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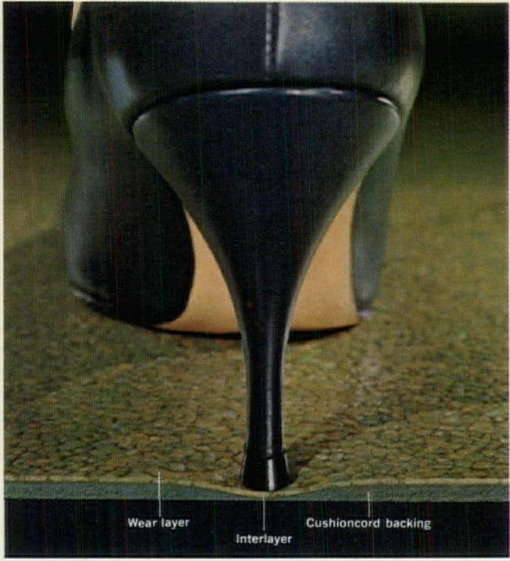


ADMINISTRATIVE CENTER FOR THE UNIVERSITY OF DETROIT BY GUNNAR BIRKERTS  
BUILDING TYPES STUDY: URBAN HOUSING  
AIR CONDITIONING: PART ONE OF A TWO-PART SPECIAL REPORT  
AN ARCHITECT'S GUIDE TO EXPO 67  
FULL CONTENTS ON PAGES 4 AND 5

# ARCHITECTURAL RECORD

JULY 1967 **7** A MCGRAW-HILL PUBLICATION TWO DOLLARS PER COPY







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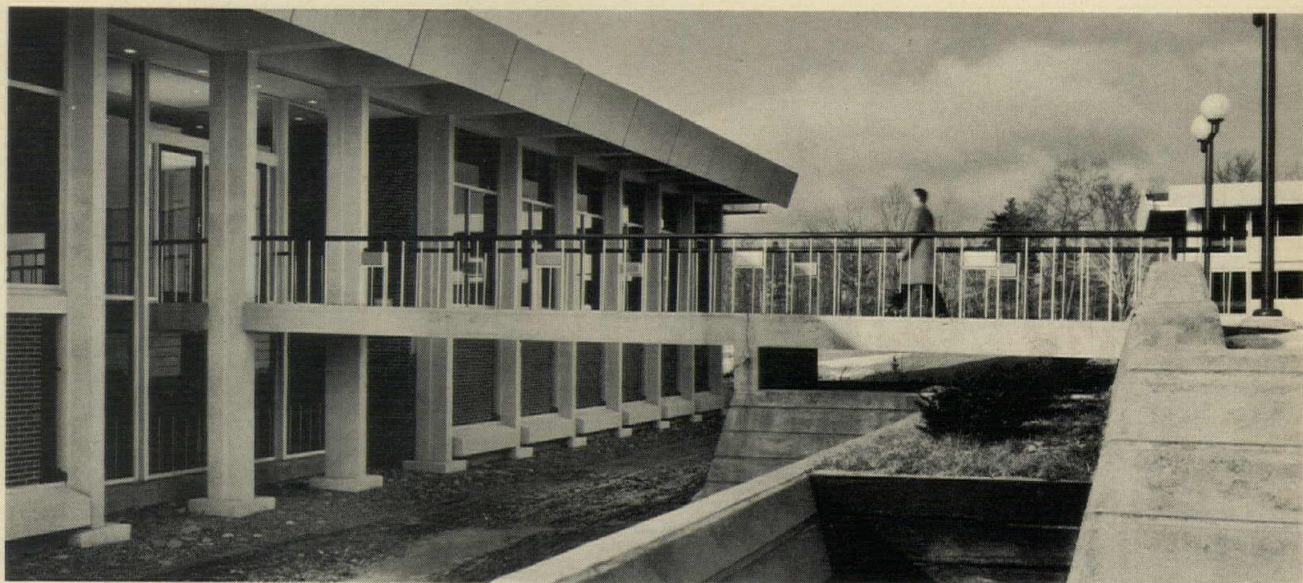


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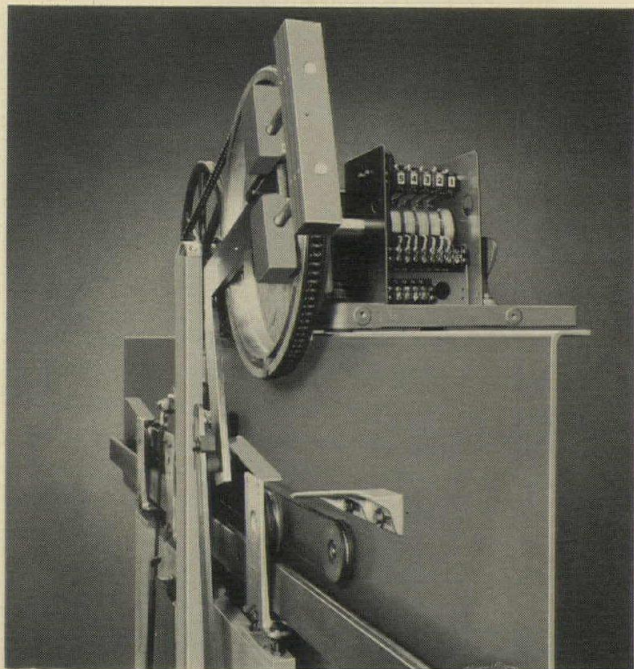




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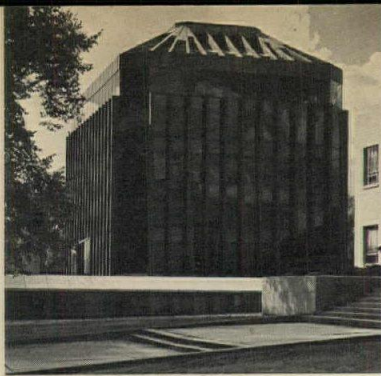
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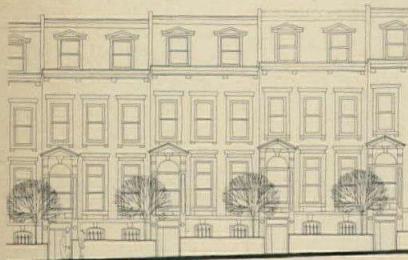
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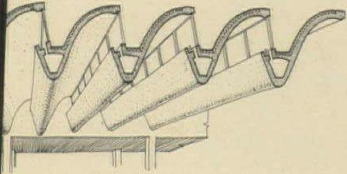
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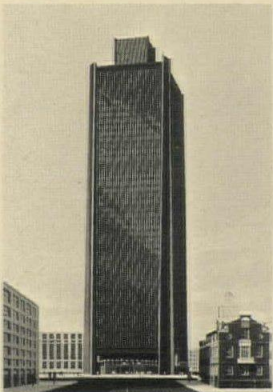
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## NEW KINDS OF URBAN SPACES DESIGNED FOR LEISURE

Some new concepts of the role of parks in the life of a city, and the kinds of leisure uses that are appropriate to them, are developing out of a new program in New York City. Architects and landscape architects are, for the first time since the Thirties, playing the significant role in the design of New York's public open spaces; and they are being encouraged to find fresh approaches. Next month's Building Types Study on Recreation will describe the program and show some of the first architectural results.

## ARCHITECTURE THAT RESPECTS A LONG TRADITION

Edward Larrabee Barnes' U.S. Consulate at Tabriz, Iran, took its controlling architectural idea from the Iranian way of building, with a system of stucco-covered brick walls and domes set inside traditional walled compounds. Next month's feature will provide a first look at the completed building.



McGraw-Hill



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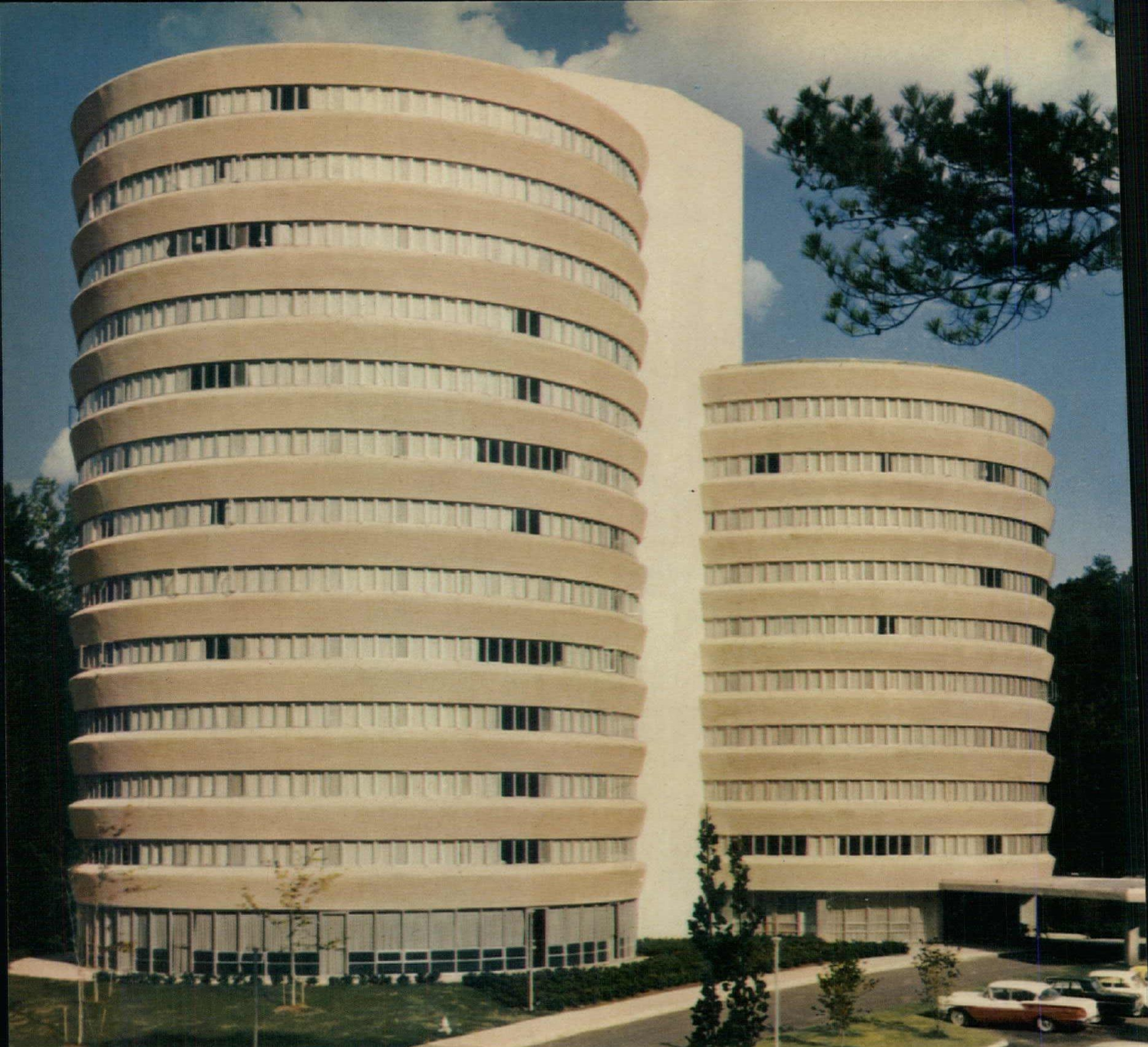
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**DRINKING FOUNTAINS**





The Wesley Woods Towers, Atlanta, Ga. Architect: Charles E. Stade & Associates, Park Ridge, Ill. Panel Manufacturer: Mabie-Bell Schokkabeton Corp., Peachtree City, Ga. General Contractor: Daniel Construction Company of Georgia, Atlanta, Ga.

ASK A COMPLEX QUESTION — GET A SIMPLE ANSWER...

## PRECAST WHITE CONCRETE PANELS

During the design of every building this question is asked...What exterior material will do this combination of things best: 1—Look great, 2—Be low in cost, 3—Be speedy to erect, and 4—Be economical to maintain. In a great many cases the answer is precast concrete panels made of Trinity White Portland Cement. They certainly worked out perfectly in Wesley Woods Towers, a convalescent home and apartment

building for the retired, in Atlanta.

The 720 exterior panels at Wesley Woods have an exposed quartz and quartzite aggregate that give color and texture. The panels were cast ahead of schedule and were available when the frame was ready for them. Most panels take a compound curved shape—curved horizontally to the curve of the round towers, and curved vertically through the spandrel area. The curved panels are

5' x 8'; the flat panels for the connecting structure between the round towers are 4' x 5'. All are anchored with welded clip angles. All fit perfectly without on-the-site cutting.

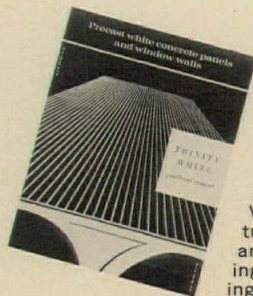
Every architect can get expert advice on the use of precast white concrete from his local concrete products manufacturer. Call him.

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## SCIENCE TO FIX EVERYTHING; DO WE NEED SOPHISTICATION?

We have all heard so much about science, or systems, or computers, and how they together will fix up everything in the future, that it is heartening to hear that perhaps something additional will be needed. This practical notion about a bit of extra sophistication or plain humanist experience comes from the right source, an official of the Department of Housing and Urban Development. He is Robert C. Wood, who was addressing the National Academy of Sciences. I shall quote extensively from his remarks.

"... HUD and the Office of Science and Technology co-sponsored a three-week study on Science and Urban Development last summer in Woods Hole. Some very interesting things emerged from this, including the alacrity with which humanists, bureaucrats, and scientists adopt each other's jargon. Within a few days sociologists were talking about 'parameters' and 'interface,' and mathematicians about 'social needs' and 'urban texture.' Not always precisely, of course, but fluently.

"I want today to talk not about the glorious promise of applying science to urban design, but about the difficulties of doing so. I want to talk not about the admirable scientific and engineering capacity America now has, but about the additional capacity, the additional sophistication, that we need.

"I do not do so to discourage the involvement of scientists and engineers in the urgent and historic task of building urban America. Such involvement is critical to our success. I think, however, that we must not lose sight of what a complicated, arduous, adventurous and expensive job it is we have before us."

You will notice that he did not specifically mention architecture; it is I who take the liberty of reading "additional capacity, additional sophistication" as meaning architecture. If that seems too presumptuous, at least those are needs that put architects in the forefront of those thus challenged.

Mr. Wood went on to give four "facts-of-urban-life":

"First, the city is the most complicated system known to man. I am sure it is tempting for those best acquainted with the design demands involved to feel that nothing could be more complicated than getting a man to the moon—and back. Such is not the case.

"Second, the city is and will remain the focus of intense conflicts. Differing ethnic groups and economic groups do not agree on the values or the ground rules which should guide the system.

"Third, any pure cost-benefit approach to urban programs will be doomed by their inevitable inconsistency.

"Fourth, in future urban planning

we are dealing with entirely new orders of magnitude. Every urban physical and social pattern must be prepared to respond to explosive growth."

And: "Caution, then, is indicated when we talk glibly about building mathematical models or about viewing the city as a system. . . .

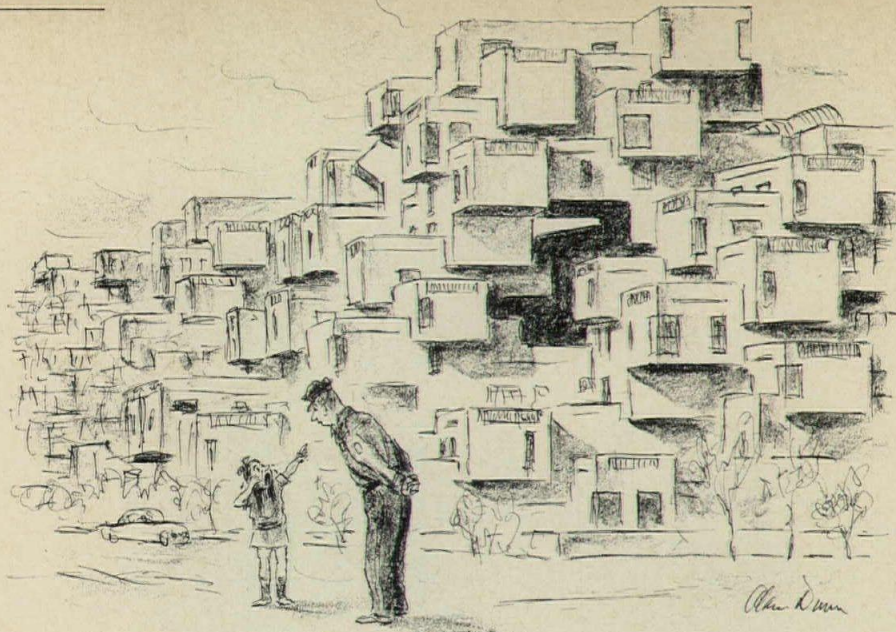
"As we are beginning to see, not only in our low-income urban ghettos but on our college campuses as well, there is a growing disinclination on the part of the less powerful segments of the community to accept passively the judgments of those accustomed to running things. Conflicts over the allocation of community resources which previously might have been quietly confined to people's hearts or their front stoops are now breaking out noisily on the streets, in city council chambers, and across the pages of the daily press. This is not a bad thing. Conflict and confrontation are often the necessary prelude to growth and change. It is only when conflict is carried on in a closed arena, with no possibility for accommodation or change, that it becomes truly destructive.

"In the past, problems of urban design were handled largely through intuition. Now we have new tools with which to work. But . . . further advances in scientific and engineering sophistication are needed. We must find ways to understand considerations of individual personality, group and neighborhood identity, mobility and aspirations."

It just might take some architectural orientation to make tolerable the environmental conditions in that explosive urban growth. Even if architects have to fight their way into the planning councils.

—Emerson Goble





"I can't find my house!"

## The architectural demands of buildings on highways

We were going on (last month) about what is determining architectural tastes of the public abroad and at home. A bit more on the subject, this by architect Russell T. Pancoast, in his history of Miami architecture:

"Almost two decades ago a policy of tranquility in services and surroundings was tacitly abandoned as a background for tourism, then as now a chief support of Greater Miami's economic structure. In its place came an aggressively promoted policy of titillation that inevitably conditioned the approach to hotel design. Pleasure, excitement, ostentatious richness, all the outward signs of affluence and luxury—these were design standards quite as much as they were watchwords of successful hotel operation. They have been expressed with such prodigal imagination and such lavish hands as to create what is almost a monotony of richness throughout the strip.

"This aura of architectural magnificence has had far-reaching results. On Miami Beach the resort hotel grew into a complete—and unique—maturity: a special sort of building type, geared to a special function and offering a variety of special services. The basic pattern is now being applied elsewhere; and the 'Miami Beach type' of resort hotel now offers its singular kind of glamour throughout the Caribbean islands, and in such widely divergent cities as Las Vegas and New York.

"Another startling phenomenon is the assemblage of architectural whims called 'Motel Row' that starts at Baker's Haulover and continues in an unbroken line along the ocean front to the residential village of Golden Beach. Owners of some of these fantastic outbursts have explained that their chief demand of an

architect was that he design the highway facade so as to stop all traffic! Edward D. Stone's biting comment on this was to the effect that with so great a conglomeration of bizarre fantasies, the only traffic-stopper left would be a facade designed with architectural beauty and dignity."

## The insights of the artist and the little black box

The present concern about science vs. people was summed up rather neatly by architect George E. Kostritsky at a recent meeting of architectural educators.

"What we rightly fear is the possibility that technological innovation, computerization and systems engineering will subdue or obliterate the poetic content of our environment and our lives."

What he was really telling about was the reorganization of his own firm to meet the challenges of the times, as the principals saw "a metamorphosis taking shape." But he made it clear that they were not giving up any architectural convictions.

"We have in effect established a new charter which recognizes that while our immediate concern is with three-dimensional problems, we must grapple also with improving the total quality of life. Even as physical and social scientists are called on to contribute their skills, we hope the architect, or whatever in the future he may be called, will be there to inspire, to lead, to apply the broad perspective of the generalist and the insights of the artist."

## What must we pay for environmental changes?

Speaking further about those coming changes caused by computerization (the

little black box) and so forth, let me quote from a favorite speaker. He is August Heckscher; the occasion was his leave-taking from the Twentieth Century Fund to be Administrator and Commissioner, Recreation and Cultural Affairs Administration, Department of Parks, New York City.

"The key is the relation of man to the environment, and the interrelationship between the two. We get off the track just as soon as we assume that man can do whatever he wills to the environment and pay no price. Or when we think we can avoid the price by making man over so as to fit him for the new conditions. We get back on the track when we begin to test and analyze and measure—and when finally we heed—the interrelated effects of what man does to the environment and what the environment does to him.

"Disturbingly little is actually known about the residues and after effects of even such commonplace, everyday things as insecticides and detergents. Even less is known about the effects on the harmonious balance of nature created by the loss of various forms of plant and animal life. And when we come to trying to preserve species whose existence is threatened, we are pathetically helpless.

"The catalog of the unknown in this field could be indefinitely extended, proceeding into the effects of crowding and numbers on our cities, the strain on the nervous system of so much noise and on health of so much pollution. It is not only that specific programs of research can be built around such questions, but that research of all kinds must be influenced when we seriously and persistently concern ourselves about man's place within the physical world."

—E.G.





Ronde Design

## When style is on your mind, put Russwin in your plans.

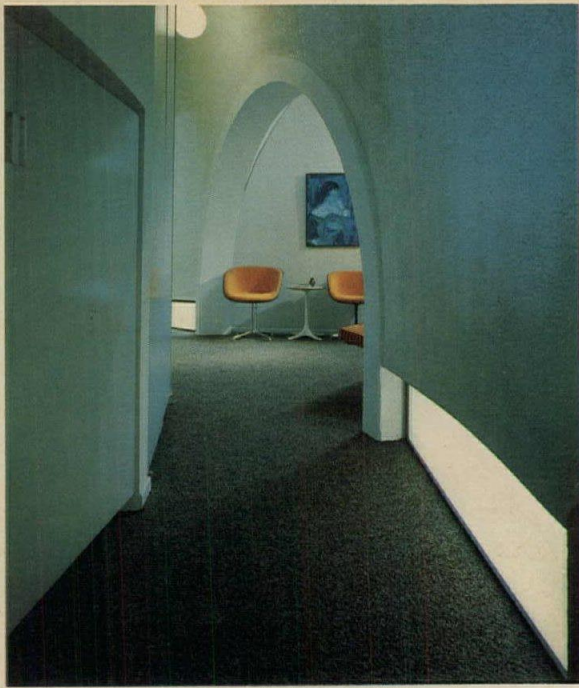
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**ASG's  
Huewhite glass—  
a glowing  
band of light  
for a functional  
cluster of domes**

Woman's Clinic, Lafayette, Indiana  
Architect: E. H. Brenner, A.I.A.





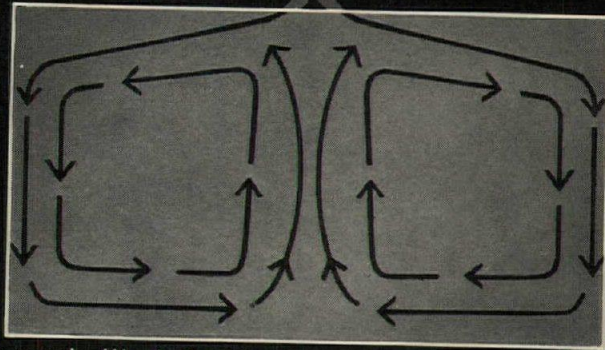
Even futuristic domes create an inviting, space-age setting for this women's medical clinic in Lafayette, Indiana. The cluster configuration is ideally suited to the clinic's purpose. It gives the four participating physicians separate obstetric/gynecology facilities for private practice under four domes. The remaining three domes provide common administrative, examination and reception areas. • Each of the domes is finished at ground level with bands of ASG's Huewhite® light-diffusing glass. By day, the alabaster white glass suffuses the interior with glare-free natural light while insuring complete privacy. At night, the bands of Huewhite come softly aglow with interior light. • Huewhite is a member of ASG's complete family of plate, sheet and patterned glasses. For full information on Huewhite, including sizes and thicknesses, write: Dept. D-7, American Saint Gobain Corporation, P.O. Box 929, Kingsport, Tennessee 37662.

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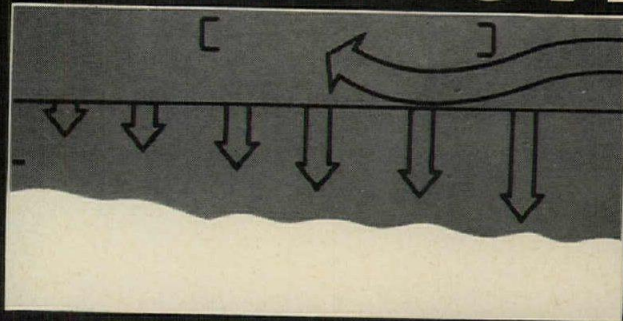


# OUR MOVE



We move air evenly. We do it with a brand new kind of linear bar that moves conditioned air to the comfort zone (see our diagram). The bar economically and efficiently and quietly distributes air throughout the space. We call it the OCF Dimensionaire Ceiling System. It's a total ceiling system. Air, light, and sound. There's nothing like it.

# THEIR MOVE



The expensive air (either heated or cooled) travels through the plenum, conditioning an unused section of the room. That's a waste of money. As you can see in this diagram, the conditioned air is distributed through the perforations, with greater force on one side of the room than on the other. That's a waste of comfort.

# YOUR MOVE

We have a movie you should see. And a brochure. They tell everything about the OCF DIMENSIONAIRE CEILING SYSTEM. Mail the coupon now, before it slips your mind.

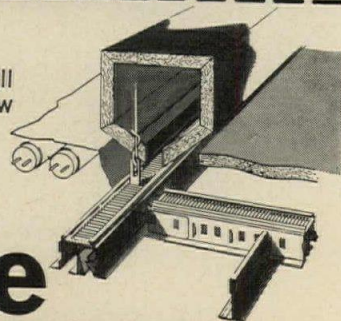


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Have your sales engineer call for an appointment to show the film.

Mail the brochure.



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**FIBERGLAS**

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AR-7





## With so many well-known brands to choose from, why would an architect use a newcomer like Marshall Tiles for a \$2,000,000 men's dormitory?

Not because he was looking for a bargain. Marshall Tile is no "cheap" tile. Matter of fact, we're a subsidiary of Monarch Tile — and you've known the quality behind that name for over 20 years.

What we offer you is unique in the industry. We limit our production to one tile size, one glaze and 14 colors — enough to satisfy just about every need. And we always maintain large inventories of those colors. That means you can get the color you want and the quantity you want, in the time and place you want it. *Without costly delays.*

When you think about it, that makes Marshall Tiles a pretty good bargain, at that.



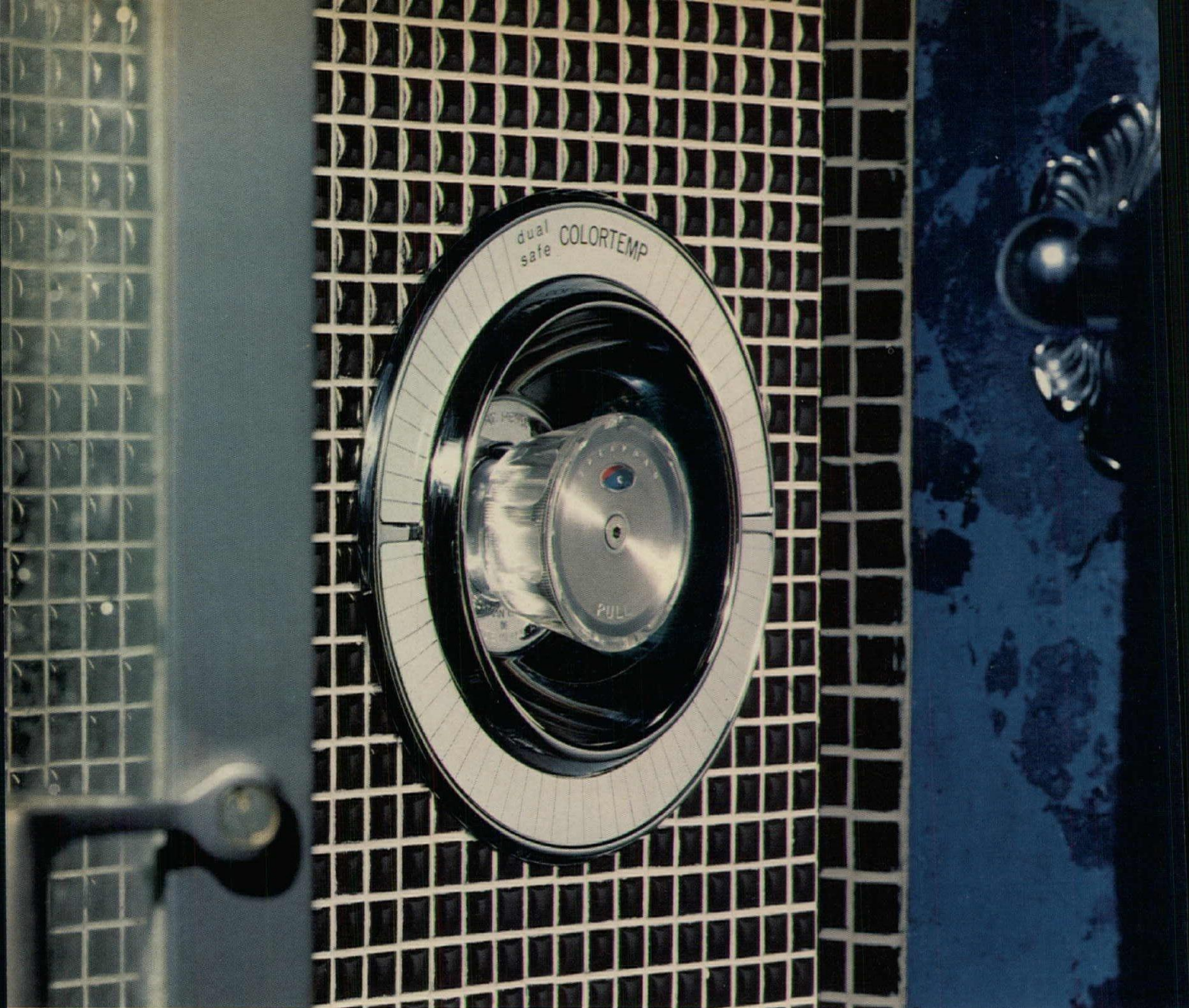
82,000 sq. ft. of Marshall Tiles installed in Olin Hall, Northeast Louisiana State College, Monroe, La. Architect — H. H. Land Arch. Inc. & Prentiss Seymour Associated Architects. General Contractor — Jesse F. Herd & Sons, Inc. Distributor — Monroe Tile Distributing Co. Tile Contractor — Monroe Brick & Builders Supply Co., Inc.

### Marshall Tiles, Inc.

Marshall, Texas 75670

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**This shower control protects your comfort  
two ways. Beautifully by Speakman.**

**Dual-Safe** Colortemp's red and blue dial regulator lets you pre-set the precise water temperature you enjoy most. **Dual-Safe** Colortemp shower valves hold temperature constant—automatically balances hot and cold water pressures.

So once pre-set—even though water is turned on elsewhere in the house—a steady never scald, never icy temperature is maintained. Never any burning or chilling surges of hot or cold water.

*It's what's outside that counts.* Dial red for hot. Blue for cold. In-between for just right. With Speakman **Dual-Safe** Colortemp you can see what you're doing—visibly pre-dial

the safe comfortable water temperature you desire.

*It's what's inside that counts.* Once the water is turned on under normal operating conditions, a new Speakman twin piston system instantly adjusts to hot and cold input variations—to maintain the safe comfortable temperature you originally dialed.

**Dual-Safe** Colortemp for dual safe comfort in the shower. Beautifully designed and exceptionally engineered by Speakman. Why not let Speakman quality speak for you.

Send for complete descriptive literature without obligation.

*dual-safe\** **colortemp**®

\*T.M. SPEAKMAN COMPANY

costs less really than you think/by **SPEAKMAN**



**SPEAKMAN® COMPANY • Wilmington, Delaware 19899 • In Canada write Cuthbert-Speakman • 47 Duke Street, Montreal 3, Quebec**

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Open for  
looking  
24 hours  
a day

Shown here is Cookson Grille pattern G5014. Check catalog for other patterns available.

For 24-hour a day selling power, high level security and visual appeal, architects and designers are turning to Cookson Overhead Rolling Grilles.

Across the country, the trend is toward the open, controlled-climate shopping mall. The need for weather-tight closures is eliminated. Only the need for security remains. Cookson Overhead Rolling Grilles can secure openings of up to 35 feet in width. For

wider openings, use removable mullions or Cookson Side-Coiling Grilles.

For further information write for Bulletin 6701, or see us in Sweet's.

*"Best Way to Close an Opening"*



**THE COOKSON COMPANY**

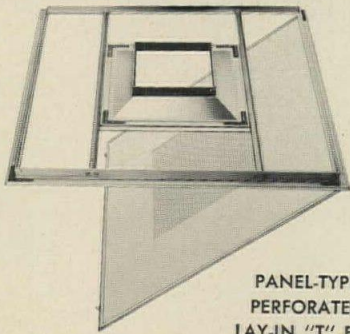
700 Pennsylvania Ave., San Francisco, Cal. 94107

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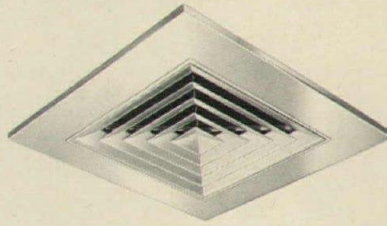


# The ORIGINAL Nylon-Fitted, Vibration-Proofed, ANODIZED Aluminum Grilles, Registers and Diffusers!

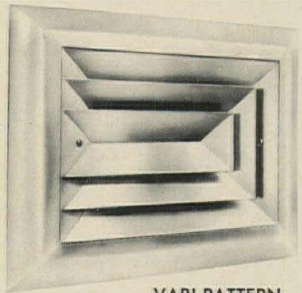
AirGUIDE Offers a Full Commercial-Specification  
and Residential Line to Meet any Design Requirements.



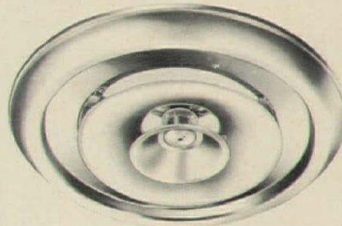
PANEL-TYPE  
PERFORATED  
LAY-IN "T" BAR



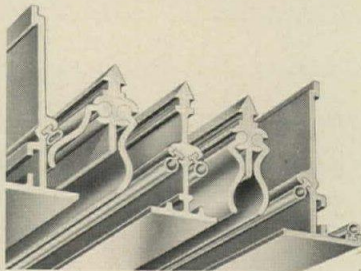
PANEL-TYPE  
LOUVER FACE, LAY-IN "T" BAR



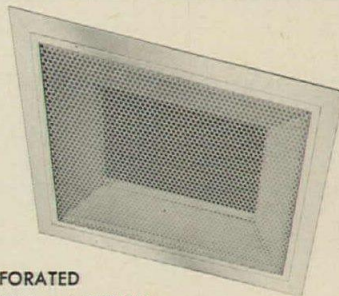
VARI-PATTERN  
1, 2, 3, 4 WAY CEILING DIFFUSERS



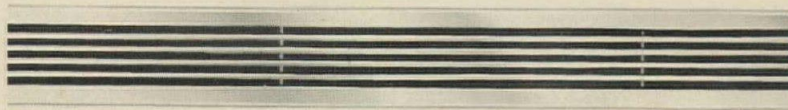
ROUND ANODIZED ALUMINUM  
CEILING DIFFUSERS  
ADJUSTABLE and 2-POSITION



"AIR-SLOT" Continuous - Line  
CEILING DIFFUSERS

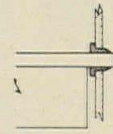


PERFORATED  
SUPPLY and RETURN  
CEILING DIFFUSERS



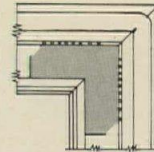
LINEAR CEILING DIFFUSERS

## AirGUIDE'S U. S. PATENTED FEATURES!



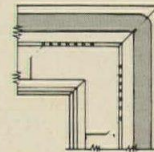
Nylon bushings in frame holes eliminate steel tension wires—no blade rattling or vibrations!

U.S. Pat. No. 3,125,944



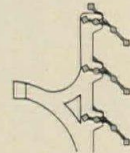
"Corner-loc" miter construction is twice as rugged as any welded corner, tighter too!

U.S. Pat. No. 3,125,944



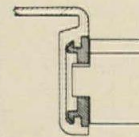
"Air-loc" vinyl gasket is permanent in metal channel. Never works loose. Can't decompose. Positive seal

U.S. Pat. No. 3,125,944



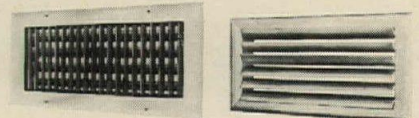
Nylon multi-louver mechanism is fool-proof. No rivets or linkages to rattle or vibrate. Trouble free!

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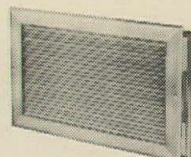


Vinyl inserts cushion Return Air and Door Grille blade assembly. Rugged I-beam mullion adds beauty and strength.

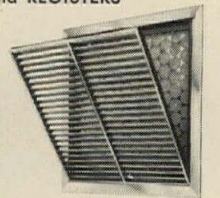
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GRILLES and REGISTERS



DOOR  
GRILLES



RETURN AIR,  
ALL MODELS

MEMBER: Air Diffusion Council



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Hialeah, Florida

CORPORATION

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Full replacement of defective units  
if caused by workmanship or materials.

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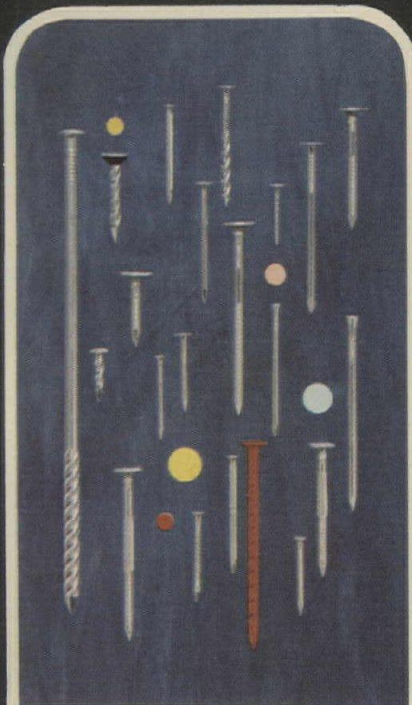
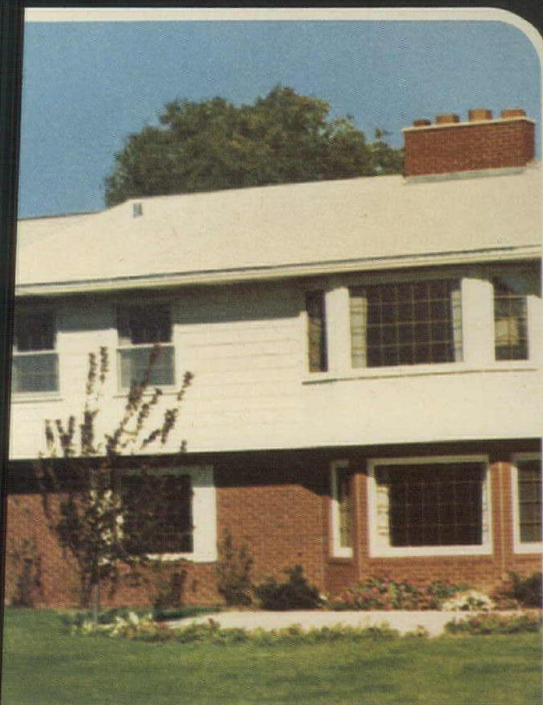
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For those who want the best, it pays to specify

## NICHOLS ALUMINUM BUILDING PRODUCTS

Built-in Longevity, Maintenance-Free, Assures Lower Costs over Lifetime of Installation



**COMPLETE LINE OF CARE-FREE BUILDING PRODUCTS** that add beauty to any home or commercial building, while providing the added feature of no maintenance costs for many years. Rustproof aluminum will not stain, warp, rot or otherwise deteriorate. Many of these products are pre-painted with baked enamel. Others never require painting because of the beauty of natural aluminum finish. Precision-engineered for a quality, dependable installation. Be sure to specify Nichols Aluminum Valley, Flashing, Building Trim, Tensil-Rib Roofing and Siding, Gutter System, Rain-Carrying Equipment, Gutter Cover or Building Corners on all your jobs.

**HY-TENSIL ALUMINUM NAILS** that are heat-treated for up to 15% greater strength than F.H.A. requirements. Won't rust, spot or stain siding, so exterior repainting cycle is extended—meaning more savings for home or building owner. **COLOR-MATCH ANY JOB** Painted nails are baked following each coat . . . for chip resistance and best paint adhesion. Available in standard or specially matched colors.

**NICHALLOY CHAIN LINK FENCE** a solid aluminum alloy fence provides many years of security and protection and an attractive touch to landscape. No painting necessary. No deterioration or corrosion from chipping. Maintenance-free. **ACCESSORIES** that never rust, stain or bleed on aluminum or steel fence installations. Fence Ties, Barbed Wire, Brace & Tension Bands. **PRIVACY PANELS** for seclusion and privacy with attractive design. Sturdy. Rust-proof. Painted white or redwood. Different heights.

Prove to yourself why it's best to specify Nichols Aluminum Products for residential, commercial or industrial installation.



**free**  
LITERATURE

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 Fence Brochures  Have salesman call

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His heating and cooling costs are going up and up. Low-cost, water-susceptible roof insulation may work at first. But, gradually there's a loss of insulation efficiency. Vapor barriers are not completely effective. They deteriorate. The movement of the building splits them. The moisture-laden air penetrates the insulation. Moisture forms through condensation, reducing insulation efficiency.

What to do? Specify STYROFOAM® RM brand plastic foam roof insulation. It's the finest, most effective roof insulation you can buy. Remains effective even if the roofing leaks. Because it's not affected by water or water vapor, STYROFOAM brand plastic foam retains a permanently low "k" factor, which means lifetime insulation effectiveness.

Eliminates a major cause of roof blis and subsequent leaking. Never rots, molds or deteriorates. Requires no vapor barrier. It's flame retardant and easy to install. A bundle of 100 board feet weighs only 25 pounds. It is tough. The skin will take the abuse of normal roof traffic without harm. For more information, write: The Dow Chemical Company, Construction Materials Sales, Dept. 71330, Midland, Michigan 48640.



## No one will ever know you installed bargain roof insulation

(Until the owner blows his top).

*For more data, circle 13 on inquiry card*







## For the better homes in any neighborhood it's wood panel doors.

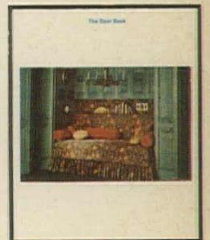
### Why wood panel doors?

Only panel doors made of wood add so much architectural interest—inside and outside. For this is the nature of wood. Only wood. Tasteful. Beautiful. Natural.

Both exterior and interior doors are available in a variety of distinctive styles as standard units. Ponderosa Pine Wood Panel Doors make

the homes you design and build more interesting . . . set them apart from the rest.

Send for our DOOR BOOK. 16 pages crammed with decorative and practical ideas and uses for solid wood panel doors—ideas today's demanding home buyers are searching for. Send requests on your letterhead.



**PONDEROSA PINE WOODWORK**  
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Chicago, Illinois 60603

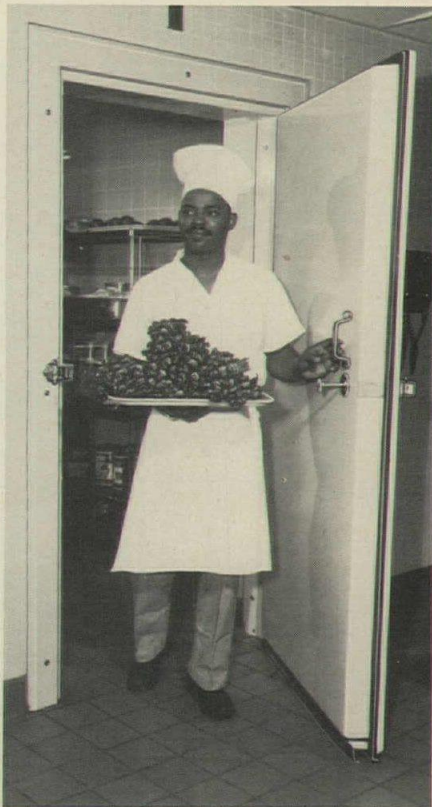


# Jamolite doors look better and operate easier in all types of food service installations

In college cafeteria, Jamison Jamolite® plastic cold storage door maintains proper temperature in fruit and vegetable storage.



Jamolite is a lower cost door made in the same sizes as heavy, standard cold storage doors. Installation is a simple one-man job.



Female employees can easily open Jamolite doors one-handed. Note extra protection of stainless steel kick plate on door and frame.



Jamolite doors help save refrigeration because women employees can easily close the doors tightly. Available as both cooler and freezer doors.

Get complete catalog data by writing today to Jamison Cold Storage Door Co., Box 70, Hagerstown, Md. 21740

**JAMISON**  
COLD STORAGE DOORS

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One man operates the Honeywell Control Center that starts, stops, adjusts, reveals, monitors, analyzes and checks almost everything in a modern, enclosed shopping center. Shown here: Southdale Center, Edina, Minn. Victor Gruen Associates, Architects.

## Honeywell 1-man Control keeps shopping center stores comfortable, protects against fire and theft, ...and saves thousands every year.

Your clients will save enough in operating costs to pay for Honeywell automated control in 3 years or less, a 33% annual return on investment!

### One man at the control center:

- reads and adjusts temperatures.
- starts, stops and adjusts equipment in every store.
- protects each store against fire and intrusion.

**Five systems.** Honeywell offers 5 different systems and more fire and intrusion detectors than anyone else, so you can pick exactly the protection you need for each commercial job.

**Greatest reliability.** Only Honeywell offers microelectronic circuitry for infinite life expectancy, unmatched reliability.

**Personal follow-up.** There's a field staff of Honeywell Building Automation Systems Engineers to help your clients get full payback.

In short, Honeywell can design, build, install, guarantee and service the complete temperature control and protection system you need for any commercial building you design.

**Make us prove it.** For examples of operating economies in other buildings, just mail the coupon.



### FREE BOOKLETS!

- Send copies of Building Automation and Security Planning Guides.

- Have a Building Automation Systems Engineer call with examples of operating economies.

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## Honeywell

automation systems help  
make people more productive





## Their new office helper is 7 feet tall

It's the new GF Over-file storage cabinet and GF Style 9000 file, of course! Together they end clutter and add beauty to a busy office. Everybody likes them.

The Over-file holds oversized items that would otherwise create storage problems. It is functional and decorative—and, with file cabinets, even serves as a partition to divide office interiors.

The Style 9000 file is new from GF, too. It has a flush front with inset pulls and label holders to complement today's professionally-designed offices. Available in a variety of colors and letter or legal widths.

For complete information, contact your nearby GF dealer or branch showroom. Or write for descriptive literature to Dept. AR-24, The General Fireproofing Company, Youngstown, Ohio 44501.



# GF

## OVER-FILE CABINETS & STYLE 9000 FILES





## The old copper cornice ain't what it used to be!

Cornices in architecture have reemerged—but what a difference! The elaborately figured cornice at left has that desirable, natural patina that only copper and time can produce. It is still in excellent condition after 53 years exposure to the elements. By contrast, the stallion at right shows how one architect kept pace with modern cornice design . . . one of the many examples of how copper lends itself so beautifully to modern architecture. No other material has such latitude of design in its makeup or combines such beauty with utility. It is easily worked into just about any shape and form desirable . . . is ageless . . . takes on a mellowing patina with the years. Or, it can be given the bronze look, so popular now, by oiling.

Little wonder that, even when sheet copper was in short supply, knowing architects continued to "design with copper in mind." For, in addition to its practically unlimited design possibilities, its long life and ease of fabrication, copper, properly designed, is rated at the lowest cost per year of actual service of all roofing and flashing materials.

Get to know copper better. Send for Revere's new 88-page Sweet's insert. It was intended for the 1967 edition of Sweet's but we missed the deadline. Don't wait for '68. Send for your free copy today. You will also receive free companion piece, "The 4 Revere Improved Systems of easy-to-install Flashings", for the complete weather-proofing of masonry buildings.

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EASES. NOW IN GOOD SUPPLY**



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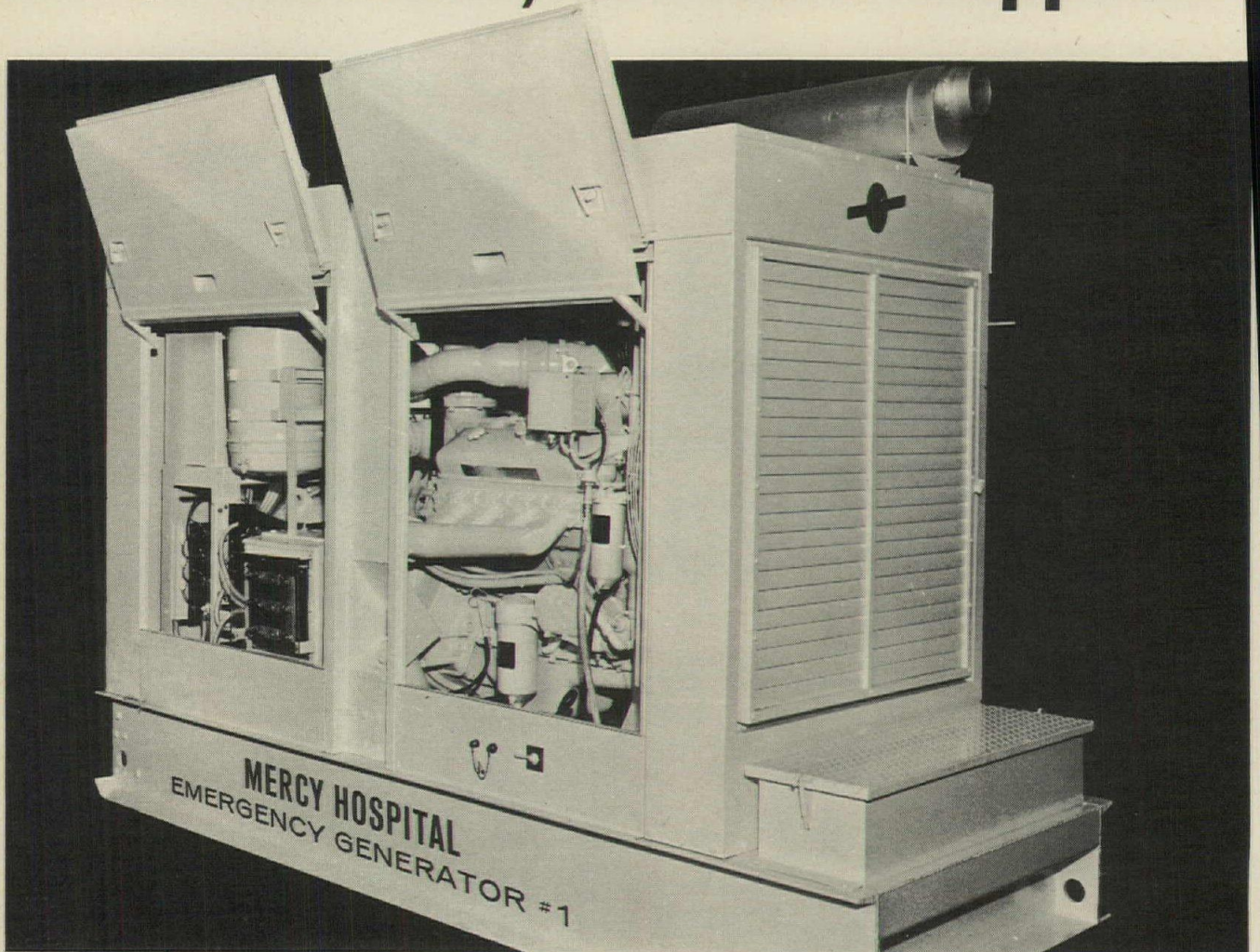
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You have to assume that any factory thoroughly tests its products . . . **but, then what happens?**



Typical of the carefully engineered and constructed Stewart & Stevenson emergency electrical generator sets is this unit developing 150 KW. Power is from a Model 8V71 GM Detroit Diesel Engine.

You are protected by an **EXCLUSIVE**  
**Guarantee of duty**—from Stewart & Stevenson

Some firms offer certificates by Independent Testing Laboratories.

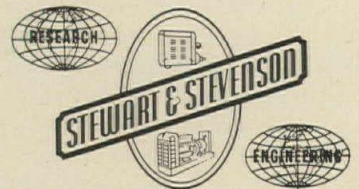
Others offer guarantees against defective parts, workmanship and material.

Yet, it is not what the unit did at the factory that really counts . . . but what happens if it does not perform as specified after installation.

Stewart & Stevenson products are protected by two guarantees . . . the standard factory warranty against defective workmanship or materials and

the time-proved Stewart & Stevenson guarantee of duty. There is no fine print or implied protection. The Stewart & Stevenson guarantee of duty specifies in plain and simple language what the equipment will do on your particular job . . . to your specifications. It provides further: "if the equipment should fail for any reason and we cannot make it perform as specified, we will remove the equipment at our expense and refund all money paid."

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# Robbins has come out with a new kind of continuous surface flooring that makes all other kinds of poured floors impractical.

## It's called ULTRAFLOOR

Every once in a while you get a chance to get in on something really new . . . design-versatile . . . and practical. Like Robbins completely new continuous surface vinyl flooring: **ULTRAFLOOR**.

Unlike conventional poured floors . . . Robbins **ULTRAFLOOR** can be installed anywhere permanent sheet vinyl can be installed . . . on or below grade. It exhibits its versatility in flash-coved, wainscoting . . . and floor-to-ceiling installations. And there are no installation problems with **ULTRAFLOOR**. It can be installed easily, quickly, and professionally by the average floor mechanic. You see . . . Robbins continuous surface **ULTRAFLOOR** doesn't have to be "manufactured" on the job. It's ready-made . . . ready-to-be-laid in continuous 6-ft. wide rolls. Another advantage of Robbins **ULTRAFLOOR** is its backing . . . called **MOISTGUARD** . . . which eliminates discoloration by preventing any show-through of the subfloor.

And the finish coat . . . which Robbins calls **N.S.U. 238** . . . does even more than expected. It dries thoroughly within 24 hours . . . with a tough, non-slip, high-gloss finish that never requires waxing and is unsurpassed for its wearability. It can even be recoated after years of hard use for a new-again floor.

The result of all this is a beautiful continuous surface floor that can be installed in a minimum of time . . . with a cost factor proven acceptable to both commercial and residential customers. **ULTRAFLOOR** adapts itself to any installation not only because of its durability and construction . . . but also because of its range of designer colors and patterns.

We think **ULTRAFLOOR** is the kind of continuous surface floor you've always wanted to specify . . . but have never been able to buy before. Why don't you get in on it right now?

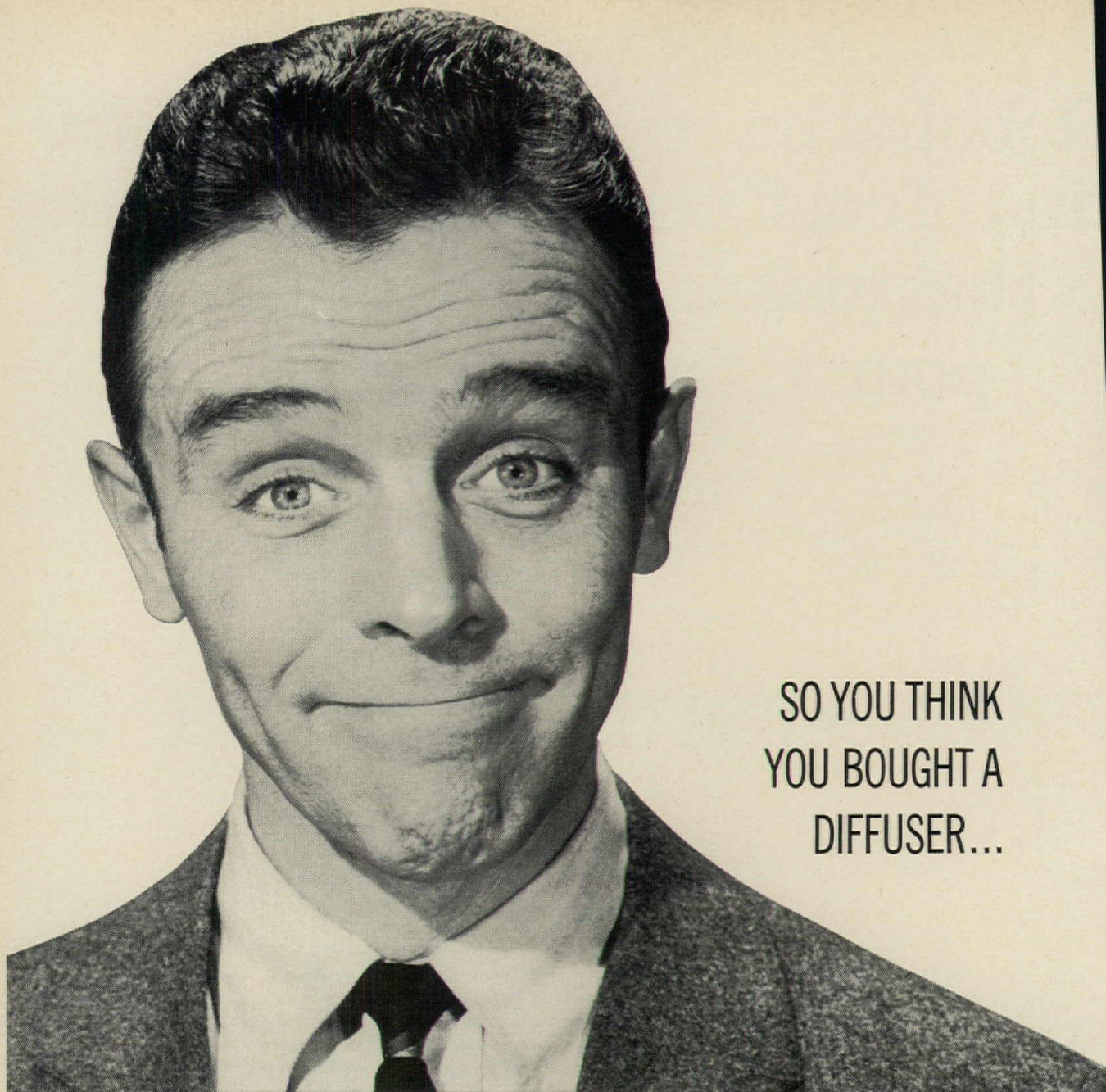
# ULTRAFLOOR

THE CONTINUOUS SURFACE FLOORING BY

**Robbins**  
PRODUCTS, INC.  
Tuscumbia, Alabama

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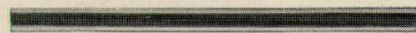
SO YOU THINK  
YOU BOUGHT A  
DIFFUSER...

A register...yes! A plaque...yes! But a diffuser...MAYBE!

You're paying good money for air diffusers, so make sure you get them. Remember: if it does not rapidly mix air and equalize temperatures, it is not a diffuser. Plaques and ordinary grilles are *not* diffusers.

Now look the field over. You'll find that only AGITAIR diffusers have genuine jet induction diffusing vanes. These vanes create high induction jets which induce greater quantities of room air toward the diffuser where it rapidly mixes with the primary air. Result: a perfect blend of homogenized air under controlled movement *in every cubic foot of space served.*

Don't settle for "look-alikes" ... get the real genuine vaned diffuser ... AGITAIR with jet induction diffusing vanes. Contact your local Air Devices representative for the complete diffuser story, or send for catalogs.



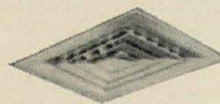
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WALL DIFFUSERS  
Catalog DQM-100



ROTO-JET  
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## Pride of the Capitol District... Showcase of America

Some of the finest homes in the tri-state area surrounding Washington, D. C., are being built from the original designs of Edward R. Spano, A.I.A., by the W. C. & A. N. Miller Development Company. These homes depend exclusively upon the distinctive beauty and durability of Pratt & Lambert paint and varnish products for their unique look of quality.

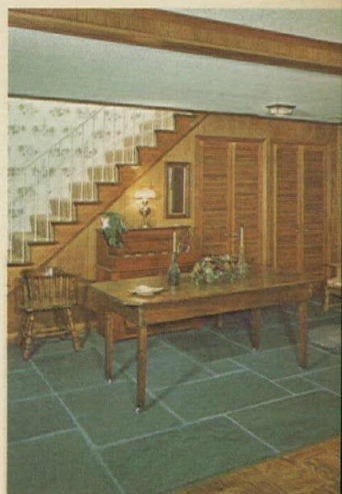
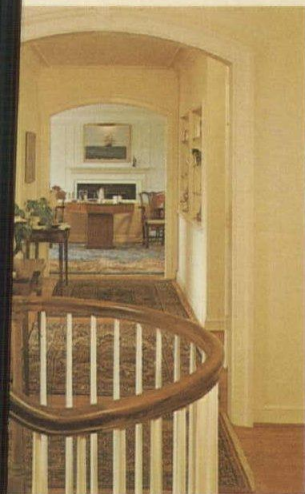
Architects are invited to use Pratt & Lambert Architectural Services either through your P&L representative, or by writing the nearest Pratt & Lambert Architectural Service Department. There's no obligation.

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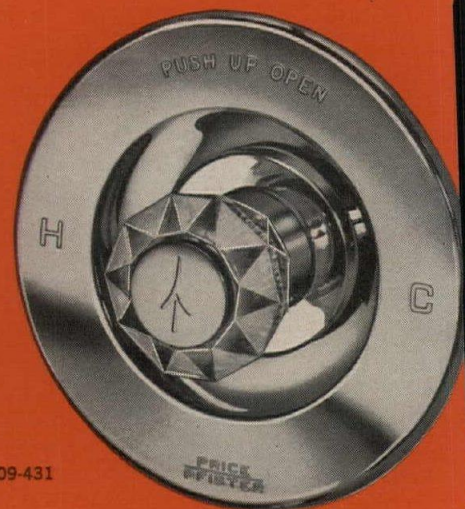
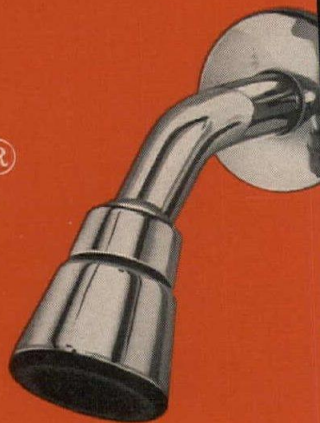
# MIX'N MATCH

## FLOW-MATIC®

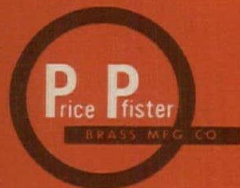
and

## Contessa®

*Price Pfister — the only manufacturer offering two prestige lines with coordinated styling. Each line is complete and comprehensive in itself — coordinates with the other in any combination of valves and faucets for matchless decorator effects.*



49-124



Established 1910

### PRICE PFISTER BRASS MFG. CO.

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Sold only through wholesalers.

Warehouses in these principal cities:

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PRICE PFISTER'S PRODUCTS . . . INSTALL EASIER, WORK BETTER, LAST LONGER.

\* Ceramic plates manufactured by Coors Porcelain Co. using Alcoa Alumina — developed by Aluminum Company of America

"FLOW-MATIC" and "CONTESSA" were conceived together, to provide a dramatic design continuity and flexibility, never before achieved in plumbing brass.

"FLOW-MATIC" combines the diamond-like effects of lucite, with our exclusive maintenance-free ceramic cartridge. \*

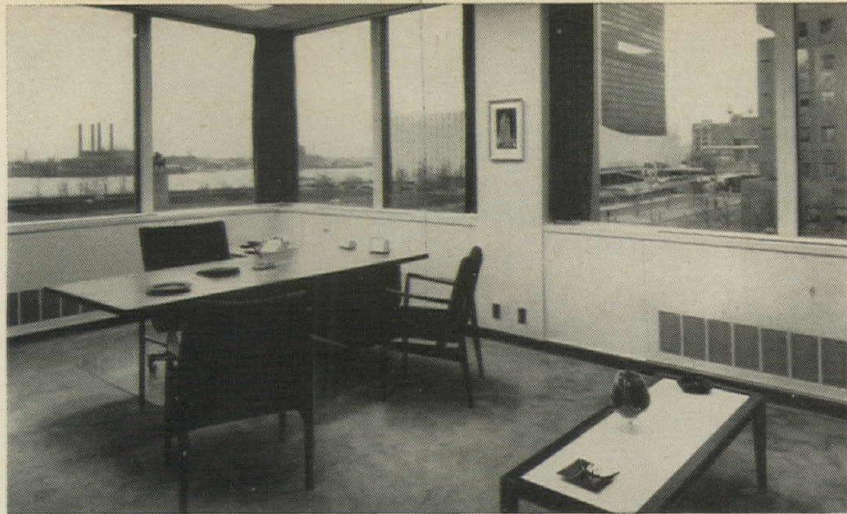
"CONTESSA," our supremely elegant prestige line of dual handle fittings, combines brilliant crystal-like lucite handles with minimum-maintenance replaceable stem cartridge assemblies, and renewable seats.

Each line offers a complete and comprehensive selection of tub and shower combinations, tub fillers, shower valves, lavatory and kitchen fittings.

Price Pfister answers today's demand in fashionable homes, hotels and apartments for integrated design harmony. Specify Price Pfister — the world's largest independent producers of plumbing brass.

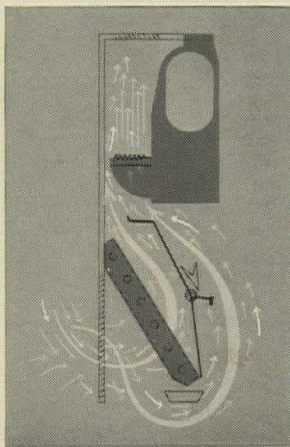
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**Carrier Bypass Weathermaster Units.** Bypass Weathermaster® units automatically maintain room temperature dialed by occupant. Units come complete with control that improves performance, eliminates valve problems, and reduces installation cost.

Bypass damper provides varying coil capacity from zero up to 100 percent. In this cut-away, damper blade is half open. In actual operation, the damper assumes instantly the exact position required to proportion properly the amount of room air permitted to flow over the coil. If no change in capacity is required, the damper is held stationary. Water temperature and flow rate through the coil are constant. This eliminates water valves and throttling noises.



## Attractive to look at! Without an "or equal" —the reason's inside!

The photo shows one of the many architecturally attractive arrangements made possible by these high-velocity induction units.

The diagram shows how these units use the reliable and extremely simple bypass principle to provide automatic response to changes in a room's temperature requirements.

Nobody else has perfected a high-velocity induction unit embodying this principle.

And we say "perfected" with evi-

dence of this Weathermaster unit's performance. Since introduction in 1936, more than 600,000 Carrier terminals have been successfully installed in high-rise buildings from coast to coast.

What advantages have these units? Design flexibility . . . factory-installed and factory-calibrated controls . . . instantaneous response to room temperature change . . . smooth and silent action, no water-throttling noises . . . water-control valves completely eliminated.

Besides being available with the auto-

matic bypass control described here, these units come with a manual bypass or with water modulating capacity control. Models may be furred-in or installed in cabinets. Cabinets and accessory components offered in 7 decorator colors. All models ARI certified.

\* \* \*

For complete information, get in touch with your Carrier representative. Or write us at Syracuse, New York 13201. Represented in Canada by Carrier Air Conditioning (Canada) Ltd.

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More people put their confidence in Carrier air conditioning than in any other make

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# It's time to make allowances (just 30" by 30") for this new American-Standard bidet.



To non-traveled Americans, the bidet is a mysterious something that people use somehow in France and Latin America.

You know, however, what this fine fixture means to all members of the family... washing with warm water and soap plus a spray rinse for complete

personal cleanliness.

Now, many traveled Americans also know the bidet. And they like it. So American-Standard has made it easier to buy.

Our new Madval\* bidet is moderately priced and a style-mate for the famous Cadet\* toilet. You play a key role in the use of bidets. For you must provide for their acceptance by allowing an extra 30" of space (next to the toilet) for the bidet

in the new bathrooms you plan.

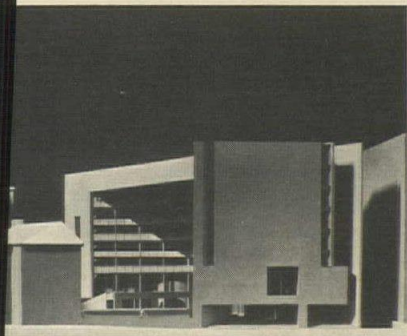
For specifications and installation details, see your American-Standard representative. Or write American-Standard, Plumbing and Heating Division, 40 West 40th Street, New York, N.Y. 10018.

 **AMERICAN  
STANDARD**  
PLUMBING & HEATING DIVISION

\*TRADEMARK AR&SS CORP.

*For more data, circle 28 on inquiry card*

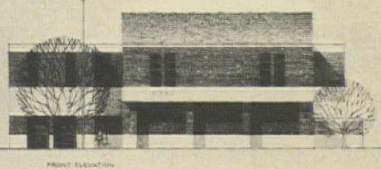




### Fine Arts Commission rejects A.I.A. headquarters design

The Fine Arts Commission in Washington, D.C., has rejected the Mitchell/Giurgola Associates' design for the new headquarters building of the American Institute of Architects (above and June, page 10). A Commission spokesman, reached after its June 21 meeting, said that the commission felt that "the whole concept violated its setting and the historic Octagon building. The new building would have overpowered the Octagon and was not sympathetic to it." The Commission stated that the design was "too highly personal in style and totally out of keeping with the feeling of the Octagon House."

Speaking for A.I.A. President Robert Durham, George E. Kassabaum, first vice president and president-elect, stated: "We regret very much that the Fine Arts Commission has arrived at this disappointing decision. As soon as more information is available from the Commission's report, we will restudy the whole question and determine the Institute's future course of action."



### Municipal competition held to name panel of architects

An unusual architectural competition has been held in San Francisco after the city's fire department came to the Northern

California A.I.A. chapter for advice on selection of architects. What resulted was a competition which selected a panel of winners who could be drawn upon for further projects as they are needed. The jury selected four designs for premiation (with an award of \$2,000 for each) from a field of 130 entries, and then designated the architect of one of the winning designs, Robert Wayne Hawley (front elevation of his submission shown below), for appointment by the city to be the architect for the first of this series of firehouses.

Commenting on this competition for selection of an architect rather than selection of a design, the jury report stated: "Deviation from a premiated design is almost inevitable during development into a working scheme. Consequently, the jury searched for aspects of design and concept that might give some clue to the ability of the author to face up to a situation requiring flexibility of mind together with strength of character, and as well, facility to improvise on a theme without loss of excitement of the original concept."

Commenting on Mr. Hawley's entry, the jury report stated: "The design is carefully studied in terms of proportion, scale and use of materials. The jurors commented that it 'looks like a firehouse.' It does, without any touch of historicism in design. Eminently adaptable to a residential neighborhood, it has dignity, a pleasing variety of surface treatment and fenestration and is not dependent for interest on special or intriguing details." Other premiated entries were by DeBrer, Bell, Heglund & Associates; James M. O'Neal with James C. Burleigh; and Thomas R. Aidala with W. L. Weber.

Serving on the jury were architects Ernest Born, Albert M. Dreyfuss, Charles Griffith, and John Lyon Reid, and William Gilmore, assistant fire chief, City of San Francisco (non-voting). Professional adviser was William B. McCormick.

### Academic appointments

**Dr. William L. C. Wheaton** has been appointed Dean of the College of Environmental Design at the University of Cali-

fornia, Berkeley. He succeeds **Acting Dean John E. Burchard**, who will continue next year in a post-retirement teaching capacity on the architecture faculty.

**Frederick Morris Wells** has been elected chairman of the Department of Architecture at the College of Architecture, Art and Planning at Cornell University. Mr. Wells, who is the Andrew Dickson White Professor of Architecture, will continue to serve as chairman of the College's Department of Design.

**Benjamin Thompson**, professor of architecture and chairman of the Department of Architecture at the Harvard Graduate School of Design, will take a leave of absence for the academic year 1967-68 in order to continue his research on the use of visual media in teaching and to carry out his professional commitments. New chairman of the department is **Jerzy W. Soltan**, the Nelson Robinson, Jr. Professor of Architecture and Urban Design at Harvard.

**James D. Gough Jr.** has been appointed director of the School of Architecture at Montana State University, Bozeman. He has been acting director since August, 1966.

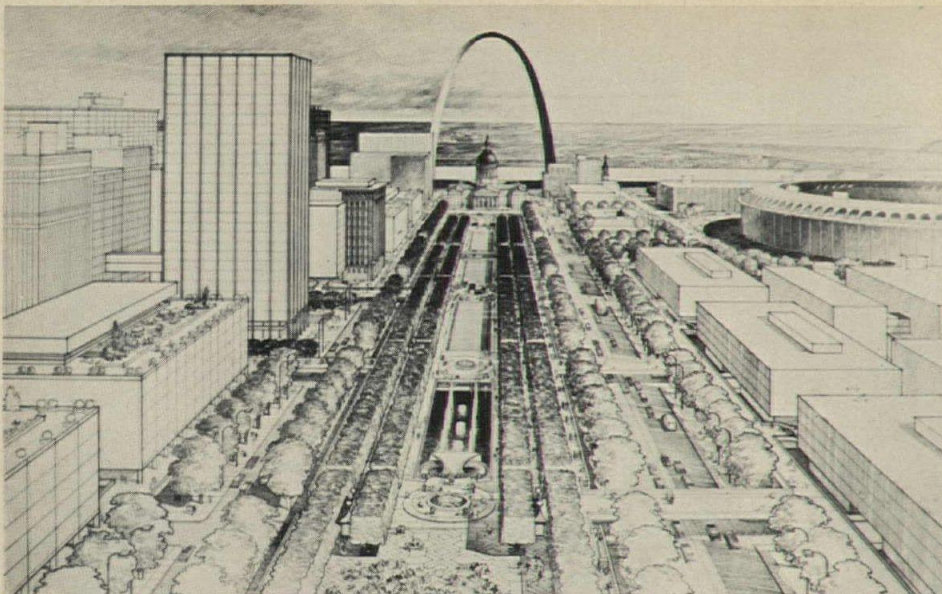
**Alan Y. Taniguchi** has been named director of the University of Texas School of Architecture, in Austin. He succeeds **Philip D. Creer**, who is returning to full-time teaching.

### Sweet's plans Interior Design File

A new product information service, Sweet's Interior Design File, is being planned by Sweet's Construction Catalog Services, a division of the F. W. Dodge Company. The first Interior Design File will be issued late in 1968.

The new file, similar in concept to Sweet's Architectural Catalog File, will consist of a series of bound, indexed volumes of manufacturers' product descriptions and specifications. The new file will be distributed annually to approximately 6,000 interior design firms, architectural firms with interior design staffs, and the design departments of major companies, institutions and government agencies.





## Winner announced in St. Louis Gateway Mall competition

The firm of Sasaki, Dawson, DeMay Associates, Inc., architects, landscape architects and planners of Waterbury, Massachusetts, has won the \$15,000 first prize in a national competition for design of the St. Louis Gateway Mall.

The jury commented that the winning design "achieves a powerful unity by the simplest of means. The careful sculptural treatment of the land gives a great calmness to the inner mall space and preserves the vista of the Old Courthouse and the Arch without the expense and complexity of grade separation. It offers a bold cohesive entity with great clarity of form; it shows masterly attention to the sightlines and to the visual separation of the longitudinal traffic streams. It unites the various urban elements, making the best use of existing structures and views."

Members of the winning design

team included Richard H. Rogers, associate in charge, Hideo Sasaki, Mark Battaglia, Tom Johnson, Vincent Nauseda, Charles Smith and Charles Turofsky.

Second prize of \$4,000 was awarded to the St. Louis firm of Murphy and Mackey Architects, Inc.; third prize of \$3,000 to Robert Frank LaRocca, landscape architect, with Willie Lang and Joseph Yee, landscape designers, of San Francisco; and fourth prize of \$2,000 to Paul C. K. Lu, architect and landscape architect, and William Page, architect, of Cambridge, Massachusetts.

Serving on the jury, which selected the winners from among 57 entries, were architects Lawrence B. Anderson, Harris Armstrong, and Charles W. Moore, and landscape architects Thomas D. Church and John Simonds. The competition was sponsored by Downtown St. Louis, Inc. and the City of St. Louis.

## Six trustees named for P.C. Educational Foundation

Six trustees have been named for the Producers' Council Educational Foundation, which was established in 1966 to provide educational courses, programs and seminars on a broad range of building industry subjects. One of the Foundation's projects, Management Advancement Programs for Building Product Executives, will be held this fall in cooperation with the College of Commerce and Administration at Ohio State University.

The new trustees are: James M. Ashley, vice president, public relations, Libbey-Owens-Ford Glass Company, Toledo; architect Robert F. Hastings, president, Smith, Hinchman & Grylls

Associates, Detroit; David S. Miller, senior vice president, The E. F. Hauserman Company, Cleveland; Elliott C. Spratt, consultant, Hillyard Chemical Company, St. Joseph, Missouri; Charles S. Stock, vice president, American Air Filter Company, Inc., Louisville, Kentucky; and Walter F. Wagner Jr., executive editor, ARCHITECTURAL RECORD.

## Largest student convention meets in New York

For the seventh consecutive year the Association of Student Chapters of The American Institute of Architects held their convention concomitantly and in conjunction with the A.I.A. The student convention opened on Sunday, May 14,

with registration at the New York City Convention Center. By the end of the week the total number of registrants reached 675, the highest number ever.

The national officers of the A.I.A. who presided over the social and business sessions were Morten O. Johnson, president; Romeo C. Garcia, vice president, and Brent Porter, secretary-treasurer.

Highlights of the first business session on Tuesday included the presentation of the Reynolds Student Prize of \$5,000 to Kent C. Underwood of Columbus, Ohio, and a presentation by Benjamin Thompson of Harvard University entitled "Comments on a Bright Future." At the second business session on Thursday, the new \$5,200 Urban Design Fellowship open to senior students of architecture for graduate study was announced by Leo J. Pantas of Eaton and Towne. Following this, Arthur Clarke, noted scientist and science fiction writer, presented a review of the "World of 2001" in collaboration with Professor Patrick Horsburgh of the University of Texas and the University of Notre Dame.



On Monday evening the first of three seminars programmed expressly for students was held. The National Institute for Architectural Education sponsored a lecture at which time a study of "The Student and His Future Development" was delivered by Roger Katan. Bethlehem Steel Corporation presented Dr. Lev Zelin on Tuesday evening with "Views and Predictions on the Structures of the Third Millennium," asking the question: "How will the buildings of tomorrow look and how will people live?" The Egg and Dart Club sponsored a design concepts seminar on Wednesday morning with O'Neil Ford and Samuel Zisman presenting their solution to the problem of developing a new campus for Skidmore College of Saratoga Springs, New York.

The social climax of the convention week was the Beaux Arts Ball on Friday night held at the Ukrainian National Home in the Bowery, featuring dancing to the beat of the South Hampton Marching, Racing and Clam Bake Society Dixieland Jass Band from Greenwich Village.



... and the first tenant hasn't even moved in.

Modern design, engineering and construction—with outdated communications planning—add up to obsolescence. Chances are your tenants will need

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\*Service mark of the Bell System

alterations and unsightly wiring later.

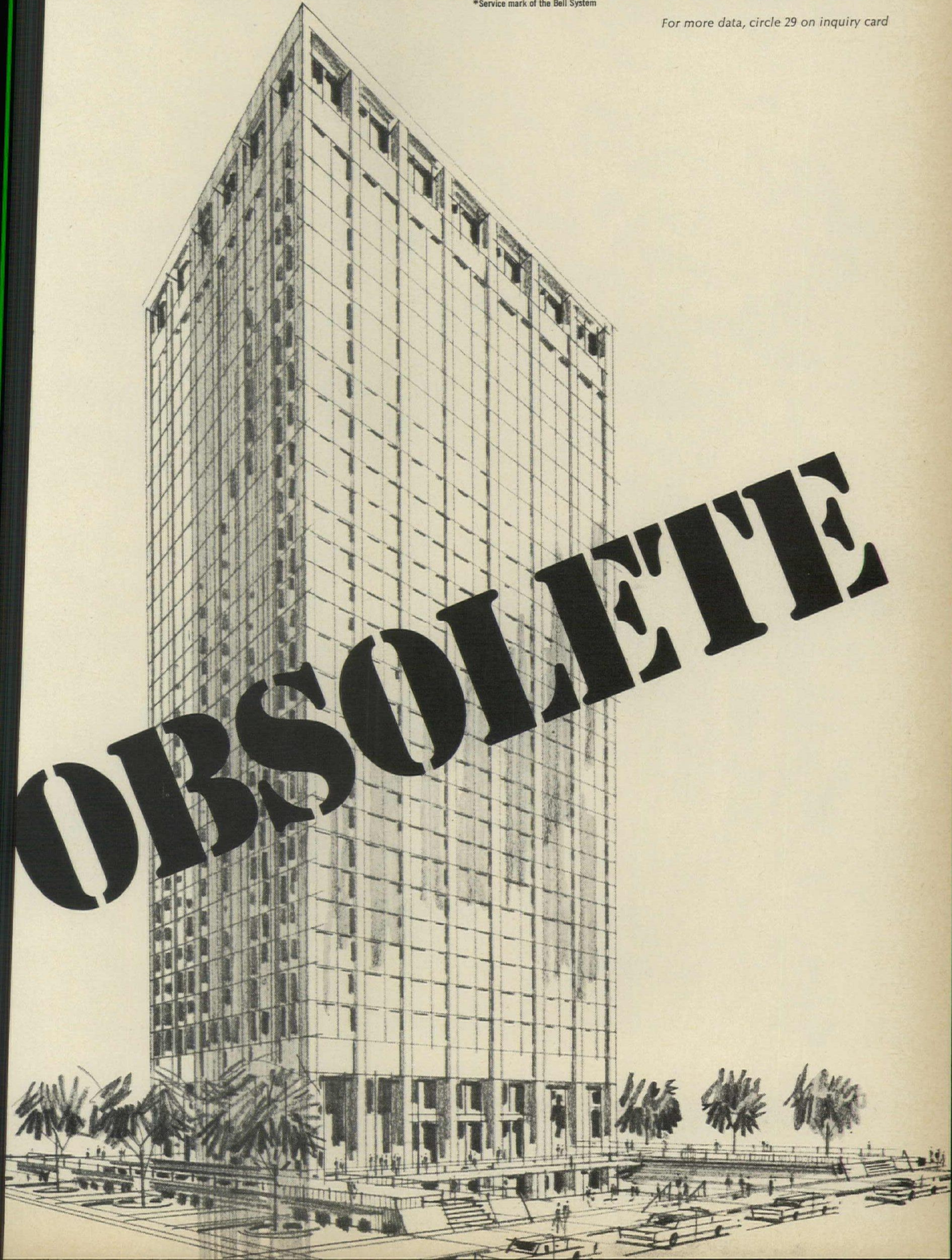
Just call 212-393-4537, collect, and we'll send you a complete list of our Architect and Builder Service representatives.



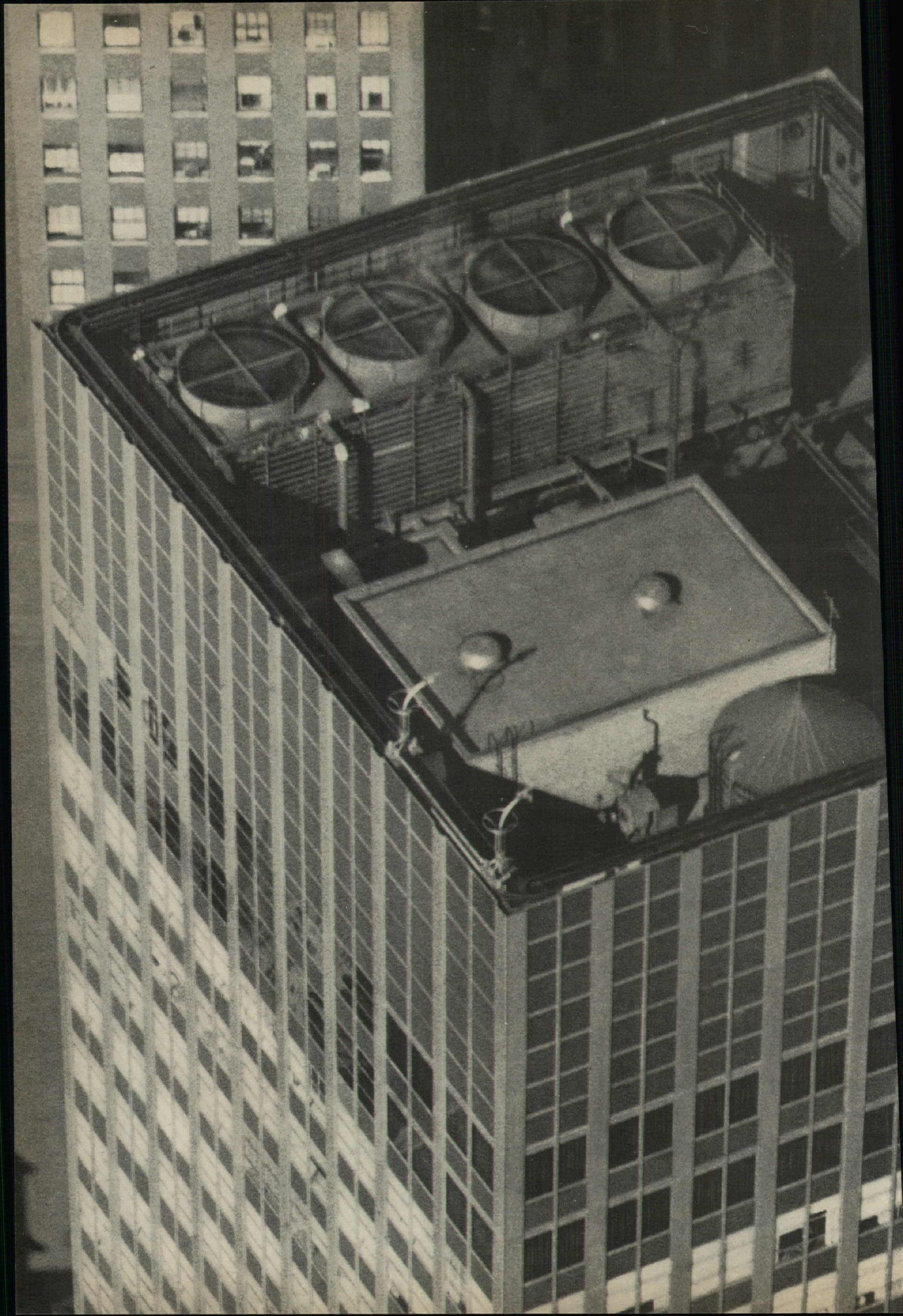
**AT&T**  
and Associated Companies

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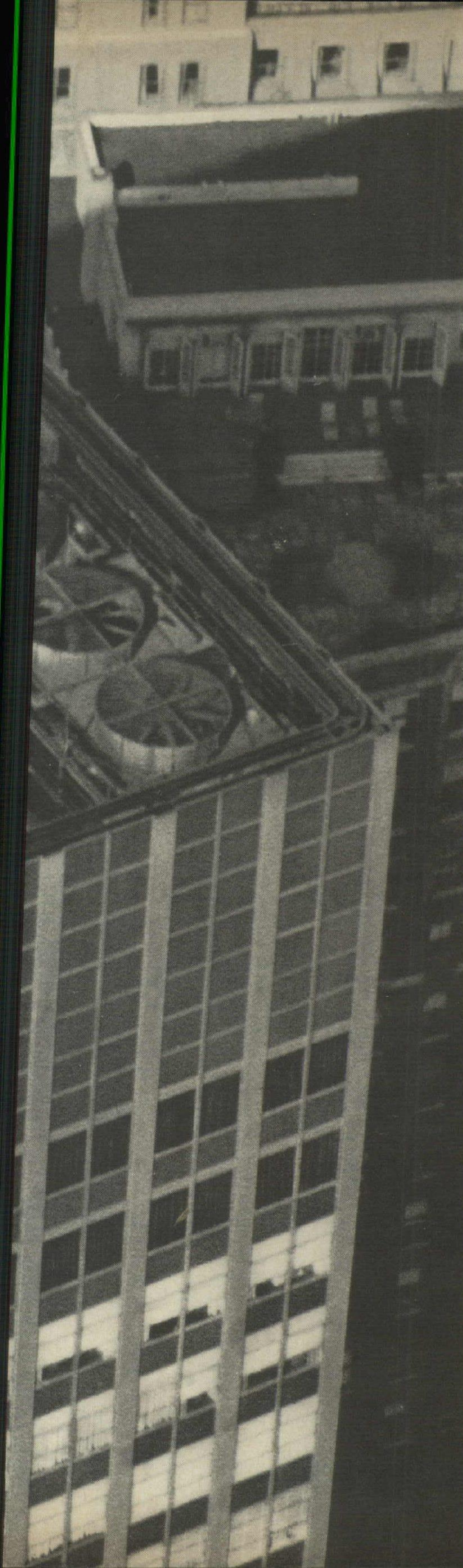
**OBsolete**











A four-pipe system  
isn't always the answer.

## There could have been a profitable pool or penthouse on this roof.

And a garage instead of a boiler in the basement.

If only someone had specified a General Electric Zonal System.

GE Zoneline units could heat and cool the outside rooms.

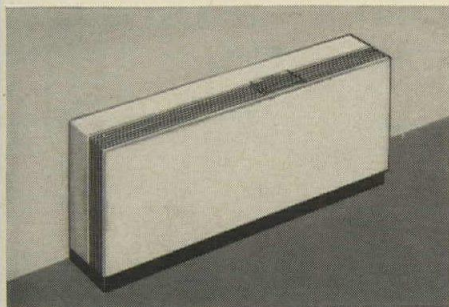
GE unitary units could heat and cool the inside, public rooms.

No rooftop cooling towers. No basement boilers. A significant increase in usable, rentable space.

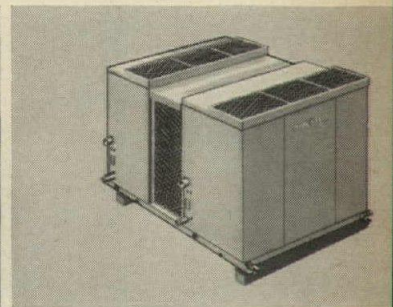
Other advantages over four-pipe systems:

- Big first-cost savings.
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From motels to high-rise construction, a General Electric Zonal System can save you space and money. For full specs, call your General Electric representative. Or write AP6-208, General Electric Company, Louisville, Kentucky 40225.



**GE Zoneline heating/cooling unit.** Room-by-room control. Choice of grilles. Fits over doors or under window seats. Through-the-wall or floor-mounted consoles.



**GE Unitary systems**—A full line from 2-20 tons, split, self-contained, with various heating means including GE famous Hi-Reliability Weathertron® heat pumps.

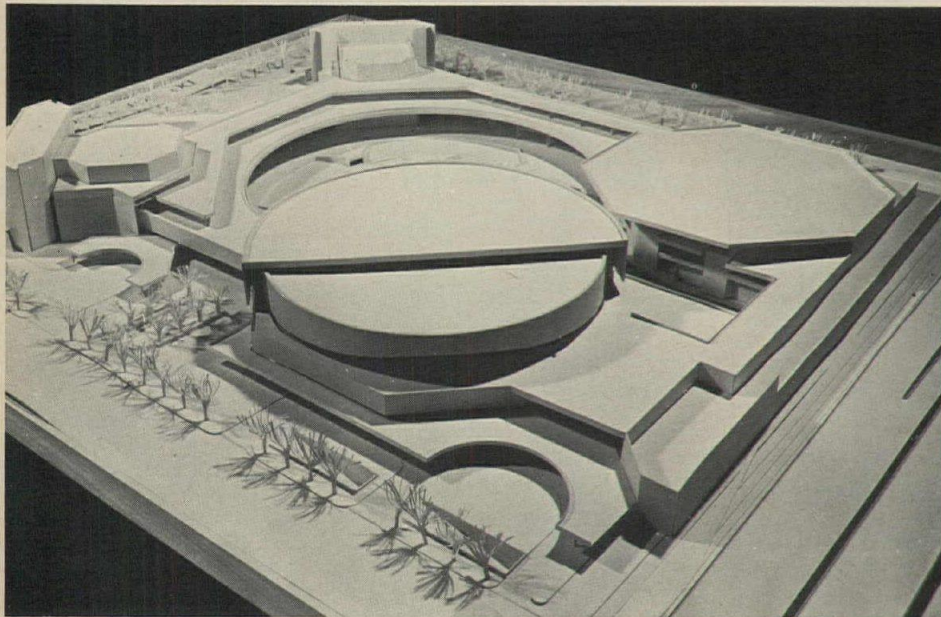
Air Conditioning Department, Appliance Park, Louisville, Kentucky

**GENERAL  ELECTRIC**

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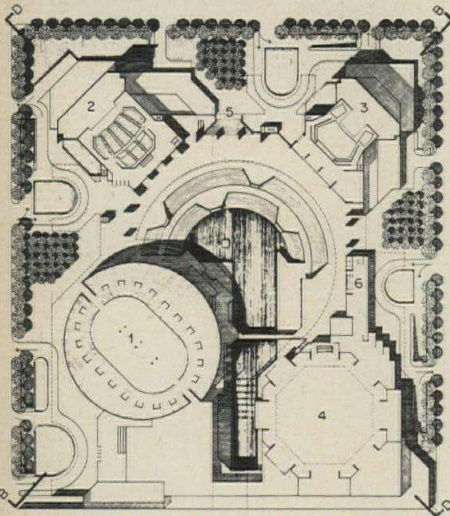
Philadelphia firm wins competition for Birmingham-Jefferson Civic Center



A design by George W. Qualls of Philadelphia firm of Geddes Bre Qualls Cunningham has won the stage national competition and architectural contract for the \$25-million Birmingham-Jefferson Civic Center in Alabama. The civic center will cover a four-block area in the northern section of Birmingham. The program called for a complex of buildings including a 13,000-seat sports coliseum, a 100,000-square-foot exhibition hall, a 3,000-seat concert hall, a 1,300-seat theater and restaurant, administration and parking facilities. The center is being funded through a special county-wide tax, and land acquisition is about to begin. Completion of the complex is scheduled for the spring of 1970, Birmingham's centennial year.

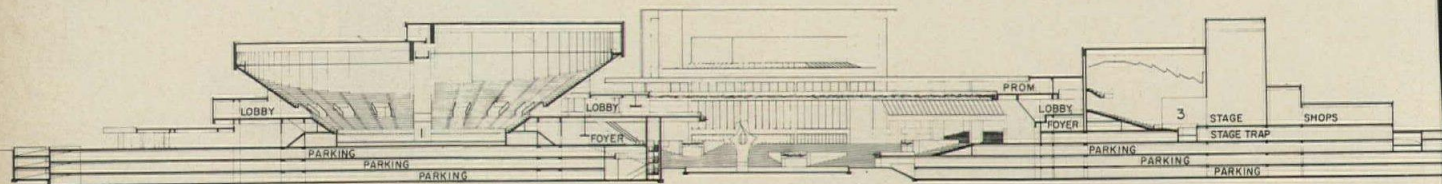
Also awarded was a second prize of \$15,000 to Ralph Rapson of Rapson Architects, Inc. of Minneapolis, and a third prize of \$5,000 to Fridstein & Fitch of Chicago, as well as five honorable mentions. All of the premiated designs are shown on these pages.

Serving on the jury, which narrowed the field of 276 entries to eight semifinalists last November and which selected the winners in May, were architect Max Abramovitz, Gyo Obata and John Carl Warnecke, and Harold Burris-Meyer, director of the University Theater, Florida Atlantic University, and John Fernald, Principal of the Royal Academy of Dramatic Art, London. Professional advise was architect William A. Briggs of Richmond, Virginia.

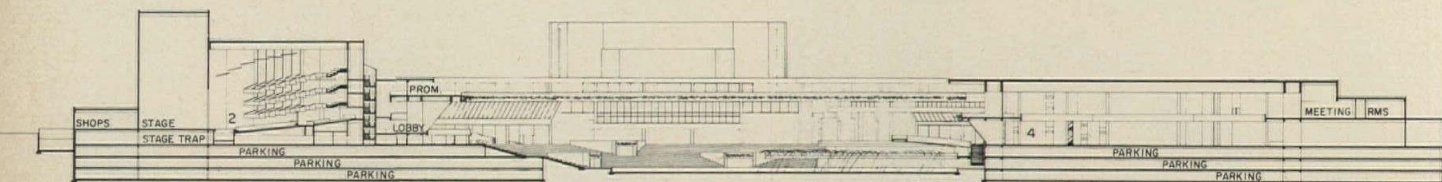


Winning design by George Qualls groups the four buildings around a large outdoor pool ringed with terraces and an amphitheater. In speaking of his design, Mr. Qualls noted that it creates "an inviting but sequestered part of the city to which anyone might come at any time. At times, when none of the functions are in session—for example, a Sunday afternoon—the general public would have access to the elevated terraces for a promenade. If necessary, the higher terrace system could be designed for the control of audiences attending functions in the four major buildings." The theater is designed to convert from a proscenium arrangement to a thrust stage.

(1) sports coliseum (2) concert hall (3) theater (4) exhibit hall (5) restaurant (6) offices and library

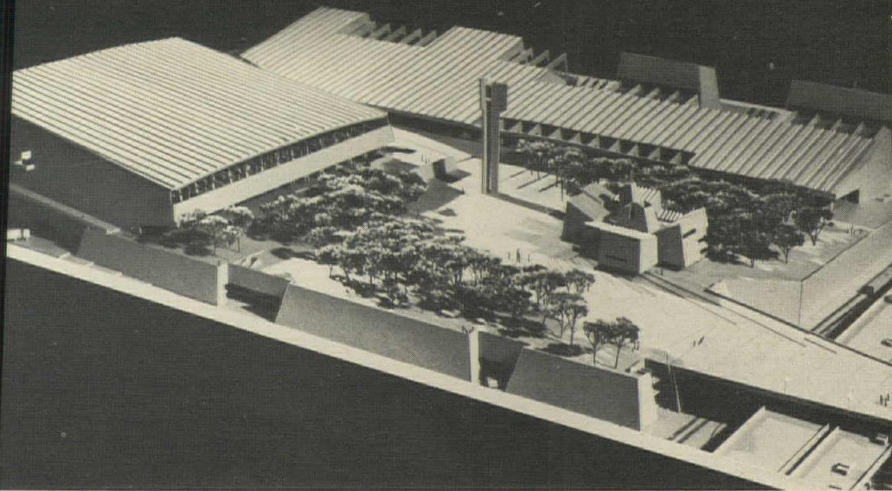


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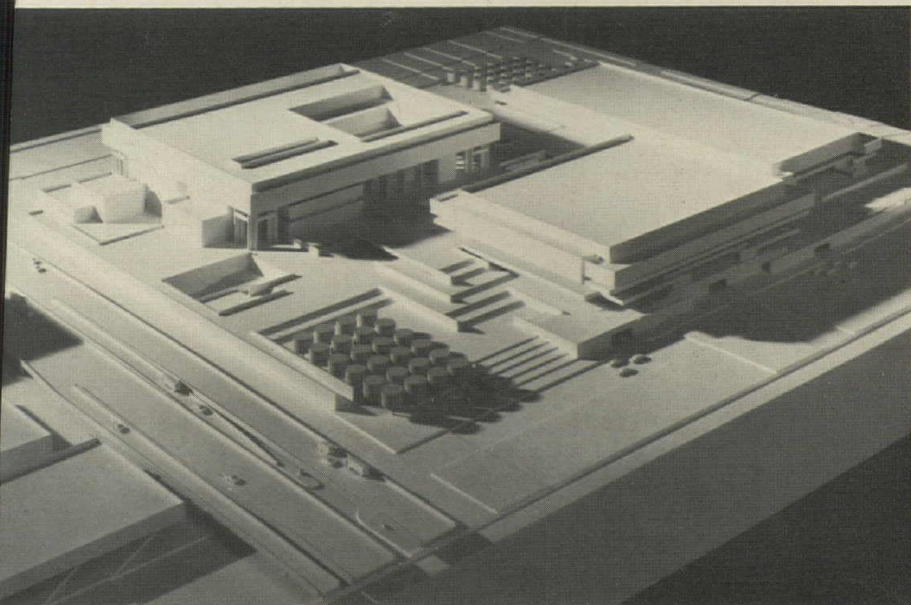


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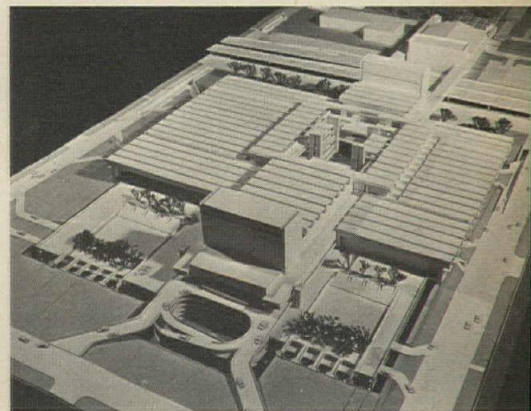




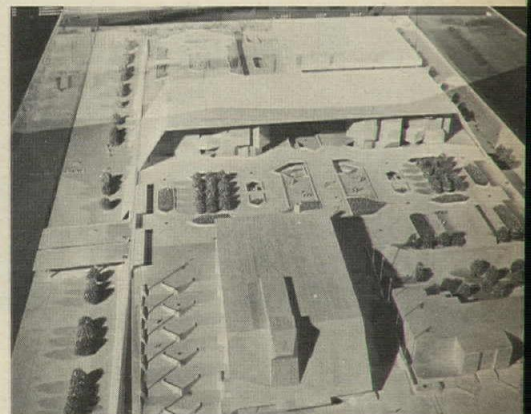
nd prize of \$15,000 was awarded to Ralph Rapson, who organized his complex around a central restaurant group in a large outdoor plaza. The sports coliseum is housed in a separate rectangular building while the long rectangular structure houses the exhibit hall, concert and theater. Mr. Rapson says of his design: "All the buildings face the plaza, with the exhibit hall, theater and exhibition facilities organized adjacent to each other, creating a continuity of lobbies, services and ancillary facilities."



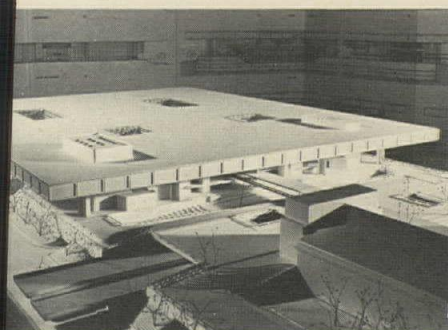
Third prize of \$5,000 went to Fridstein & Fitch for the design of a complex with three major structures: a coliseum, an exhibit hall and a composite facility. According to the architects, "the three major elements are arranged around a great central plaza and are interconnected by a series of tiered platforms. The three main platforms are linked at the center of the complex. The terrace which defines the surface of the central plaza is the primary exit level for all the tiered functions of the buildings."



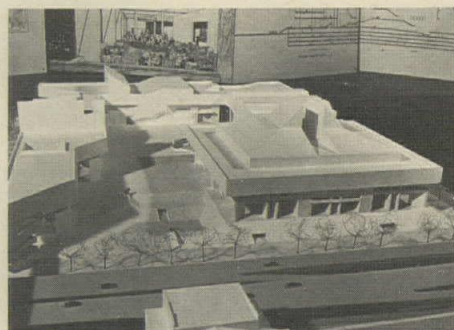
Honorable mention went to Barry Elbasani, Donn Logan and Barakonski-Riley Associates for a design where the buildings were conceived as "simple structural containers" to allow freedom and flexibility of activities.



Honorable mention went to E. N. Turano and Associates for a design where "music hall and theater reach out across the space to each other" and the roof of the exhibit hall is part of the plaza for outdoor exhibits.



Honorable mention went to John Stuart Mill of Beckhart & Mill for a design which "is premised on using a single cover over the entire center, unifying all diverse functions and providing further interior elevated space."

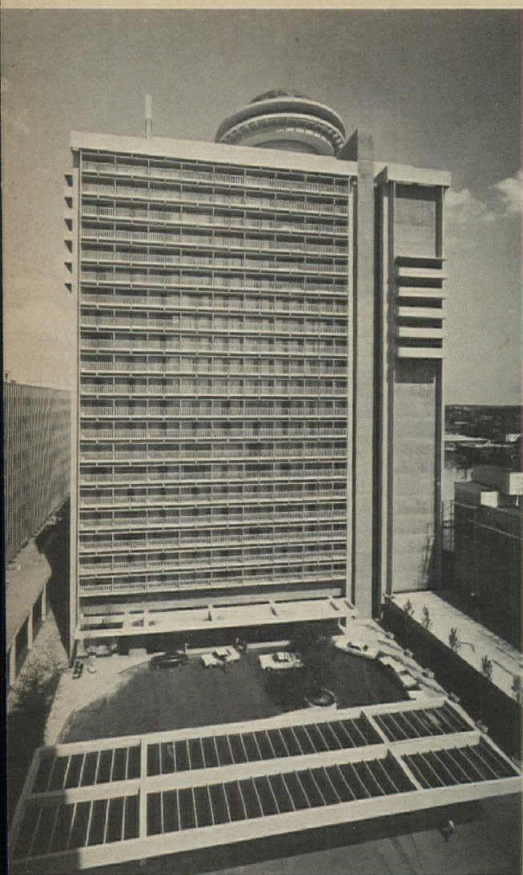


Honorable mention went to B. J. Hoffman and Hanford Yang Associates for a design which combines the buildings into one giant sculptural form with major elements articulated by pedestrian entrances to the central court.

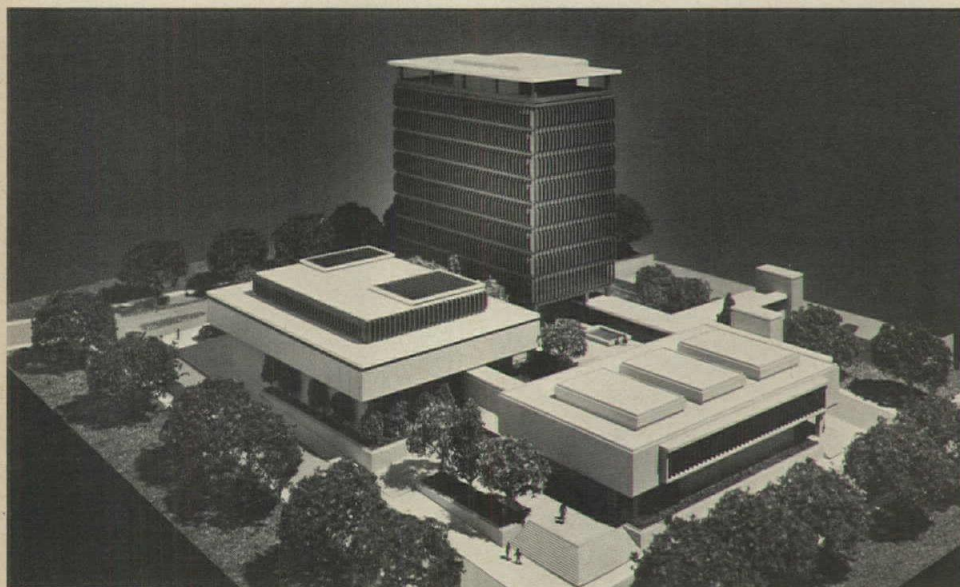
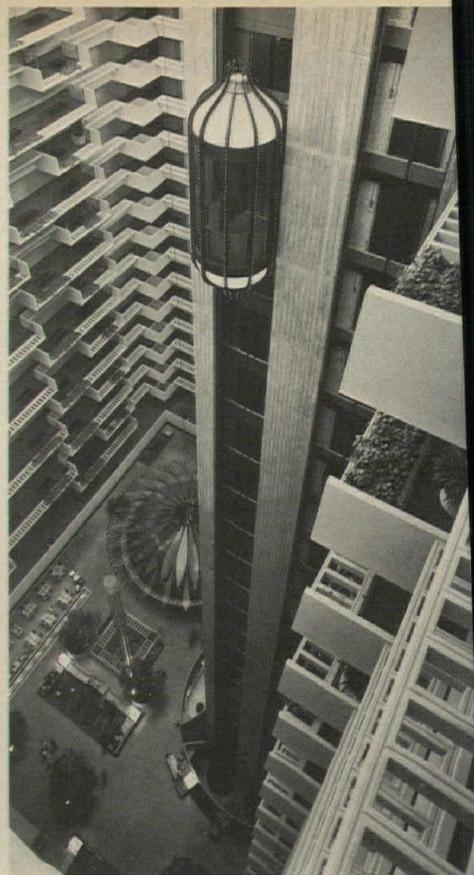


Honorable mention went to James Martin Harris of Harris & Reed for design of a complex as "an integrated unit" with access to all functions from street level as well as through the central vertical circulation core.

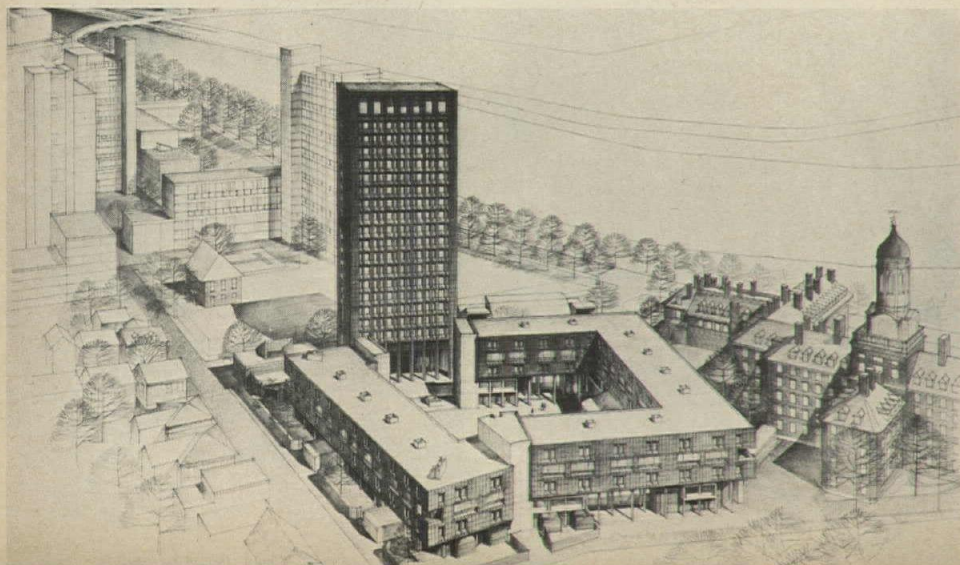




**The Regency Hyatt House** in Atlanta, designed by Edwards and Portman, is an 800-room, 21-story hotel with the rooms arranged around a landscaped, skylighted and air-conditioned enclosed atrium which rises the full height of the building. Access to the guest-rooms, as well as to a superstructure 40 feet above roof level which houses a revolving restaurant, is by five glass capsule elevators suspended from a giant column at one side of the lobby. Each guest room has an exterior balcony. There are five floors below lobby level which house dining areas, convention hall for 1,700, meeting rooms accommodating 2,500, exhibition area and parking for more than 500 cars. Contractor for the \$18-million building was the J. A. Jones Construction Company.



**The Contra Costa County Hall of Justice** in Martinez, California, designed by Frederick R. Confer & Associates, is a three-building complex consisting of a jail (at left in model), a 10-story administration building, and a courts building. The administration building will house administrative facilities for all divisions of the County Sheriff's Department within one building. The jail building, which has a maximum cell occupancy of 16 inmates, will contain complete facilities for processing and holding male and female adults and juveniles. The courts building will house two Superior Courts and one Municipal Court. A circulation bridge will permit secure transfer of prisoners between the jail building and court facilities.

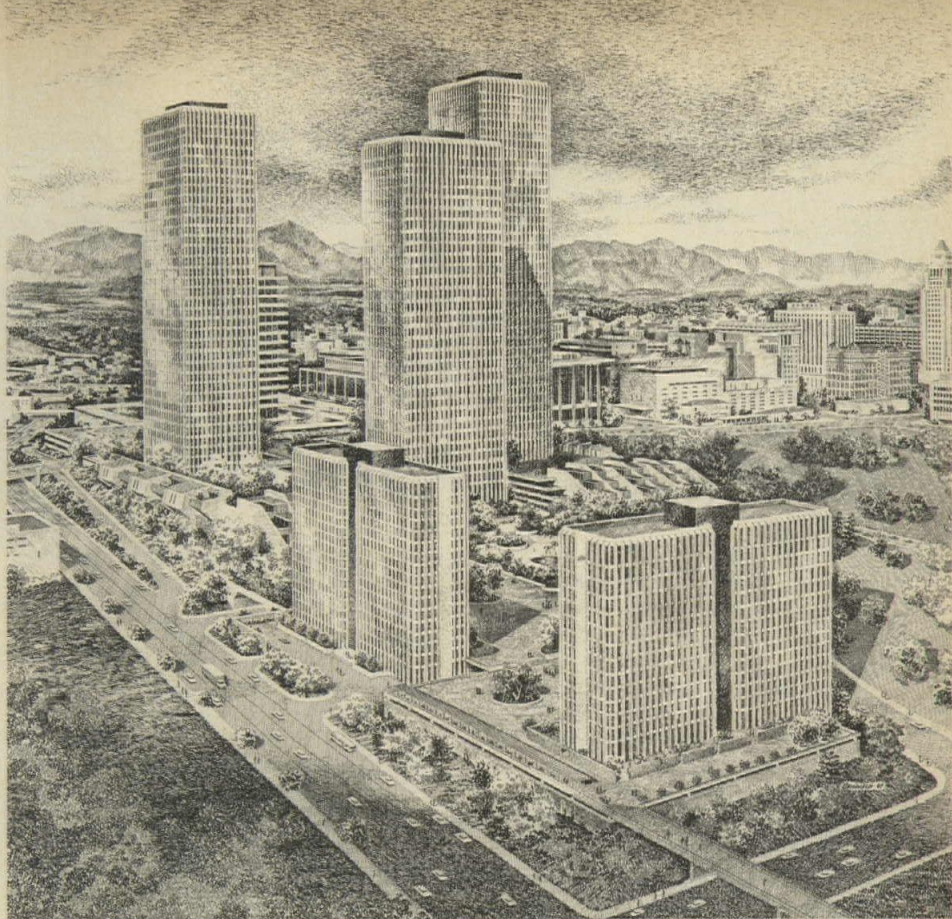


**Mather House** at Harvard University, Cambridge, Massachusetts, designed by Shepley Bulfinch, Richardson, and Abbott, will serve as a residence for 400 students. The \$8-million complex will consist of a 21-story tower and a series of connected structures grouped around a central courtyard. The tower will contain both single rooms and two-man suites while the low-rise section will have suites for four men and for six men, each suite having a living room and alcove for refrigerator and hot plate. Another section of the low-rise structure will house a library and offices for tutors. Facilities provided in a separate two-story building will include a dining room, a grill and meeting rooms.



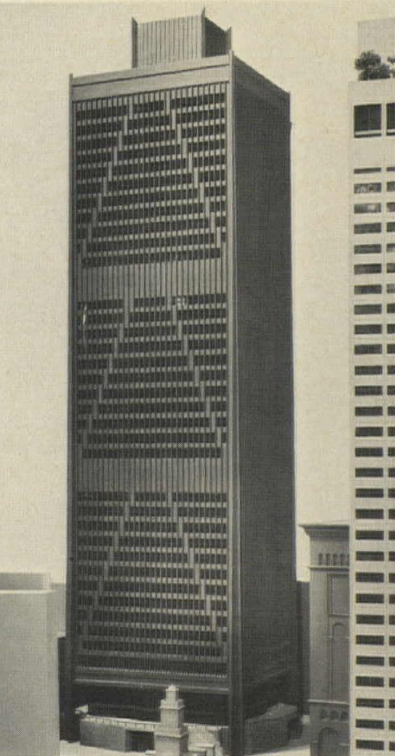


**Interchange Tower** in the Los Angeles Center area, designed by Richard L. Man & Associates, is a 38-story multi-use building. It will provide office space to complement an adjacent medical complex and municipal offices with courtrooms on lower levels, as well as commercial and restaurant facilities for the area which will include the Bunker Hill apartment development (see rendering at right). The \$160-million building will include underground parking and will contain 870,200 square feet.



**The Bunker Hill Towers** apartment development in Los Angeles, designed by Robert E. Alexander, F.A.I.A., and Associates, will ultimately consist of 40-story, 35-story, 30-story and two 17-story buildings as well as a series of two- and three-story structures. The \$55-million project will provide 1,750 apartments and underground parking for 2,400 cars below landscaped plazas. The first increment of construction, on which ground will be broken shortly, will include the 30-story and the two 17-story towers, and will cost \$22.5 million. Apartment sizes will vary from one-room studios to four-bedroom penthouses. General contractor for the first phase of construction is the Simpson Construction Company.

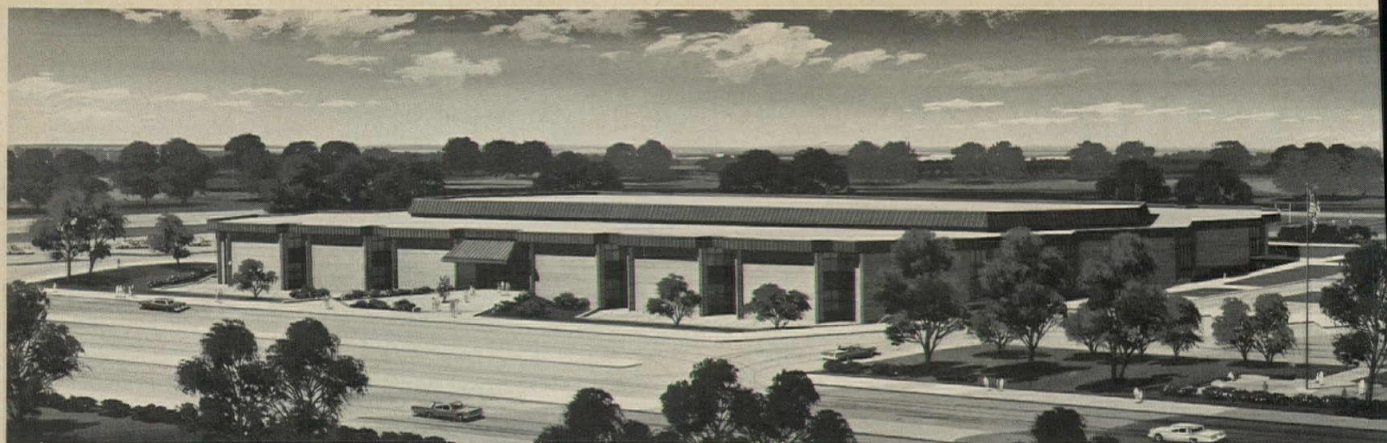
**The Westchester County Courthouse** in White Plains, New York, designed by Welton Becket and Associates, is a \$28.3-million complex which will include a 20-story courthouse building and a 1,000-car, four-level parking structure linked by a three-story building which serves as a pedestrian bridge. The top 12 floors of the tower will contain two-story-high courtrooms, with a typical floor containing a large facility seating 144 and three smaller ones each seating 28. Complete separation of the general public and judges and jury traffic is achieved on all floors by a series of exterior cores. The lower floors contain related facilities such as the sheriff's department, offices, family courts and surrogate courts.



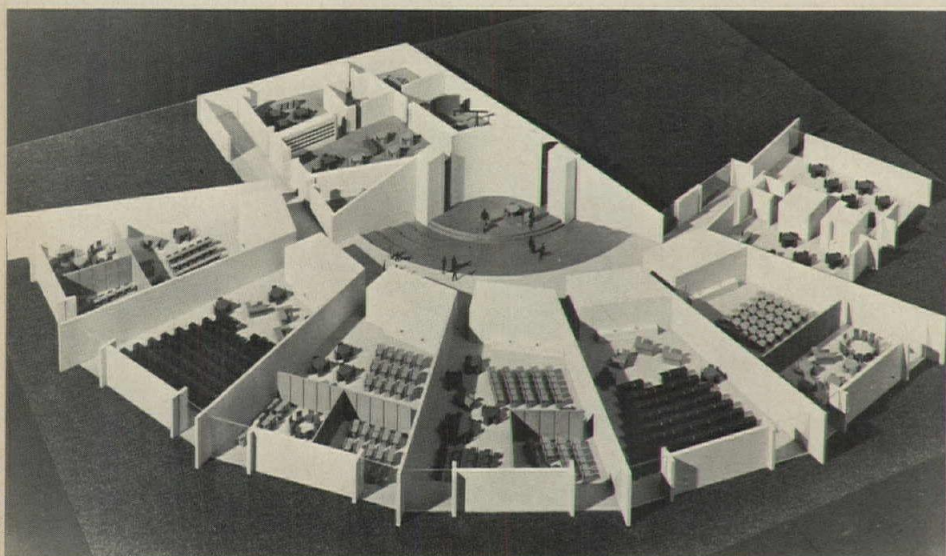
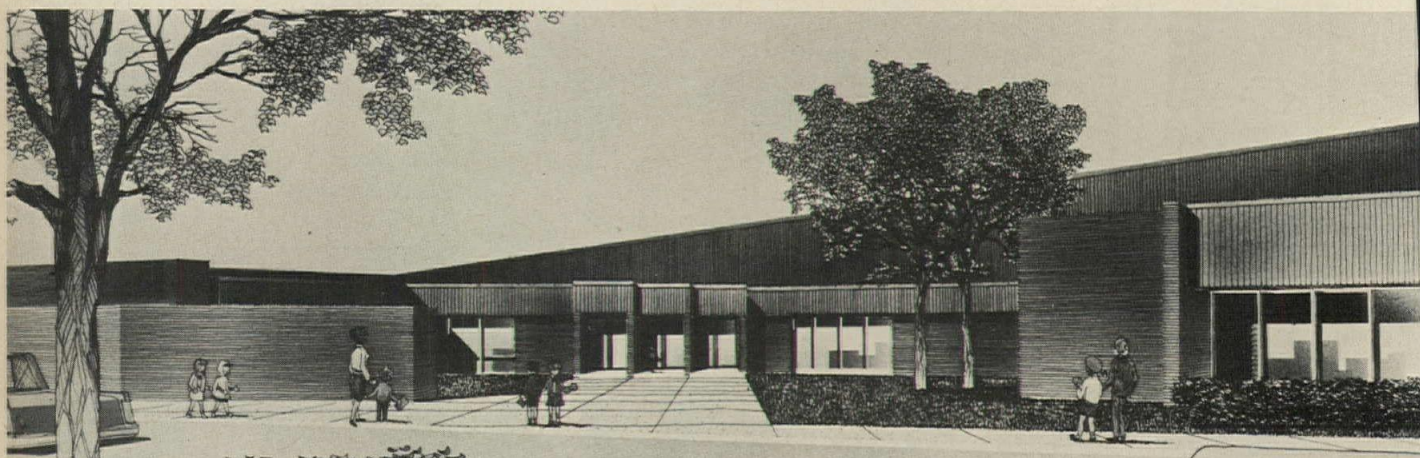
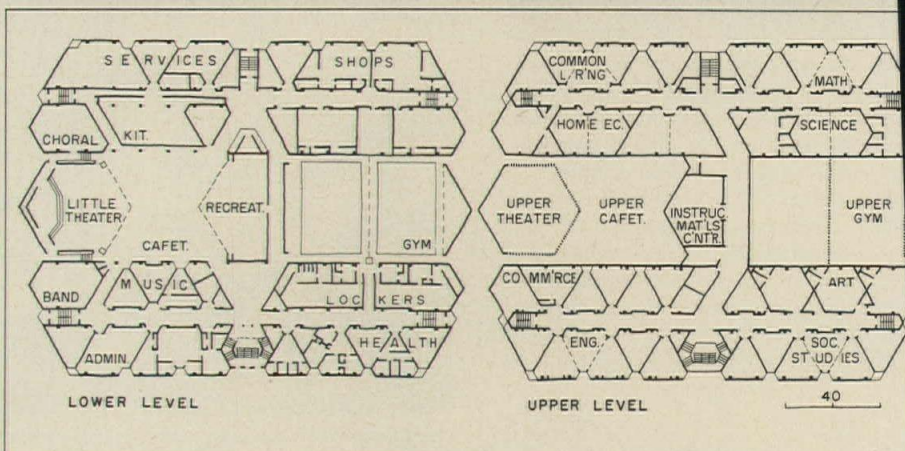
**A 40-story office building** in Boston, which will probably be called The Boston Company Building, designed by Pietro Belluschi, with working drawings being prepared by Emery Roth & Sons, will have four external corner columns and the building's core providing total structural support for the office tower which rests on an octagonal, two-story base. The tower will be deep bronze in color while the plaza level will be sheathed with granite. The building, which is being developed by Cabot, Cabot & Forbes, will contain 685,000 square feet. An adjacent multi-level parking garage will be accessible from within the new building.







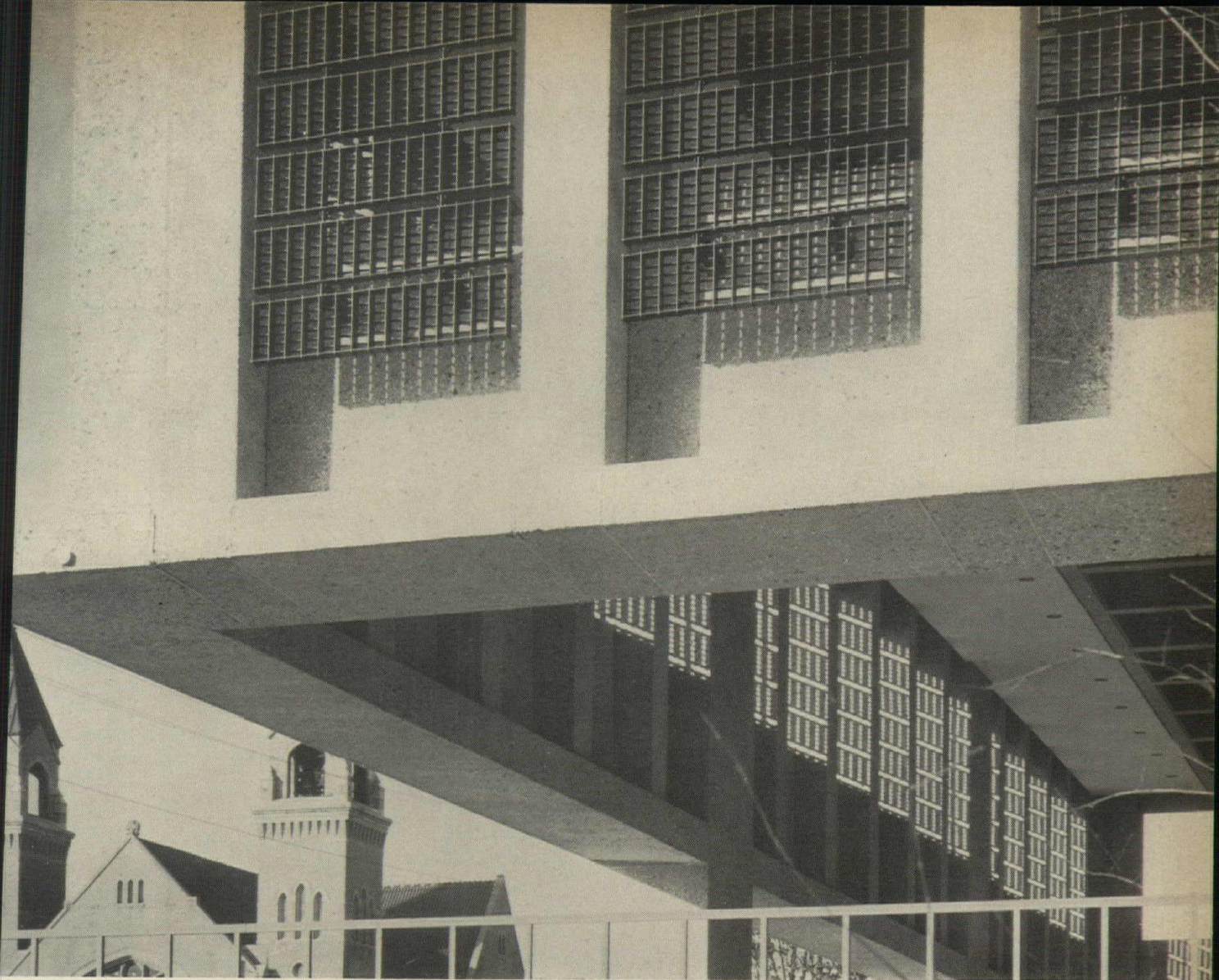
**The Benjamin Rush Junior High School** in Philadelphia, designed by Thalheimer + Weitz, received variances from the city's building code to accomplish two purposes—minimum window areas and completely interior classrooms. The use of triangular classrooms on the perimeters of the buildings permits one window to serve three rooms, and, by removing folding partitions, these spaces form a triple-sized area. The two-story, \$4,344,000 building contains approximately 180,000 square feet and will accommodate 1,250 students. The building will be of steel frame construction with brick exterior and aluminum windows and panels above glass area. Also provided is on-site parking for 150 cars and 21 buses.



**The Jack Downing School**, a facility for 65 students from kindergarten through eight grade levels, in Riverview, Michigan, designed by Eberle M. Smith Associates, has six large flexible class spaces for non-graded classes and team teaching techniques. Each of these classrooms will have a three-man teaching team, located centrally, for 90 students. Each of the spaces has flexibility in the use of areas and mobility of furniture so that students can be divided into groups of various sizes. The six class spaces are arranged around a multi-instructional center consisting of a theater, material center for audio and visual aids, and a television control center. The isolated kindergartens (located at the right in the model) have access to the theater. On the other side are special education and vocational areas. The \$1,425,000 school is set for completion in January 1968.

Copy Craft, Inc.





## **BORDEN DECOR PANEL: Custom Design Screening**

The North Carolina Mutual Life Insurance Co. building in Durham, North Carolina, is shown here. Designed by Welton Becket, F.A.I.A., Architect, of New York City, this multi-story structure utilizes custom designed screening of Borden Decor Panel in rich Kalcolor Bronze finish.

Created to complement and enhance the character of the building, the Decor Panel screens were custom designed and specified, individually fabricated, and tailored for special erection methods—all within a fixed budget. The savings effected by Borden's fabrication

and erection techniques made it possible for the architect to use the handsome bronze finish as well—still within the initial budget.

Sturdy, lightweight aluminum Borden Decor Panel, in both custom and standard designs, is a versatile architectural medium, widely used for facades, screening, sunshades, dividers, partitions, grilles, etc. It is particularly valuable for refacing of existing buildings. For more detailed information on custom and standard Borden Decor Panel:

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## Record Houses '67

Congratulations on another superb issue of *Record Houses*. It is by far, to me anyway, the best issue yet and I am very proud indeed to be included. The drawings and floor plans done by your staff are truly elegant and work admirably with the photos. It really is so spiffy that my eyes missed the part on page 85 that speaks of the living room opening out onto the swimming pool. This is a very minor oversight anyway.

Hugh Newell Jacobson  
Washington, D.C.

I thought this year's *Record Houses* was the best one yet. It has a terrific over-all dignity and attractiveness.

Ulrich Franzen  
Ulrich Franzen & Associates  
New York, New York

My comment after seeing the *Record Houses* of 1967: What a complete bore. You know, there are architects other than those who are members of the "School of Copyists."

Norman H. Grider  
Prolsdorfer & Smith  
Mobile, Alabama

A double congratulations: (1) on your receipt of the Jessie H. Neal Award for having the best single issue in 1966 in your circulation category and (2) on the presentation of another superb issue of *Record Houses*.

Earl R. Flansburgh  
Earl R. Flansburgh & Associates  
Cambridge, Massachusetts

I was very pleased with the extensive coverage in the newspapers about ARCHITECTURAL RECORD's house awards for 1967. I am very honored to have been included in your selection of these award winners.

Delnoe Whitney Goubert  
New York, New York

## Bird sanctuary or egg farm?

I rarely write to editors of magazines, but I am prompted to do so by the article on page 151 of the May issue with respect to the library of the Institute for Advanced Study here at Princeton designed by Harrison and Abramovitz.

As a resident of Princeton and a close neighbor of the Institute, I think

there is no question that this is indeed a handsome structure, and those of us who live near the Institute for Advanced Study and enjoy the privilege of walking on the grounds and through the bird sanctuary, which adjoins the library, clearly enjoy this splendid building.

My semi-negative vote, however, refers to the fact that libraries in general, and that of the Institute in particular, are used almost as much at night as they are in the daytime. It is at night that the neighbors and the surrounding community for miles around receive their greatest shock. On page 153, you report the roof structure in great detail. Specifically, you state, "... the curved soffit and haunch of a typical beam picks up the daylight from the north-facing panels and reflects it downward—or at night, serves equally well to distribute illumination from the concealed fluorescent tubes." It is at night that the sky over the library is lit up like the opening of a supermarket. Unquestionably, the design of the roof was a *tour de force*. It was a fantastic construction problem as well. I witnessed the construction of this building almost on a daily basis and, believe me, the forms necessary for the construction of the concrete roof were massive indeed and resembled the ribs-and-keel bracing of an 18th-century windjammer.

As I have indicated above, the irony of the situation is that the Institute has provided for the residents of the community one of the most desirable natural wooded sections and bird sanctuaries in this region. I am afraid, however, that the birds within half a mile of the library have had no more rest in the evenings than the chickens in the massive egg farms in New Jersey which are kept awake at night by artificial light so that they will produce more eggs. I raised this question with an academic friend who is an ecologist with a particular interest in bird life, and he agreed that the conditions were most unfortunate.

It seems to me that an architect has a responsibility for the environment in which he places his building as well as the beauty and function of that building. Even as a source of north light, referred to in your article, the point is debatable in this latitude. The number of days when

the absence of cloud cover makes and particularly reflected light, effective for sustained reading is a small percentage of the total. Thus, artificial light the daytime is, more often than necessary. At night, however, and at night, the glare in the sky is unbelievable. When there is a bit of an overcast, that is a sight to behold, which can be clearly seen from U.S. 1 about a mile away. I don't know if either of the Messrs. Harrison or Abramovitz lives in the country, but I would wager they would be incensed if their night view were obscured by the garish light of a shopping center on opening night, no less.

Ricardo A. Mestre  
Princeton, New Jersey

## Architectural photography

The May issue of RECORD came today with congratulations on the beautiful color of your cover and to Morley Baer for doing the first class photography job he usually does. This is absolutely the clearest and best tone reproduction I've seen on a cover in a long while.

George Zimberg  
Architectural Photographers  
Cambridge, Massachusetts

## Kind words department

Let me take this opportunity to say how much I have enjoyed reading your fine magazine. You are doing a good job of providing the architects with an excellent publication.

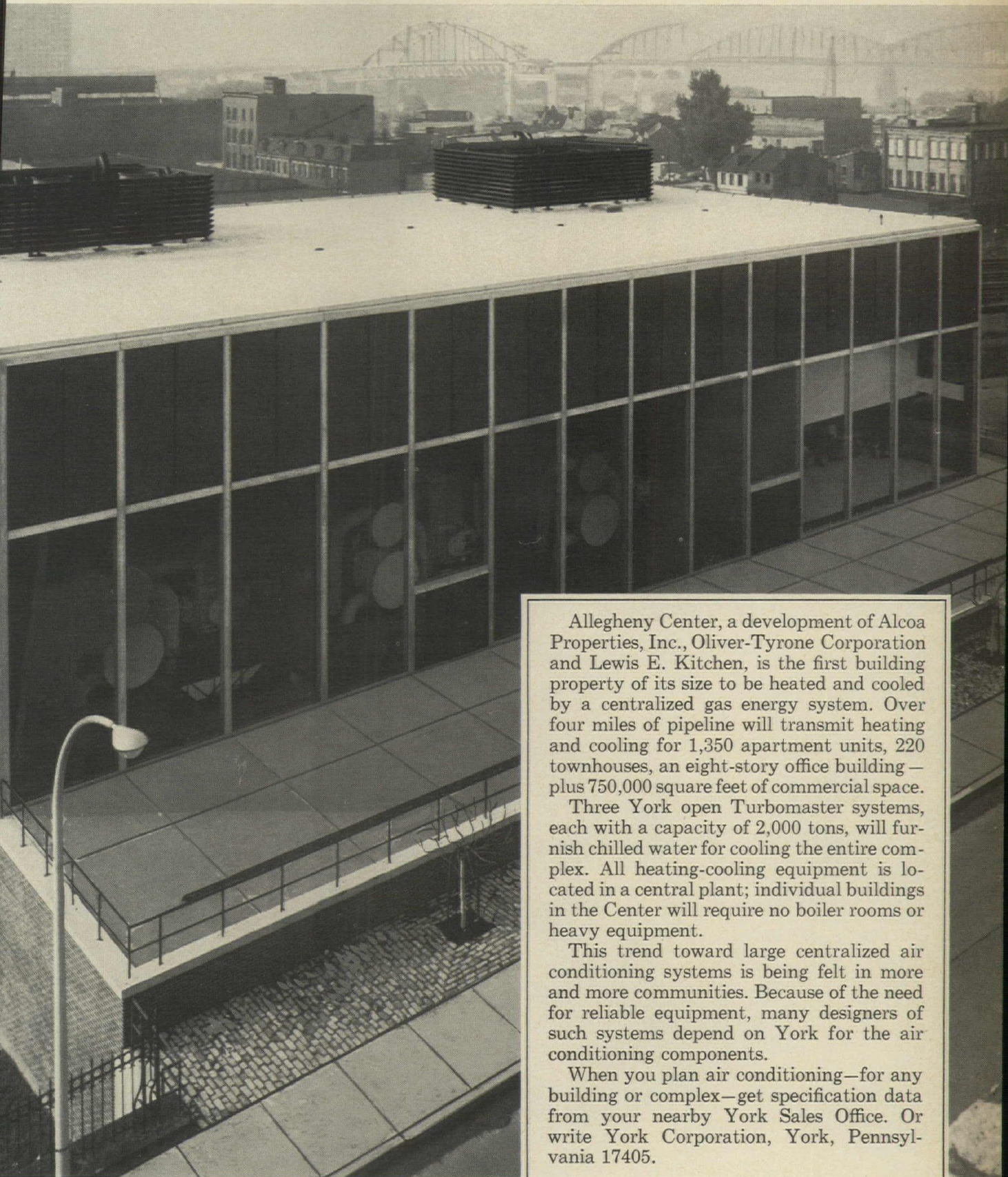
Herbert L. Smith, III, A.I.A.  
Norfolk, Virginia

I would like to take this opportunity to congratulate RECORD on its excellent format. In our office, after reading the magazine, we use it as a tearsheet and file as per the A.I.A. periodical files. It gives us a great opportunity to keep the information to a minimum in bulk and to be able to, later, recall a maximum of information from the articles. This is the only professional magazine I know that does as good a job in allowing us to make this use of the material. The article and the photography, the short article on specs, mechanical, book reviews, are all of the highest quality.

B. Milton Cuppy, Jr.  
Cuppy Flagg Meek, Inc.  
Indianapolis, Indiana



# York Turbomaster systems chill water for 1.5-acre Allegheny Center building complex.



Allegheny Center, a development of Alcoa Properties, Inc., Oliver-Tyrone Corporation and Lewis E. Kitchen, is the first building property of its size to be heated and cooled by a centralized gas energy system. Over four miles of pipeline will transmit heating and cooling for 1,350 apartment units, 220 townhouses, an eight-story office building — plus 750,000 square feet of commercial space.

Three York open Turbomaster systems, each with a capacity of 2,000 tons, will furnish chilled water for cooling the entire complex. All heating-cooling equipment is located in a central plant; individual buildings in the Center will require no boiler rooms or heavy equipment.

This trend toward large centralized air conditioning systems is being felt in more and more communities. Because of the need for reliable equipment, many designers of such systems depend on York for the air conditioning components.

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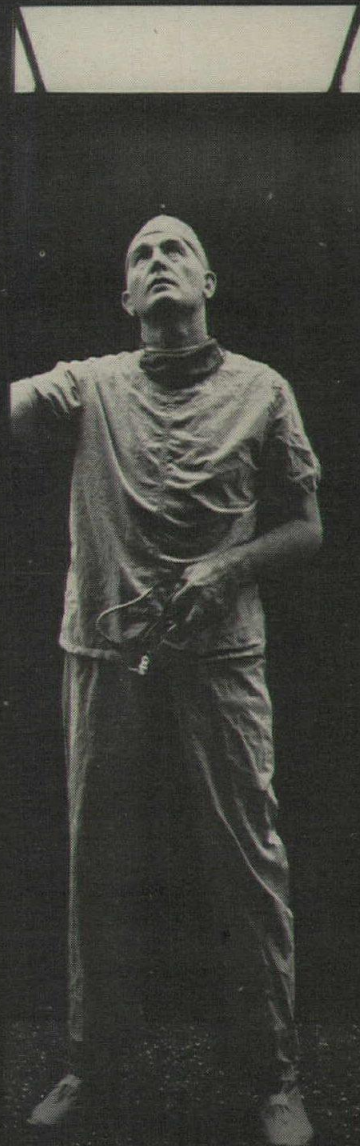


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There's a super-dense surface pile of 100% continuous filament nylon with a circular cross-section. (219,000 tufts per sq. yd. Almost 3 times as dense as normal commercial carpet.)

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Another thing. The vinyl backing allows Powerbond to be cemented to any type of floor. Permanently cemented. Not even moisture can affect it.

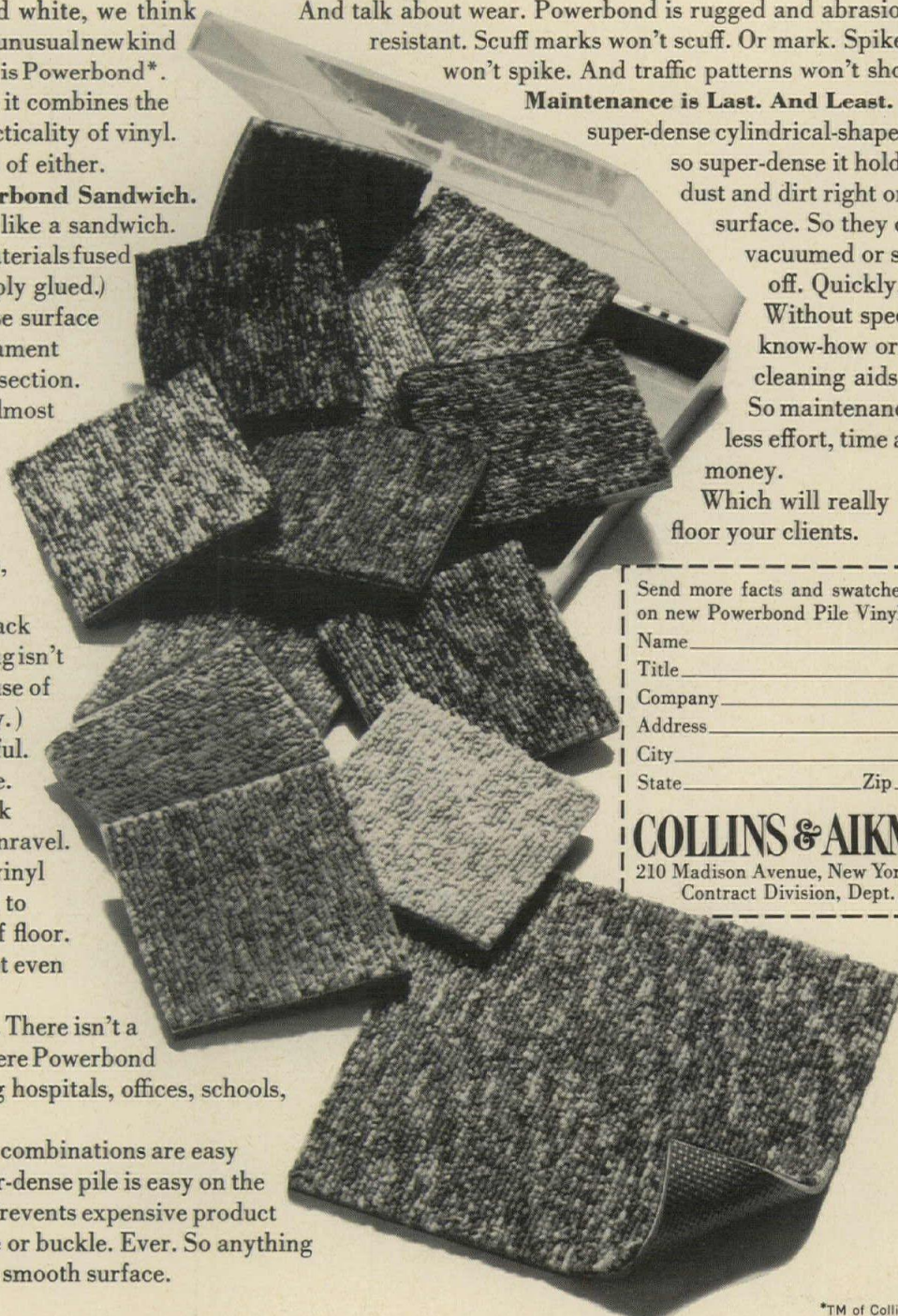
**The Beautiful Wear Plan.** There isn't a commercial application where Powerbond couldn't be used. Including hospitals, offices, schools, supermarkets, etc.

Its 12 colorful tweed combinations are easy on the eyes. While the super-dense pile is easy on the feet. It also muffles noise. Prevents expensive product breakage. And won't ripple or buckle. Ever. So anything on wheels rolls easily on its smooth surface. But people won't slip.

And talk about wear. Powerbond is rugged and abrasion-resistant. Scuff marks won't scuff. Or mark. Spiked heels won't spike. And traffic patterns won't show.

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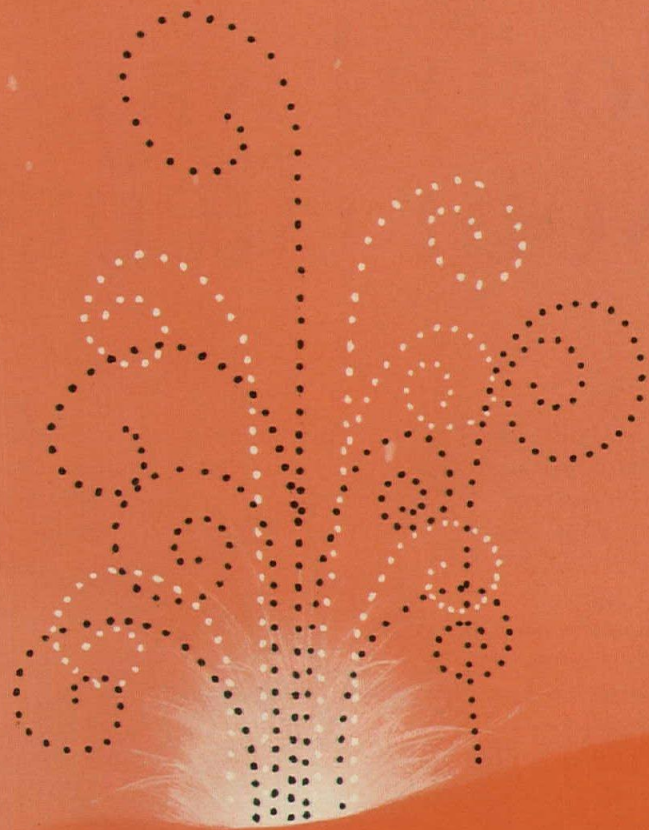
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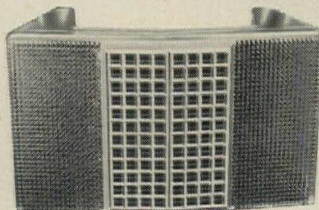
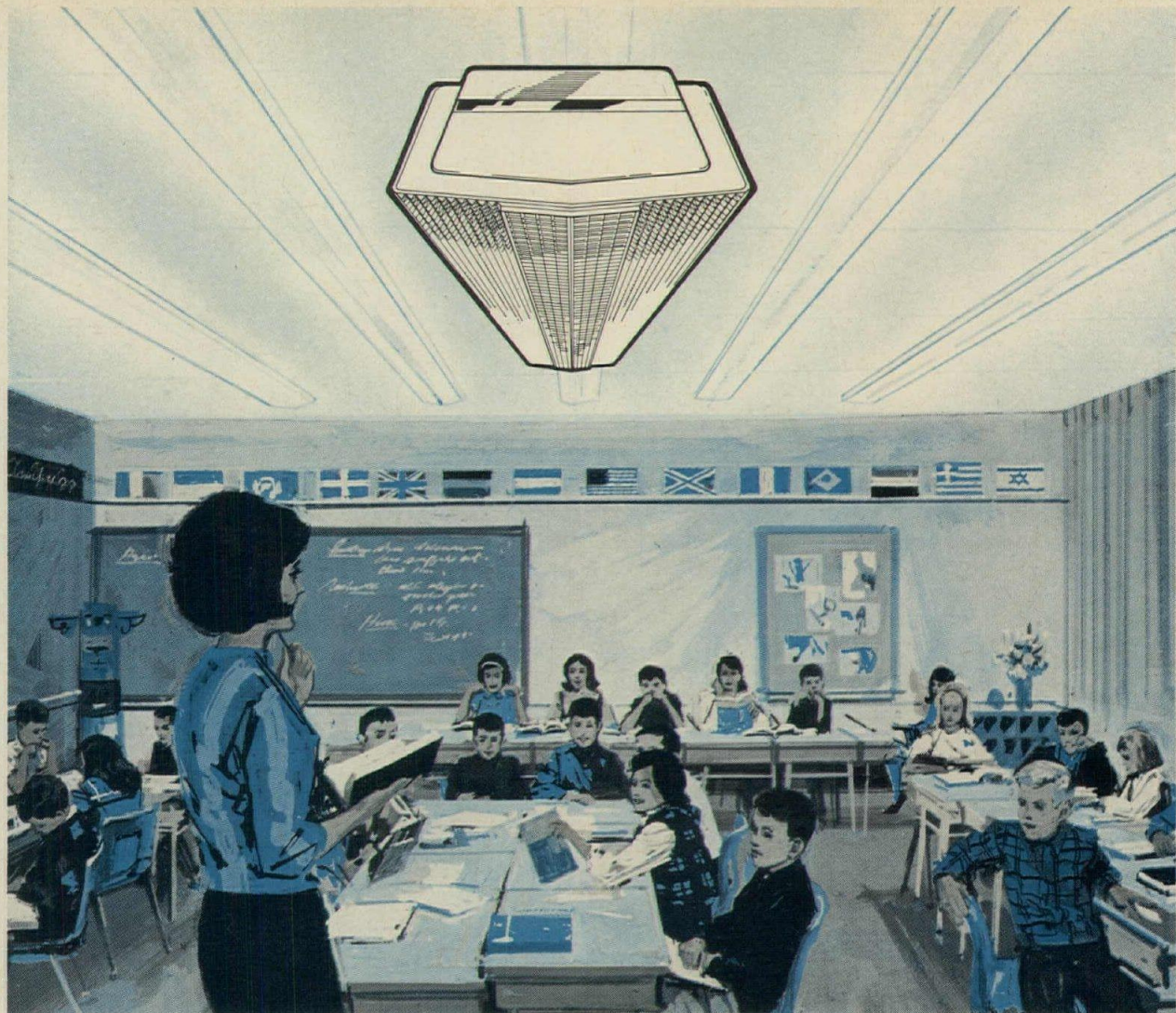
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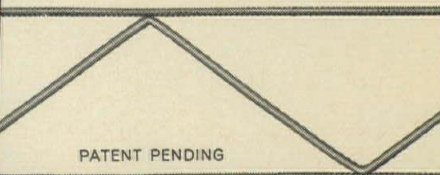


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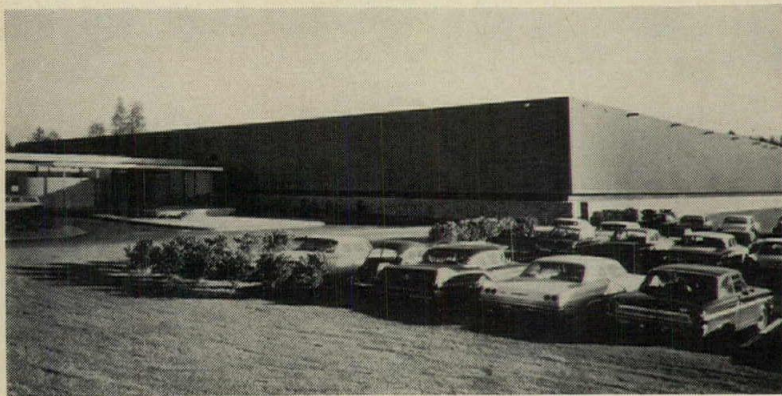
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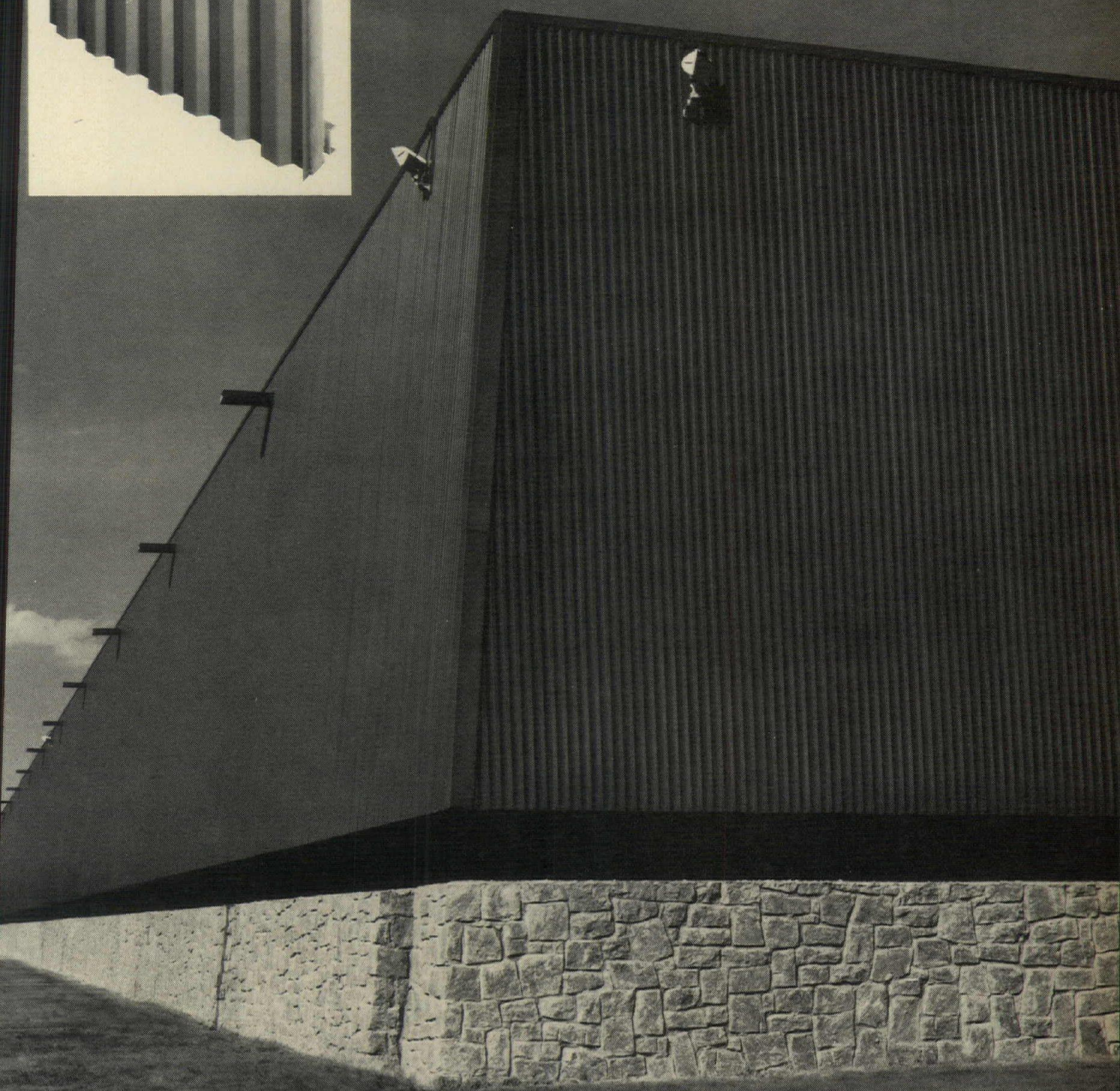
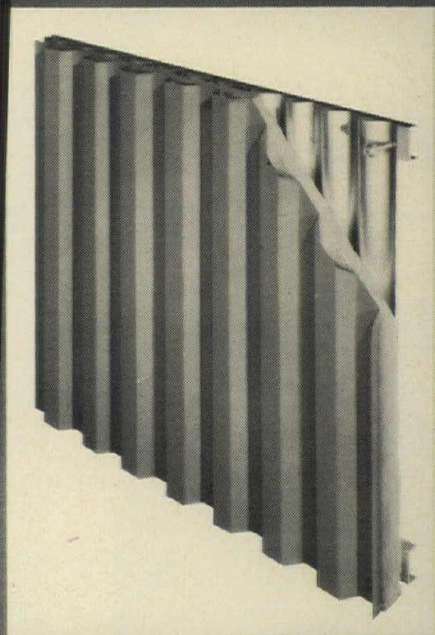
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**B. H. Backlund & Associates, Inc.**, of 4924 Poppleton Ave., Omaha, announce that **Ralph H. Taylor, A.I.A.** has joined their firm as vice president for architecture.

**The Ballinger Company**, architects and engineers in Philadelphia, have appointed **Lauri J. Kurki, A.I.A.** and **Robert E. Wetmore, P.E.** partners and **Carl C. Colket** has been made a senior associate.

**Francis Bartlett, A.I.A.** has formed a partnership with **Gaylord H. Forbes** to be **Bartlett & Forbes Architects** at 226 Walnut Blvd., Rochester, Mich.

**Leon Brand, A.I.A.** and **S. Hart Moore, A.I.A.** have formed the architectural firm of **Brand & Moore** with temporary offices at 660 Bergen Ave., New York City.

**Vinton P. Frost** has been appointed director of client relations for **Burke, Kober, Nicolais & Achuleta**, a Los Angeles-San Francisco based architectural and engineering firm.

**E. W. Carroll, F.A.I.A.** and **Louis Daeuble, A.I.A.** announce that **George C. DuSang, Jr., A.I.A.** and **N. Patrick Rand, NSPE** have been made partners of **Carroll, Daeuble, DuSang and Rand, Architects and Engineers** located at 2501 N. Mesa Ave., Suite 303, El Paso, Texas.

**William J. Conklin** and **James S. Rossant** announce the departure of **Julian H. Whittlesey** from the firm of **Whittlesey, Conklin & Rossant**. The practice continues under the name **Conklin & Rossant** at 31 Union Square, New York City.

**Samuel B. Nelson** will become a vice president of **Daniel, Mann, Johnson & Mendenhall**, a planning, engineering and architectural firm located at 3325 Wilshire Blvd., Los Angeles.

**Rodney S. Davis, A.I.A.**, former partner, **Fisher & Davis**, announces the formation of **Rodney S. Davis Associates** for the practice of architecture at Suite 827 Ideal Cement Bldg., 821-17th St., Denver.

The architectural firm of **Kelly & Gruzen**, New York and Newark, announces the admission of six new partners and the change of its name to **Gruzen & Partners, Architecture-Planning-Engineering**. The new partners are **Rolland D. Thompson**, **Richard P. Rosenthal** and **Peter Samton**, who have been associates in the firm of **Kelly & Gruzen**, and **Norval C. White**, **Julian H. Whittlesey** and **William D. Smith**, all formerly partners in their own firms.

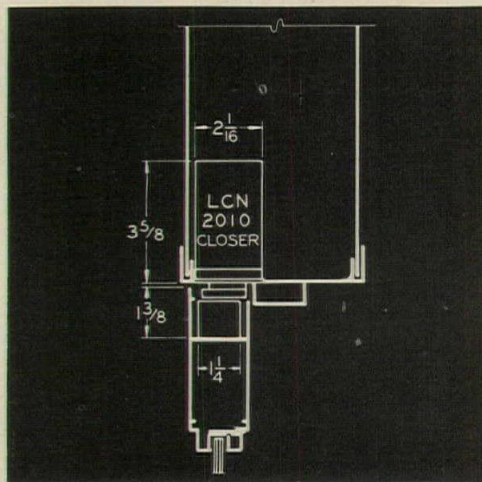
**Norbert W. Weinberg** has been appointed Director of Design of **Koebig & Koebig, Inc.** an engineering, architecture and planning firm in Los Angeles, Calif.

*continued on page 69*

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Detail at head for LCN overhead concealed closer installation shown in photograph

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PHOTO: Troy Municipal Building, Troy, Michigan;  
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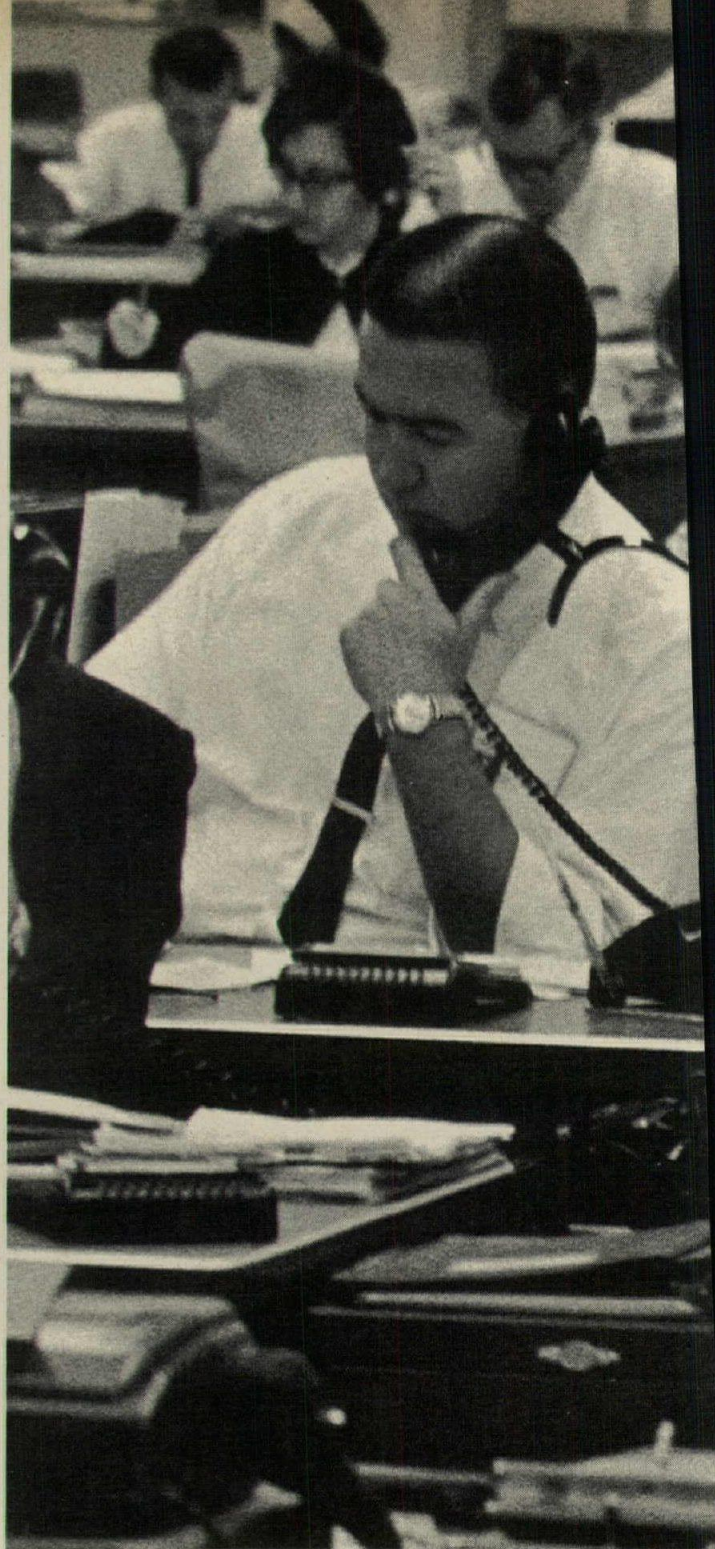
ROY MUNICIPAL BUILDING







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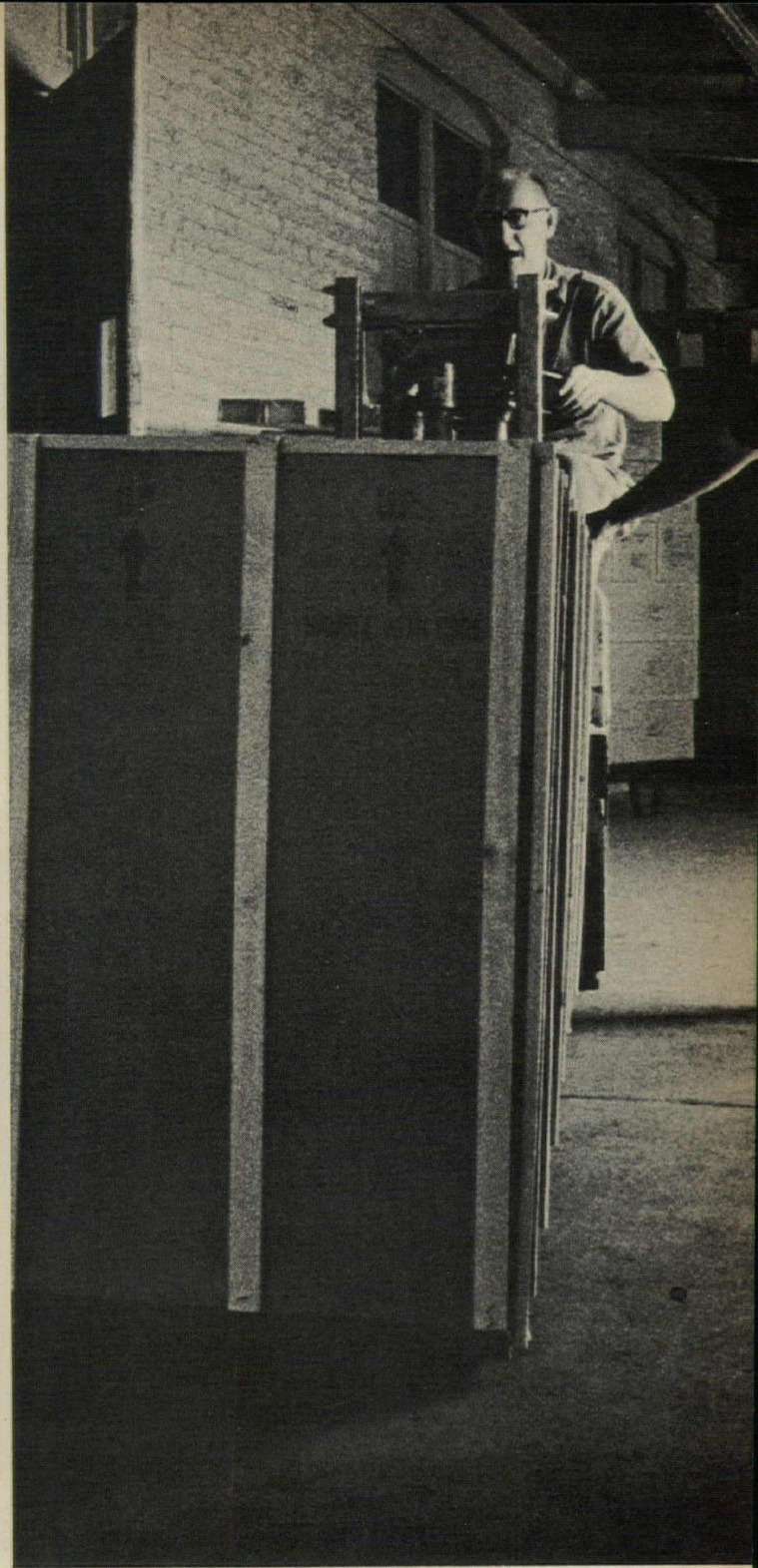
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A long-range project which may ultimately include seven major new buildings, Peachtree Center began with the completion in 1961 of the Merchandise Mart, the world's first all-electric commercial building. The 30-story Peachtree Center Tower office building followed, along with the 800-room Regency Hyatt House, Atlanta's unique new hotel. The latest addition

to the complex is the Atlanta Gas Light Tower.

Square D supplied the electrical distribution and control equipment for each of these buildings. Such Square D products as switchboards, lighting panelboards, busways, underfloor raceways and motor starters assure the dependability and versatility required in a project with the scope of Peachtree Center. You'll find these and other Square D products in factories, homes, institutions—*wherever electricity is distributed and controlled.*



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*Executive Offices • Park Ridge, Illinois*

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GO STRAIGHT . . .

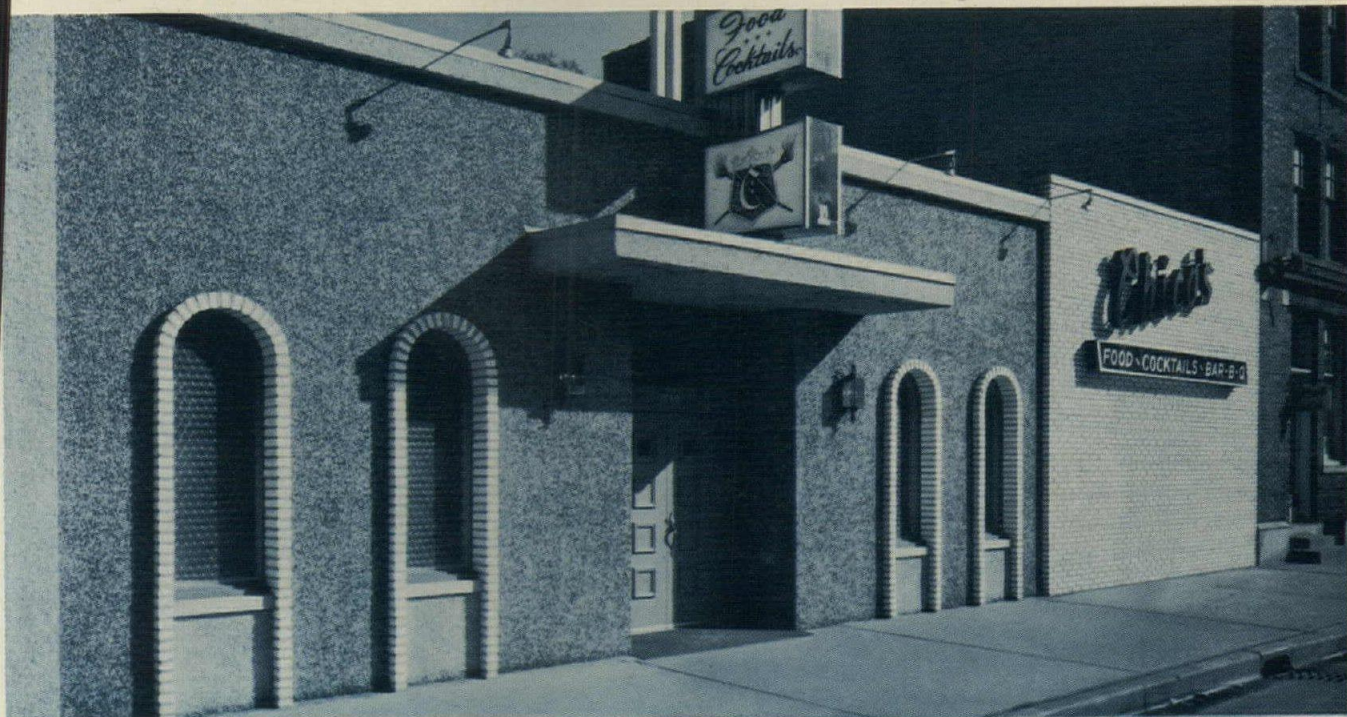
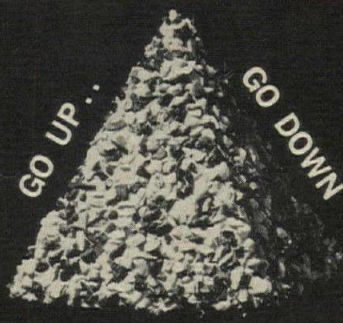


GO ROUND . . .



GO UP . . .

GO DOWN



Chico's Restaurant, 1550 North Farwell, Milwaukee, Wisconsin

## Fuller Tuff-Lite® Matrix

# gives old buildings a new, strikingly bold personality

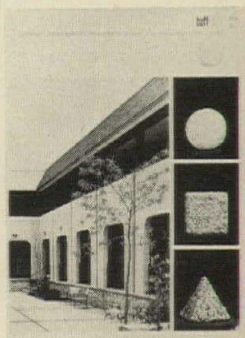
Tuff-Lite® gives older buildings a new lease on life. Gives them a personality that can be strikingly bold, bright and interesting, distinctively different. Tuff-Lite®, an epoxy-based matrix, is ideal for refurbishing older buildings in yet another way. It is so lightweight—actually eight times lighter than concrete—it eliminates the need for structural reinforcement in old buildings and special load-bearing design considerations in new buildings.

Get the greater depth, the greater dimension possibilities in exposed aggregate construction with Fuller Tuff-Lite® Matrix. Use it for interior or exterior applications. Tuff-Lite® will bond to nearly any dry, clean substrate . . . concrete, brick, wood, etc. Can be applied to any surface shape

. . . flat, contoured, irregular, recessed or overhead. Its superior bonding strength allows more aggregate to be exposed for a more noticeable three-dimensional effect.

Tuff-Lite® can be troweled on at the job site. Or it can be applied off-the-job on pre-fabricated panels of plywood or other material. It is available in any color to blend or contrast with any aggregate. Tuff-Lite® retains its color and superior bonding strength through wind, snow, frost and all temperature changes. Will not pit, spall or peel. Will not shrink, chip, crack or craze.

Aggregate may be seeded immediately after Tuff-Lite® is applied. Matrix cures in less than 24 hours. Saves time and labor costs.



Refer to Sweet's Architectural Catalog File 130/Fu or write for FREE Brochure.

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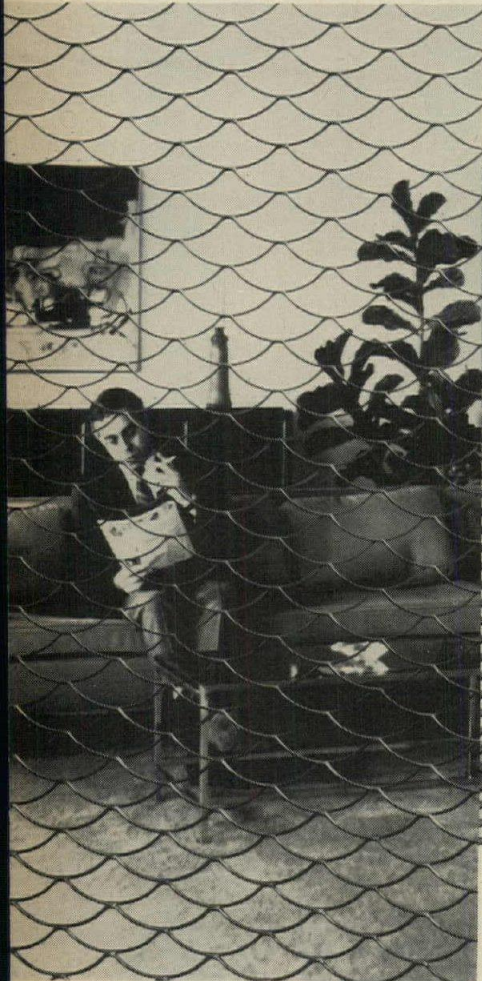
1150 Eustis St., St. Paul, Minn. 55108, Dept. 26042

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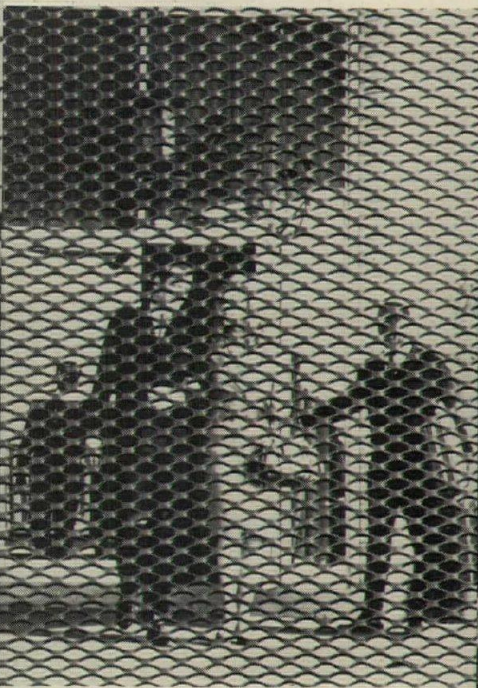


# Peekaboo

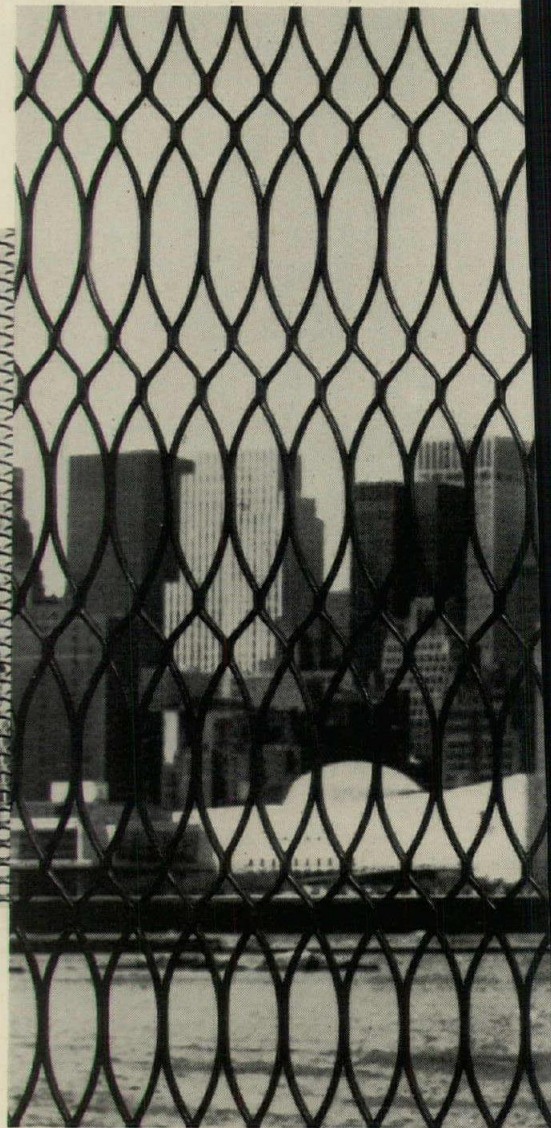
Peekaboo Parlor.



Peekaboo Portico.



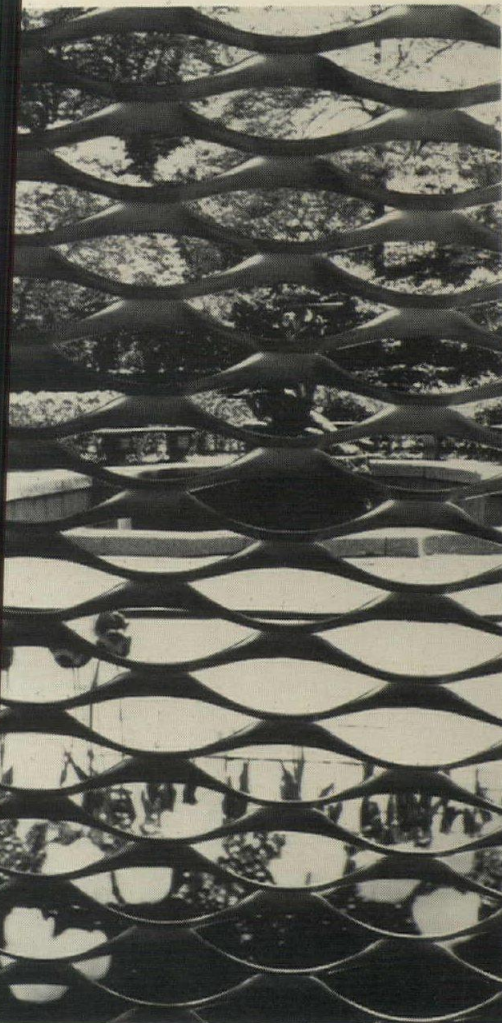
Peekaboo Panorama.



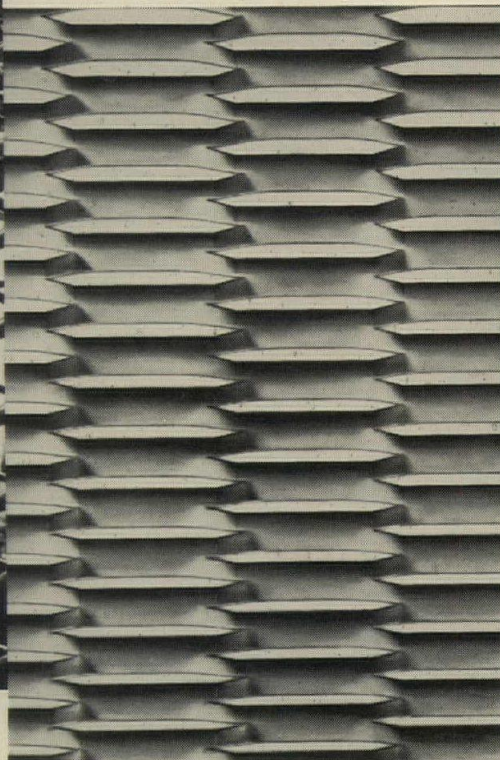


# Steel.

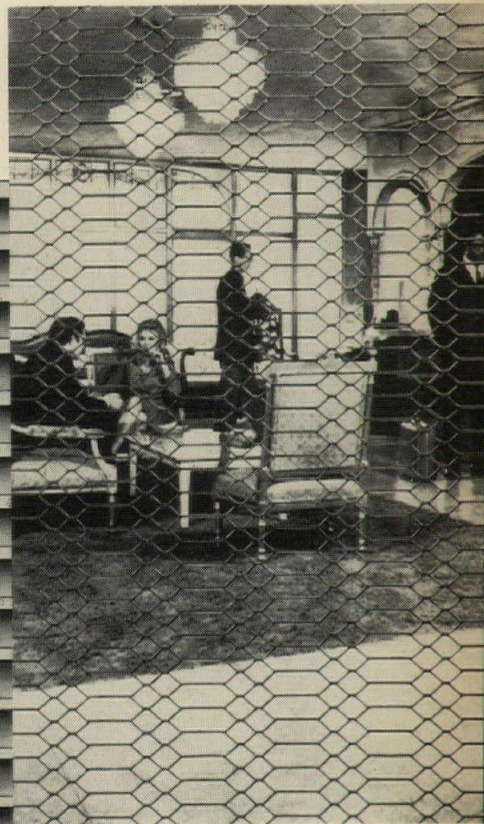
Peekaboo Pool.



Peekaboo Privacy.



Peekaboo Pub.



We're always asking if you've looked at Wheeling lately. Today's question: Have you looked *through* Wheeling lately? Please do. Observe the possibilities of Wheeling expanded steel mesh. This is eye-opening stuff. It's the paintable, bronzeable, laquerable, galvanizable, rubber-or-plastic-coatable steel of the future. You can see how all those perforations add versatility and visual appeal. What you can't see is how the same perforations make it lighter per foot, stronger per pound, and even more rigid than the original sheet of solid steel. But we'll be glad to explain. Write us for a comprehensive expanded steel catalog.

You'll find there's more to our mesh than meets the eye.  
(Who'd have thought the next breakthrough in steel would be the hole?)

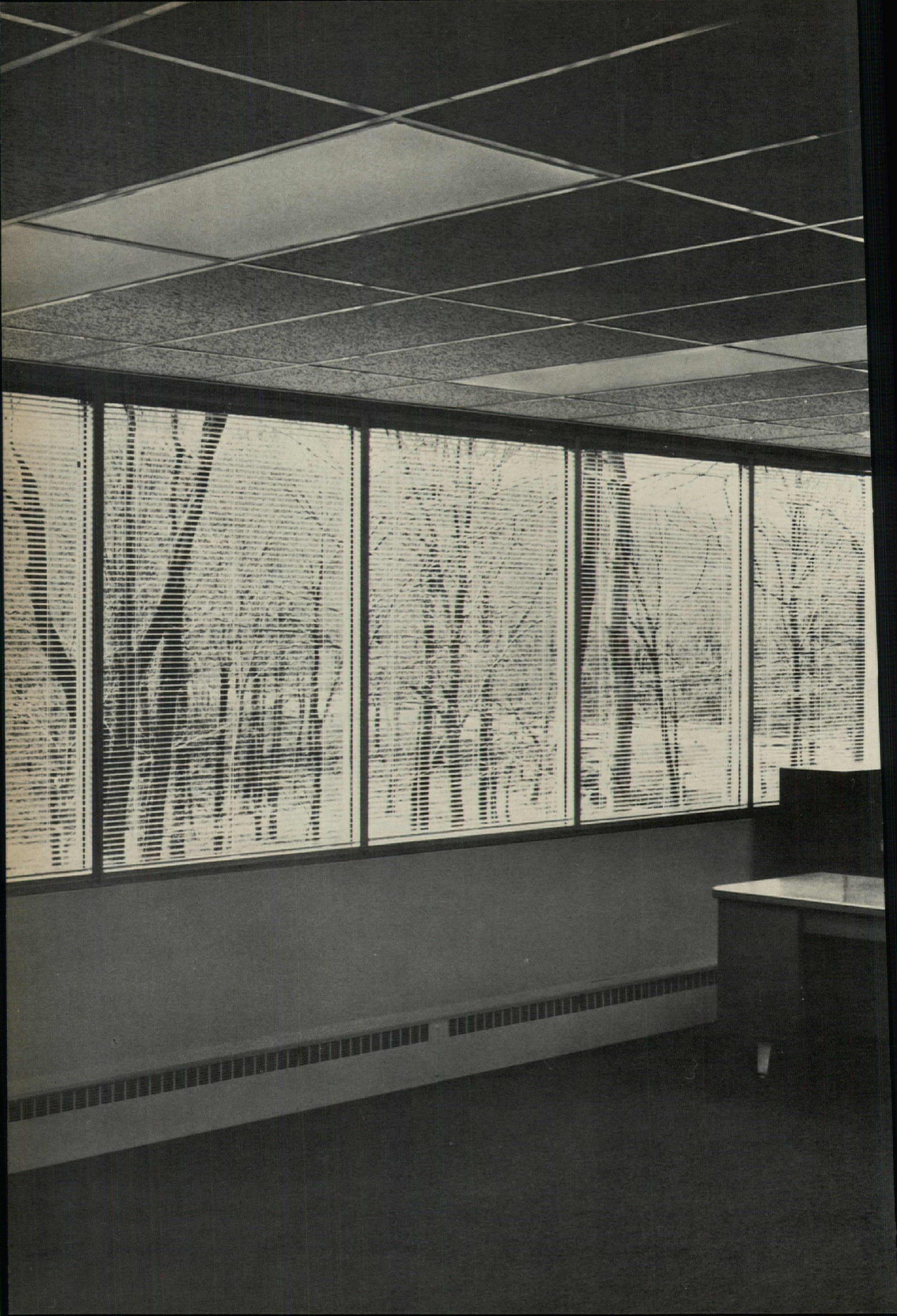
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Wheeling Corrugating Co. Div. Wheeling Steel Corp.,  
Wheeling, West Virginia


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For more data, circle 43 on inquiry card









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A TRANSPARENT LORIT  
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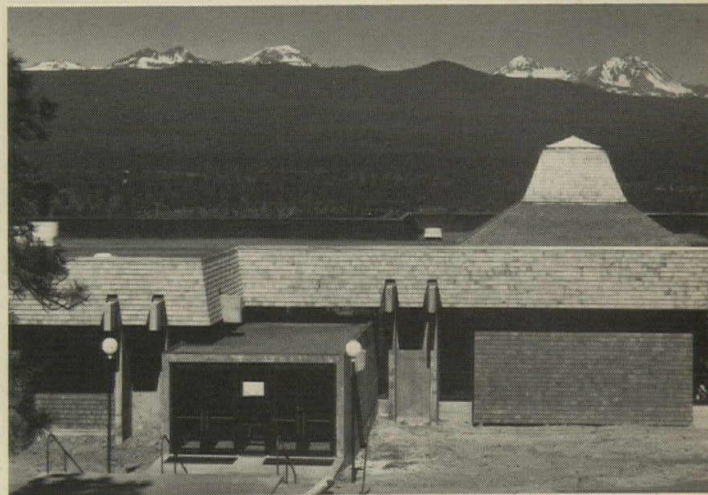
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(In Canada, 1477 West Pender Street, Vancouver 5, B.C.)



(3)



(4)



(5)



(6)

mpuses and chapels.

(1)

(2)

- (1) (2) Green River College, Auburn, Washington. Architects: Sullam & Aehle. Certigrade Shingles, #1 Grade 18" Perfections with 7" to the weather.
- (3) (4) Central Oregon College, Bend, Oregon. Architects: Wilmsen, Endicott & Unthank. Certigrade Shingles, #1 Grade, 16" Fivex with 5" to the weather.
- (5) Bayshore School, Ottawa, Ontario, Canada. Architect: Z. J. Nowak. Certi-Split Handsplit/Resawn Shakes, 18" x 1/2" to 3/4" with 8-1/2" to the weather.
- (6) Chapel, Keuka College, New York. Architect: Vincent G. Kling. Certi-Split Handsplit/Resawn Shakes, 24" x 3/4" to 1-1/4" with 9" to the weather.

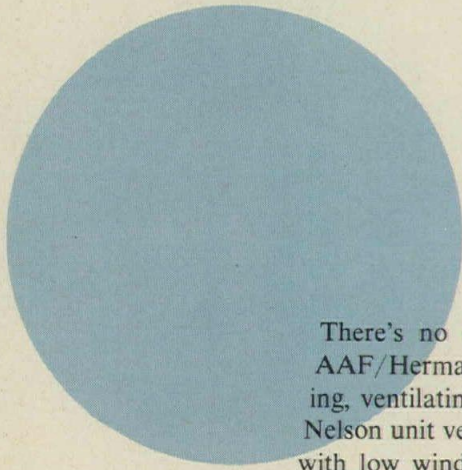


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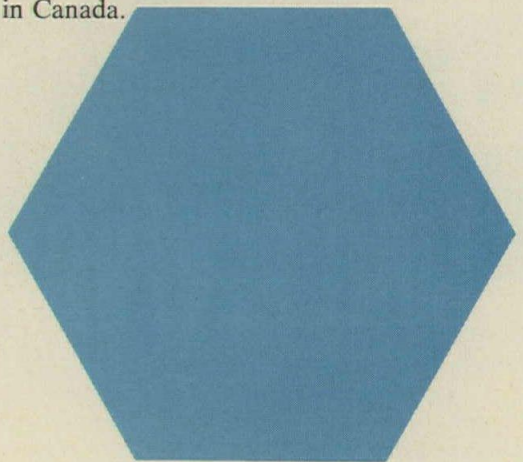


# UNIT VENTILATORS

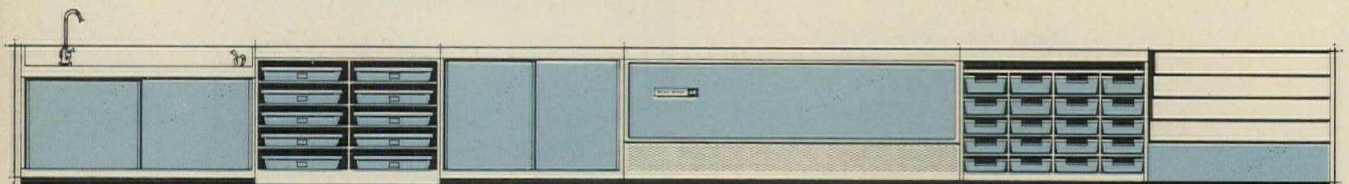
Circular, trapezoidal, hexagonal schools.  
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There's no end to school design possibilities with AAF/Herman Nelson unit ventilators doing the heating, ventilating and air conditioning. □ AAF/Herman Nelson unit ventilators deliver fresh, clean air to schools with low window sills, schools without windows at all, to circular schools, cluster schools and schools with flexible floor plans. Whatever shape today's schools take, we make the ideal thermal environment to fit. □ Chances are, we've already got the classroom heating, cooling and ventilating system for the school you've yet to design. □ Or, if a school air problem has you cornered now, your Herman Nelson representative could well be a great help. In any event, call or write American Air Filter Company, Inc., 215 Central Avenue, Louisville, Kentucky 40208. By the way, Herman Nelson know-how and products are also available in Canada.



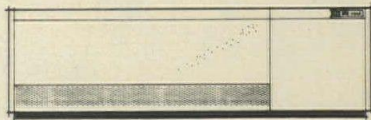
**AAF** Herman Nelson  
SCHOOL PRODUCTS DIVISION



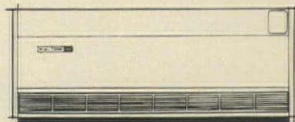
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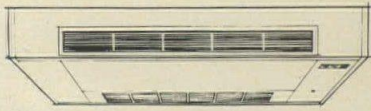
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**NELSON/aire** cabinet heater and air conditioner. Ideal for offices, entranceways and smaller rooms. Thin-profile unit adapts to any wall thickness. Can be used with steam, hot water, or electric resistance coils. Self-contained units available in 8,000, 12,000 or 15,000 BTU/hr cooling capacities. Lets you air condition now or later.



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continued from page 56

**Graham Latta & Donald Lynch, Architects** have formed a partnership with offices at 3363 Glendale Blvd., Los Angeles, Calif.

Architect **Richard K. Fleming** has rejoined **Richard R. Leitch & Associates**, Newport Beach land planners, Calif., as an associate architect.

**Earl A. Freels** has joined the environmental planning firm of **Linesch and Reynolds** in Long Beach, Calif.

**Fred E. Bloch** and **Ronald J. Kiaer** have joined the architectural and planning firm of **Charles Luckman Associates** as project architects in the firm's New York offices, and **Samuel M. Burnett** has been made a project architect in the Los Angeles office.

**Manson-Jackson & Kane, Inc.**, of Lansing, Mich. have announced the appointment of **Herbert J. Iverson** as managing architect.

**Tobias T. Stapleton** has been named an associate in the firm of **Lawrence E. Matson & Assoc.** of Idaho Falls, Idaho.

**Moffat & Moffat** have formed a new partnership, **Moffat Moffat & Kinoshita, Architects, Engineers and Planners** at 55 Eglinton Ave. East, Toronto 12, Ont.

**Moore and Hutchins, Architects** announce the addition to the partnership of **Gillet Lefferts, Jr., A.I.A.** and **William R. Evans, A.I.A.** The firm will continue its practice at 800 Second Ave., New York City under the name **The Moore and Hutchins Partnership.**

The consulting engineer firm of **Walter P. Moore, Consulting Engineer** announces a change in firm name to **Walter P. Moore & Associates, Inc.** located at 2 Pinedale, Houston.

**William C. Krommenhoek** has been elected to be an associate with the firm **Architects Robert Mosher & Roy Drew** at 1255 Coast Blvd., La Jolla, Calif.

**James W. Nicas A.I.A.** and **Gary L. Goldstein A.I.A.** have formed a partnership for the practice of architecture under the name of **Nicas Goldstein & Associates, Inc.** at 3000 Farnam St., Twin Towers, Omaha, Nebraska.

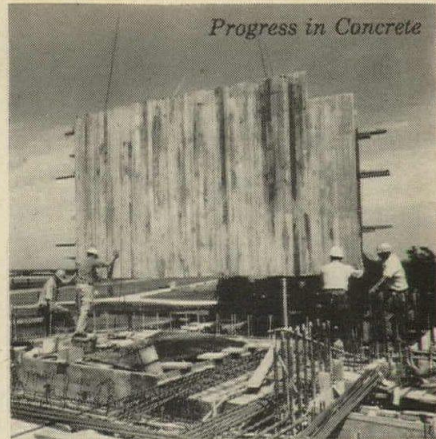
**Arthur C. Hauswald** has joined the firm of **P & W Engineers** as Vice President, Structural Engineering. The firm is located at 309 West Jackson Blvd., Chicago.

**Robert S. Berini** has been appointed Chief of Surveys for **Parlett Engineering**, San Francisco and Richmond, Calif. consulting civil engineering firm.

**Donald C. Hyde** has joined the New York firm of **Parsons, Brinckerhoff, Quade & Douglas** as an associated consultant.

continued on page 73

Progress in Concrete



### SYMONS STEEL-PLY FORMS GANGED AND LINED



Gerace and Castagna, Manhasset, New York, contractor; Warner, Burns, Toan and Lunde, architects.

Hofstra University, Hempstead, Long Island, recently constructed a new library tower which expanded their facilities three times.

Four 140' high mitered and tapered corner shafts, poured in place, form the library design base. To form these corner shafts, Symons Steel-Ply Forms were assembled in 11' x 15' x 20' gang sections, and lined with Spruce and Pine, 4" wide and varying in thickness. A rough finish was obtained by staggering the varied thickness boards, and by intermingling circular saw cut boards.

Symons Forms were chosen because they could be ganged and hold an irregular mitered shape. Also, careful formwork construction was essential to insure that the texture of the rough-sawed lumber butt-joined pattern showed. The mitered corners, which have a 11° angle, were formed with Symons hinged corners. Two gang sections were joined with the corner and a 2" steel filler to complete the formwork. Finishing was easy because Symons Gang Form Ties with their positive breakback and a .225 diameter, left small tie holes which were easy to fill.

Forms may be rented, purchased or rented with purchase option. *Architectural Bulletins sent on request.*



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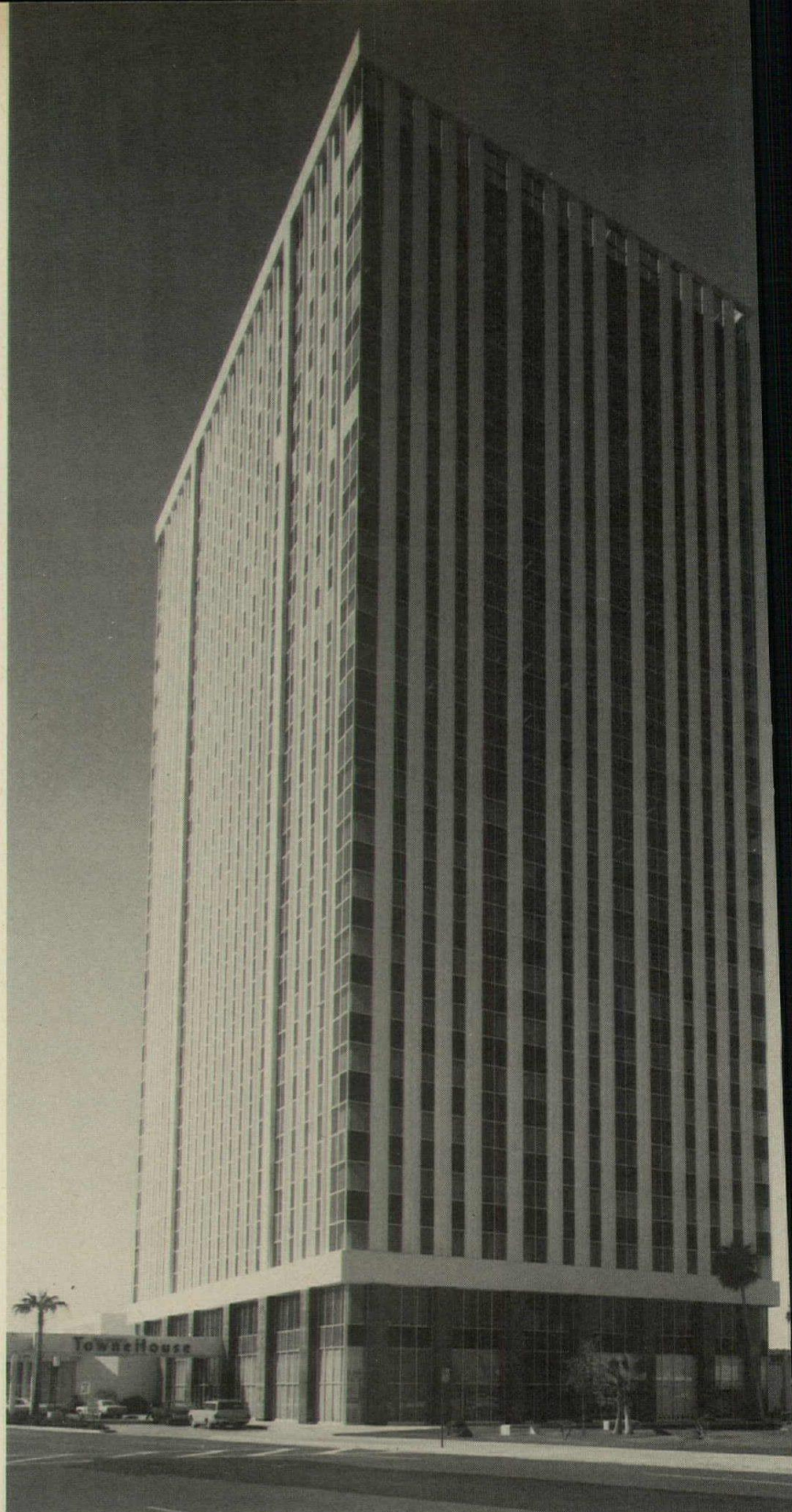
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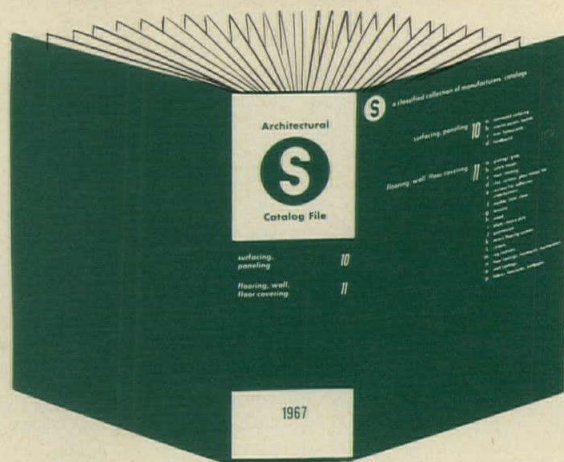
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For instance, now you won't have to waste time trying to figure out whether G-P's decorative hardwood paneling is filed under wood...or plywood...or wall covering...or what have you.

G-P paneling is filed where it should be: File 10b—"Paneling."

Georgia-Pacific product catalogs are filed 11 different places in the Sweet's Architectural File. Only the all-inclusive "Application and Selection Guide" is found under "Wood."

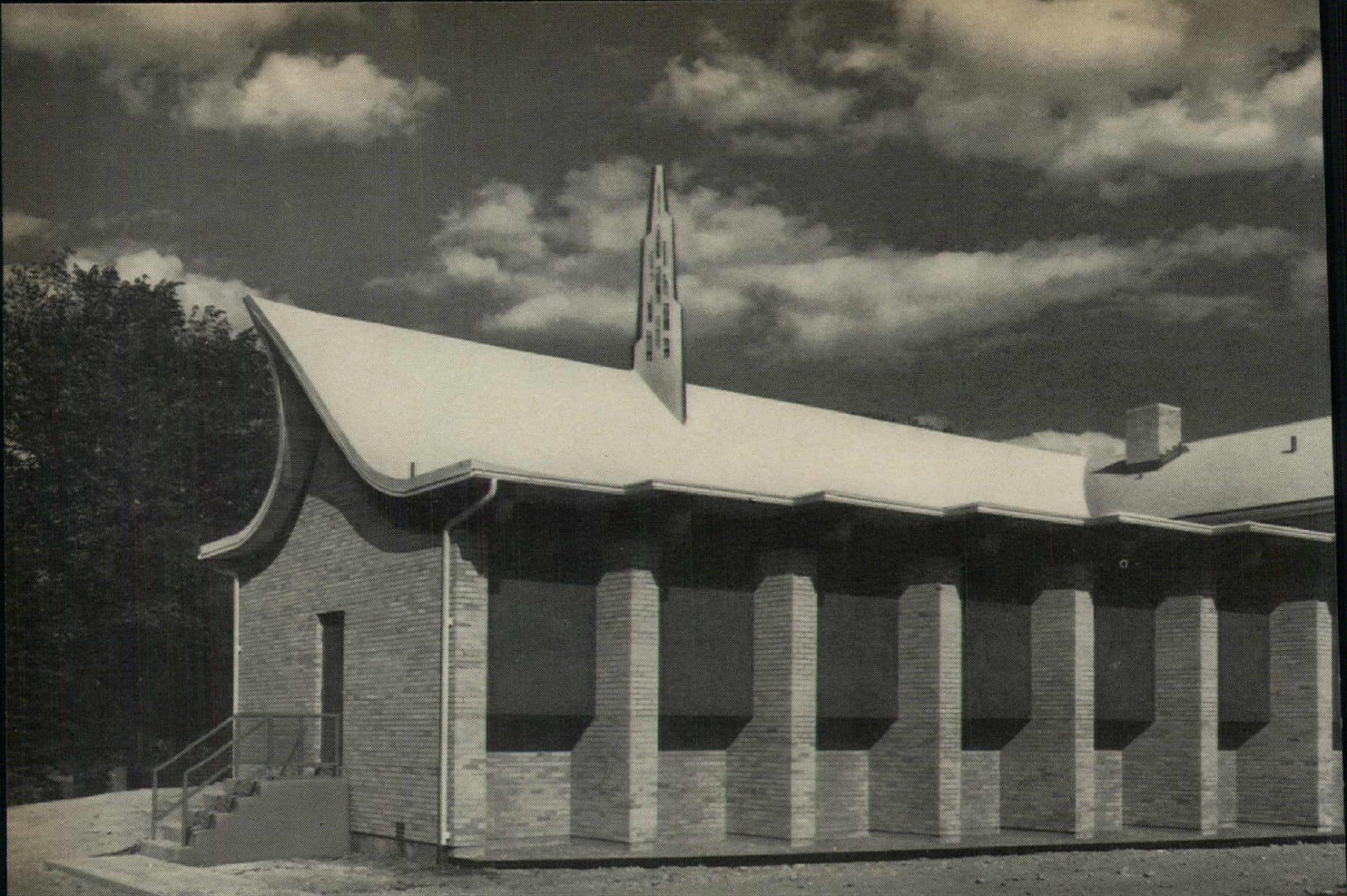
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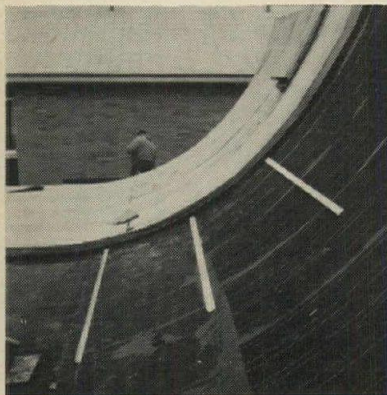
 **GEORGIA-PACIFIC** / THE GROWTH COMPANY

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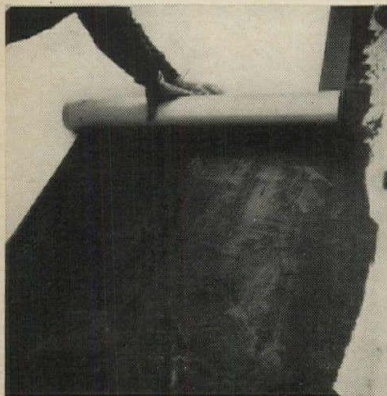
**For roofs of unexcelled beauty and durability...  
specify Ruberoid T/NA 200® roofing (with Du Pont TEDLAR\*)**



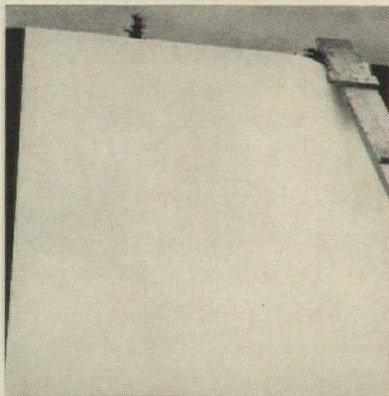
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2. Easy, quick to apply.



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Haskell & Connor, were the architects and Welliver Construction Co., Inc., both of Elmira, were the General Contractors.

Write today for full information on this unusual roofing material. Also available in pastel grey or green.

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continued from page 69

**William A. Plyer, A.I.A.** has been named an associate partner by **Petroff Jones Associates-Architects** at 441 Madison Ave., New York City.

**Ignacio Romero, Frank C. Marceland Richard S. Hayden** have been named associates in the New York Office of **Fred Easton Poor, Architects.**

**Daniel P. Jenny** has joined the staff of the **Prestressed Concrete Institute** as Technical Director in Chicago, Illinois.

**Thompson B. Burk and Associates Barnard and Burk, Inc.** have combined to form **Professional Planning Associates**, with architecture, urban design and engineering services. They have offices in Baton Rouge and New Orleans.

**Quinlivan Pierik & Krause Architects/Engineers** are pleased to announce the admission of **Carl Steere Myrus, A.I.A.**

**John P. Stopen, P. E.** as associates of the firm and expansion of the practice to include engineering.

**Uel C. Ramey and Jack R. Jones** announce the inclusion of **Allen G. Ahrens** as a partner in their architectural firm which will be called **Ramey-Ahrens-Jones, Architects**, 830 N. Main, Wichita, Kan.

**T. Trip Russell and Associates**, architects at 1800 Coral Way, Miami announce the admission of **Howard Ivy Melton, Jr., A.I.A.** as a member of the firm which is now called **Russell-Melton-Associates.**

**Severud-Perrone-Sturm-Conlin-Banham**, consulting engineers, announce that **Ed N. Severud, Jr.** has become a partner and **Yaw Shuin Lee and Tibor Szegezdy** have become associates. The firm is at 15 Lexington Ave., New York City.

**Raymond Grenald, A.I.A.** has joined the office of **Sylvan R. Shemitz and Associates, Lighting Consultants** at 1294 Chapel St., New Haven.

**Harry W. Bessler, Jr., John B. Meek and John S. Todd** have been named associates of **Smith, Hinchman and Grylls Associates, Inc.** an architectural firm based in Detroit, Mich.

**Neill Smith and Associates** has appointed **Charles D. Wiley** as an associate of the architectural firm which is located at 40 Gold St., San Francisco.

The Decatur, Illinois firm of **Spangler Beall Salogga Bradley A.I.A.**, architects, engineers and planners have named **George A. Albers A.I.A.** a partner.

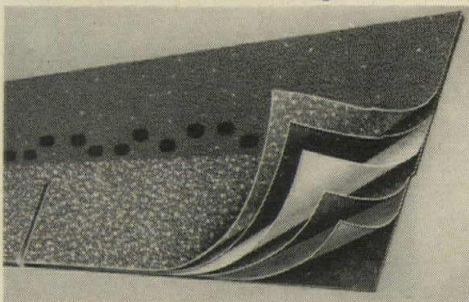
**Steinmann and Cain, Architects** announce the retirement of **Milton B. Steinmann** as a partner in the firm and his appointment as consultant to the successor firm of **Walker O. Cain & Associates, Architects** who has appointed **John Gray Faron** and **John J. Farrell** partners. The firm is at 101 Park Ave., New York City.

# ...tough roofing from RUBEROID®



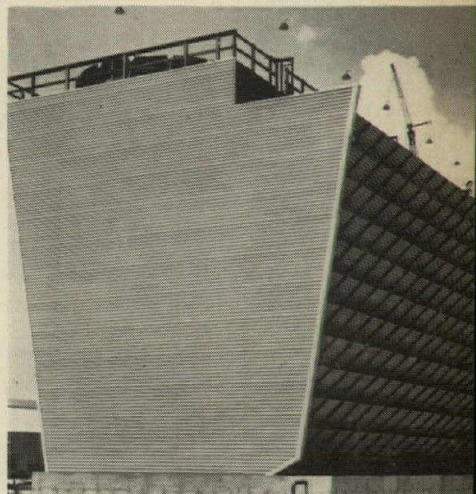
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### fire-resistant shingles



Ruberoid FIRE-GUARD 325-lb. residential shingles feature a built-in, special fiberglass blanket, in addition to other flame-resistant layers. U.L. puts these self-sealing shingles in top Class A rating for fire and wind resistance. Good looks too, in 7 modern colors!

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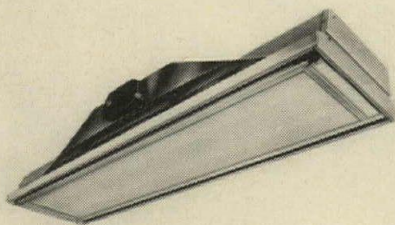






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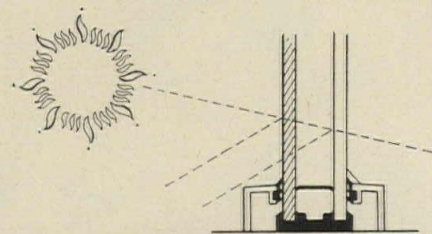
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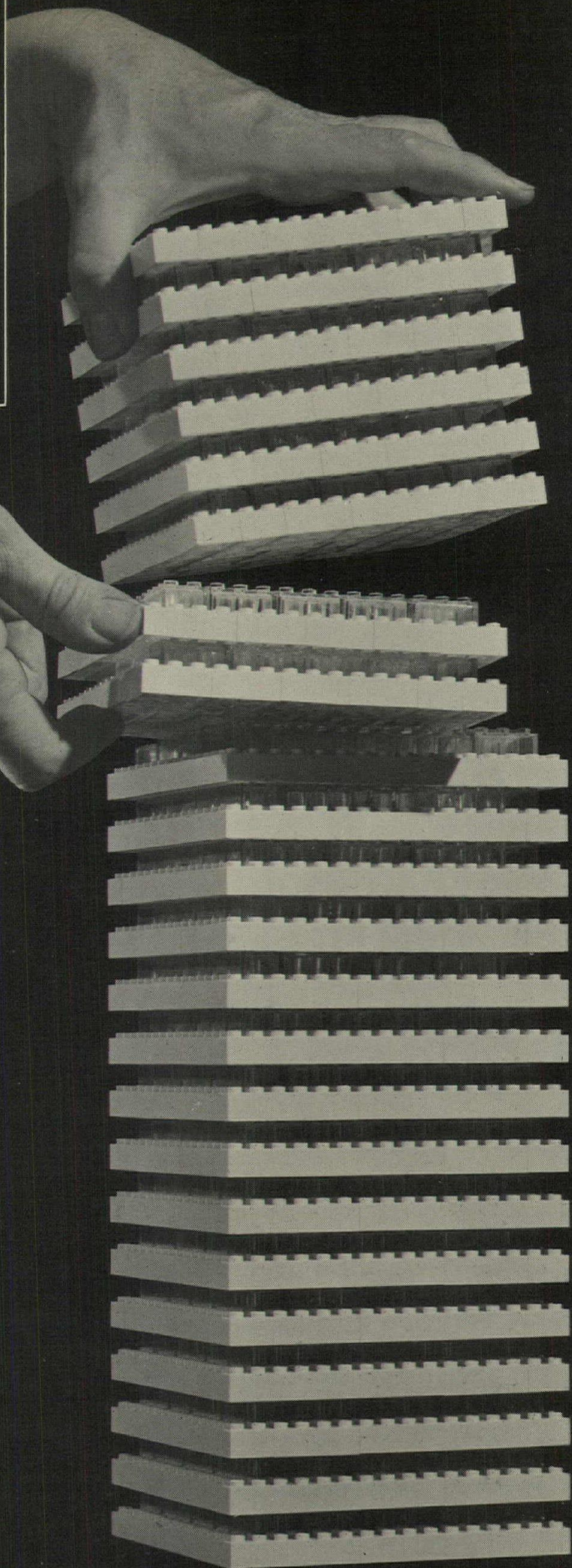
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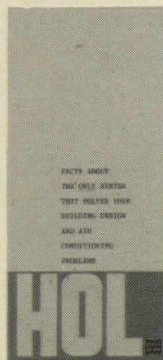
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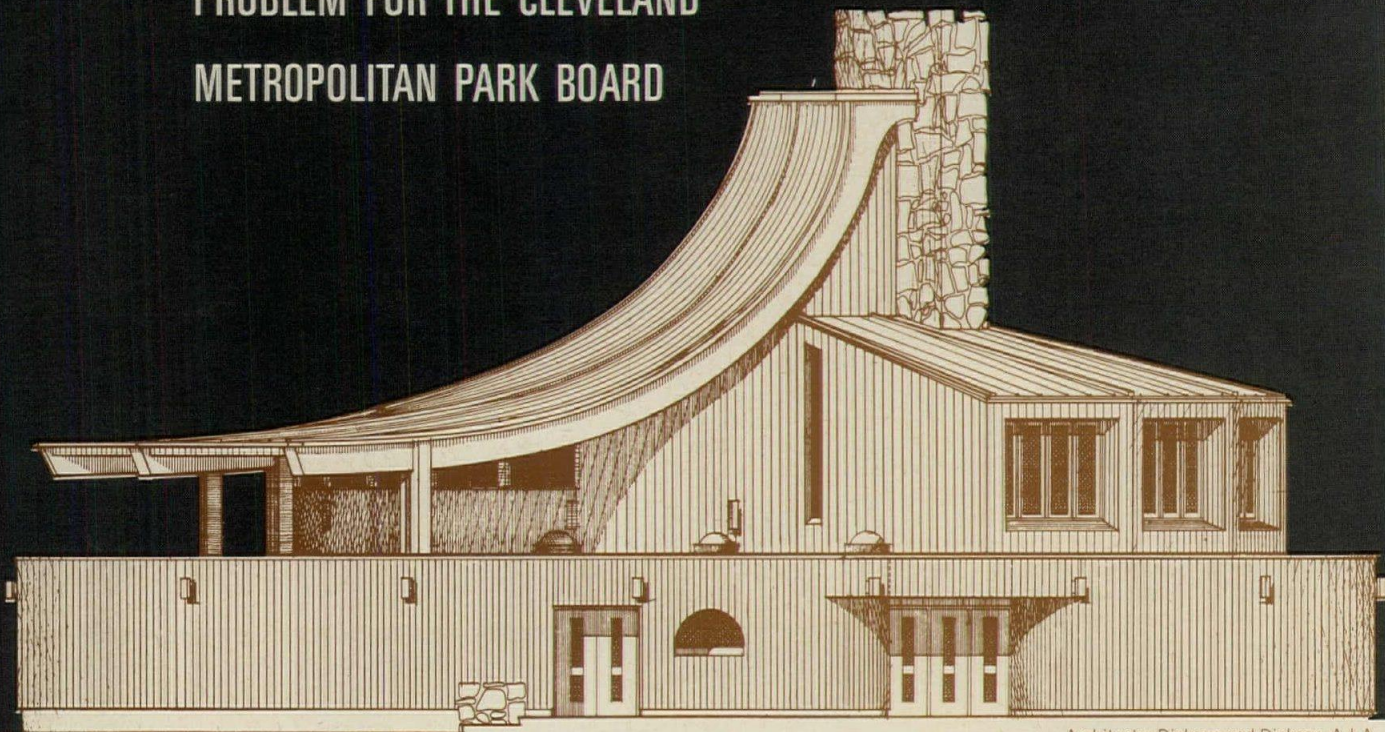
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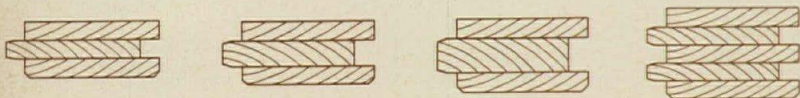


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## Easier loans for commercial/industrial properties?

Businessmen seeking mortgage loans for commercial, warehouse, or industrial properties will, in the coming months, find credit somewhat more accessible than in some instances, less costly than present, according to Richard B. Morris, Buffalo, N. Y., president of the National Association of Real Estate Boards.

His remarks on the outlook for this segment of the mortgage market were based on the spring mortgage market survey prepared by NAREB's Department of Research. The study was based on data from 114 Realtors representing market areas throughout the country.

"It is anticipated that lenders will be increasingly receptive to applications for prime quality business loans," Mr. Morris stated, "but that the supply-demand relationship will not reach a level sufficient to create the type of pressure for placement experienced in 1965." He added that, as a result, the outlook for less-well-qualified borrowers "is not particularly bright."

### Plans on prime commercial properties are actually seeking takers

In discussing specific examples, Mr. Morris noted that the easing in the supply of credit has had its greatest impact on the market for loans on prime location commercial properties with national credit leases.

Borrowers offering this caliber security, he reported, are actively being sought in some areas and are at least welcome applicants in most areas. The money market supply is currently ample in 45 per cent of the country and moderate in 48 per cent. "This degree of availability is fairly similar to that of a year ago and sharply up over last September, when an ample supply was lim-

ited to 7 per cent and a moderate supply was available in 36 per cent of the areas," Mr. Morris said.

He explained also that interest rates for these choice mortgages have declined one-fourth to one-half a percentage point since the Research Department's fall survey. The most frequently reported charge is 6½ per cent, reported in 39 per cent of the nation. A charge of 6¾ per cent is now common in a fourth of the country, and a 6 or 6¼ per cent rate is reported prevalent in another fourth of the country. "In the remaining areas, borrowers, despite the high quality of the security, are paying 7 per cent or better," Mr. Morris said.

He reported that improvements have been made for mortgages with less security than the prime location with a national credit lease. However, as the strength of security decreases, the amount of improvement declines also. As an example, he noted that while there has been improvement in the mortgage situation for secondary location properties with local credit leases, "conditions are still quite bleak in many areas."

Funds for mortgages on this type of property are currently ample or moderate in about half the areas of the country, compared with a moderate supply reported in only 10 per cent last fall. Funds are still tight, however, in many areas.

An interest rate of 7 per cent is reported in about half the areas, similar to the figure for last fall. This spring a rate of over 7 per cent was reported in 17 per cent of the areas, compared with the 32 per cent of the areas reporting a rate of over 7 per cent last fall.

Turning to the warehouse and industrial properties segment of the market, Mr. Morris reported lenders are re-entering the market and, as a result of this revived interest, the outlook for the qualified borrower will further improve.

According to the NAREB report, 55 per cent of the areas quote an interest rate of 6½ per cent or less for mortgages on this type of property, while last fall, 65 per cent of the areas reported a rate of 6¾ per cent or more.

### Experts enlisted to solve tight money troubles for housing

Last year's home-building slump, and worries about a further tightening of the money supply later this year, have prompted influential leaders in Congress to call on the nation's experts for possible action to avert further problems.

Sen. John Sparkman (D-Ala.), long-time chairman of the Senate housing subcommittee and now chairman of the parent banking committee, has solicited views and suggestions from major banking and mortgage organizations plus various independent experts.

Their views, contained in a weighty volume of the housing subcommittee, will be discussed soon at a "town meeting" forum before Sen. Sparkman.

No one has come up with any panacea to assure designers of a continued flow of projects. However, the various spokesmen have suggested some reforms in the methods of long-term financing.

#### ARCHITECTURAL BUSINESS THIS MONTH

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One common theme: the interest rate on FHA-insured and VA-guaranteed mortgages should be more flexible, responsive to market conditions and without an arbitrary ceiling imposed by legislation (currently 6 per cent).

The thrift institutions—mutual savings banks, savings & loans—that supply the lion's share of long-term money have suffered from rising interest rate competition in the past few years. Several groups urge that these institutions should be given greater authority to make loans

other than mortgages to take advantage of short-term interest rate fluctuations.

Traditionally, large amounts of long-term capital have shied away from investing in mortgages—problems of monthly collections, fear of foreclosure, and other "sticky" aspects have made corporate bonds more attractive. Several experts suggest pooling mortgages and then selling shares of the aggregated debt.

Further, there is no uniform system (other than for government-backed mortgages) of determining the quality of the

debt paper. Some suggest the government, through the Federal National Mortgage Association, should act as a central trader for all mortgages, buying and selling whether the mortgages are backed by Uncle Sam or not.

These and many other ideas will be discussed, probably next month, at Sparkman's hearings. What might remain to be seen. At least the government "recognizes there's a problem," says National Association of Homebuilders' President Leon Weiner.

## Labor's drive to strike at construction sites heightens

This could be the crucial month in labor's long drive to have its "Situs Picketing" bill approved by the House of Representatives. The bill, H.R. 100, would permit secondary boycotts at construction sites, which in turn could cripple the architect's involvement as the owner's representative, says the A.I.A.

The legislation would tend "to deprive an architect of his free choice in the selection of building materials," the A.I.A. told Congress.

A.I.A. has joined forces with the home builders, the Associated General Contractors, and some 30 other employer organizations to fight the bill. Opposition to the measure has been growing, too.

The Supreme Court's recent "Philadelphia Door" decision has hurt chances for the bill, acknowledges AFL-CIO President George Meany who has committed his huge organization in support of the building trades' bill.

In that decision, the Court ruled that building trades with "work preservation" clauses in their contracts can rightfully picket a job where pre-assembled components are used. The Court added that the basic issue was one for Congress to resolve and merely asserted that the contract clause was legally enforceable through picketing.

Consequently, employer groups hope to overturn the decision by attach-

ing a rider on a labor bill; Rep. Charles Goodell (R-N.Y.) has such a rider for "Situs Picketing" bill, but at a recent meeting of the employer groups, almost everyone agreed with the home builders' strategy to defeat "Situs Picketing" on its own merits, but if losing, support the Goodell rider.

The showdown vote is expected to come this month, when the building trades assemble some 4,000 members in Washington to plead the cause with various congressmen. Lack of legislative action this month could mean the labor strategists feel insufficient votes are assured to try to test the bill on the floor of the House.

## Capital investments up for '67, McGraw-Hill survey reveals

American business now has plans to spend \$64.38 billion on new plants and equipment in 1967, according to a year-end re-check by McGraw-Hill Publications' Department of Economics. This represents a 6.3 per cent increase over 1966, and the gain is nearly 1.5 percentage points higher than industry expectations indicated in an earlier McGraw-Hill survey last fall. Manufacturers now plan to spend \$29.1 billion this year compared with \$27 billion spent last year. Thus, manufacturers indicate that their planned increase is now more than 2 percentage points higher than it was last fall. The architectural slice of this investment pie

could be considerable—and at least is certain to be bigger than last year's.

These are the highlights of a special survey conducted by the department during the month of January. While the over-all figures indicate only a small upward revision in industry's investment plans, the fact that they are up at all may come as a surprise to those who have been expecting sharp cutbacks in capital investment.

The over-all results of this survey indicate industry's confidence in the economy and in its own growth prospects. And while the level of investment currently planned will not generate as

much steam in the economy as last year's expenditures, it is still sufficient to constitute a major element of strength in the business outlook.

This special check-up is based on replies received during the last three weeks in January. The companies queried represent every major field of industry from steel to commercial business and account for approximately 50 per cent of total capital investment. As in other McGraw-Hill Department of Economics plant and equipment surveys, this check-up is not a forecast. It represents the plans on the books of the companies at the time the survey was made.

## A.I.A. clarifies employment rules

The American Institute of Architects has clarified the controversial sections 3.9 and 3.10 of its Standards of Professional Practice relating to employment of A.I.A. members by consulting engineers, planners, landscape architects and others, it was reported at a recent meeting of the Interprofessional Commission on Environmental Design (ICED).

The A.I.A. reported that the revised section 3.10 clarifies that A.I.A. membership is open to architects who are employed in professional positions by consulting engineers and other design professionals.

Last year some A.I.A. chapters denied membership to some architects employed by consulting engineers, re-

sulting in the needed revision of these sections of the standards and precise interpretation of their meaning. Key to the revision is professional integrity.

A.I.A. told ICED that its standards were and are directed toward architects employed by "package dealers" and others as salesmen or in positions of a non-professional nature.



COMMENT AND CONTRACT TABULATION

by A. Christie, Chief Economist  
Dodge Company,  
Division of McGraw-Hill

# second boom in school building

Part 1 of two parts

...akes a little perspective to appreciate the full impact of what's happening to the growth trend of school building these days. (That's the purpose of the report.) Right now we're well into a "second stage" of educational building, and it's making the first stage look almost dead. The question is, how much longer will it last?

traction. The second educational building boom got its start in 1962, and by last year had brought annual values more than 60 per cent above the highest level reached during the first great surge.

Basically, the explanation lies in the post-war baby boom. The response by our educational systems was to begin building the required elementary classroom capacity on a crash basis. And yet, it took until the latter part of the Fifties to accomplish this tremendous feat. By this time the pressure was starting to hit the secondary system, and though the need for adding elementary schools subsided, it was concurrently replaced by an equally urgent demand for high school facilities. Hence the period of fairly stable construction shaded in the chart.

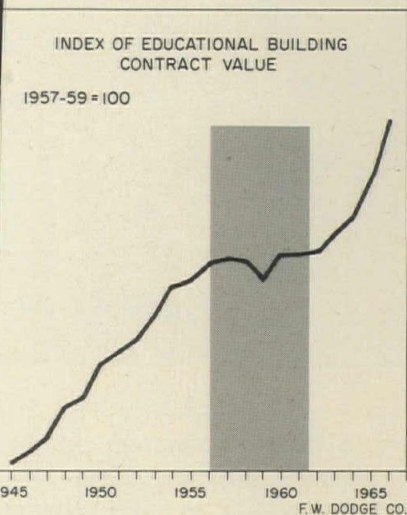
Now, of course, we're off on another boom, and this time it's mostly college and university construction. Last year's contracts for college facilities were expanding three times as fast as either elementary or high school construction. But today it's more than a simple matter of relating past births to current classroom needs. There are some added complications. Enrollments in higher educational institutions are considerably lower in the aggregate (presently about six mil-

lion students, compared with 13 million in high school) but are growing much faster. Building costs are quite a bit higher for college structures—between one-third and one-half again as much per square foot. In addition, educational building at all levels (but especially higher educational) has had a big boost with the passage of several major Federal-assistance programs.

Where does the trend go from here?

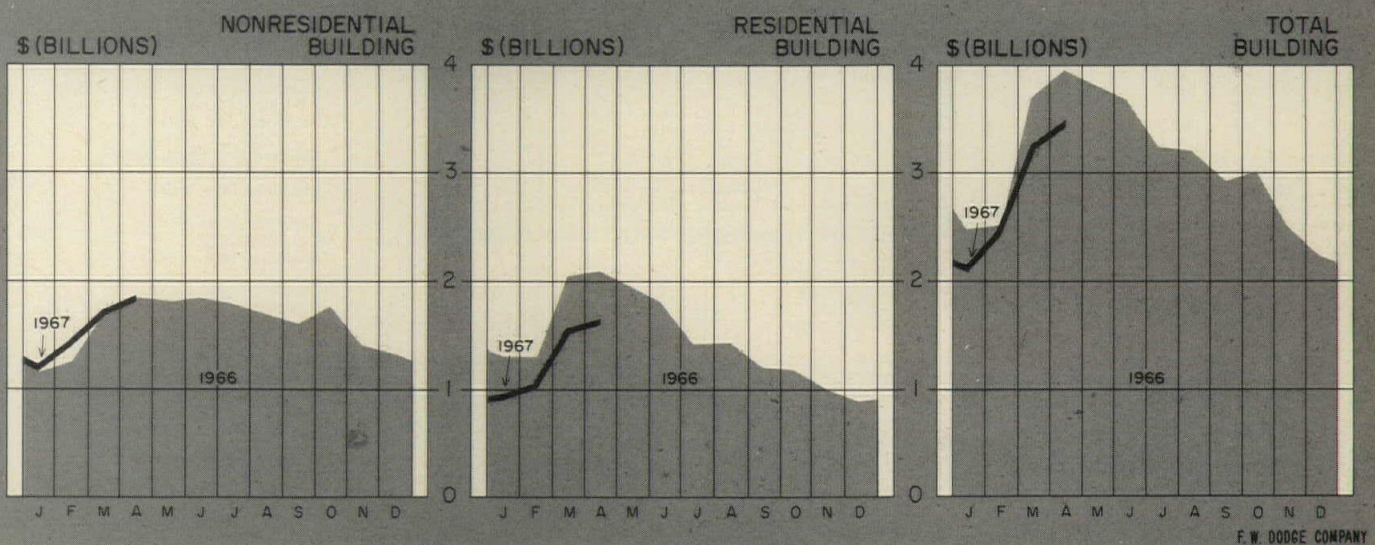
Consider 1967 first. Last year's big credit squeeze not only created a crisis in housing markets, but it set school building back for a time as well. High interest rates forced the postponement of many educational building plans, and toward the end of 1966 and during the early months of 1967 the rate of contracting declined from last spring's peak. But once funds became available and long-term rates edged down a bit, the volume of state and municipal financing jumped sharply. This year's opening quarter set a new high.

Now, what about the longer-term outlook for school construction? In this context, financial conditions take a back seat to the more fundamental matter of the prospective growth of enrollments. And that's the subject for next month.



The first stage of growth began immediately after World War II and lasted until about 1956. Then followed a half dozen years of neither growth nor con-

## Building activity: monthly contract tabulations





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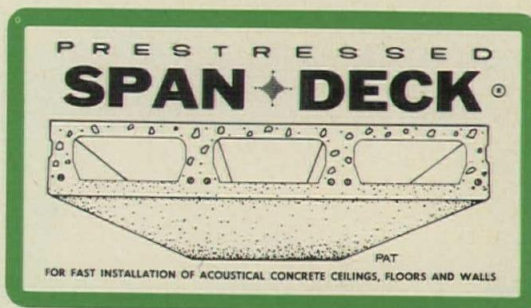
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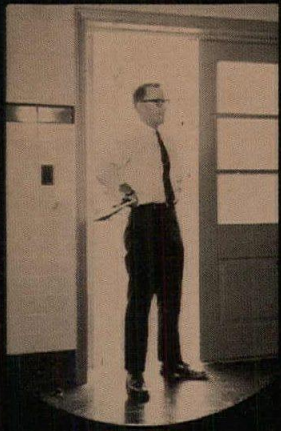
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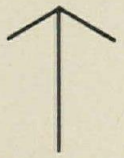
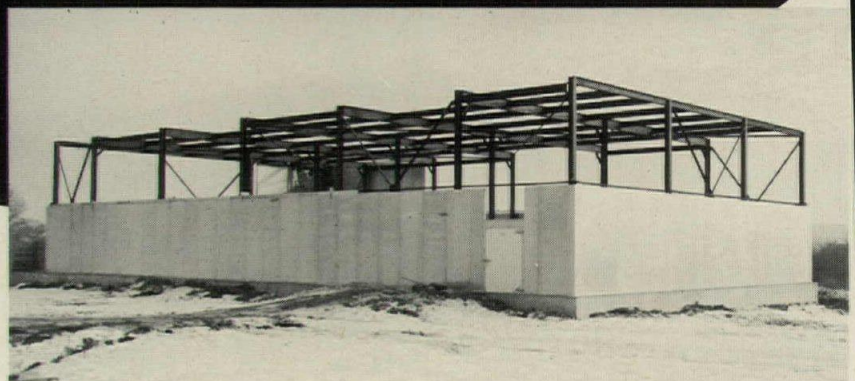








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## TRENDS AND ANALYSIS

by Lawrence C. Jaquith, Economist  
 The McGraw-Hill Construction Information Group  
 The McGraw-Hill Companies

## Imported materials: new flavor or national threat?

It is estimated that imports amounting to over a half-billion dollars went into the construction of domestic projects last year—a figure that will almost certainly increase. If so, this trend may prove to be a mixed blessing.

On the plus side there is the prospect of greater price competition among suppliers, wider channels of supply and improved accessibility to specialized materials. But it may also require closer attention to specifications to assure that a high quality product, whether foreign or domestic, is used.

The impetus for this shift in materials usage could well come from the recently completed "Kennedy Round" of tariff cuts.

### Competitive advantage the key factor

Additionally, there has been relatively little trade in building materials because of their low value-to-weight ratio. This situation will continue to prevail for that reason, but with some important exceptions. Since there are numerous possibilities for substitution, cost is a major consideration in the selection of building materials. In this respect, foreign producers have a decided competitive advantage in certain items.

This advantage—the ability to produce at a much lower cost than is possible in the United States—is often taken to mean the advantage of cheaper labor costs. To a large degree this is valid, but other countries also benefit from easy access to raw materials or from the development of specialized machinery. Also, some foreign products are competitive because of their esthetic appeal or simply because they are more technically advanced and new on the market.

### High transportation costs overcome for key materials

Transportation costs are still the major obstacle to a sizable influx of foreign building materials. And, to a certain extent, building code variations also act against such an increase. Some foreign products, especially those that can be shipped in large quantities via low-cost

sea transportation, have grown to be quite competitive in domestic markets. A few control quite a large share.

Foreign steel products have become a sizable factor in domestic construction. Last year 11 per cent of all steel sold in the United States was imported. Major items included an estimated \$200 million worth of concrete reinforcing bars and structural shapes. It is quite commonplace to see major projects utilizing imported steel. For example, nearly all the steel to be used in the World Trade Center will be produced in Japan.

Approximately 27 per cent of all window glass sold in this country last year was imported, representing a substantial increase over the past few years. Yet tariffs averaged over 25 per cent of value on all flat glass except for laminated. Forthcoming cuts in these high rates are sure to make imports even more competitive in price. One major manufacturer is seriously considering the possibility of abandoning domestic production of window glass.

Lumber and lumber products continue to be imported at a rapidly increasing rate. Approximately 30 per cent of hardwood plywood comes from foreign producers despite tariffs that average over 16 per cent. Imports of such items as door moldings and hardwood fiberboard have doubled in recent years. These and other wood products, mostly from Canada, will undoubtedly gain a greater share of the domestic market as tariffs are reduced. Even on items where the tariff is small, the elimination of small "nuisance tariffs", such as the 1.8 per cent levied on door moldings, will assist foreign producers.

Of special concern to architects is the rapidly increasing import of ceramic tile. It is estimated that \$30-million-worth of ceramic tile comes into the country each year, mostly from Japan. Overseas purchase of these products has doubled in the past few years and now accounts for an estimated 20 per cent of total supply. Many U. S. producers, to remain competitive, have shifted their production to such items as plastic tile. Tariff rates on ceramic tile, which will be

reduced from the present average of nearly 25 per cent, should intensify this competitive situation.

Even imports of cut stone and stone products, despite high transportation costs, have more than doubled lately and command approximately 10 per cent of the domestic market. Most of these products are specialty items, such as marble, and Italy is the major supplier. Import duties average approximately 15 per cent of value.

### Tariff changes will have a gradual effect

While foreign supply plays a major role in these five categories of construction materials, it is a relatively small factor in most others. Some change is inevitable, but it is unlikely that there will be any rapid increase in the use of foreign building materials as the tariff cuts take effect. Over-all, the reductions will average 35 per cent, and they will be implemented gradually over a five year period.

But the mere reduction of tariffs does not mean that imports suddenly become competitive where they were not before. Production costs still have to be substantially lower to overcome high transportation costs if an item is to be competitive in price. And even then, sales markets must be developed—not an easy task, since low cost is often equated with low quality.

Those imports that are now competitive with domestic materials will certainly benefit from the tariff reductions. They already have a foothold in the market and as competition intensifies, and price differences narrow, a few percentage points of savings on import duties can be quite significant.

### The architect will benefit in the long run

Competition in building materials from imports has a most obvious benefit to the architect and his client—lower costs. When domestic producers find themselves losing their competitive advantage they will quite often undertake more intensive research to regain their position. This may take the form of new



productive methods to reduce cost or the development of an improved substitute. In either event, the architect stands to benefit.

#### **Even if it's just a better doorknob**

A rather minor incident of a few years ago offered an interesting illustration of

this. Doorknobs produced in Germany became popular with architects since they were designed with handles rather than in the traditional tulip shape. Up until then it was felt that handles would be likely to break, but the German manufacturers came up with the necessary solution to overcome this. Responding to this technological innovation, Ameri-

can manufacturers soon began producing doorknobs with handles.

The only caution in dealing with imported materials is for adequate engineering (if necessary) and careful specification writing to assure a quality product. It is a small price to pay when compared to the potential savings that directly or indirectly accrue from these material

## **Phased construction can increase costs in the long run**

One problem the architect must inevitably face is the task of designing a project that will be built in phases. The client may request that contract documents be prepared so that the substructure can be let as a separate contract. Then while this segment is under construction, the architect can complete his work on the rest of the building. Or, more likely, the architect will be asked to design a project so as to permit future expansion. Both situations evoke the same question from the client: "how much more will it cost to phase the construction?"

#### **Time and money are key factors in clients' decisions**

In the first instance, time is the crucial factor and the builder may want to get the project under way as soon as possible. On the other hand, phasing for future expansion may be a speculative move. But more often it is dictated by funding considerations.

Even under the most favorable circumstances, a building constructed in phases will generally cost from 2 to 5 per cent more than the same project built all at once. Moreover, this additional expense will be incurred over and above any cost escalation that occurs with time.

#### **Example: the elements of decision in hospital construction**

On one recent major hospital project, this consideration proved to be only one of many factors that had to be weighed. Time was the immediate concern. This led to an analysis of the project with the thought of starting work on the foundation and basements while the architect completed the design of the remaining portions of the building. From a construction point of view, this proved to be feasible and other factors were considered.

Some thoughts were raised as to how the contractors would bid this kind of job. The contractor might give a low price on the substructure with the hope of getting on the job to enhance his position for the remainder of the work. The contractors bidding on the second phase might shave their prices realizing that

they had to overcome this. But this was mostly conjecture and it seemed more likely that the client would end up paying twice for general conditions.

There was the possibility of difficulties arising between contractors if two were on the same site at once. Since there would be a division of responsibility on the project, less than adequate supervision could be the result. Co-ordination was a key concern. If the substructure wasn't ready on time, the contractor on the remaining part of the structure might sue the owner for extras.

The possible complications were numerous, and most seemed unfavorable. Although time was still important, when the final decision was made, the overriding factors were budgetary considerations. The client wanted to insure that the architect's total concept of the project was implemented; therefore construction was not phased.

#### **Organized procedures can help lower costs**

On another major medical project a similar approach to phased construction was actually carried out, and quite successfully. The key to this—as it is on most successful projects—was teamwork. This cooperation was coupled with a CPM schedule to coordinate the efforts of all concerned. If there is any question of responsibility or a division of interest on phased construction, it rarely works well.

It should be pointed out that on hospital projects only certain methods of phased construction can take full advantage of Hill-Burton funds. For example, building a shell for future expansion might lead to sizable savings in terms of actual construction dollars but not in terms of the Hill-Burton formula.

#### **Vertical and horizontal expansion can be equally costly**

In another area of phased construction, the architect must occasionally decide whether to allow for future expansion either vertically or horizontally. Most often the decision is an obvious one, e.g.,

not enough land. Either can be expensive. When expanding laterally, site work costs might be high because of grading problems or poor soil conditions. Retaining walls in the original structure might have to be removed. Vertical expansion, of course, requires heavier foundations and the operations of the building are more severely interrupted.

Because of the variable conditions that can prevail, each project must be considered on an individual basis. For this reason, no general rule applies on the costs of vertical vs. horizontal expansion. It is usually more *convenient*, however, to expand horizontally. In either case, the client should be made aware that unit costs are much higher than normal for the original phase of the project. The costs of the heavier foundations, large ducts and pipes, over-sized boilers, etc. necessary for eventual expansion are divided over a smaller square-foot area.

Whether the client is planning a phased construction project because of the time element, funding considerations or for speculative purposes, the architect's task is made more difficult. Cost factors are more complex and require careful consideration. Co-ordination is equally essential in the drawings and implementation and management.

After final plans have been approved, the architect must often be the one to decide when to place the project on the market so as to achieve the most favorable bid results. A matter of a few months can be quite significant in terms of both the number of bidders and the low bid.

The architect must consider current and anticipated construction in the area, and the effect this will have on contractors' attitudes. If demand for contractors' work is high, or if they are optimistic about future projects, bids will run high. And since many contractors specialize, it is important to know when and if the ones that have bid on similar projects in the past are available. Few general rules apply except that in most cases, the larger the project, the more bidders—and the more competitive.



INDEXES AND INDICATORS

by H. Edgerton  
 Senior Editor, Dow Building Cost Calculator,  
 W. Dodge service

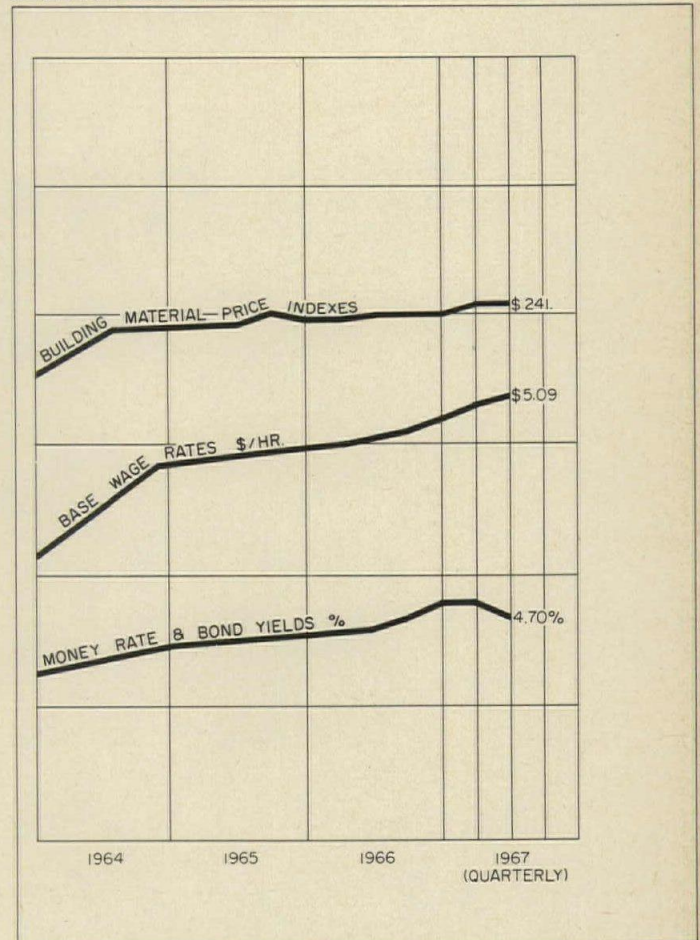
1967 BUILDING COST INDEXES

Metropolitan Area	Cost differential	1941 averages for each city = 100.0		% change year ago
		Current Dow Index residential	non-res. res. & non-res.	
U.S. Average	8.5	280.0	298.3	+2.20
Atlanta	7.2	318.4	337.7	+3.12
Baltimore	7.7	279.0	296.7	+0.66
Birmingham	7.5	258.4	277.8	+2.20
Boston	8.5	252.8	267.6	+1.69
Chicago	8.9	310.0	326.1	+2.42
Cincinnati	8.8	266.7	283.5	+1.41
Cleveland	9.2	287.7	305.8	+2.45
Dallas	7.7	262.6	271.2	+2.25
Denver	8.3	284.2	302.1	+1.01
Detroit	8.9	288.3	302.7	+4.40
Kansas City	8.3	250.9	265.6	+1.43
Los Angeles	8.3	284.9	311.7	+2.04
Miami	8.4	274.2	287.9	+1.79
Minneapolis	8.8	279.0	296.6	+2.27
New Orleans	7.8	252.1	267.1	+2.09
New York	10.0	295.7	318.0	+3.98
Philadelphia	8.7	277.7	291.5	+1.95
Pittsburgh	9.1	260.0	276.4	+1.11
St. Louis	9.1	278.8	295.4	+2.86
San Francisco	8.5	363.9	398.1	+3.04
Seattle	8.4	255.0	285.5	+1.98

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 (8.0) 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 of 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

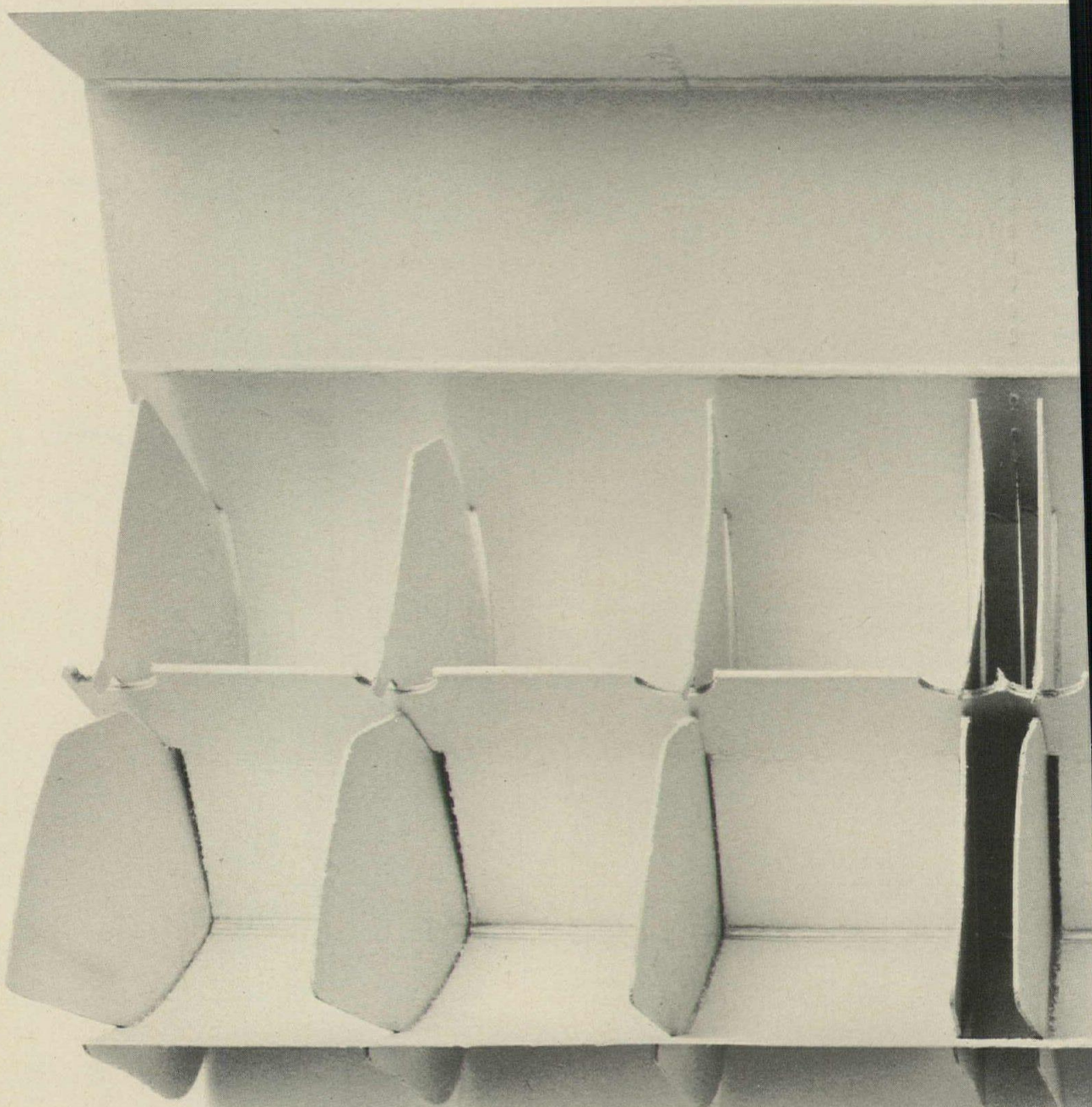
Metropolitan area	1941 average for each city = 100.00															
	1966 (Quarterly)							1967 (Quarterly)								
	1952	1960	1961	1962	1963	1964	1965	1st	2nd	3rd	4th	1st	2nd	3rd	4th	
U.S. Average	213.5	259.2	264.6	266.8	273.4	279.3	284.9	286.3	287.3	290.4	286.6	292.7	293.7	—	—	
Atlanta	223.5	289.0	294.7	298.2	305.7	313.7	321.5	322.2	323.3	328.5	329.8	332.4	333.4	—	—	
Baltimore	213.3	272.6	269.9	271.8	275.5	280.6	285.7	288.6	289.6	289.4	290.9	290.4	291.5	—	—	
Birmingham	208.1	240.2	249.9	250.0	256.3	260.9	265.6	267.1	268.1	269.7	270.7	272.9	274.0	—	—	
Boston	199.0	232.8	237.5	239.8	244.1	252.1	257.8	258.5	259.6	260.9	262.0	262.9	263.9	—	—	
Chicago	231.2	284.2	289.9	292.0	301.0	306.6	311.7	312.6	313.7	318.9	320.4	320.4	321.3	—	—	
Cincinnati	207.7	255.0	257.6	258.8	263.9	269.5	274.0	274.7	275.7	277.2	278.3	278.7	279.6	—	—	
Cleveland	220.7	263.1	265.7	268.5	275.8	283.0	292.3	293.0	294.1	299.2	300.7	300.0	301.3	—	—	
Dallas	221.9	239.9	244.7	246.9	253.0	256.4	260.8	261.7	262.6	265.8	266.9	267.6	268.5	—	—	
Denver	211.8	257.9	270.9	274.9	282.5	287.3	294.0	294.6	295.5	296.6	297.5	297.6	298.5	—	—	
Detroit	197.8	259.5	264.7	265.9	272.2	277.7	284.7	285.5	286.5	295.7	296.9	298.0	299.1	—	—	
Kansas City	213.3	237.1	237.1	240.1	247.8	250.5	256.4	257.3	258.2	260.0	261.0	260.8	261.9	—	—	
Los Angeles	210.3	263.6	274.3	276.3	282.5	288.2	297.1	298.0	298.6	301.6	302.7	303.6	304.7	—	—	
Miami	199.4	256.5	259.1	260.3	269.3	274.4	277.5	278.4	279.2	282.9	284.0	283.4	284.2	—	—	
Minneapolis	213.5	260.0	267.9	269.0	275.3	282.4	285.0	285.7	286.6	288.3	289.4	292.0	293.1	—	—	
New Orleans	207.1	242.3	244.7	245.1	248.3	249.9	256.3	257.1	258.0	258.8	259.8	262.3	263.4	—	—	
New York	207.4	265.4	270.8	276.0	282.3	289.4	297.1	297.8	298.7	302.8	304.0	309.4	310.6	—	—	
Philadelphia	228.3	262.8	265.4	265.2	271.2	275.2	280.8	281.7	282.6	285.3	286.6	287.1	288.1	—	—	
Pittsburgh	204.0	243.5	250.9	251.8	258.2	263.8	267.0	268.9	270.1	270.7	271.7	272.2	273.1	—	—	
St. Louis	213.1	251.9	256.9	255.4	263.4	272.1	280.9	282.2	283.2	287.0	288.3	290.3	291.3	—	—	
San Francisco	266.4	327.5	337.4	343.3	352.4	365.4	368.6	376.2	377.7	384.7	386.0	388.1	389.2	—	—	
Seattle	191.8	237.4	247.0	252.5	260.6	266.6	268.9	271.1	272.1	273.9	275.0	276.5	277.5	—	—	

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.

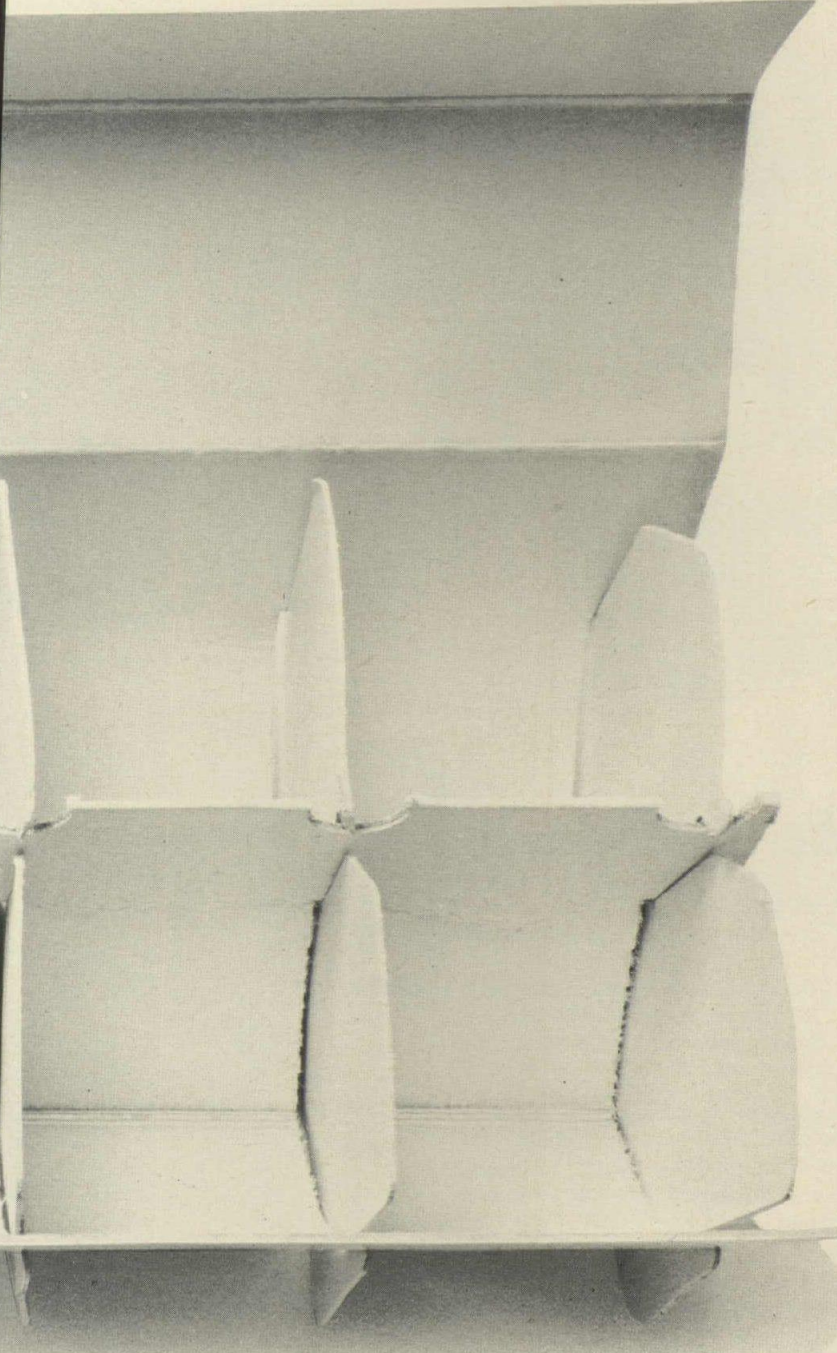


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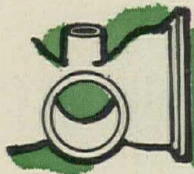
If you're working on school air conditioning design, talk to your Nesbitt man. He's in a great position—he handles both kinds of systems so he has no axe to grind. He'll help you do the best job at the best price. What more could you ask?

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NESBITT **ITT**



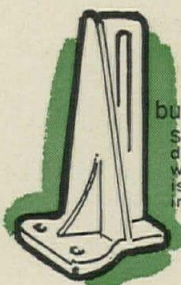
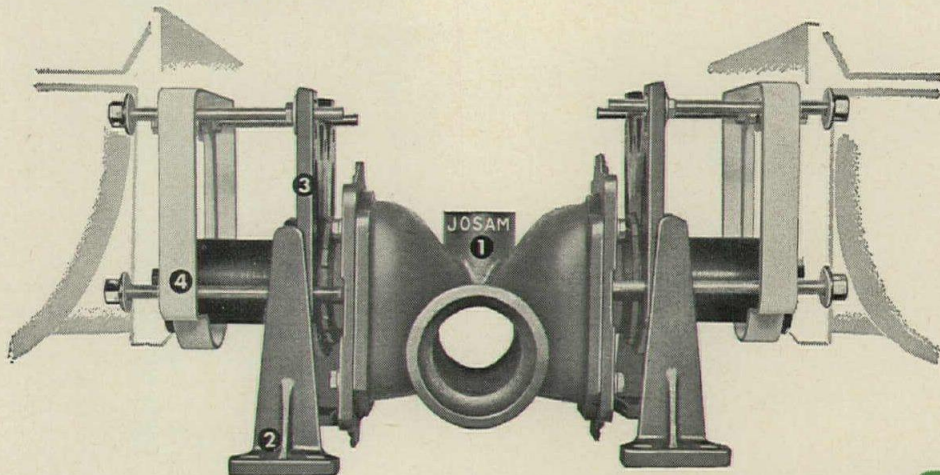
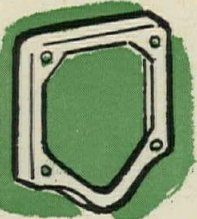
# WHAT MAKES AN OFF-THE-FLOOR INSTALLATION **COST LESS?**



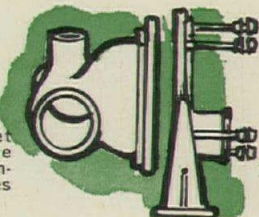
**common vent (1)**  
Saves chase space  
...substantially re-  
duces the number  
of connections re-  
quired in a battery  
of toilets

**positioning frame (4)**

Simplifies alignment...  
Saves one or more  
hours of labor per  
bowl\*... saves fix-  
ture breakage...  
saves call-backs...  
acts as template for  
wall finish, saving tile-  
setting time.



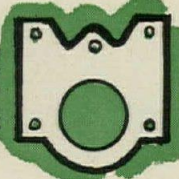
**butters foot (2)**  
Short Bulldog feet  
do not interfere  
with any type of fin-  
ished floor... saves  
installation time



**fitting and carrier are separate**  
provide more adaptability to meet  
changing conditions of installation  
... save revision time and labor

**invertible carrier body (3)**

Fits all types of  
toilets, blow-out or  
syphon jet... saves  
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eliminates stocking  
and ordering of dif-  
ferent carriers.



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## ADDRESS

... Luckman, F.A.I.A.  
 American Institute of Architects Convention,  
 1967

## ... our uncommon profession"

architect, in particular, faces challenges in planning and design today which have no tradition or pattern. He works often with a world that is far from beautiful or joyful; a world in turmoil; a world seeking, without success, some kind of order and balance in an era in which Humpty-Dumpty is king.

The problem is one of communication. The answer is not simply education, although some of our pseudo architectural critics could use some—hopelessly from the school of hard knocks. As a astute editor recently said: "I have suffered considerable distress in reading what is being fed to the general public by so-called architectural critics in the popular press. It is easy to rattle off the patter of the current preoccupations, and make a great appearance of wisdom, but one is apt to doubt that the catchwords accomplish anything very much besides perhaps impressing the unwary listener." ARCHITECTURAL RECORD, Editorial, (May 1967) These unblest critics do irreparable harm; since 90 per cent of our clients build only once—they are indeed the unwary listeners."

The way for us to combat our erstwhile critics is to learn to talk freely and frankly with our clients; to support beauty for its own sake, and not as either an excuse or a justification for a strange functional solution; to handle our memos, reports and submissions in a business-like manner; to recognize that in an era of change and confusion, careful communication can be our salvation; to deal with our clients as equals, for his money and our talent make us so. What helps me to communicate is certain knowledge, that just as we need him, so he needs us.

If we are able, from the beginning to the end, to communicate the essence of our partnership; if we are able to convey that in our hearts and minds, we and the client are inextricably bound together.

**Statement: "The single most important problem is our percentage fee system."**

So now I would like to make some observations on our fee system—even though

at an early age my mother cautioned me, "If you don't have anything nice to say—don't say it." Well, in view of the intensity of my feelings on the subject, I think I am being reasonably nice when I say that *the fee system which is based on a percentage of the cost of construction is archaic, impractical and immoral.*

The percentage fee system is archaic because it presupposes that the architect is responsible for the cost of construction. This is not true. Instead, the requirements of the client are responsible for the cost of construction. The architect's responsibility is to either fulfill the requirements in an aesthetic and efficient manner within the budget—or to advise the client, at an early date, that his requirements will result in a construction cost in excess of his proposed budget.

The percentage fee system is impractical because its fundamental premise is based on an irrational fallacy. Simply stated it is this: the more careful the architect is in trying to keep the cost of construction down, the less he gets paid. The more careless the architect is of the cost of construction, the more he gets paid. Not even a computer can make sense out of that!

The percentage fee system is immoral because it places the architect in the ambiguous position of having to defend his integrity. All of us, on occasion, advise the client to do something constructive even though it will add to the cost of the project. When this happens should we put ourselves in a position where we can be looked at with a jaundiced eye? We should no longer be willing to get ulcers from mountain climbing over molehills of suspicion.

Many of our clients believe that this entire process makes no sense; they agree there is no rhyme, reason or rationale for our present "percentage of the cost" fee system; they agree that it is nothing more than a rule of thumb gambling device, of which not even Las Vegas would be proud.

There are, however, three fee arrangements that are up-to-date, practical and moral:

- Where the scope of the work and the budget are agreed upon—the establishment of a lump sum fee for the architect.
- Where the scope and budget are uncertain at the beginning of the project—the establishment of a percentage fee which will be convertible to a lump sum at the completion of the schematic drawings and schematic cost estimate.
- Whether the scope and budget are known or unknown—the establishment of a lump sum professional fee for the architect; plus his payroll costs, overhead costs, and out-of-pocket costs.

It may be of passing interest to you to know that 87 per cent of all the new contracts we have written in the last five years have been based on one of these three procedures. We don't make any more money—but we don't lose as much!

And the fee felony is frequently compounded, if the architect is on a percentage fee, and if, in turn, he places the structural and mechanical engineers on a similar percentage fee basis. For then, even though the client's total budget is met, if the final costs of the structural and mechanical systems go over their individual budgets, the architect must pay the engineers more dollars of fee, and have less dollars left for himself!

I feel it is high time architects gave more thought to the making of a better living for themselves and their families. For its practitioners, architecture has a soul-satisfying stimulation, but at best, it is a tortuous occupation. For it is inherent in the nature of what they do that architects, large and small, find it mandatory to sustain their life on a steady diet of trials and tribulations. Neither our "professional status", nor an increased profit, can shield us from these daily doses of duress, but a more equitable fee arrangement could make them more palatable.

A short time ago, an officer of the A.I.A. put it more succinctly when he said that: "It's time that the architectural profession became a little more concerned about money—their own, and not just their client's. Not because any of us are greedy, but because it is the one thing by which our society measures success, and success is the primary thing our society respects, and with respect comes



the power to exert influence. The profession has to understand and appreciate the relationship between money and power." Oh, Diogenes; you have at long last, found your honest man!

Today I am the most fortunate of men—for, in addition to my family, I am able to have what I want above all else—the soul-stirring sense of satisfaction at seeing a concept become a reality. I be-

lieve with all my heart and mind, that one has as limitless an opportunity as architects have today. For true it is that everything we do affects the living, and leisure of our people.

## Costs of architectural practice: bad news

One of every 12 architects lost money in 1966, and one of every four projects cost the architect more than his fee to execute. Those doleful statistics were part of the findings of the study of the cost of providing architectural services conducted by Case & Company, San Francisco management consultants. The first returns of the study were announced at the practice session of the 1967 A.I.A. convention in New York. Preliminary summaries of data still undergoing analysis were reported to the convention by Alf Werolin and Charles J. Marsh of the Case staff.

Purposes of the study are: 1) to ascertain the real cost of doing architectural work; 2) to relate cost to profit; 3) to find a basis that will permit a new fee structure.

Some 280 firms throughout the nation were asked to participate: 223 replied with usable data on 1,150 projects. All 280 firms were also visited or interviewed by telephone. Firms responded on two kinds of forms. One form asked for 90 items of information about the operation of the firm. The other was a project form which asked for 70 items of information on clients, scope and costs of specific individual projects. Five project forms were requested from each firm.

In addition to findings indicating that one of every 12 architects lost money in 1966 and one in every four projects was unprofitable, there were other causes for dismay. About 17 per cent of firms surveyed made no effort to schedule work, 23 per cent made no effort to control costs, and 47 per cent

reviewed a financial report only once a year.

Charles Marsh stressed, however, that mismanagement was far from the prevailing condition and that the three most-often-heard architects' complaints seemed reasonable.

First, architects complain of a cost/price squeeze, and one clearly exists. Pre-tax income, or profit, in firms surveyed is down from 22.6 per cent of gross receipts in 1950 to 9.2 per cent in 1966. Main reason is rising salaries. While the building cost index has risen only 13 per cent since 1960 (and the architects' fees for 84 per cent of projects analyzed were based on construction costs), pay for professional and other personnel is up from 25 to 44 per cent in the same period (see charts).

Second, architects say clients are "demanding more complicated and sophisticated service." These demands include increased programing and engineering, feasibility studies and construction management with attendant increases in risk and liability.

Third, architects talk about the lack of quality personnel. Noting that the complaint seemed true enough on the surface, and admitting that the role of Case and Company was diagnostic, not therapeutic, Mr. Marsh nonetheless suggested that presently available personnel might be used to somewhat better advantage by simple upgrading of management procedures.

Calling the architects' situation "a serious dilemma," the consultants said architects were asking such questions as:

1) How can I continue to provide

clients with attractive, functional sound buildings within their ever-mounting stringent budget limitations?

2) How can I maintain quality design in spite of constantly rising costs for services and materials?

3) How can I manage my practice so that my monetary return is proportionate to my investment of time, money and effort—plus the value to my client of my skill and knowledge?

With these questions as a kind of guide, areas needing remedial measures can be identified:

1) Overcoming the profit squeeze—budgeting job time; controlling costs and expenses; pricing services; using manpower effectively.

2) Determining better and more equitable methods of compensation.

3) Deciding which services architects should provide from their offices—which through consultation.

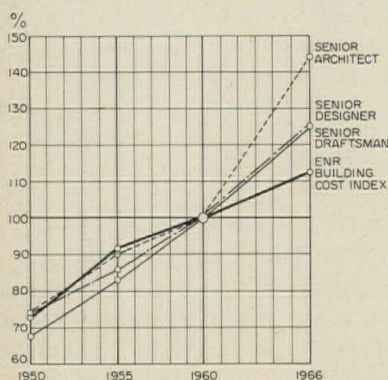
4) Planning profit into each job.

5) Educating the client and the public about what architects do, how they do it, and how they earn their fees.

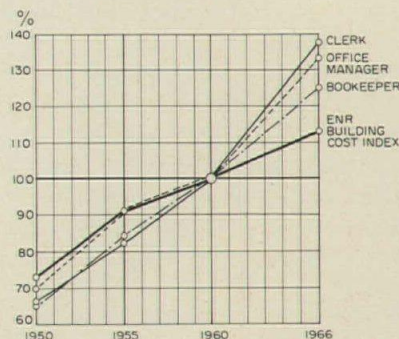
6) Devising an information base where architects can quickly obtain up-to-date facts pertinent to practice policies, employee benefits, methods and techniques.

Architects do not seem to be taking advantage of services the A.I.A. already provides in some areas, the Case consultants noted. With some research and information sources already finished or under way, they warned against the possibility of duplication unless the resources of some sort of clearing house are fully exploited.

COST OF DIRECT PROFESSIONAL SERVICES COMPARED WITH BUILDING COSTS

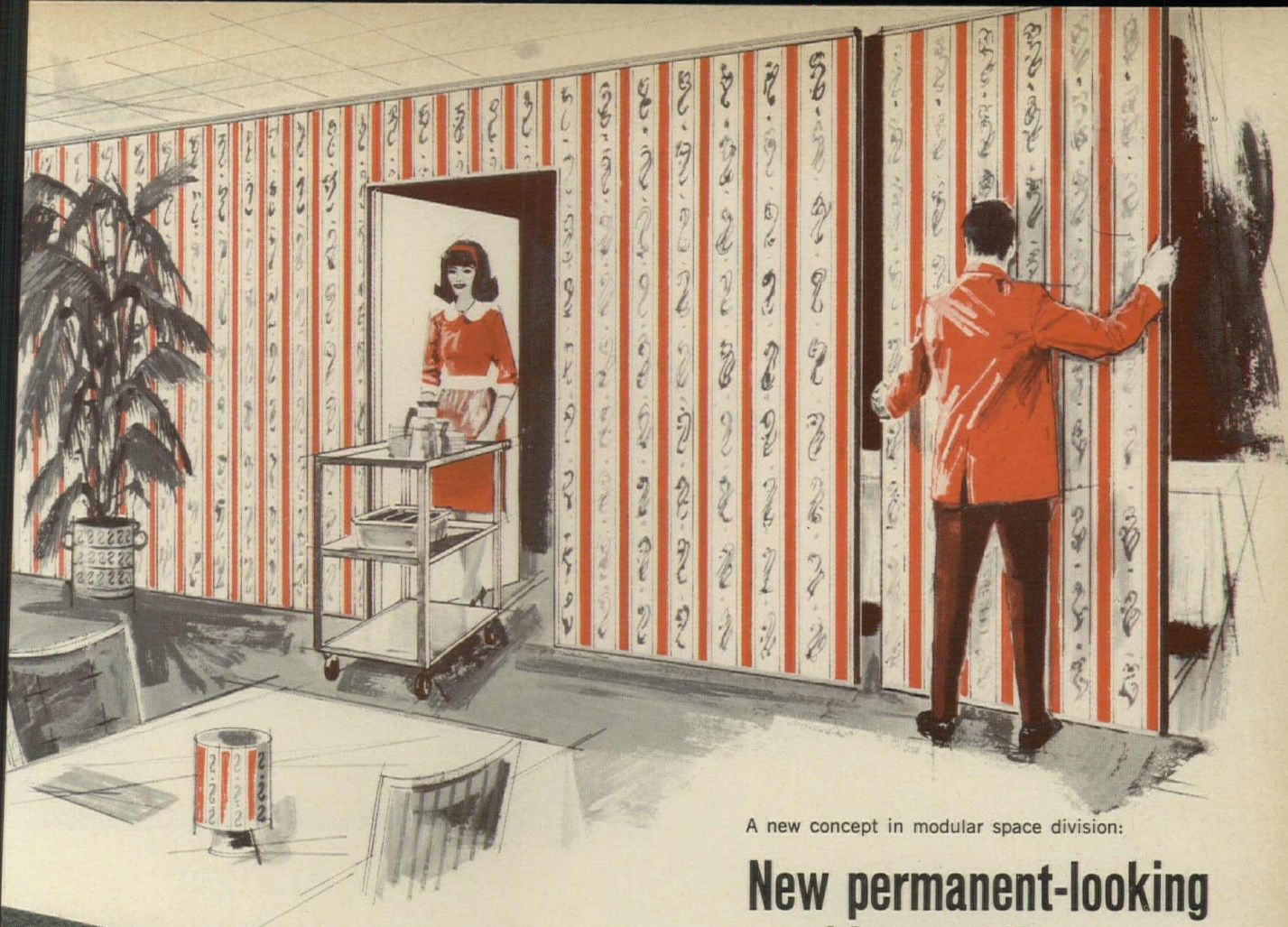


COST OF INDIRECT SERVICES COMPARED WITH BUILDING COSTS



**Architectural barriers.** Sen. E. L. Bartle (D-Alaska) has introduced a bill to require ramps and other facilities for the handicapped in all future Federal buildings, but its prospects are dim. Meanwhile, the President's Commission on Architectural Barriers, with an assignment to ease the problems of access for the handicapped, is increasing efforts to make sure architects consider the problem as one of the design elements of Federal buildings. Action on the bill is not likely to be rapid.





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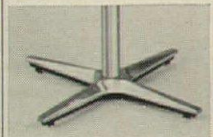
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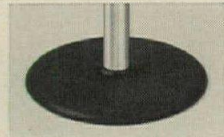
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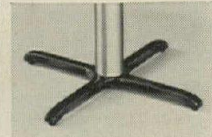
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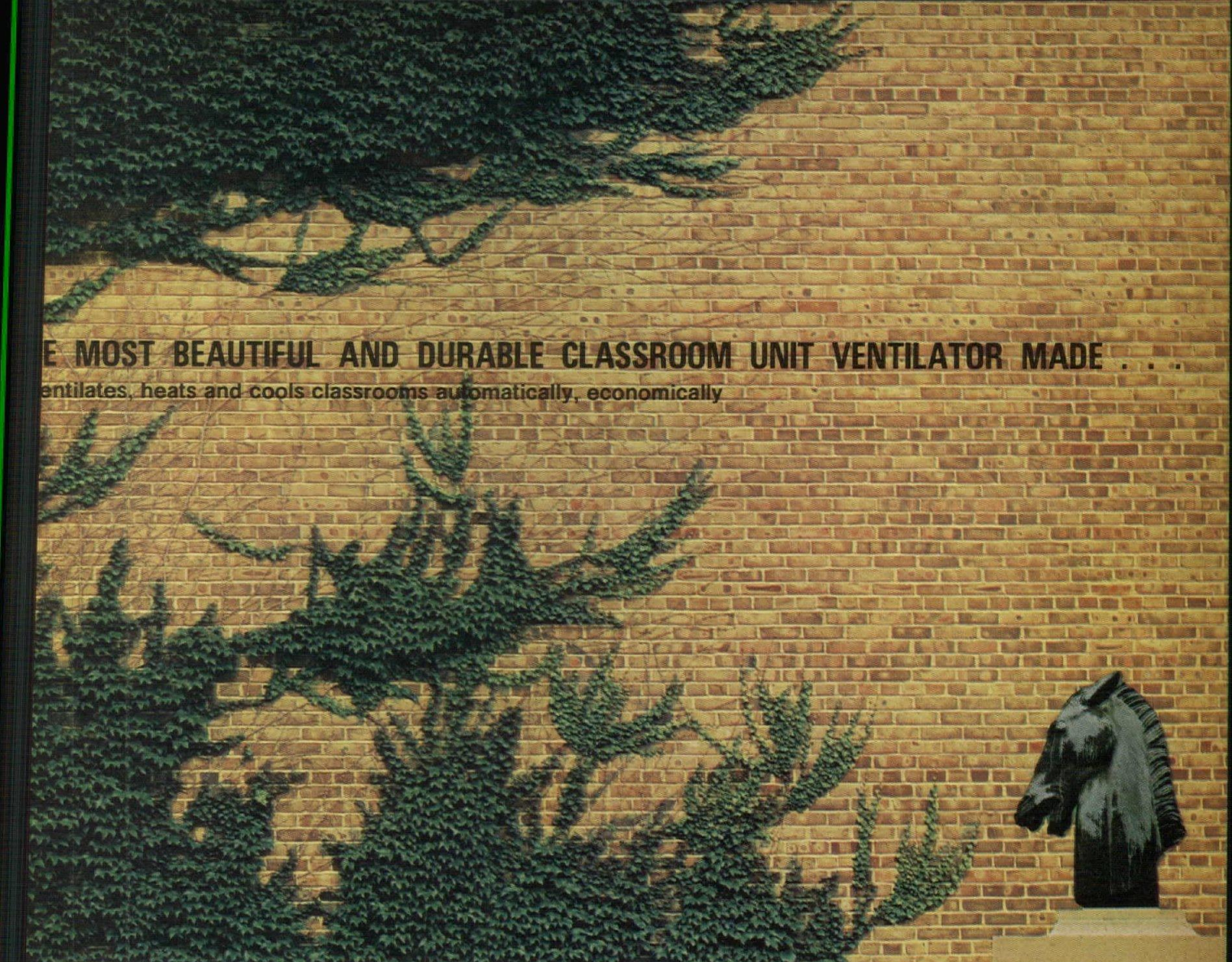
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A brick wall with ivy growing on it. To the right, a dark sculpture of a horse's head is mounted on a pedestal. In the foreground, a long, low, rectangular classroom unit ventilator is shown. It has a grey top and two large orange doors with silver handles and a small square logo on the left door.

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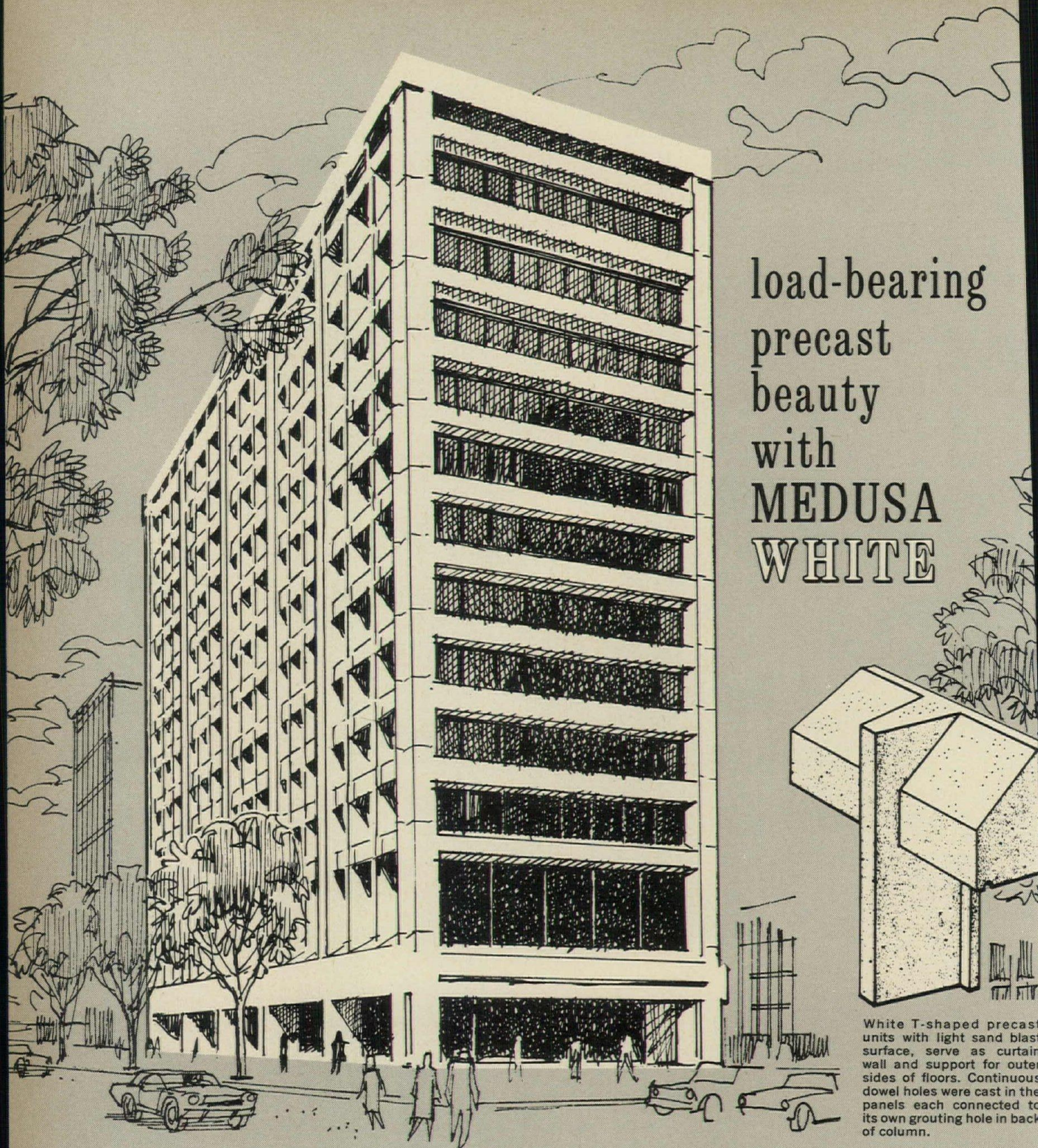
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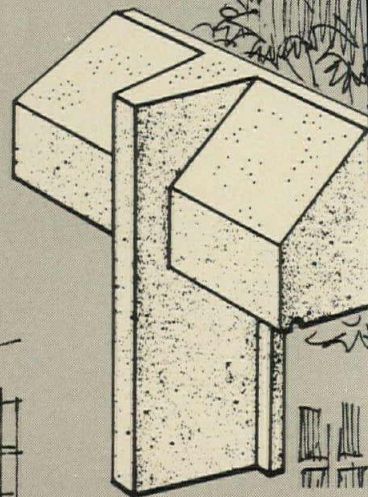
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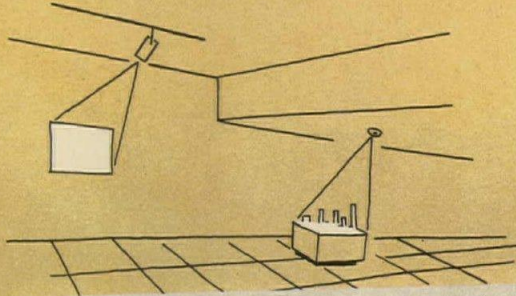
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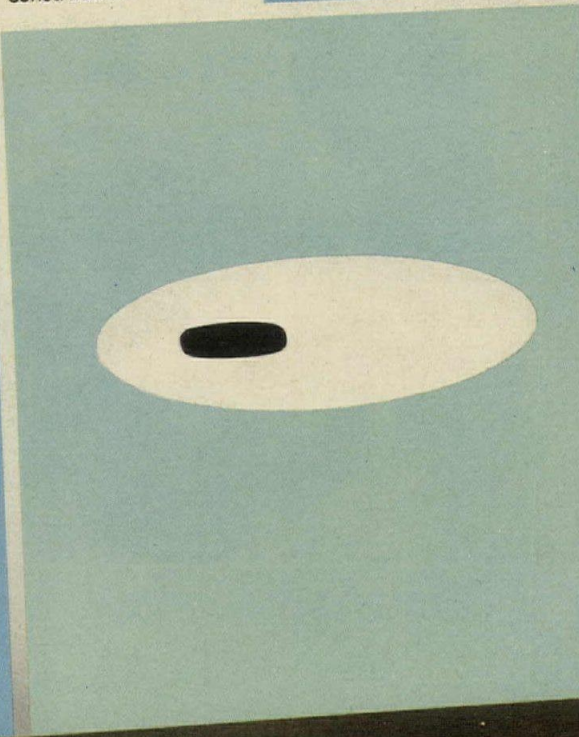
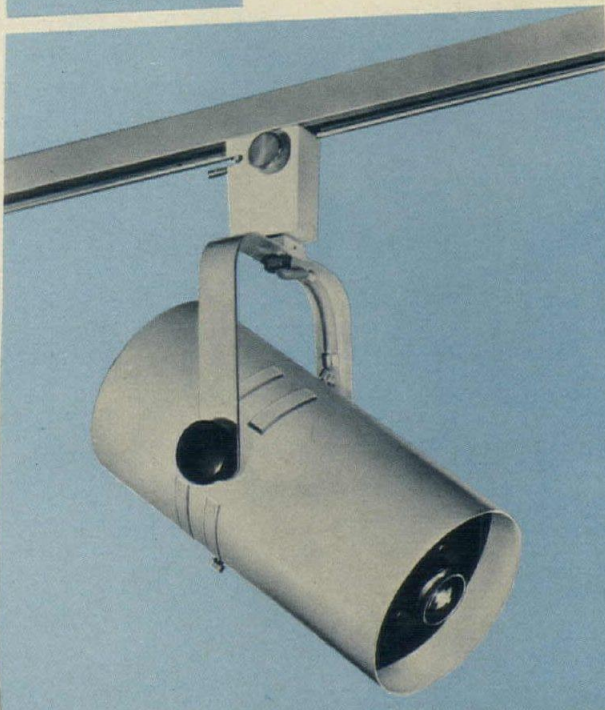
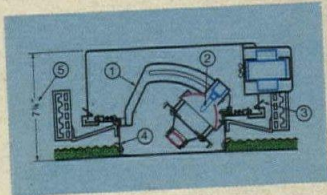
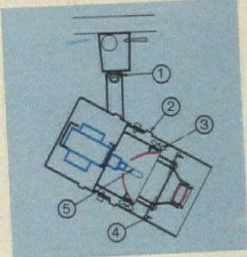


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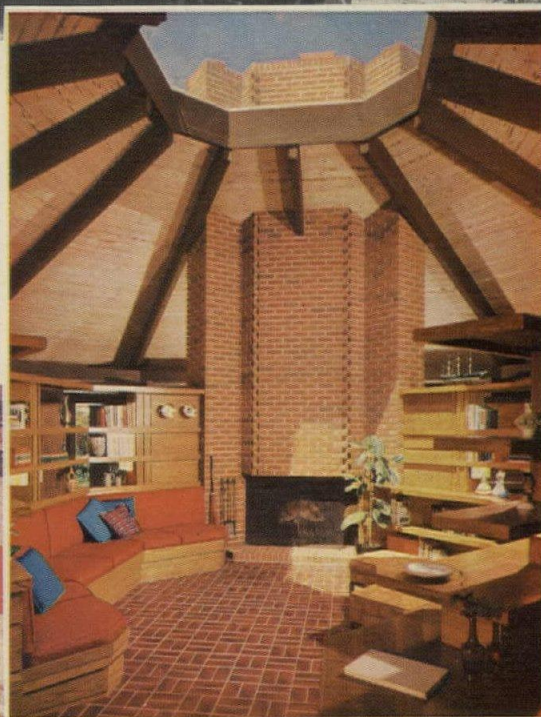
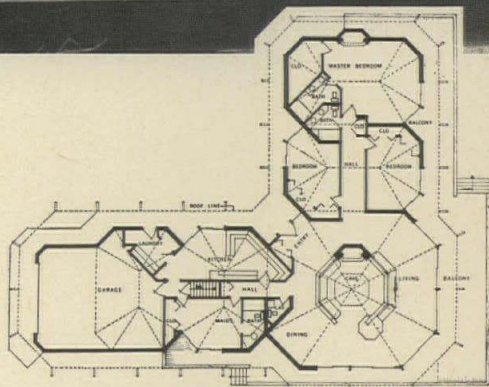
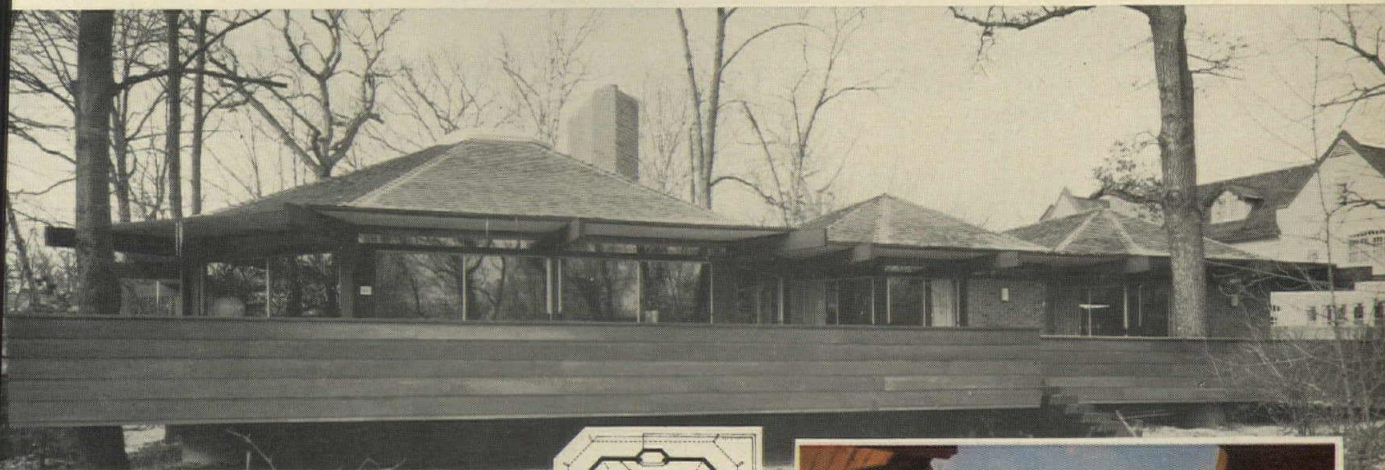
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# Erickson and Stevens enhance a modern day "cave" in a sophisticated country home with ceramic tile.

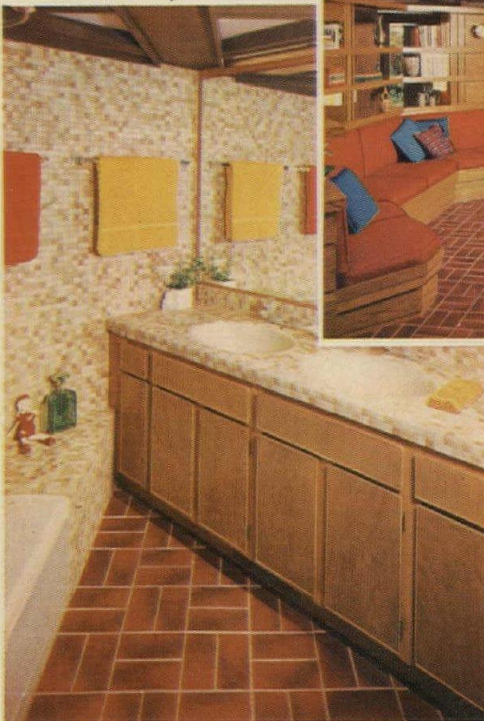


The focus of this home located in a wooded area of Winnetka, Illinois is the "cave"—a room within a room. It was designed to meet the owner's requirement of an intimate yet not isolated conversation area. The cave, as well as the surrounding entry, dining and living areas have ceramic tile floors.

The philosophy behind the design of this home is the use of a prismatic plan offering maximum opportunity to capitalize on spectacular views in all directions. At the same time, privacy is accommodated by the adaptation of individual, adjoining living "cells," each with its own roof.

Throughout the home, architects Erickson and Stevens have made extensive use of ceramic tile for decorative as well as functional values. Bathroom vanity tops, tub enclosures and walls are finished in random blend ceramic mosaic tile with quarry tile floors. In the kitchen, counter tops and backsplashes are tiled for color harmony and durability.

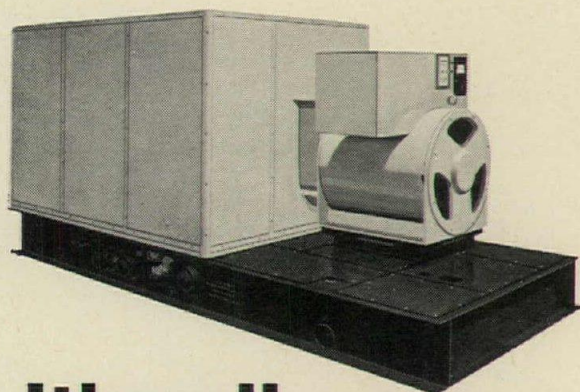
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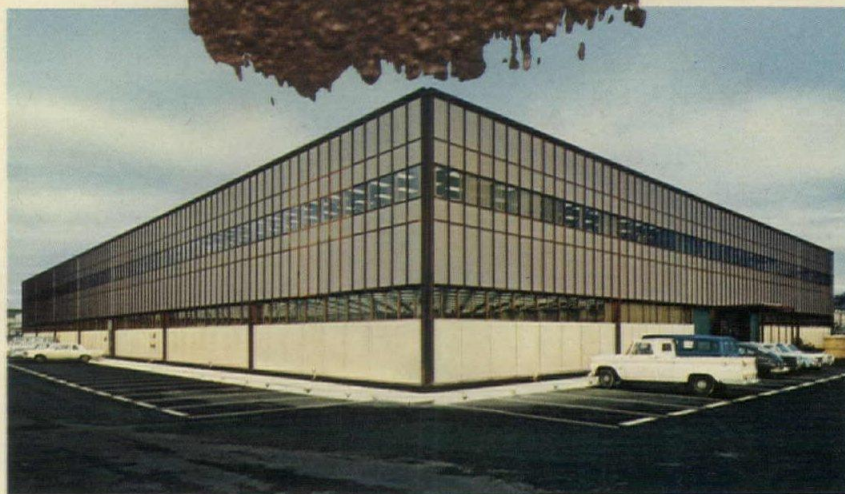
**AiResearch Total Energy Systems**



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# This engineering building is "painting" itself



The Boeing Company's Engineering Laboratory Building photographed in Nov. 1966, 13 months after erection. Architect: Leo A. Daly & Associates, Seattle. General Contractor: Peter Kiewit Sons Co., Seattle. Structural Steel: Joint venture— Pacific Car and Foundry Co., and Issacson Structural Steel.

The exposed steel in The Boeing Company's new Engineering Laboratory Building at Renton, Washington, is USS COR-TEN Steel, the steel that "paints" itself as it weathers. It develops a tight, dense oxide coating that seals out corrosion; if it is scratched, it heals itself. The longer bare COR-TEN Steel weathers, the better it looks. Nature provides its rich, earthy color and texture.

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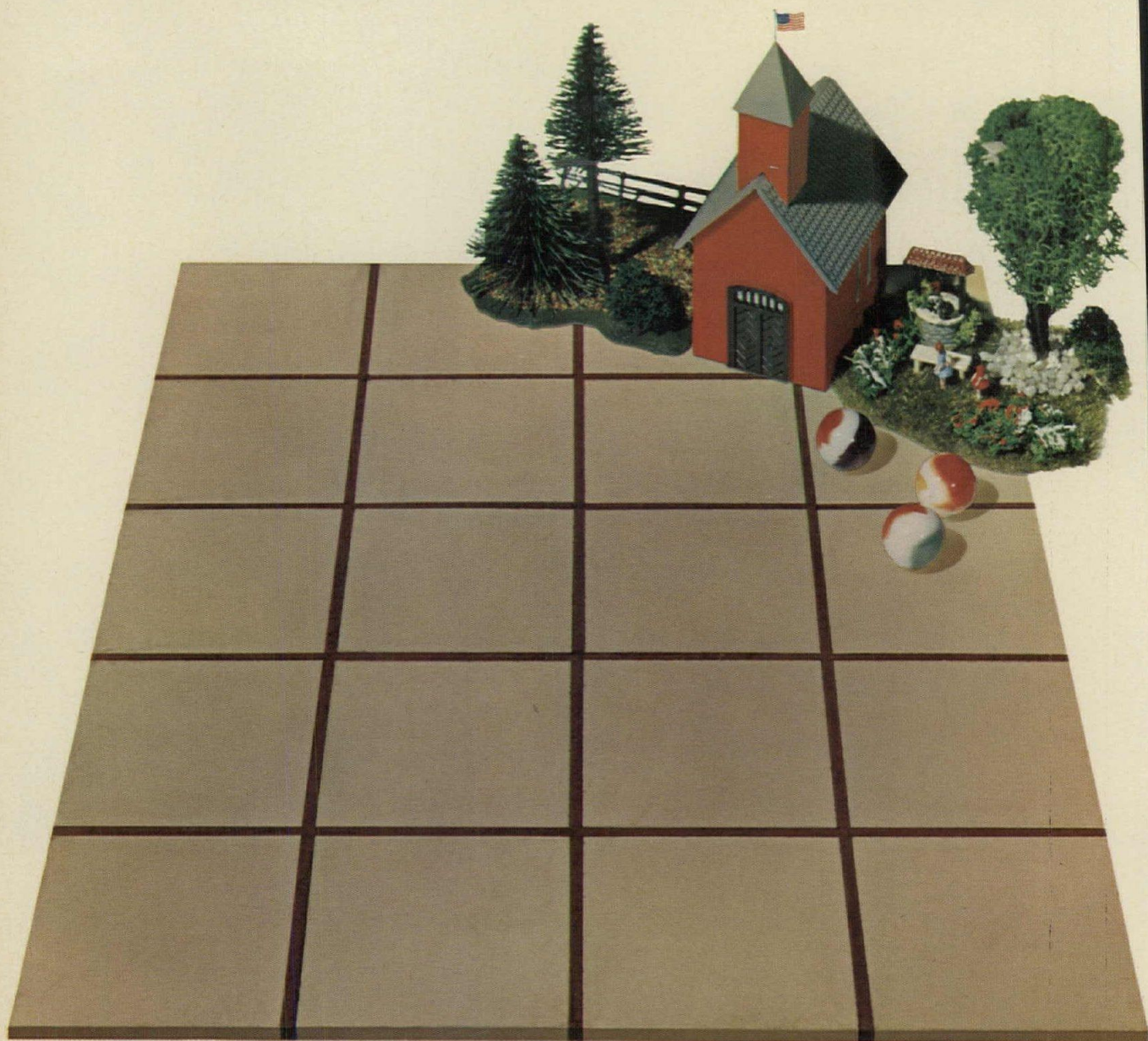
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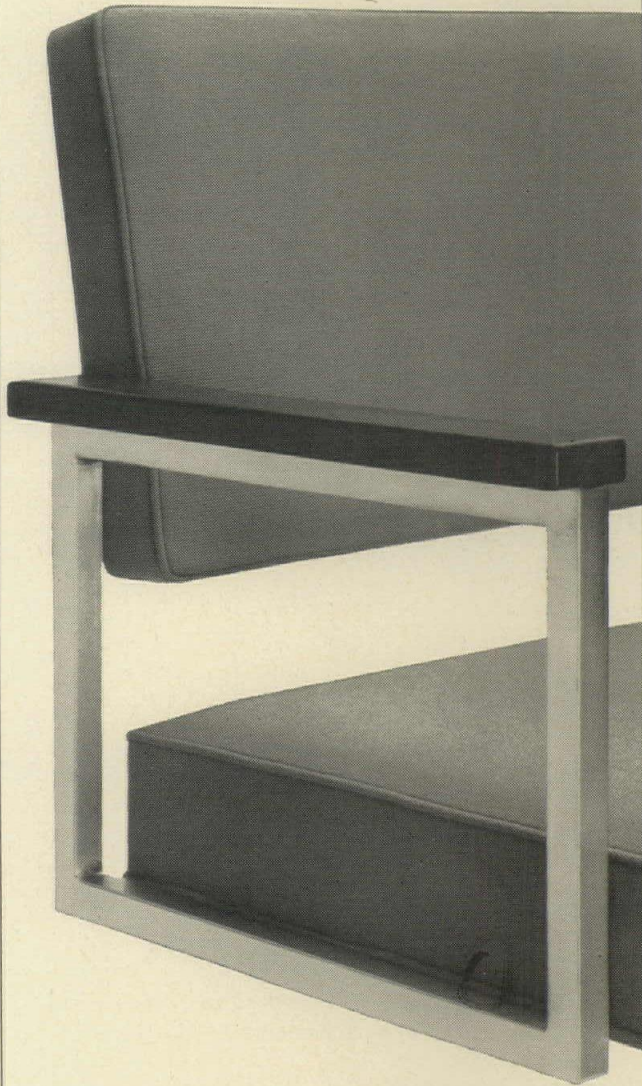


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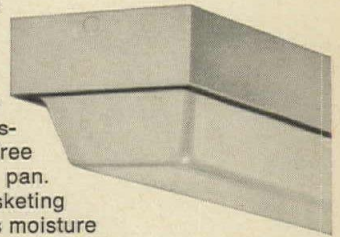
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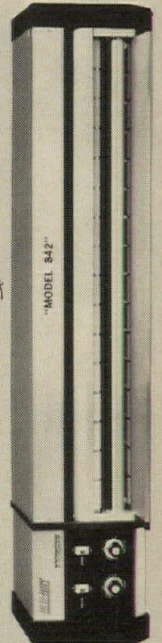
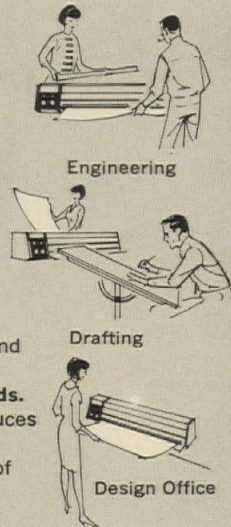
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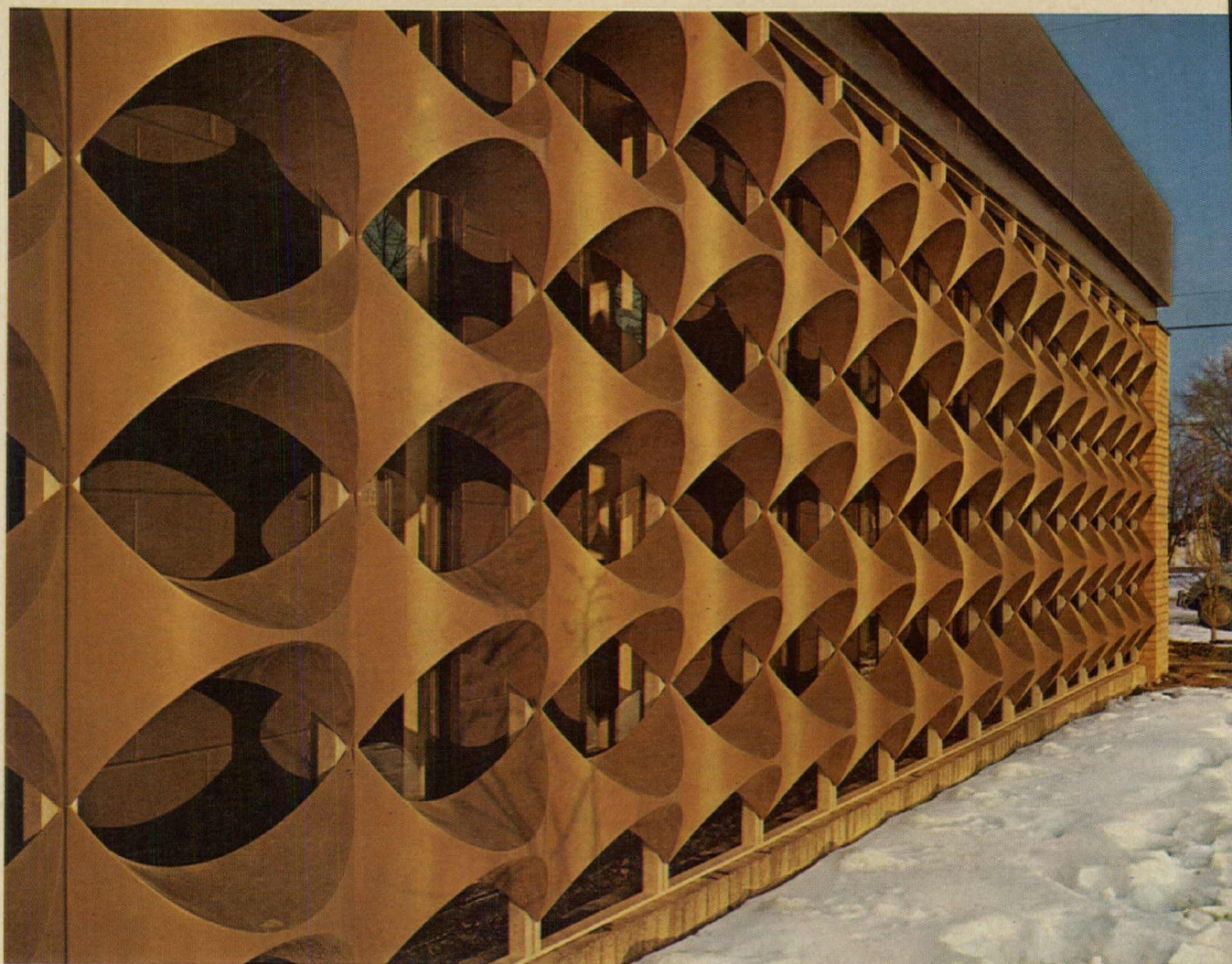
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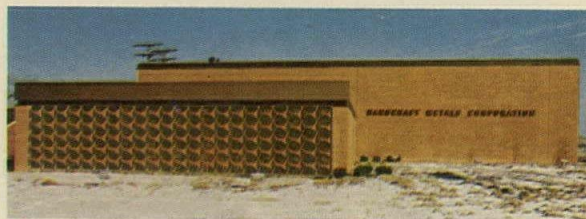
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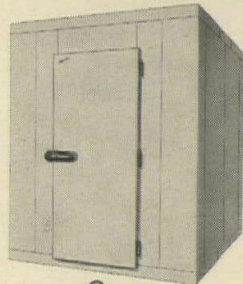
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**TOWN**



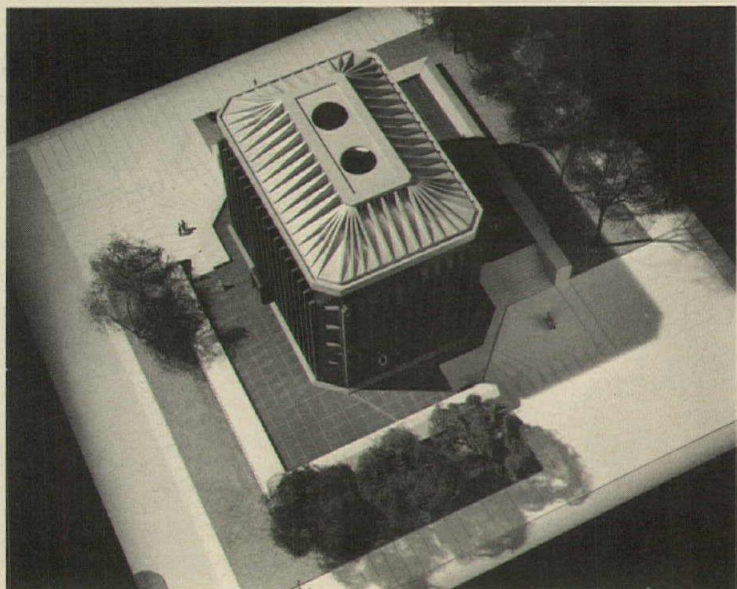


Balthazar

STRUCTURE  
AND FORM  
EXPRESS  
THE THREE-WAY  
FUNCTION OF  
THIS OFFICE  
BUILDING

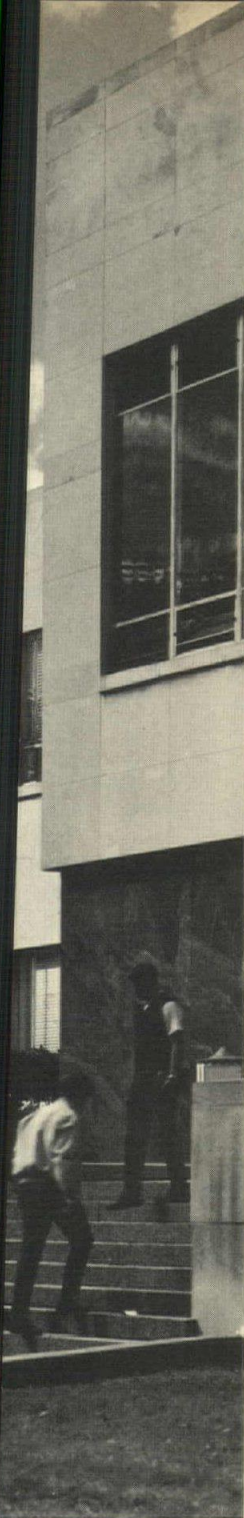
Both the form and the structural system of the Fisher Administrative Center at the University of Detroit make visually manifest the building's three-part division, which corresponds to its three-way function. The ground floor—several times the area of a typical office floor—contains facilities for activities that serve or deal with students, and is a low, horizontal, concrete element that makes a base for the super-structure. Locating it below the main entrance floor divides pedestrian traffic so the lobby, stairways, and elevator are free of congestion during peak hours. Principal public entrance and access to the upper five office floors is from the raised podium or terrace level, reached from two sides. The four typical floors are laid out on a modular grid of 5-foot squares, with conforming ceiling troffers for air supply and lighting. The floor slabs are carried by concrete mullion-columns and by the core; the roof is suspended from the central core by concrete-encased steel cables. The top, or fifth, floor—for executive use—is thus free of columns and is fitted with continuous glazing for undisturbed vision.



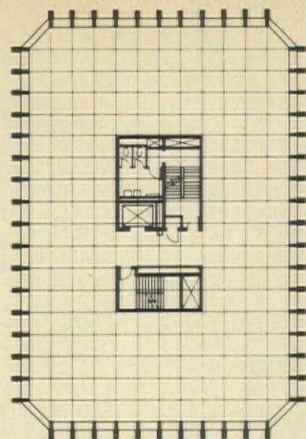




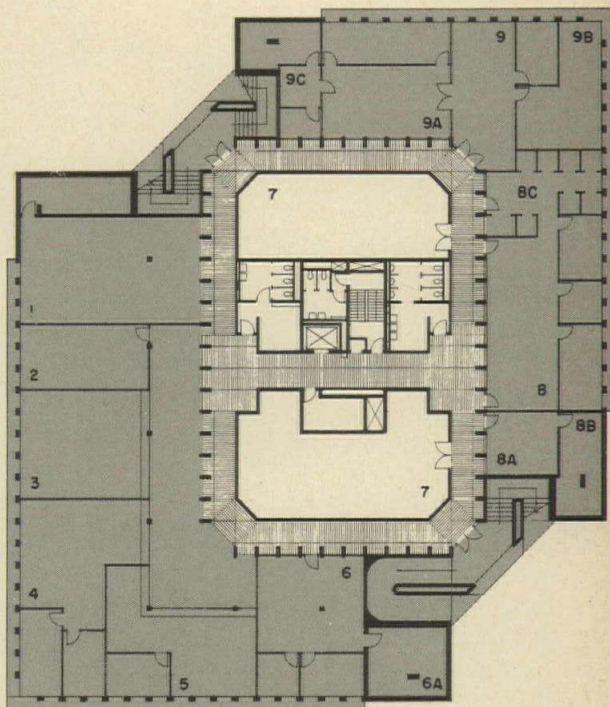
FISHER  
ADMINISTRATIVE  
CENTER



Architect Gunnar Birkerts explains that existing nearby buildings provided numerous clues in the search for an expression of appropriate scale and character. Neighboring structures are mostly of limestone bearing-wall construction, with tall, narrow, deeply recessed windows, and with sloping roofs of red tile. The new building obviously echoes some of these characteristics, but without compromise and without belaboring the idea. In denying the horizontals of the spandrels—by pushing them behind the glass—the building gains a more imposing look. This was the intention, since the new building is located near the future main gate.



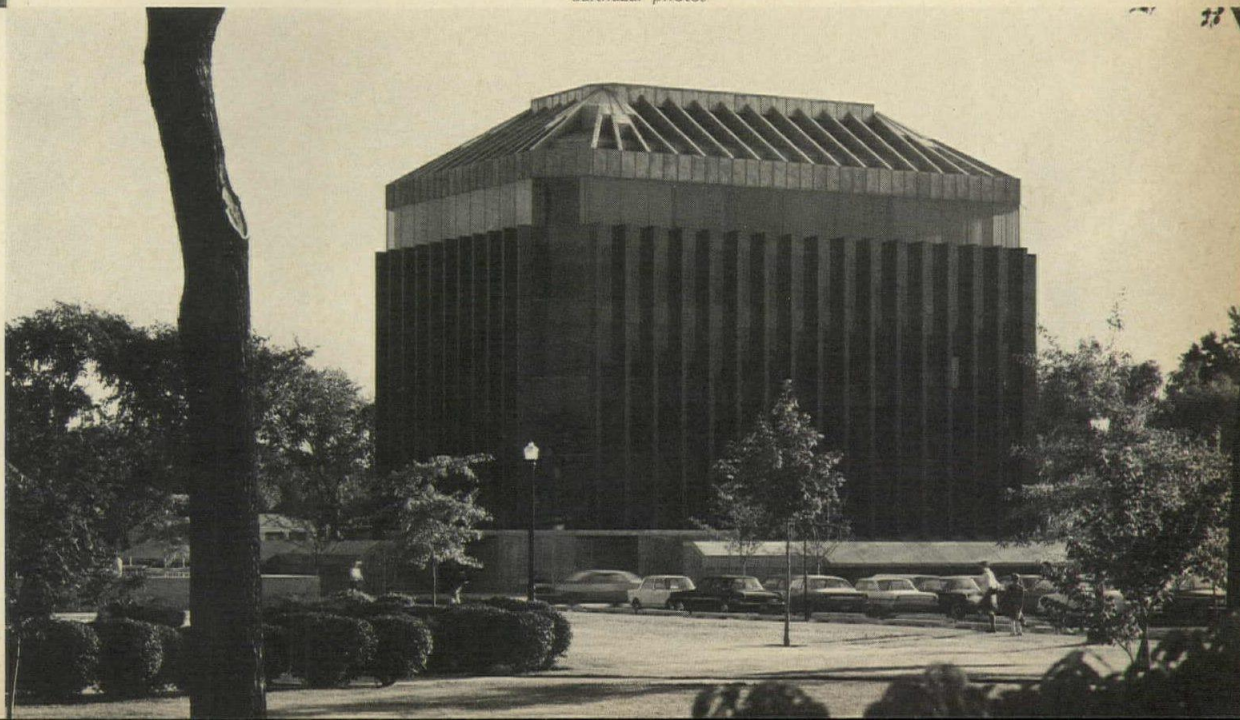
TYPICAL FLOOR



GROUND FLOOR

- |                               |                         |
|-------------------------------|-------------------------|
| 1 Mail and storage            | 8 Computing Lab         |
| 2 Expansion                   | 8A Program              |
| 3 Bursar                      | 8B Vault                |
| 4 Business Services Institute | 8C Student-faculty area |
| 5 Registration, scheduling    | 9 Public information    |
| 6 Registrar                   | 9A Studio               |
| 6A Vault                      | 9B Work, reference      |
| 7 Mechanical                  | 9C Photo lab            |

Balthazar photos

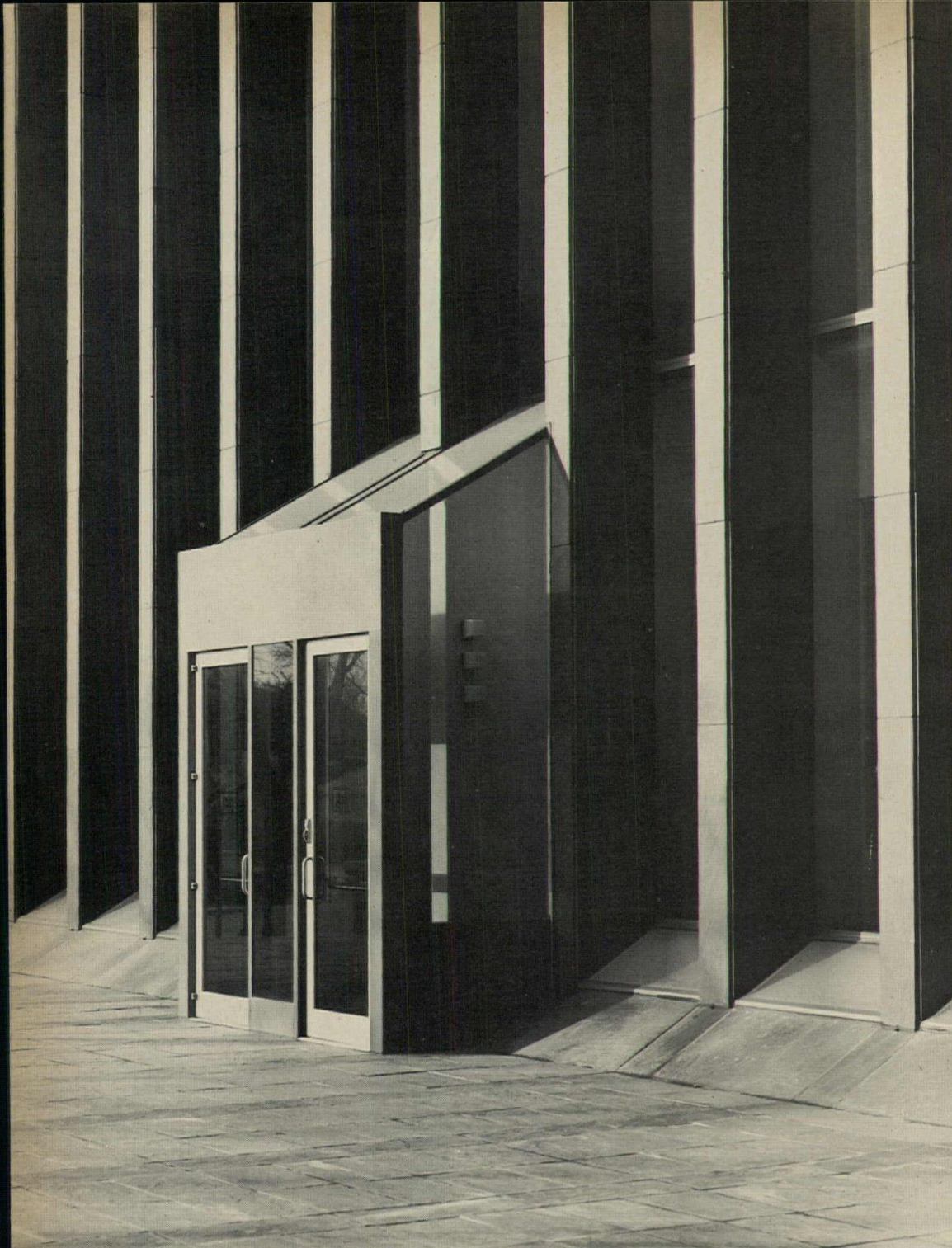




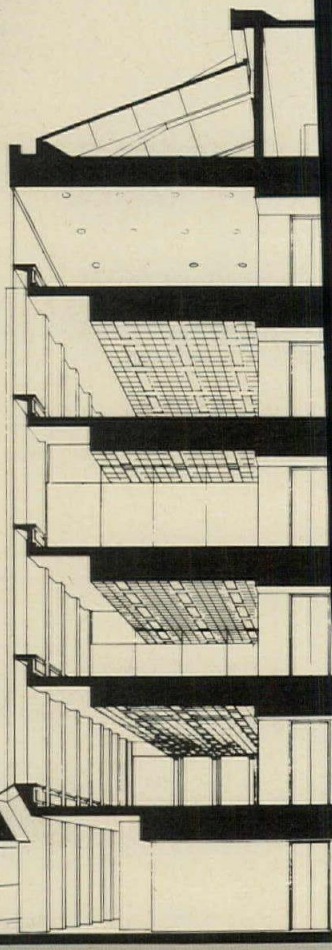
FISHER  
ADMINISTRATIVE  
CENTER

These two photographs and section through the building show the manner in which architect Birkerts has brought daylight to the heart of the indoor, low-level space. Note the sloped glass panels between the colored glass panels between the colored mullions at terrace level.

The exterior palette is a simple and restrained one, consisting of lead-coated copper cladding, natural cleft Buckingham limestone for mullions and terrace, and heat-absorbing plate glass in the aluminum sash anodized dark gray, and the natural concrete ground floor element. The building creates a total effect that is strong yet restrained, monochromatic but not dull.



Daniel Bartush photos







FISHER ADMINISTRATIVE CENTER  
*University of Detroit, Detroit, Michigan*

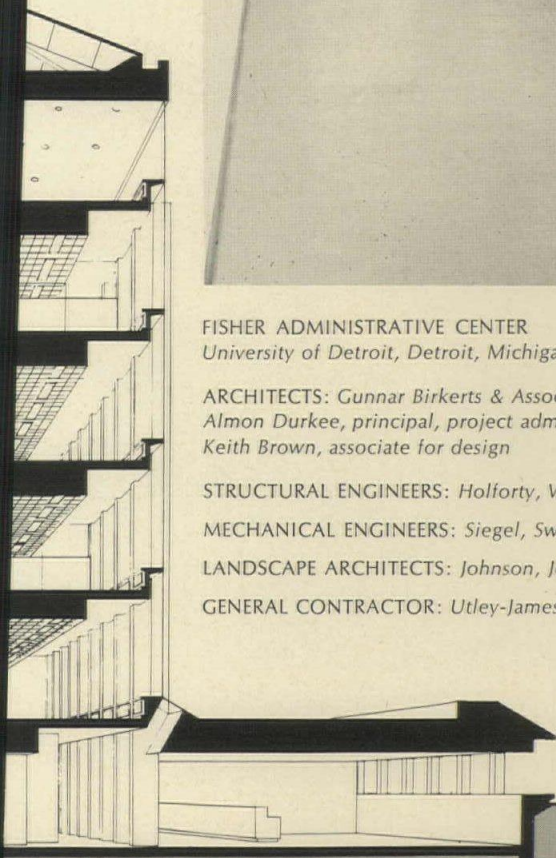
ARCHITECTS: *Gunnar Birkerts & Associates*  
*Almon Durkee, principal, project administrator*  
*Keith Brown, associate for design*

STRUCTURAL ENGINEERS: *Holforty, Widrig, O'Neill Associates*

MECHANICAL ENGINEERS: *Siegel, Swiech & Associates*

LANDSCAPE ARCHITECTS: *Johnson, Johnson & Roy*

GENERAL CONTRACTOR: *Utley-James Corporation*



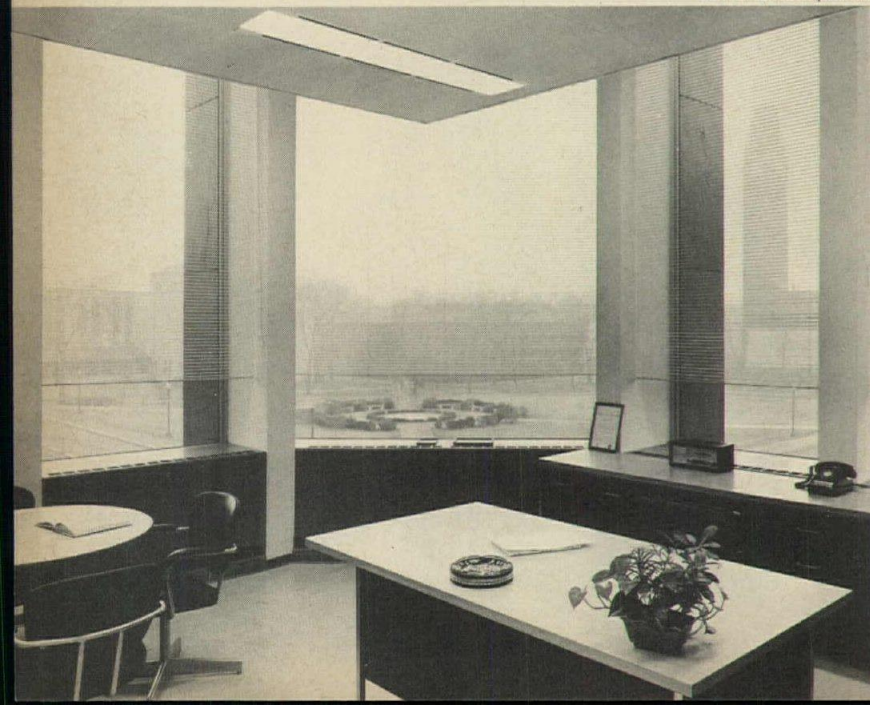


FISHER  
ADMINISTRATIVE  
CENTER



The general character of the interiors can be seen in these three photographs. Above, the president's office on the executive floor: note the ceiling and cabinetry of light birch—the furniture is bleached oak. At right, a typical second-to-fourth-floor office; below, a typical second-to-fourth-floor corner office. On typical floors, the ceilings are metal pans, and the floor covering is vinyl-asbestos tile. On all floors, the plaster walls are painted off-white and partitions are natural birch.

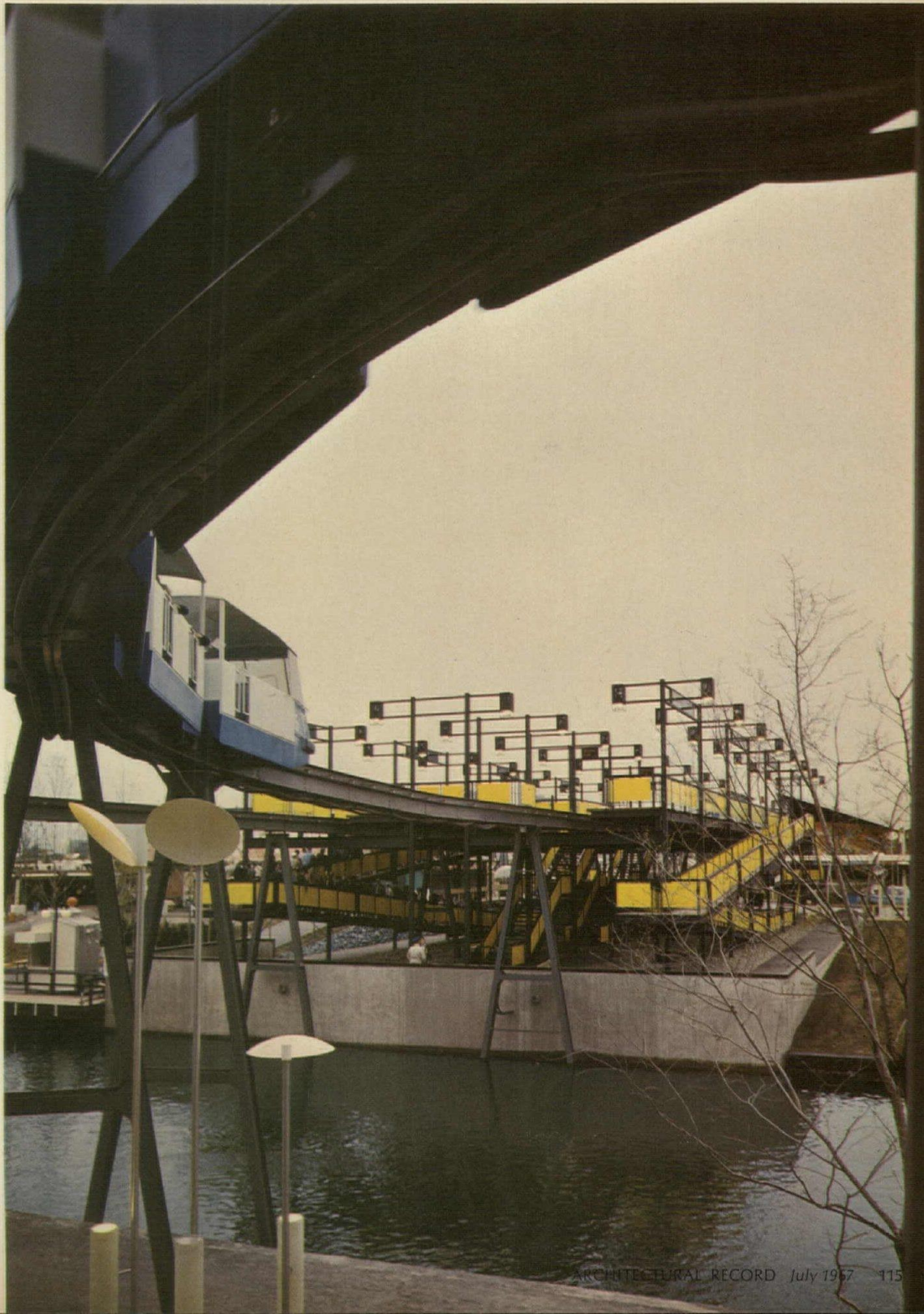
*Daniel Bartush photos*



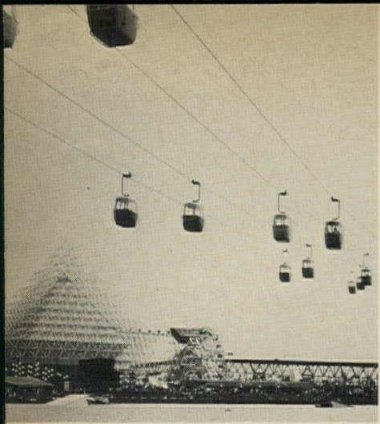


# A BRILLIANTLY ORDERED VISUAL WORLD

expo 67





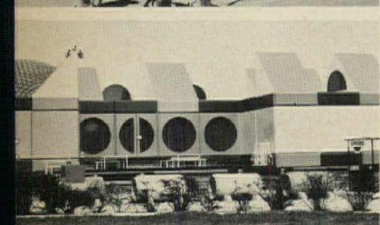
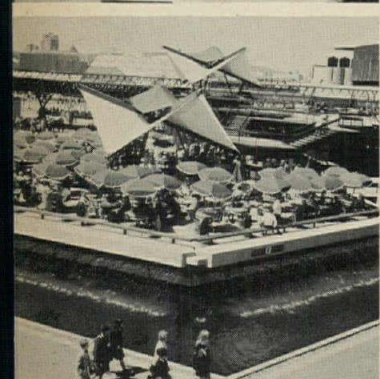
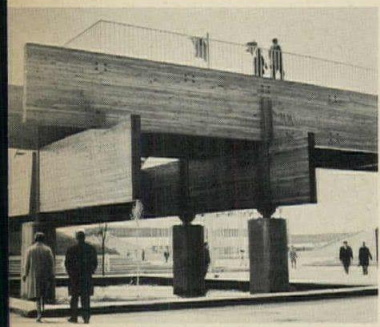
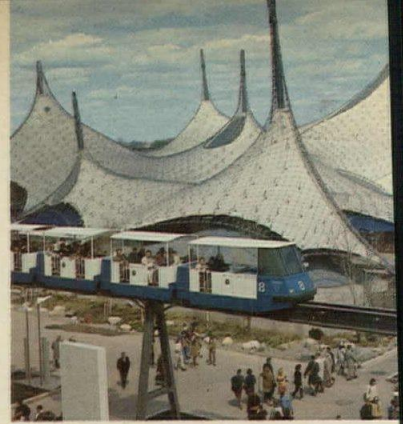


expo 67 is a brilliantly ordered visual world—and almost everyone loves it. The inhabitants of our grey cities and drab suburbs have never seen anything like Expo, and it is attracting them in unpredicted, unprecedented, and indeed uncomfortable numbers. It is probably not fair to say that the huge public has been attracted to Expo by architecture alone, but once there, people are certainly exhilarated by it—and this is important. Some may realize that they owe much of their pleasure at the fair to skillful design, and will wish to see more of it in their everyday environment.

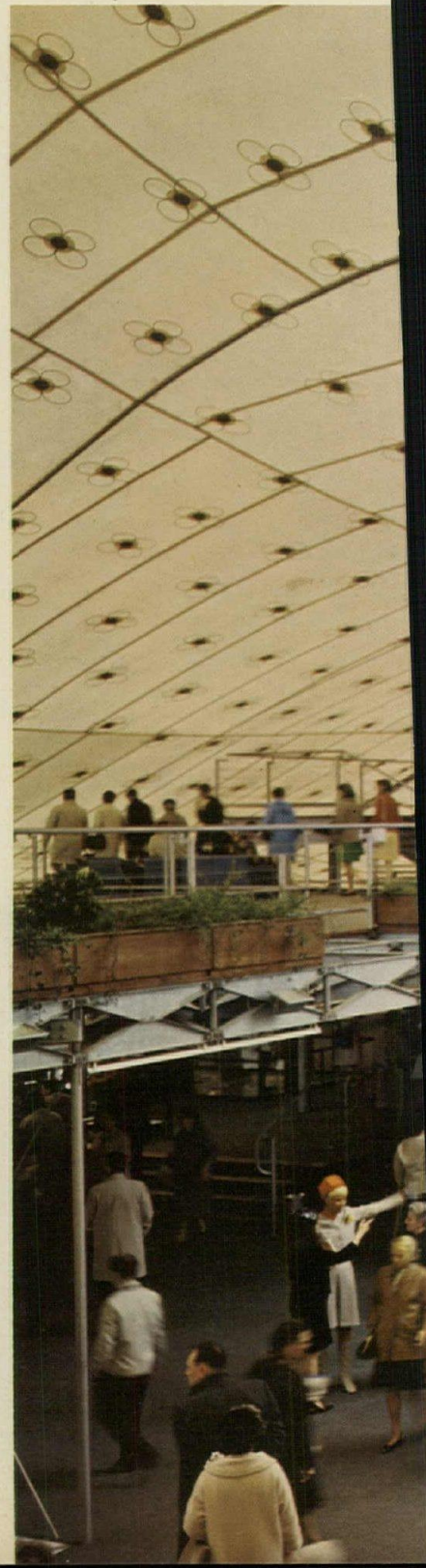
The site plan gives coherence and excitement to what would otherwise have been a vast and sprawling conglomeration of pavilions. This plan, subtle, varied and unobtrusive, provides an underlying pattern of circulation networks—express trains, minirails, vaporettos in pretty canals, Hovercraft in the river, skyrides from here to there, and footpaths and bridges which interconnect carefully related hierarchies of buildings, placed to make the most of their setting.

Expo, of course, can be criticized. Because it is much bigger, it has more mediocre pavilions than Mr. Moses was able to gather in Flushing Meadow. This fair, furthermore, has no one single work of the imagination to compare with the New York fair's most memorable pavilion—IBM's great egg in the trees, designed by Charles Eames and the late Eero Saarinen. But Expo's good buildings are very good indeed, and there are many more very good buildings than at the New York fair.

When the five-millionth visitor passed through the turnstiles three weeks after opening day, the forecasters and computers had been topped by more than one million in predicting the gate. The citizens of Montreal, happily arriving and re-arriving by means of their handsome new subway, queue up by the hundreds at the popular exhibits, help to crowd the express and minirail platforms, clog the paths, spill over onto the grass and planting, jam the lunch counters, restaurants and bars, and stretch the lines which form outside the toilet facilities. Can the fair's attractiveness withstand this onslaught? The planners are doing their best—main thoroughfares are being widened, buses now crawl along pedestrian paths and more restaurants and toilets are being rushed to completion. But the question remains: will success spoil Expo? —Mildred F. Schmertz



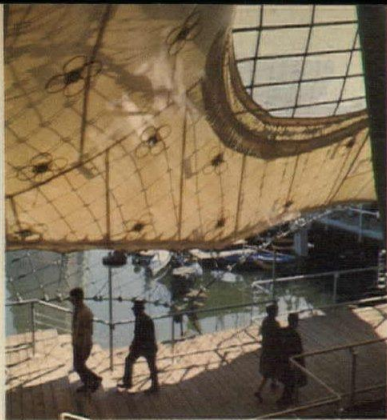
1. PLACE DES NATIONS  
Architect: *Andre Blouin*
2. THE CANADIAN PAVILION  
Architects:  
*Ashworth, Robbie,  
Vaughan & Williams;  
Schoeler & Barkham;  
Z. Matthew Stankiewicz*
3. THEME PAVILION  
Architects:  
*Affleck Desbarats Dimakopoulos  
Lebensold & Sise*
4. VIENNA KINDERGARTEN  
Architect: *Karl Schwanzer*





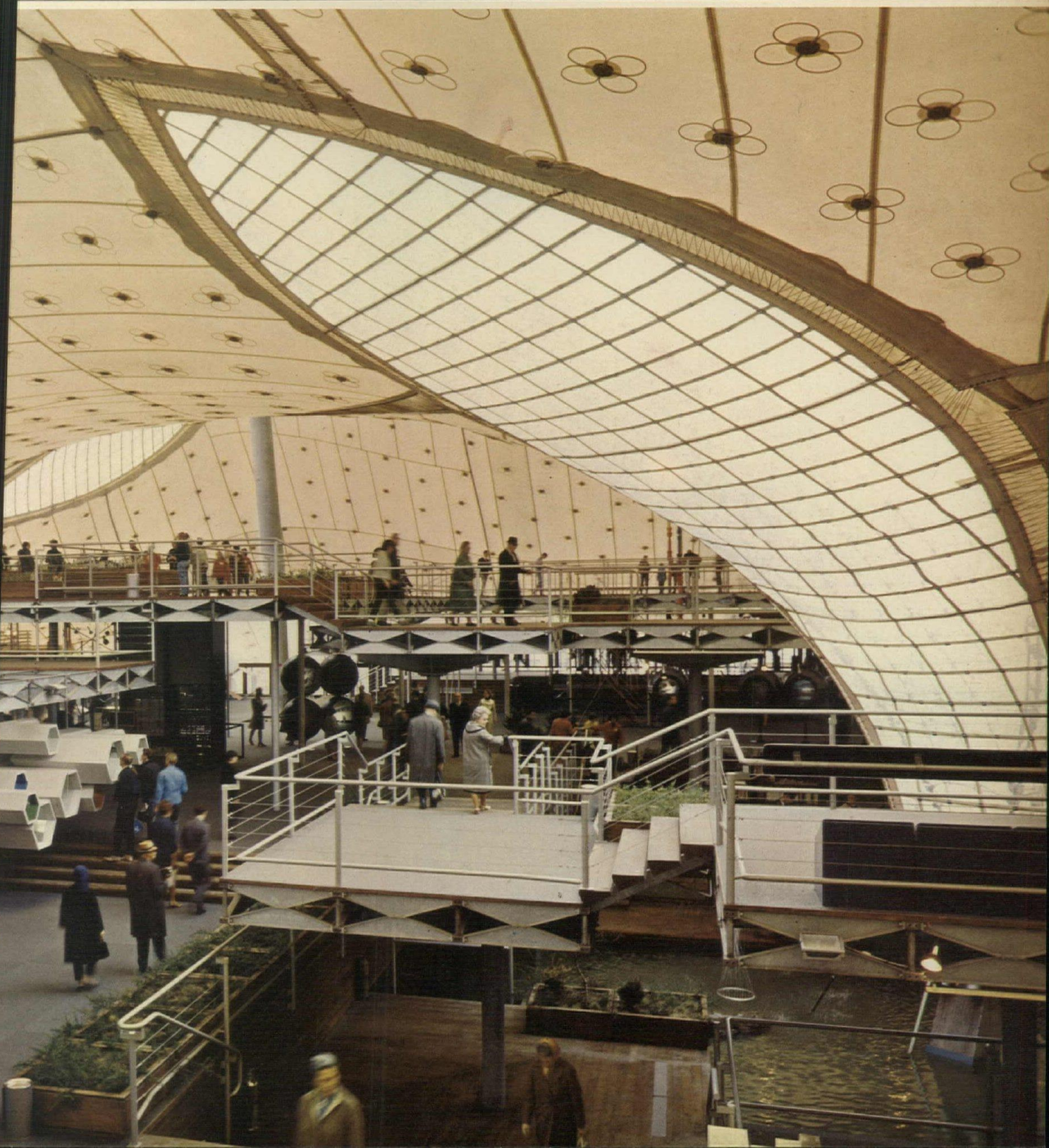
GERMAN PAVILION.

Owner:  
Bundesbaudirektion,  
Federal Republic of Germany, Berlin;  
architects:  
Rolf Gutbrod, Frei Otto;  
Canadian associate architects:  
Olgierd Tarnowski, George F. Eber;  
structural engineer:  
Dr. F. Leonhardt;  
Canadian associate structural engineers:  
C. B. A. Engineering Ltd., Knud Manniche;  
mechanical and electrical engineers:  
Pageau & Morel;  
general contractor:  
Ross & Anglin Ltd.

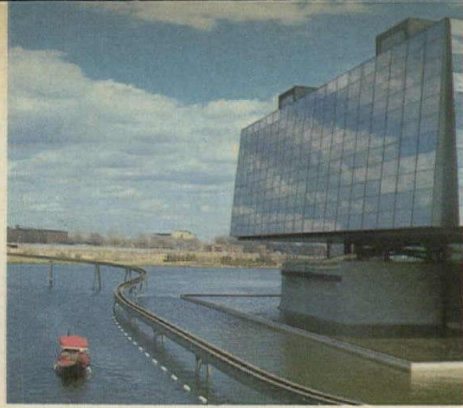


**Frei Otto's German Pavilion** on Ile Notre-Dame has a favored position in Expo's site plan. The elevated Expo express train makes a wide arc around it giving fairgoers on their way to La Ronde amusement area a fine view of its remarkable cable-hung roof.

The minirail (above left) allows a closer inspection of the tapered tubular steel masts and steel net in tension. From within, daylight is softened and warmed as it filters through the translucent membrane of polyester fabric. By contrast, the unfiltered light of the sky appears more intense, lending sparkle to the surrounding canal.







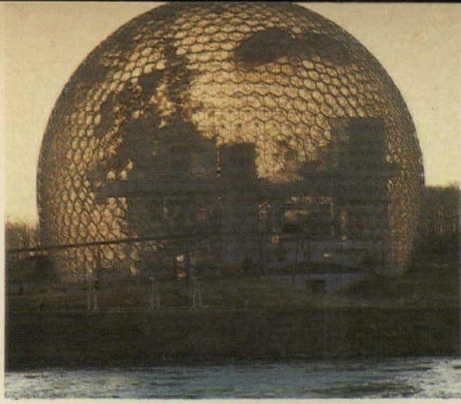
**QUEBEC PAVILION.**

Architects:  
*Papineau, Gerin-Lajoie, Leblanc & Durand;*  
structural engineers:  
*Boulva, Wermlinger & Associates;*  
mechanical & electrical engineers:  
*Bouthillette & Parizeau;*  
exhibit design:  
*Julien Hebert.*

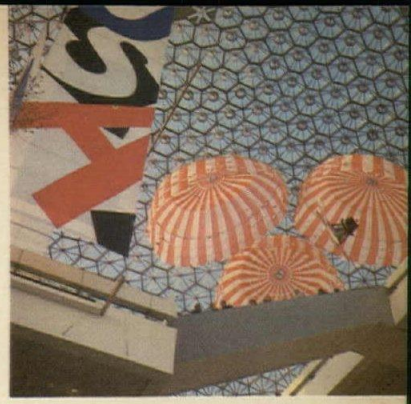
The outlines of the Quebec Pavilion on the Ile Notre-Dame are retraced at a respectful distance by the route of the minirail which snakes out over the water to give everyone a better look at one of the handsomest buildings at the fair. Quebec's walls of mirrored glass transform the flags, clouds and buildings which they reflect into fragile, shifting abstractions which suggest early Cubist compositions. The French Pavilion next door looks far better in reflection (below) than in reality. The displays within the Quebec Pavilion are as well done as the building itself—a happy design synthesis all too rare at Expo.





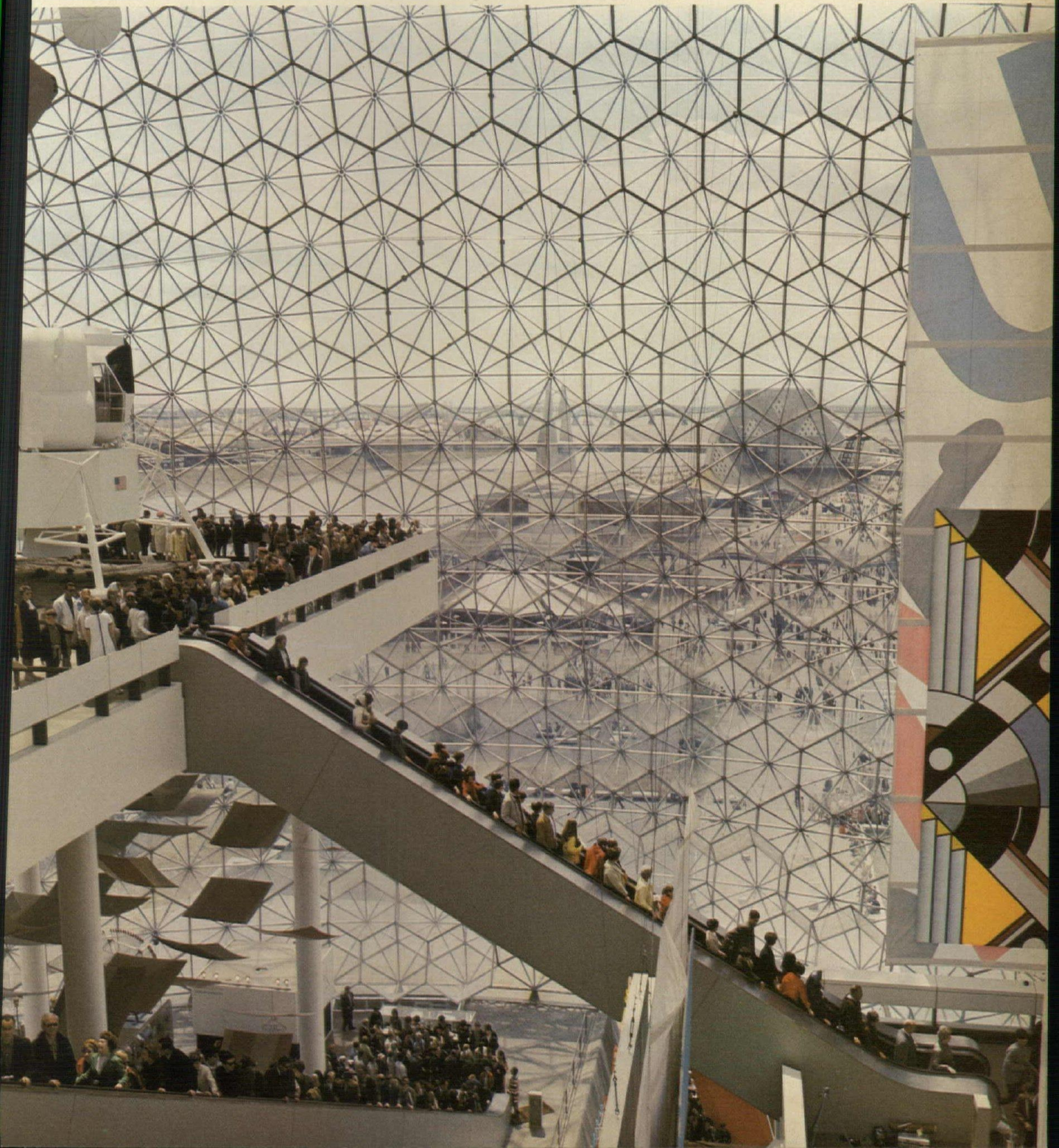


UNITED STATES OF AMERICA PAVILION.  
Owner:  
*United States Information Agency;*  
architects:  
*R. Buckminster Fuller,  
Fuller and Sadao, Inc.,  
Geometrics Inc.,  
and Cambridge Seven Associates;*  
Canadian associate architect:  
*George F. Eber;*  
structural engineers:  
*Simpson, Gumpertz & Heger, Inc.;*  
mechanical and electrical engineers:  
*Paul Londe and Associates;*  
general contractor:  
*George A. Fuller Co.*



**The incredibly beautiful United States Pavilion** is the ultimate version of Buckminster Fuller's geodesic dome.

*This triumphant structure at Expo, a welded steel pipe and hub space frame 20 stories high and 250 feet in diameter at its equator, encloses a volume of 6,700,000 cubic feet within a transparent acrylic skin. Inside, the U. S. exhibit, witty, joyful, and gay, brilliantly commands a magnificent space. Understandably, it confounds those who expect to see only quantitative boasts of industrial strength, military power, scientific progress and cultural ascendance.*







THEME PAVILION: "MAN THE PRODUCER".  
Owner:  
Canadian Corporation for the 1967 World Exhibition;  
chief architect:  
Edouard Fiset;  
project architect:  
Jerry Miller;  
consulting architects:  
Affleck Desbarats Dimakopoulos Lebensold Sise  
partner-in-charge, Guy Desbarats,  
project architect, Thomas E. Blood;  
structural engineers:  
Eskenazi, Baracs, de Stein & Associates;  
mechanical and electrical engineers:  
Cote, LeClair, Langlois, Boisvert & Associates;  
acoustical engineers:  
Bolt, Beranek and Newman, Inc.;  
general contractor:  
Desourdy Construction Ltd.

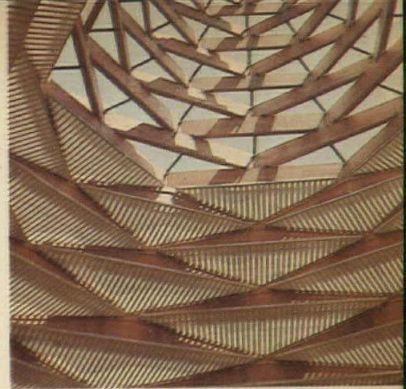
**This Theme Pavilion**, bridging a major circulation hub on the Ile Notre-Dame, is identical in structural concept to its mate across the channel on the Ile Sainte-Helene. These great megastructures of rusted steel loom above the smaller pavilions and serve as landmarks for the visitor trying to orient himself. In each the entire structure is a space frame—floors and roofs as well as walls—providing immense clear span spaces as shown below and smaller volumes where required. Ductwork weaves through the interstices of the space frame and is accessible at almost any point.







THEME PAVILION: "MAN IN THE COMMUNITY".  
Owner:  
Canadian Corporation for the 1967 World Exhibition;  
chief architect:  
Edouard Fiset;  
project architect:  
Roger Desmarais;  
consulting architects:  
Erickson & Massey



The Theme Pavilion is formed of great beams of spruce and fir, forming overlapping hexagons of gradually diminishing size, making a cone which encloses a splendid interior space with a garden and pool. This geometric lattice is 140 feet high and 285 feet in diameter at the base. Interlaced with translucent plastic at the junctures of the larger hexagons, it is open to the sky at the top. This beautiful pavilion is marred by singularly mindless exhibits which must be passed through before the graceful and restful oasis shown below can be reached.

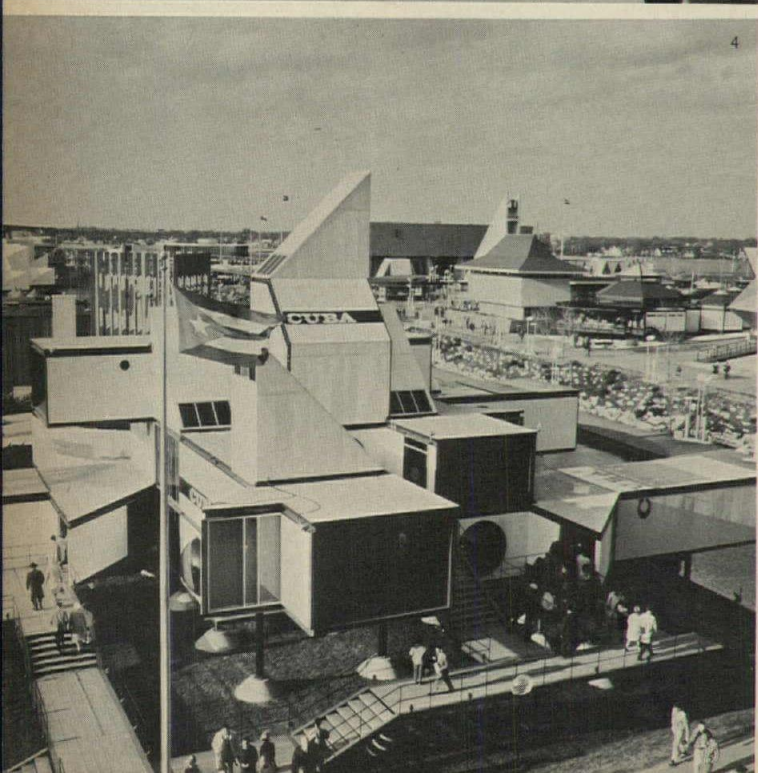
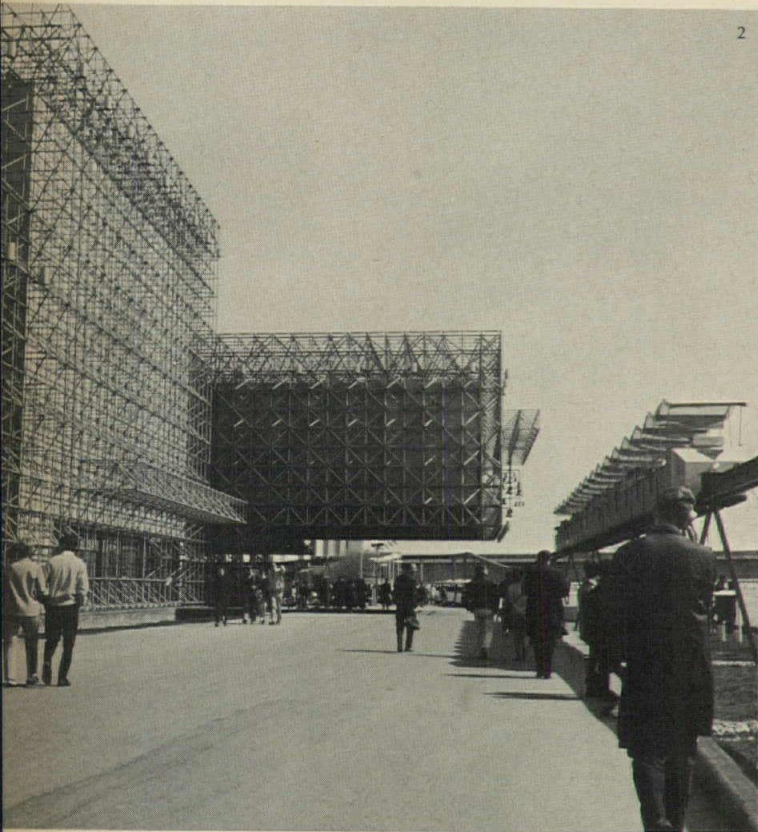






1. MONTREAL AQUARIUM. Architect: George F. Eber
2. NETHERLANDS PAVILION. Architects: W. Eijkelenboom and A. Middelhoek; Canadian associate architect: George F. Eber
3. SCANDINAVIA PAVILION. Architects: Denmark—Erik Herlow & Tormod Olesen, Finland—Jaakko Paatela, Iceland—Skarphedin Johansson, Norway—Otto Torgersen, Sweden—Gustaf Letterstrom, Canadian associate architect: R. V. Chadwick & G. Bennett Pope
4. CUBA PAVILION. Architects: G. Baroni & Vittorio Garati
5. HABITAT '67. Architects: Moshe Safdie and David Barott Boulva Associated Architects

Other noteworthy buildings at the fair: The Montreal Aquarium is a permanent structure and may become a model for aquaria everywhere. The Netherlands Pavilion nests within a "cocoon-like" space frame constructed of aluminum tubing and boasts a startling cantilever. The Scandinavian Pavilion overlooks a sculpture by Calder. Cuba's exterior is diverting. Habitat has not been designed for the Montreal climate nor is it an acceptable approach to low-cost mass-produced housing as claimed. It is, however, the largest and one of the best looking pieces of Cubist sculpture you will probably ever



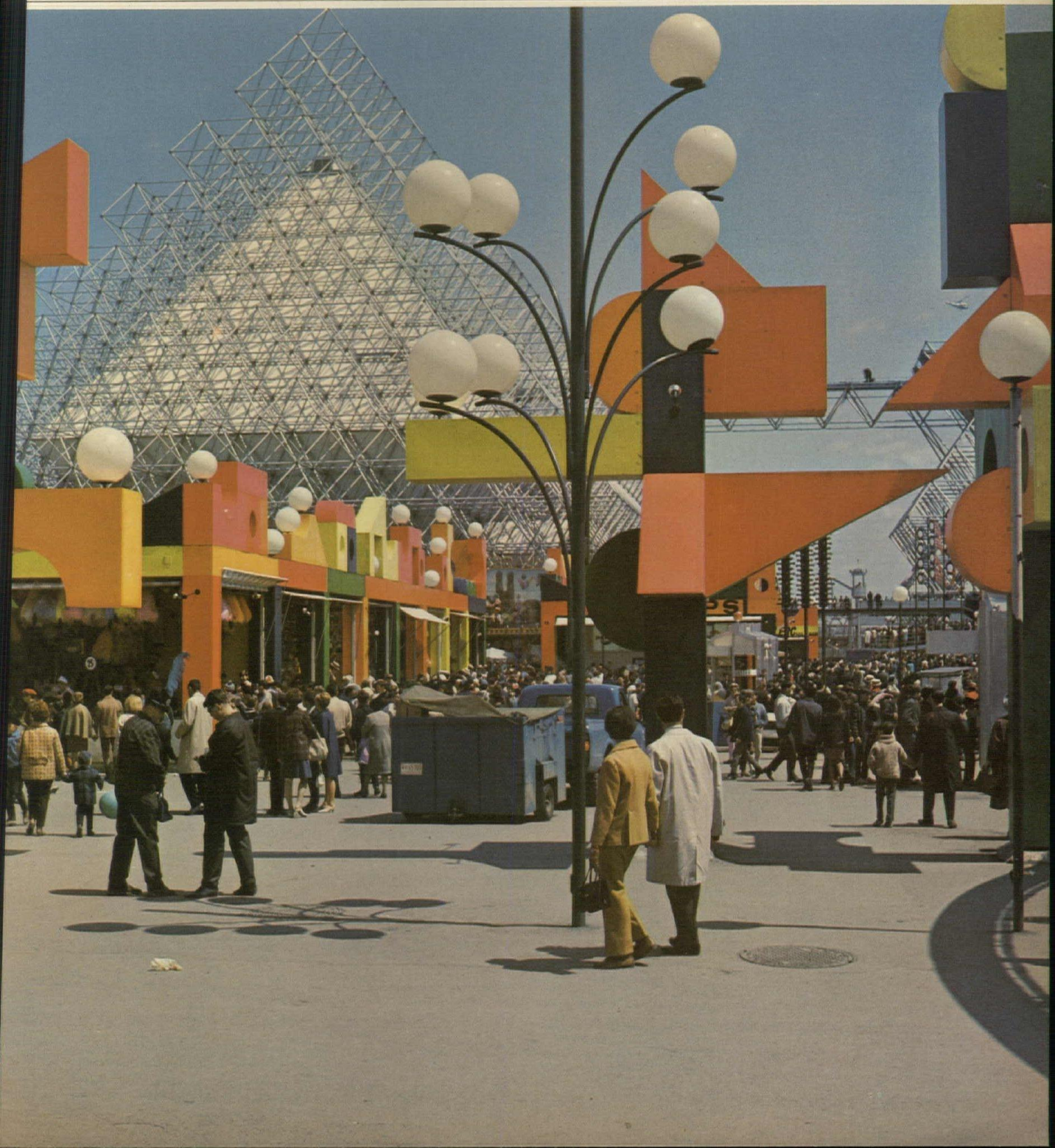


ND: RIDE CENTER, GYROTRON AND GAMES AND CONCESSIONS AREA.  
Designer of Gyrotron:  
*Sean Kenny in association with George Djurkovic;*  
structural engineers:  
*F. N. Kraus*



**La Ronde** has its own minirail from which one can admire its roovescape (above),  
and a sky ride in a gondola car that provides a sweeping view  
of this wonderfully planned amusement area.

*There are wilder rides available, including one through the Gyrotron,  
and engaging vistas for those on foot.*







LA RONDE: RENDEZ-VOUS LA RONDE.  
Architects:  
*Issalys & Gareau, Lalonde & Pauer Associates;*  
engineers:  
*Dillon Associates*

The Expo express train platform at La Ronde (above) and the Bonaventure station of the new Montreal Metro completed in time for the fair (below) show the excellence which can be achieved by administrators who know that the design of transportation facilities merits the attention of good architects.



THE MONTREAL METRO: BONAVENTURE STATION.

Owners:  
*City of Montreal;*  
architect:  
*Victor Prus;*  
structural engineers:  
*The Department of Public Works, City of Montreal, A. Samikian;*  
mechanical and electrical engineers:  
*The Department of Public Works, City of Montreal, C. J. Morency;*  
contractors:  
*Spino Construction Inc. and Grimard Construction.*

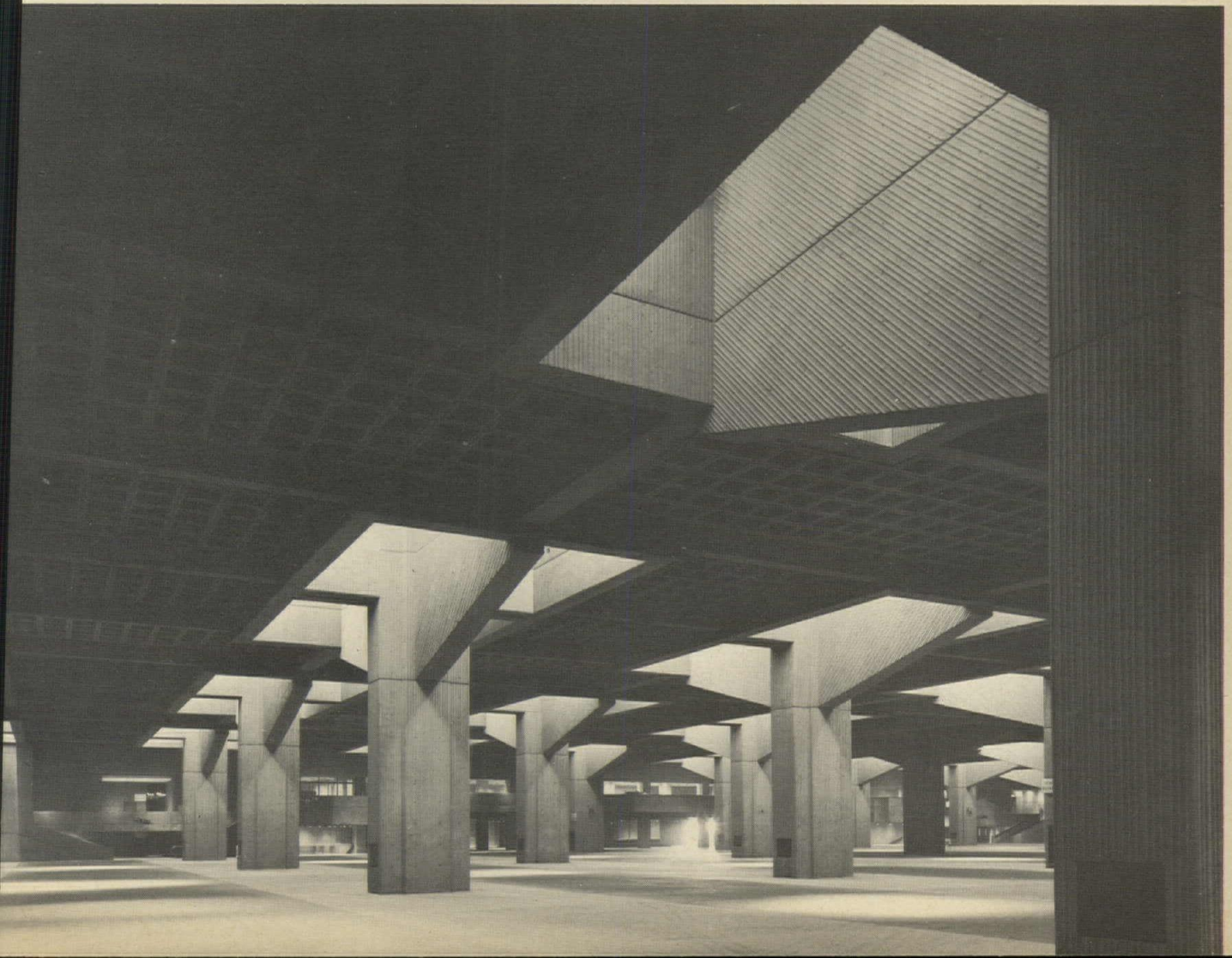
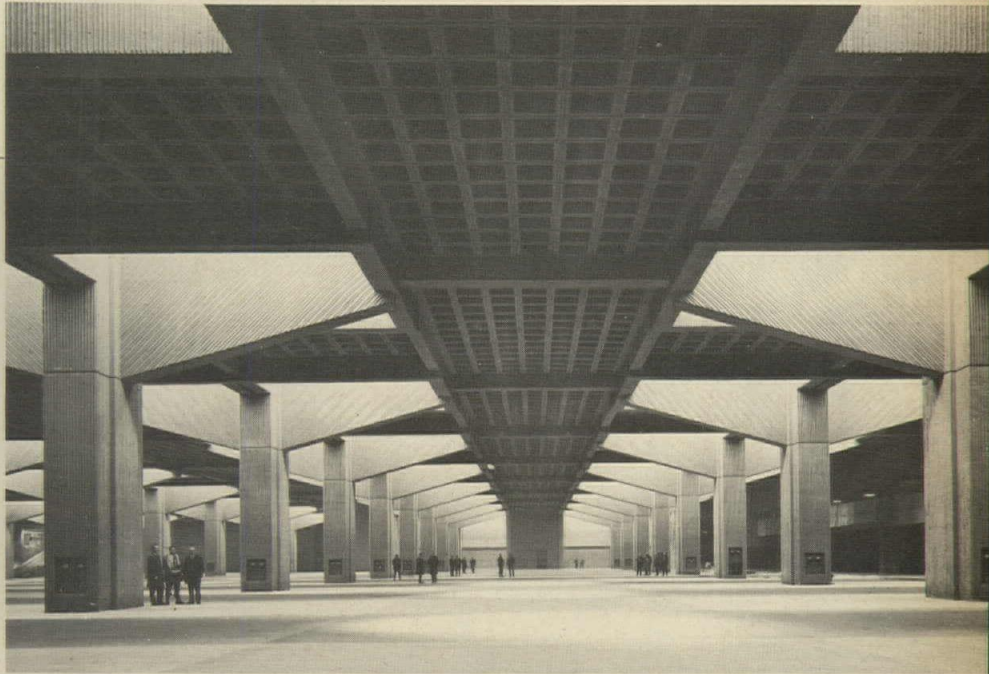






PLACE BONAVENTURE.  
Owner:  
*Place Bonaventure Inc.*;  
architects:  
*Affleck Desbarats Dimakopoulos  
Lebensold Sise*  
—partner in charge, *R. T. Affleck*,  
—project designer, *Eva Vecsei*;  
structural engineers:  
*R. R. Nicolet & Associates  
and Lalonde, Valois, Lamarre,  
Valois & Associates*;  
mechanical and electrical engineers:  
*James P. Keith & Associates*;  
lighting consultant:  
*William M. C. Lam.*

*Place Bonaventure*, a massive trade center  
downtown Montreal, should be seen by architects  
during the trip to Expo. Shown below is its vast  
exhibition space. Giant columns support  
eight floors above.

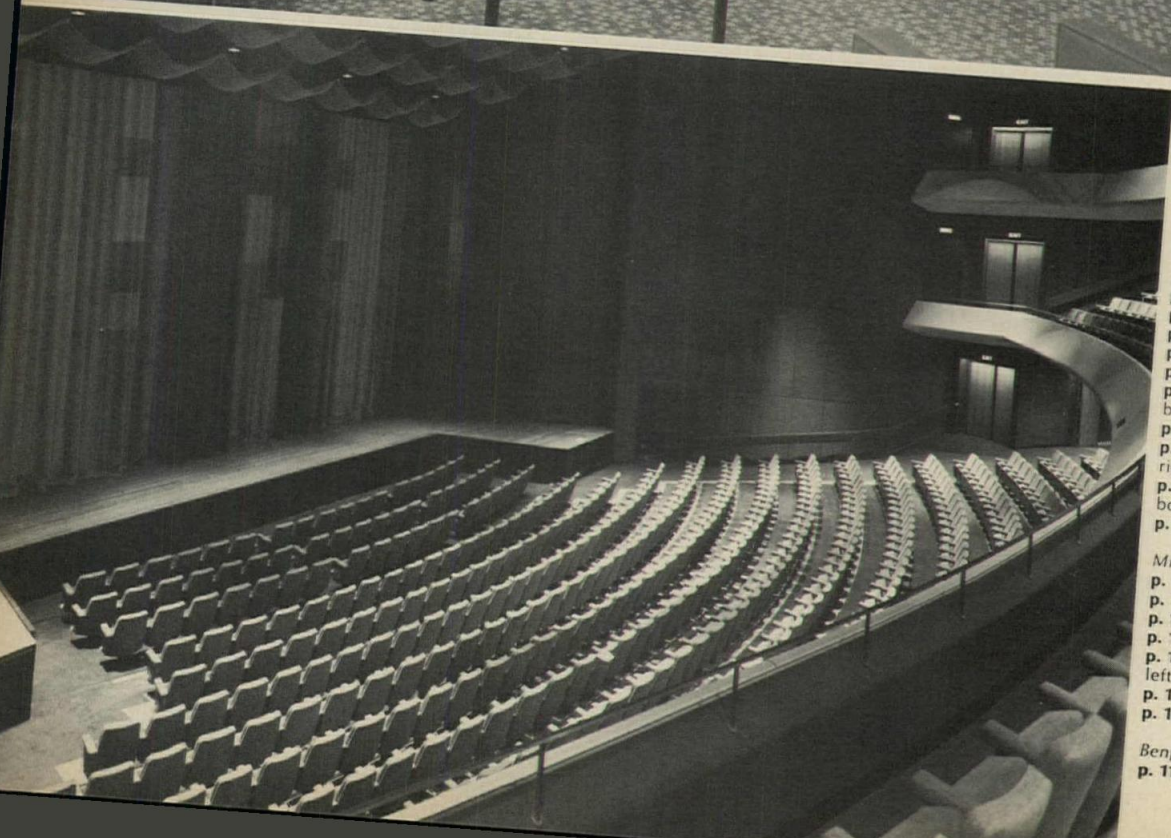




THEATERS BUILDING,  
Place des Arts, Montreal, Canada.  
Architects:  
David Barott Boulva  
Associated Architects;  
consulting architect: Raymond Dufresne;  
structural engineers: Brouillet, Carmel,  
Boulva and Associates;  
mechanical and electrical engineers:  
Lalonde, Girouard, Letendre,  
McDougall and Friedman  
acoustical consultants:  
Bolt, Beranek and Newman, Inc.;  
stage and theater consultant:  
Ben Schlanger;  
interior design:  
Jacques Guillon and Associates;  
general contractor:  
Louis Donolo Inc.



**Expo 67 has stimulated other construction in Montreal.**  
Permanent new cultural facilities have been erected at the fair and elsewhere in the city. At Place des Arts, two new theaters now adjoin the major concert hall completed several years ago. They are housed in a single building. Shown below is the 1,300-seat Theater Maisonneuve and its adjoining foyer. The 800-seat Theater Port-Royal is directly beneath.



#### Photographers

Michael Drummond  
p. 125 - right middle

Joseph W. Molitor  
p. 115  
p. 116 - second from bottom  
p. 117 - bottom  
p. 119  
p. 120 - bottom  
p. 121 - right top  
bottom  
p. 122 - left and right bottom  
p. 124 - left and right middle  
right bottom  
p. 125 - top and left middle  
bottom  
p. 126

Mildred F. Schmertz  
p. 116  
p. 118  
p. 120 - top  
p. 121 - left top  
p. 122 - top  
left and right middle  
p. 123  
p. 124 - top

Benjamin Thompson  
p. 117 - left and right top



# OUR BUILDINGS FOR BANKING

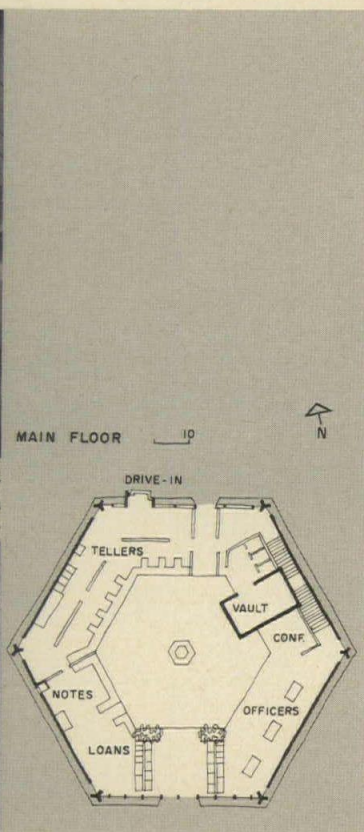
Each of these four buildings could have been a simple box and still have provided all the requirements of its program. But in each case both owners and architects sought distinction and individuality, and as a result the solutions—often made difficult by unusually small sites—and the architectural expressions are completely different. All have the essential of design quality.



## A BRANCH BANK IN A SUBURBAN BUSINESS DISTRICT

The site for this branch is small but its location, in the center of the San Carlos business district, is advantageous for the bank. The unusual—and highly effective—form of the building evolved to meet the needs of the bank and the specific problems of the location. Warm, inviting colors are used on both the exterior (two shades of tan brick, a copper roof) and the interior (dark tan magnesite floor, charcoal gray carpet, natural wood). The glass wall at the main entrance, with its view to the banking space, is also inviting. The structure is concrete framed, with brick filler walls. The roof structure consists of laminated glued purlins resting on a concrete ring at column height and connected to concrete ribs. The ceiling is of natural hemlock, with a portion of it designed as lighting panel.

BANK OF CALIFORNIA BRANCH OFFICE, San Carlos, California. Architects: *Richard C. Marshall & Chester Bowles, Jr., & Saul Wolf, Associate*; structural engineer: *Robert Hammill*; mechanical engineers: *Vann Engineering Co.*; electrical engineer: *Robert FoeHN*; contractor: *Harvis Construction Co.*







## A BRANCH OFFICE FOR A SAVINGS AND LOAN ASSOCIATION

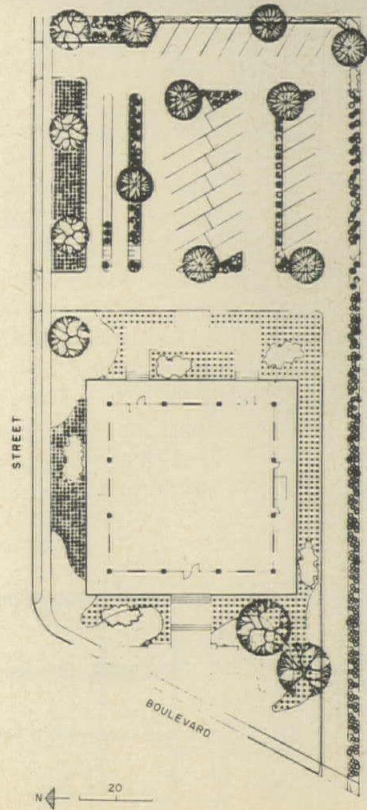
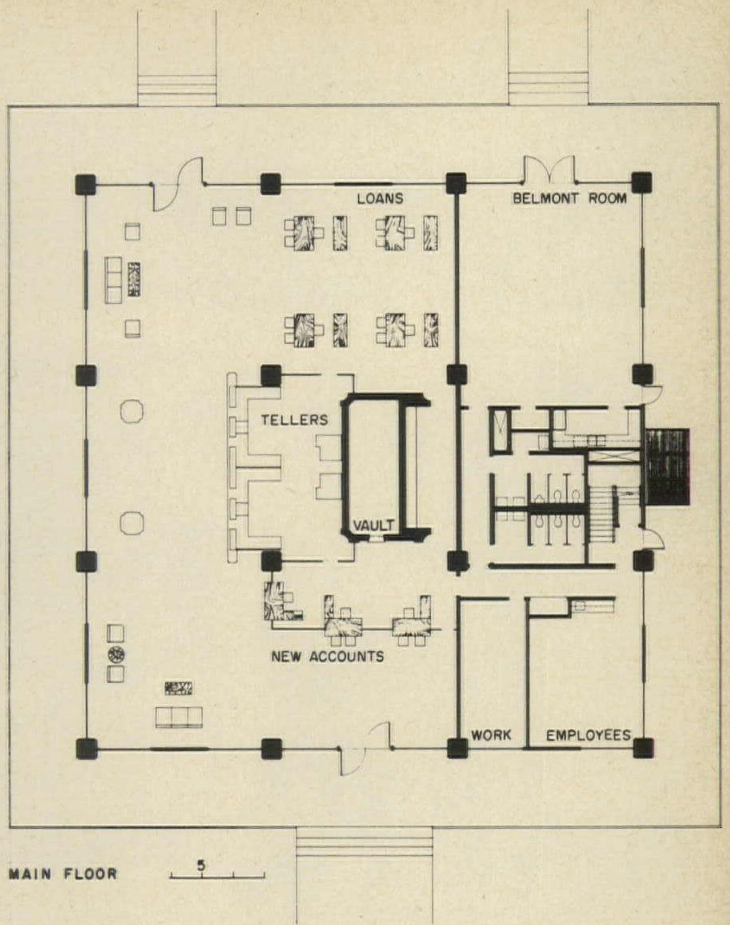
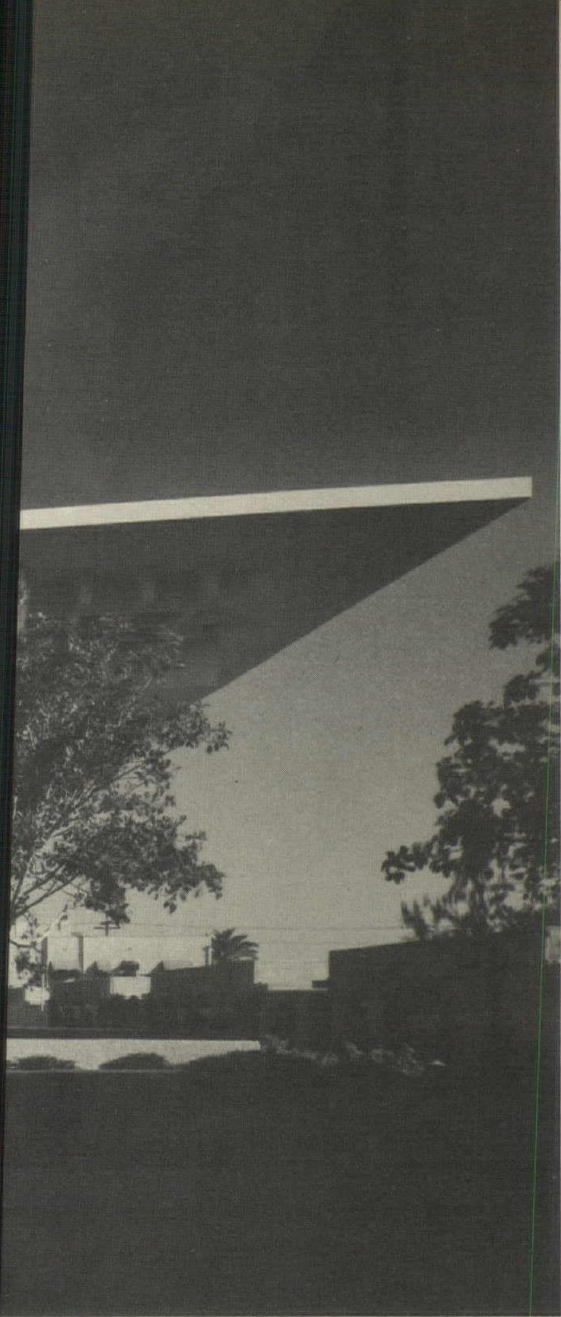
Jack Laxer photos



The formal placement of this building ignores the irregular shape of the corner site, using the setback for landscaping and providing an entrance well accessible from both streets. As part of the solution to the program requirements for a building that would be "impressive and yet inviting," the building is placed on a low podium, and is reached by wide steps at both main and parking area entrances. The 20-foot overhang alters the basic cube of the building and, with the wide steps, large glass areas and elegant detailing, achieves the requested "inviting and gracious" appearance. Teak panels alternate with glass to form the enclosure. Structure is reinforced concrete with a canted ceiling over banking area.

BELMONT SAVINGS AND LOAN ASSOCIATION, Glendale, California. Architects: Laxer & Kelsey; contractor: Samuelson Brothers.



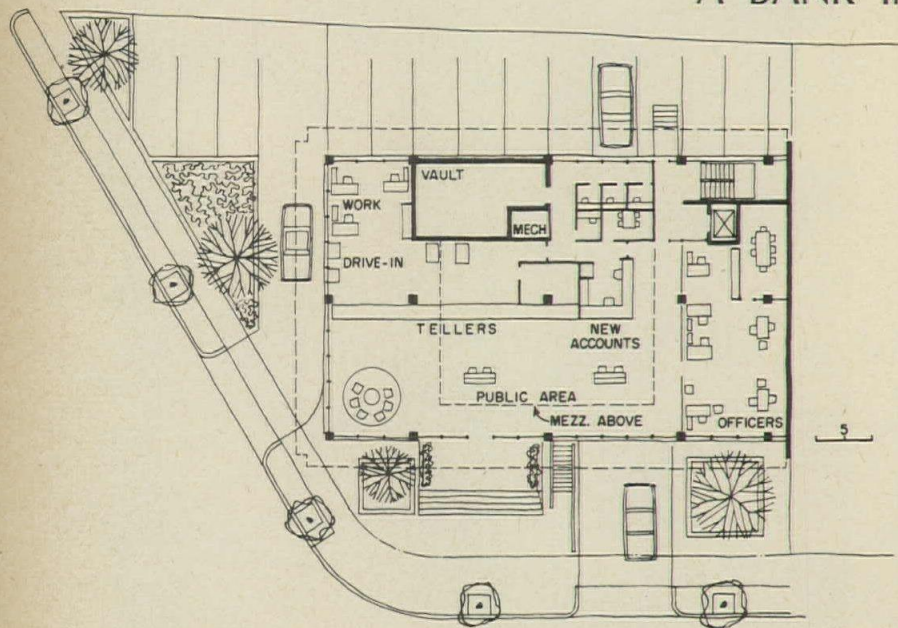




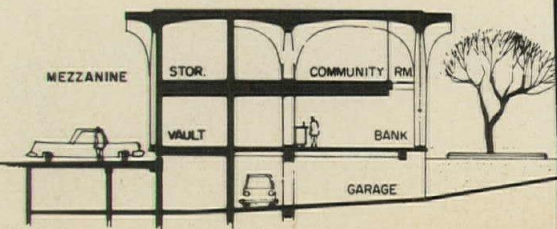


Richard Gross photos

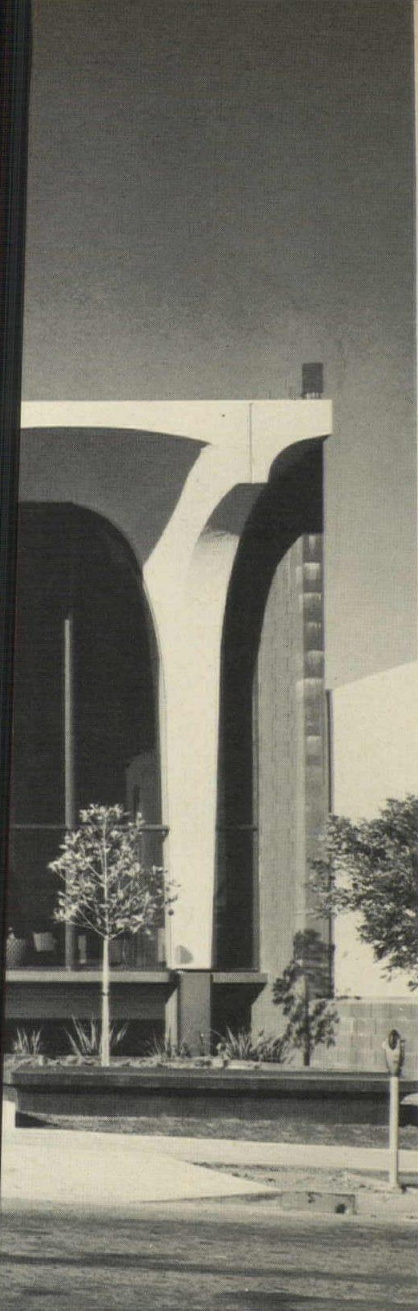
## A BANK IN A SMALL NEIGHBORHOOD



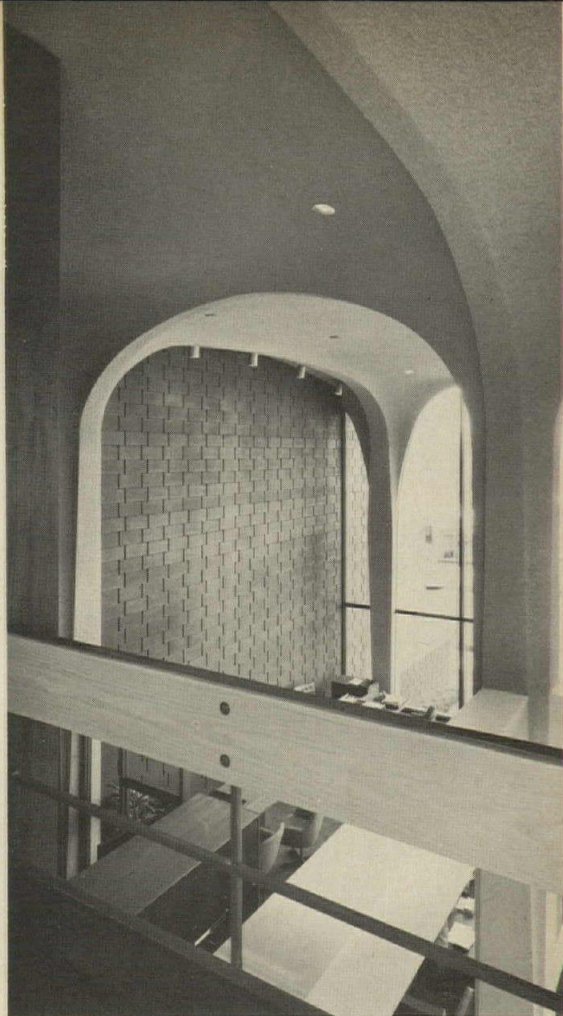
The site for this handsome bank building is a very small plot in a shopping center near a residential area. Eight vaults—the two at each outer end are designed on a slightly smaller module than the center four—give the building exterior a distinctive appearance and on the interior work with the sculptured columns to produce unusual spaces. The banking area is two stories high, unexpectedly spacious. A mezzanine floor at the other end of the building contains a meeting room for public use. Interiors are finished







The interior is surprisingly spacious—two stories high in portions of the public banking area—and open, with full-height bronze glass on three sides to increase its apparent size. A mezzanine floor which overhangs the tellers' area contains a public meeting room for community use. The columns are contoured in the upper sections and produce interesting spatial results as they sweep into the ceiling vaults.



## SHOPPING CENTER

teak, with bronze details; floors are off-white terrazzo; banking fixtures were designed by the architect. Since the bank had to provide its own parking spaces and there was not enough space on grade, the building is slightly raised above street level to permit a basement garage.

BEVERLY HILLS NATIONAL BANK, Brentwood, California. Architects: *Richard Dorman & Associates*; interiors (furniture and carpets): *Roger Wood of George Frank Design Associates*; contractor: *Kersey Kinsey Company*.

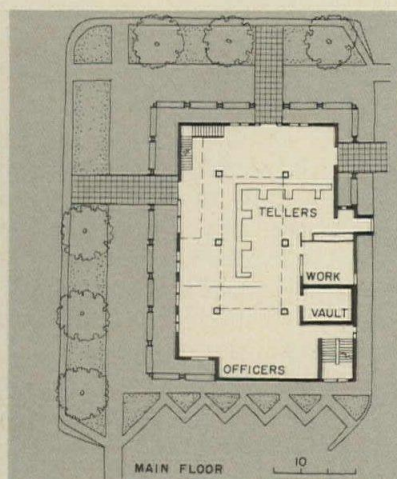




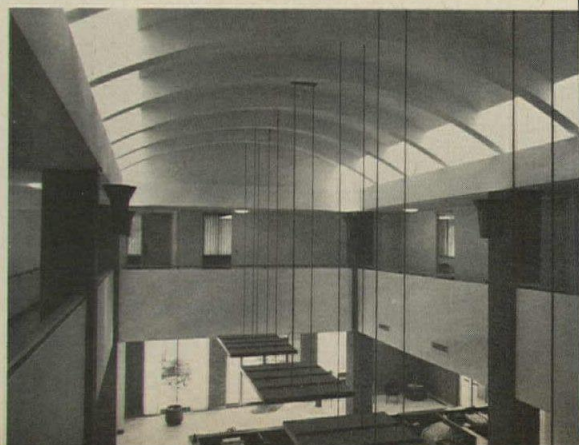
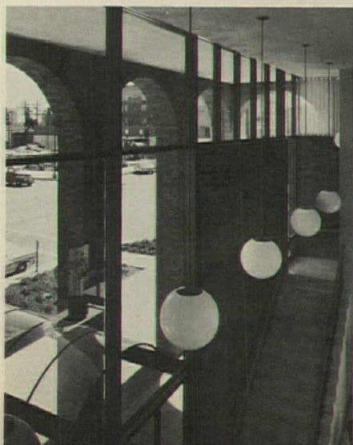


## A HEADQUARTERS FOR A SAVINGS AND LOAN ASSOCIATION

This arcaded building, for the headquarters offices of an Oregon savings and loan association, was designed to meet the client's request for a "modern and impressive" building. Its brick exterior, dark in a city predominantly white because of its many marble-faced government buildings, recalls in material the old city hall across the street. But the brick—a special amber-rose in color—and the arches were used, say the architects, as a "romantic interpretation of regal." The arcade also serves as shelter in the rainy winter season and as sunshade for the interior areas in the summer. A shielded skylight floods the banking space with daylight. Mezzanine has offices, conference room and lounge.



FIRST FEDERAL SAVINGS AND LOAN ASSOCIATION, Salem, Oregon. Architects: *Wilmsen, Endicott & Unthank*; structural engineers: *Honey & Kramer*; mechanical engineer: *Keith Kruchek*; electrical engineers: *Klawa & Mehlig*; landscape architects: *Mitchell & McArthur*; interiors: *Lila Colwell*; graphics: *Dale Ott*; general contractor: *Mills Construction Company*.





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# Urban housing design

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## for new towns

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## and old neighborhoods

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Architects have yet to gain many opportunities to design new housing units, or plan the rehabilitation of old housing units, within the context of well conceived comprehensive plans. When they do have this opportunity, the quality of these units is often much better than the established standard.

The typical basic housing unit—whether new or rehabilitated—is a functioning space, essentially neutral in character, and standard in construction, which achieves its quality and desirability by its relationship to the favorable elements in its environment—attractive neighboring units, park and recreation space, well located community and cultural facilities and good transportation. (The Brooklyn slum brownstone and the Upper East Side luxury brownstone are essentially the same unit.)

The housing shown in this study is the work of architects who have been charged with the design and planning of the neighborhood, district or new town in which the housing is located. The broad-scale approach to the rehabilitation of slum neighborhoods is receiving impetus from private industry and non-profit organizations encouraged by newer governmental programs—notably rent supplement. Developers are constructing well planned new towns instead of tract housing in areas where stronger planning controls have recently been implemented. Results are encouraging, as the examples which follow will show. —Mildred F. Schmertz

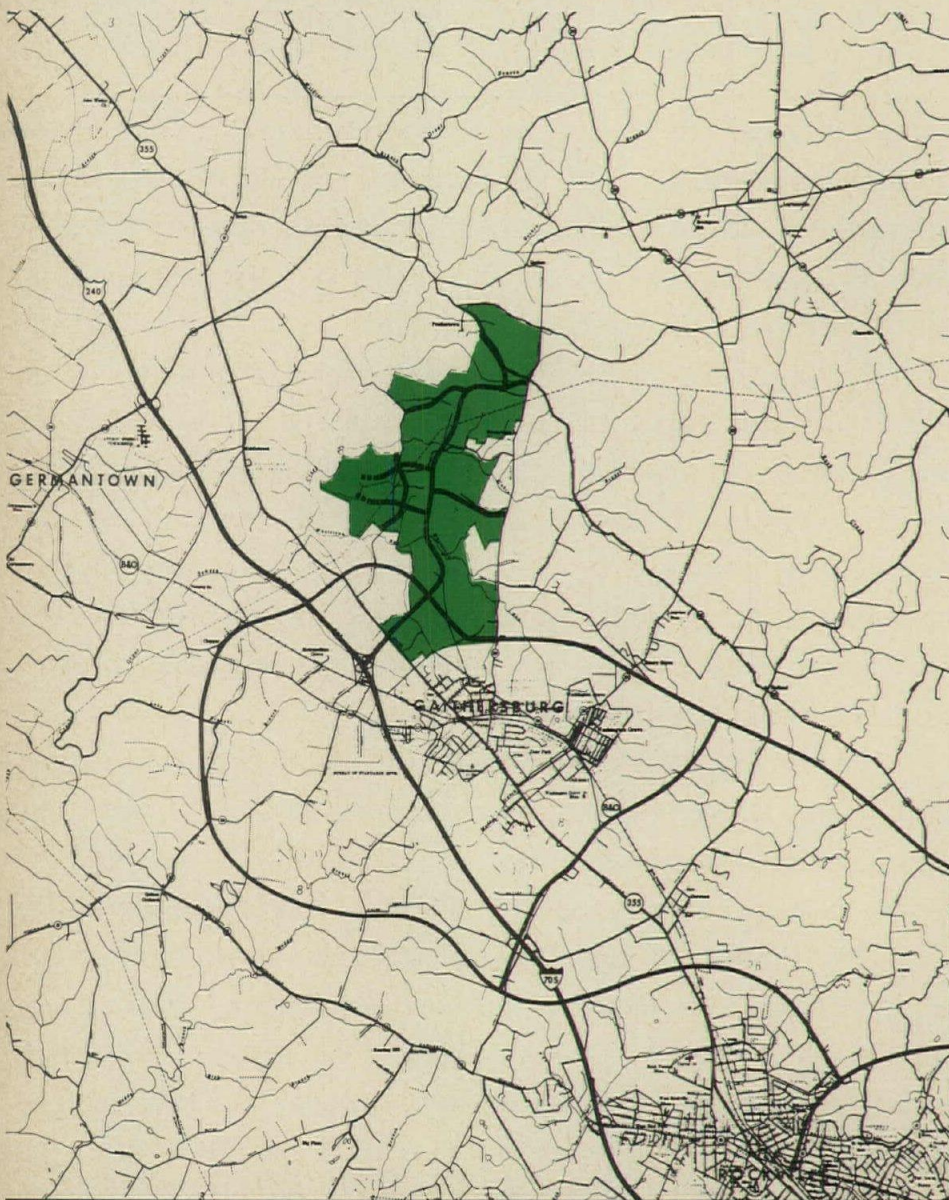


# MONTGOMERY VILLAGE

## A NEW TOWN WITHIN A CORRIDOR CITY IS SHAPED BY NEW PLANNING CONCEPTS REQUIRED BY IMPROVED ZONING CODE

The town sector plan for Montgomery Village shown in green on the area map (below) and at a larger scale in the open space diagram (opposite) conforms to the General Plan for the Maryland-Washington Regional District, prepared by the Maryland National Capital Park and Planning Commission and adopted January 22, 1964. This plan encourages the growth of a radial corridor system with Washington, D. C. at its hub, and recommends the development of a new corridor

city at the town of Gaithersburg, Maryland, which lies between Rockville to the southeast and Germantown to the northwest. All three towns are on Interstate route 70S, Maryland Route 355, and the direct access railroad to the Washington Metropolitan Area. These arteries form the northwest spoke of the radial corridor system. Montgomery Village, adjacent to Gaithersburg, will for the most part lie within the boundaries of the future Gaithersburg corridor city.



■ Any developer wishing to construct houses in Montgomery County, the planning entity known as the land-Washington Regional District, must apply to the local district council with a fully documented and well conceived "town sector" plan in hand. This plan must conform to the Town Sector Zone Section of the Montgomery County Zoning Ordinance. If the developer's plan does so conform and is approved, the zone upon which he wishes to build is reclassified, and the former rural residential zone becomes a town sector zone which allows urban densities in a residential high enough to accommodate urban activities, but low enough to provide open land for recreational purposes.

This new ordinance requires an entirely new approach on the part of the housing developer. He must hire a private team of architects and planners to prepare a town sector plan which, conforming to the new ordinance, gives the promise of becoming a profitable enterprise. Montgomery Village, now under construction, and entirely financed by conventional borrowing on the part of its developer-builder, is one of the examples of this new kind of endeavor. A residential town for 30,000 people will occupy 2,000 acres of beautiful countryside near Gaithersburg, Maryland, 20 miles north of Washington, D.C. This new town is the work of four firms which are serving as primary planning consultants to Kettler Brothers, Inc., the private developer: Rogers, Taliaferro, Kostritsky & Lamb—responsible for landscape planning, architectural design of multiple family and commercial units and architectural co-ordination of the total project; Mott & Hayden—planners for the greater Gaithersburg area, as well as the over-all development of Montgomery Village; Greenhorn, O'Mara, Dewber & Nealon—engineers responsible for developing road patterns and utilities; and Larry Smith Associates—economic and commercial consultants.

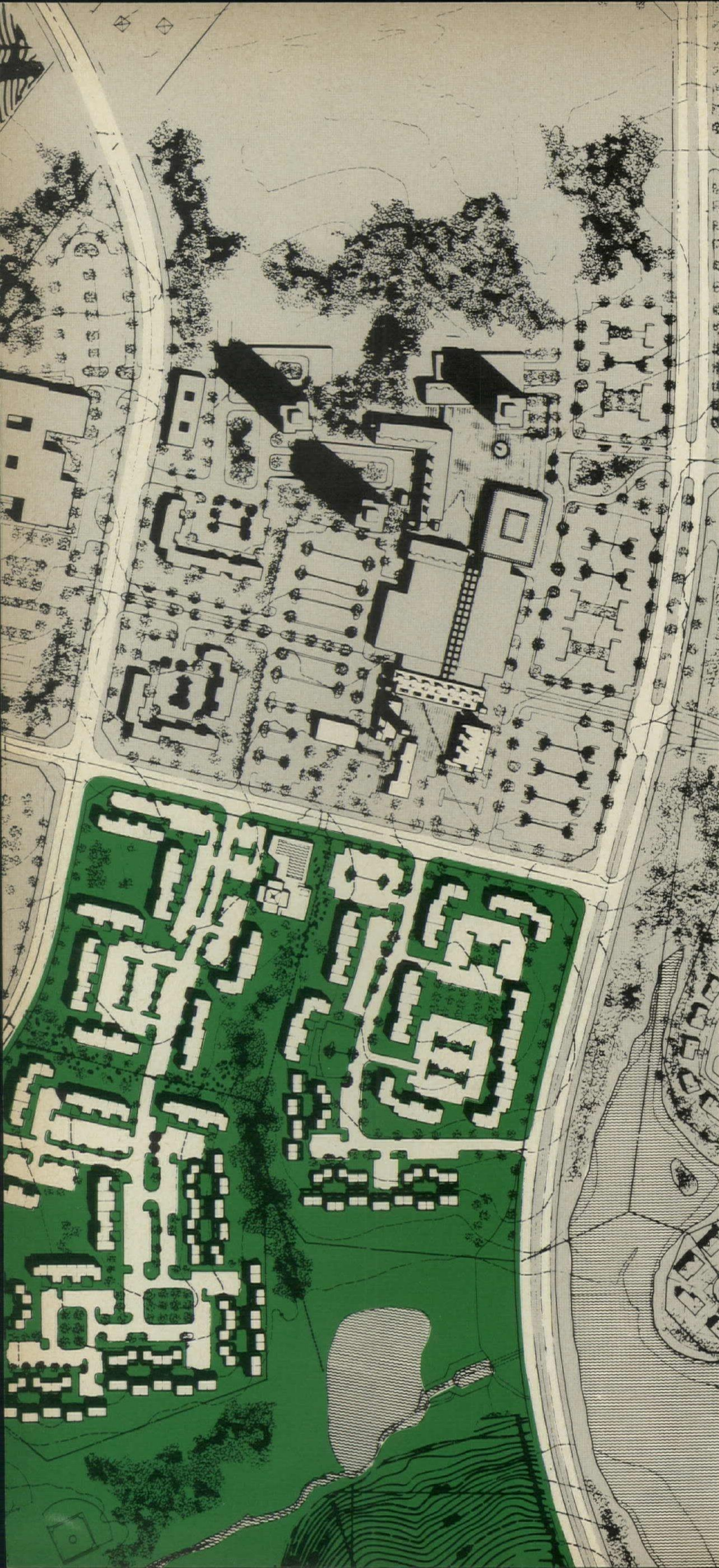
The town sector plan provides more than 557 acres of open space. Commercial, cultural and recreational facilities support the basic residential character of the town.

Circulation routes within the town sector, including major arterials and cul-de-sacs, are being constructed by Kettler Brothers, Inc. Schools, which will occupy 95.3 acres of land to be donated to the local school system by the developer, are located for family convenience and to serve as neighborhood centers. No residential area is more than a 15-minute walk from school.



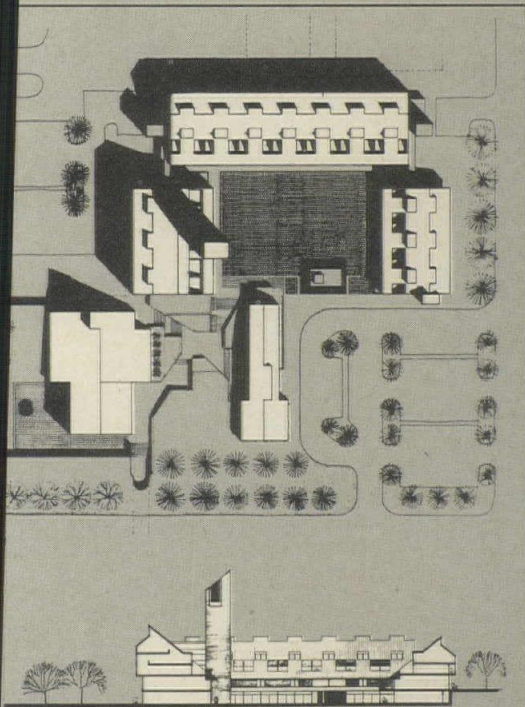




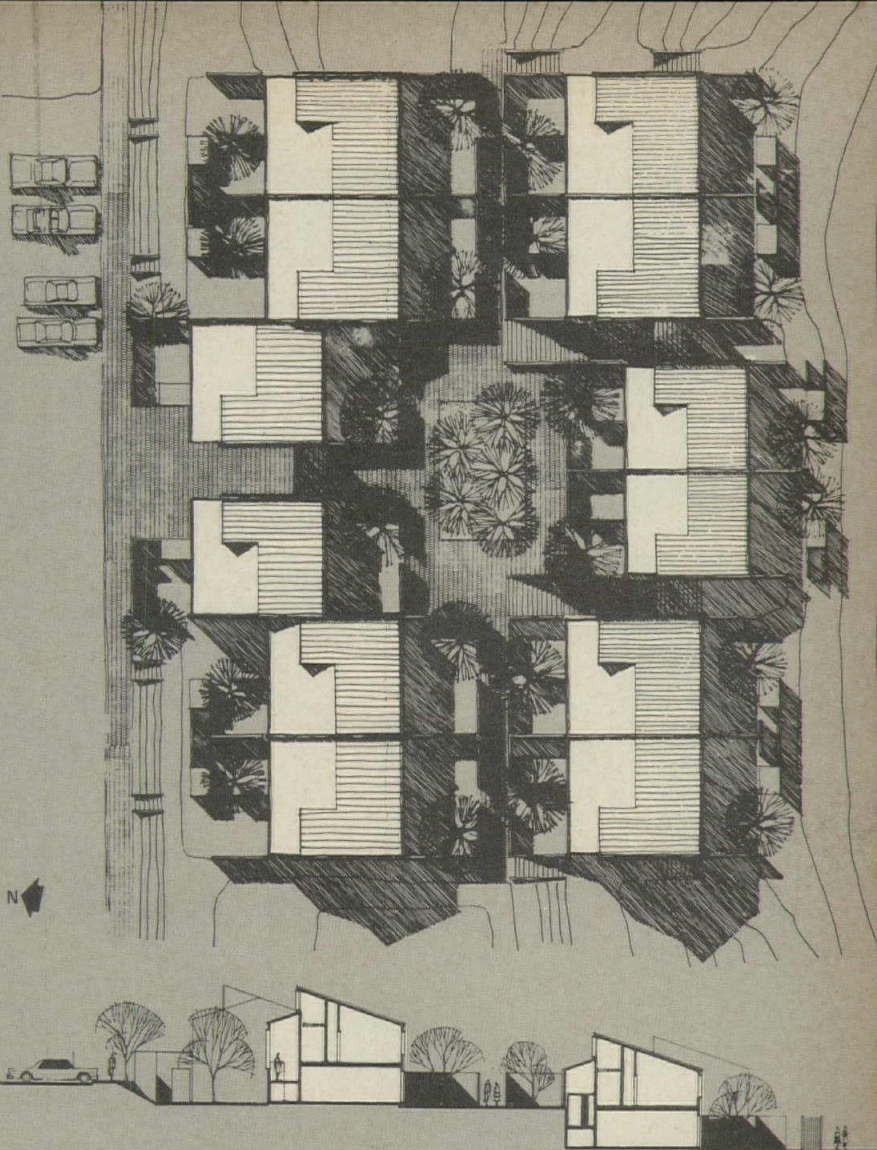


The first community of rental townhouses with private gardens to be constructed will be known as "Mills' Choice." As the site plan (left) indicates, the buildings are carefully oriented to preserve a view of the stream valley between the lake. This development is joined to the village center to the north of the road by a pedestrian underpass. The area includes a recreation complex with a swimming pool. Extensive open space is provided. The townhouses shown in site plan, plan and section (opposite page) will occupy sloping sites. The program required that they be two-story units designed for a maximum construction cost of \$11.00 per square foot. On-grade parking has been provided at a density of 1.8 cars per unit. The units are tightly clustered on hillsides. Each group shares a central paved and landscaped courtyard and each unit has its own private courtyard. Parking is peripheral to each cluster. The buildings, domestic in character and deliberately understated, will be frame construction with brick masonry exterior and retaining walls.



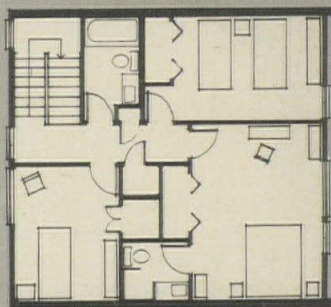


The Village Center (above) will stand on a high ridge in the geographic center of Montgomery Village. To be built in several stages, it will ultimately include retail space, offices, 1,000 apartments and a variety of supporting facilities. The first phase, to be built in 1967, will include an information center and a covered swimming pool. The major pedestrian circulation in the Village Center is separated from vehicular routes and enters into the Center through underpasses. Buildings will be of brick masonry with slate roofing.

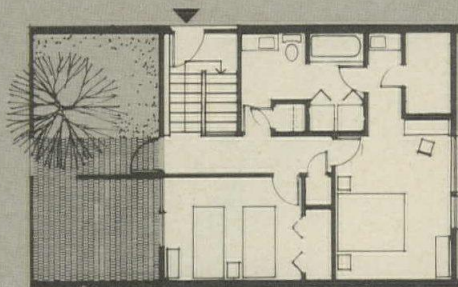


TYPICAL CLUSTER PLAN AND SECTION

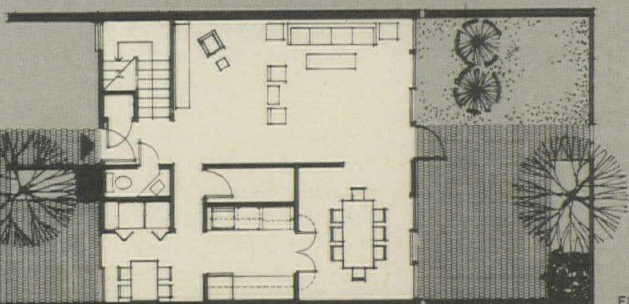
16



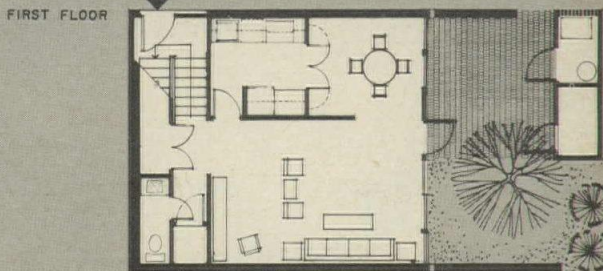
SECOND FLOOR



SECOND FLOOR



FIRST FLOOR



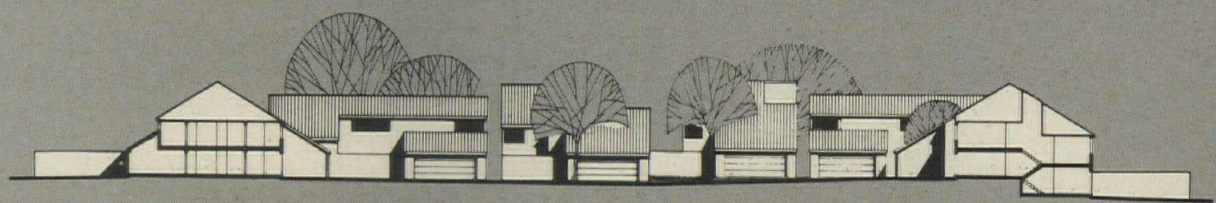
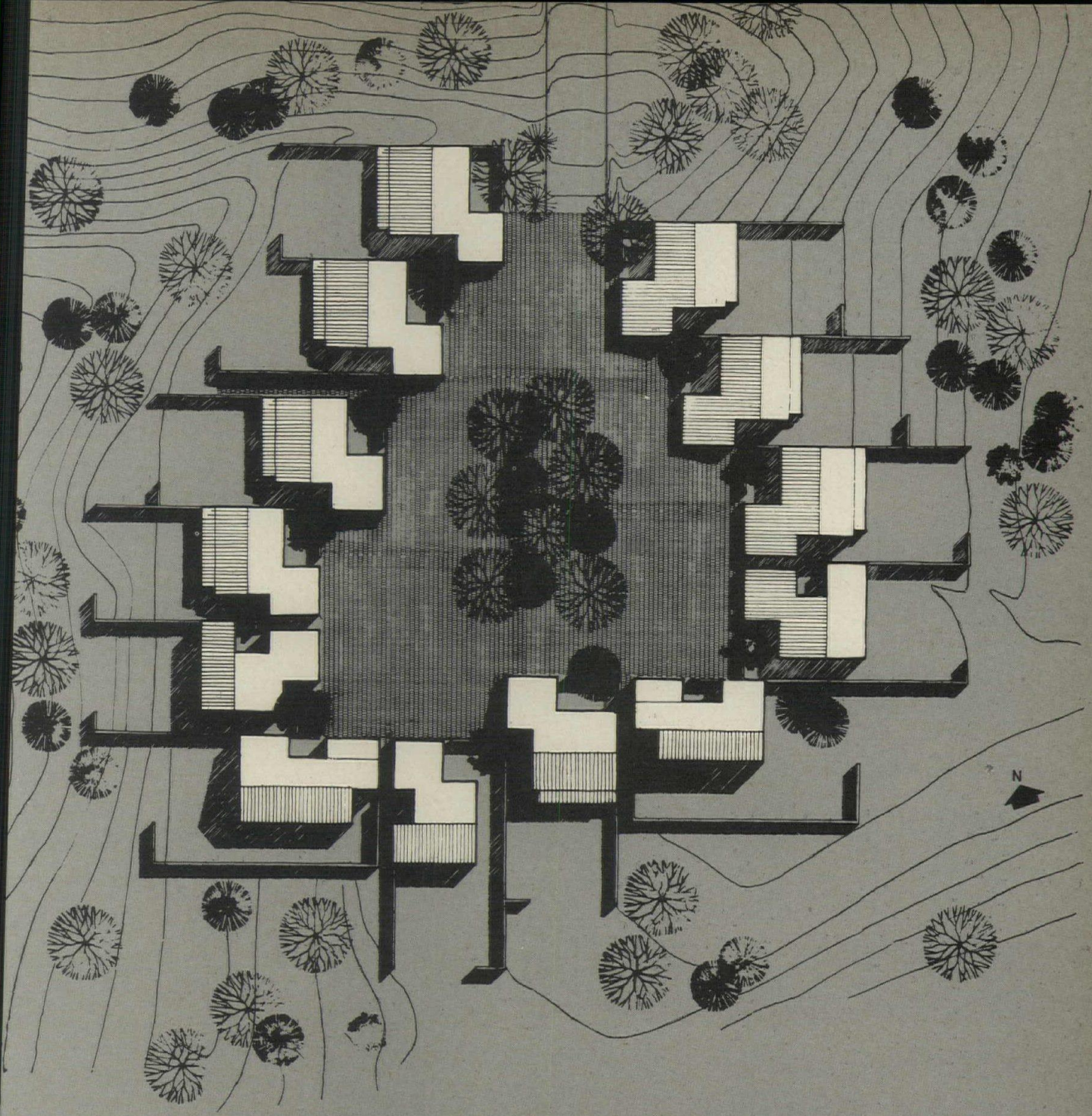
FIRST FLOOR





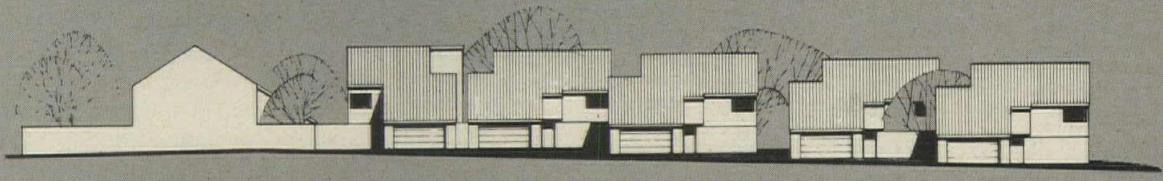
Detached single family houses are being constructed on the portion of Montgomery Village to be known as "Whetstone," shown in the site plan (left). Those to the north of the site are clustered to preserve park land. The typical cluster, shown in plan and elevation (opposite page), surrounds a handsome paved courtyard conceived as an architectural space rather than as a formless *cul de sac*. The courtyard will be used for auto turn-around and visitor parking. This cluster plan accommodates four different models to be built within a sale price range of \$45,000 to \$58,000 including the lot. Each lot will be completely private from its neighbor. Every house will have an enclosed two-car garage. As in the neighboring Mill Choice development, these houses will combine frame construction with brick masonry.





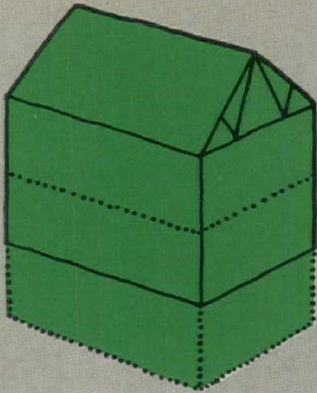
SECTION LOOKING SOUTH

16



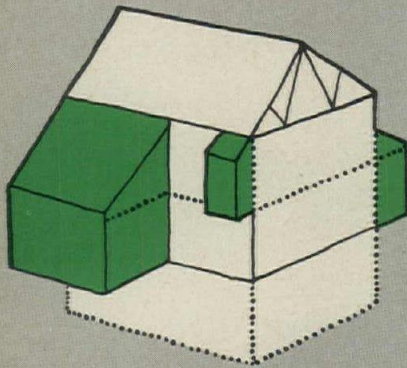
SECTION LOOKING WEST





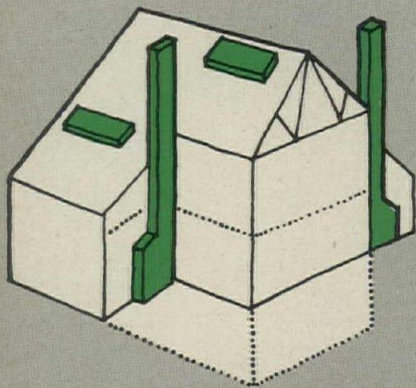
**Base Unit**

1. Span limited to maximum truss span or maximum span for 2x10 floor joists and rafters.
2. Length of base limited to 35 feet.
3. Base unit to include basement.
4. Area of base unit same for all houses—interiors to vary.



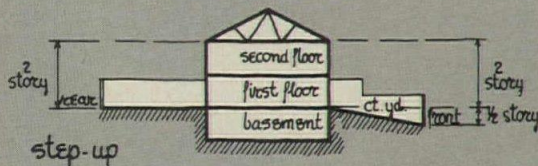
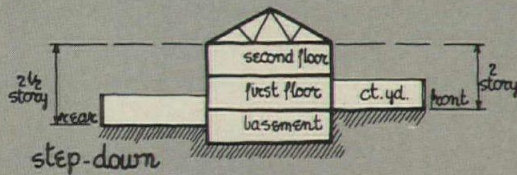
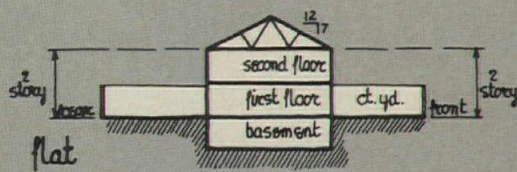
**Appendages**

1. Appendages limited to economical length of rafter—roof pitch and the necessary height for window sills.
2. Appendages will have no basement, and will either rest on a slab or be attached as a short cantilever.



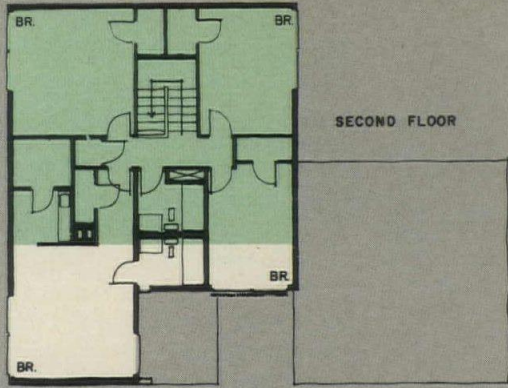
**Elements**

1. Chimney to be located outside of base unit—connected with appendage and slab.
2. Stairs can be anywhere necessary—but are most economical if within the base unit.
3. Skylights to be the flat type and put in appendages—exception is a skylight over a stairwell.

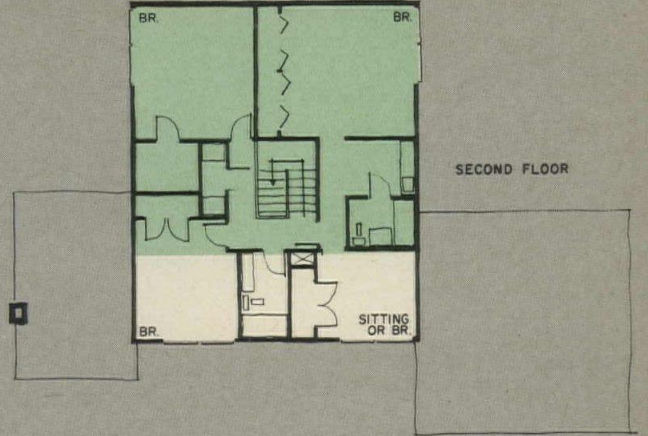


A development house for Montgomery Village has been designed by architects Rogers, Taliaferro, Kostritsky and Lamb. It consists of a standard base unit shown in the diagram (above) and indicated in green on the plan of four basic two-story models (opposite page). To this base unit are added the various appendages which the owner requires. These adjust vertically to accommodate grades.

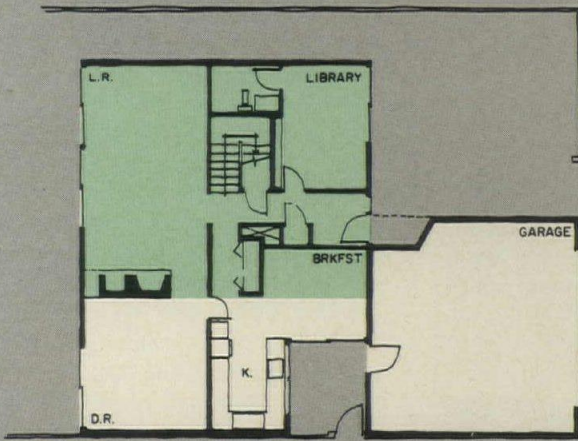




SECOND FLOOR

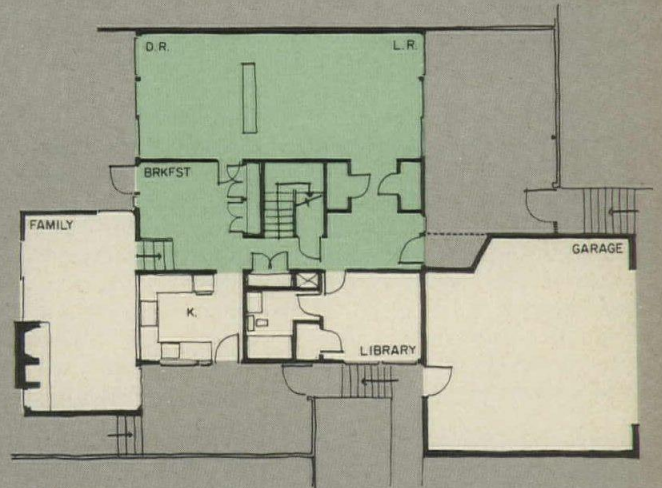


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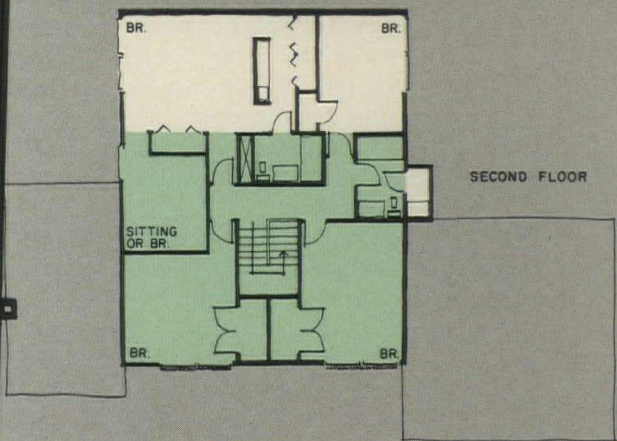
SCHEME "A"

FIRST FLOOR

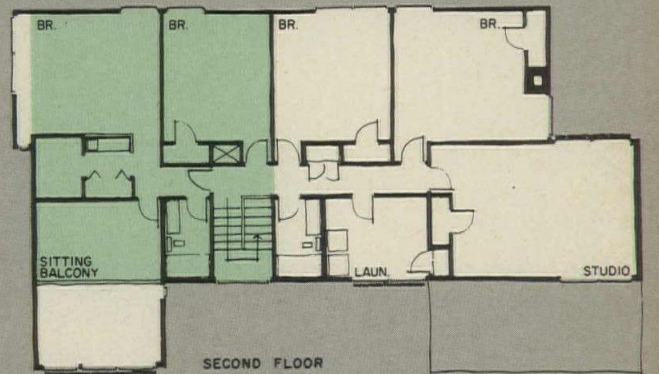


SCHEME "B"

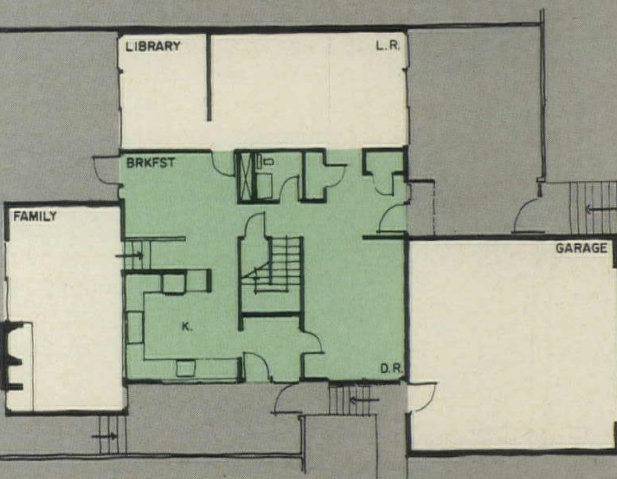
FIRST FLOOR



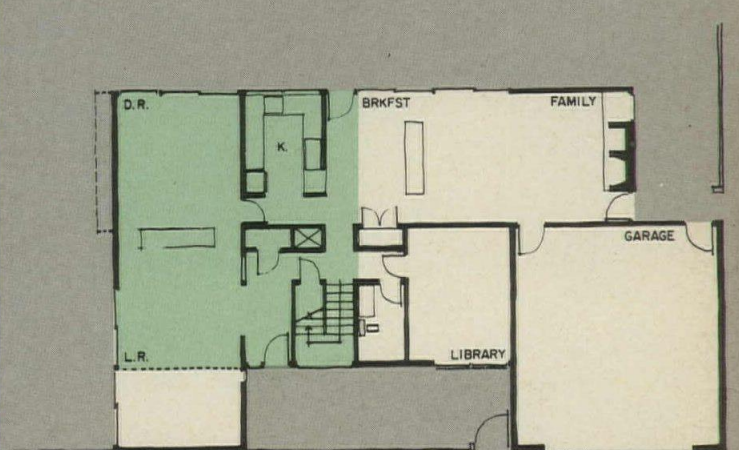
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SECOND FLOOR



FIRST FLOOR



SCHEME "D"

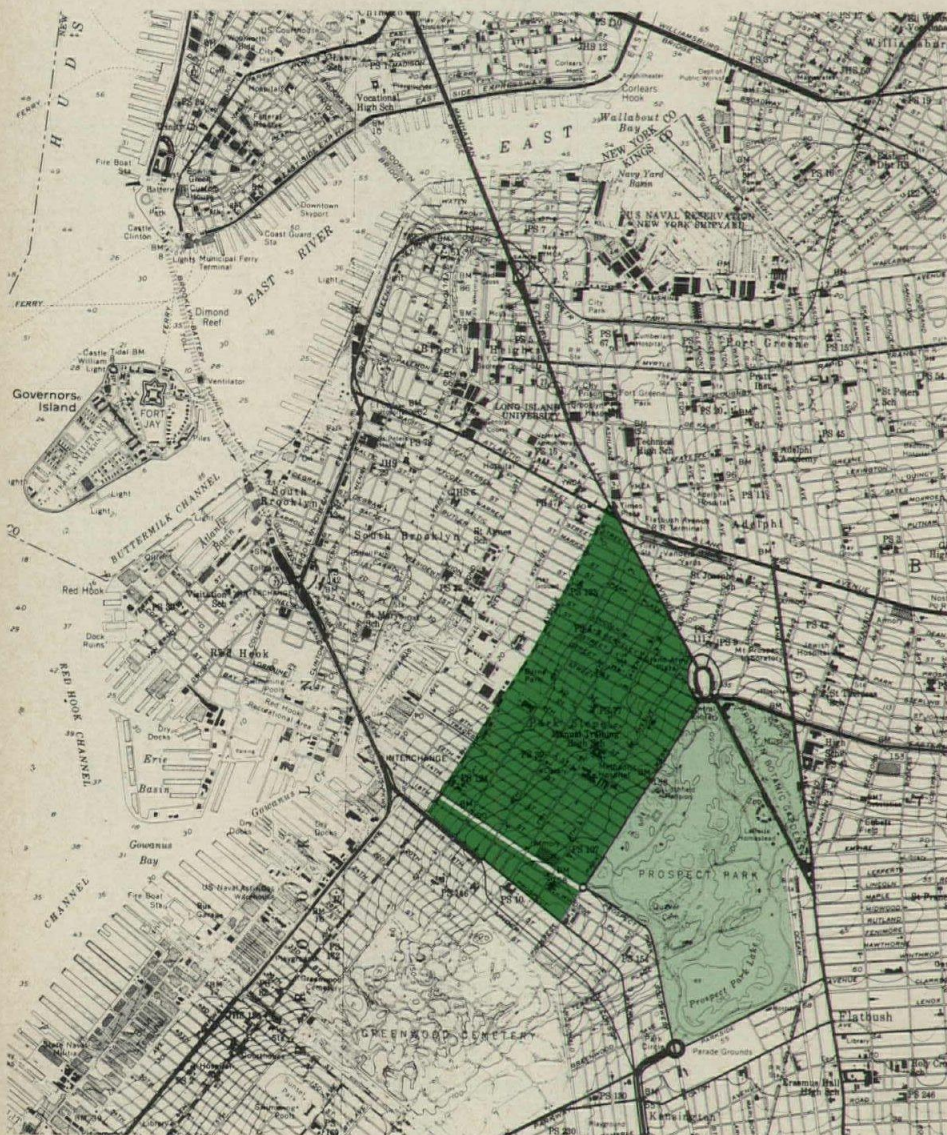
FIRST FLOOR



# COMPREHENSIVE DISTRICT PLANNING PRIVATELY SPONSORED GUIDES REHABILITATION OF SIX BLOCKS IN BROOKLYN

**Rehabilitation of Park Slope North**, the neighborhood shown in gray on the development plan for the entire Park Slope district (opposite page), was planned as part of a broad-scale study of the district which architect John H. Beyer of Victor Gruen Associates made for its client, the Park Slope North Improvement Corporation. As designated on the Brooklyn map (below) the Park Slope district does indeed slope, down-

ward toward the East River from Prospect Park on the southeast to Fourth Avenue, a major route which forms the boundary to the northwest. On the northeast, Flatbush Avenue cuts diagonally through the old grid-iron plan, and to the southwest the district is defined by Prospect Expressway and the Greenwood Cemetery beyond. The total area comprises approximately 566.5 acres and 74,800 people.



■ Area redevelopment studies on a scale of the plan for the Park Slope district in Brooklyn (opposite page) are usually performed by city planning commissions, redevelopment agencies or outside planners under contract to the city. The Park Slope study, however, was initiated and paid for by a non-profit organization, the Park Slope North Improvement Corporation, which hired Victor Gruen Associates to develop a comprehensive plan which would provide guidance for the rehabilitation of the much smaller area shown in gray on the plan opposite. The president of this non-profit group, Frederick W. Richmond, shares the belief with his clients that, wherever possible, neighborhood rehabilitation should be carried out within the context of well-formulated long-term physical and social goals for the broadest definable area. The small-scale neighborhood rehabilitation project just started, according to plan. Its sponsors hope that this will act as a catalyst leading to the implementation by the city of their broad proposals.

The project was begun by two pastors, heads of churches located within a rapidly deteriorating Park Slope neighborhood. Reverend Michael Quinn of St. Augustine's Roman Catholic Church and Reverend Clifford A. Buck of John's Episcopal Church, sought help from the Frederick W. Richmond Foundation. The two churches and the foundation became sponsors of the rehabilitation demonstration, the latter providing funds for a 10 per cent down payment on the initial property to be acquired and for legal and architectural fees.

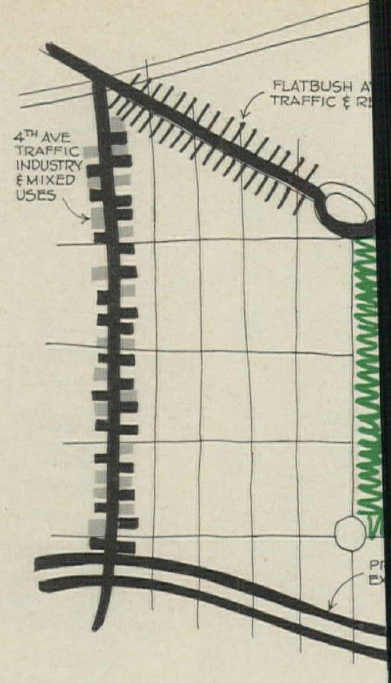
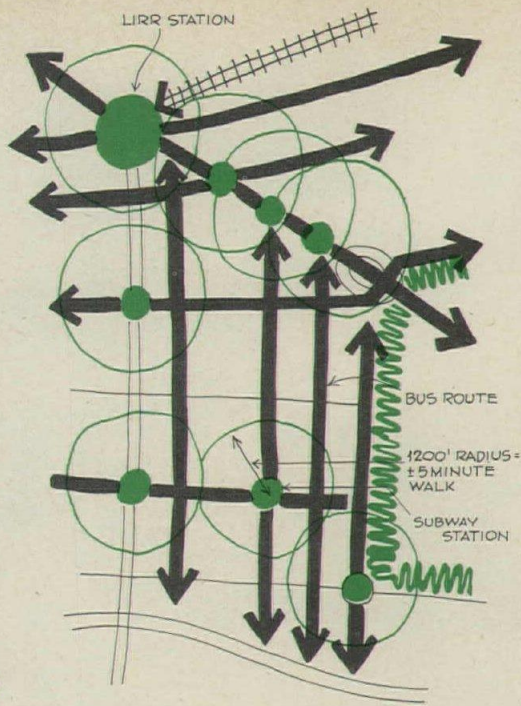
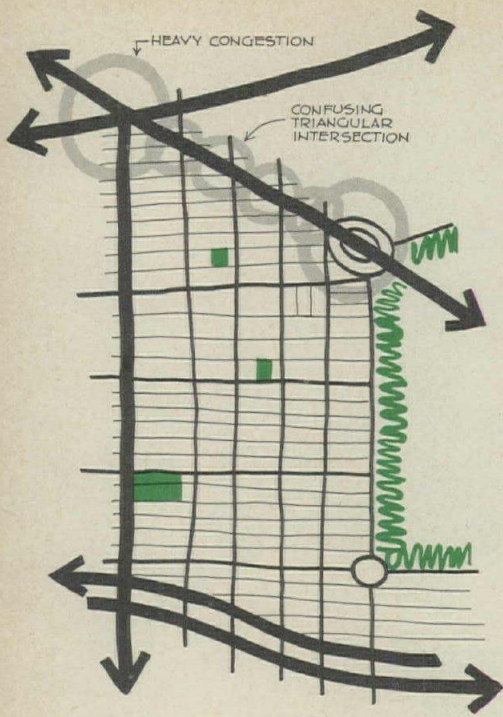
The project is being carried out with the assistance of the Federal government, acting through the Department of Housing and Urban Development (HUD) and the Office of Economic Opportunity (OEO). The City of New York is participating through the Rent and Rehabilitation Administration (RRA). Permanent financing will be provided by the Federal National Mortgage Association, under Section 221 (d) (3) of the National Housing Act, using the below-market interest rate provision, with rent supplement. This Section provides 100 per cent insured mortgages for non-profit corporations. Preliminary expenses for property acquisition and planning that were not paid for by the foundation were financed from an OEO grant administered by the Rent and Rehabilitation Administration.

The first phase of the neighborhood plan calls for rehabilitation of 17 brownstone buildings, four stories high, which were built between 75 and 100 years ago for single-family occupancy. Seventy-six new dwelling units will be created within these brownstones: 16 three-bedroom





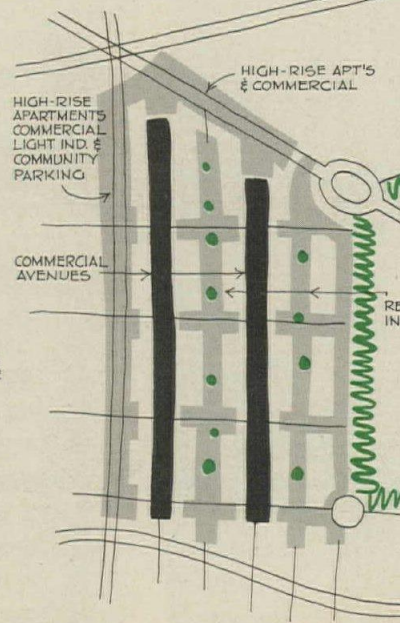
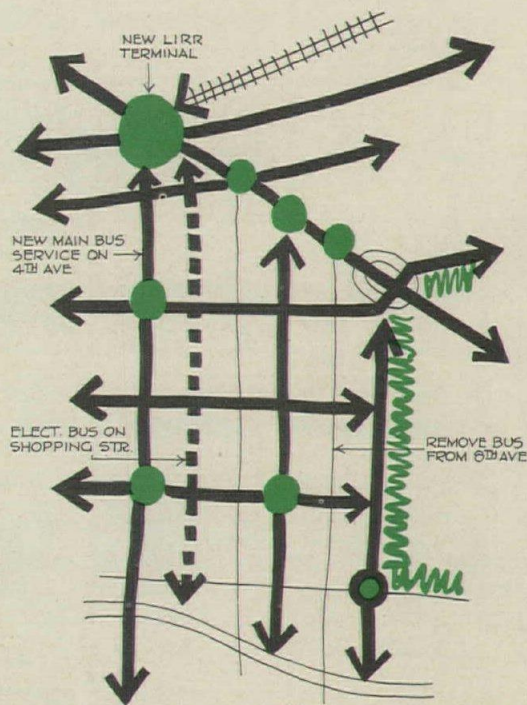
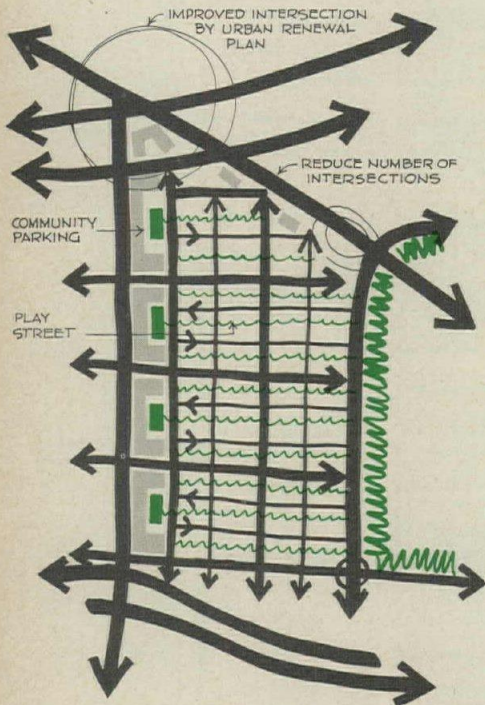




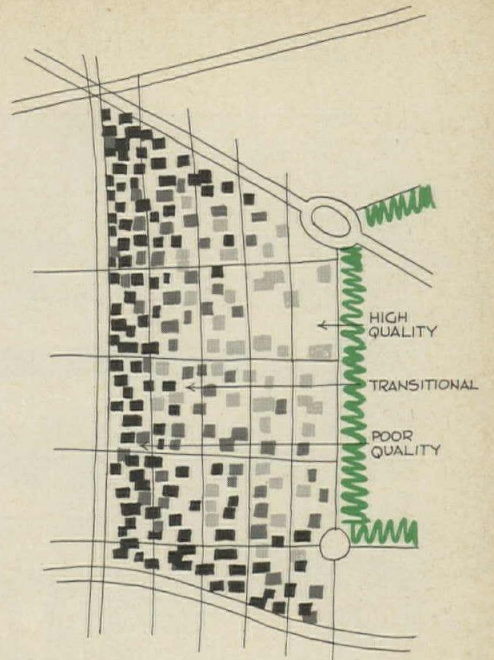
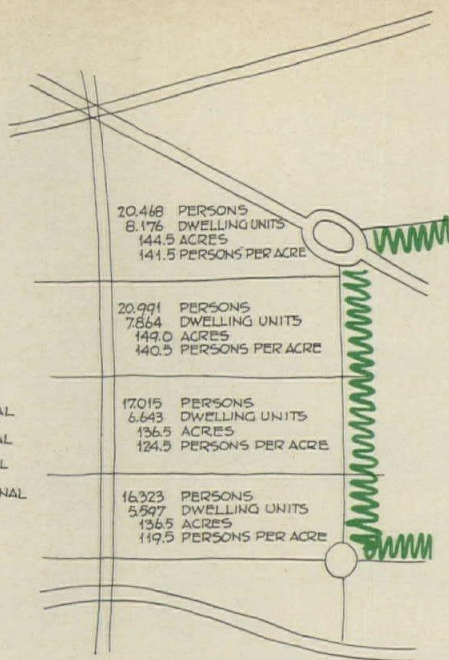
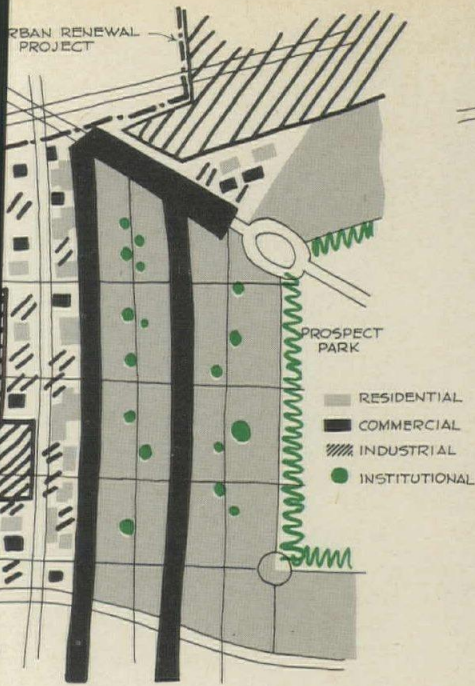
Patterns of traffic and open space which now exist (above) would be transformed into the proposed system (below). Improvement of the intersection of Fourth Avenue, Flatbush Avenue and Atlantic Avenue at the northwest edge of the district has already been planned as part of an urban renewal program for an adjacent sector. The four major east-west streets remain two-way. Alternate streets would be closed off for play, and those which remain become one-way. The four north-south streets within the district boundaries would alternate as heavier traffic streets. Community parking facilities are recommended along the Fourth Avenue edge.

Public transportation, while good, would be improved in the Gruen scheme. Existing subway and bus routes (above) are plentiful, and most Park Slope inhabitants can walk to the nearest subway station in five minutes. The new mass transportation plan (below) places the main two-way bus service on Fourth Avenue, a boundary street and the proper long-haul route to the subway stations. The planners propose that an electric minibus operate on Fifth Avenue, a narrow artery which should become a shopping mall. The scheme removes the Eighth Avenue bus route, since service is available on the adjoining north-south streets.

Existing urban characteristics at Park Slope boundaries, shown in the diagram (above) influence Gruen's proposed guidelines for heights and densities of new construction (below). Because the Fourth Avenue Flatbush Avenue arteries are wide enough to handle additional traffic generated by increased population densities, and since most construction can and should occur along these greatly deteriorated edges, Gruen planners propose that a boundary of high-rise apartments be erected surrounding the three-story apartments. Prospect Park is a great amenity. The plan discourages high-rise construction on its border.



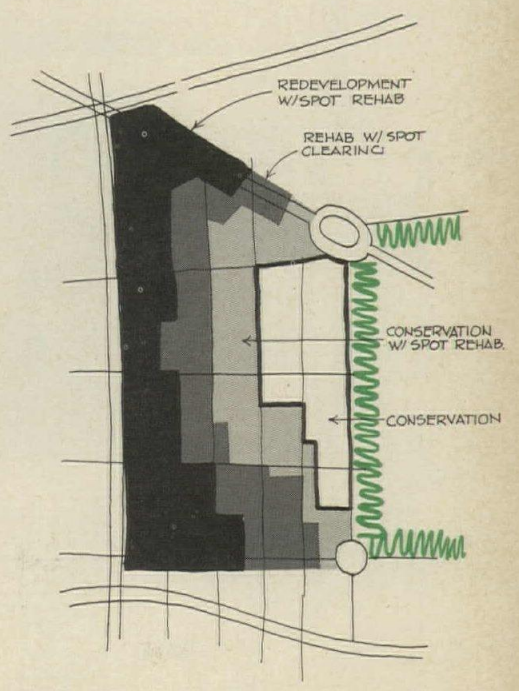
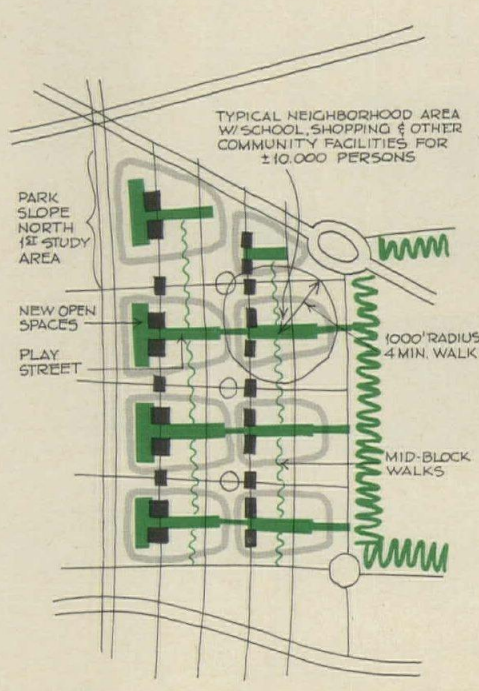
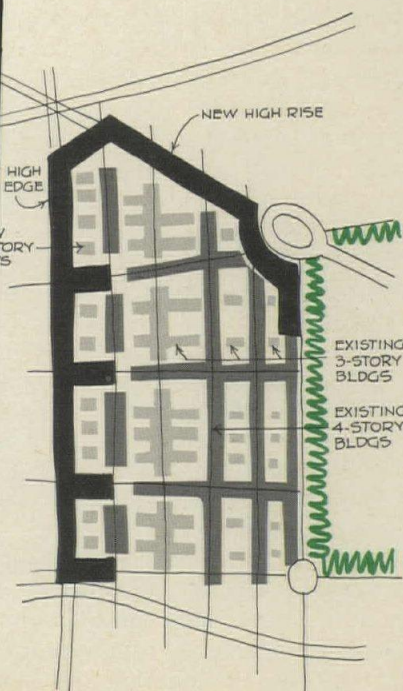




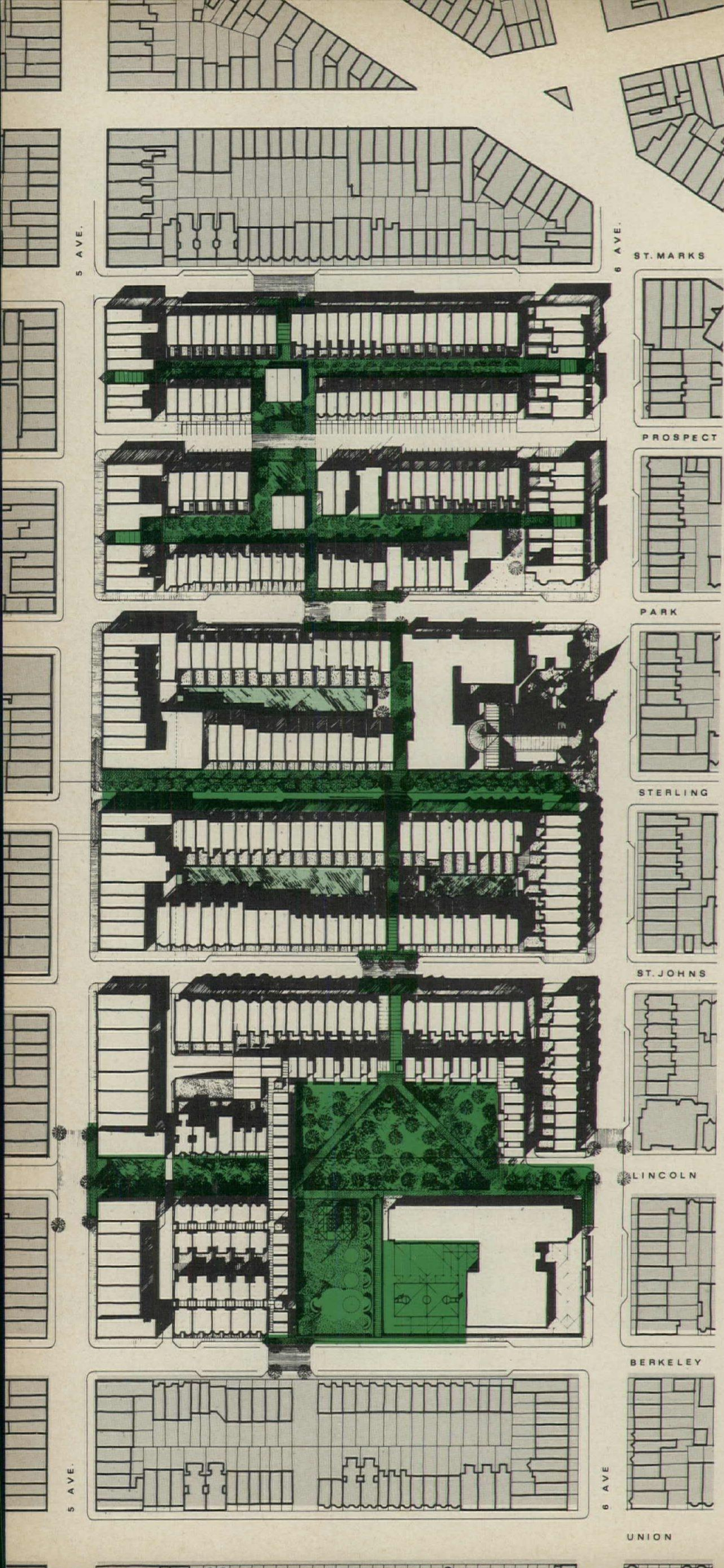
ent land use and activities (above) help  
e Gruen's zoning proposals (below).  
Fourth Avenue and Flatbush Avenue  
es have a varied and unstable mix of resi-  
tial, commercial and industrial uses.  
in the boundaries, the district exhibits  
ear system of alternating uses. Fifth and  
enth Avenues are shopping streets, Sixth  
Eighth are institutional and residential.  
Gruen's scheme, Fifth and Seventh Ave-  
s would be zoned for commercial use,  
Fourth and Flatbush Avenues for ware-  
sing, small manufacturing, heavy com-  
mercial uses, high-rise residential construc-  
n and community parking.

**The present population,** number of existing dwelling units and current densities per acre are shown (above) for the four major areas defined by the crosstown streets. Gruen's planners believe that 10,000 persons can form an urban neighborhood of comfortable densities, and convenient amenities, if the aggregate of shopping and service facilities, schools and open spaces form a center which is no more than 1,000 feet or a four-minute walk from its boundaries. The diagram (below) shows eight neighborhoods of this type. Major open spaces are located within the high-rise housing and linked by means of the play streets to the park.

**The condition of existing structures,** shown in the diagram above, was assessed, block by block, by means of a "wind shield" survey, supported by Community Renewal Program data supplied by the city. Gruen's planners propose four distinct levels of action, shown in the plan (below), which correspond directly with existing conditions. The well built sound neighborhood near the park should be conserved. The area immediately adjoining it, which is beginning to decline, calls for conservation and spot rehabilitation nearer the park, and rehabilitation with spot clearance in the section which adjoins the perimeter slum to be redeveloped.







units to rent for \$137 per month; 44 bedroom units to rent for \$123 month; and 16 one-bedroom units, ing for \$108.

The Richmond Foundation, in viding seed money for the Park S North Rehabilitation Project, is adv ing the idea that non-profit organiza have a major role to play in slum habilitation. Frank C. Montero, treas of the non-profit corporation puts it way: "Non-profit groups have the b advantage of being able to operate the flexibility and freedom sacred to private entrepreneur. For instance, tual insurance companies provide n profit service to their policy hold Non-profit effort in the housing field provide equally effective service tenants on a long-term basis without need for return on investment.

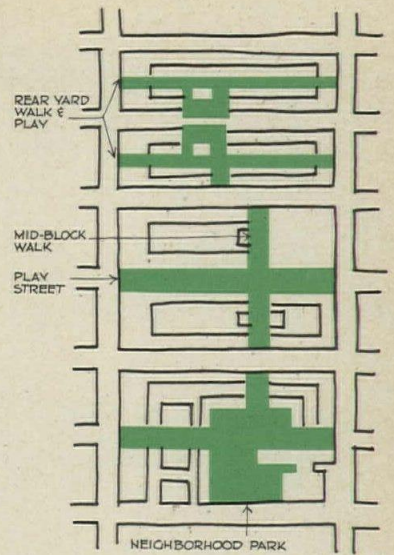
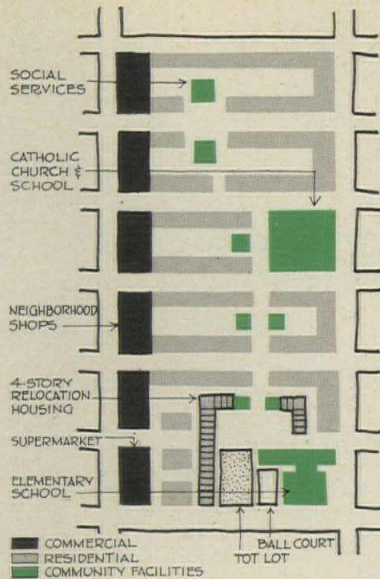
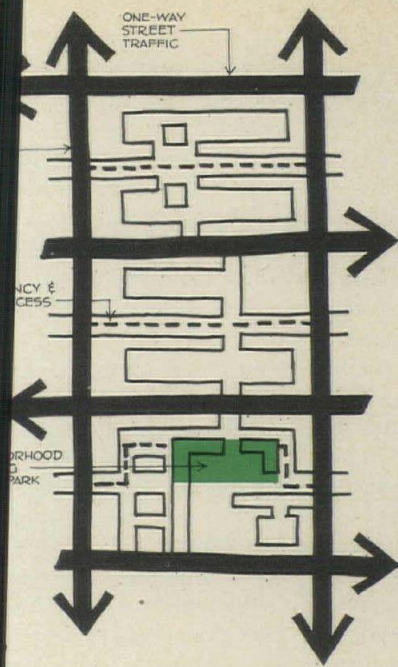
"A public commitment to pro decent housing for all citizens is basic necessity. For families whose comes are too low to pay rents in unassisted housing market, there is obvious need for subsidies if this co mitment is to be honored and the pu lic interest served. Through various co binations of low interest rates, la write-downs, long-term mortgages, r estate tax abatement and rent supp ments, non-profit groups can provide substantial number of the units requir If it is argued that only public housi authorities should provide subsidiz housing, then the government will eve tually become landlord for more th one million families, leaving little ba for comparison of costs, quality or ma agement; and because of its legal an administrative requirements, it will pe petuate economic segregation.

"Perhaps the most creative and p tentially fruitful approach in providi genuine help where it is really need in housing is the Rent Subsidy progr enacted in Congress in mid-1965. Unde this program, families must have an in come of not more than \$4,300 a year to qualify for rent help. When familie move into new buildings or rehabilitate buildings, they must pay out 25 per cen of their income in rent, and the govern ment pays the rest. If the income rise enough so that 25 per cent pays the ful rent, the government subsidy ends.

"This is good for people undertak ing non-profit housing because it places a financial cushion under the projects. It also removes the risk of eviction for low income and welfare tenants who work and earn growing incomes."

It should be added that non-profit organizations cannot fight the slums without the assistance of private industry. Robert F. Dormer, vice president of both the Richmond Foundation and the





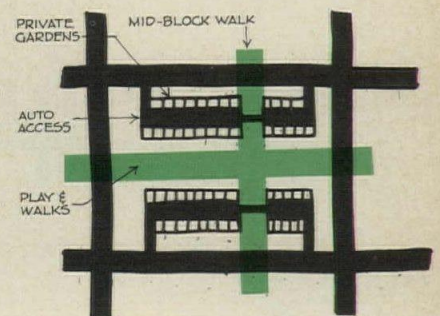
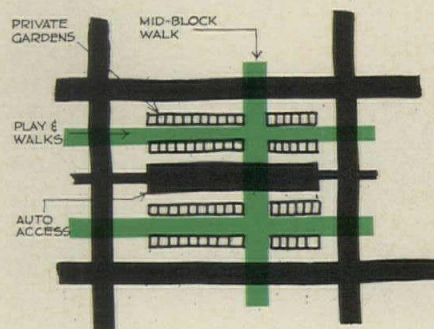
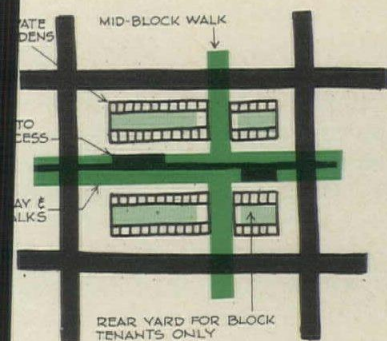
Park Slope North action area shown in plan (opposite page) and in the diagrams (above) consists of six existing city blocks, three blocks away from Flatbush Avenue to the north and bounded by Fifth and Sixth Avenues to the east and west. A section of the neighborhood in decline, many of its brownstones are now single-room occupants, a sure measure in statistical terms of worsening conditions. The number of non-whites in the area is rapidly on the increase. The neighborhood is anchored by two institutions—St. Augustine's Roman Catholic Church near the center, and a public school to the south. The planners have transformed the six blocks into three superblocks for approximately 2,000 persons each. The play streets

which bisect each superblock will provide limited automobile access and serve as fire and service lanes. They will connect with large semi-private play areas at the rears of parallel rows of brownstones. In addition, each brownstone may have a small private garden at the back. The planners note that it is inadvisable to make the area between the backs of brownstones into a public space if the street is to remain public.

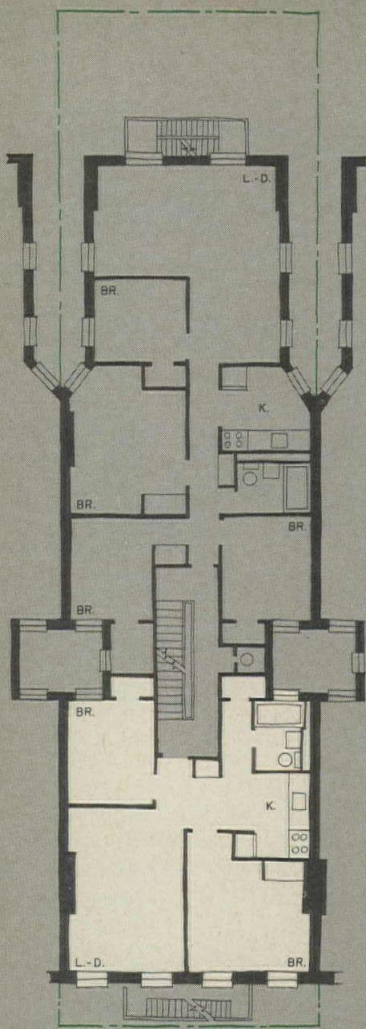
A neighborhood park which will be bordered by new low-rise units has been introduced adjacent to the public school. A supermarket with parking beneath will be located nearby on Fifth Avenue, the commercial street. This superblock will thus become the nucleus of Park Slope North. Since

the blocks are quite long in the east-west direction, a mid-block north-south pedestrian path will be developed to interconnect neighborhood-oriented community facilities.

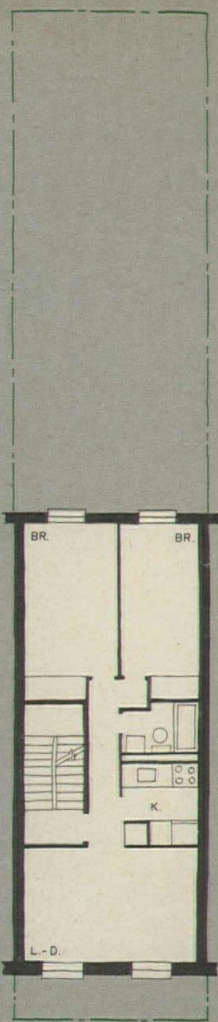
The diagrams (below) show three possible alternatives for superblock design. In the first plan the intermediate street becomes a play street with access limited to neighborhood autos, fire and service vehicles. This is the scheme proposed for Park Slope North. In the second plan, the center street is used entirely for service and limited access and the backyards become a common play and sidewalk area. In the third scheme shown, backyards become the common access and service street, and the old street is transformed into a play area.







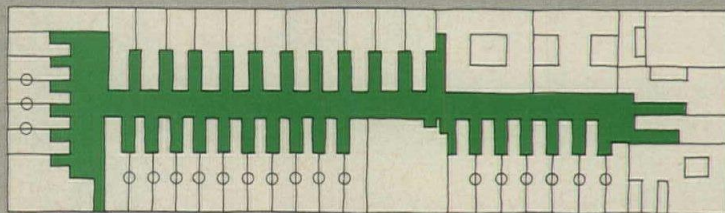
TYPICAL OLD LAW TENEMENT PLAN



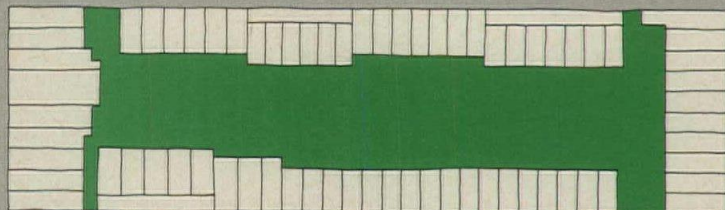
TYPICAL BROWNSTONE PLAN

**The old-law tenement vs. the brownstone—** which should be rehabilitated? Old-law tenement rehabilitation can be socially valuable when performed as a stop-gap measure in a decaying area, but the repaired structures—still airless, viewless, yardless and several stories too high without elevators, will never be truly fit to live in and should eventually be torn down. The brownstone, on the other hand, is an ideal urban residential unit which can be continually renewed. It is a domestic building type which has not been essentially improved upon for centuries. Buildings are still being designed with the identical plan. All rooms except the service elements at the core receive light

and air, yards are usually ample, and even the fourth floor is easily reached by stairs. Old-law tenements, built rapidly and in great numbers for poor immigrants at the turn of the century, have the stigma of poverty about them still, no matter how improved. The brownstone, socially neutral, is dependent on the neighborhood for its status—housing the rich on Manhattan's Upper East Side, and the middle class and poor elsewhere. Where it has been allowed to decline the brownstone is easily upgraded, although its rehabilitation is expensive. Planners believe that the rehabilitation of a neighborhood of brownstones can attract a wide range of incomes and further desired integration.



TYPICAL OLD LAW TENEMENT BLOCK



TYPICAL BROWNSTONE BLOCK

Park Slope North Improvement Co- tion, asserts that he is concerned disappointed with the performance private industry in the rehabilitation our cities. "In one case that I am fa with, the largest retailer in the co —and a strong vocal supporter of renewal—spurned the opportunity engage in the redevelopment of downtown of a city in New Jersey cause of the beckoning attractions competing suburban shopping ce Very few of our banks—in spite of guarantees—seek out opportunities participate in programs to provide b housing for families whose needs be met only with some degree of p assistance.

"Plans for rebuilding our ce cities cannot be founded upon the sumption that more than a few m industrial and commercial organizat will be guided in their investment c sions by the same concern for the c that is expressed in their speeches in their contributions to scholarships spite of the fact that a number of ur renewal projects in various parts of country have major organizations as velopers, or as tenants of develop the scale of the involvement is almost significant in proportion to the probl

"If effective participation involv great financial risks and burdens th we could recognize the need for o porate caution. However, the burd have been minimized through the abi of public agencies to undertake the o difficult and costly aspects of assembly a clearance of areas suitable for new us and the risks have been socializ through the device of FHA insuran There are many non-profit organizati willing and able to undertake the oper ing responsibilities in connection w rehabilitated or new housing eligible f 100 per cent financing under the 21 (d)(3) program. These non-profit grou can become an important force in ad ing to the supply of moderately price adequate housing if they can obtain th funds to accomplish the prelimina work required in order to secure mor gage proceeds. New York State has re ognized this problem and last year pro vided a \$10,000,000 Housing Develop ment Fund which will be used to pro vide repayable advances to non-prof groups. Although the non-profit group themselves are not governed by ordinar business considerations, their activitie provide profit opportunities for archi tects, builders, lawyers and materials sup pliers. Therefore, industry can assist in achieving both business and social goals by providing a similar fund—but on a scale which I hope would be in keeping with the dimensions of the problem."



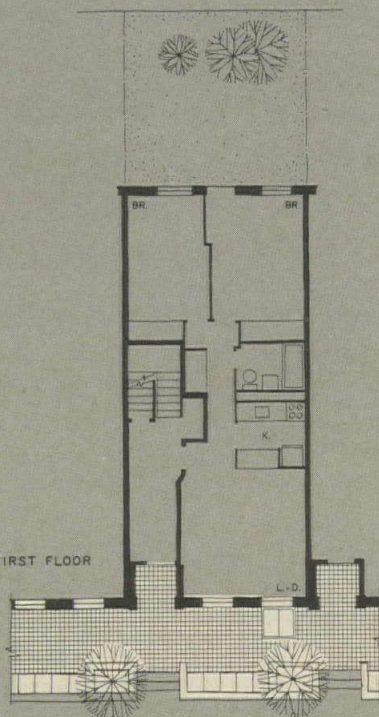


Restoration of Park Slope brownstones will start first of removing the steps which formerly led to the "parlor floor" and hidden servants' entrance and trash cans on the ground floor. New low walls, planting, paving and screening of trash cans will redefine this area and screen trash cans as the plan and drawings show. Each house becomes a full four-floor townhouse. New kitchen and bathroom cores will be added and new finishes will be applied to floors, ceilings and walls.

VIEW OF LOWER SIDEWALK AND PLAY AREA →



TYPE "H" FIRST FLOOR

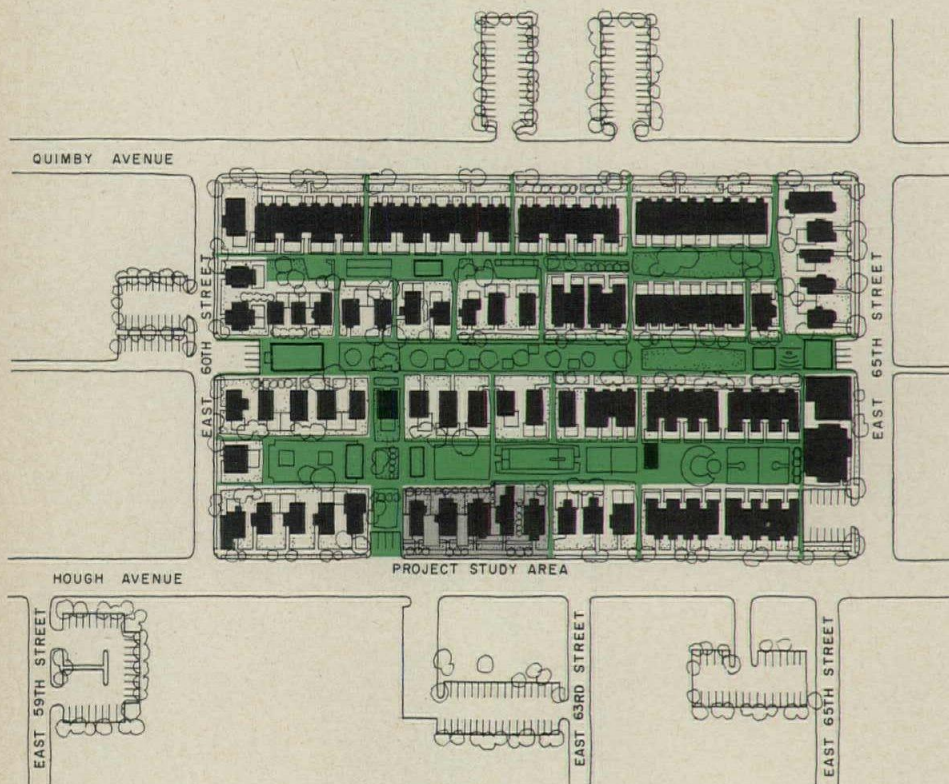




A NEW KIND OF TEAM—  
 THREE TRADE ASSOCIATIONS,  
 A NON-PROFIT CITIZENS' GROUP  
 AND HUD—COMBINE TO REHAB SLUM

Two long slum blocks planned as a unit by architects A. Quincy Jones and Frederick E. Emmons will, it is hoped, act as a catalyst for the rehabilitation of a still larger area of Cleveland's notorious Hough slum. As can be seen in the plan (below), the center east-west street will be closed to traffic and converted into a public mall with commercial facilities and provision for small neighborhood industry. Rear yards will also become continuous public open space in which desirable community and recreational facilities will be intro-

duced. Each house will have a small private garden at the rear. All three public malls will be linked together and to the perimeter streets to the north and south by a system of paths following the routes of former alleys. Perimeter lots for off-site parking will be located within a four minute walk of the area center. The drawings (opposite page) show proposals to improve the appearance of the houses by removing porches and extending eaves. More importantly, common terraces screened from the street will be created between houses.



For the first time a major industry group has joined with a non-profit neighborhood-based sponsor to rehabilitate a slum using Federal mortgage insurance. The American Plywood Association, National Forest Products Association and the Southern Pine Association have joined with HOPE, Inc. (Our People Economically), to rehabilitate two slum blocks in Cleveland's Hough district, and have hired architects A. Quincy Jones and Frederick E. Emmons to establish planning guidelines. The associations have pledged \$150 thousand in seed money with the aim of generating \$2 million in FHA below-market mortgage. HOPE, Inc. will later manage the completed property and service the mortgage.

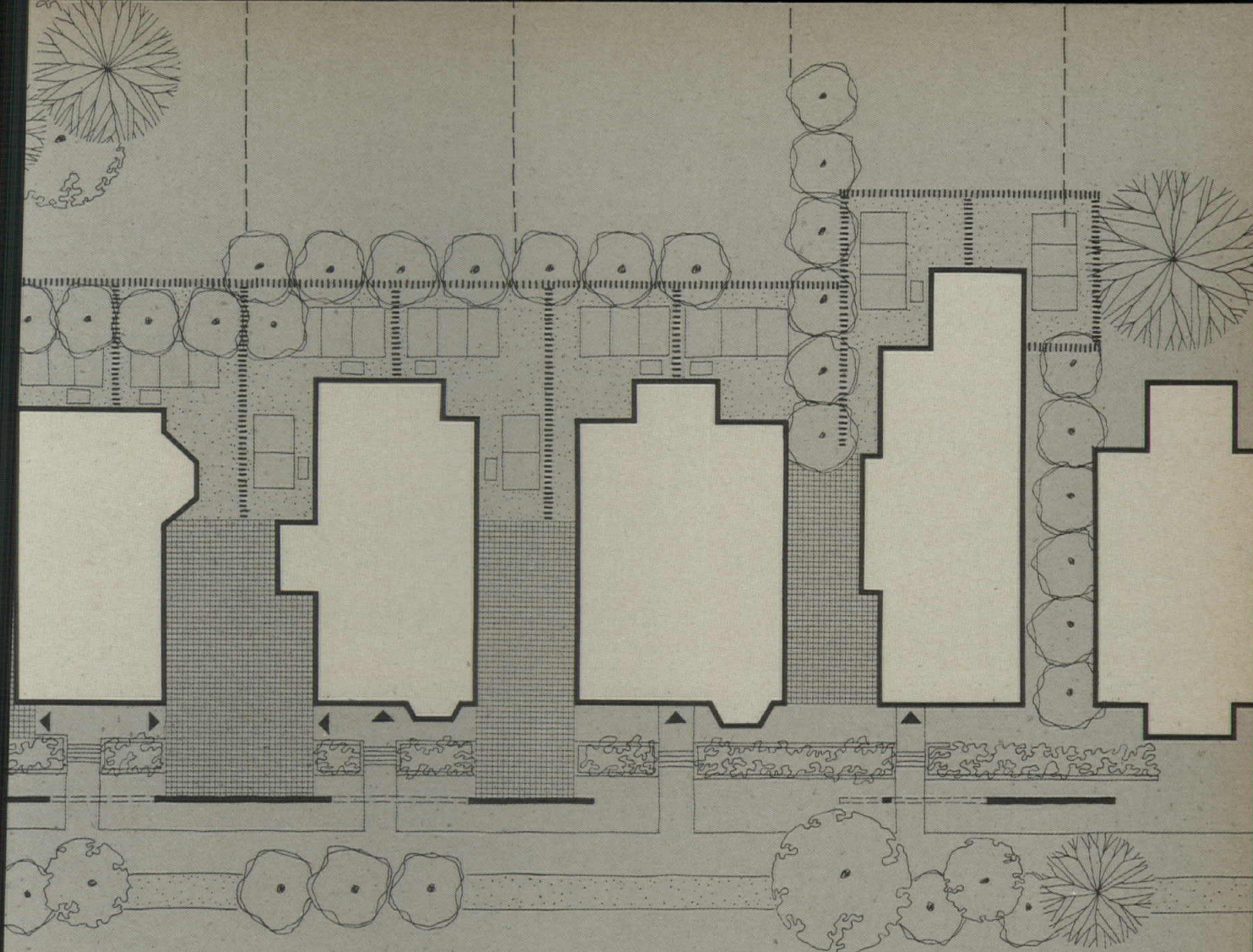
HUD experts estimate that there are in the U. S. at least five million unoccupied housing units which could be rehabilitated. Assuming a cost of \$10 thousand per unit this adds up to a \$50 billion market. Until now, only brick or masonry housing has tended to get renewed. Lumber men figure that a large percentage of the five million units awaiting transformation in our smaller cities and towns are wood frame.

The three associations hope to provide better and more efficient structural and installation systems in the process of rehabilitating Hough. By undertaking this specific project they also believe they will stimulate other segments of private industry to enter the rehab field. In addition they wish to test the workability of existing legal and financial mechanisms and to be a force for the improvement of procedures which may prove unwieldy.

The project area consists of 140 existing units including a few single-family multi-family buildings. The Jones & Emmons plan increases this density to 180 units. Since all property will eventually be held in single ownership by HOPE, Inc. the planners have been able to develop common areas for community activities to take the place of badly deteriorated alleys and backyards. Construction will be phased for minimum displacement of residents—one series of units will be completed and occupied before construction is begun on the next.

Early publicity on the Hough project caused the price of yet unassembled lumber to increase by two to four times its actual value. Fortunately HOPE, Inc. had options to purchase nearly 80 percent of the properties before prices went up on the remaining 20 percent. These remaining parcels were owned by absentee landlords many of whom had left the area after the riots of 1964. The lumber associations have forced the prices down again to reasonable levels by threatening to withdraw their support. The project is now quietly going ahead.

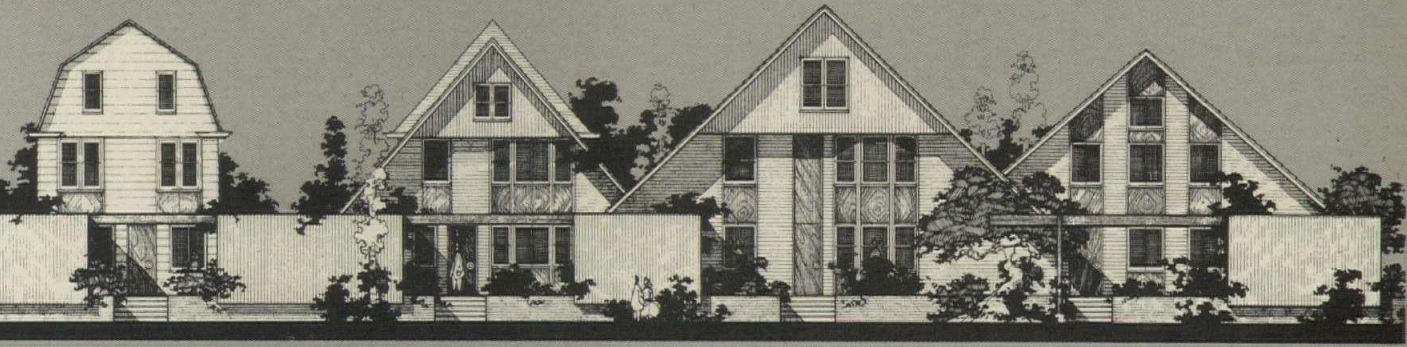




CT STUDY AREA



ELEVATIONS

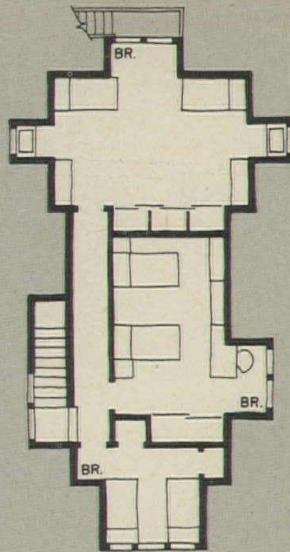


ED ELEVATIONS

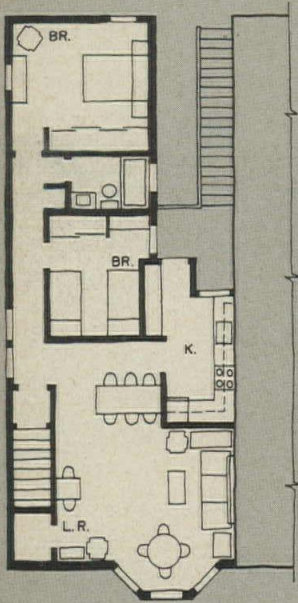


In the typical rehabilitation plans bedrooms are added where possible in the spaces between houses, more compact kitchens and bathrooms replace old facilities, and unnecessary partitions are removed. Extensive changes in floor and stair layout are not necessary since most of these frame houses, built as single-family dwellings, have served as three-story apartments for the last 30 years.

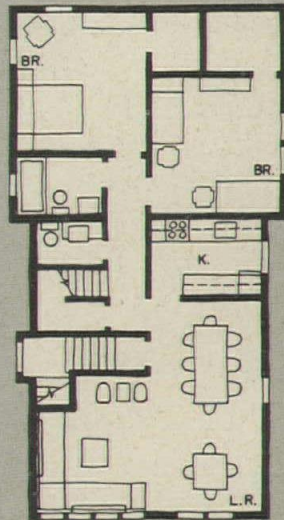
ATTIC FLOOR



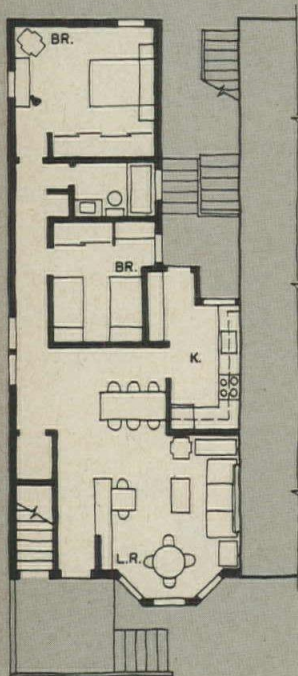
SECOND FLOOR



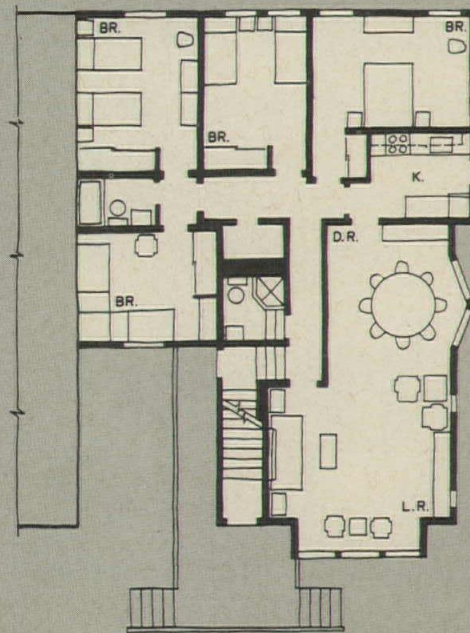
SECOND FLOOR



FIRST FLOOR



FIRST FLOOR





## Air conditioning: a new interpretation for architects

The fast-changing technology of air conditioning in buildings demands for comfortable environment in buildings is increasingly important concern for architects. Not only should they have a basic grasp of components and systems, but also they must consider the changing needs of the client, the changing process of system integration with architecture, and the changing relationships between architect, engineer and manufacturer.

Air conditioning is hardly a romantic consideration in architecture. It is, rather, an indispensable environmental ingredient of the modern-day building—difficult to assimilate and make part of an organic whole. And, unfortunately, no technological breakthroughs are in the offing to eliminate this difficulty. In fact, the very nature of air conditioning—which involves air movement and air changes—works against simple solutions. And although many interesting developments have taken place in the area of physical co-ordination and integration of air-conditioning systems with structure, lighting and acoustics, this is only one facet of a complex and multi-faceted technical and economic problem. Further, even though industry is furnishing more sub-system elements in larger and larger pre-engineered packages, this does not eliminate the task of determining over-all system thermal performance requirements and economics in relation to each building design.

The architect no longer has to wonder about what sort of thermal conditions need to be provided for comfort air conditioning—these are pretty well set forth. He does, however, need to become even more concerned about the interaction of building design and air-conditioning system. He needs to be aware of what system characteristics are necessary to provide a continuity of comfort as the building is subjected to a variety of loads. There is a vast array of systems and sub-systems to provide thermal comfort. Selection will depend on a variety of interrelated factors having to do with thermal performance; degree of individual control desired; flexibility for future change; space requirements for equipment, pipes and ducts; how the owner wants to approach initial and operating costs; how difficult the system will be to design; what sort of maintenance help is required; relative costs and availability of energy sources. While a detailed analysis of some of these factors must be performed by the engineer, nonetheless the architect must become increasingly aware of their implications for building design, and he must consider their influence very early in his programming of a building. Beyond these basic influences on system selection is the architect's concern for how sub-system components such as diffusers and other in-room elements affect room appearance.

The purpose of this two-part article is to provide the architect with an over-all view of air-conditioning system types; to familiarize him with some of the more important current trends in air-conditioning technology; to help improve the dialogue between architect and manufacturer; to help the architect in his working relationship with the mechanical engineer; and, finally, to help the architect program buildings better in their technical aspects.

—Robert E. Fischer



## THE BIG PROBLEM: VARIABLE HEATING AND COOLING LOADS

Most buildings are air conditioned today. Many have to be to neutralize the heat from sun, lights and people. More glass is used—usually without the benefit of built-in shading effects of the deep window reveals of years past, although these are coming back in some facades. Lighting levels are reaching new highs—so much so that it often pays to recover heat from lighting fixtures to take care of a large part of the heating load in winter. More interior space is being utilized nowadays, since we need not depend on daylight for seeing—and this means that most building interiors are being cooled year-round.

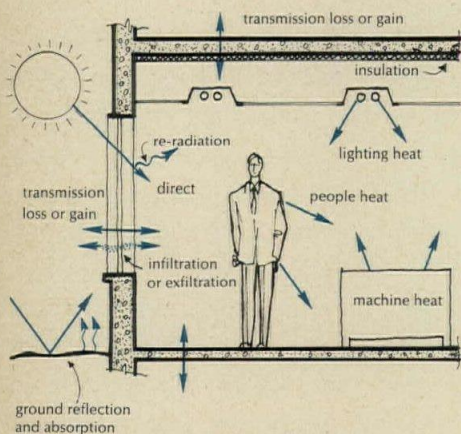
So the problem is not one of deciding whether or not to air condition a building, but, rather, how to do it most effectively. And there's the rub. Cost of the air-conditioning system for a high-quality office building can run from 20 to 30 per cent, or more, of the cost of the building. Air conditioning takes space—often seeming like an oversized octopus with its tentacles of ducts and pipes winding their way through shafts, hung ceilings and chases.

Since air conditioning cannot be seen, in contrast to building structure, lighting, or even acoustical elements, it frequently gets neglected in terms of proper space requirements and performance. Naturally, there is no reason why necessary air-conditioning elements within the room—ceiling and wall diffusers and under-window conditioning units—should be unsightly. In fact, great strides have been made in recent years by architects working with manufacturers to develop air outlets that are unobtrusive. And even in some cases these elements can be made to do double duty. For example, linear ceiling diffusers can support suspended ceilings and

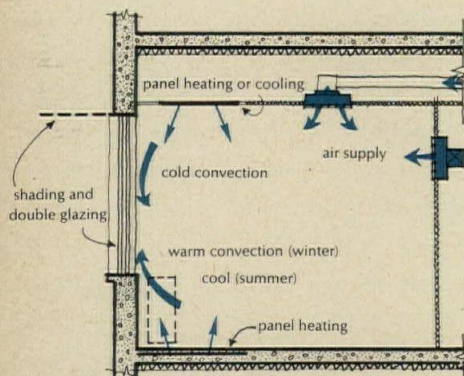
be notched to receive movable louvers. And these diffusers may disintegrate altogether if the air is supplied to a ceiling plenum to perforated panels. Enclosures for under-sill air terminals are designed with a clean appearance, are frequently made smooth and can be partly concealed within a floor-ceiling sandwich.

In still another area, ceiling supply and return openings have been integrated with recessed lighting fixtures—on the one hand, to give the ceiling more organized, less cluttered appearance; on the other, to remove lighting heat before it enters the room. This heat may be merely exhausted and rejected but in many cases it is recovered to serve energy being used either to control the temperature of incoming supply air, to add heat to fresh air in winter, or to be raised to a higher temperature level by a heat pump system. Thus, the room elements which cannot escape the eye are gradually being refined in terms of both appearance and function. Even the tiny room thermostat is having its face lifted by manufacturers, and, in some cases, it is removed from the room altogether and placed above the ceiling to sense temperature of return air.

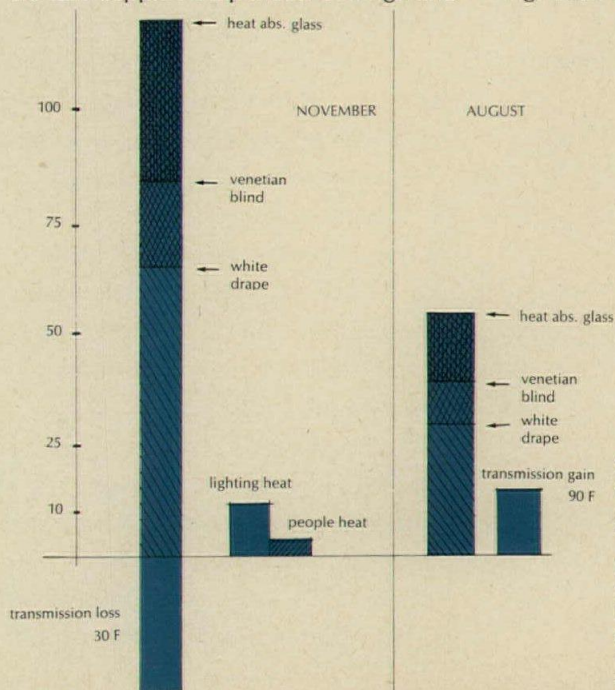
**Architects want to conserve space, but there's an irreducible minimum.** Architects, and of course their clients, are concerned about how much space is taken up by the floor-ceiling sandwich for transporting air, and equipment room space for refrigeration and boilers, fans and pumps, and cooling towers. This problem causes many to look to the future for thermoelectric cooling and heating, and, in the present, to evaluate the possibilities of panel cooling. Even if these two techniques were



**Heating-cooling loads.** The perimeter zone of a building is subject to heat losses and gains that are both highly variable and, much of the time, of greater magnitude than interior zone heat gain (lights, machines, people). The perimeter system usually must have greater capacity and response than the interior system.



**Neutralizing effects.** If possible, external loads should be reduced before they have a chance to penetrate the building exterior to lessen the demands on the air conditioning system. Once inside, these loads can be neutralized by convection or radiant effects of the system.



**Sun.** On the south side, the sun may cause a much greater over-all heat gain in late fall than in summer. The numbers on the graph are BTU per hour per square foot (exterior or floor area). Heat absorbing glass has been assumed with the shading device. Lighting is assumed to be 100 footcandles and a population of 1 person per 100 sq ft.



## BASIC TYPES OF AIR CONDITIONING SYSTEMS

practical and economic today,\*  
ings would still have to have ducts  
ply air for humidity and odor cond-  
nd, more recently, to remove the  
rom lights.

rchitects and engineers have man-  
o reduce duct space requirements  
igning structural elements to serve  
conduits; by using double floors  
rovide air plenums; by running  
up columns, pilasters and through  
; and by coordinating duct and  
ural elements to save space. The  
all economics of these approaches  
careful appraisal.

ome savings in space for basic  
ng and cooling equipment have  
e effected by utilization of heat from  
electric heating elements; room-  
om heating-cooling units; pur-  
e of district heating and cooling en-  
from a utility; heat pumps to elimi-  
boilers; decentralization of smaller  
al fan coil equipment with installa-  
in low rental or normally wasted  
e.

### ing design characteristics affect occupant comfort

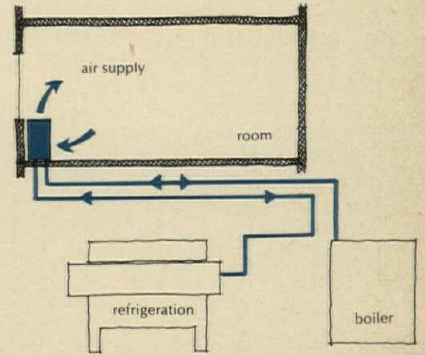
superficial sense, the role of air con-  
ning is simple—principally to pro-  
bodily comfort through the regula-  
of heat loss from building occupants.  
heat loss mechanisms, while under-  
d, are still relatively complex in terms  
their relative balance. For example, a  
e might be reasonably cool, but have  
subjective effect of seeming "drafty."  
room air temperature and humidity  
nt be in their correct ranges in a  
ce, but the hot radiant effect from

glass exposed to the sun could create  
discomfort. Nonetheless, a general, but  
basic, understanding of how the human  
body exchanges heat with its surrounding  
environment will help the architect avoid  
thermal environmental problems that are  
expensive, or even nearly impossible to  
remedy.

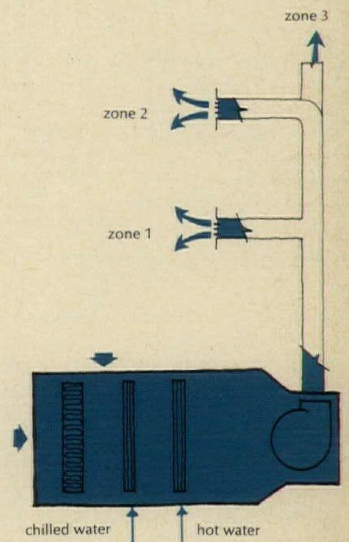
The definition of air conditioning is  
simple enough: treatment of air so as to  
control simultaneously its temperature,  
humidity, cleanliness and distribution.  
But the relationship between the basic  
process and actual occupant comfort in  
all parts of the occupied space—on a  
year-round basis—is not so simple.

As has been said, controlled heat  
loss is always required for the occupant.  
The human body must dissipate waste  
heat to the surrounds mainly by convec-  
tion, radiation, evaporative cooling and  
also by respiration. Generally, discomfort  
occurs only when radiant effects (such as  
sun or lights) or velocity and tempera-  
ture of the air stream reaching an occu-  
pant are out of balance with the amount  
of bodily heat that the occupant of the  
space needs to get rid of.

People are reasonably comfortable  
within a fairly wide air temperature  
range. For that matter, no comfort air  
conditioning system maintains tempera-  
ture and relative humidity within too  
close limits. The usual range might be  
about plus or minus 2 degrees. Adequate  
mixing of supply and room air is a must.  
Usually, problems should not occur ex-  
cept where there are difficult air dis-  
tribution situations, high radiant energy  
loads, or wide and rapid load swings.  
From a practical standpoint, what this  
should mean to architects and their con-  
sulting mechanical engineers is that  
reasonable limits should be set on archi-  
tectural elements which tend to increase

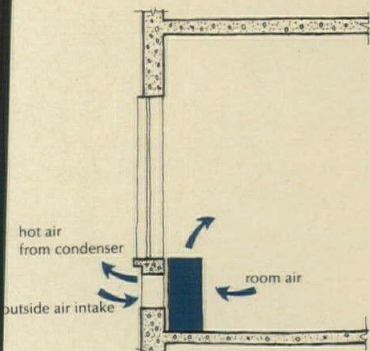


**Building central heating and cooling to room fan-coil units.** With this system the main heating and cooling effects are distributed via water, rather than air. Ventilation air is supplied through the wall or from a ducted system, perimeter or core.

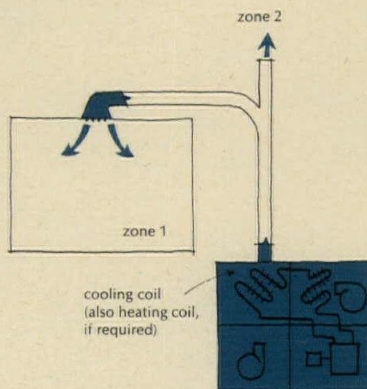


**Central-station air system.** This system comprises cooling and heating coils, filters and fan, all at one location. Cooling and heating energy are provided separately.

thermoelectric technique has been used for  
refrigerators and for small air-handling units  
(son Wax building). Panel cooling has been used  
sionally in office buildings and hospitals.



**Unitary: room-by-room.** The simplest system. Has its own refrigeration. Heating can be hot water or electric (resistance of heat pump). Opening may be needed for condenser cooling and ventilation.

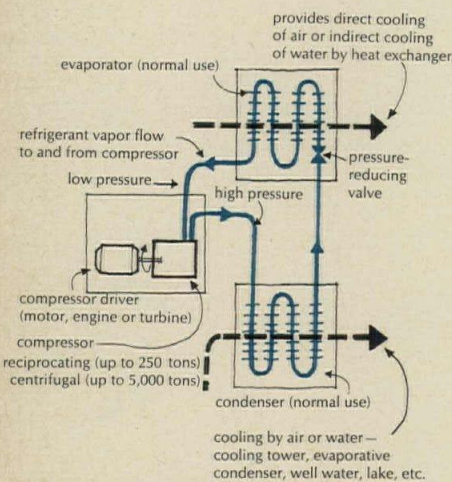


**Unitary: packaged central system.** As with room conditioners, these systems have their own refrigeration and air mover. The package may be adjacent to the space or remotely, serving one or several zones.

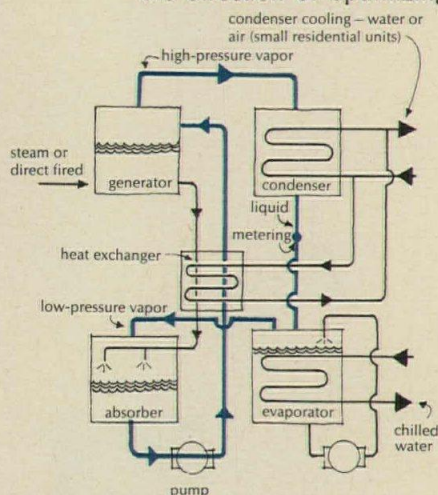


## BASIC TYPES OF REFRIGERATION SYSTEMS

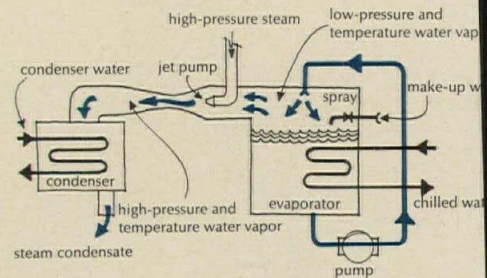
All common types of refrigeration systems produce cooling by the evaporation of a refrigerant. The liquid refrigerant in changing state to a vapor absorbs heat. In order for the vapor to be reconverted to a liquid state, it first must be compressed to a higher-pressure, higher-temperature vapor. Then as it is cooled in the condenser by a medium such as water or air, the refrigerant once again becomes liquid, and the cycle is repeated all over again.



**Mechanical refrigeration.** A mechanically-driven compressor (motor, engine or turbine) produces a high pressure, high-temperature vapor. The condenser turns it to a high-pressure, medium-temperature liquid. The refrigerant leaves the pressure-reducing valve as a low-pressure, low-temperature vapor. In the evaporator the refrigerant is evaporated by absorption of heat from the air or water being cooled.



**Absorption refrigeration.** Here, the refrigerant is water. The water vaporizes in the evaporator and as it evaporates, absorbs heat. The vapor is attracted to the absorber by an absorbent, usually lithium bromide solution. The generator removes water from the absorbent.



**Steam jet refrigeration.** Water is the refrigerant and cooling is produced by vaporization of water in the evaporator which is at low pressure. The steam jet compresses the vapor to a higher temperature and pressure. A condenser condenses both the vapor and the steam.

radiant gain or loss unduly, or which restrict the means by which heating or cooling effects can be introduced into the space in a satisfactory manner—good practice being proved by previous experience, or indicated through engineering analysis and tests of the proposed application.

In general, the demands placed on air conditioning as a system are much more difficult to meet than those of other building and environmental systems.

A structure, for example, is designed to known, or at least assumed, loading conditions. The problems in this area are, more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.

Perhaps the most difficult aspect of air conditioning is that it rarely operates under constant occupancies and design conditions. To make matters even more complicated is the fact that the air conditioning system consists of so many different sub-components. Thus although these components can be chosen with sufficient capacities to meet whatever demands are placed on them, it is difficult, if not impossible, at the present time to optimize completely the sizing of sub-components or the operation of these components in the total system. Some steps are being made, however, in the direction of optimizing sub-systems

such as refrigeration plants the operation via computer control. For in the future is the possibility of the computer optimizing the operation of all systems of air conditioning. Since many of the sub-components, control load operating data are either not available from manufacturers or are not known, the computer could be used to monitor the performance of all sub-systems and sub-components and then write its own program for optimum system operation. This approach is known in the computer field as "adaptive" programming.

To some extent, the architect can expect too much of modern-day technologies, particularly as applied to control of the thermal environment. Sometimes the fact that something can be done encourages pressures to be built up to do it, without due consideration being given to over-all economics. Making a situation more difficult is the fact that, surprisingly, except for a few standard building types, meaningful data on operating costs are not available—first because most air-conditioning systems either are not metered at all, or not metered equitably; and, second, because of the non-standardized type of buildings, each system is different.

Of course, it is only reasonable to expect that an air-conditioning system should be capable of being as flexible in meeting changing occupancies and loading conditions (lights, machines, sun) as the client thinks is desired or necessary for his particular situation, and as flexible as he is willing to pay for. Another question is: what degree of individual control would the client like, and what can he afford? Does he expect the system to switch automatically and immediately from heating to cooling and vice versa?



## FOUR METHODS OF SPACE TEMPERATURE CONTROL

can be a problem during intermediate season operation, particularly with some central systems.) This switchability can be provided with a number of systems, but with some it can be done with operating economy because of the necessary mixing of hot and cold fluids and the requirement of in-availability of heating and cooling from the energy plant.

Obviously, certain building types such as laboratories and auditoriums require an "instant" type of response to changing conditions. But, surprisingly, although the newer auditoriums are designed to have sufficient capacity to handle the surge of cooling load, it is not unusual to find their air conditioning systems unsatisfactory because of wide swings in temperature, resulting in discomfort from too little cooling at one time, or drafts at another.

With other building types, however, which wide load variations are not intended, the architect can in many cases reduce the extent of load variations through attention to some design details. This is particularly true in the matter of glazing on east, west and south facades. Even there are large areas of glass on the north, it is easily possible to have a higher heating load in winter than in summer because the sun's rays are more perpendicular to the glass. In addition, there is condensation of moisture in the air on cold winter days which greatly increases the available solar energy. This fact, frequently overlooked, has resulted in some over-heated perimeter office spaces in the middle of winter.

But what makes system design and operation most difficult are the wide swings in temperature demands of perimeter spaces with exteriors principally of unshaded glass. (In general, heat absorb-

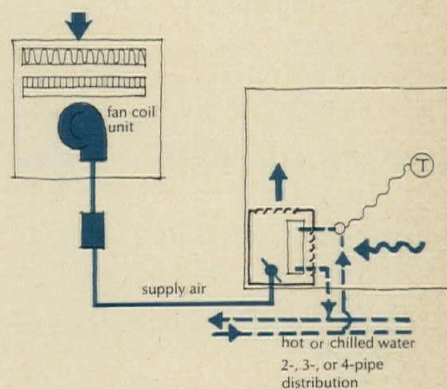
ing glasses, alone, can reduce solar heat gain from, say, 30 to 50 per cent. White drapes increase these values to, say, 60 and 65 per cent, respectively. Reflective insulating-type windows can have solar heat rejection of 70 per cent.)

As can be seen from the graph on the first spread of this article, on a late November day, the heating load due to sun in a perimeter office with 75 per cent glass (heat-absorbing) is four times that lost by conduction to the outside. If the sun were suddenly hidden by clouds, the load would almost instantly plunge from 107 Btu/hr/sq ft of heat gain to 13 Btu/hr/sq ft of heat loss. While this example might seem to be an extreme case, it nonetheless can, and has, happened. Such a tremendous fluctuation is difficult for many systems to match in terms of continuity of comfort.

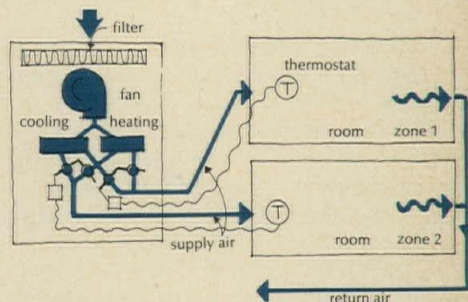
If internal shading had not been provided for in a situation such as this, it almost surely would have to be added later. Perhaps because of past difficulties, but also because of esthetic preferences, architects seem to be using darker heat absorbing glasses, and are beginning to use more reflective glasses. The dark glass ties in with a dark surround, the reflective glass with a light surround. Architects should realize that drapes should be light in color and of close weave to be effective. The architect and engineer should have a clear-cut understanding as to the exact selection.

### Perimeter temperature control can be difficult in spring and fall

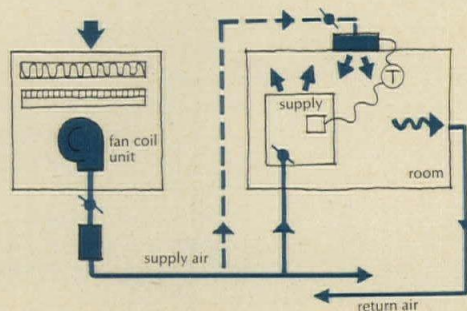
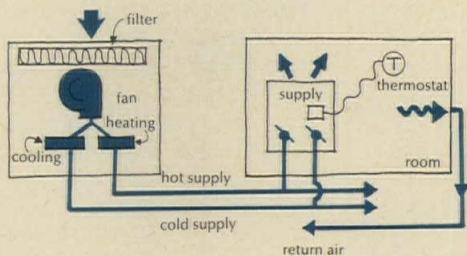
It is obvious from the foregoing discussion that the perimeter spaces of most buildings (except windowless, heavily-insulated exteriors) have a number of fluctuating heating and cooling loads imposed on them, such that the perimeter



**Single-duct induction unit (air and water system).** The main heating or cooling effect is furnished by water pumped through coils in the induction units. A single duct carrying conditioned air blows through nozzles in the unit to induce room air over the water coils and then mix with the fresh, conditioned air,



**Multi-zone system.** With this approach, mixing dampers are provided at the central fan-coil apparatus. The dampers mix the air in response to the demands of thermostats in various zones. While the multi-zone system is not new, it has most recently been applied to roof-top package equipment.



**Single-duct air system.** A constant volume of air is supplied to the conditioned space with variation in temperature being met by mixing hot with cold air supply. The losses due to this mixing can be kept relatively low under optimum conditions; they will be maximum during intermediate seasons when the loads due to sun and outdoor air vary greatly.

**Single duct variable air volume.** This system provides temperature control by varying the volume of supply air through prescribed limits (avoiding drafts on the high side, stagnation on the low). The system may include reheat using either hot water, or warm return air from lights as the sources.



## A GLOSSARY OF HEATING AND AIR CONDITIONING TERMS

**AIR CONDITIONING**—A process of treating air within an enclosed space so as to control simultaneously its temperature, humidity, cleanliness and distribution.

(Comfort air conditioning provides for occupant comfort in a space in which adequate shielding from outdoor weather and solar effects and indoor lighting and equipment radiation is provided—to the extent the system does not have the capability to counteract them.)

**AIR-CONDITIONING SYSTEM**—In its most elementary form it can be a single-package refrigeration system including a forced-convection air-flow system with air blowing over the evaporator and directly into the space. A central system will use ductwork and may use a secondary fluid (chilled water) instead of a direct refrigerant.

**AIR ENTRAINMENT**—The induced flow of room air created by the primary air stream from an outlet, the combination of which results in an ever-increasing mixed air-flow stream of increasing cross section and lower velocity.

**AIR OUTLET**—Any opening through which air is delivered to a space to provide heating, cooling, humidification, dehumidification or ventilation.

**AIR-AND-WATER SYSTEM**—System in which two cooling mediums, air and water, are distributed to the terminal units.

**ALL-AIR SYSTEM**—System in which air is the sole cooling (heating) medium to the terminal units.

**CENTRAL PLANT**—The complete assemblage of inter-connected equipment and auxiliary systems which function to produce or transform energy for the purpose of distribution and use outside the plant.

**CENTRAL PLANT (BUILDING)**—Plant which serves a single building.

**CENTRAL PLANT (BUILDING ZONE)**—Plant which serves a single zone of a building.

**CENTRAL PLANT (DISTRICT)**—A plant which serves a group of remote buildings through an outside energy distribution system.

**CENTRAL PACKAGED ENERGY PRODUCING UNIT**—A matched assembly of major equipment and controls—either completely or partly factory assembled prior to field installation—with supervised installation and start-up available from the manufacturer. The unit may either constitute a central plant in itself or require interconnection with auxiliary equipment and systems furnished and specified by someone other than the manufacturer.

**CHANGE-OVER POINT**—The outside temperature at which maximum use of outside air quantity in the system can handle the entire cooling requirements of the zone with zone refrigeration shut off. [This can vary for a particular building at different times of the year due to large variations in solar radiation—particularly with change of season, e.g., it can be much lower in fall and winter for south exposures.]

**FAN-COIL UNIT (ROOM OR CENTRAL SYSTEM)**—An air-handling unit containing a filter, air heating and/or cooling coils and a high- or low-pressure blower driven by a motor.

**HEAT PUMP**—A refrigeration system in which flow to the evaporator and the condenser may be reversed, thus allowing air or water passing through the evaporator (which normally cools) to be either cooled or heated.

**INTERNAL INDUCTION**—The inducing of room air through a circulation opening in a terminal unit caused by passing primary air through a nozzle(s), and the discharge of the mixture from the unit.

**NOZZLE**—A flow control device used to increase the velocity of a stream of water or air.

**PRIMARY AIR**—The ventilation air or conditioned air supplied directly to a type terminal air unit, terminal air-handling unit or terminal outlet unit.

**REHEAT**—Heat added to the cold primary air supply to a zone in order to maintain temperature control.

**REFRIGERATION SYSTEM**—A closed-flow system in which a refrigerant is compressed, condensed and expanded to produce cooling at a lower temperature level and rejection of heat at a higher temperature level.

**REFRIGERANT**—A compressible vapor which abstracts heat in going from liquid to vapor (evaporation) and gives up heat in going from vapor to liquid (condensation).

**REFRIGERANT CONDENSER**—A heat-exchange device in which refrigerant vapor is liquified (condensed) by the removal of heat.

**REFRIGERANT EVAPORATOR**—A heat-exchange device in which refrigerant liquid is vaporized (evaporated) by the absorption of heat.

**SECONDARY ENERGY**—Energy which cannot be used directly to produce shaft work but which can be used for useful process purposes.

Examples:

- a. hot water for heating or process
- b. chilled water
- c. hot gases in a furnace
- d. low-pressure steam used for heating

**TERMINAL UNIT (ROOM OR ZONE)**—Final thermostatically controlled cooling and/or heating air-distribution unit served by a central all-air, air and water or all-water cooling plant.

**TERMINAL ATTENUATOR UNIT**—An acoustically lined box within which primary air is reduced to low pressure [single duct or mixing type].

**TERMINAL AIR INDUCTION ATTENUATOR UNIT [ALL AIR, AIR & WATER]**—An internal induction terminal attenuator unit [normally single duct] which induces air from the space and mixes it with the primary air. In air-water system units, the units are room units only, and the room air drawn over the coil [protected by a lint screen] is large compared to the amount of primary air (e.g., 5:1).

**UNITARY HEATING OR AIR-CONDITIONING EQUIPMENT**—Completely self-contained packaged equipment with secondary energy generating plant within the unit; also includes the additional packaged equipment provision for delivery of the energy so generated. The unit may be supplied with gas, oil and/or electric power with provisions for direct supply of heated or cooled air to a space or spaces on a single or multi-zone basis. Example: unit could include a direct fired heater (oil, gas, electric).

**ZONE**—The largest single space or group of spaces served by a system, the temperature and/or humidity control for which is accomplished by single set of controls such that conditions within the spaces do not vary outside of accepted limits.



## THE FLOOR-CEILING SANDWICH DISTRIBUTES HEATING-COOLING

conditioning system must be capable of following the changes. In addition, in office buildings, it is the perimeter offices that are most likely to be provided with dual control to suit individual preferences. Not only are there changing loads, but it is more likely for the perimeter, especially in office buildings to have varying population loads—say, when a conference is held in a private office.

Of course the amount of lighting in a building will determine just how significant changes in population will be. The energy at desk tasks must lose about 100 Btu per hour, which if you assume one person per 100 square feet will require you 4.5-5 Btu/hr/sq ft. If you assume a medium-intensity lighting level requiring 4 watts per square foot, this gives you 4 Btu/hr/sq ft.—nearly three times as much as people heat.

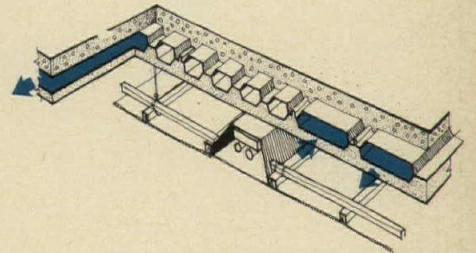
The interior zones of buildings have a fairly constant load—in most cases during the day, cooling year-round. If interior zones happen to be divided up into private offices, or if there is general office space, individual control can be provided without difficulty. Two recent techniques for accomplishing this are variable air volume, or tempering of room supply air with heat recovered from exhaust air directed through lighting fixtures.

The difficulty of intermediate season control of perimeter zones has led to manufacturer development and engineering of such systems as dual-duct air systems and 3- or 4-pipe water distribution to provide instant availability of either heating or cooling effects. And where a high degree of individual control is demanded for interior spaces, variable air volume systems are being increasingly employed. The reason for this is that with outlets operating within prescribed limits so as to avoid, on the one hand,

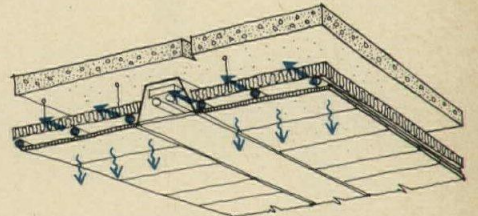
drafts, and, on the other hand, stratification and stagnation of air, the system need only supply just enough cooling effect to satisfy load conditions. A constant-volume dual-duct system, however, must mix hot air of varying temperature with cold air to vary air temperature in accordance with the load. A three-pipe water system has hot and cold water supply lines and a common return. The reason, obviously, is to avoid having to provide returns for both hot and cold water. The economics of operation of a three-pipe system are difficult to predict, however. It is apparent that if one side of a building requires predominately cooling, while another side requires heating, the mixing of hot and cold water is bound to be inefficient.

Even though the systems mentioned for perimeter-zones are being used more and more, it would behoove the architect not to overtax the system with excessive load variations. In addition, there are always "hidden" or unanticipated aspects of system-building interaction that frequently are not discovered until the building and system go through a "shakedown" period. Unfortunately it is true, and probably always will be to some extent, that much of the guideline information on building-system interrelationships must be obtained empirically. With non-standardized buildings, the client, to a certain extent, will have to expect, at the minimum, that the system will have to go through a period of adjustment. And if the building design presents the consulting mechanical engineer with a "brand new" and highly demanding situation, it is indeed possible that the system may not be perfect the first time around.

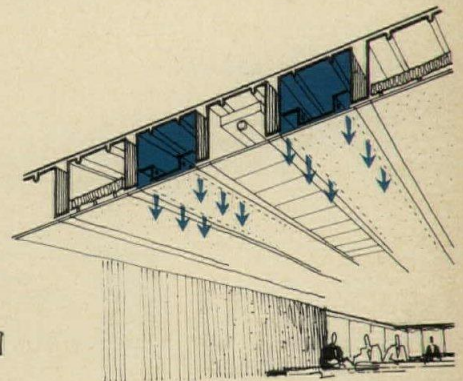
An example of an unanticipated condition arising out of a new design ap-



**Cellular steel floor with integral ducts.** Some of the cells have been slightly enlarged from those normally used with this standard manufactured material to provide sufficient space for air distribution. Cellular flooring manufacturers have also offered dual-duct mixing boxes compatible with the floor system.

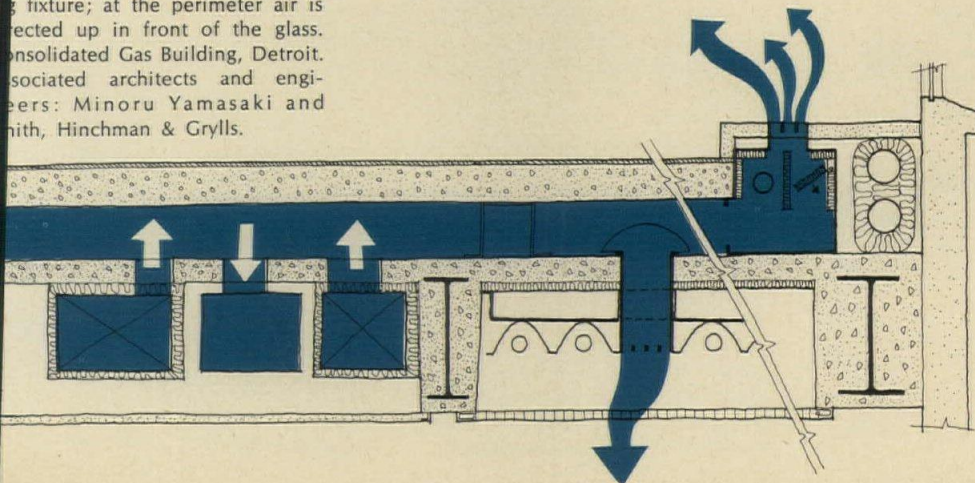


**Panel heating-cooling.** Available as a manufactured item is a panel heating-cooling system having water tubes integral with the panels. The panels may be perforated to allow sound absorption by blanket insulation behind them. Another system incorporates the water tubes with lighting fixtures to remove lighting heat which can be recovered for use as reheat, or for elevation to a higher temperature by heat pump.



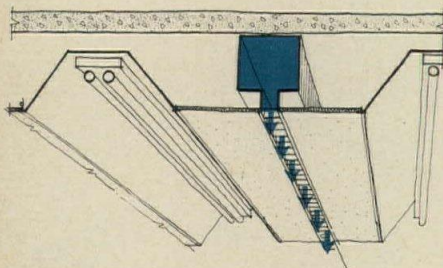
**Multi-functional steel deck.** This manufactured system of large-size cells provides self-contained ducts for air distribution, recessed space for lighting fixtures and perforated pans to be used with sound-absorbing batts. Air is emitted through built-in linear diffusers.

**Double floor.** Corrugated formwork spanning between wire-rod joists supported by stub posts set in the structural slab forms an open space for distributing air. For the interior, supply is through the lighting fixture; at the perimeter air is directed up in front of the glass. Consolidated Gas Building, Detroit. Associated architects and engineers: Minoru Yamasaki and Partners, Hinchman & Grylls.

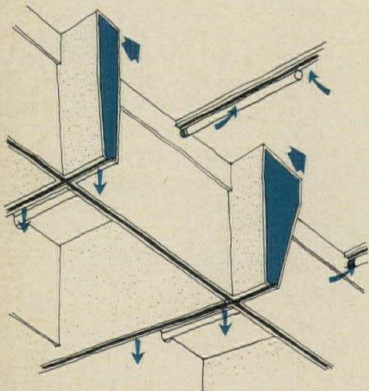




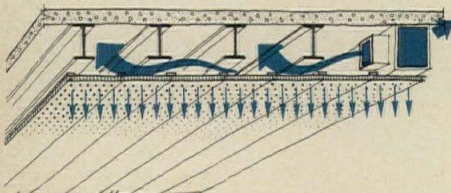
## INTEGRATED CEILINGS: NEW AIR DISTRIBUTION TECHNIQUES



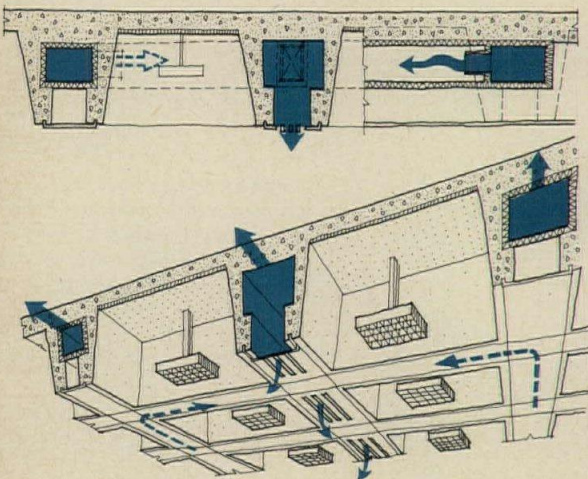
**All-panel system.** Large-size acoustical panels form recessed troughs for lighting fixtures as well as flat ceiling area. Linear diffuser is designed to work with ceiling.



**Lighting baffles as ducts.** Deep baffles of this integrated system are available in the form of air-conditioning ducts. Another type of baffle is designed to receive partitions.



**Ventilating ceiling.** Perforated acoustical tile admits air to the room from a pressurized ceiling plenum. Ceiling also can be triangulated to receive lighting.



**Structure delivers air, controls light** (left). Two-way concrete structure carries air, works as a low-brightness light reflector and also partly as a light-shielding device. Cummins Administrative Office Building. Architect: Harry Weese & Associates; mechanical engineer: Cosentini Associates; lighting consultant: William M. C. Lam.

**Dual-function linear diffuser** (right). The first linear diffuser to be used also as a ceiling track to receive partitions was developed for use in the Union Carbide Building. Architects: Skidmore, Owings & Merrill; consulting mechanical and electrical engineers: Syska & Hennessy.

take as little space as possible, to be completely inconspicuous, and to produce no noticeable noise or vibration. In some cases, however, he may even emphasize some elements visible as part of the over-all design statement.

Naturally, there is no one approach to air-conditioning system selection. There will always have to be compromises between the various requirements of space requirements, first cost, operating cost, performance quality, decentralization, noise, fuel and electrical costs, and temperature control flexibility. Further, the increasing array of ceiling designs, partition and interior ceiling systems will necessarily increase the number of types of air-conditioning systems and sub-systems, and the need to integrate all of these elements into the overall design.

The architect's concern for the appearance of air-conditioning elements within the occupied space is not new. Through architect-manufacturer cooperation, vast improvements have been made in the appearance of air-conditioning unit cabinetry and in ceiling air diffusers. Low-sill air-conditioning cabinets have been introduced, and air outlets, more and more, are being integrated with other ceiling elements such as lighting fixtures and ceiling suspended T-bars, etc.

With perimeter-zone, central system fan-coil cabinetry, manufacturers can provide a limited range of appearance and size modifications at only a small increase in cost, if the cost of design and tooling changes can be amortized over, say, several hundred units. Adaptations, obviously, are more significant if the base unit itself does not have to be modified. When through-the-wall air conditioners are to be used, some m-

proach is the effect of perimeter air distribution on glass, particularly that of the heat-absorbing variety. For one thing, cool air blowing against heat-absorbing glass subjects the glass to undesirable stresses, which, taken together with other factors such as partial shading, may lead to breakage of solar glass. But beyond this, it probably is not generally appreciated that this forced convection can materially increase total heat gain, perhaps 30 per cent or more (summer or fall cooling).

As mentioned earlier, dual-duct systems have been employed as an all-air approach for central system conditioning of perimeter spaces subject to a fair amount of load fluctuation; and three- and four-pipe hot and cold water piping has been utilized for air-water and all-water systems.

This requirement of exterior zone temperature flexibility also has provided an argument for the room-by-room unitary system approach. That is, the unitary package offers instant availability of either heating or cooling on a room-by-room basis. A further argument is that room units allow each occupant to adjust room temperature to suit his own preference. Another consideration, separate from temperature control, is that the unitary package approach allows nighttime and week-end use of a few offices without the penalty of having to condition the whole building. The unitary approach, of course, generally requires an under-the-window unit within the room space and through-the-wall opening for condenser cooling and ventilation air.

**Manufacturers respond to the architect's esthetic preferences** Hopefully, the architect would like to have air-conditioning system elements



## BASIC STRUCTURE FOR AIR CONDUITS

ers are willing to develop custom, outline units, with custom enclosure and with conditioner working elements being disposed to fit the particular thickness (possibilities are good windows are deeply recessed). Of course, will mean a premium cost over standard unit, a much longer lead between placement of the order and delivery; and the possibility that the will not have N.E.M.A. certified

architects will find most manufacturers willing to provide assistance on form and styling possibilities. Also, manufacturers can provide test facilities for prototype units once cooling tests have been established and mock-ups can be made.

Some manufacturers are also willing to become involved in the development of new system components—more true to the area of in-space devices (room perimeter units and concealed above-ceiling units) and air supply diffusers and outlets than in basic refrigeration equipment. In the latter area there is a trend toward more and more standardization of pre-engineered packages. There are several reasons for this, some of them obvious, but these will be discussed later.

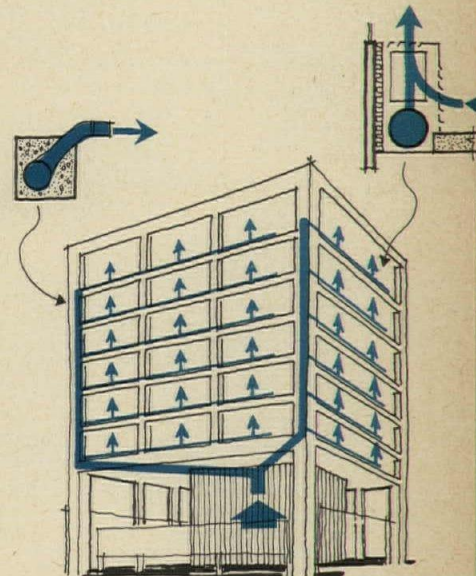
The manufacturer reasonably expects that when he becomes involved in component development, his research and design expenditures will be made up in new product sales. One suggestion by a manufacturer is that management must expect a return of 100 percent of staff salary to warrant their undertaking a research development project.

Manufacturers report that architects are becoming increasingly involved with matters that affect engineering design of system components and systems them-

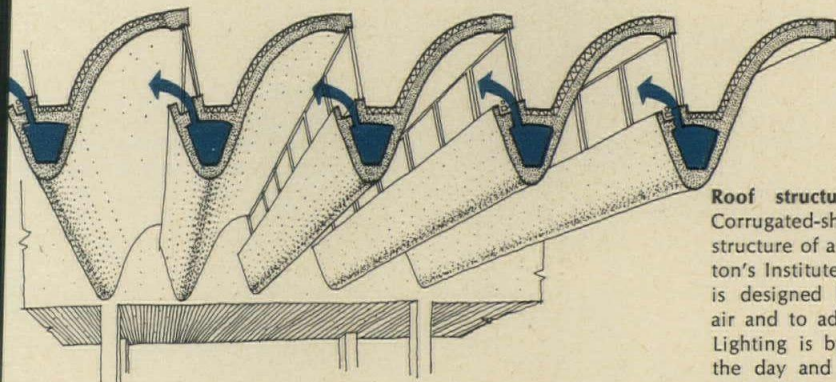
selves. While this interest generally lies in areas affecting appearance, or the physical coordination of air distribution elements with the structure, it may extend to interest in developments such as industrialized building, which involves some understanding of the potentialities as well as the limitations of large-size, pre-engineered packaged systems. Special designs required by architects may range all the way from new component development and testing to meet specified performance requirements, to the much less demanding job of architectural detailing of air supply outlets—one architect may like perforated diffuser outlets, another architect slotted. Architects have also asked manufacturers to make multi-functional diffuser devices after their own designs; for example, combine the diffuser with a drapery track.

It is incumbent upon the manufacturer to do the research mentioned above. The consulting mechanical engineer, generally speaking, has no research facilities. Besides, his usual fees do not include money for research.

Before embarking on a new-component development, the architect should make sure that the client understands the nature of the involvement—what sort of research needs to be done, by whom, and for how much, and the benefits to be derived from the development work. This is particularly important in the case of the unsophisticated client who has no foreknowledge of the respective responsibilities and areas of expertise of architect, consulting mechanical engineer and manufacturer. If, for example, the manufacturer cannot be sure that the developed component will ever be used again, then these costs cannot be written off against the prospects of future business. At least, perhaps, the testing



**Exterior columns as air conduits.** In the new administration building at Princeton University, air supply to perimeter induction units is sent to ducts in corner columns from supply in the center core. From the corner ducts air goes to laterals behind the low-height spandrel, and contained within the induction units. Interior area is supplied directly from the core. Architect: Edward Larrabee Barnes; consulting mechanical and electrical engineers: Meyer Strong & Jones.



**Roof structure as air conduits.** Corrugated-shaped concrete roof structure of a new library at Princeton's Institute for Advanced Studies is designed both to carry supply air and to admit it into the room. Lighting is by natural light during the day and by fluorescent lamps concealed by lip near air outlet. Architect: Harrison & Abramovitz; consulting mechanical and electrical engineers: Meyer, Strong & Jones.



## THE TREND TOWARD MORE SOPHISTICATED PACKAGES

program will have to be underwritten by the client. The situation gets especially sticky when a manufacturer is asked to participate in component development, involving his personnel's time and research facilities, and then bidding is opened to all and sundry. He has less to complain about, of course, if he is paid for his development work. But he rightly feels he is being unfairly treated if he loses the bid, and is expected to absorb his development charges as part of the course of doing business—that is, with the expectation that the next job might be in his turn. Surprisingly, some clients may balk at the prospect of reimbursing a manufacturer for several thousand dollars in development charges, even though the building is costing millions. The manufacturer is hesitant to include this in his bid figure because he may, in fact, not get the job. While such jockeying is not uncommon, it would seem to be an unhealthy practice, making everybody's costs in the air conditioning field just a little higher.

### Clients are looking for economies in both initial and operating costs

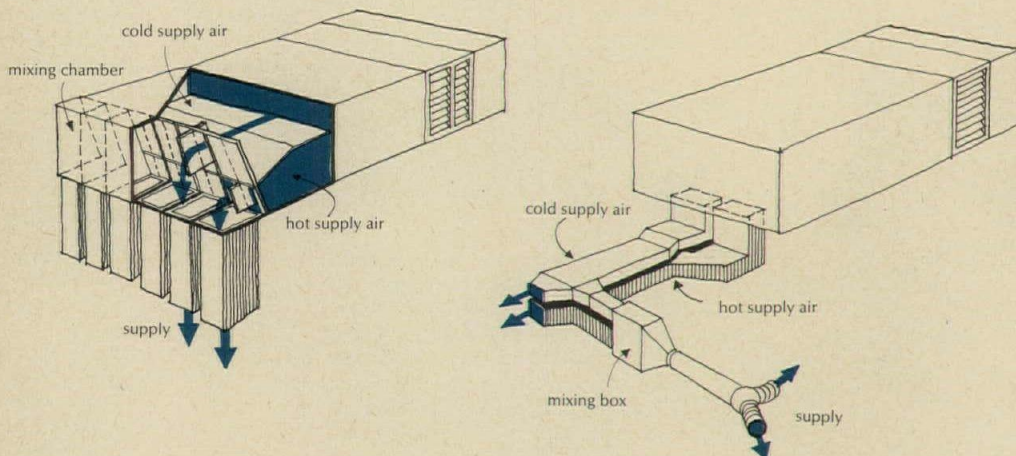
Demands from owners require much more than heretofore in the way of relative economic evaluations of various overall building system combinations. This is particularly true when the client is a non-profit organization such as a university or a government agency, since these organizations many times have less trouble getting initial appropriations than they do getting operating funds. A corporation, operating for profit, can, on the other hand charge off a large part of its operating and depreciation charges against taxes.

But even profit-making organizations are demanding more in the way of

evaluation of alternate systems. One reason for this, no doubt, is the growing application of cost-effectiveness techniques such as "value engineering," but also systems cost evaluation, the use of construction and cost consultants, and the like. Part of this picture, too, is the growing strength of finance, control and accounting functions of management. Many management groups concentrate on quantified, rather than judgmental, decisions based principally on experience. At the same time there appears to be a weakening, generally, of owner staff engineering influence, except in the industrial area, with greater influence by the accorded administrative, cost accounting and purchasing staff groups. This means that the client many times is less knowledgeable technically, placing more demands on the building consultants to get the manufacturer to "prove out" a system.

One manifestation of this trend is the development of computer programs that can quickly perform building load calculations, to "print-out" required air quantities, and, to some extent, make economic comparisons of operating costs. As a result, some specialist consultants are emerging in the areas of energy utilization such as all-electric buildings, total energy, heat pumps, and the like.

Still another manifestation of this new management approach is the trend toward more "systems" purchasing and a greater centralization of manufacturer responsibility for system performance. The latter has resulted in a trend toward broad-scope performance specifications rather than descriptive specifications of components and systems. If one manufacturer is providing the whole air conditioning system, or most of it, he may be more willing to accept overall responsibility



**Roof-top unitary air conditioning** are now being furnished as a multi-zone unit or for dual-duct supply. The roof-top multi-zone unit was developed to meet the requirements of California's School Construction Systems Development project to provide zoning for modules as small as 450 square feet. Mixing dampers proportion the amount of cold and hot air necessary to meet temperature requirements. The unit is designed to be used both for perimeter and interior zone application. Mechanical refrigeration is provided in a separate compatible add-on package. The basic unit will always include the cooling coil.



system performance. But the ball is to be tossed around when each of the systems is provided by a different manufacturer.

**Systems are trending to packages to centralized districts**

The architect is aware, no doubt, of two strikingly contradictory trends relative to conditioning systems, central energy plants and their control.

The first is the increasing trend toward centralization of equipment and systems in ever-larger sizes—reaching the size of district energy plants serving large complexes, or even whole areas.

The second is the trend toward decentralization, either in the form of pre-engineered energy plants (heating and cooling) or air conditioning systems, including a room-by-room approach to air conditioning using larger-size through-wall units.

Both of these are happening for similar reasons: (1) the increasing cost of and deterioration of competence of field-installation labor; (2) the difficulty of convincing engineers in attracting engineer-graduates and technicians; (3) the difficulties of getting and paying for maintenance and operating personnel.

Larger centralized plants can justify higher paid and more-qualified personnel. Centralized control centers allow for centralized remote monitoring of operation and trouble shooting.

On the other hand, the use of larger, larger complete air-conditioning systems, packages, of a more sophisticated nature but yet standardized design, permits system application engineering, information and field start-up and test with a single manufacturer.

Also decentralized, standard pack-

ages can be set up for automated remote operation, but with a fewer number of functions subject to centralized control.

Still another reason for the decentralized approach is the requirement of many clients that the system be zoned for relatively small modules, with provisions being made so that the zoning can be freely altered, and capacity changed to meet new occupancies.

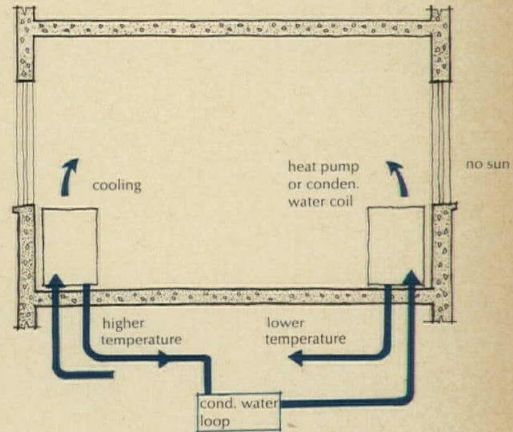
Packaged air conditioning systems may run from 20 all the way up to 100 tons of refrigeration. Not only do packaged systems eliminate the problem of trained skills for erection, but with them the consulting engineer need not take as much time for field supervision, but can rather use his time more effectively in making evaluations of various packaged systems and related components. Manufacturers expect that there will be increasing sophistication in the design of packaged systems in the way of performance, longevity and temperature control.

**Demand for greater economies force changes in air distribution**

The relatively simple low-pressure, large-size duct systems of yesterday have given way to more compact and more flexible systems demanded by the economics of space utilization and the owners' desire for a greater degree of individual control. The basic types of air-conditioning systems, themselves, remain the same, however, whether they be room-by-room, central zone or central building. And they are still classified as either all-air, air-and-water, and all-water systems (with separate provision for ventilation air).

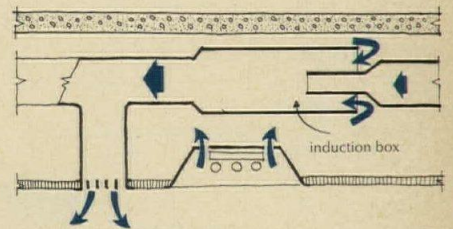
As mentioned earlier, the greater degree of individual control called for today has led manufacturers to develop new types of air terminal devices which re-

**HEAT RECOVERY DEVICES AND SYSTEMS**



**Heat recovery via condenser water.**

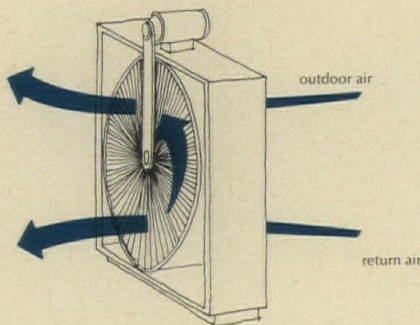
Two similar approaches have been offered recently with unitary equipment to cope with the problems of control and operating economy when one side of a building may call for heating and the other side cooling. This could occur in buildings having large areas of glass, during intermediate seasons and occasionally in the winter. These two approaches both utilize heat rejected by refrigeration condensers in rooms requiring cooling. In one system, condenser water is circulated from a heat pump which is cooling to a heat pump which is heating. In the other system, heat rejected from an air conditioning unit condenser is circulated to a coil set in the supply air stream of another air conditioner.



**Reheat by heat from light.**

Instead of lighting heat being dumped into the room, it can be exhausted through fixtures into a plenum. Then, if the air distribution system can usefully employ the reheat technique for temperature control, this can be accomplished by an induction box in the ceiling which pulls in heated plenum air to temper supply air.

**Heat recovery wheel.** This device transfers heat from return air being exhausted to the outside, and thus normally lost, to ventilation air being brought in from outdoors. One type of heat recovery wheel incorporates aluminum mesh as the heat-transfer medium. As the wheel revolves slowly, outdoor air is pre-warmed.





## GROWING SOPHISTICATION IN COMPUTER CONTROL

spond to fluctuating loads, but at the same time offer greater operating economies. An example is the variable-air-volume (VAV) terminal. A regulator device opens and closes in response to room temperature demands, varying the air volume within a prescribed range. There has to be sufficient air to prevent stratification, but not such quantity as to produce drafts. These devices rely on a high rate of air entrainment of room air to maintain an adequate circulation of mixed air—in fact, this had been one of the limiting factors on these devices in the past.

Single-duct all-air VAV systems are used primarily for interior zones, and for exterior zones only when there are not wide swings in load due to sun or transmission loss and gain through the wall.

One of the main advantages of the single-duct all-air variable-volume approach is, of course, that temperature control is achieved by varying the volume of the air supply rather than by mixing hot and cold air streams or by reheating the cold air stream. A well designed dual-duct system, however, could have very low energy losses because mixing would be minimized.

The VAV approach can be applied to exterior zones, also, by using reheat either by means of a water coil or by having both hot and cold air supply available. The latter implies either a dual-duct system or reheat by means of induced room air or ceiling plenum air when waste heat is reclaimed from lighting fixtures. Recovery of this lighting-fixture heat provides reheat at minimal cost. (The cold, high-velocity air stream "jetting" through an induction box sucks in warm exhaust air—generally 85 F, maximum—in the ceiling plenum to give the required supply temperature.)

The principal advantage of the reheat system is that it cuts down on the size of the central fan system, the reheat system and some of the work by taking advantage of diversity factors. The reason is that peak demand will occur only in one perimeter zone at a time. For the interior, recovery of lighting heat, combined with the volume control concept can provide individual space temperature control over a wide range of load variations.

The problem of space for ceiling duct systems has led to the use of high velocities and system pressures combined with the use of colder supply air. Since air is transmitted at higher velocities and pressures, special flow regulating devices and sound absorbers are required to prevent noise problems.

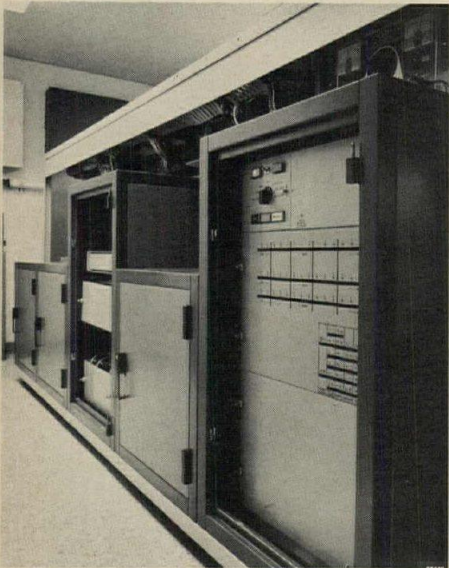
Minimum duct size is particularly important with peripheral air distribution, for vertical risers, and, sometimes for horizontal runouts of all-air systems.

High-pressure systems allow greater centralization of air-handling equipment which is important when shaft space is limited.

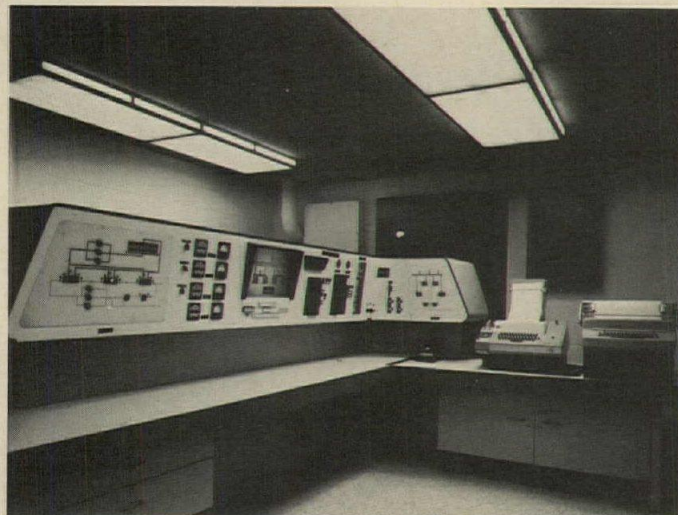
While a high-velocity system takes less space, it also requires more expensive fans, sound-attenuating treatment and air-control devices, and also requires more fan horsepower than a low-velocity system. High-velocity systems also are more difficult to analyze, involving detailed design, system balancing, static pressure within the system, at the fan, and at terminal units.

Innumerable high-velocity system combinations are possible—high velocity plus low velocity; high velocity primary air or ventilation air plus water coil. Any of these can be combined with reheat or booster cooling.

High velocity systems are used more



Computer in the new building for the International Monetary Fund in Washington, D. C. is designed to optimize the operation of the refrigeration plant. It will establish when and how long refrigeration apparatus is to run based on outdoor conditions, building loads, time of day, etc. The centralized control system also changes control setpoints throughout the building. The computer is shown above, at right.





erior zones than interior zones for reasons. First, there is generally a far greater limitation on shaft space for ducts and pipes at the building perimeter. Secondly, the cooling load for the peripheral zones is not only highly variable, but the cooling load can be two to three times that of the interior zone.

With central systems the perimeter must be zoned for exposure to accommodate mainly differences in solar radiation and somewhat less for convection due to wind. More and more frequently, architects are finding that one side of a building may call for heat, while the other side calls for cooling. The system should be capable of varying air supply and water supply temperatures for hot-water and all-water systems, and supply temperature for all-air systems; but there is a minimum requirement for air-temperature systems.

It can be highly complex to analyze temperature reset requirements and status of air- and water-flow systems. Usually some compromises are made for the sake of first cost and to keep the system simpler. This increases operating cost, but may, perhaps, even lower the level of performance.

#### Engineered package units becoming a new breed

The simplest air conditioning systems are fan-by-room units, all-water fan-coil units and unitary room air conditioners. They have a shorter life than central systems, may take up room space and require wall openings, and may produce a higher noise level—although vast improvements have been made on both longevity and noise, and the architect's attention has been applied to improving appearance and the integration of wall openings with facade design.

Intermediate between room-by-room air-conditioning systems and complete central system are the central unitary air-conditioning plants. Many more of these systems are being used today, and applications are growing as manufacturers improve them and add to their sophistication. Most types of air distribution and terminal units can be used with central unitary systems, except those that require a fairly high minimum pressure (e.g. air and water induction unit which induces a high ratio of room to primary air across a coil protected by a lint screen).

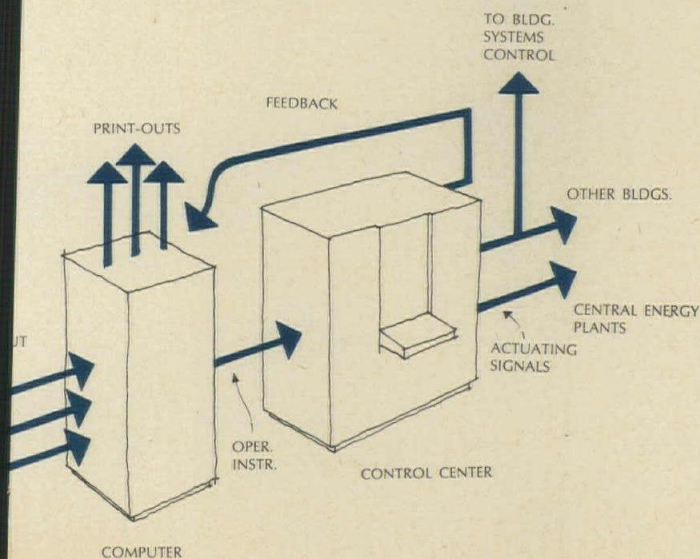
A limitation of these systems is that the engineer has more restrictions in matching equipment selection to building requirements. The reason is that there is, necessarily, a greater degree of standardization of equipment sizing, cooling capacity, control capability and fan pressure capability. Also the engineer is obliged to make a careful evaluation of packaged systems and pre-selected controls designed by the manufacturer. This is balanced to a large extent by the greater manufacturer involvement in application engineering and back-up of system performance.

#### Good air conditioning counteracts air pollution

While air conditioning is concerned first with environmental comfort, a no less important consideration is the quality of air in the indoor environment. The harmful pollutants in the atmosphere can be removed by air conditioning systems to the extent that they are usually unnoticeable, except sometimes in the case of severe odor problems. This is so even when special filtering provisions have not been made. Naturally, higher-quality central air systems with high-perform-

#### Functions of the control center

1. **To indicate** whether equipment is on or off, or is operating within limits.
2. **To control.** On-off or positioning switches to activate system elements and change set points.
3. **To record.** Recording devices such as charts, automatic typewriters or digital tapes.
4. **To alarm.** Abnormal conditions are signalled by audible alarms and annunciator lights.
5. **To communicate.** Audio and sometimes visual equipment (closed-circuit TV) allow monitoring remote equipment.
6. **To display.** Graphic presentations of air-conditioning sub-systems are shown to indicate various system check points.



**Functions of the computer** in relation to the control center for more complete automation of air conditioning systems is illustrated in this simplified sketch. At the present time their use has been limited to large systems in a few installations for an office building complex, a university, a hospital complex and for the NASA Manned Spacecraft Center.



ance filter are more effective.

Medical evidence has been slowly accumulating on the need for more complete removal of certain harmful particulate, gaseous and vaporous pollutants. A reasonable objective is to set limits on allowable concentrations. The best clues as to the magnitude of the air pollution problem in a particular general area could be obtained from air sampling stations established by various public agencies.

Naturally, industrial "clean room" type of filtering is a very special technique and is not needed in commercial and institutional practice. However, as a result of studies and tests by the U. S. Public Health Service and other environmental specialists, realistic high-performance design criteria and definitive standards have been set for hospital air-conditioning systems. These pertain particularly to quality of air filtration and recirculation or air. Today's filter performance standards rest on a surer base due to the demands of specialized facilities.

Generally speaking, the problem of shielding building occupants from the adverse effects of atmospheric air pollution involves the following:

1. Optimum placement of outside air intakes to obtain the cleanest possible air and to avoid recirculation from building air discharges.
2. The highest quality air filtering system economically feasible with adequate provisions for maintenance.
3. Additional provisions for removing gases, vapors and odors where these may be excessively high.
4. Additional provisions to allow maximum recirculation of space air and minimum outside ventilation air. When maximum outside ventilation air is essential, and does not require pre-treatment,

then provisions should possibly be made for recovery of the energy in the discharge air to reduce refrigeration or heating load.

### **Centralized control is a feature that many clients expect**

One of the more glamorous, albeit potentially useful developments, is automated control of energy plants and systems and the related control of heating and cooling effects. New approaches to control centralization, coupled with the computer, promise higher efficiencies, improved performance and lower operating costs. In another area—design of mechanical systems—engineers see the day when at least much of the "dog work" can be turned over to the computer. Conceptualization must remain in the mind of the engineer working in concert with the architect.

Right now business management and institutional administrators very much want to get exposure with these new offsprings of "space-age" technology, sometimes being mainly interested in having one. So, as control manufacturers will tell you, perhaps too many functions were monitored in early control centers; the control center told operators more than they really needed to know. In any event, the more complicated and larger energy plants and air-conditioning systems are bound to require advanced control techniques for their operation to help optimize operation and cope with the problem of operating and maintenance personnel.

### **Practical advantages and future potential of centralized control**

First attempts to simplify operation and surveillance of increasingly complex systems used central control panels for each

system or group of systems in a given machine room. The next step, obviously, was to combine these control panels into one assembly with each machine grouping forming a segment of the entire or building complex control center. With simpler systems the various gauges could be displayed pictorially on panels; but with more complex systems it made sense to provide a scanning device for viewing on a selective basis. A control center makes it possible for an experienced operator to enlarge his field of supervision—an important consideration today.

A real benefit of centralized control rarely mentioned is its use in troubleshooting the system during the initial "shakedown" period.

Proper use of the computer in system operation will require that the engineer have a more detailed technical knowledge of all elements of the system and each mode of operation. And although the computer could be used to optimize system operation after the fact, it would seem more logical to employ the computer in optimizing equipment and component selection at the start.

Presently, the computer is becoming more important in load calculations and evaluation of seasonal energy consumption mainly in connection with computing fuel costs, particularly for total energy and all-electric approaches.

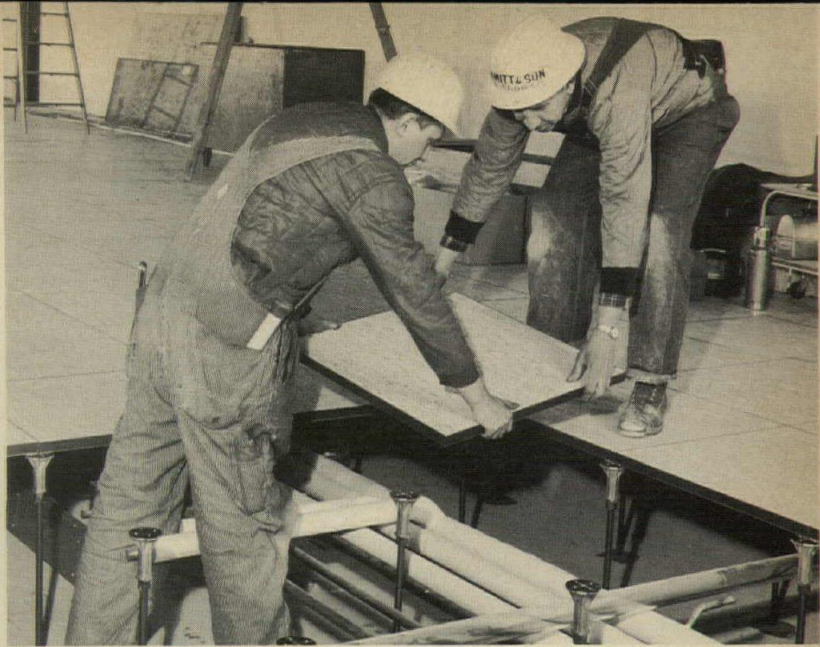
Use of the computer with the automated control center utilizes memory storage of equipment performance data and system response under actual operating conditions. Because of the greatly increased cost now of such a control center and current difficulties in programming, its use is currently limited to large size installations and to a relatively few functions.

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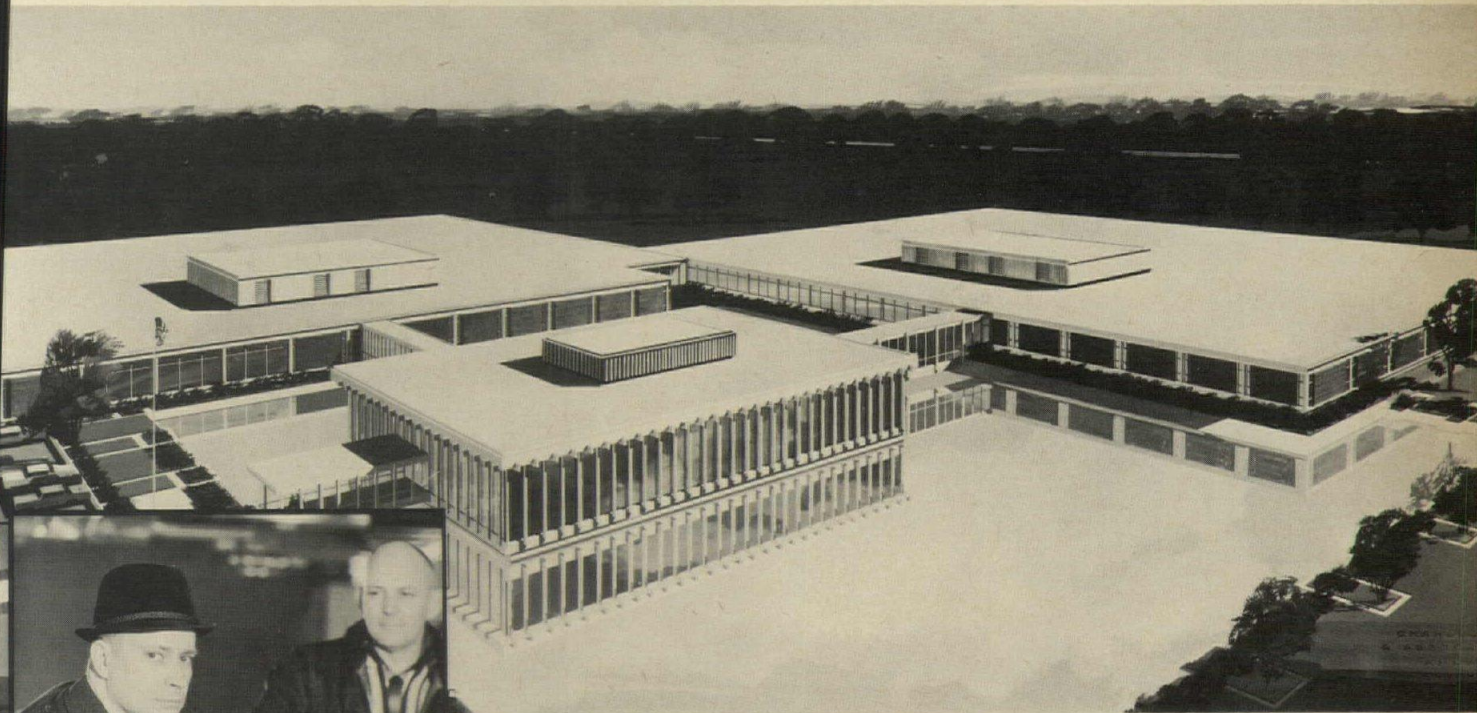
Part two of this article will cover: 1) the trend toward larger pre-engineered packages and systems, 2) education and training of architects and engineers with respect to air conditioning, 3) performance criteria and systems development.

*This article has been prepared in collaboration with F. J. Walsh, consulting engineer.*





## Is elevated flooring too costly for general construction?



Architect Charles H. Harper (left) discusses floor installation with James Lawton, job foreman for general contractor, Joseph P. Jansen.

*No! Says Architect Charles H. Harper, who used nearly three acres of it in this giant complex for Globe-Union Inc.*

If you think of elevated flooring as a specialty item reserved for computer rooms, take a tip from Charles H. Harper, the Milwaukee architect who designed this 3-building research and administrative center for Globe-Union Inc. His plan called for 120,000 square feet of Weber elevated flooring, which Harper says netted out at about \$1 per square foot. (That's for finished flooring, about half of which was carpeted.)

But cost was only one of Harper's problems. Time was precious. He had only 10 months to design and build the entire complex, and Weber elevated flooring gave him the flexibility he needed to meet this tight deadline. Walls and top decking were built first with a slab foundation. All utility lines, including plumbing, electrical, telephone, heating, ventilating and sewage, were installed on top of the slab after completion of the building shell. Installers

worked rapidly and accurately under comfortable indoor conditions. Globe-Union gained too in structural flexibility. Offices and laboratories can be rearranged at any time without tearing up expensive flooring to relocate utilities.

Charles Harper proved that elevated flooring is practical for general use and offers many advantages. For complete specifications on Weber flooring and the full story of its use at Globe-Union (as reprinted from ARCHITECTURAL RECORD), write today.


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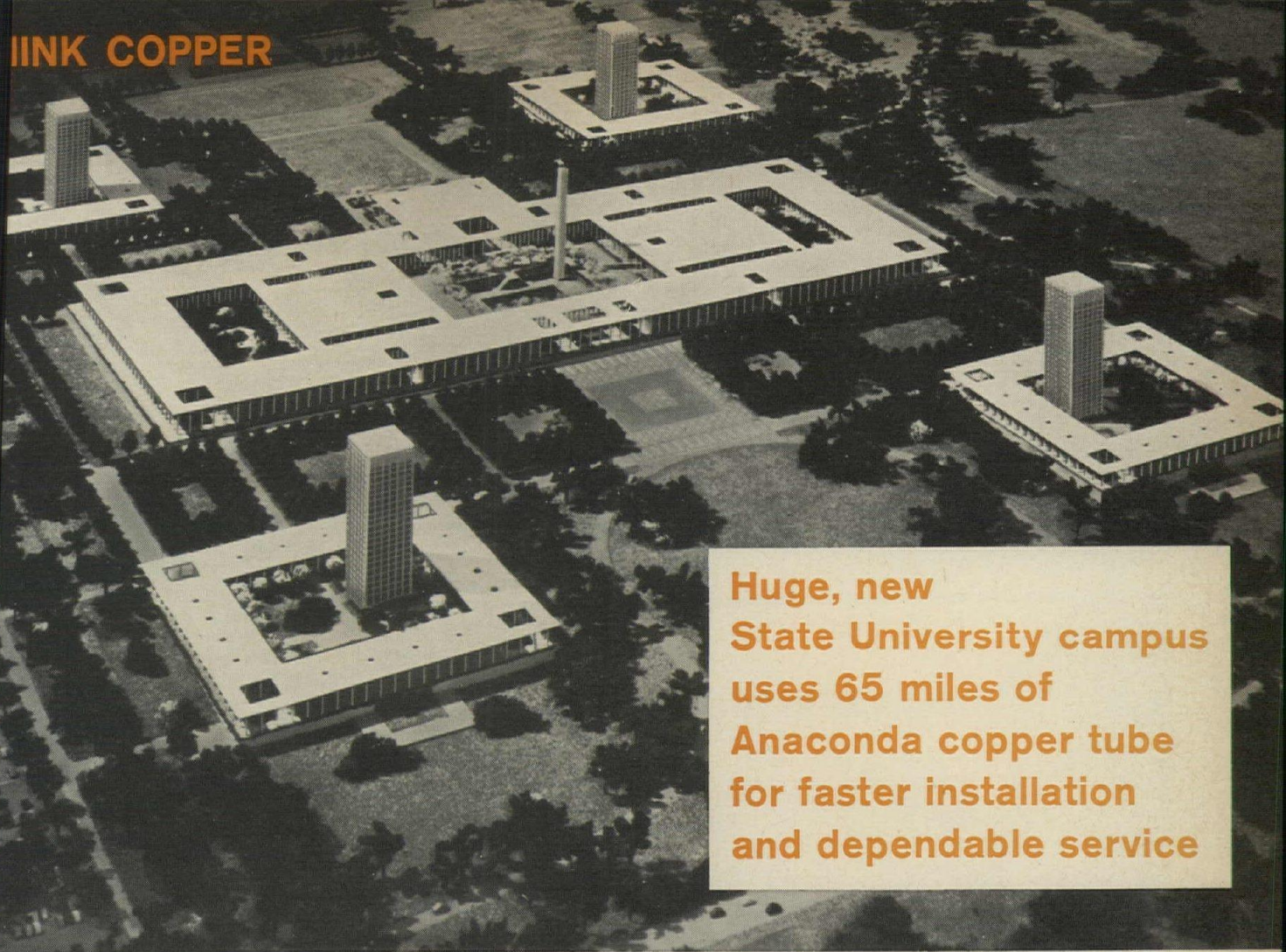
K-15 is self-supporting. Because it's far thicker. A full .200" thick. A natural for frameless. And K-15 has the bold new big-prism pattern. 1x4, 2x2, 2x4. Specify K-15. Write for bulletin K1347.



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for faster installation  
and dependable service**

(Photo of Architect Edward Durell Stone's model)

0 million campus at Albany, N.Y., (Owners: State University of New York, through the Dormitory Authority of the State of New York and the University Construction Fund—Architect: Edward Durell Stone—Consulting Engineers: Consentini Associates—Mechanical Contractor: Wis & Eckert—General Contractors: McManus, Longe, Brockwehl, Inc.; Psaty & Fuhrman; Basic Construction Company; Lipkins Corp., D. Fortunato, Inc.)

located on a 360-acre tract of rolling hills and woodlands, New York's new State University complex is being built with an eye toward the future, in more ways than one—minimal maintenance and lasting service.

The early decision of the consulting engineers to specify copper tube for water supply lines and for waste and vent service was based on the many advantages copper offers—faster installation, space savings, time-saving preassembly operations and dependable, trouble-free service.

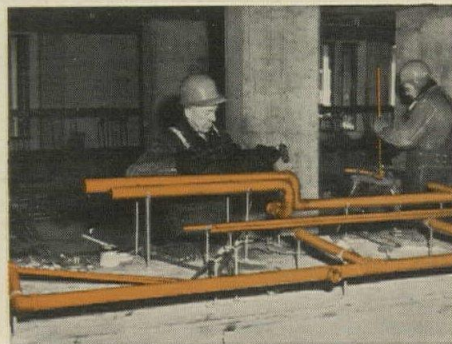
Making full use of the efficient "prefabrication" techniques possible with lightweight copper tube, mechanics bench-assembled, at the site, multiple units required for each floor. Each unit served two bathrooms and contained hot and cold water supply, waste and vent lines. The few connections required to join these units to the system reduced roughing-in time and helped maintain construction schedules.

And looking even farther ahead, Consentini Associates specified copper tube because of its resistance to corrosion, immunity to rust, and its smooth interior for swifter flow and better sanitary conditions. A combination that adds up to minimal maintenance even after long years of service.

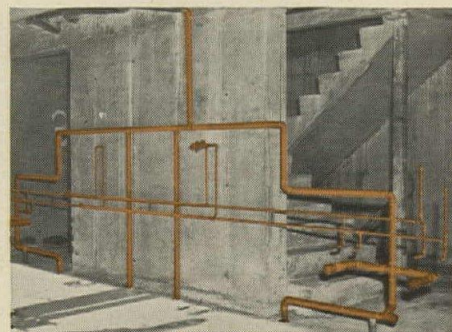
In terms of installation savings and long-range economical service, Anaconda copper tube is truly a product of unusual practicality . . . and far ahead of competitive materials. Next time, plan to use Anaconda copper tube right from the start . . . to come out ahead on your jobs. For further information, write: Anaconda American Brass Company, Waterbury, Connecticut 06720. In Canada: Anaconda American Brass Ltd., Ontario.

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*Mechanics pre-assembling copper plumbing "tree" on site, in a new dormitory of the State University of New York at Albany.*



*Installed copper "tree" showing typical arrangement of water supply, waste and vent tubes serving two bathrooms, in State University dormitory.*



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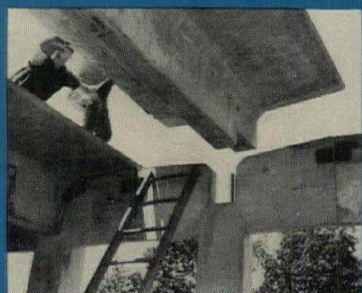
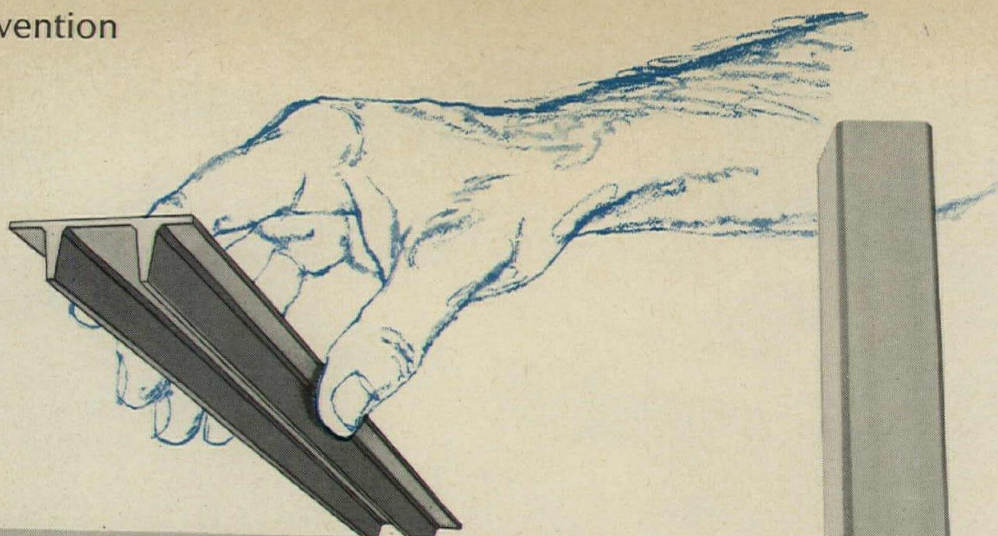
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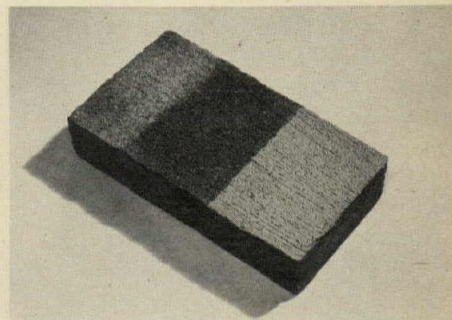
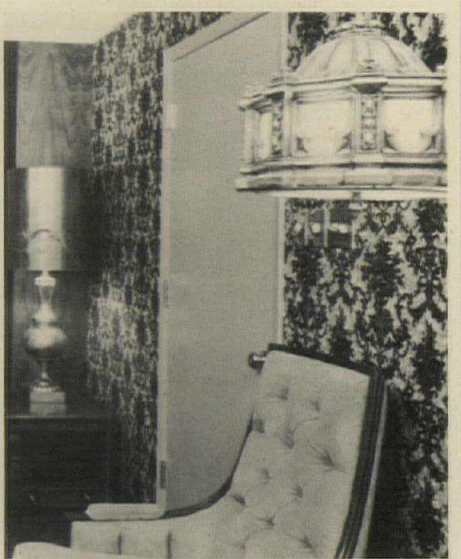
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For more information circle selected item numbers on Reader Service Inquiry Card, pages 251-252



**GARAGE DECK COATING** / *Daratop* promises to seal parking garage decks against the damaging effects of winter de-icing salts dripping from cars and normal spillage of oil and gasoline. The materials penetrate and seal surface pores of the concrete so that the concrete itself takes the wear of traffic and the *Daratop* sealer is not disturbed until the concrete wears away. In addition, *Daratop* is reported to cost only 10 to 15 cents per sq ft.

The system is a two-step application of a base coat that seals the concrete pores, and a gray finish coat that provides added resistance against salts, gasoline, and battery acid. When applied to freshly placed concrete, the base coat acts as a curing agent and eliminates the need for other curing compounds. When applied to existing decks, only a thorough cleaning of the surface is necessary before application. ■ W. R. Grace & Co., Cambridge, Mass.

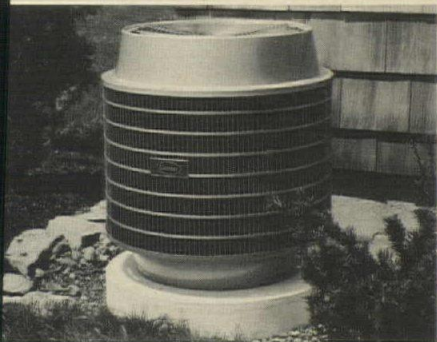
Circle 301 on inquiry card

**WALL COVERING** / *Armored Velvet*, a nite wall covering, is applied in two steps. A specially formulated epoxy adhesive is applied like paint to any surface—wall-board, masonry, wood, glass, metal, paper or rubber. Minute nylon fibers—as many as 300,000 per sq in.—are propelled at a 90-degree by an electrostatic applicator onto the treated surface providing a permanent bond. The density can be controlled so that finishes may create a felt (short fibers), a velvet (medium fibers), or a plush (long fibers) effect. There are no seams or overlaps. Thousands of tiny air spaces produce seasonal insulation.

The covering is reported to be fire retardant, waterproof, sound absorbent, heat resistant, and will not mildew or fade. It will not show hand marks, will not crush down and is abrasion-resistant. Vacuuming or brushing will remove surface dust, and stains come clean with soap and water or a cleaning agent.

Twenty-nine colors are available and color combinations and designs are unlimited. *Armored Velvet* may be applied to one wall for accent or to all walls. In bathrooms it will not discolor or leave drip marks because of steam. ■ Velvetex Industrial Corp., Detroit.

Circle 300 on inquiry card



**AIR CONDITIONING** / New lines include circular condensing units for home cooling and a water-cooled condensing unit especially adaptable to apartment house construction. The new units are lighter

and are reported to reduce installation cost of central cooling systems in homes by as much as \$75 to \$150. Estimated installed cost of systems in small homes is reported as low as \$600.

In the cylindrical condensing units, (standard is available in five sizes from 18,000 to 48,000 Btu; deluxe is available in four sizes from 24,000 to 48,000 Btu) top air discharge permits freedom of unit placement by directing sound upward and away from surrounding houses. Cost reduction is due in part to the circular shape which is more economical to produce than a rectangle. The curved coil forms part of the supporting structure and also presents a greater coiled area.

The water-cooled condensing units are compact and quiet and will be concealed indoors, in a closet or even under the kitchen sink. They may typically be applied with water-conserving heat-removal devices such as a cooling tower, spray pond or fountain, or with water drawn from a well, lake or river.

Other new lines feature cooling coils for all types of furnaces, a new line of fan-coil units, and new electric heating coils which can provide all-electric heating and cooling. ■ Carrier Corporation, Syracuse, N.Y.

Circle 302 on inquiry card

more products on page 174



# OFFICE LITERATURE

for more information circle selected item numbers on Reader Service Inquiry Card, pages 251-252

**LIGHTING FIXTURES** / A 4-page brochure shows weathertight ceiling fixtures. Specifications for anodized case aluminum units in two 100-watt and two 60-watt sizes, and for elliptical, tapered and saucer diffusers are included. ■ mcPhilben Lighting, Melville, N.Y.\*

Circle 400 on inquiry card

**AIR DRYER** / A 4-page bulletin describes six models of non-cycling air dryers. Units have capacities of 0 to 10 scfm at 100 psig and 100 deg F saturated inlet air. ■ Hankison Corporation, Canonsburg, Pa.

Circle 401 on inquiry card

**MODULE WALL** / A 4-page, two-color folder stresses the ease with which movable walls can be erected in offices for more privacy, better noise control and greater office efficiency. Photographs show erection and indicate how the electrical and telephone wiring is recessed into raceways. ■ Petcor Industries, Muscatine, Iowa.

Circle 402 on inquiry card

**OPERABLE WALL** / A 1967 catalog presents 16 pages of photos, diagrams and information on sliding acoustic barriers for meeting rooms, schools, and offices. Advantages of sound control, instant flexibility and low maintenance are explained. ■ The E. F. Hauserman Company, Cleveland, Ohio.\*

Circle 403 on inquiry card

**TILE COLOR** / The 1967 edition of color comparison charts for vinyl asbestos and asphalt floor tile has been brought up to date with all the new colors and designs in 1/8-in. and 3/32-in. gauges. The charts provide comparisons among similar colors offered by various manufacturers. Breakdowns are by patterns, size, color and gauge. ■ Asphalt and Vinyl Asbestos Tile Institute, New York City.

Circle 404 on inquiry card

**DOORS** / "Discover Steelcraft" is a 12-page catalog giving information on fire resistance, thermal factors, decibel ratings, test data and relative costs for the full line of doors. ■ Steelcraft Manufacturing Company, Cincinnati.\*

Circle 405 on inquiry card

**OUTDOOR LIGHTING** / A 32-page comprehensive, illustrated guide to functional and decorative outdoor lighting covers the full range of residential landscape lighting topics. There are 90 photographs. ■ General Electric Co., Cleveland.\*

Circle 406 on inquiry card

**EPOXY-TAR PAINT** / A six-page technical bulletin entitled "AVIBEST-C Micro-crystalline Silicate—Use In Epoxy-Tar Paint" explains that the product is composed of submicron, rod-shaped particles which contribute useful rheological characteristics when dispersed in paints and other liquids. It provides viscosity control and retards pigment settling. ■ FMC Corporation, Princeton, N.J.\*

Circle 407 on inquiry card

**ROLLING DOORS** / A 24-page catalog gives use, benefits, details, dimensions and specifications on metal service or fire doors, rolling counter shutters, rolling grilles, door operators and overhead type doors. ■ The Kinneer Manufacturing Co., Columbus, Ohio.\*

Circle 408 on inquiry card

**WALLCOVERING** / A 41-page sample book contains 33 wallcovering designs in 475 decorator colors. There are four different types of wallcovering. ■ Stauffer Chemical Company, New York.\*

Circle 409 on inquiry card

**AIR HANDLING** / A 4-page brochure explains how air handling silencers solve noise problems and provide flexibility of space design to suit tenant changes. ■ Industrial Acoustics Company, Inc., Bronx, N.Y.

Circle 410 on inquiry card

**DUCT SYSTEMS** / A 12-page booklet describes *Micro-Aire* preformed fiber glass round ducts and duct board. Three types include preformed round with molded-in slip joints and plastic jacket; duct board with a factory-applied facing of 3-mil aluminum for field or shop fabrication; and preformed round with an integral, embedded aluminum seal. ■ Johns-Manville, New York City.\*

Circle 411 on inquiry card

**FURNITURE** / An illustrated catalog presents "user-designed" church, school and institutional furniture. Designs range from tubular steel folding chairs to tables guaranteed for 20 years to a kidney-shaped table that allows the teacher to give personal attention to eight pupils at once. ■ Adirondack Chair Co., Ltd., New York City.

Circle 412 on inquiry card

**COMFORT SCREEN** / An 8-page brochure explains that the vinyl-coated fiberglass yarn screening has been developed for control of radiant heat and shade windows and doors, to effect cooling and thus reduce air-conditioning costs in homes, commercial buildings, hospitals, schools and industrial plants. ■ J. Stevens & Co., Inc., New York City.\*

Circle 413 on inquiry card

**CEILINGS** / "Ceilings for Enduring Beauty" is the title of a 28-page color booklet. The booklet presents a series of interiors in which ceiling tiles, suspended ceilings, and accessories have been chosen for appearance and acoustic control. Also featured are ways to lower ceilings, provide extra lighting, hide pipes or ducts, and transform basement and attic areas into useful sleep and study rooms. ■ Wood Conversion Company, St. Paul, Minn.\*

Circle 414 on inquiry card

**GLAZING MATERIALS** / A new safety standard for types of glazing materials used in building construction describes five types of transparent safety glazing materials that can meet some or all of the standard's specifications. Price of the standard is \$2.50. ■ USA Standards Institute, 10 E. 40th St., New York City, 10016.

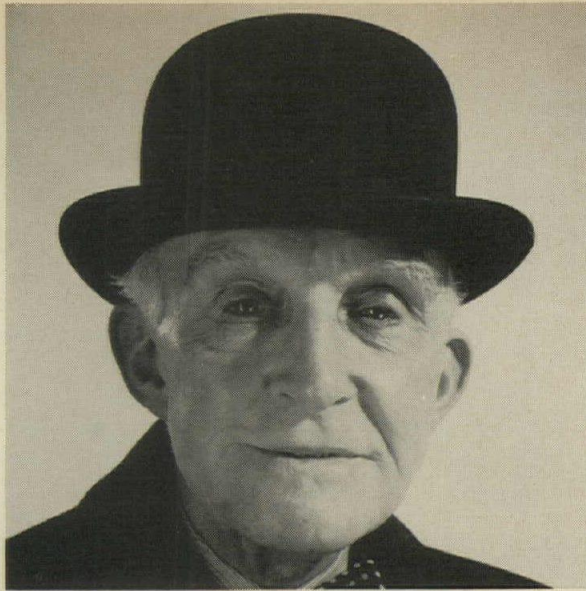
**AIR POLLUTION CONTROL** / A 24-page technical bulletin contains information on seven basic types of wet scrubbers for removal of noxious gases, corrosive mists, and entrained solids. ■ The Ceilcote Company, Berea, Ohio.

Circle 415 on inquiry card

\* Additional product information in Sweet's Architectural File

more literature on page 237






## B. V. Wyndham-Hall likes our wall covering.

As you probably know, Mr. Wyndham-Hall is chairman of the board of Little Wonder Gimlet Sharpener Corp. It's a position where a man needs all the prestige he can lay his hands on. Any wonder Mr. Wyndham-Hall had his office walls done in Pliant Wood?

For the most prestige for the price, look to Laminating Services — today offering the widest selection of wall coverings of any manufacturer, bar none. Pliant Wood, for instance, is genuine wood veneer with fabric backing. You can apply it to any flat or curved surface. It goes over existing walls without furring strips or without altering woodwork. It comes in over 50 species, in matched or random grades. (Mr. Wyndham-Hall, not unexpectedly, chose French Moroccan Walnut.)

There are many other Laminating Services wall coverings: Vin-L-Fab, offering hundreds of colors, textures and patterns, such as Vin-L-Fab "22" a solid vinyl that even comes in stripes and widths you specify . . . Wovan, for the soft beauty of real woven cloth . . . and velvety Vin-L-Suede of washable nylon flock. For complete details, write today for Brochure No. 100 AR.

SEE US IN SWEET'S 



**LAMINATING SERVICES INC.**

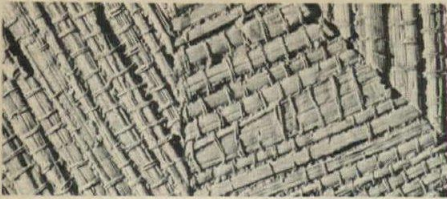
4700 Robards Lane, Louisville, Ky. 40218



Distributor Showrooms: **Clark & Burchfield, Inc.**, Los Angeles, **Don Rumsey Assoc.**, San Francisco, **Mateer & Company, Inc.**, Atlanta, **Souther Distributors**, Chicago, **The Nahan Company**, New Orleans, **Laue Brothers, Inc.**, New York, **Otto Coerver Company**, Dallas, **Potomac Wallcoverings**, Silver Springs, Md.

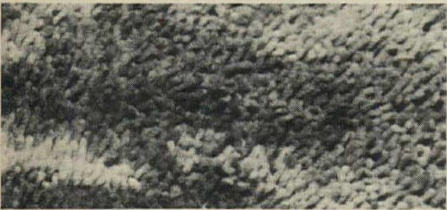


continued from page 171



**VINYLS** / *Limited Editions* is the name of a new collection of five designs captured in a broad spectrum of fifty colors. Shown is *Basketry* which gives the texture of hand-crafted straw, snipped into wedges, then fitted together in diverse ways. Available in 12-in. by 12-in. tiles and 36-in. slabs; 1/8-in. gauge. About \$2.50 a square foot. ■ Amtico Flooring Division, American Bilrite Rubber Co., Trenton, N.J.

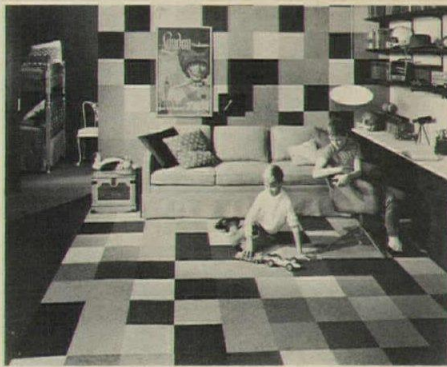
Circle 303 on inquiry card



**CONTRACT CARPET** / Man-made fibers dominate a large collection in which textures are achieved through yarn manipu-

lation, as well as through weaving techniques. ■ Bigelow-Sanford, Inc., New York, N.Y.

Circle 304 on inquiry card



**CARPET TILES** / Twelve-in. squares of *Town-Aire* carpet made of Vectra olefin fiber with foam rubber impregnated into the back are recommended for all types of commercial installations as well as for houses. Carpet tiles are spot- and stain-resistant and are cleaned by vacuuming. While tiles are recommended for high-traffic areas, should a tile become burned or need replacing, it can be easily removed and a new one inserted. Many patterns can be created. ■ Ozite Corporation, Chicago.

Circle 305 on inquiry card

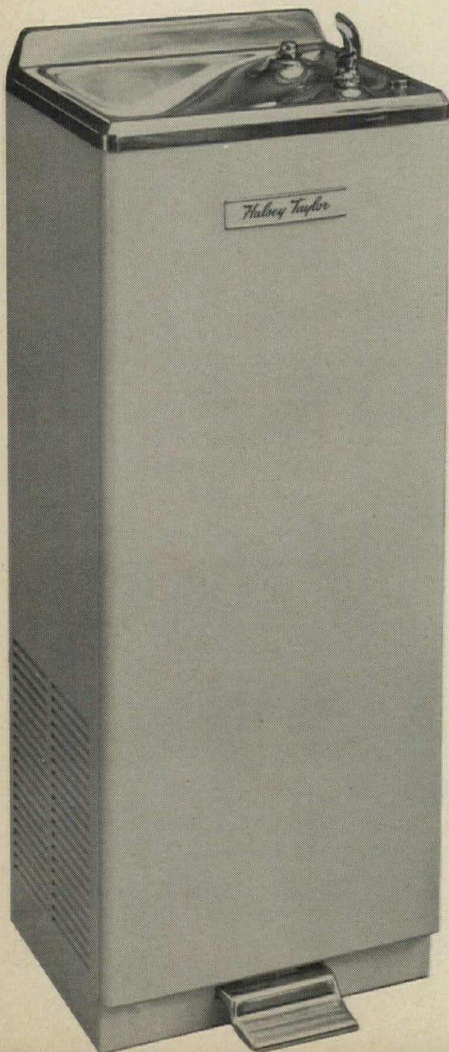


**WALL COVERINGS** / A line of three-dimensional sculptured polystyrene coverings includes *Seville*, *Aztec*, *Tiki*. Batten strips and corner mold in matching colors are provided, or wall molding can be used. The covering is said to resist fading, marring and discoloration; is washable; and is highly resistant to damage from impact and abrasion. Also recommended for doors, cabinet fronts, soffits, and other flat surfaces. ■ K-Lux Products Div., K-S-H, Inc., St. Louis.

Circle 306 on inquiry card

**JOINT SEALANT** / A self-leveling paving joint sealant combines adhesion, puncture and abrasion resistance, and elongation and recovery properties. Designed for contraction and expansion joints in sidewalks, pavements, decks and other concrete structures, *Sonolux Paving Joint Sealant* is a two-component urethane system. It is reported unaffected by most chemicals.

more products on page 172



## 5 Accessory Features improve

Sturdy, pressure-type electric water coolers, available in either free-standing or wall-tite design. On both types, dual (hand and foot) operation is standard. Stainless steel receptor wipes clean and deep recess design prevents splashing. Exclusive Halsey Taylor two-stream, mound-building projector provides a satisfying, sanitary drink of water. Standard cabinets are gray baked enamel — also available in all stainless steel.

Write for NEW HALSEY TAYLOR CATALOG. Or look us up in SWEET'S or the Yellow Pages.

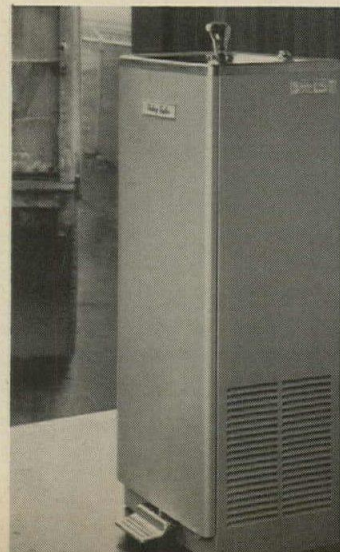
**Halsey Taylor®**

THE HALSEY W. TAYLOR COMPANY  
1560 Thomas Road • Warren, O. 44481

For more data, circle 80 on inquiry card

### ANTI-FREEZE PROTECTION

For loading docks, unheated buildings or other outside locations. Factory installed heating elements located inside cabinet thermostatically cut in at approximately 32°F. — cut out at 37°F.





*continued from page 174*

extreme temperature changes, ozone moisture. It offers a minimum life expectancy of 20 years, shows no surface degradation after aging and weathering, resists deterioration due to oils and chemicals. ■ Sonneborn Building Products, Inc., Des Plaines, Ill.

Circle 307 on inquiry card

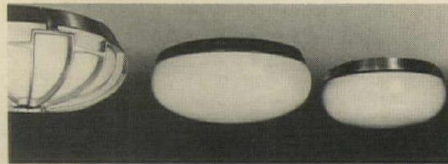


**WOOD SHINGLES** / Wood shingles and shakes are pressure-impregnated with a retardant compound that resisted lateral spread of flame with no sparks or flying brands when subjected to air currents of 12 and 18 miles an hour. The wood also passed leaching tests equivalent to 800 in. of rainfall over a 10-year

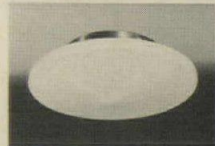
period. Red cedar given the treatment retains its natural color. The chemical has no adverse effect on galvanized nails, aluminum or copper gutters and flashing.

■ Koppers Company, Inc., Pittsburgh.

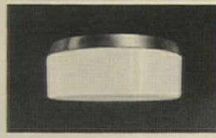
Circle 308 on inquiry card



ELLIPTICAL DIFFUSER UNITS



SAUCER UNIT



TAPERED DIFFUSER UNIT

**CEILING FIXTURES** / Weathertight units for canopies, corridors, shower rooms, garages and other wet locations come in elliptical, tapered and saucer shapes. One-piece precision cast aluminum construction has triple-ground satin aluminum or satin black anodized finish. Reflector is semi-specular aluminum anodized for permanence. ■ mcPhilben Lighting, Melville, N.Y.

Circle 309 on inquiry card



**EXPANDABLE WALL** / Pabco Expandable Wall is suited for non-load bearing partitions in residences as well as for dividers in offices. The assembly consists of gypsum wallboard facings that are separated by heavyweight paperboard webs which extend the length of the panels. For non-fire-rated construction the panels are faced with 1/2-in.-thick gypsum wallboard. For 1-hour fire resistive construction they are faced with 5/8-in. type X gypsum wallboard. Panels can be easily dismantled. ■ Pabco Technical Services, San Francisco.

Circle 310 on inquiry card

**PLASTIC LAMINATE PLANKS** / The complete Lamidall line, plastic laminate planks and panels that are reported not to split, delaminate, check or crack, is more products on page 176

## The Performance of Halsey Taylor® Floor Model Coolers

### EXPLOSION-PROOF

Aluminum conduit system houses electrical components—as a barrier against dangerous arcing. Hermetically-sealed cooling unit is also explosion-proof. Recommended where flammable or explosive atmospheres exist.

### HOT WATER DISPENSER

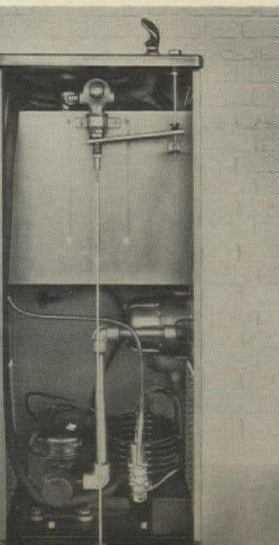
Factory-installed "Coffee Bar Server." Consists of an electrically-heated hot water tank (4 pints capacity); and a lever-operated, gooseneck dispenser. Will serve 10 cups rapid draw or 60 cups of 180°F. water per hour.

### WATER FILTER

Easily installed on water supply line. Inner core of activated charcoal effectively removes microscopic solids—neutralizes objectionable taste and odor from chlorination and other sources. Replaceable carbon filter tube.

### SIDE-MOUNTED FOUNTAIN

Provides low-level drinking convenience for children. Factory-installed auxiliary fountain has separate valve and automatic stream regulator. Waste outlet and water supply are integral with electric water cooler. Available in stainless steel or vitreous china.

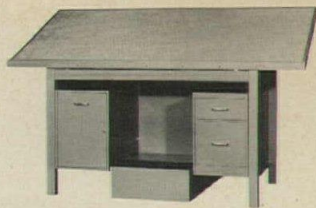




*continued from page 175*

now guaranteed against defects of material or workmanship for the life of the building in which it is installed. Lamidall is reported practically indestructible in ordinary use in offices, restaurants, stores or in commercial or recreational areas. The polyester outer layer seals in the look of woodgrains, solid colors or various patterns. The material can be wiped clean with a damp cloth. ■ Woodall Industries, Inc., Carpentersville, Ill.

Circle 311 on inquiry card



**DRAFTING TABLE** / This unit features a 40- by 80-in. non-warping birch veneer top that is reversible, allowing the operator to utilize storage space in the unit immediately behind him; a 60- by 37- by 36-in. frame with 110-volt double elec-

tric outlet; a sliding step stand, and a 55-in. shelf. Options include right or left full-suspension letter-size file drawer, three-box-drawer or high cabinet door unit with four shelves for drawings; bookcase unit with shelf; compartment that fits into rear of table; file drawer; tool drawer which can be hung under the file drawer; and vinyl or steel or linoleum covered top.

Corry Jamestown Corp., Corry, Pa.

Circle 312 on inquiry card



**OFFICE FURNITURE** / A 66-in. credenza in pecan veneers provides easy access to all storage elements. The top-opening file units make all material visible and reachable without bending. Vertical drawer pulls are designed to be gripped naturally by the outstretched hand without turning the wrist. The legs are joined to storage units by functionally exposed metal pins. ■ Jofco, Jasper, Ind.

Circle 313 on inquiry card



**INFORMATION SIGNS** / Transillumination signs designed for central transit terminals provide complete route service information quickly and simply. When a question button is pressed, the sign incorporates both color coding and selective transillumination to produce the answer graphically. The particular route in question remains illuminated for 30 seconds. ■ Devco Engineering Inc., Fairfield, N.J.

Circle 314 on inquiry card

more products on page 20

# STOP THIS—

# and STOP 90% of all ROOF LEAKS!

New building owners, prior to the Hickman System, should have blamed the weather and not the architect for the troubles and problems produced by roof leaks at eaves and expansion joints. Thermal reaction between roofing felts and metal water dam-cants, other than galvanized steel\*, causes roofing felts to crack as badly as shown above . . . Now this condition can be prevented; refer to Sweet's 21G-Hi and see proof that the Hickman System "gives positive control of roof water at eaves." Also, see how tar drip-page and water stains on building exteriors are prevented.

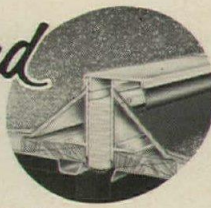
\* When installed in maximum 10' lengths to react independently have a thermal coefficient compatible with roofing felts.

Smart looking fascia profiles in Kalcolor, Fluoron (Kinar-500) and baked enamel enable you to combine wall beauty with positive roof perimeter protection.



## HICKMAN *Safeguard*

**fascia and water dam systems  
and expansion joint systems**

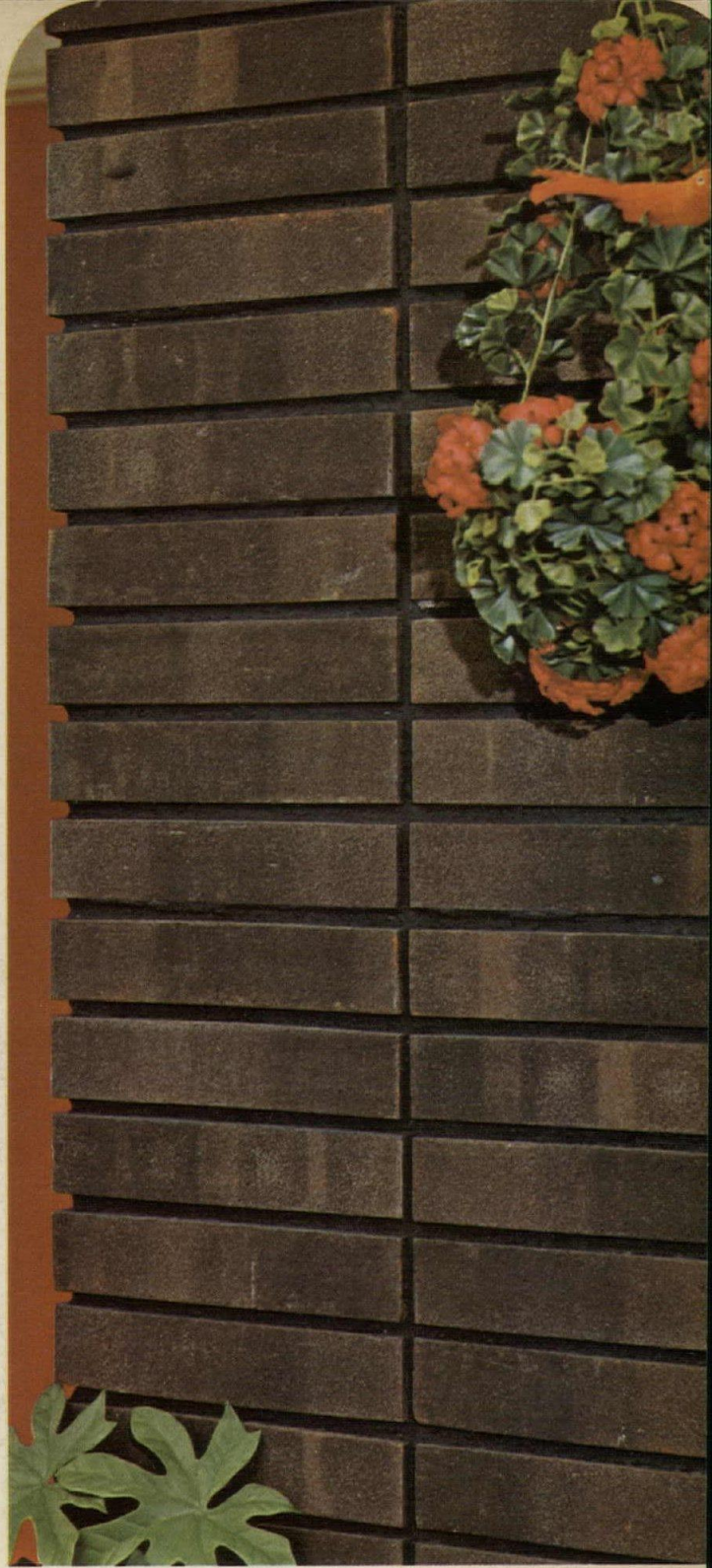


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CAN YOU GUESS HOW THE SEVEN THOUSAND PLUS FEET OF ROOF PERIMETER ON THESE BUILDINGS ARE POSITIVELY PROTECTED AGAINST LEAKS? See Sweet's 21G-Hi. LATROBE SENIOR HIGH SCHOOL, LATROBE, PA.; BARTHOLOMEW-ROACH-MOYER-WALFISH, ARCHITECTS







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use **MEDUSA CUSTOM COLOR**

Medusa Custom Color Masonry Cements can add "personalized" beauty to any masonry wall. □ Charming buff shades for that "aged" colonial appearance. Matching colors for that modern, monolithic effect. Coordinated colors to a color scheme. Accent colors to match trim, roof, etc. All are available on-the-job, ready for sand and water with Medusa Custom Color Masonry Cements. □ Try some creative artistry with colored mortar. Ask your Medusa representative about the full line of Medusa Masonry Cements. Or write Medusa, P. O. Box 5668, Cleveland, Ohio 44101.

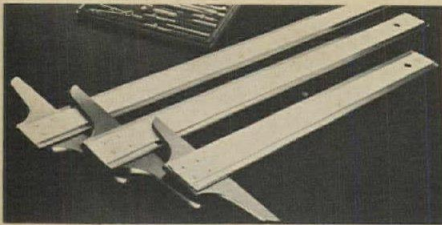


**MEDUSA** PORTLAND CEMENT COMPANY

White & Gray Portland Cements • White, Gray & Custom Color Masonry Cements • ChemComp Shrinkage-Compensating Cement



continued from page 176



**T-SQUARES** / Four threaded steel inserts are permanently imbedded in the Lok-Tite T-square head, which is held in exact alignment by precision jigs during drilling and fastening operations. Machine

screws bind the head to the blade. Edge liners are extruded by Perfex Plastics of Chicago. ■ Frederick Post Company, Chicago.

Circle 315 on inquiry card

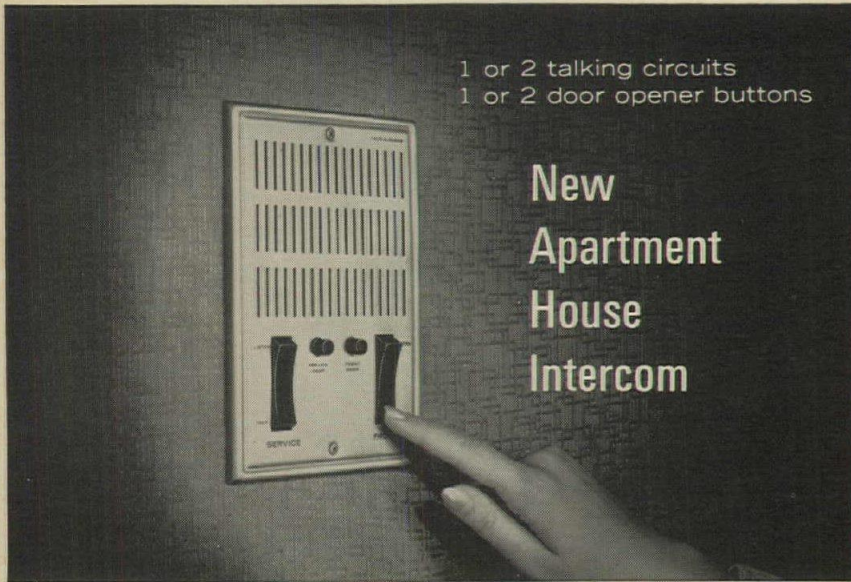
**FLUORESCENT UNIT** / A 100 per cent sealed and anodized aluminum fluorescent unit features a full framed and hinged enclosure of extruded aluminum, promising to eliminate danger of dust, rust, vapors, moisture, and corrosion. ■ Allite Corporation, Chicago.

Circle 316 on inquiry card



**WATER CLOSET** / This elongated, one piece closet combination feature push-button actuated flush valve, centrifugal flushing action and an anti-syphonic brass float valve. It is available for 12 inch rough-in, in white and many colors. ■ Briggs Manufacturing Co., Warren, Michigan.

Circle 317 on inquiry card



1 or 2 talking circuits  
1 or 2 door opener buttons

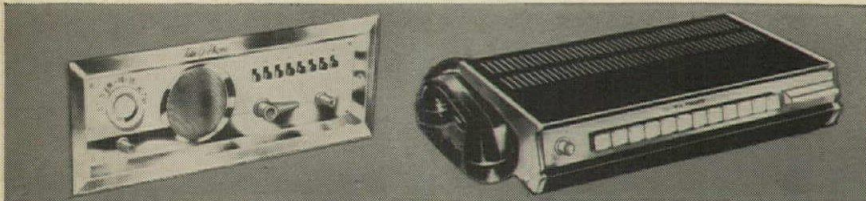
## New Apartment House Intercom

# New TALK-A-PHONE

Provides instant and direct 2-way conversation between any Apartment and Vestibule . . . Greater Performance with Exclusive Talk-A-Phone Features:  
• Ample Volume—Whispers, shouts and normal voice are heard clearly without "boom" • Automatic Privacy—On all Apartment Units • Volume Selector—Each Apartment selects own volume. Concealed yet easily accessible • Built-in Buzzer—Pleasant sound, in each Apartment Unit • With one or two independent talking circuits and one or two independent door opener buttons.

Distinctively styled. Quality Engineered. Built to withstand continuous use.

**TALK-A-PHONE . . . "Has Everything. Does Everything."** The accepted standard of quality and dependability in Intercommunication for over a third-of-a-century.

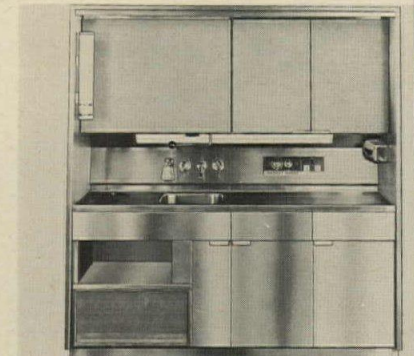


**Intercom For The Home.** Enjoy comfort, convenience and peace of mind. From any room you can • Listen-in on baby, children or sick room • Answer outside doors • Talk to anyone—upstairs or downstairs, inside and out • Enjoy radio. Distinctively styled. Beautifully finished. Easily installed.

**Intercom For Office and Industry.** Saves thousands of man-hours, simplifies office routine. Distinctively styled, ruggedly built to withstand continuous day and night use. From 2-station systems to elaborate installations, you can do it better and more economically with Talk-A-Phone. Pays for itself many times over.

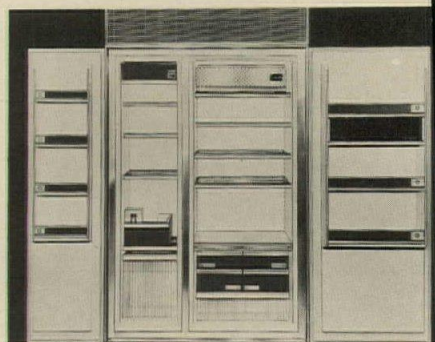
Send for Free Catalogs... Dept. AR-7  
**TALK-A-PHONE CO., 5013 N. Kedzie Ave., Chicago, Illinois 60625**

For more data, circle 100 on inquiry card



**FOOD-PREPARATION STATION** / This station has a refrigerator unit located eye-level on the right-hand side. The unit is enclosed by easy-to-clean blue-vinyl clad doors with magnetic gaskets for positive closing. The liner of the refrigerator is one piece molded plastic with no seams. ■ Market Forge Co., Everett, Massachusetts.

Circle 318 on inquiry card

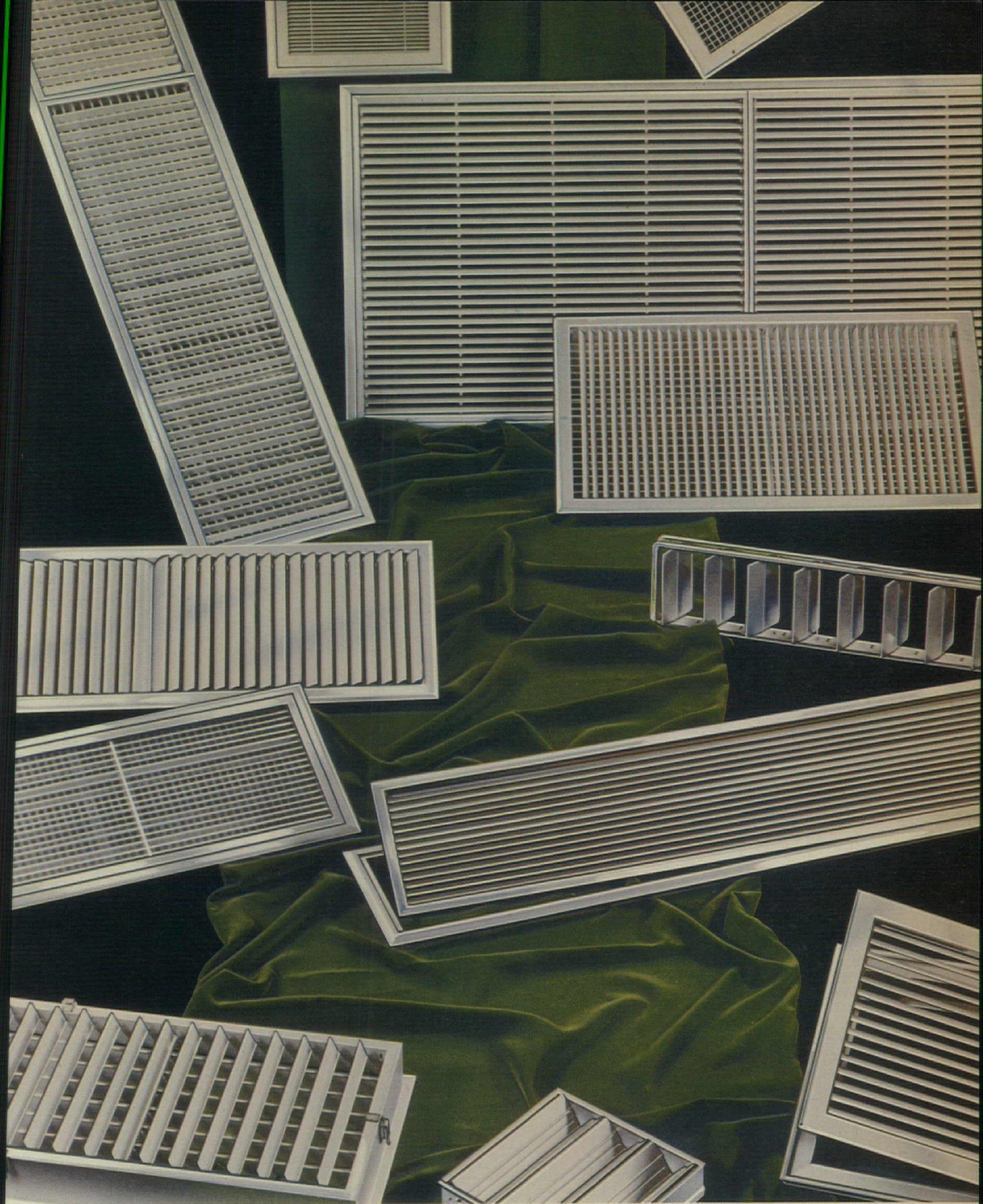


**REFRIGERATOR-FREEZER** / Built-in refrigerator-freezer combinations in side-by-side, over-and-under and under-counter types fit kitchen arrangement in spaces from 18 1/8 in. to 48 in. wide. ■ Sub-Zero Freezer Co., Inc., Madison, Wisconsin.

Circle 319 on inquiry card

more products on page 212





STANDARD SUPPLY & RETURN REGISTERS & GRILLES

# WATERLOO *Air Diffusion* EQUIPMENT

DESIGN ORIENTED . . . . . THE *COMPLETE* QUALITY LINE

MEMBER OF THE AIR DIFFUSION COUNCIL

WATERLOO REGISTER DIVISION

DYNAMICS CORPORATION OF AMERICA  
CEDAR FALLS, IOWA



For more data, circle 101 on inquiry card



# Concordia Tiles by Ludowici

Designed by EERO SAARINEN  
and ASSOCIATES



Ludowici-Celadon Company was selected to produce the ceramic roofing tiles, designed by Eero Saarinen & Associates, which were so important in the full development of the architectural character of Concordia Senior College.

For over 70 years we have been assisting archi-

tects and engineers in producing roofing tiles for their specially designed work.

In addition, we offer standard patterns in a wide range of colors of roofing tile in both the Interlocking and Flat Shingle types for contemporary and traditional designs.

*Our representatives are always available to assist you on your special roofing problems*

 **LUDOWICI-CELADON CO.** 75 EAST WACKER DRIVE, CHICAGO, ILL. 60601

*Manufacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick*



**This good-looking terrazzo floor  
cured in 16 hours,  
weighs only 3 to 4 lb./sq. ft.**



**It's based on Shell Epon® resin.**

Shell Epon resin is gaining rapid acceptance as a binder for terrazzo floors. It acts as both the marble chip matrix, and the adhesive that bonds to the substrate. The result is a highly durable, non-dusting floor with broad design and installation possibilities.

**Lightweight**—These "thin-set" floors are applied in thicknesses of 3/16" to 1/4" giving a weight of only 3 to 4 lb./sq. ft. compared to about 30 lb./sq. ft. for portland cement terrazzos. For new construction, less load-bearing capacity is needed. For remodeling, thin-set terrazzo can be installed on upper stories as well as lower floors, and elevations need not be raised.

**Fast cure**—Terrazzo based on Epon resin can be walked on in 10 to 12 hours, can be ground in 16 to 20 hours. This permits workmen to re-


turn quickly to the job site.  
**Low maintenance**—The tough, smooth, chemical-resistant surface of these floors is very easy to clean.

**Flexible, crack-resistant**—Epon resin-based terrazzo absorbs impact, vibration and noise, resists cracking much better than portland cement. If desired, it can be made flexible enough to eliminate divider strips.

**Easy installation** over wood, concrete and steel. Floor is applied in 5 steps: (1) Etching the substrate; (2) Priming the substrate; (3) Power-trowelling the binder/aggregate mix; (4) Grinding and grouting the surface; and (5) Sealing. A finish may also be applied.

**Why Epon resin?** Shell Epon resin is the ideal binder for thin-set floors. It has extremely low shrinkage, and adheres tightly to substrates. Its low

odor permits installation in institutions and food plants with a minimum of operational interruptions. Terrazzo floor systems based on Shell Epon resin are readily available in a wide range of colors. Mail the coupon if you'd like a supplier of these materials to contact you.

**Shell Chemical Company**  
Plastics and Resins Division  AR-7

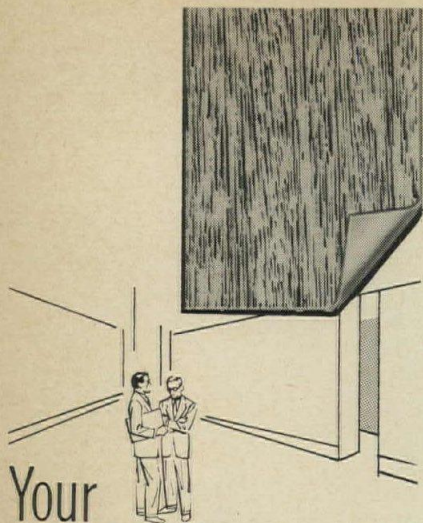
**Shell Chemical Company**  
Plastics and Resins Division  
113 West 52nd St., N.Y., N.Y. 10019

Please have a supplier of Epon resin-based terrazzo materials contact me.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

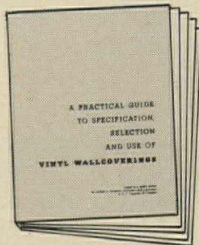
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Your **VICRTEX** Man knows a lot about Vinyl Wallcovering... he's at your service

The VICRTEX representative who helps you when you're working with vinyl wallcovering is a professional perfectionist. He'll follow through on the job after you write specs—you'll find him on the installation site checking wall preparation, hanging and inspection. Your VICRTEX Man is knowledgeable about every aspect of vinyl wallcovering—he can show you a whole world of color availabilities, three-dimensional textures and design-conscious installations similar to the one you're working on. Depend on him to be alertly on the job before, during and after specifying time. It's easy to work with the best vinyl wallcovering—VICRTEX. You get top quality, easy application and maintenance . . . and conscientious service from your personal VICRTEX Man. Find out for yourself why many leading architects and designers believe VICRTEX is an unbeatable combination of product and people. At your service from Hawaii to the Caribbean.



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(212) Longacre 4-0080  
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Distributed in principal cities from Hawaii to the Caribbean, by:

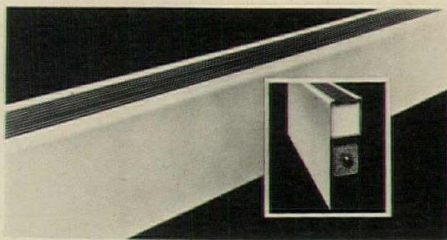
VICRTEX SALES CORP.: New York, Chicago, Detroit, Philadelphia, Pittsburgh, Los Angeles, San Francisco, Boston / DWOSKIN, INC.: Atlanta, Houston, Dallas, Miami, Charlotte, Washington, St. Louis, Oklahoma City / HOWELLS PAINT CO.: Salt Lake City / RATTAN ART GALLERY: Hawaii / R. B. ADLER, INC.: Santurce, Puerto Rico.

For more data, circle 103 on inquiry card

continued from page 210

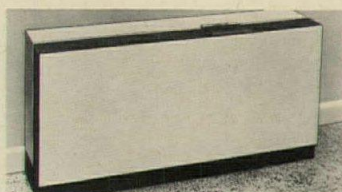
**DIMMER** / A 2,000 watt electronically controlled dimmer for incandescent lighting has one-piece construction, will fit a standard two-gang box, and does not require a separate remote power unit. An ivory cover plate snaps over the metal face plate. ■ Ideal Industries, Inc., Syracuse, Ill.

Circle 320 on inquiry card



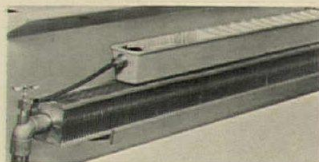
**RADIATION CABINETS** / Snap-on, slip-joint perimeter units have a flush, full-length extruded aluminum cabinet grille and narrow depth. Cabinets are 16-gage steel reinforced at frequent intervals with factory-welded internal gussets. ■ The Trane Company, La Crosse, Wisc.

Circle 321 on inquiry card



**COOLING AND HEATING** / Console Zonelines are designed particularly for curtain wall construction in apartments, office buildings, motels, nursing homes, hospitals and schools. No central compressors, chillers or towers are required. Climate can be controlled in each zone and each unit may be individually metered. No complicated duct and piping design is required. ■ General Electric, Louisville, Ky.

Circle 322 on inquiry card



**HUMIDIFIER FOR HOT WATER HEAT** / The fully-automatic Three S Humidifier featuring a fiber glass, non-corrosive water pan, fiber glass evaporating inserts, and a styrofoam float is set on the heating coil and is connected at the regular air vent. Air locks are impossible. ■ Three S Company, Estherville, Iowa.

Circle 323 on inquiry card

more products on page 236

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The functional program requirements of a general hospital are thoroughly and lucidly discussed in this excellent book. Programs and area analysis, budget control, patient care divisions, obstetrical delivery and emergency; isolation and asepsis; physical medicine, central sterile supply and many other important topics are examined in specific detail. 296 pp., \$13.50.

**4 Construction Lending Guide. A HANDBOOK OF HOMEBUILDING DESIGN AND CONSTRUCTION.** By JOHN L. SCHMIDT, WALTER H. LEWIS and HAROLD BENNETT OLIN.

This book has been produced by the U.S. Savings and Loan League in cooperation with the American Savings and Loan Institute. It covers Land Planning, Design, Construction, Appraising and Construction Loan Procedures. Each section is supplemented by a concise but comprehensive work file. 650 pp., \$26.00.

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*continued from page 172*

**SCHOOL CONSTRUCTION** / An economic study conducted by Ellerbe Architects of St. Paul, Minn. considers the availability and cost of building schools in colder northern U.S. climates and makes comparisons with the California School Construction Systems Development program. ■ Hough Manufacturing Corporation, Janesville, Wisc.\*

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**TURNABLES** / A 4-page brochure describes and illustrates turntables for managing traffic-control and limited-space problems. ■ Macton Machinery Company, Inc., Stamford, Conn.\*

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**STEEL JOISTS** / The "1967 Edition of Specifications and Load Tables" for high-strength open-web steel joists is a workable handbook with technical data to specify joists to carry uniform loads on spans up to 96 ft. ■ Steel Joist Institute, Washington.\*

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**MOVABLE OFFICE PARTITIONS** / A 32-page color brochure gives information on ease of take-down and relocation, panel heights and widths, and specifications. There are details on colors and textured wood grain panels. Accessories also shown include wardrobe units, sliding glass wickets, shelving, cabinets, and magnetic picture and coat hooks. ■ Circle Steel Partition Company, Inc., Port Chester, N.Y.\*

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**REINFORCED CONCRETE** / The 28-page "1967 Steel-form Services" brochure describes floor and ceiling systems in six monolithic reinforced concrete constructions. The brochure also covers steeldomes, largeforms, adjustableforms and longforms. ■ The Ceco Corporation, Chicago.\*

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**POLYPROPYLENE PIPE** / A 28-page booklet features applications, installation techniques, fusion bonding and other detailed information. ■ Chevron Chemical Company, San Francisco.

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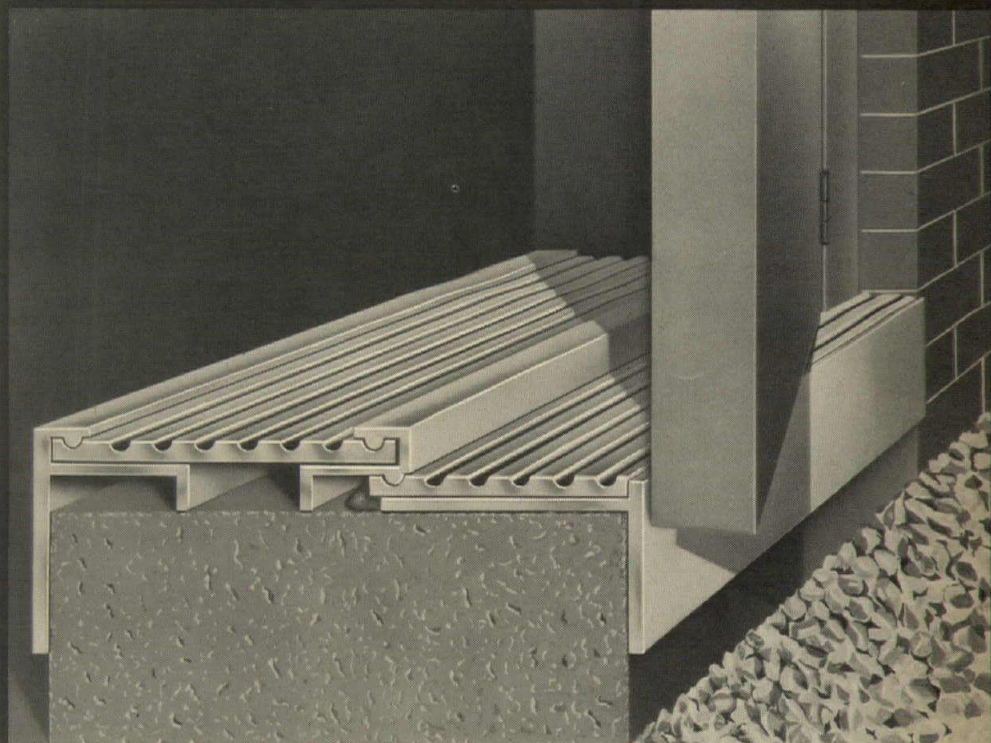
**TROFFER** / A 7-page booklet introduces the Aluminaire trimless regressed aluminum fluorescent troffer. ■ Silvray Litecraft Corporation, Passaic, N.J.

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## Frank Lloyd Wright

FRANK LLOYD WRIGHT, *his Life, His Work, His Words*. By Olgivanna Lloyd Wright. Horizon Press, 156 Fifth Ave., New York, N.Y. 224 pp., illus. \$7.50.

FRANK LLOYD WRIGHT, *A Study in Architectural Content*. By Norris Kelly Smith. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632. 178 pp., illus. \$5.95.

By H. Allen Brooks

Two books devoted to a single subject could hardly be more diverse in approach than these, and it is precisely for this reason that each successfully, if unintentionally, stands as the complement of the other.

Olgivanna Lloyd Wright presents a warm and humanistic biography of her husband which is richly interwoven with the master's words. Indeed half, or more, of the text is drawn from his writings or speeches with *An Autobiography* the most frequently quoted and with his recorded talks to the Taliesin Fellowship the prime source of his hitherto unpublished words. By this means the architect speaks for himself about his own work and ideas—his designing of Unity Temple, the sea shell as "housing" in Nature, the concept of organic architecture—and thus the reader obtains a vivid, first-hand account of Wright's philosophy as an architect. Around this is structured Wright's biography which, from the mid-1920's, is told by the person closest to Wright of all. In the recounting of the habits and happenings of his daily life the reader obtains an intimate view of Wright the individual rather than the Wright of public fame.

Surely this biography is not intended to supplant those already published but rather to reach an audience previously neglected. Its most valuable service will be as an introduction of Wright to America's youth—those whom he always sought to reach—and the layman for whom most previous biographies have been either too detailed or too single-minded in their approach. Yet the book has value for the specialist and the scholar as well, for not only does it shed

Mr. Brooks is a member of the Department of Fine Arts at the University of Toronto

more light on Wright the man but it offers the most detailed and complete list ever published of "The Buildings and Projects of Frank Lloyd Wright." At long last the chronological list first presented by Henry-Russell Hitchcock in 1942 (*In the Nature of Materials*) is up to date. Street addresses, unfortunately, have been excluded, yet these are generally available in *Frank Lloyd Wright: Writings and Buildings*, edited by Edgar Kaufmann and Ben Raeburn. The present list, made from the drawings at Taliesin, endeavors to record the date of each design's conception—which is the significant date to have—and these understandably vary at time from those already published. Incorporated also into the list is pertinent biographical information, a most useful addition which contains many facts not previously so readily available.

Norris Kelly Smith carefully explains, in the prologue to his book, that his is not a traditional biography in which the subject is related to his time, contemporaries and the Modern Movement, but rather "I have undertaken to interpret Wright's architecture mainly in terms of what he himself had to say and in terms of the expressive form of the buildings themselves." In effect, the author endeavors to relate Wright to the broad scope of history, or more precisely, the history of ideas. To do so is provocative and this is where much of the book's real value lies. When comparing the author's thesis that Wright is anti-Greek and basically Hebrew in thought to Vincent J. Scully's biography (the only other to assess Wright in similar breadth) which associates Wright with the Greek and proto-Greek world, some conclusions are indeed debatable. Yet Smith leaves Scully unmentioned in his text, obviously intentionally since both Manson and Hitchcock are snipped at from time to time.

One statement aptly summarizes the entire book. The author notes, "I have argued at some length that the key to Wright's thought, and perhaps to Romanticism in general, is to be found in a characteristically Biblical and anti-Hellenic emphasis on the dynamics of personal being, as against the static and objective being-of-things; that that emphasis has tended to express itself in

terms of polar tensions; and that polarities with which Wright struggled from the beginning, both in his life in his architecture, are at last fully exemplified in the Kaufmann house and the Johnson building." The cogent opening chapters establish the disparate poles that of the conservative Wright who fit so neatly into Chicago's upper middle class and creates such a formal design as the Charnley house, and the opposite pole—to which Wright is the more firmly linked—of Romanticism and the Biblical "emphasis on the dynamics of personal being." Thorlief Borman's *Hebrew Thought Compared with Greek* is used here as the basis for discussion. With a chapter entitled "The Oak Park Year" begins the more formal chronological survey of the architect's life and work and also the analysis of the "polar tensions" according to which Wright's prairie houses are distinguished as the "closest to the pole of formal regularity" or those "nearest the opposite pole" with the case for regularity inadvertently being the more convincing. Subsequent chapters, while tracing the vicissitudes of Wright's life, compare his work, his attitudes and his thoughts to those of Rousseau, Emerson, Nietzsche, to the Arthurian legend of the Round Table (the Taliesin Fellowship), and so forth. Finally the polarities are reconciled in Wright's work, finding their clearest and most characteristic exemplification in the Kaufmann house and the Johnson building, both of 1936.

Both of these texts have future reference value. Yet both presses have each treated their book as fiction, and have not bothered to include an index.

## The use of plastics

PLASTICS IN BUILDING. Edited by Irvin Skeist. Reinhold Publishing Corporation, 430 Park Ave., New York, N.Y. 466 pp., illus., \$18.00. PLASTICS IN BUILDING STRUCTURES. Pergamon Press, Inc., 44-01 21st St., Long Island City, N.Y. 32 pp., illus., \$15.00.

Both of these books are interdisciplinary drawing on chemists, engineers and architects as contributors. They differ in presentation and potential audience.

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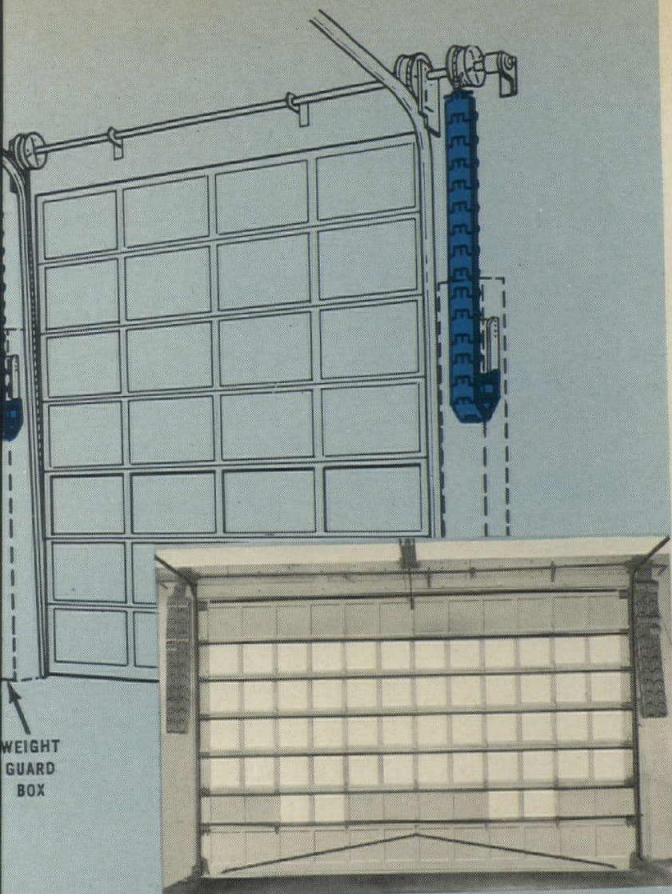


Fig. A; Counterweight Door in closed position. The Inner Drums and Cables raise and lower the door. The Outer Drums and Cables raise and lower the weights. Cables are attached to the upper or moving end of the weight assembly; stationary end is attached to anchor plate on wall. Drums are locked to single shaft with keys and set screws and rotate at uniform speed.

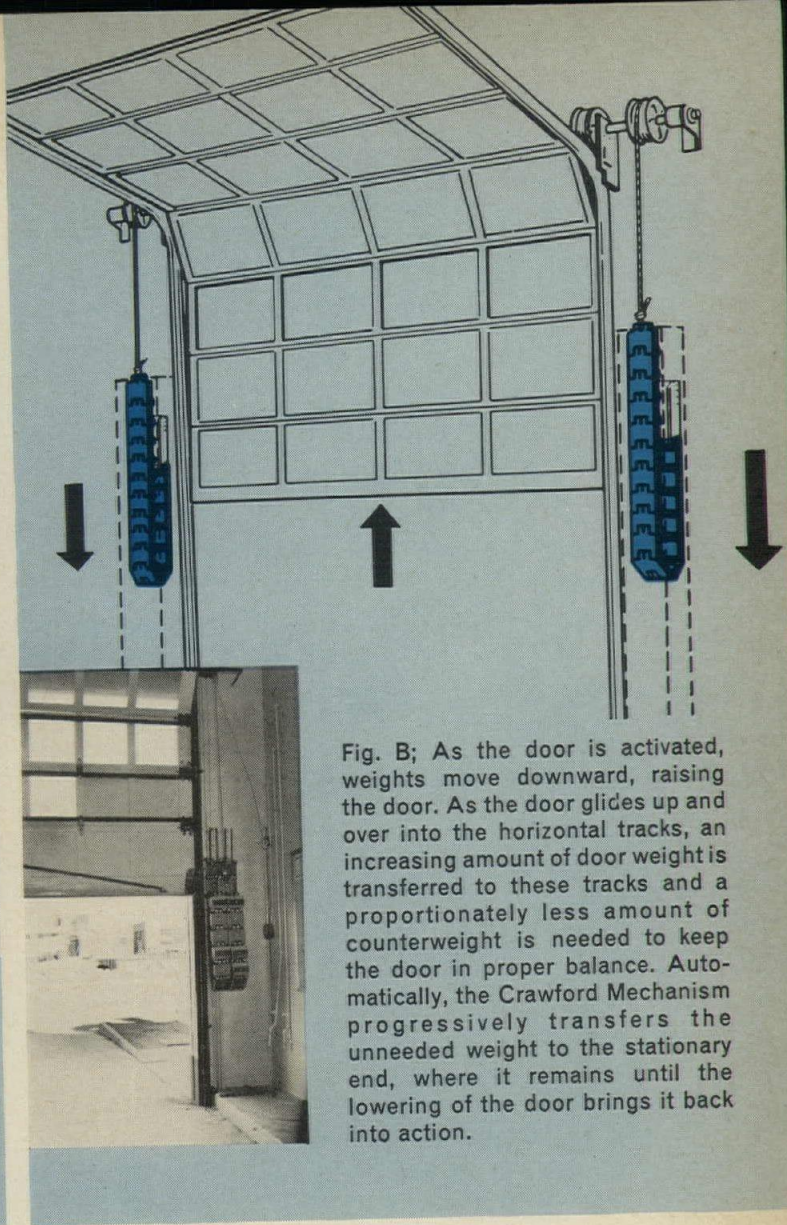


Fig. B; As the door is activated, weights move downward, raising the door. As the door glides up and over into the horizontal tracks, an increasing amount of door weight is transferred to these tracks and a proportionately less amount of counterweight is needed to keep the door in proper balance. Automatically, the Crawford Mechanism progressively transfers the unneeded weight to the stationary end, where it remains until the lowering of the door brings it back into action.

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continued from page 238

*Plastics in Building* provides guide- for architects and engineers making primary evaluations of materials or cations. *Plastics in Building Struc-* could be used by a structural de- er interested in designing a system. The first book was assembled by an or, Irving Skeist, who selected 24 ors. A basic reference work, it has oters on everything from linoleum to sed-skin space grids. Editor Skeist brought the guns to bear at an edi- s command—illustrations demon- e applications, appendixes and bib- raphies are used as needed, charts eadable. Going a little beyond the ic handbook function served by good l of the material is a five-part series plastics uses abroad.

The second book, *Plastics in Build- Structures*, is made up of papers read the (British) Plastics Institute confer- e, organized with the Royal Institute British Architects, the Institution of Structural Engineers, and the Institution Civil Engineers. The papers are usually ort, and can serve as introductions to ecific concerns of the various areas thin plastics. Chemists and engineers ommitted the greatest number of papers, t seven contributors were architects, th United States architects included. o papers deal with molded plastics throoms such as those used in Expo 's Habitat '67, and several deal with astics as structural materials, while ners discuss such concerns as fire and st problems.

For the reader with a particular prob- m, the book, composed of conference aterial, might be likened to attending a nference or symposium—the chances e he will find some papers too general, hers too tightly specific, but he may ke home a really important piece of ormation relevant to his needs.

**THE FEDERAL BULLDOZER.** By Martin Anderson. Mc-Graw-Hill Book Company, 330 West 42 Street, New York, N.Y. 10036. 272 pp. Paperbound, \$2.45.

**ARCHITECTURE IN ANCIENT EGYPT AND THE NEAR EAST.** By Alexander Badawy. The M.I.T. Press, 50 Ames Street, Cambridge, Mass. 02142. 246 pp., illus. \$10.00.

**ITALIAN VILLAS TODAY.** By Marco Dezzi Bardeschi. Transatlantic Arts, Inc., 565 Filth Avenue, New York, N.Y. 10017. 239 pp., illus. \$18.50.

**BUILDING CONSTRUCTION COST DATA. 1967.** By Robert Snow. Means Co., Inc., P.O. Box 36, Duxbury, Mass. 02332. 174 pp. Paperbound, \$3.75.

**THE RESTORATION MANUAL.** By Orin M. Bullock, Jr. Silvermine Publishers Inc., Norwalk, Conn. 181 pp., illus., \$8.50.

**ILLUSTRATED GLOSSARY OF ARCHITECTURE 1850-1830.** By John Harris & Jill Lever. Clarkson N. Potter, Inc., 23 East 67 Street, New York, N.Y. 10021. 78 pp., illus. \$12.50.

**ROW HOUSES AND CLUSTER HOUSES.** By Hubert Hoffman. Frederick A. Praeger, 111 Fourth Avenue, New York, N.Y. 176 pp., illus. \$18.50.

**CRITICAL PATH SCHEDULING.** By Joseph Horowitz. The Ronald Press Company, 15 East 26 Street, New York, N.Y. 10010. 254 pp., illus. \$8.50.

**SHOPS AND SHOWROOMS, AN INTERNATIONAL SURVEY.** By Karl Kasper. Frederick A. Praeger, 111 Fourth Avenue, New York, N.Y. 10003. 165 pp., illus. \$15.00.

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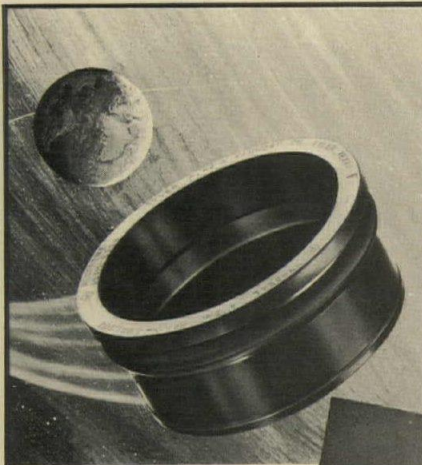
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**MALLADIO'S VILLAS.** By James S. Ackerman. J. J. Augustin, Inc., Publisher, Locust Valley, New York. 9 pp., illus., \$5.00.

**TECHNICAL SESSIONS PRESENTED AT THE 10TH ANNUAL INTERNATIONAL VISUAL COMMUNICATIONS CONGRESS.** American Institute for Design and Drafting, 770 South Adams, Suite 110, Birmingham, Michigan 48011. 122 pp. Paperbound, Members, \$5.00; Non-members, \$10.00.

**A SYMPOSIUM ON DESIGN AND DRAFTING MANAGEMENT.** By The American Institute for Design and Drafting, 770 South Adams, Suite 110, Birmingham, Michigan 48011. 253 pp. Paperbound, Members, \$25.00; Non-members, \$35.00.

**COLOR SLIDE CATALOGUE OF WORLD ARCHITECTURE.** By the American Library Color Slide Co., Inc., 805 East 45 Street, New York, N.Y. 10017. 113 pp., illus.

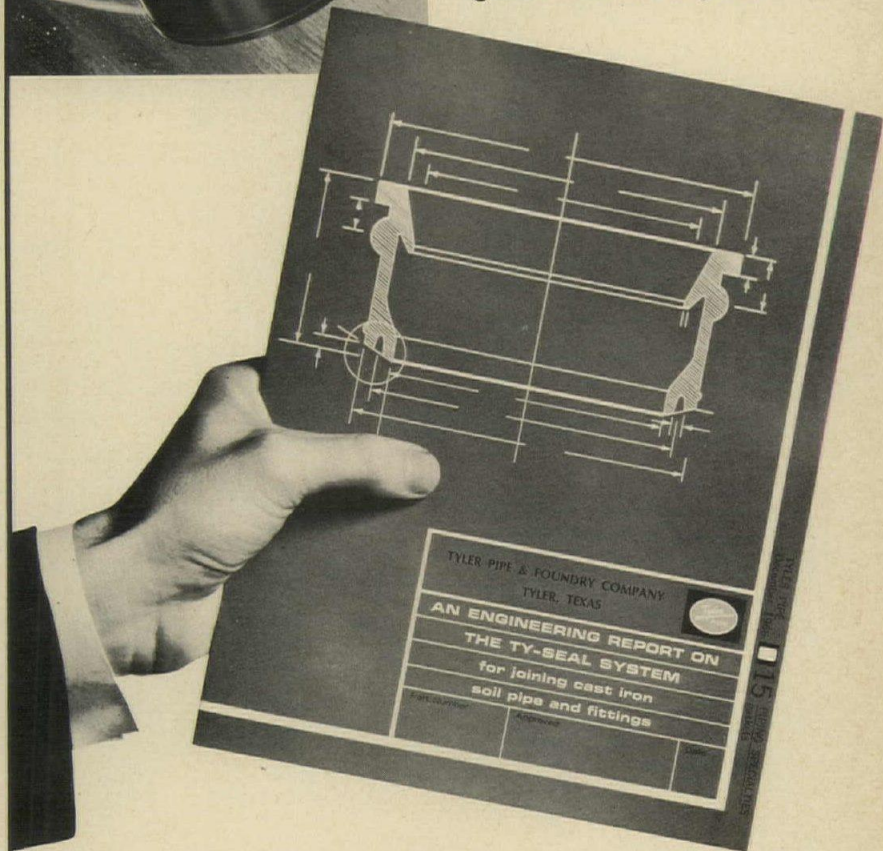


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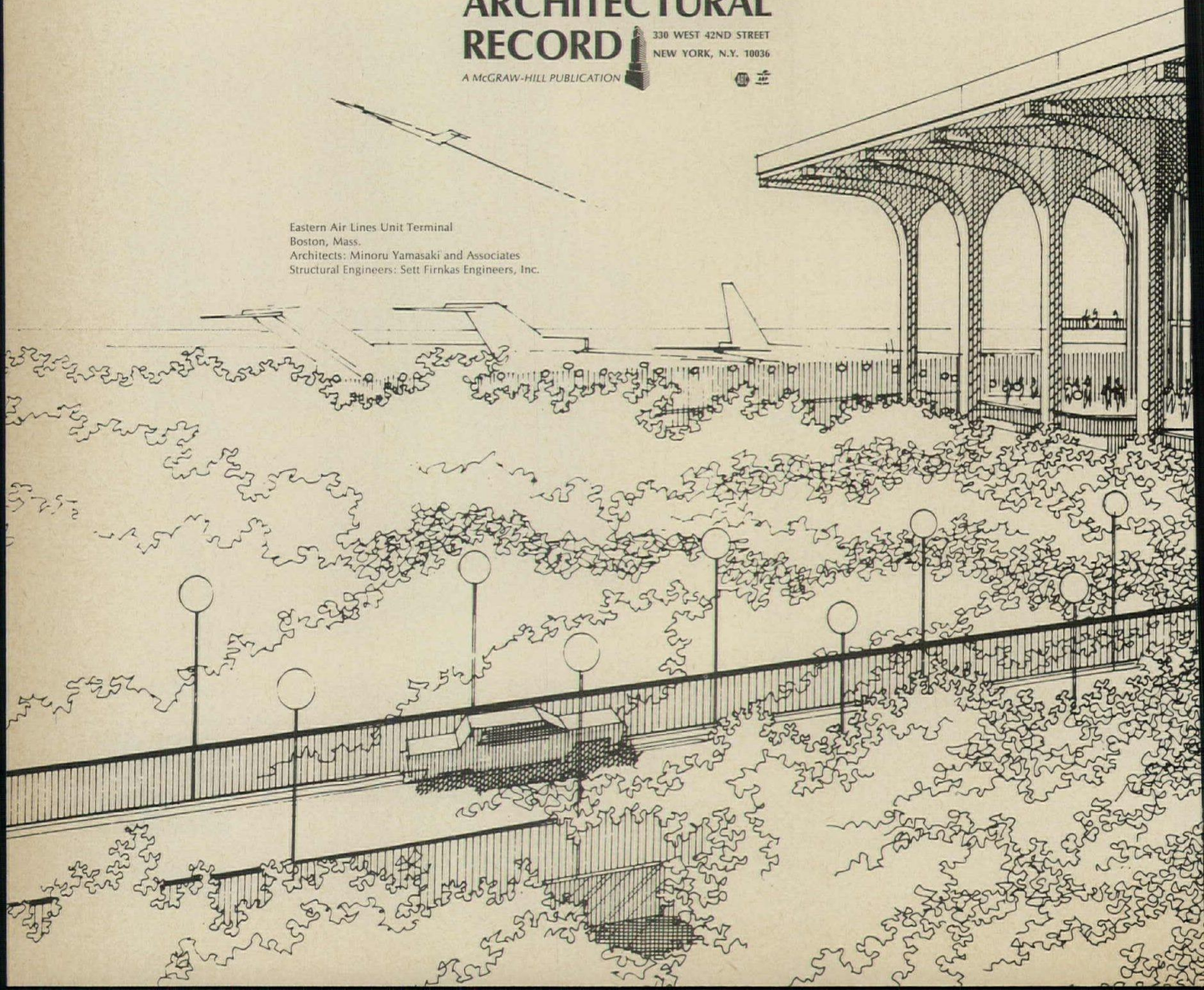
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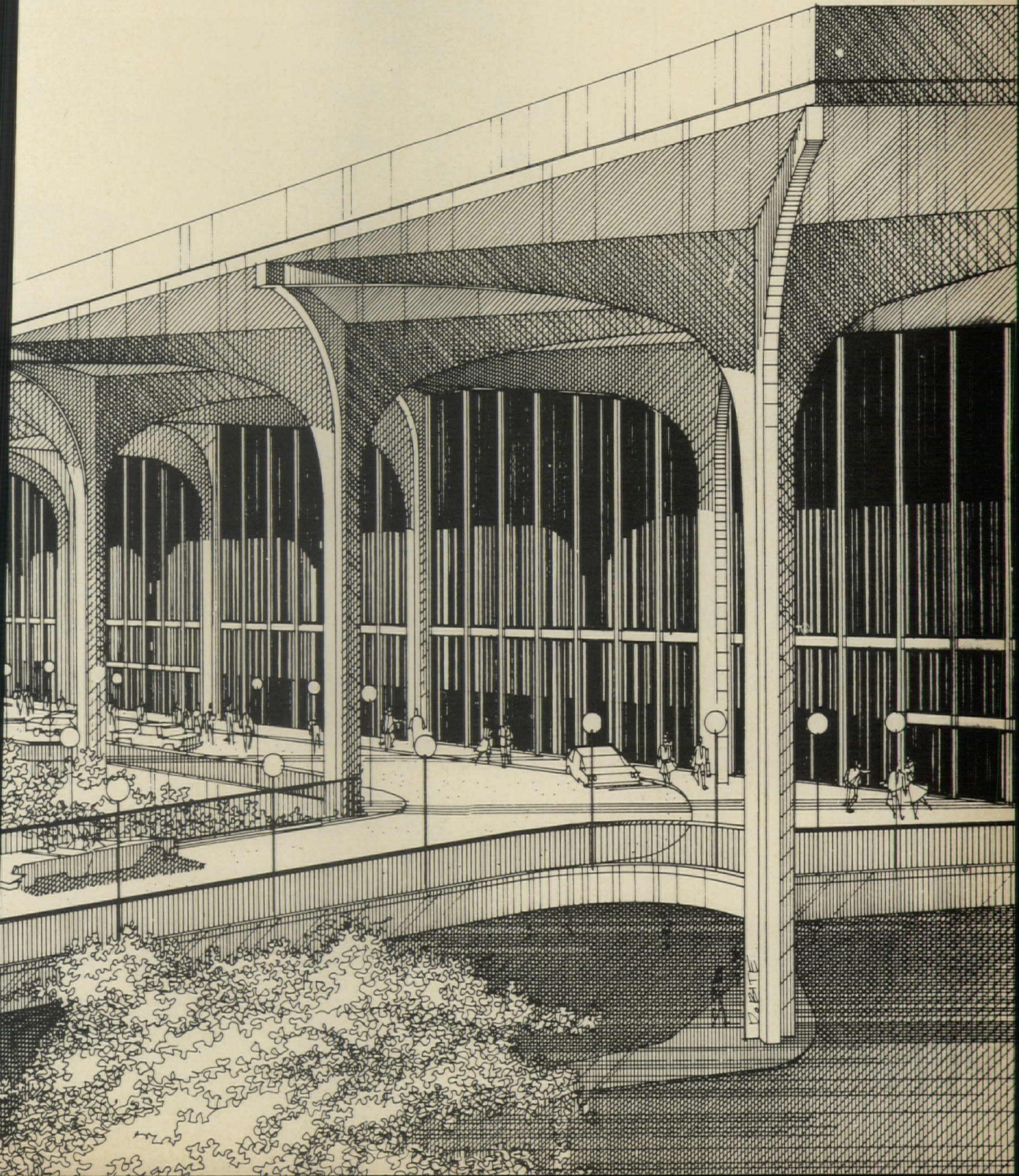
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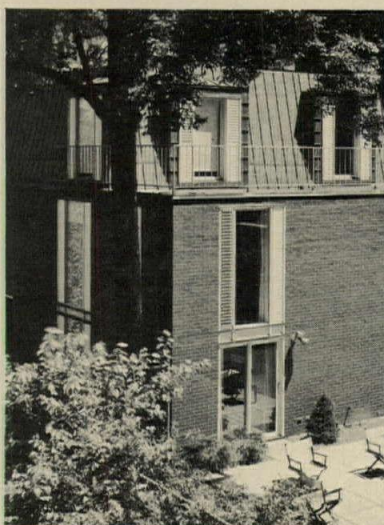
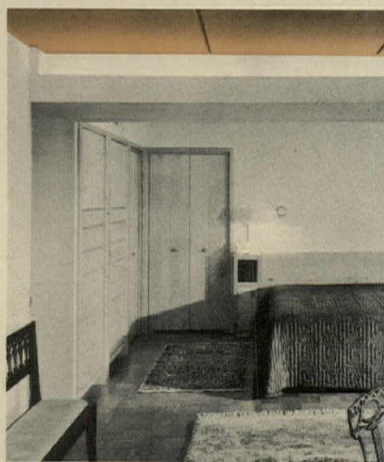
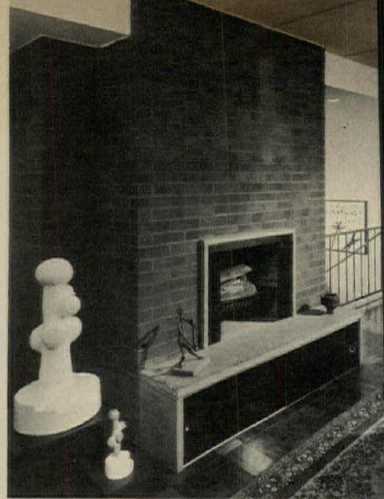




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continued from page 241

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RESIDENTIAL LOCATION AND SHOPPING PATTERNS, OAKLAND COUNTY, MICHIGAN. By William M. Ladd, Patricia D. Cousens and David A. Pampu. The University of Michigan, Center for Urban Studies, Dearborn, Michigan. 56 pp.

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RUNCORN NEW TOWN MASTER PLAN. By the Runcorn Development Corporation, Chapel Street, Runcorn, Cheshire, England. 136 pp., illus. \$8.00.

SOURCES OF MODERN ARCHITECTURE, *A Bibliography compiled by Dennis Sharp*. Wittenborn and Company, 1018 Madison Avenue, New York, N.Y. 10021. 56 pp., illus. Paperbound, \$4.75.

NEWTOWNS IN ISRAEL. By Erika Spiegel. Frederick A. Praeger, 111 Fourth Avenue, New York, N.Y. 10003. 191 pp., illus. \$17.50.

IDEAS FOR PLANNING YOUR NEW HOME. By the Editors of Sunset Magazine and Sunset Books. Lane Books, Menlo Park, California. 128 pp., illus. Paperbound, \$1.95.

ACOUSTICS: DESIGN & PRACTICE, Vol 1, *General Acoustics*. By R. L. Suri. Taplinger Publishing Co., Inc., 29 East 70 Street, New York, N.Y. 10003. 539 pp., illus. \$14.50.

ORIGINAL SURVEY AND LAND SUBDIVISION. By Norman J. W. Thrower. Rand McNally & Co., 405 Park Avenue, New York, N.Y. 160 pp. \$5.00.

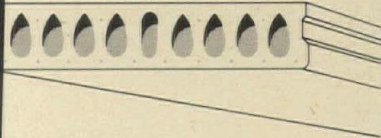
THE PAINTING OF THE LIFE OF ST. FRANCIS IN ASSISI. By Leonetto Tintori and Maillard Meiss. The Norton Library, 55 Fifth Avenue, New York, N.Y. 10003. 239 pp., illus. \$1.95.

THERMAL PERFORMANCE OF BUILDINGS. By J. F. Van Straaten. American Elsevier Publishing Company, Inc., 52 Vanderbilt Avenue, New York, N.Y. 10017. 311 pp., illus. \$13.00.

THE ART AND ARCHITECTURE OF MEDIEVAL RUS-SIA. By Arthur Voyce. The University of Oklahoma Press, Norman, Oklahoma. 432 pp., illus. \$9.95.

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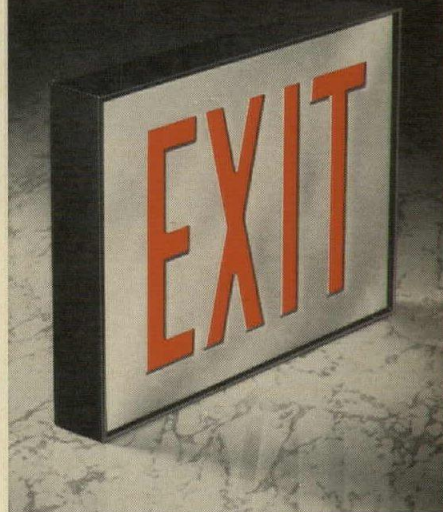
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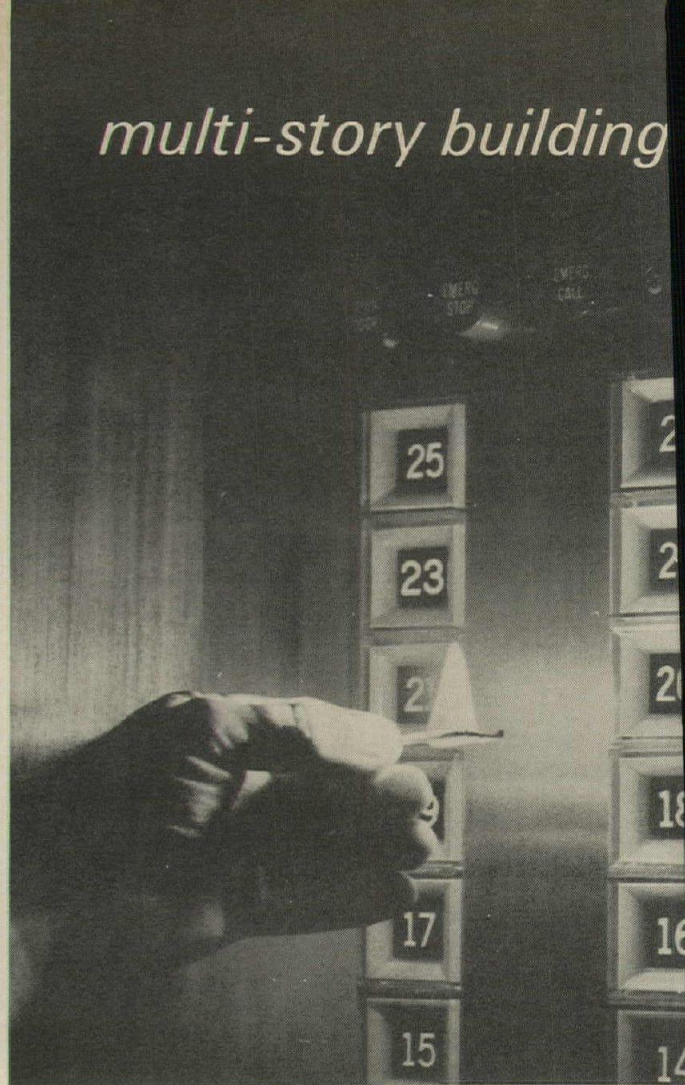
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## Where standby power is a must... gas turbine generators are a must

There's only one leader in gas turbine generator sets—and that's *Solar*. Here are 8 reasons why Solar's new 200 kw gas turbine generator set is the *modern*, practical way to provide standby electrical power to meet any need or emergency.

**1 Compact size. Light weight.** Solar's completely packaged 200 kw gas turbine generator set weighs only 4,000 lbs. and measures 96" x 51" x 62.5"—approximately  $\frac{1}{4}$  the weight and  $\frac{1}{2}$  the size of an equivalent reciprocating engine system!

**2 Virtually vibration free. Low sound level.** There is none of the annoying vibration inherent in a reciprocating engine. Sound levels are attenuated to meet NEMA standards for residential operation.

**3 Start-up in seconds.** The Solar 200 kw gas turbine generator starts fast, has full power capability in seconds. No elaborate heating

systems needed to keep unit ready for start-up as in the case of reciprocating engines.

**4 Easy, low-cost installation.** The set is quickly and easily installed anywhere from rooftop to basement. No special foundation or cooling water are needed. Thus, unlike a reciprocating engine, the Solar generator can be inexpensively moved to a new location if desired. The result: *lower installed costs per kilowatt than any other form of standby power!*

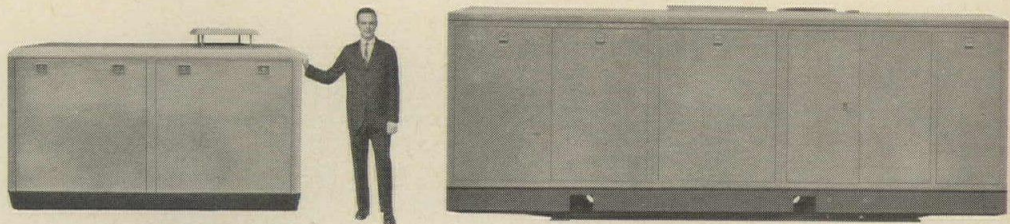
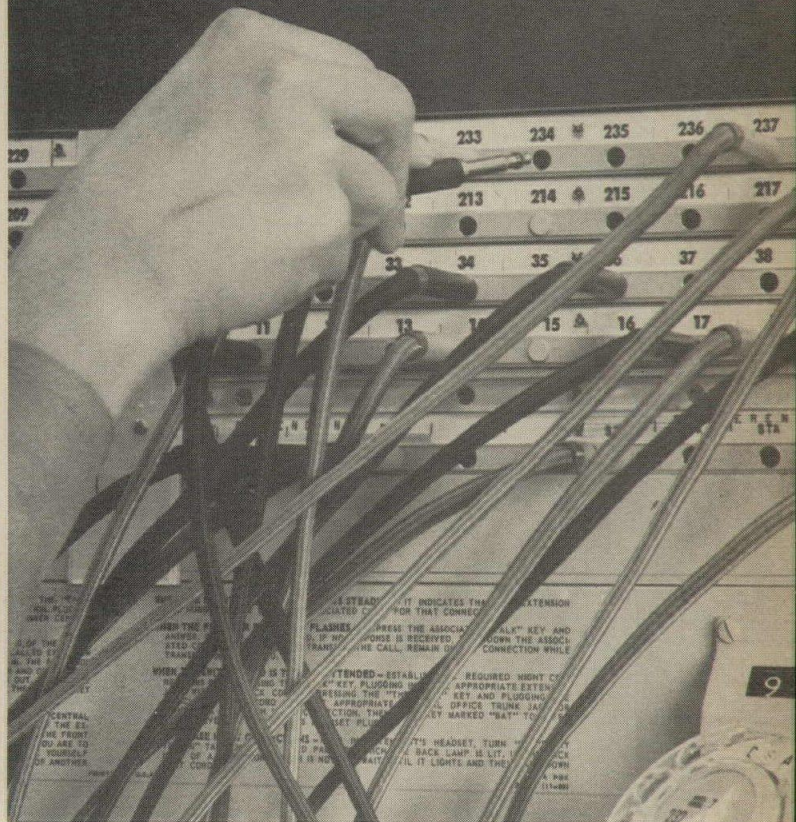
**5 Almost any site suitable.** The small size and light weight of the Solar set become particularly important where buildings requiring standby power were not originally designed for this needed equipment. Nearly all building codes and designs permit installation of Solar gas turbine generator sets. Many city and state governments are presently considering mandatory standby power legislation. So, whether you are designing a new



airports...



vital communications...



Solar 200 KW (left) and 750 KW gas turbine generator sets

Building or adding standby power to an existing one, Solar gas turbine generator set should be your first consideration.

**6 Low maintenance costs.** The simplicity and reliability of the Solar set minimize maintenance and operational attention. No expensive load banks required for periodic start-ups and checking. Components are designed for long life between overhauls.

**7 Superior performance.** The Solar 200 kw gas turbine generator excels reciprocating engines in the areas of frequency control, voltage regulations, transient response, and behavior in parallel as established by existing test data.

**8 Proven reliability.** The new Solar 200 kw generator set embodies the same principles proven so reliable in the Solar 750 kw gas

turbine generator set which has demonstrated its reliability in hundreds of installations throughout the U.S.A. For example, these are the sets chosen by American Telephone and Telegraph Company to provide standby power at its disaster-proof, hard-site communications centers from coast to coast.

**Write for more complete information.** Brochures explaining in more detail the advantages of both the new Solar 200 kw generator set and the 750 kw generator set in supplying low-cost standby electrical power for a wide variety of applications are now available. Just write: Solar, Department P-266, San Diego, California 92112.

# SOLAR

DIVISION OF INTERNATIONAL HARVESTER COMPANY



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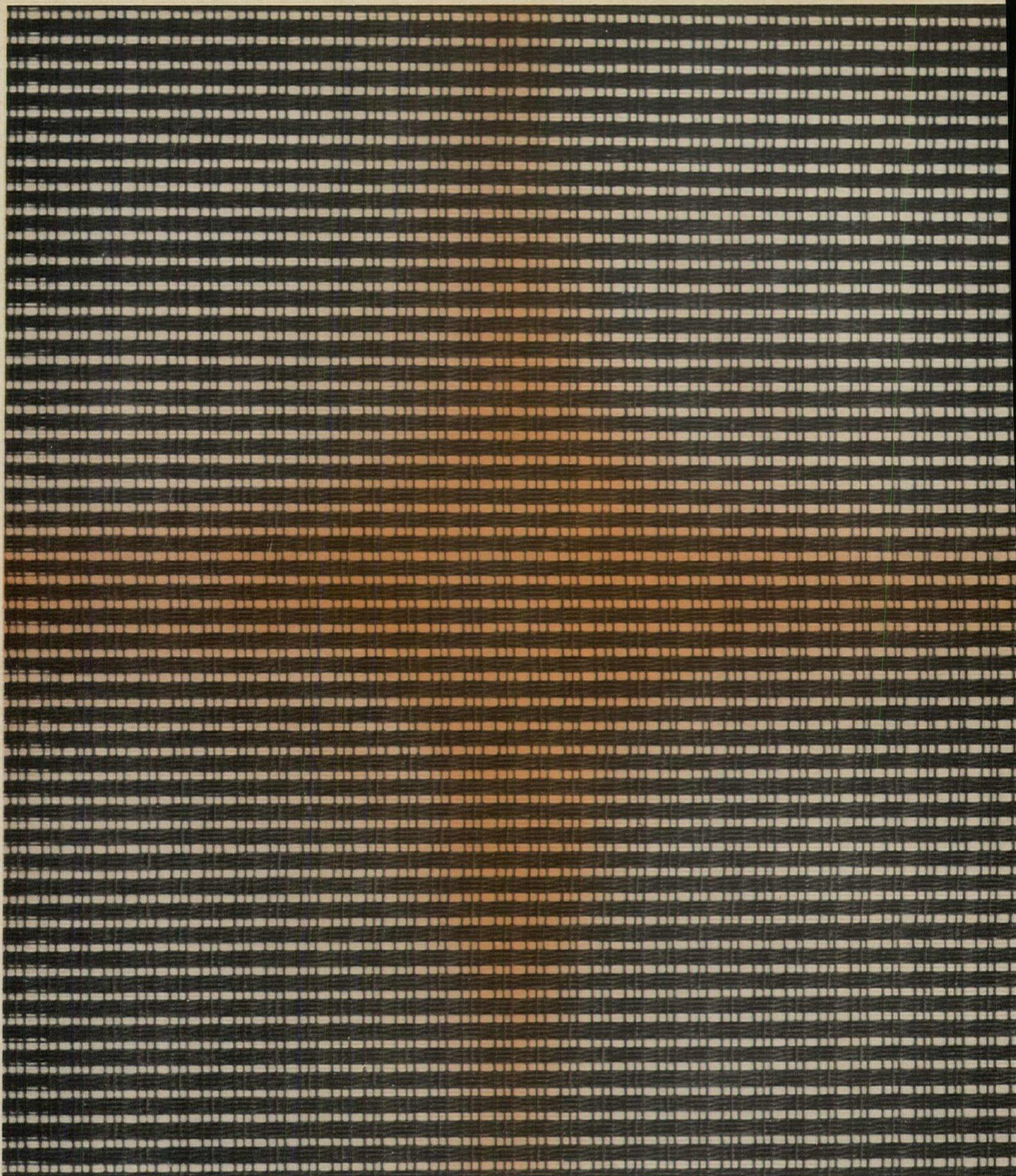
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