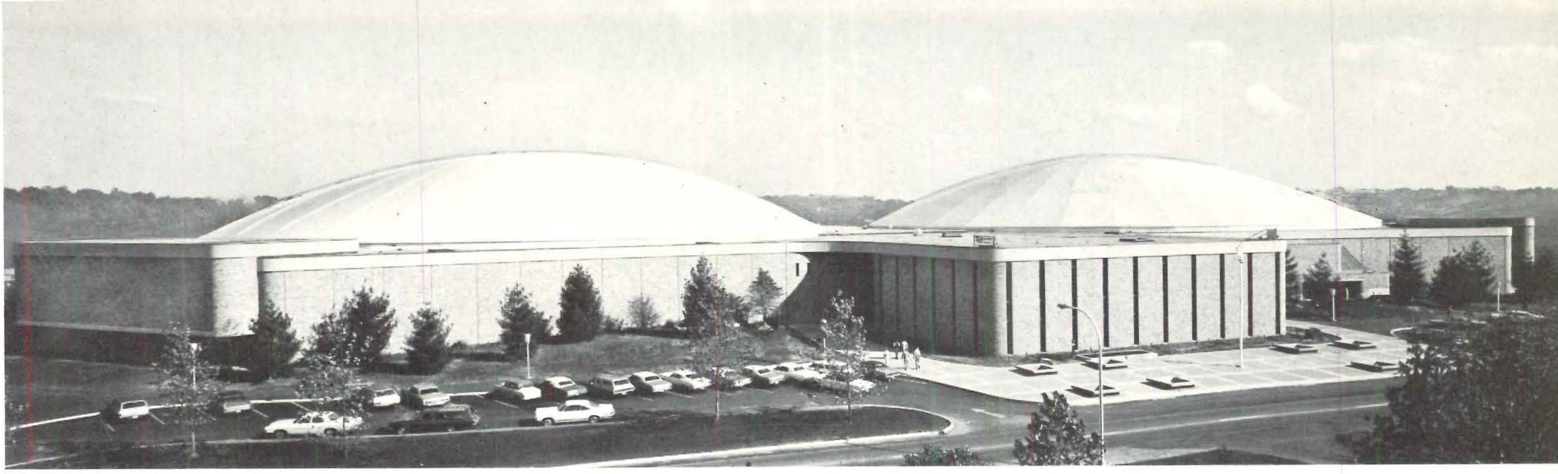
Pre-filed catalogs of the manufacturers listed below are available in the 1969 Sweet's Catalog File as follows.
A Architectural File (green)
I Industrial Construction File (blue)
L Light Construction File (yellow)
D Interior Design File (black)

ARCHITECTURAL RECORD

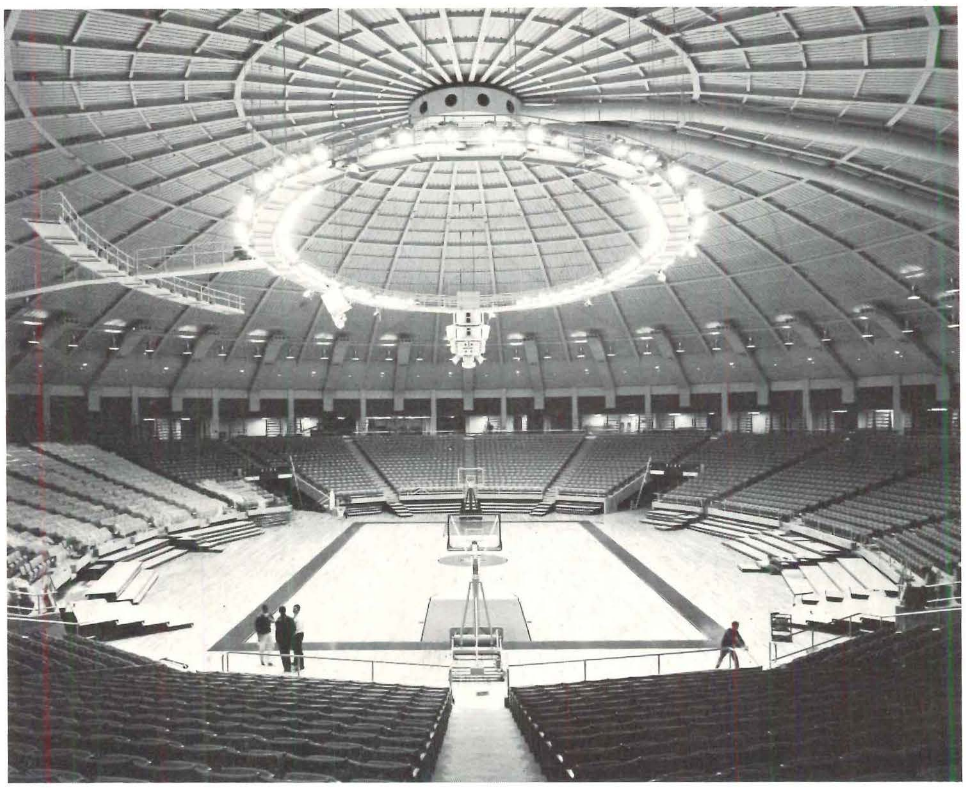
McGraw-Hill, Inc., 330 West 42nd Street,
New York, New York 10036
Advertising Sales Mgr.: Louis F. Kutscher (212) 971-2838
Production Mgr.: Joseph R. Wunk (212) 971-2793
Promotion Mgr.: Sam H. Patterson, Jr. (212) 971-2858
Research Mgr.: Elizabeth Hayman (212) 971-2814

District Offices:

Atlanta 30309 — Edward G. Graves, 1375 Peachtree St., N.E., (404) 892-2868
Boston 02116 — Ted Roscoe, 607 Boylston St., (617) 262-1160
Chicago 60611 — Robert T. Franden, Edward R. Novak, 645 N. Michigan Ave., (312) 664-5800
Cleveland 44113 — David B. McCourt, 55 Public Square, (216) 781-7000
Dallas 75201 — Wayne L. Loving, 1800 Republic National Bank Tower, (214) 747-9721
Denver 80202 — Richard W. Carpenter, 1700 Broadway, (303) 255-5483
Detroit 48226 — Tom Brown, 2600 Penobscot Bldg., (313) 962-1793
Los Angeles 90017 — Robert L. Clark, 1125 W. Sixth St., (213) 482-5450
Minneapolis 55402 — Edward C. Weil, 1104 Northstar Center, (612) 332-7425
New York 10036 — Donald T. Lock, Ted Roscoe, John S. Renouard, 500 Fifth Ave. (212) 971-3583
Philadelphia 19103 — Robert G. Kliesch, 6 Penn Center Plaza, (215) 568-6161
Pittsburgh 15222 — Bradley K. Jones, 4 Gateway Center, (412) 391-1314
St. Louis 63105 — Richard Grater, 7751 Carondelet Ave., (314) 725-7285
San Francisco 94111 — Wayne C. Carter, 255 California St., (415) 362-4600



ELLERBE ARCHITECTS, *architect* · SLUTSKY PLUMBING & HEATING CO., *plumbing contractor* · NATIONAL MILL SUPPLY, INC., *plumbing wholesaler*
AMERICAN STANDARD, *fixture manufacturer*



Notre Dame's Athletic and Convocation Center

Twin-domed complex houses sports, trade shows, conventions, simultaneously, —rain or shine

Weather's no problem in South Bend. Not at Notre Dame's fabulous new sports arena and convention center which can house as many as 15 activities at one time beneath its cavernous 10.5 acre roof.

Developed through cooperation of the University and the South Bend business community, this fantastic eight-and-a-half-million-dollar facility provides complete physical education facilities, as well as a trade show and convention center of unique and comprehensive design.

A big time hockey and year 'round ice skating rink, a ten lap per mile special composition running track, a gigantic basketball arena, a baseball infield, four gymnasiums, classrooms, meeting rooms and offices—embrace activities to keep the center open from 7 A.M. to 11 P.M.

Buildings at Notre Dame are built with minimum maintenance in mind—one very important reason why the flush valves in this beautiful new complex are Sloan. Sloan Quiet-Flush II Flush Valves are famous for quality, dependability, quietness and low maintenance costs. Your building, too, can have these same extra advantages which are Sloan. Just be sure you specify and insist on Sloan Quiet-Flush II Flush Valves. Most people do.

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