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BUILDING TYPES STUDY: INDUSTRIAL BUILDINGS

FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD

JANUARY 1967 **1** A MCGRAW-HILL PUBLICATION TWO DOLLARS PER COPY



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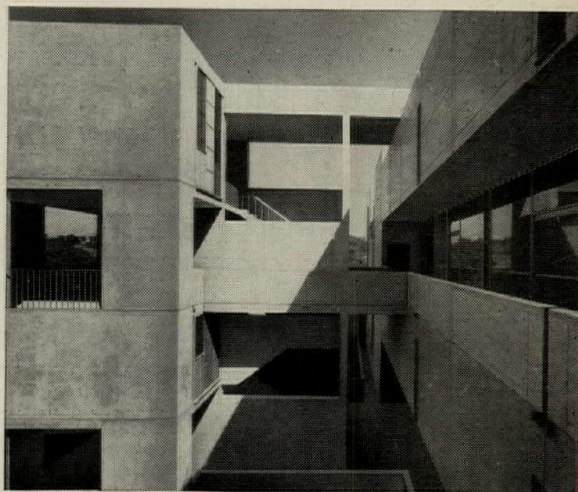
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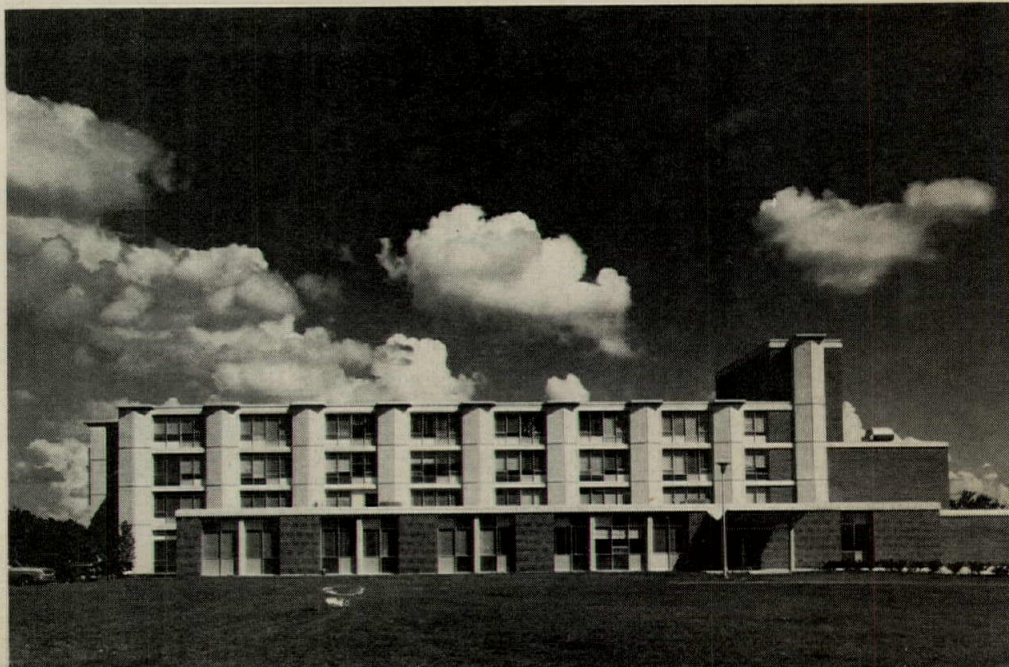
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ABOVE: William F. Bowld Hospital and Dobbs Research Institute, Memphis, Tenn. *Architects:* Eason Anthony McKinnie and Cox, Memphis. *General Contractor:* J. A. Jones Construction Co. Seven Dover Geared Elevators, capacities to 4000 lbs., speeds to 350 FPM; one Oil-draulic freight elevator, capacity 5000 lbs.; installed by Dover Elevator Company.

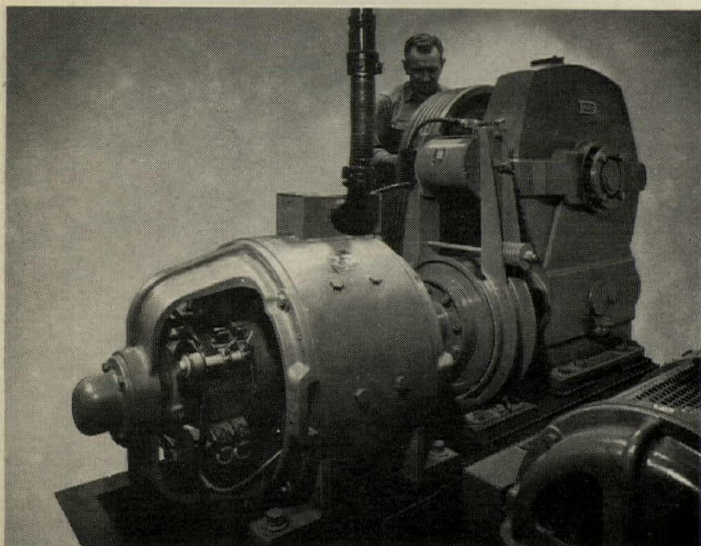
RIGHT: Holy Family Hospital, Atlanta, Ga. *Architects:* Aeck Associates, Inc. *General Contractor:* Beers Construction Co. One Dover Geared Elevator, 4000 lbs. capacity, 350 FPM; one Dover Oil-draulic Elevator, 4000 lbs. capacity, 200 FPM; installed by Dover Elevator Company.



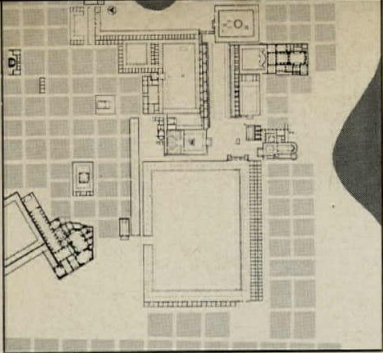


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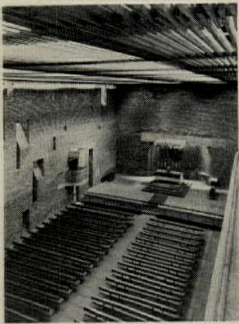


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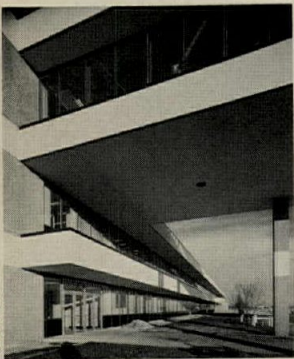
Cover: Plan of Miletus,
a Greek, Hellenistic and Roman city
from DESIGN OF CITIES by Edmund N. Bacon

FEATURES



Sam Lambert

BUILDING TYPES STUDY 366



Lens-Art

113 DESIGN OF CITIES: CITY AS AN ACT OF WILL

In this excerpt from his forthcoming book, architect Edmund N. Bacon, executive director of the Philadelphia Planning Commission, provides an original and perceptive analysis of the design structures of ancient Athens, Miletus, Delos and Rome.

129 UNFORCED SIMPLICITY FOR A UNITARIAN CHURCH

Keyes, Lethbridge & Condon's design for a Unitarian church near Washington, D.C. shuns both structural gymnastics and elaborate historicism.

133 AN AUSTERE AND MONUMENTAL CHURCH IN SCOTLAND

A new church by the Glasgow firm of Gillespie, Kidd & Coia captures the spirit of traditional north European brick church architecture.

137 CHICAGO'S MULTI-USE GIANT

The first comprehensive report on the 100-story John Hancock Center, designed by Skidmore, Owings & Merrill.

145 A RESORT DESIGNED TO FIT A SCENIC SITE

Salishan Lodge demonstrates how well architecture can develop without destroying a beautiful natural landscape.

151 INDUSTRIAL BUILDINGS: THE NEED FOR MORE THAN EFFICIENCY

Seven buildings that demonstrate the growing acceptance of attractive surroundings and employee comfort as necessary factors in the design of industrial plants:

152 AN APPEALING ENVIRONMENT FOR WOMEN EMPLOYEES

Avon Products Center in Ohio, by architect Sol King.

156 GOOD DESIGN AND AMENITY FOR A VAST AUTO PLANT

New Ford Stamping Plant, near Detroit, by Albert Kahn Associated Architects and Engineers.

158 OPEN PLANNING CREATES A ONE-CLASS PLANT

Newspaper plant in Galveston, Texas by architects Howard Barnstone and Eugene Aubry.

160 CAMPUS-LIKE ATMOSPHERE FOR AEROSPACE RESEARCH

Lockheed-Georgia Research Center, by Aeck Associates.

162 WINDOWLESS PLANT ENHANCED BY COLOR AND PLANTING

DWG Cigar Corporation plant in Ohio, by Louis G. Redstone Associates

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ARCHITECTURAL RECORD

CONTENTS: JANUARY 1967

ARCHITECTURAL ENGINEERING



- 163 POOL AND FOUNTAINS SHIELD OFFICES FROM LABS
Research center for the Donaldson Company, Minnesota, by Hammel Green and Abrahamson.
- 164 AUTO ASSEMBLY PLANT SET IN TREE-BOUNDED PARK
Volkswagen plant in Venezuela, by Dirk Bornhorst.
- 169 HOW TO DESIGN SEALANT JOINTS
Determining joint dimensions is highly important to avoid overstressing the sealant when building components move as the outdoor temperature changes. This article shows how to do this and explains the theory of joint design.
- 175 INSTANT REHAB NOT SO INSTANT
New York's drop-in kitchen-bathroom for rehabilitating slum apartment buildings has caused much talk, but some practical matters raise questions about the approach.
- 181 BUILDING COMPONENTS
A guide to silicone masonry water repellents describes how they work and tells what types to use where.
- 183 PRODUCT REPORTS
- 184 OFFICE LITERATURE
- 273 READER SERVICE INQUIRY CARD

THE RECORD REPORTS



- 9 BEHIND THE RECORD
"Preserve It, If It's Great Architecture" by Emerson Goble.
- 10 PERSPECTIVES
- 35 THE RECORD REPORTS
- 40 BUILDINGS IN THE NEWS
- 46 LETTERS
- 81 ARCHITECTURAL BUSINESS
Building activity 83
Cost trends and analysis 87
Cost indexes and indicators... 89
Practice/Contract law 93
- 244 CALENDAR AND OFFICE NOTES
- 258 REQUIRED READING
- 270 ADVERTISING INDEX

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With proliferating research proliferating change in concepts of treatment, the mental hospital of yesteryear has become a whole family of building types dedicated to the mental health of the community. Next month's Building Types Study will examine some important examples in the context of some of the new Federal and state programs helping to fund them.

DESIGN FOR THE PERFORMING ARTS

Architectural results and technical requirements are never more closely related than in buildings for the performing arts, and a major presentation of three such buildings will give special attention to that relationship as it developed in quite varying circumstances.



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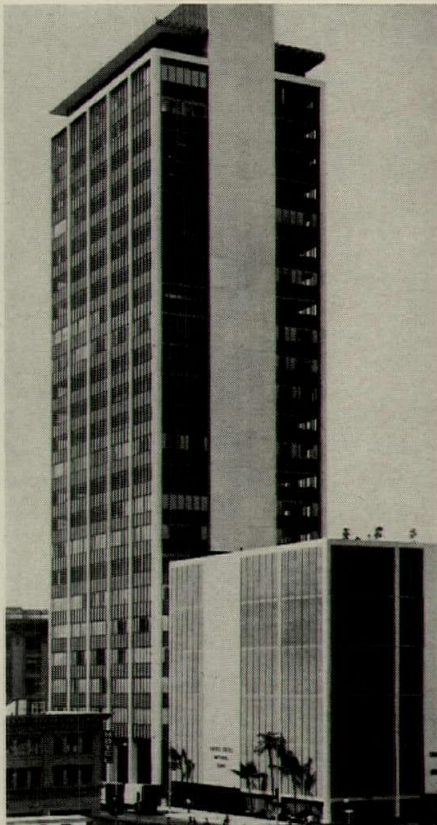
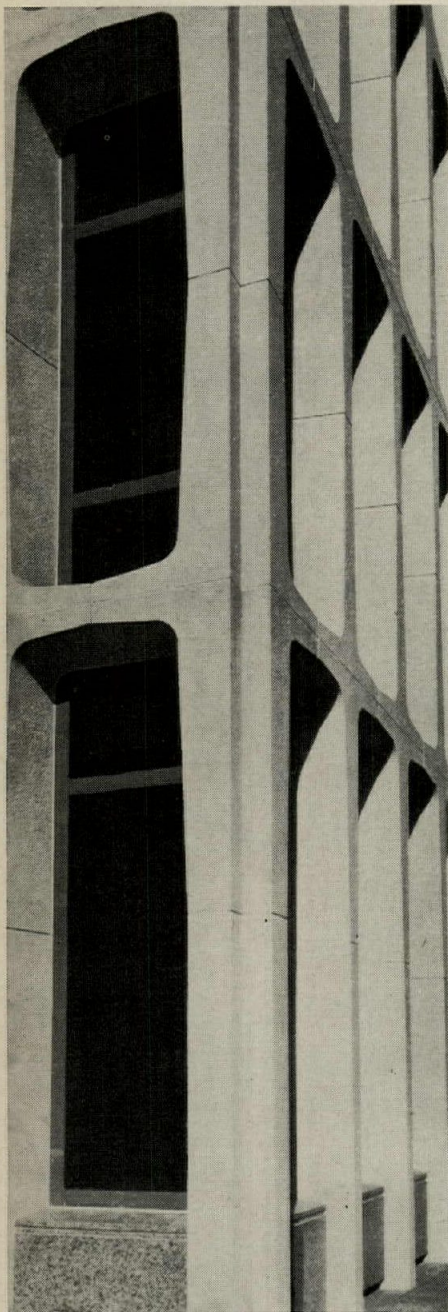
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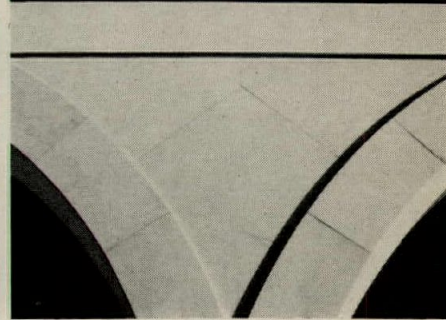
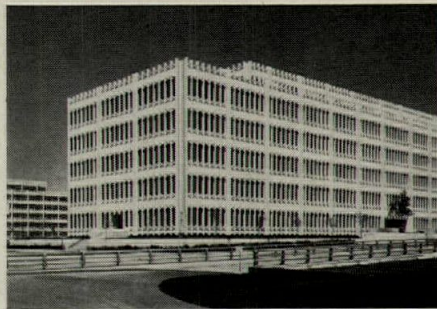
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PRESERVE IT, IF IT'S GREAT ARCHITECTURE

This ambiguous headline promises something less than great enthusiasm for the preservation of architectural examples of historic times. You are absolutely right. But first I want to take the positive side, and tell you what I think should be preserved at all costs.

First, a story. When I was a lad—and this goes back too close to 40 years—I was walking one Saturday on Woodlawn Avenue in Chicago. What I was thinking about I haven't the slightest idea, but presumably it had to do with football, like Stagg fears Illinois, or something like that. In any case, it had nothing to do with architecture; I had scarcely heard the word at that time. But suddenly I chanced to turn to the northeast, kitty-corner across the street junction, when I was struck by the view of a house. As I remember I stopped still, and gaped for a minute or two, thinking "Boy, whoever designed that house knew what he was doing. Look at those lines. I guess that is what they mean by 'architecture'."

Well, I went on to the football game; can't tell you who won, even who played, or whether I played my clarinet in the band. But the vision of the Robie House so impressed a kid who was mentally a thousand miles away, that I have never forgotten it. It was years before I knew it was the Robie House, or who designed it. No matter, the impact was greater for its anonymity.

Architecture like that should be preserved. And I shall fight—I already have, of course—for the cause. That kind of architecture is worth a lot to this man-designed world. It's worth tying up a block on Chicago's University campus; it's worth all it costs in upkeep, or inefficiency for its present use.

Now a negative case—the Pennsylvania Station, late lamented by a lot except myself. You know, I never heard a good word, from any architect, about that old station until news broke that it was to be torn down. I heard about those long and empty corridors (as if I didn't know); I heard about those waste spaces, and the difficulty of getting from here to there (as if I didn't know). I heard about those terribly expensive columns, the blocks and blocks of expensive stonework.

But when it was to be torn down, what architects talked about was not its arrogant inefficiencies, but its grandeur. Its great spaces. Its beautiful columns. And so on. It was one of the great buildings of New York, and somebody should save it from ruin.

Well, I agree with what I heard first—the inefficiencies, the waste, the dreadful expense. There were great spaces, yes, but they had no relation whatever to what went on below them. People scurrying for trains, with kids and suitcases and lunch boxes; and they were sup-

posed to stop and look up and sigh with rapture at those great cathedral heights.

I have a private opinion that those architects who protested its wreckage didn't think any more of it than I did. But Penn Station did represent a monumentality, an opulence, an arrogance which were passing out of architectural work. And what a pity!

But I don't think Penn Station would be a very good recommendation for an architectural firm today, especially for a client with a multi-million dollar mid-New York plot.

Now we are hearing a lot these days about preserving national monuments, seashores, forests, and recreation areas. Hear, hear, hear! Here is a real fight and a worthy one. We need to plan, to work, to raise some hell, to preserve natural assets, national monuments, traditions and historic sites. But this is not architectural preservation, and we should distinguish between whether we are preserving a building because of its historic significance—like the Octagon—or because it might really have advanced the cause of architecture.

I think it is basically wrong for architects to show undue sentimentality about the past. Of course we have an architectural history, and it's important. But we can take a set of photographs, and what not, without tying up some important rebuilding project by insisting that this little railroad station building was a perfect example of such and such, and no government should ever be allowed to tear it down.

We are having hundreds of these decisions thrown at us in urban renewal matters.

And I hope we can distinguish between mere sentimentality and something of the quality of the Robie House.

—Emerson Goble



"Landmarks Commission, I think!"

It's official—architects are supposed to make money

George E. Kassabaum—vice presidents have to make speeches, you know—has been throwing out a couple of points that architects need to hear more about.

One is that an architect ought to get into politics, into active politics; run for mayor, and so on. "However, even if no architect wished to go into politics, there are still many community activities and many, many, boards of directors of businesses of all sizes where much influence can be exerted. If we want to keep our fingers on the the pulse of society, we can accomplish it primarily by involvement in that society."

Another is that architects ought to "speak up" more, especially in matters relating to development of the environment. "Now I know that architects are not unanimous on anything, and perhaps we disagree among ourselves more than others, but we have let this lack of unanimity discourage us from taking a position on *anything*. This just has to be interpreted as a form of weakness. One can certainly not hope to show leadership by meekly keeping quiet. . . . If we are the experts and *everything* is apparently acceptable to the experts, how can we hope to develop a quality-conscious society?"

But there's more to come: "My third suggestion is that more than just a few architects . . . must become promoters. Vision and planning are basic to our profession, and there is no reason that exciting changes in our cities, or imagination on a large scale, should primarily come from outside the architectural profession. Every improvement in our environment must begin in the mind of one man, and I urge that you see that that man is an architect."

" . . . So, number four. It seems to me that becoming the creator of the idea—the promoter—as well as the creator of the structure, holds out the best hope of making the architect influential in his community by providing the most likely opportunity for some of the profession to become reasonably rich."

Let George go on talking; he's talking about money

Remember George Kassabaum's fourth point (this page) that some architects ought to get reasonably rich. Well, it has been done, of course, but most architects don't follow the money-making line of thought.

Let George say it: "This is more important than it used to be, and I do not believe we can rely on an increase in a percentage fee to bring it all about. In the first place, in times of inflation and shortage of help, about all we can hope to do is to increase fees fast enough to keep up with our own cost of doing business.

"In the second place, there always seems to be someone around who will do the job for less. If we look solely to fees, we are going to have enough trouble keeping even, and keeping even is not good enough if we are going to increase the stature of the profession.

"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."

The passing of a publisher calls for a personal note

In a quick item in December we noted the passing of H. Judd Payne, former publisher of ARCHITECTURAL RECORD, but this former collaborator must get in a few words. We shared too many projects, fears, doubts, tentative tries, joys, successes—for me merely to forget them.

Judd made more sweeping changes in the RECORD than were generally realized. It was lifted out of the thin times of the 30's by a bootstrap exercise which added purpose to many operations. Many of the magazine's features, which we seem now to do automatically, were once major shifts and worrisome decisions.

His position in the field of architecture, he would always tell you, was that of a magazine publisher. He denied any knowledge of architectural styles or approaches or mystiques. He might, of course, express an opinion saying that he could do better with a piano box but he hired people who could cope with architecture and left artistic decisions to them. But the work of the staff was always directed into lines which built up a usefulness for readers, built up readership numbers and eventually led the magazine to a top position. And of course the final success of a magazine directly affects what it is able to do for its readers: staff manpower, travel to visit offices, photographs, printing, drawing, number of pages—all of these take money.

Well, I couldn't resist the thought that many of these features which we now take for granted in the RECORD are largely the result of some prodigious efforts of those early days, and without Judd Payne's publishing skill the RECORD might be much less of a service than it now is.

—E. G.



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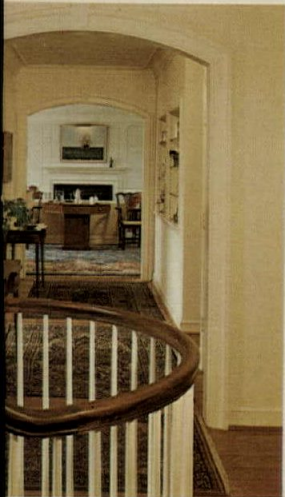
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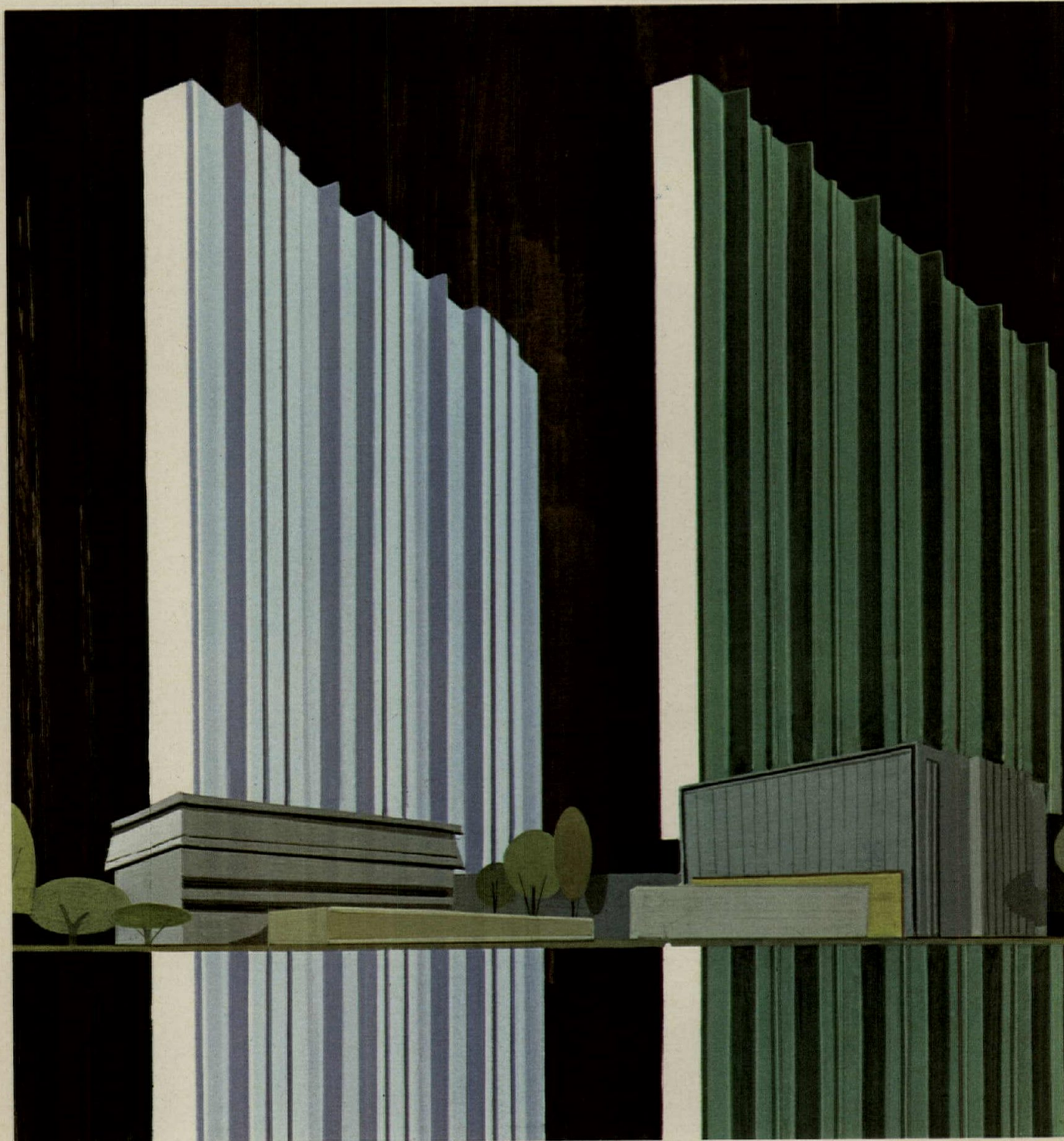
PRATT & LAMBERT-Inc.

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**from Mahon...
insulated wall panels that
will help you add color and flair
to your "Plain Jane" projects**

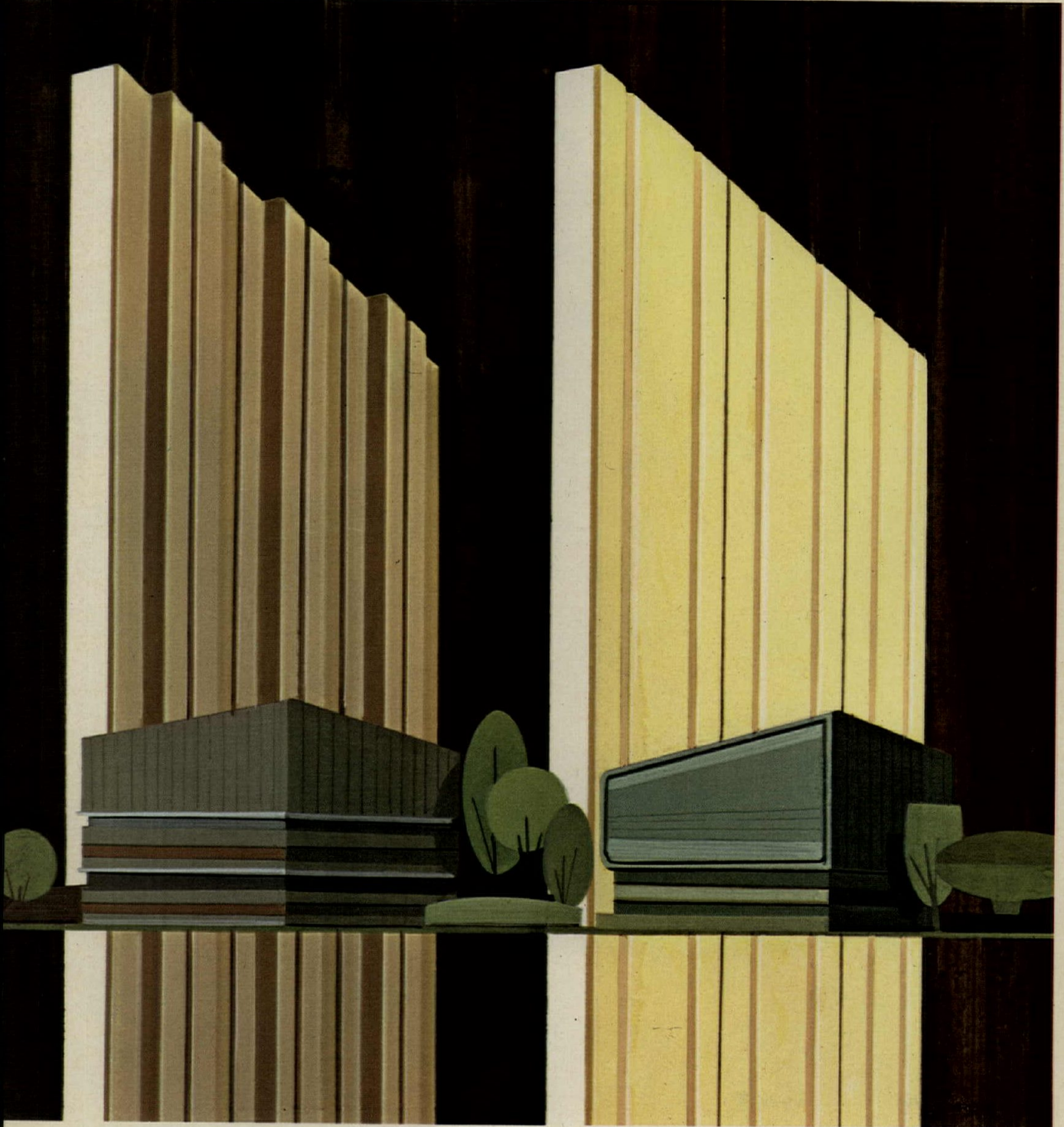


Expanses of steel, aluminum and glass. Exciting, bold buildings where dreamers, planners, developers—men of ideas live and work. Functional designs created with skill and authority. Conceived and brought to life on the architect's drawing board—made possible with Mahon insulated-metal Curtain Walls. Available in lengths up to 60 feet—in stainless steel, aluminum, galvanized steel and cold-rolled steel. In colors. Fast, easy, economical construction. For complete information write The R. C. Mahon Company, 6565 E. Eight Mile Road, Detroit, Michigan 48234.

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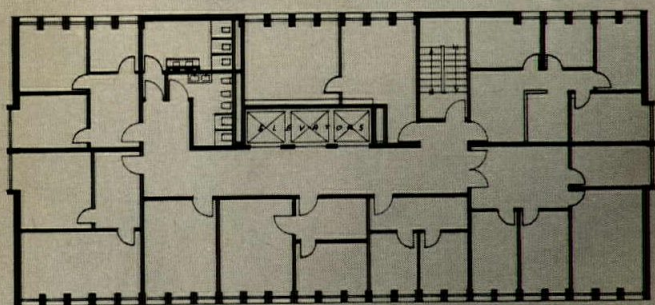
4454



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Until today,

when you bought
carpet for this—



you also paid for
this waste
yardage



Now, with Modu/Floors® you pay only for the carpet you need, and you get exactly what you need: size, color, fiber, density, backing, cushioning. And, at lower installation costs.

Forget carpet by the yard. This is carpet by the job. For the job. To do the job. Any size job.

It took CCC—the creators and manufacturers of Densylon—to come up with this concept: Carpet, tailor-made to your blueprints. Carpet constructed to your specifications to meet your traffic, acoustical, aesthetic, humidity, maintenance, budget requirements.

With Modu/Floors you order carpet by the yarn. Take your pick: Wool Six®, Acrylic 73®, Nylon 360-D®, Polypropylene 8®—whichever works best for you in a given area, for looks, wear, maintenance, price.

But that's only the beginning.

With Modu/Floors, you order carpet by the yarn woven to the exact density you need. Lower, less costly for low-traffic areas. Tighter, denser for high-traffic areas. And to the pile height you want. With the backing and cushioning you want. To the modular width you need.

Think what this means!

It means more carpet for your dollar because there's no waste. It means you can put carpet in areas you couldn't afford to before. And it means better design for your dollar because there are no limits. You're not locked in to a fixed pattern or weight or price of finished goods and forced to make the best of possible compromises.

You can have the same yarn, in the same color in different constructions, and get the same look with different wear in corridors, rooms, lobbies, entrances, offices. Or you can have the same texture in different yarns and different colors. You can use fibers single, double, triple. Mix them or match them.

In short, you can design your own carpet. At no extra cost. And that's the best thing you've had going for you since carpet!

It took foresight, and the facilities to operate this way. It took the development of new machinery, special fibers, backings, cushionings. And it takes a skilled space engineer to analyze your needs, suggest solutions and service your job. Before, during and after installation!

Only CCC is set up to do it. Only CCC—the largest exclusive manufacturer of commercial carpet in the country, with the largest sales force in every region of the country (102 men strong!)—could do it!

Modu/Floors just saved a client 2,204 yards on a 21,000 yard installation. 10%!

Sounds good to you?

Hold everything until you get the full story. Mail coupon now.

Commercial Carpet Corporation
10 West 33rd Street
New York, New York 10001 Dept. AR-1
Attention: Mr. Walter Brooks

Please send me complete information about Modu/Floors.

Please have CCC's Modu/Floors space engineer call on me.

Name _____

Title _____ Phone _____

Organization _____

Address _____

City _____ State _____ Zip _____

Visit us at Intercon I at McCormick Place and at the Chicago Merchandise Mart—11th floor, Chicago, Illinois. March 20, 21, 22, 1967.

Modu/Floors by CCC

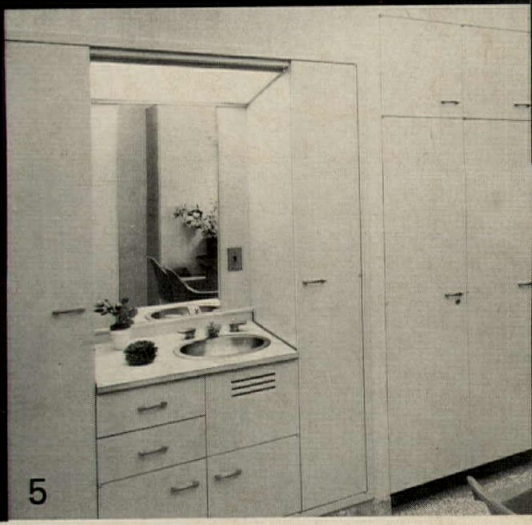
Commercial Carpet Corporation offices in principal cities—(Pacific Commercial Carpet Corporation, Los Angeles, San Francisco)

The world's largest exclusive manufacturer of commercial carpet. Creators and manufacturers of Densylon, the only floor covering that has obsoleted tile and carpet for high-traffic areas.

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1. Receptionist Station
2. Employee Convenience Center
3. Executive Washroom
4. Executive Dining Room
5. Wardrobe and Storage Wall
6. Laboratory Test Kitchen



Almost anything
can be stored in a
*St. Charles**
storage unit

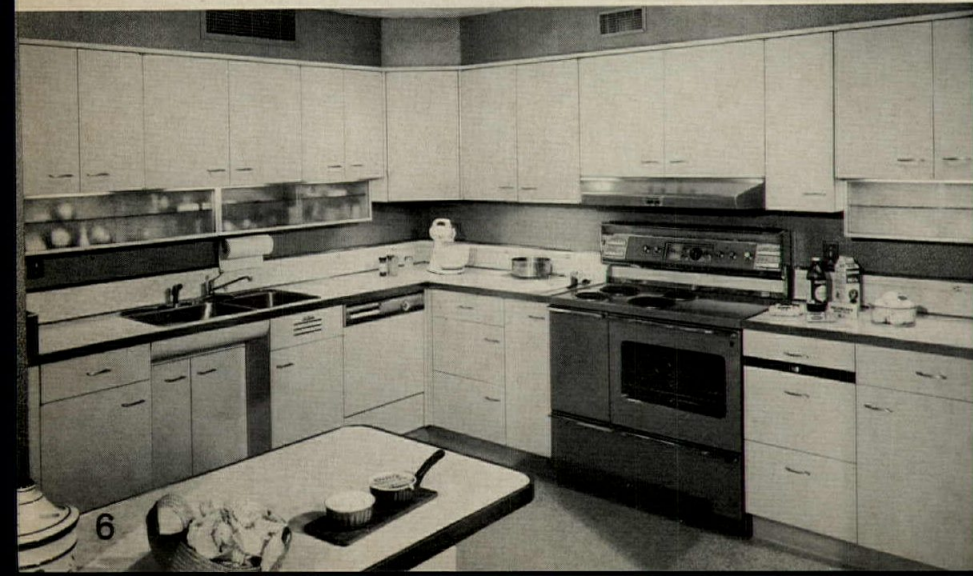
Almost anything . . . in virtually any type of building you may be called upon to design.

For over 30 years, St. Charles has been constructing custom storage units of lifelong durability for churches, firehouses, museums, municipal buildings and courthouses, office buildings, airports, railroad stations . . . in fact, truly all manner of buildings.

When your client requires storage facilities . . . no matter how unusual, unique or complicated . . . let us suggest a solution in St. Charles custom casework.

There are over 200 St. Charles storage specialists conveniently located to serve you.

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**ST. CHARLES
STORAGE CASEWORK**

ST. CHARLES MANUFACTURING COMPANY
ST. CHARLES, ILLINOIS

For remedial sealing or a complete face lift

SEAL OF SECURITY

For almost 15 years, sealants based on Thiokol's LP[®] polysulfide polymer have been used to replace inadequate weatherproofing systems in more existing structures—have been installed as original equipment in more new buildings—than any other elastomeric sealing material. Reason: LP[®] polymer based sealants deliver the high performance, extended service life and cost effectiveness mandatory in major structural investments. Doesn't it make sense to insist on sealants of such time-proven quality for your building maintenance and renewal projects?

Weatherproofing today's new buildings, and maintaining older structures is recognized more and more as a demanding construction practice. Why specify expensive but untried materials for critical joint sealing? Why use sealant that turns to stone? Why sacrifice craftsmanship for so-called time and labor saving systems? Failures are too costly to architect, contractor, owner.

History-proven polysulfide base sealants are now backed by greater performance specifications than ever before—standards set by

Thiokol, long a leader in sealant technology. Compounds meeting the standards display Thiokol's Tested and Approved Seal[®]—and are constantly monitored for performance capability. To assure yourself of sealing weatherability, longevity, serviceability, specify a sealant that wears the seal.

*The manufacturer warrants by affixing this seal to his label that the product is a duplicate of materials independently tested and approved by—and in accordance with standards established by—Thiokol Chemical Corporation. The seal means you can specify with confidence.



Thiokol manufactures base materials only, not a finished sealant.

Revives time-worn joints

Old structural joints gain service life that lasts, treated with Tested and Approved LP[®] polysulfide base sealant. For information about Approved Sealants, write to Thiokol.

Thiokol CHEMICAL CORPORATION
780 N. Clinton Avenue, Trenton, N.J. 08607.

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STRATOSPHERE
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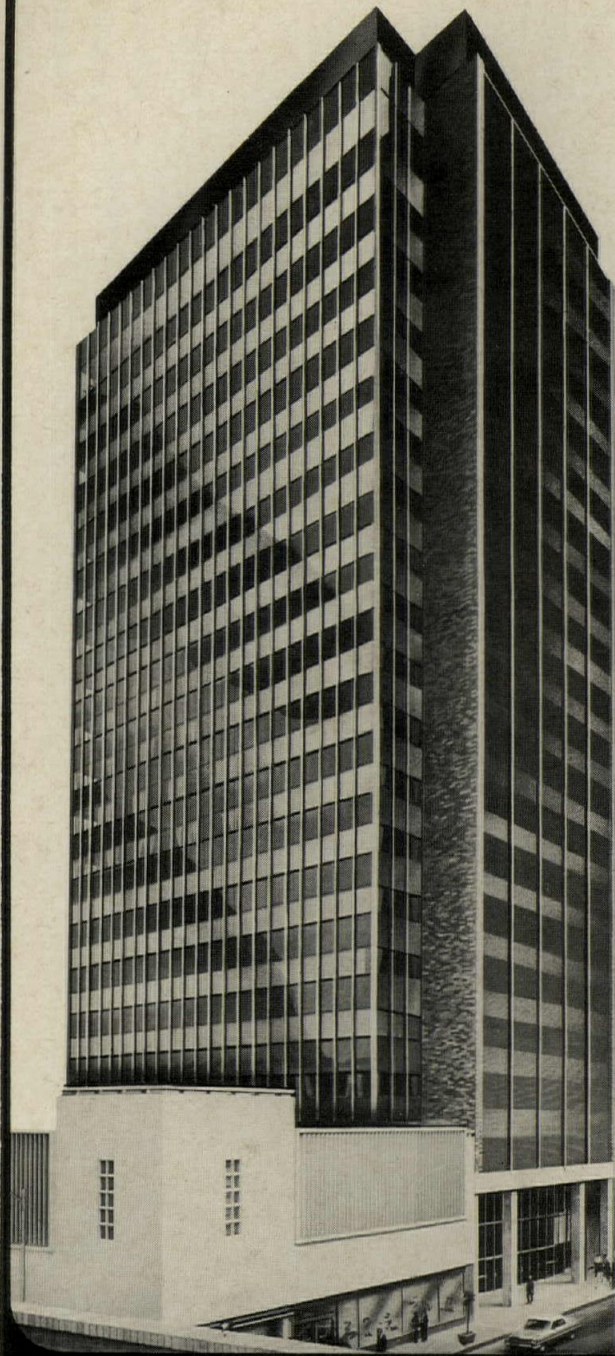
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Almost anybody can clear a lobby at 9 A.M. It's when *she* comes in at 10... while *he's* going down to General Files ...and *you're* en route to a meeting on 14—that Otis shows its stuff. The VIP system always knows who's where.

Sends cars instantly. Even anticipates traffic demands. Only Variable Interval Programming is so alert. And only Otis has it. One reason more buildings around the world have Otis Elevators than all others put together.

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Be sure to visit our display in Booth Number 1314 of the 18th International Heating & Air Conditioning Exposition, January 30 - February 2, 1967. Cobo Hall, Detroit.

Shown here is Tucson Federal Savings Tower, Tucson, Arizona

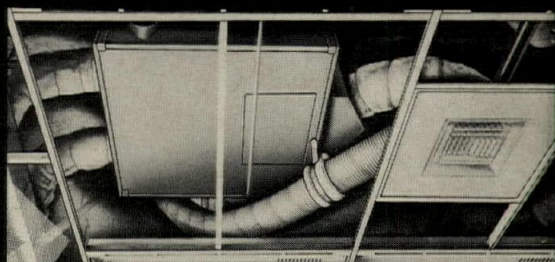
ARCHITECTS — Place & Place Architects
GENERAL CONTRACTOR — M. M. Sundt Construction Co.
MECHANICAL CONTRACTOR — Clark & Co.



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FREE! Write for Perforated Ceiling Diffuser,
All Pattern Air Trak or Hi Velocity Mixing Box catalogs.
Write: Krueger Manufacturing Co., Inc.
P.O. Box 5155, Tucson, Arizona.



This compact installation in the new Tucson Federal Savings Tower, Tucson, Arizona features a Krueger 1104 Diffuser. The 1104's patented features eliminate smudging of the ceiling and its extreme flexibility permits engineering to compensate for unknown occupancy factors which may develop. Also shown are the 1900 All Pattern Air Trak and Model CVM-M Hi Velocity Mixing Box.

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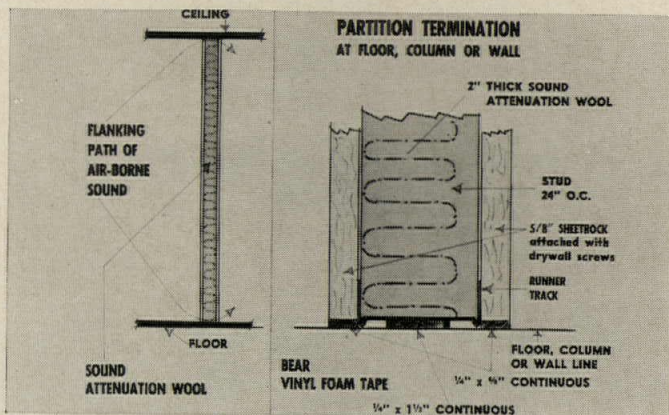
Here's how BEAR Vinyl
to improve sound control



CENTURY CITY

Building Design: Welton-Becker & Associates, Architects & Engineers

Foam Tapes were usedwith interior wall partition systems.



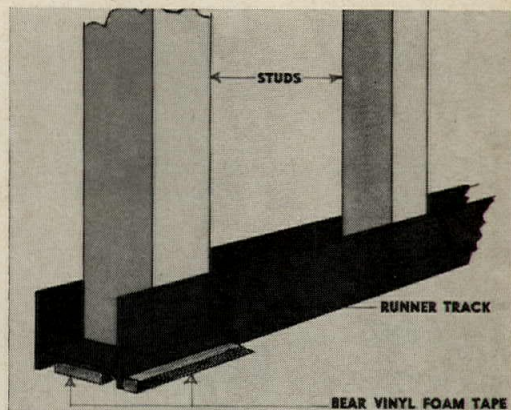
For gasketing wherever max sound isolation was required . . .

VINYL FOAM TAPE blocks the path of flanking air-borne sound and seals uneven areas that cause sound leaks. Used for party walls, mechanical equipment rooms and in professional office areas, this new pressure-sensitive tape insures the recommended STC ratings desirable in modern high rise construction.

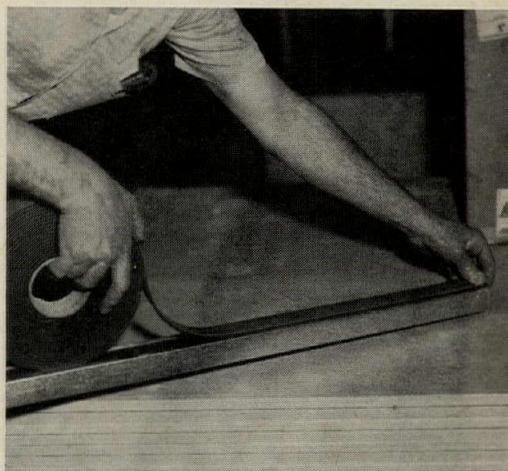
Under as little as 15% compression, this non-connected cellular polyvinyl chloride product is weatherproof, will not allow passage of water, air, dust or industrial pollution.

It has been used for interior and exterior construction and performs within a temperature range of -40°F to $+200^{\circ}\text{F}$. Easy to apply, it requires no mixing or cleanup.

We invite your evaluation of this exciting new product as a compatible component in building systems. For details and application data, write Frank E. Houck, Sales Manager Tape Operations, Troy, N. Y. This new sealant can solve your sound transmission problems with a minimum of time and labor.



between partition runner tracks and abutting surfaces . . .



for ease of application with no cleanup required

Now, isn't that more than you get from any other sound deadening sealant?



BEAR BRAND Quality . . . key to real economy

BEHR-MANNING DIVISION NORTON
TROY NEW YORK

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Century City

chooses

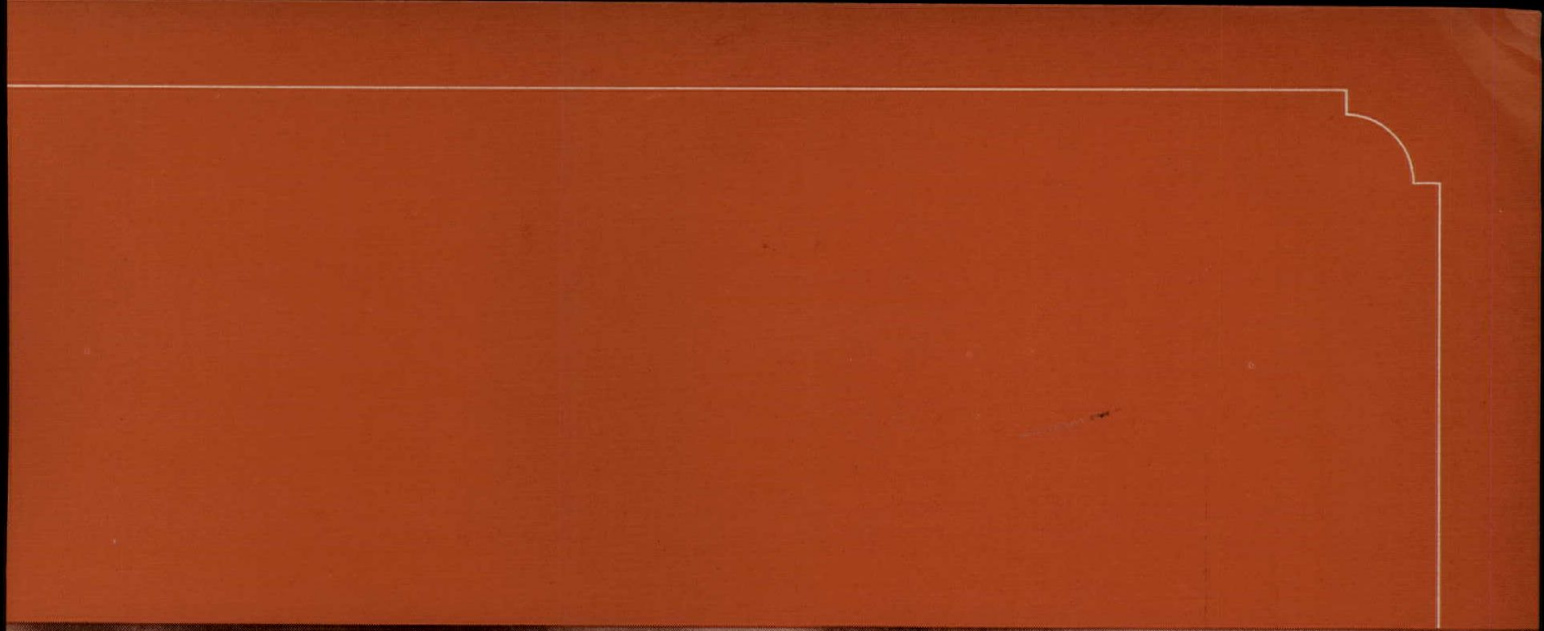
FLOW-MATIC *by Price Pfister*

exclusively for its new high-rise apartments

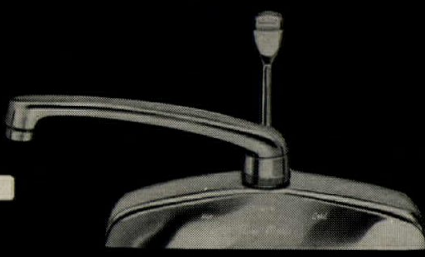
Century City is the world's largest privately financed urban development, a \$500 million dollar "city within a city." Its magnificent office buildings, fabled shops and restaurants, and fabulous new hotel and night clubs are a constant delight and convenience to the citizens of Beverly Hills and Los Angeles.

Now, these individual achievements are joined by Century Park East, incredible twin apartment towers featuring a swimming pool, tennis court, putting green, and most fittingly, Flow-Matic single-handle fittings by Price Pfister in every bath and kitchen of every elegant apartment home.

Flow-Matic mixing valves and lavatory fittings feature sculptured lucite handles while the clean, tapered lines lend unaccustomed grace and ease to the kitchen area. Price Pfister's exclusive ceramic cartridge assures *maintenance-free operation* for years to come.



Established 1910



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Shipping department aisle showing part of our inventory of thousands of Bally Walk-In panels in various sizes and finishes.



The only place for curved lines is **“on”** a roof ventilator.



That's what architects told us. So Carnes engineers went to work and designed Multiflex—a new series of straight-line, low silhouette power roof ventilators that blend with any building design. And best of all, they're competitively priced without any sacrifice in Carnes high quality or efficiency.

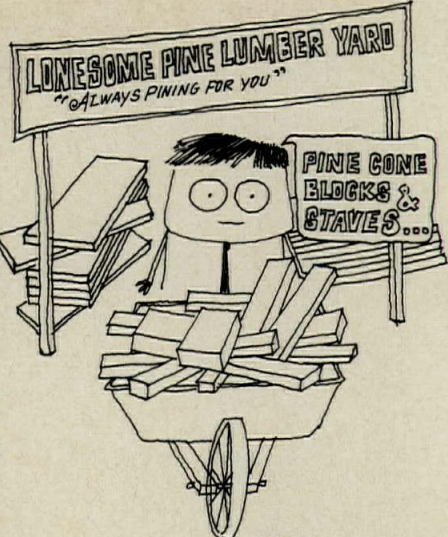
For example, Carnes automatic, quiet-closing louvers eliminate extra-cost backdraft dampers and bird screens, keep out the weather. Actually, Multiflex can save as much as 20 percent in installed costs.

Multiflex ventilators are provided in four models designed to fit your particular requirements—Stormline, Vertiline, Louverline and Trimline. All feature belt-drive, rugged vibration isolated-drive frame and weather resistant construction, quiet-running centrifugal fan wheels, backwardly-inclined, non-overloading blades and shielded motors. All achieve maximum-efficiency operation, and minimize noise level as well as motor size.


Write for the Multiflex Power Roof Ventilators catalog. (If you prefer curved models, we carry them, too!)

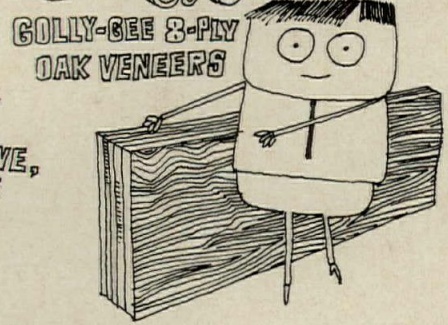
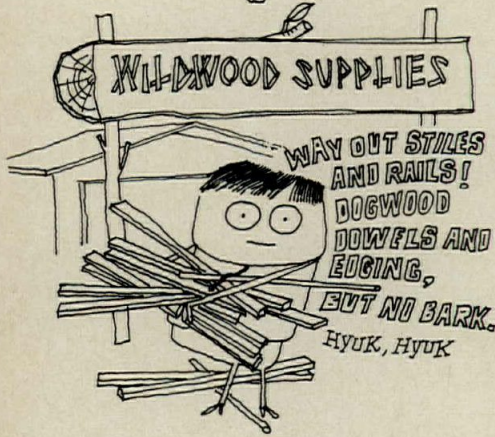
Carnes Corporation, Verona, Wisconsin • In Canada: Vapor Carnes, Ltd., 3955 Courtrai Avenue, Montreal 26, Quebec

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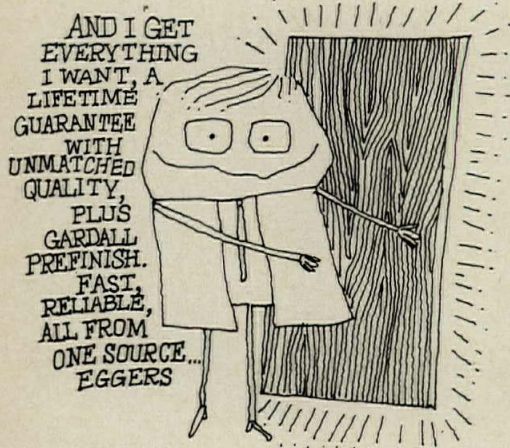
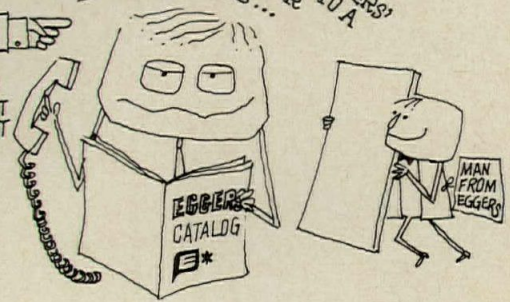
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Artie  the world's newest architect, just couldn't "dig" most manufacturers' specifications. He went the "out" way and made his own on-the-spot specs. But, Archie, the "old pro" simply played it cool and went the "in" way.



WHEN I WANT SPECIAL DOORS, I DON'T GET INVOLVED WITH MOST MANUFACTURERS' TIGHT SPECS. ONE SIMPLE CALL QUALITY MANUFACTURER TO A LIKE EGGERS...

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You'll never be in doubt or "go wrong" if you specify Eggers custom craftsmanship from the start. When it comes to the finest quality architectural solid core and specialty doors or job-matched plywood paneling, most "old pro" architects spec more from Eggers, and they get it all ways!

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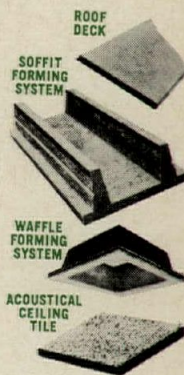
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Permadeck is rated incombustible and fire retardant . . . it insulates, is humidity resistant . . . has a light reflectance factor of approximately 70% . . . and a noise reduction coefficient of up to .85. It's competitively priced . . . and yes, we deliver on time. Get all the facts from your Concrete Products representative, or write, and we'll rush full information to you.

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New kind of glass keeps out noise: ACOUSTA-PANE®

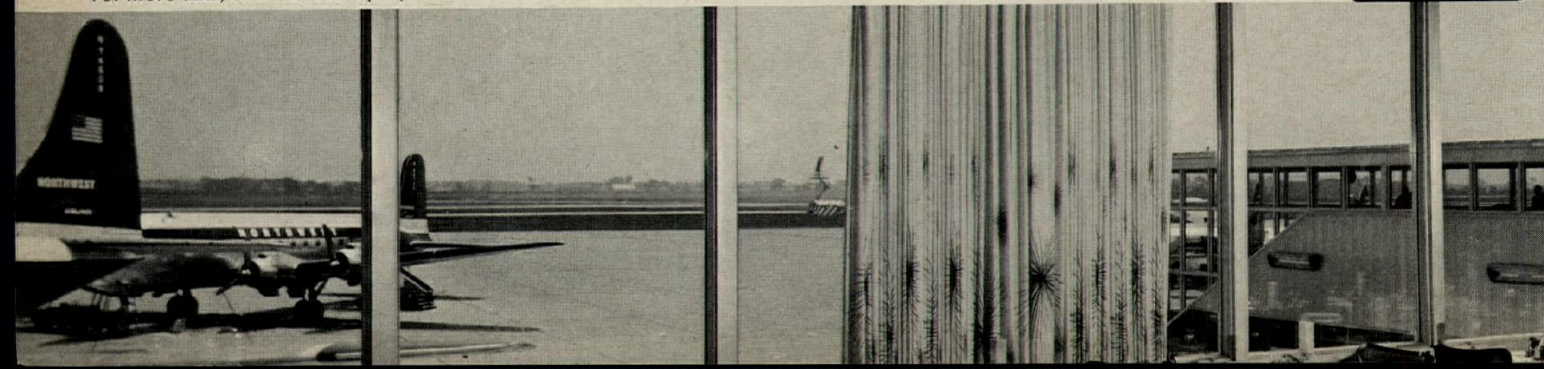
When building site requirements put you in the path of planes, trains or just plain noise, you need ACOUSTA-PANE. It's the only *true acoustical* glass, providing effective sound control plus full visibility. Available in ratings high as STC 43, ACOUSTA-PANE reduces noise levels at all significant frequencies. It outperforms plate glass, spaced glass, and many "blind" materials, too. Yet ACOUSTA-PANE is a single glazing unit, installed as easily as plate glass. (You can also specify ACOUSTA-PANE for interior partitions to shut out noise without cutting off the view). ACOUSTA-PANE is produced colorless and tinted—amber, bronze, grey. Extra bonus: ACOUSTA-PANE is laminated safety glass and shatter-resistant. Find complete information in A.I.A. File No. 26-A-9, Sweets Architectural File. Or, write to us.

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Amerada Glass Corporation is exclusive licensee of Bolt, Beranek & Newman, Inc. for the manufacture of multilayer sound-retarding glass.

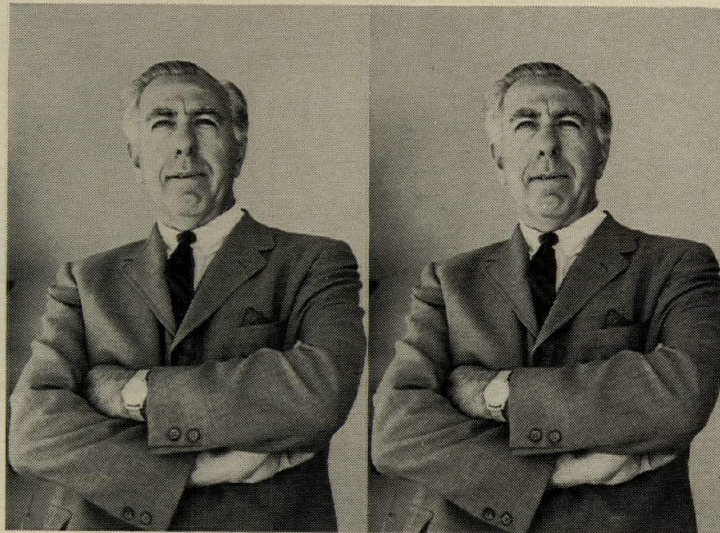
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Treacy Building, 1801 S. Catalina Avenue, Redondo Beach, California.
Architects: Young, A.I.A., & Remington. Owner-contractor: John Treacy.

The Treacy building is all-electric for a very good reason:



The builder and the owner are the same man.

When building and operating costs *both* come out of your own pocket, you don't compromise. You build all-electric as Mr. Treacy did.

Putting in an electric heating and air conditioning system not only saved plumbing, ducting and space; it gave the architect more latitude. The absence of a boiler, flue stack and combustion air vents, for example, permitted a much

more flexible design. The result was a more attractive building for less money.

Operating costs also are low. Only one source of power is needed.

For complete information about all-electric building, write: Southern California Edison Company, Marketing-Engineering, P.O. Box 62, Terminal Annex, Los Angeles 90051.

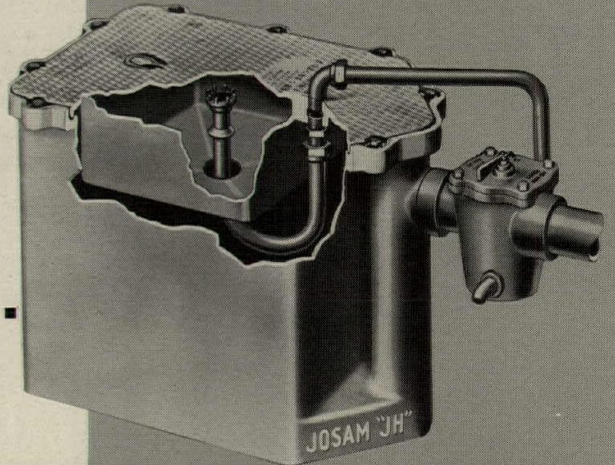


Southern California Edison

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NO GREASY HANDS ODORS MESS COVER PROBLEMS...

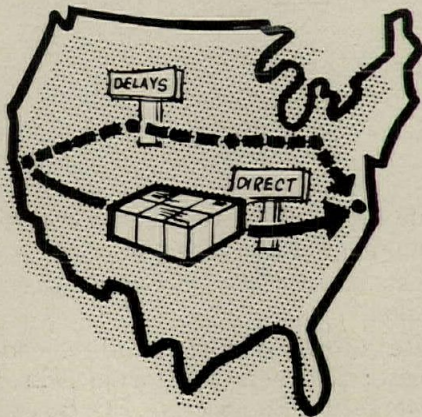
... the grease flows out of the nozzle at the turn of the valve... almost automatically. JOSAM GREASE INTERCEPTOR is the one to specify for restaurants, hotels, schools, cafeterias, packing and food processing plants. Write for manual JH.



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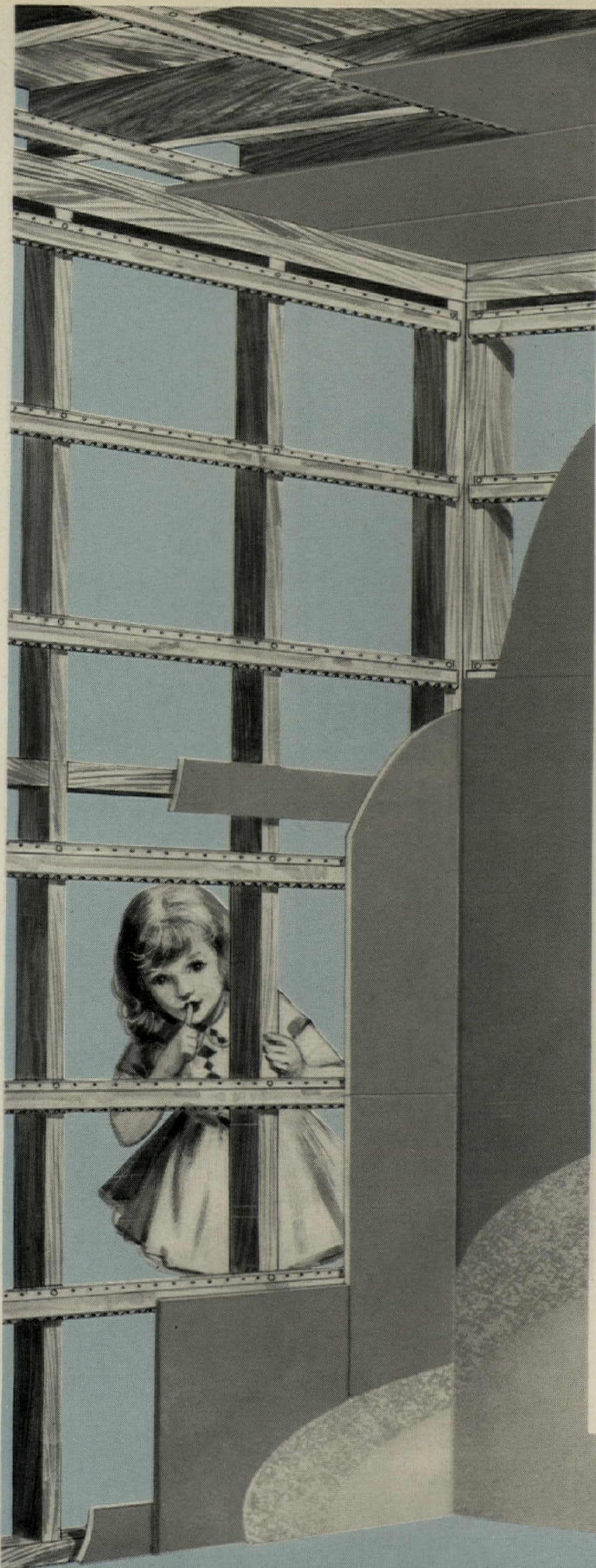
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ZIP Codes keep postal costs down but only if you use them.





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CEILING · PARTITIONS

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BLUE DIAMOND Resilient Strip Lath and Plaster Systems cost but pennies per square yard — a small price to pay to satisfy home buyers and apartment tenants that demand quiet and privacy.

CEILING...STC 50 ONE HOUR FIRE RATED

Wood Strip Flooring — 25/32"

Felt Building Paper — 15 lb.

Plywood Subfloor — 5/8"

Wood Joists — 2" x 8", 16" o.c.

ATLAS™ Resilient Strip — 16" o.c.

FLINTLATH® Lath — 3/8"

BLUE DIAMOND Hardwall Plaster (sanded) — 1/2"

PARTITION...STC 45 ONE HOUR FIRE RATED

Wood Studs — 2" x 4", 16" o.c.

ATLAS Resilient Strip — 16" o.c., one side

FLINTLATH Lath — 3/8"

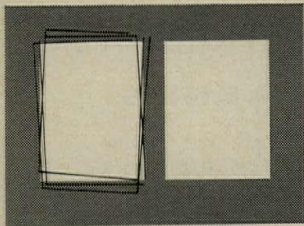
BLUE DIAMOND Hardwall Plaster (sanded) — 1/2"



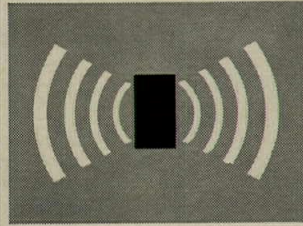
BLUE DIAMOND GYPSUM DIVISION

BUILDING PRODUCTS GROUP, THE FLINTKOTE COMPANY
LOS ANGELES • SALES OFFICES THROUGHOUT THE WEST

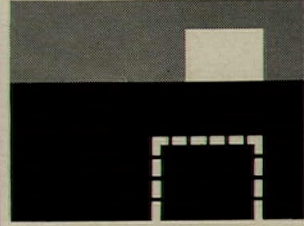
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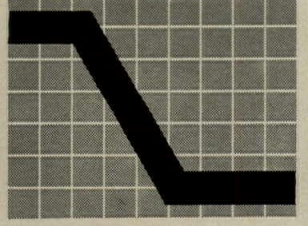
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WANT TO
ELIMINATE
VIBRATION**



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TO SAVE
VALUABLE
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Jefferson Chemical Building, Houston, lighted with only 15 "Wide-Lite" floodlights. Neuhaus & Taylor, AIA, architects; Manes Construction Co., Inc., general contractor; I. A. Naman & Associates, consulting engineers.

Wide-Lite* floodlights give buildings dramatic beauty at night!



During the day, the beauty of this unusual building is apparent. And at night it is "painted with light" to transform what might otherwise have

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"Wide-Lite" floodlights were specifically chosen for night lighting to bring out all the beauty the architect had put into the building. And only 15 fixtures do a dramatic job on the three sides of the building which were illuminated.

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Your "Wide-Lite" representative can give you more detailed "Wide-Lite" information. Phone him, or just mail the coupon. There's no obligation either way!



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Also manufactured in Australia, Belgium, Canada and Mexico.

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A Division of Esquire, Inc.

4114 Gulf Freeway, Houston, Texas

Dept. 24A-352

Please send me more facts about "Wide-Lite" floodlighting.

NAME _____

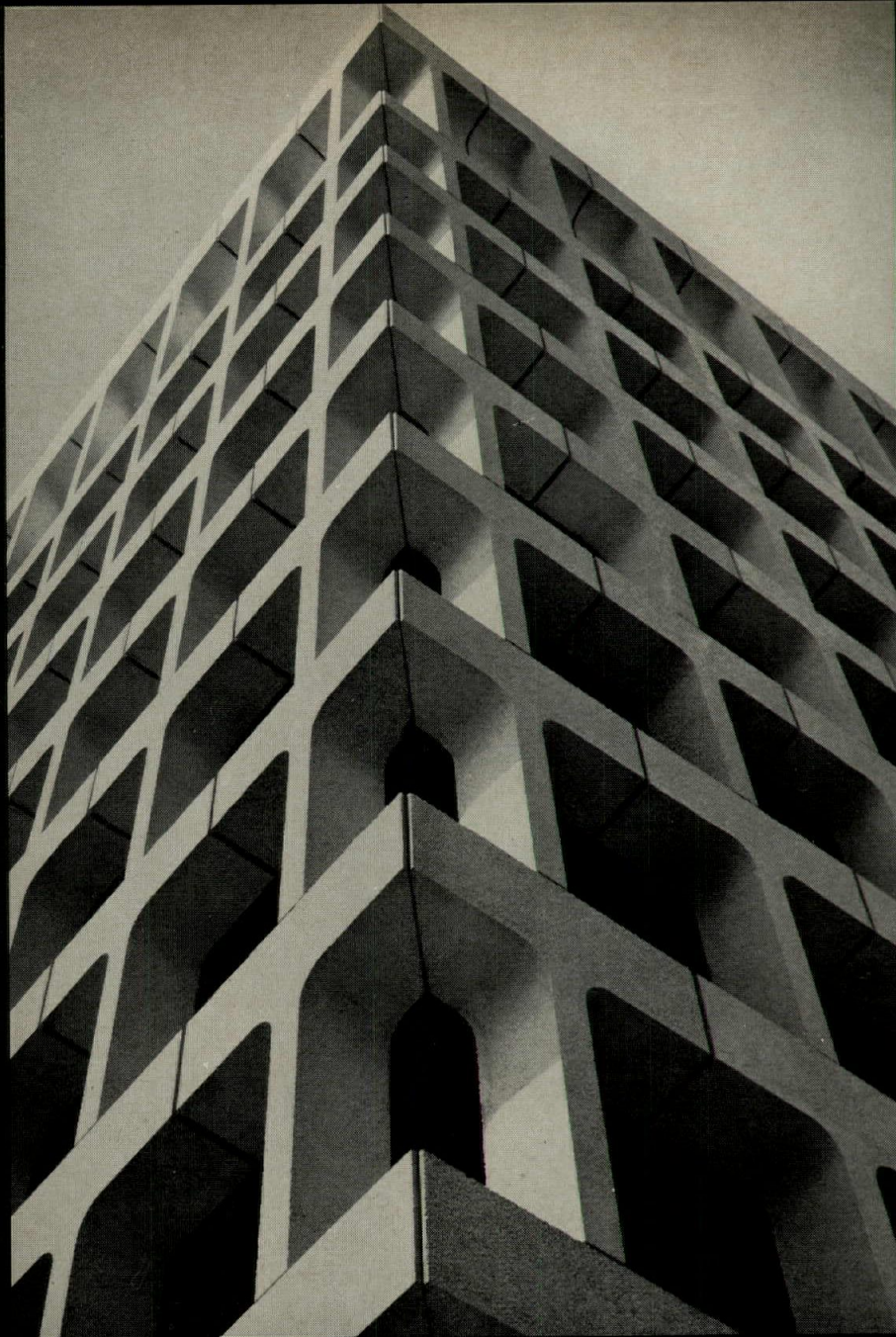
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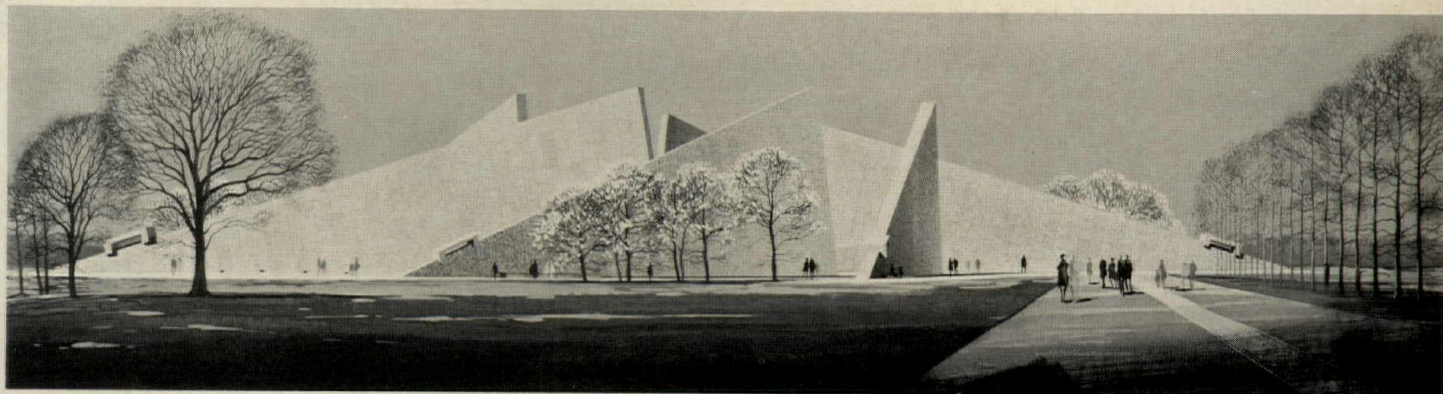
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New FDR Memorial designed to complement nearby memorials

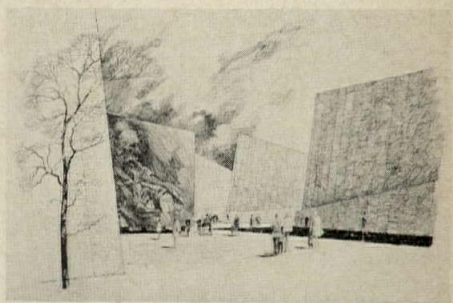
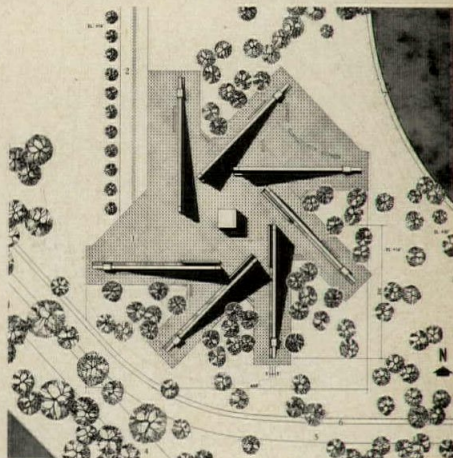
"It has been nearly 22 years since FDR's death and now it is time to build and stop talking about it." So said Representative Eugene J. Keogh, chairman of the Franklin Delano Roosevelt Memorial Commission, at the presentation of a new design for the memorial in West Potomac Park in Washington, D.C., by Marcel Breuer and Herbert Beckhard, architects. The new architects were chosen last June (July, 1966, page 36) after the original, controversial, competition-winning design by Pedersen, Tilney, Hoberman, Wasserman and Beer, was finally rejected.

The new design, which will cost between \$3 and \$4 million, has seven sloping walls moving away from the core in tangential directions. At the core is a piazza which is dominated by a cube, 32 feet per side, which hovers on low supports. Each of the sloping walls, 5 feet wide, is flanked by a 5-foot-wide pool.

The primary building material will be a gray granite. On the sloping walls

it will have a rough tooled finish; on the plaza it will have a slightly smoother sawn finish; and on three sides of the cube it will be polished. On the west side of the cube, which confronts the entrance, will be a photographic image of FDR transferred into the stone by a new technique which adapts the texture of halftone engraving and recesses it into the surface. Another means of achieving direct personal reference (the architects wished to avoid "the usual idolizing statue") will be recordings of the voice of FDR, audible only within a small part of the piazza.

The stone walls rise 73 feet above sea level (60 feet above grade) and thus complement rather than compete with the nearby Lincoln Memorial (141 feet above sea level) and the Washington Monument (598 feet). The original, competition-winning design consisted of eight massive tablets, the highest of which was 165 feet in the original design and 140 feet in the redesign.



New York City loses Hoving to Metropolitan; names housing administrator for new super-agency

Thomas P. F. Hoving, New York City's ebullient 35-year-old administrator of recreation and cultural activities and parks commissioner (October 1966, page 36) will leave the city administration on April 15 to become director of The Metropolitan Museum of Art. He will succeed the late James Rorimer. In his all-too-short tenure as Parks Commissioner, Mr. Hoving has been responsible for bringing a new emphasis not only on "happenings" but on design to parks and park structures. He has infused the public with a new awareness of its recreational areas

and their possibilities for active use.

The Mayor has named Jason R. Nathan to head a new Housing and Development Administration, thus ending speculation that Edward J. Logue, administrator of the Boston Redevelopment Agency, would be named to the position. The new agency encompasses five formerly separate housing and planning agencies, as called for in a report to the Mayor by Mr. Logue and the Institute of Public Administration (November 1966, page 36). The City Planning Commission was not included in the new agency, as

the report also recommended (see below). The Mayor is said to have implemented as much of the report as he could by executive order, instead of waiting for controversial reorganization to be acted upon by the City Council. Mr. Nathan, who was chairman of the City's Housing and Redevelopment Board before being named to the new post, formerly held a Federal post as director of urban renewal for the Philadelphia region.

At the same time, lawyer Donald H. Elliot, formerly counsel to the Mayor, was named chairman of the Planning Com-

mission, succeeding architect William F. R. Ballard. Mr. Ballard, who had held the post for three years, will return to private practice.

Illinois architectural students will study in France

Thirty students, in their fourth year of a five-year course, are flying to France this month to spend a full semester. Three faculty members will accompany the students. The party will be located at La Napoule on the Mediterranean and will live and work in a chateau and villa made available by the La Napoule Art Foundation. Purpose of the course: "Some of the most significant developments in architecture, urban development and planning are occurring in Europe," says Jack Swing, Illinois department of architecture chairman. "It is vitally important that American architectural students become personally acquainted with these." Schedules will include side trips to other European countries.

German firm is holding furniture design competition

A German furniture firm, Christian Holzapfel KG, is holding an international competition for furniture design. The competition, called "Interdesign 2000", seeks furniture designs "that distinguish themselves by their novelty, idea shape,

material, function and production method." Prizes will total \$30,000, with a first prize of \$10,000. The competition is sponsored by the International Council of Industrial Design, Brussels. Initial queries must be made by March 31, with final submission due on October 15. Further information can be obtained by writing Christian Holzapfel KG Mobelfabrik, 7273 Ebhausen, Germany, Code: Interdesign 2000.

Reynolds announces award for community architecture

The Reynolds Metals Company and the American Institute of Architects have announced the establishment of a new \$25,000 international award for community architecture. The new R. S. Reynolds Memorial Award for Community Architecture will be presented on alternate years starting in 1967, and is intended "to encourage public recognition of the contribution being made by architects to create an urban environment in which man can live pleasantly and work efficiently." The use of aluminum or any other building material will not be a factor in the new award. Serving on the first jury are architects Morris Ketchum Jr., immediate past president of the A.I.A., who is chairman, John Fisher-Smith, and Archibald C. Rogers. The jury will work entirely from its own nomination list.

Architectural League of New York moves its headquarters; reasserts its purposes

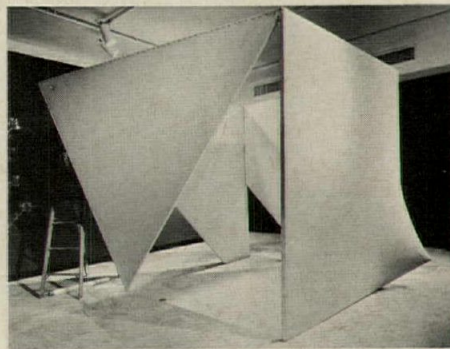
The Architectural League of New York, under the leadership of its new president, architect Ulrich Franzen, has moved its headquarters to 41 East 65th Street, New York City, and has reasserted its purpose as a dynamic educational institution. The League, founded by a group of young architects in 1881 "to quicken and encourage the development of the art of architecture, the arts and crafts . . ." was bogged down by the financial obligation of maintaining clubhouse facilities. The new quarters, located in the building which is the headquarters of The American Federation of Arts, provide two meeting rooms and two offices, as well as the use of spacious ground-floor exhibition galleries and second-floor reception area.

To reflect its new sense of purpose, the League has developed a program of events under the direction of RECORD assistant editor John S. Margolies, chairman of current work for the League. The League has also retained a full-time program director, Ruth Lande, to co-ordinate its activities.

The new program includes:

- Environmental exhibitions: a series of exhibits in which artists working alone or

collaboratively, in traditional and new media, transform the galleries into environments which reshape space, giving the viewer a new sense of involvement. Environment I, organized with the cooperation of the Richard Feigen Gallery, opened December 19 and will run until



O. E. Nelson

January 12. Included in this exhibit is a huge (8-by 8-by 8-foot) canvas construction by artist Richard Smith (see installation photograph above). Environment II, which will open on January 19 and which is underwritten by a private foundation, will be a collaboration by sculptor

The A.I.A. and Reynolds will continue the original R. S. Reynolds Memorial Award for Architecture with aluminum, now in its 11th year, which presents an annual prize of \$25,000. Nominations for this award are now being received at the A.I.A. in Washington.

Society of Registered Architects elects new officers

At the annual national convention of the Society of American Registered Architects, held late last year in Cleveland, John R. Hellman, Falmouth, Massachusetts was elected president of the organization. Other new officers include: Roy D. Murphy, Urbana, Illinois, vice president; Herbert Burger, Wichita, Kansas, secretary; and Robert E. Isaacs, Cincinnati, treasurer.

Middle Tennessee A.I.A. gives awards to clients

The Middle Tennessee Chapter of the American Institute of Architects suspended its usual awards program for member architects and chose, instead, to honor clients. A total of seven awards were made late last year, honoring clients "for their contribution to the profession and to architecture by helping the architect to achieve excellence in design and in the architectural environment."


Charles Ross, who makes prisms and lenses, with USCO, a group that works with psychedelic and theatrical lighting.

- Forums: a series of public forums, organized under the leadership of Peter Blake, editor of Architectural Forum, and architect Martin Growald, which will probe the significance and effectiveness of the reorganization of New York City housing functions into a single super-agency. These panels will include government officials as well as practitioners in the fields of architecture and the allied arts, and will be held later, in the spring.

- Work-in-progress: a series of informal confrontations between students and practitioners with architects and artists who have significant works underway. This series is under the direction of architect Peter Hopner.

- Project New York—Blueprints for the Future: a series of lecture-presentations, under the direction of Mr. Franzen, which will present visionary concepts of what the shape of the city might be. These lectures will be held in the fall at The Metropolitan Museum of Art.

more news on page 63



Architect: Minoru Yamasaki & Assoc., Birmingham, Mich.
General Contractor: Geo. A. Fuller Co. • Leadwork: O. G. Kelley Co.

Harvard puts valued space to work below these pools *Naturally the pools are lead-lined*

Below the water-line at this scene at Harvard's new William James Hall work proceeds apace in examination, research, storage and utility rooms. Undampened too.

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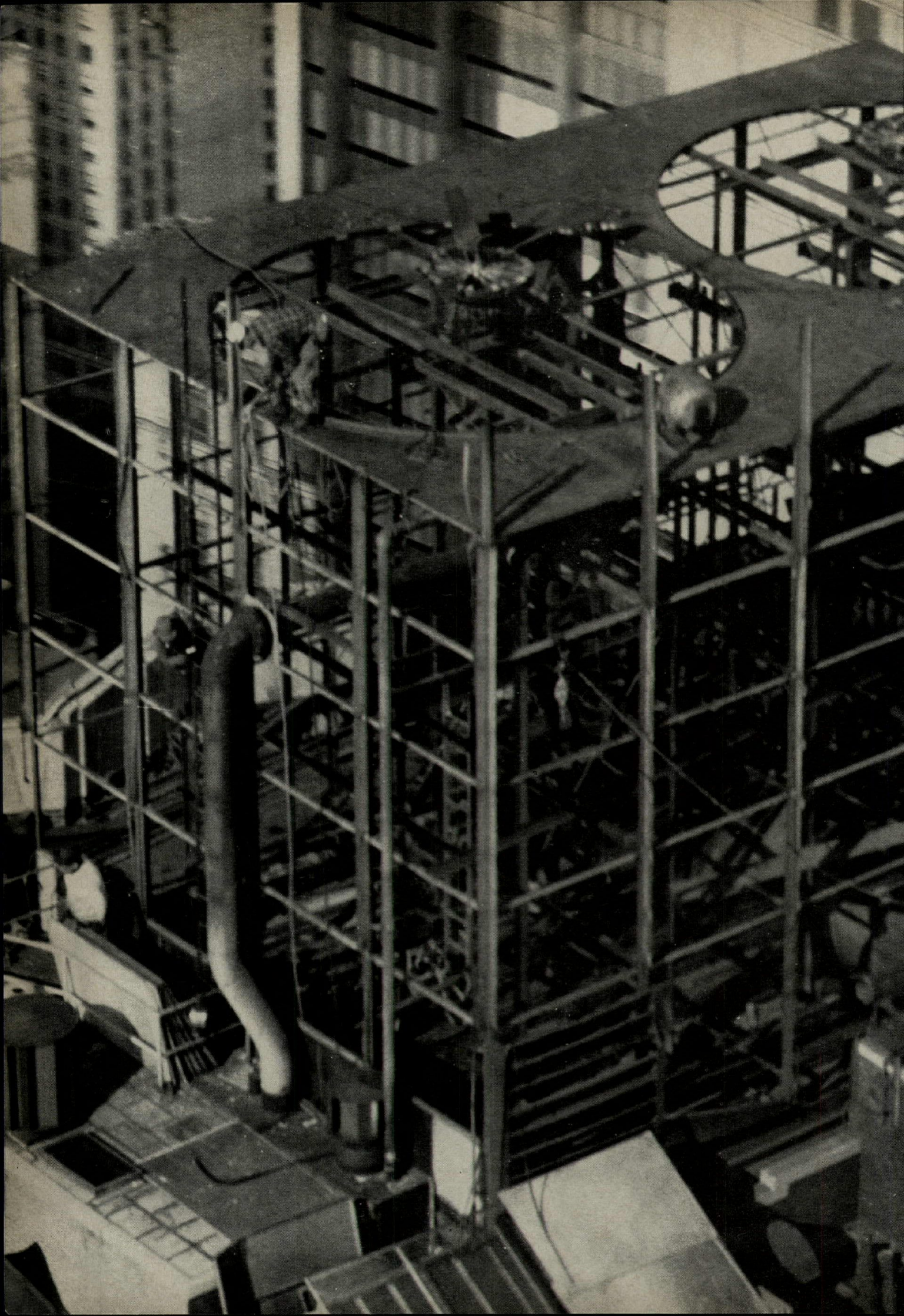
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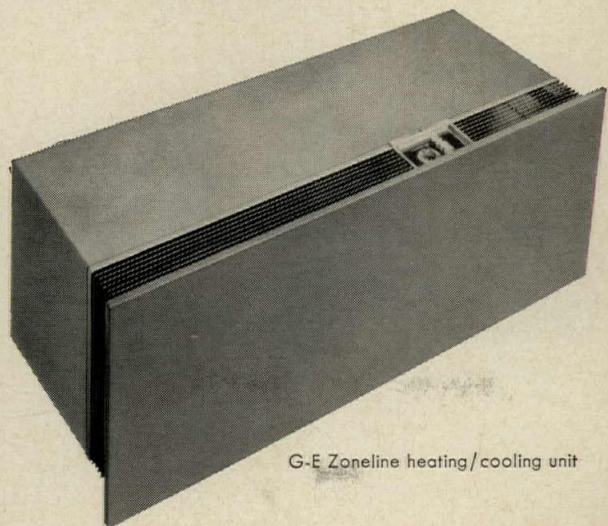
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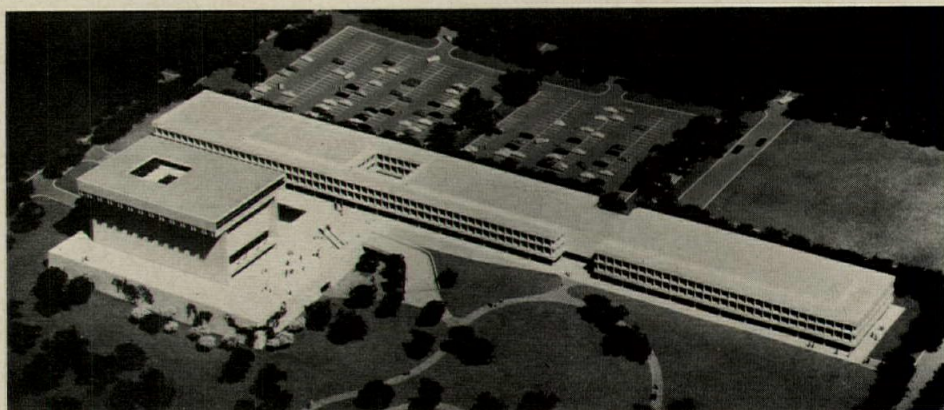
Air Conditioning Department, Appliance Park, Louisville, Kentucky



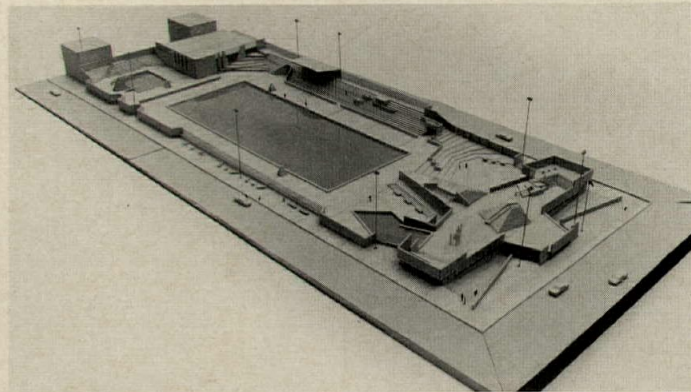
G-E Zonline heating/cooling unit

For more data, circle 27 on inquiry card

A library research complex at the University of Texas, Austin, designed by Skidmore, Owings & Merrill (Gordon Bunshaft in charge of design) and Brooks, Barr, Graeber and White, is comprised of two parts: an eight-level, 150,000-square-foot structure to house the Lyndon Baines Johnson Library; and a three-story, 935-foot-long structure to house a number of libraries and the Lyndon B. Johnson School of Public Service. The Johnson Library will have parallel sloping tan stone walls 65 feet high on the east and west, with the north-south walls set back 15 feet providing balconies. Facilities include a 1,000-seat auditorium and 250-seat lecture hall.

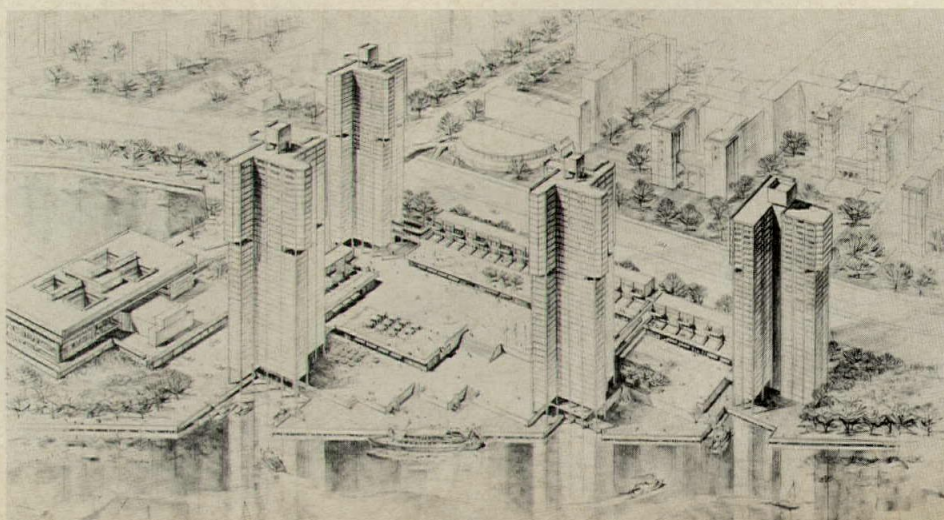


The Barbados Hilton, near Bridgetown, British West Indies, designed by Warner, Burns, Toan & Lunde, has arches on its main building patterned after the island's old military garrisons. The main, four-story building, constructed of native coral stone, contains 104 guest rooms. A one-story wing, along the beach, contains 54 units. The recently completed complex cost \$5,256,000.



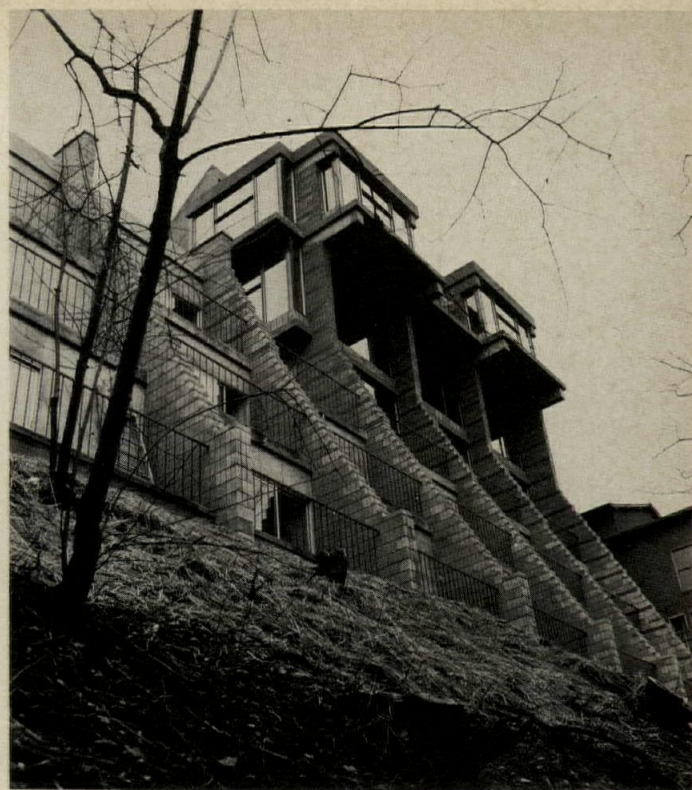
A swimming pool and recreation complex for Brooklyn, New York, designed by Morris Lapidus Associates for the Park Department, is composed of an aluminum pool, 100 feet by 250 feet, and supporting facilities, including locker rooms and play areas, constructed of reinforced concrete. The \$1.9-million project is designed "for multiple use during warm weather and cold, during the day and the evening."

The Waterside apartment complex, New York City, designed by Davis, Brody & Associates, will contain 1,450 residential units and will be erected on platforms extending over the East River. Of the 1,450 units, 350 will be made available to low- and middle-income families. Rentals will range from \$18 per room per month to approximately \$60 per room per month. The \$42-million complex will be located around a multilevel platform and will also contain townhouse residences, a theater, restaurant and service shops. The builders will be HRH Construction Corporation. On the left in the rendering is the United Nations School designed by Harrison & Abramovitz.





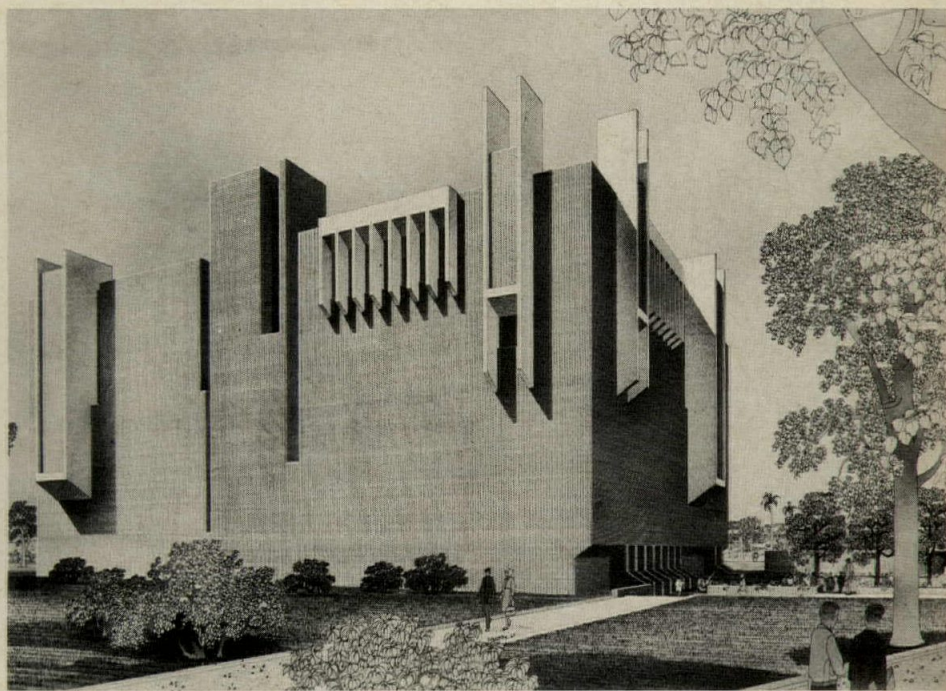
The Central National Bank headquarters building, Cleveland, designed by Charles Luckman Associates, includes a 20-story office and bank building and a four-story, 343-car garage. A 180-foot-long shopping arcade separates the buildings. The office building will contain 466,176 square feet of rentable space. It has a steel frame structure with half of the columns on the facade used for support. Alternate columns will house mechanical ducts. Both buildings will be faced with brown brick. General contractor and developer for the projects is Tishman Realty and Construction Company.



The Edge, a motel-restaurant located on Mt. Washington in Pittsburgh, and designed by Tasso Katselas, has 23 guest rooms spilling down the side of the mountain, each with a terrace view of the city. The motel at its main entrance is three stories, but has a total of five stories including guest-room levels. Construction materials are brick, concrete and glass. From the mountain side, the building can be approached by use of the Monongahela Incline, a steam-operated outdoor elevator built in 1870. General contractor for the recently completed project was Forbes Construction Company.



A 38-story office building in San Francisco, designed by Welton Becket and Associates, will have 3-foot 10-inch square columns, sheathed in dark stone, rising the height of the building. The building, covering less than 55 per cent of the site, will be located in a landscaped stone plaza with a sunken plaza entrance to a rapid transit station. The building will replace the old Crocker Building, built in 1892. Landscape architect is Sasaki, Walker Associates and contractor will be the Dinwiddie Construction Company.

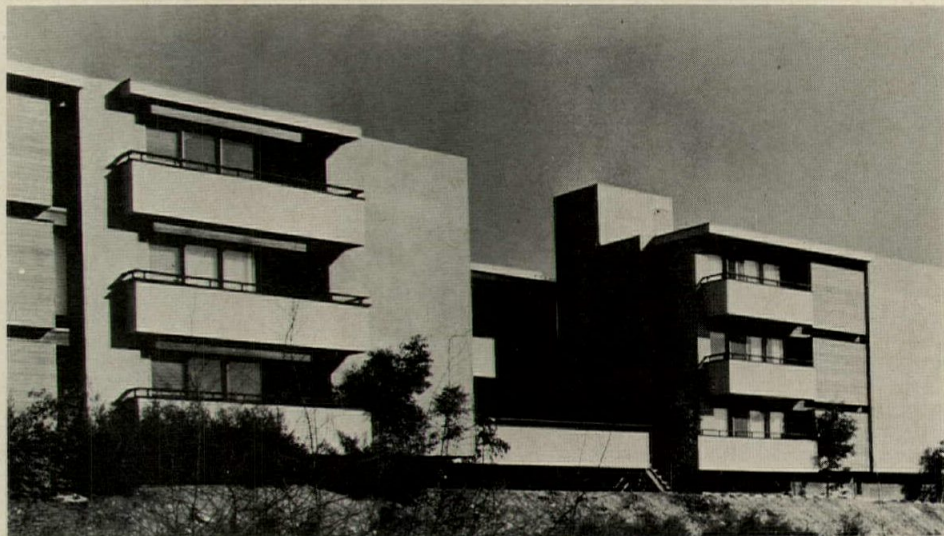


A science center at the University of South Florida, Tampa, designed by H. Dean Rowe with Frank Prince, project associate, in association with Forrest M. Kelley Jr., expresses vertical mechanical, plumbing and electrical chases on the exterior, and thus allows maximum interior flexibility. The lower two floors will contain a research library and

computing center. The upper three floors will house laboratories, graduate student areas and various science departments. The upper three floors are extended on the east and west and supported by corbeled brick cantilevers. These cantilevers are visually supported by buttress-like brick piers which also define the entrances to the building.

Southern California cites 13 buildings in triennial awards program

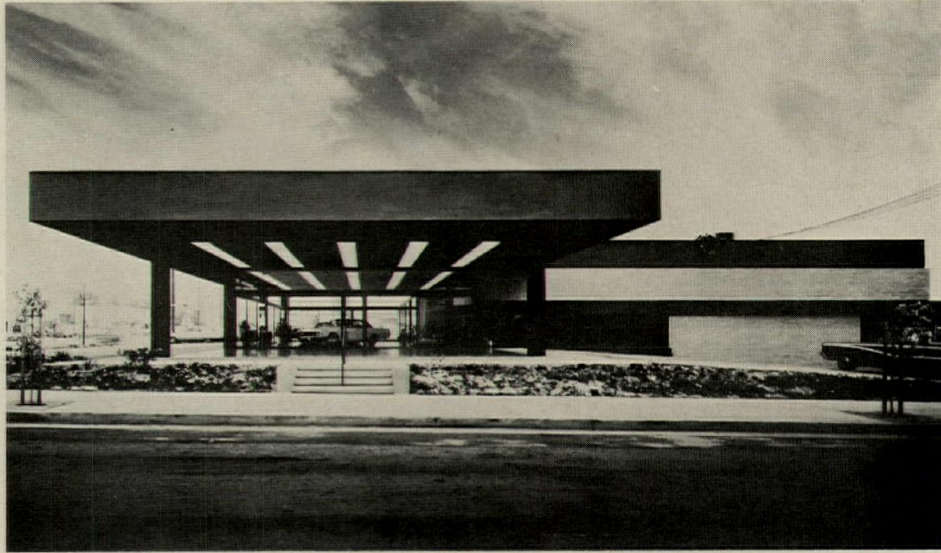
Four honor awards (shown), eight merit awards (three shown) and a special honor award have been presented in the triennial awards program of the Southern California Chapter, American Institute of Architects. Serving on the jury, which judged 157 entries, were architects George Qualls, William Caudill and Paul Hayden Kirk. Merit award winners not illustrated here include: Robert Alexander—Challenger Residence Hall, University of California, San Diego; William Pereira—Ventura Savings and Loan Association; Daniel Dworsky—Nibblers Restaurant, Beverly Hills; Leroy Miller—residence, Brentwood/Bel Air area; and Robert Jones—residence, La Jolla. A special honor award was presented to Robert Farquhar, 94-year-old architect, for his design of the California Club in 1930.



Honor Award: Condominium, Palos Verdes. Architect: Raymond Kappe; general contractor: Martin Schlutz.



Honor Award: Residence, Sherman Oaks. Architect: Richard Dorman & Associates; general contractor: Lee Lauger.

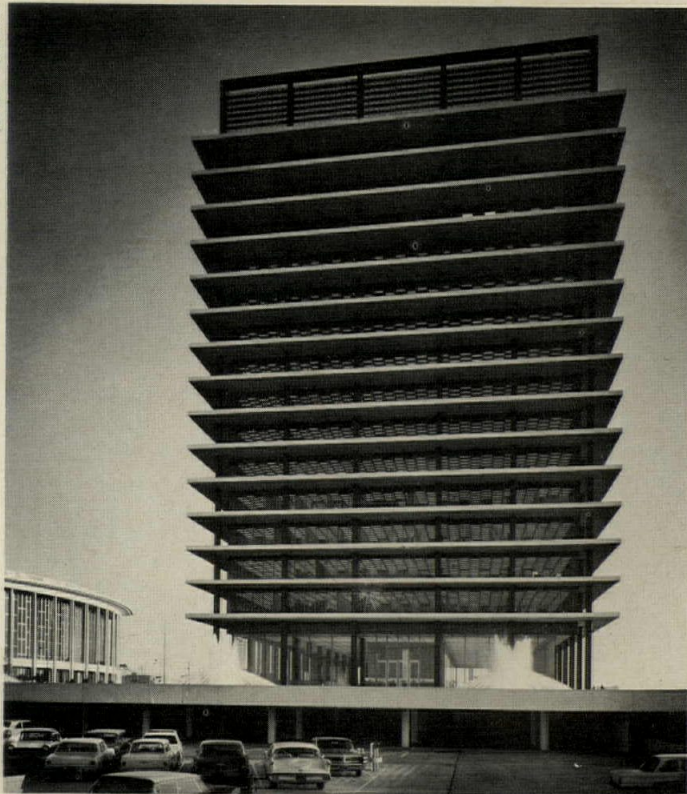


Honor Award: Bill Hopkins Lincoln-Mercury Agency, Torrance. Architect: Daniel Dworsky; general contractor: Millie and Severson, Inc.

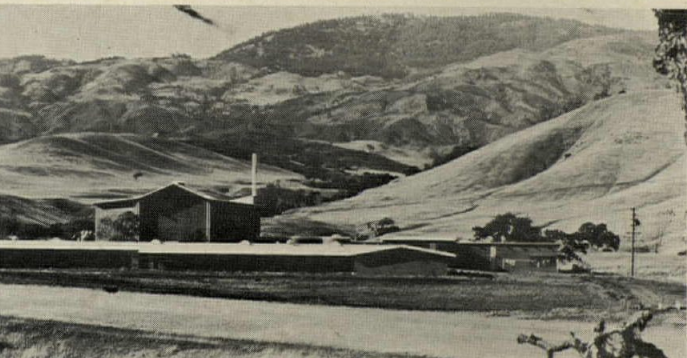
San Diego A.I.A. gives high honors to two projects

Two buildings, shown here, have been given Awards of Excellence in the bi-annual honor awards competition of the San Diego Chapter, American Institute of Architects. Two projects by architect Russell Forester and a residence by Robert E. Jones received awards of honor, and residences by architects Homer T. Delawie and Paul W. McKim received awards of merit. Serving on the jury were architects Robert B. Marquis, chairman; A. Quincy Jones; Lulah Maria Riggs; and Gerald McCue, chairman, Department of Architecture, University of California, Berkeley; and Esther McCoy, associate editor, Arts & Architecture.





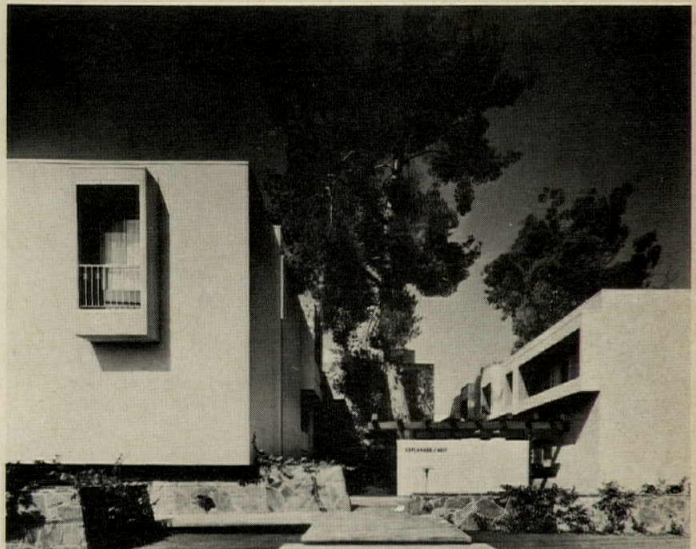
Honor Award: Headquarters, Department of Water and Power, Los Angeles. Architect: Albert C. Martin, Jr.; general contractor: Gust K. Newberg Construction Company.



Merit Award: Franciscan Capuchin Seminary, near Solvang. Architect: Chaix & Johnson; contractor: Valley Construction Company.



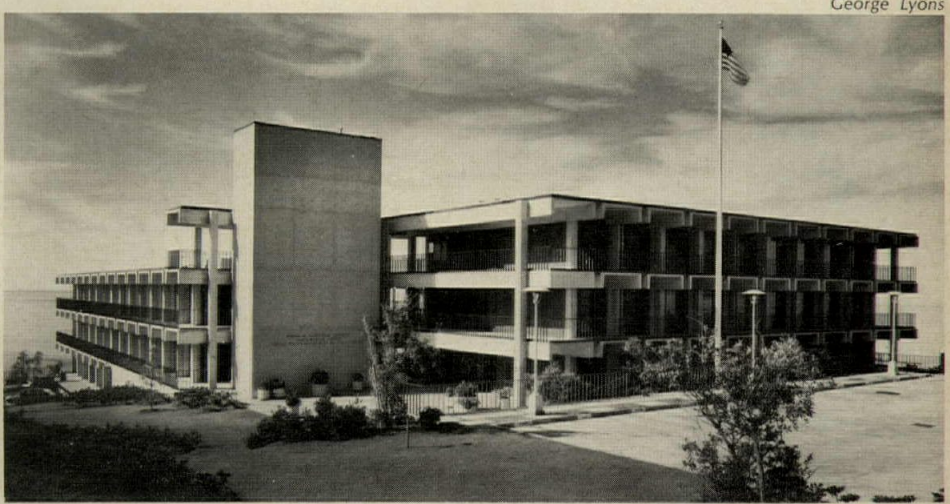
Merit Award: Amling's Nursery, Newport Beach. Architect: Thomas Echternach; general contractor: Ed Soule.



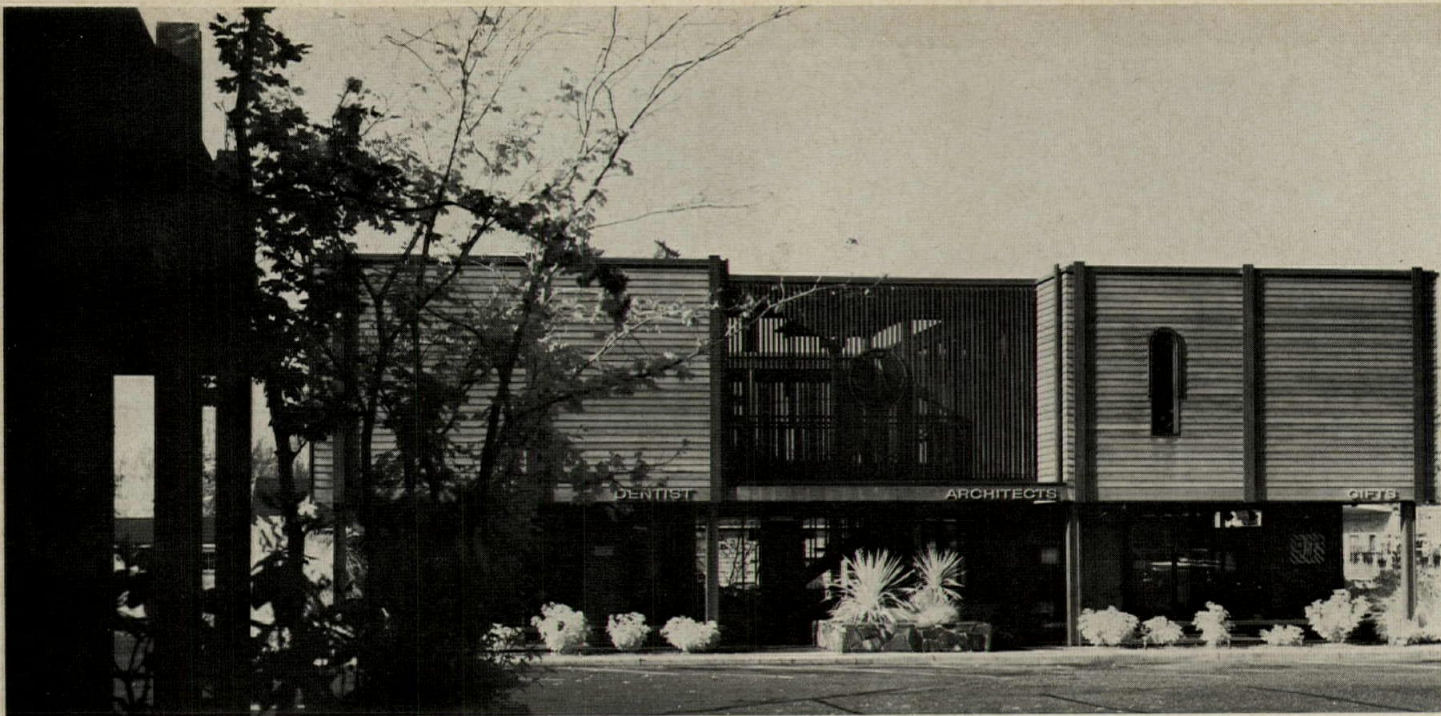
Merit Award: Apartment building, Sherman Oaks. Architect: Kamnitzer & Marks; contractor: Hyman Harrison and Janet Harrison.

Award of Excellence: (left) Art gallery (in a former bowling alley), University of California, San Diego. Architect: Robert Mosher & Roy Drew.

Award of Excellence: (right) Oceanography Research Facility, Bureau of Commercial Fisheries, University of California, San Diego; contractor: M. H. Golden & Company.



George Lyons



Jini Dellaccio

Honor Award: Architect's office for Johnson-Austin, Associates, Tacoma. Architect: Johnson-Austin, Associates; general contractor: Don O'Neill.



Morley Baer



Merit Award: Investment counselor's office for John Hewitt Jr., Tacoma. Architect: Liddle & Jones; general contractor: R. H. Wegner Construction Company.

Merit Award: Home for the Elderly, Tacoma. Architect: Robert Price & Associates; general contractor: Merit Company.

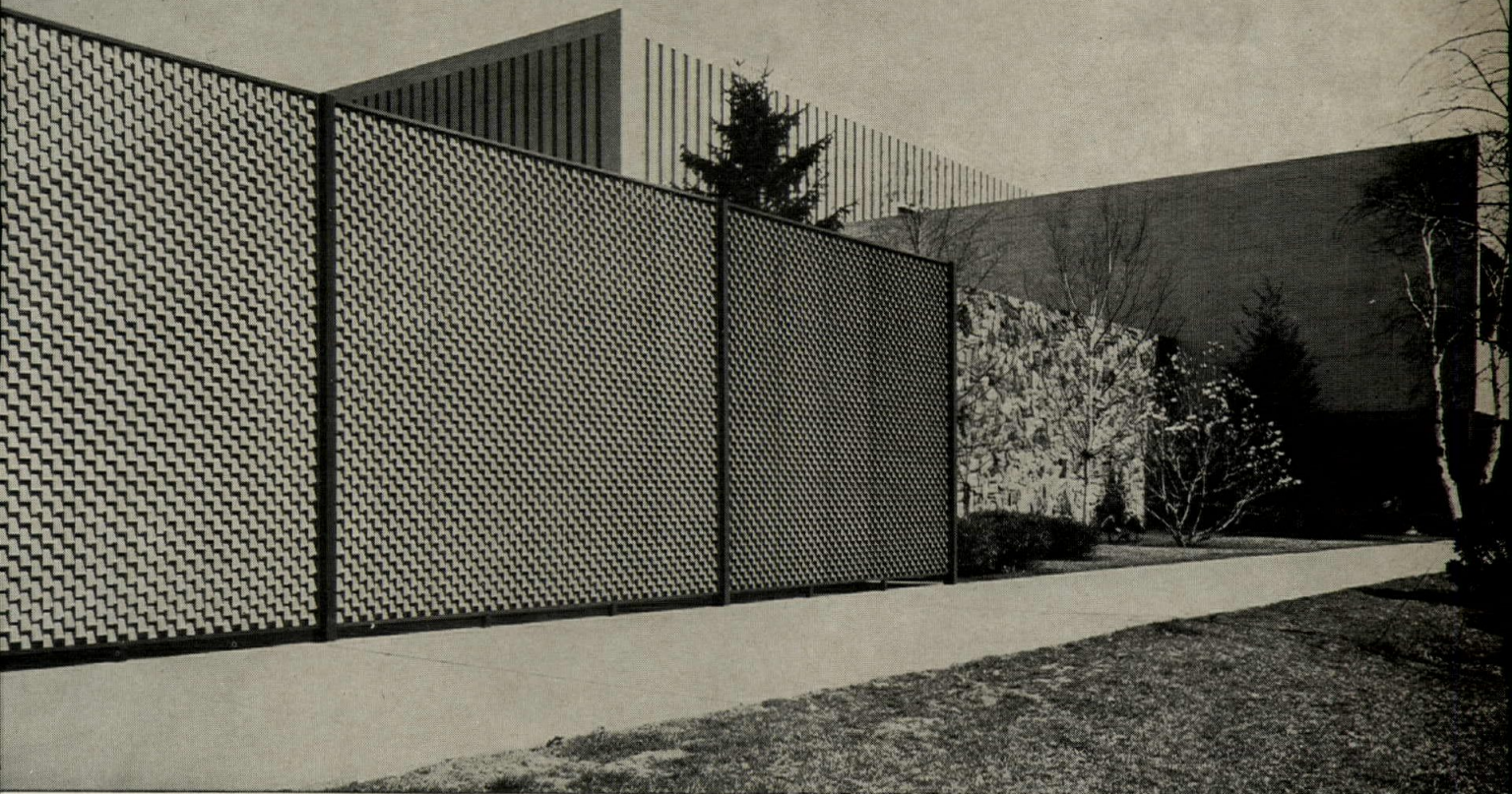


Chas. R. Pearson photography

Merit Award: Camelot School, Federal Way. Architect: Harris & Reed; general contractor: Merit Construction Company.

Southwest Washington A.I.A. honors four buildings

One honor award and three awards of merit have been presented in the 1966 honor awards program of the Southwest Washington Chapter of the American Institute of Architects. Serving on the jury were Daniel Streissguth, chairman, Department of Architecture, University of Washington, and architects Warren Cummings Heylman and Norman C. Zimmer.



Architect: Abbott, Merkt & Co., New York City

BORDEN ARCHITECTURAL DECOR PANELS: DECA-GRID

Shown above: Custom-designed Borden Deca-Grid panels with tilted spacers, used to separate and screen the service area at Saks in Garden City, Long Island.

With the Deca-Grid style, specifications for spacings and spacer bar positions may be varied almost indefinitely. Another variation available for Deca-Grid is known as the Slant-Tab variation—here the spacers are mounted at angles of 30°, 45°, 60° or 90° and the spacers (called Slant-Tabs) may be altered in length, depending

on angle of mounting selected.

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New York's new try

Only pressure of work has kept me from writing you about your article, "New York's Attack on Design Mediocrity." I hope that you will be able to put your cynic's badge away for keeps.

It was good of you to write so favorably about our efforts to make New York a more beautiful city.

Jason R. Nathan, Administrator
Housing and Development Administration
The City of New York

Young architect in an old world

Architect Mabry (standing) in front of Grand Mosque.

I am a 1965 University of Texas graduate in architecture and a Peace Corps Volunteer here in Kairouan, Tunisia. I have been helping to restore the local Grand Mosque.

Assigned to the National Institute of Archeology, I was first put to photographing the *medina* (the old Arab section) of Tunis, the capital city, before coming here to photograph Kairouan's *medina* and to work on the restoration.

It was only recently that the Institute signed a contract with an Italian architect and well-known authority on architectural restorations. Work is now progressing under his direction with the aid of three architects, Mr. & Mrs. Paulo Donati and me.

At present, we are concerned mainly with research. Holes have been dug at several locations to check the extent and strength of the foundations. Carefully measured and drawn sections through the perimeter walk are being done to show more graphically the extent of the inclination. Other detailed measured drawings are being made for each important element of the Mosque.

It may seem like meticulous, tiring work, but there is something about being high up on the scaffolding in the dome, being able to touch the stones and to see them from a viewpoint that no tourist will ever experience, that makes the work easy.

Photographing the *medinas* of Tunis and Kairouan has given me a real appreciation for their dynamic type of townscape. Unfortunately, much of the flavor is being lost in many towns. In the headlong rush to bring Tunisia into the 20th century, the *medinas* are being ruined. They are old and crowded and are, therefore, considered slums. They must make way for the "French Modern." Kairouan is in the same predicament. Many hasty changes are being made in the name of modernization, usually resulting in a great loss.

The main street of the *medina* at present one of the most interesting in Tunisia is a good example. A walk through the street reveals a fine series of closed vistas, short turns and newly exposed views. There are several good examples of traditional Arab doorways and balconies. And yet, the latest proposal is to cut a wide, tree-lined French avenue straight from Bab Djellidine to Bab Tunis—lining up both facades of the street into static straight walls and eliminating all elements of surprise.

I believe that modern life can be lived in the present environment. History and tradition need not suffer in the wake of progress.

Robert Mabry

Good luck all around

Belatedly, I want to thank you for the fine story in the September Record on our three library projects. I thought the coverage was very complete and well done.

Incidentally, the Brown Sciences Library was given an Award of Merit by H. E. W. in the middle of October, and the Hofstra Library is to receive the First Award from the Concrete Industry Board a little later this month; so we have had very good luck with these projects all around.

Danforth W. Toan
Warner Burns Toan Lunde
New York City

Automobile in architecture

Your Building Types Study 364, "The Changing Role of the Office Building" is a most interesting albeit not a new concept. The combining of many functions and services into a cohesive plan gives recognition to the human needs involved in large office complexes. The daytime "population" of these structures is frequently greater in number than the large suburban shopping center serves, and yet the needs and desires of these "inhabitants" has been generally ignored by architects and planners. It is interesting to note that ARCHITECTURAL RECORD at long last is presenting this concept, although somewhat succinctly.

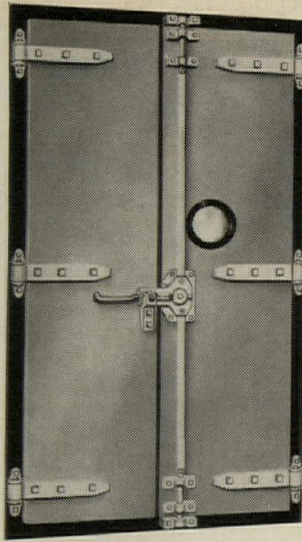
In characteristic fashion, you have glossed over the inadequacies and oversights of the planning. I refer to the "high button shoe" (complete with the button hook) approach to the car-handling. This machine (the automobile) has forced us to bore through mountains, flatten hills span immense bodies of water and veritably replan and rebuild our cities at a cost in the billions of dollars. The stupendous problems caused by the American affluent habit of automobiles for everyone has taxed a national economic capacity to provide freeways and highways and streets to accommodate them. And yet you calmly enumerate the thousands of cars to be housed in the underground dungeons all to be served by two or three puny driveways delving many stories below the street grades, or some cork-screw ramp that would give the best airline captain vertigo, all the while you blithely assume that average men and frightened women have the capacity to execute this automobile slalom.

It is appalling that you still do not recognize the influence and impact that our automobile must exert on architecture. Renowned architectural firm names appear providing authenticity to the impossible solutions, and yet you murmur not one word of question or criticism. Imagine ordinary men and women executing driveways, ramps and spirals for 1,000 feet or more in bumper to bumper fashion vainly trying to reach the street above! Why should you not point out, at least in a small, plaintive voice, that there are shortcomings and lack of a good so-

more letters on page 50



Jamison all-metal banana room doors maintain critical temperature levels and also provide gasketed seal to contain gases used in fruit ripening.



All-metal smokehouse door with high temperature fiberglass insulation. Special gasketing and triple locking prevent escape of smoke and heat.

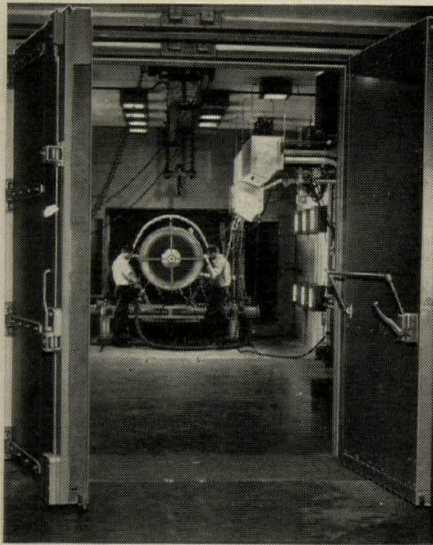


Jamison see-thru acrylic doors add efficiency and convenience in large, busy kitchens. They open easier and improve employee supervision.

If you have a door problem, there's a Jamison door to solve it



Jamison door at entrance of controlled atmosphere (CA) apple storage room. Door is overlap type with heavy, durable gasketing to maintain room temperature and gas composition.



Sound reduction doors designed by Jamison consistently reduce noise by a factor of at least 50 decibels.



Space-saving, lightweight hinged panel overhead door for loading docks and other installations with limited ceiling height. Power or manual operation.

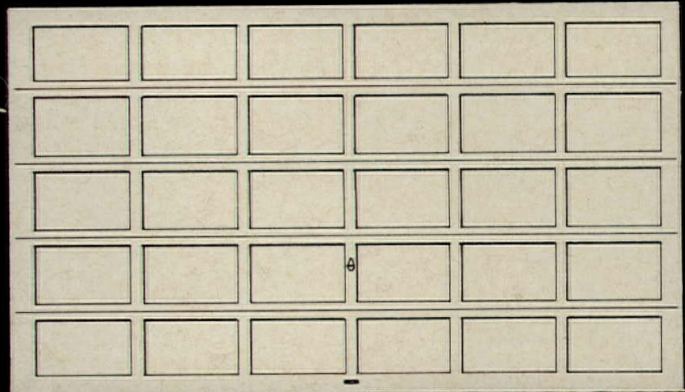
Whatever your door problem, Jamison makes a door to solve it. Write for data to Jamison Cold Storage Door Co., Hagerstown, Md.

JAMISON

COLD STORAGE DOORS

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Builder News III

MOBAY

Part of a series of product-use bulletins published by Mobay to keep architects, engineers, builders and contractors informed on new developments in urethane foam materials for the commercial and residential construction industries.

BN-6

DEVELOPER OF RELOCATABLE BUILDINGS SHOWS SCHOOL BOARDS HOW TO SAVE UP TO ONE-THIRD ON SCHOOL CONSTRUCTION COSTS

One of the big problems school planners face stems from the population explosion itself and is measured by numbers of kids. But size of enrollment is often a simple problem compared to the one of population movement. One family in five moves each year and the resulting enrollment shifts, complicated by consolidation and shifting of school districts for other reasons, have school planners looking more and more seriously at relocatable structures as the most practical answer to the problem.

One leading builder of conventional type schools, the Vinnell Steel Co., of Oakland, Calif. 94623, has developed a modular school concept which successfully combines the mobility of a relocatable unit with the aesthetics, economics and permanence features of a conventional structure built on site.

The modular classroom unit has plan dimensions of 10' x 32' with an 8' overhang at one end and 4' at the other. Each unit is completely prefabricated down to the last finished detail, including tile or carpeting on the floor. Units are interchangeable and are designed to form a complete structure when two or more are joined together.

All adjoining units are self-aligning and, when connected, insure positive alignment of floors, walls and roofs. The modules may be easily separated, hoisted, and transported on state and national highways by stock equipment, or by attachment of a trailer hitch and wheels to the frame, with no unusual permit required.

The main structural support for the units is provided by an all-welded, self-supporting steel frame capable of withstanding all applicable design loads for permanent buildings.

Wall panels are of conventional sandwich-type construction, 2" thick. The exterior surface is 24-gauge galvanized steel, factory finished with 2 coats of baked-on alkyd melamine paint. The interior surface is 20-oz. vinyl sheet with 1/2" fiber or gypsum board backing.

The core and insulation material is self-bonding, self-extinguishing rigid urethane foam, poured in place, with a minimum density of 1.8 pcf, using a foam system supplied by Reichhold Chemicals, Inc., White Plains, N. Y. 10602. Although the



These children will be middle-aged before the 40-year minimum life expectancy of these mobile school buildings expires. A wall core of rigid urethane foam combines structural strength and insulation for long-term economies.

sandwich panels are non-load-bearing, the urethane foam imparts a degree of self-supporting rigidity which makes them true structural components since they form the entire wall enclosure.

From 9 to 12 panels are foamed at one time by means of a special stacking press utilized by the fabricator. Once installed, the panels rest vertically on the floor of the structure, attached at bottom and top to the steel members, and are connected and sealed vertically by extruded aluminum and neoprene mouldings.

Presently, the finished buildings sell for \$12 to \$14 a sq. ft. installed at the site and are completely ready to use with connection to electricity and water supply. They include heating and air conditioning facilities, all lighting and wiring, plumbing, and finished walls, ceilings and floors. A wide choice of fitted window arrangements is offered. The relocatable buildings are also being marketed for a variety of other uses besides schools, such as stores, restaurants, medical offices and dorms.

For further information on this project, please contact:

Builder:	Vinnell Steel Co. Oakland, Calif. 94623
Foam System	Reichhold Chemicals, Inc.
Supplier:	White Plains, N.Y. 10602

For additional information on the use of urethane foam in other insulation and construction jobs, write on your letterhead to:

MOBAY CHEMICAL COMPANY, CODE AR-9, PITTSBURGH, PA. 15205

For more data, circle 31 on inquiry card

continued from page 46

lution in what you publish. I hope that you are not frightened by the name of the architectural firms! I also hope that you do consider this as part of the architectural problem.

Charles A. Baylon
Architect
Automated Towers Corporation
Seattle

Indeed, the editors consider the automobile as part of the architectural problem. We are not at all sure that the solution proposed by reader Baylon's firm—automated parking—is the ultimate solution, any more than the solution used—automobile slalom, if you must. Let us all—architect, editor, and manufacturer—keep exploring the problem, along with all the others who are concerned with the problems generated everywhere by "America's affluent habits."

FLW hotel under wrecker's hammer

I was shocked recently to read that the Imperial Hotel in Tokyo, a masterwork of Frank Lloyd Wright, may soon fall under the wrecker's hammer.

Not being an architect, I have no idea what interest your publication has taken to rally support for the preservation of this magnificent structure. I am writing you therefore to urge you to exert every effort to do what you can to prevent what, I feel, would be an act of vandalism—the destruction of this wonderful creation of Frank Lloyd Wright.

Elmer S. Newman
Cleveland

Campus—and credits

May I congratulate you for the remarkable article, "A Handsome Beginning for Southern Illinois' New Edwardsville Campus," in your December issue. This high quality of journalism is extremely helpful both to the profession and to other universities. Indeed, I had two distant calls on the first day asking for additional information.

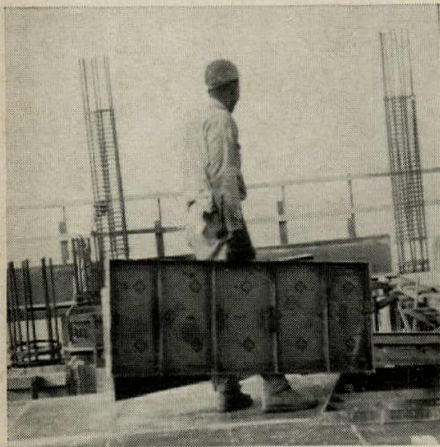
Hedrich-Blessing's photographic skill shows extreme sensitivity of view-point and composition, and they are to be commended.

It is unfortunate that the firm of Sasaki, Dawson, DeMay (formerly Sasaki, Walker and Associates) is simply listed as landscape architects, for while HOK had the primary responsibility, the former was deeply involved, not only in the landscape, but also in the overall aspects of master planning and site development.

John D. Randall
Associate University Architect
Southern Illinois University
Edwardsville, Illinois



SYMONS SLAB SHORE CUTS DECK TIME FROM 5 TO 4 DAYS



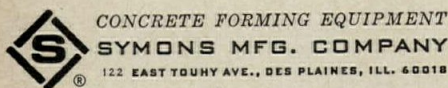
When Henry C. Beck Co. exceeded original cost estimates on a 20-story La Jolla, California, high rise, it decided to use Symons Slab Shore system in an effort to cancel the loss. Initial loss was recovered, and scheduled per floor construction time was reduced from 5 to 4 days.

From the third to the eighteenth floor, a twin tower section, each deck was typical, containing about 18,000 sq. ft. Decks were wide open, except for a few columns. Eighteen floors above ground and two below were formed with the Symons decking method.

Steel-Ply Forms used for the deck work are light enough to be stripped and carried by hand. This took a lot of pressure off the crane, allowing it enough time to handle other materials.

Only 8 man shifts of 8 hours each were needed to strip the forms from an 18,000 sq. ft. area. Two men moved the forms up to the next floor, and four men set a deck every four days.

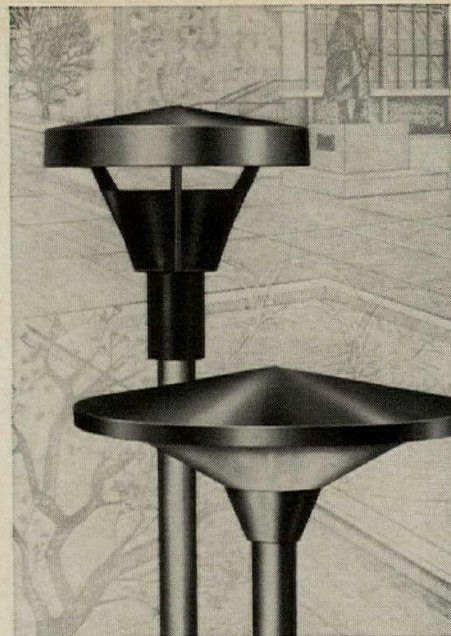
The job had originally been set up for a five day per floor schedule. After the tenth floor, however, crews became so proficient they were on a four day cycle. *Free Slab Shore brochure available on request.*



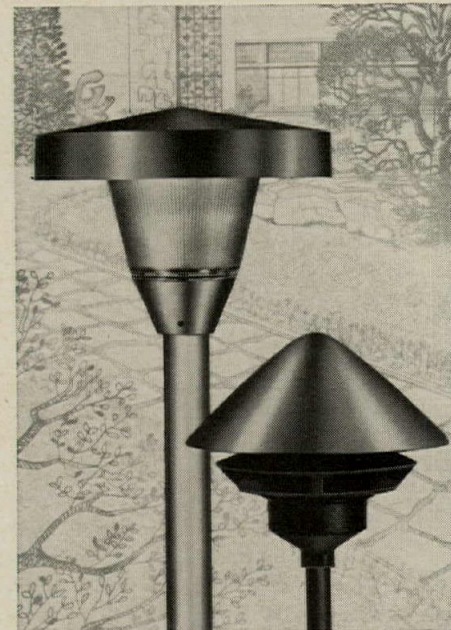
CONCRETE FORMING EQUIPMENT
SYMONS MFG. COMPANY
122 EAST TOLUAY AVE., DES PLAINES, ILL. 60018

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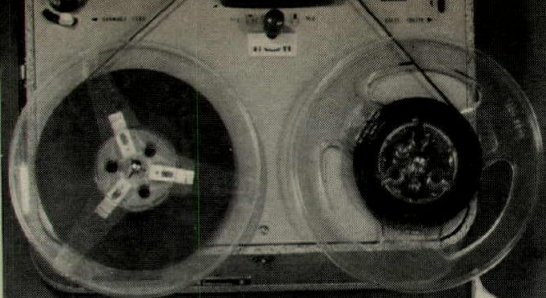
EMERSON ELECTRIC CO. [INC.]

270 LONG ISLAND EXPRESSWAY, MELVILLE, N.Y. 11747
CANADA: 2275 Midland Avenue, Scarborough, Ontario

For more data, circle 33 on inquiry card

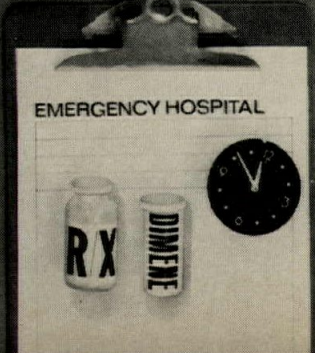
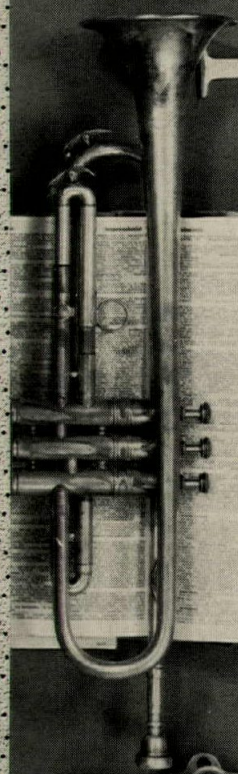
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SUMMER SEASON
PLEASING ENTERTAINMENTS!
OPERATIC
GEMS
GENTEEL COMEDIES
SIGN'R STRINI
MRS. ADA KING,
MR. EDWARD WARDEN
SATURDAY EVENING, June 17, 1904

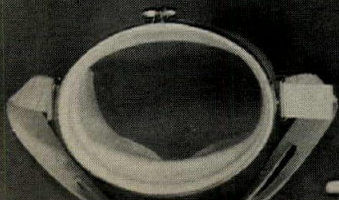


70
60

LIBRARY



OPS 22



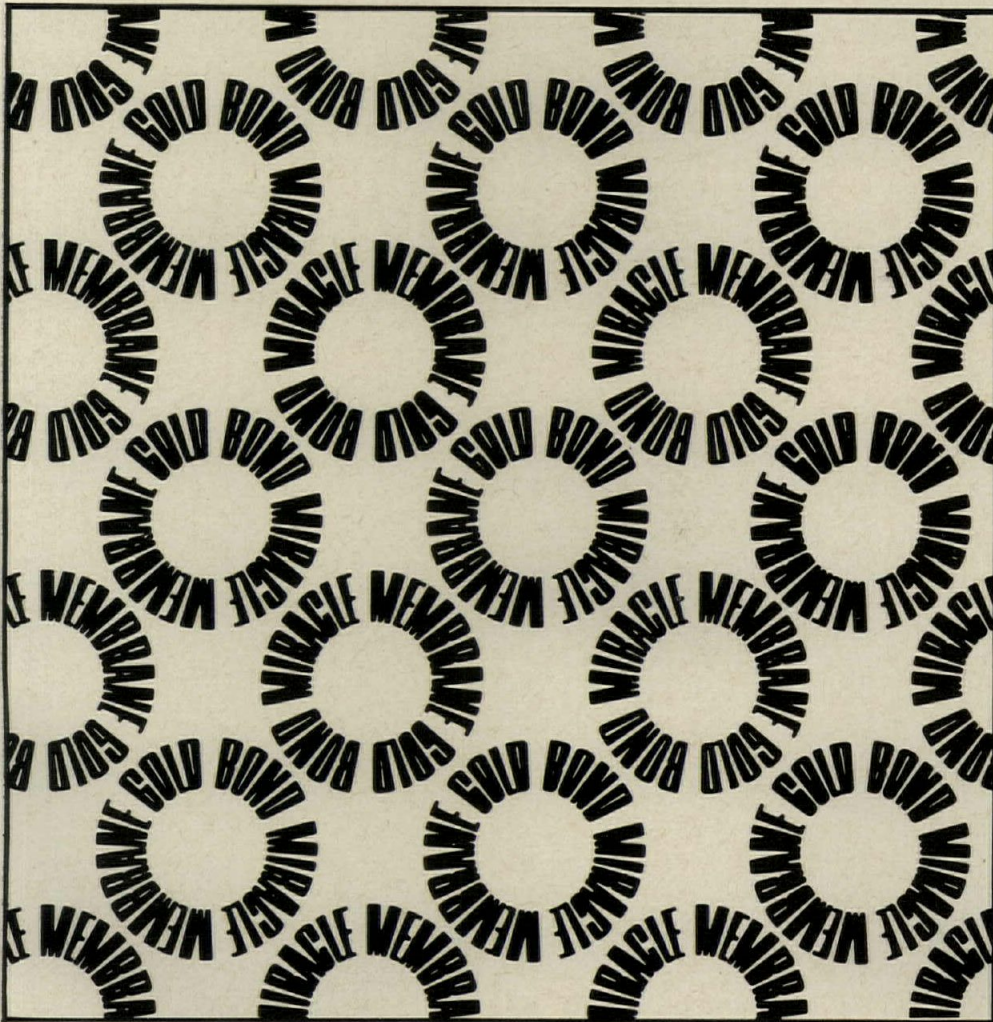
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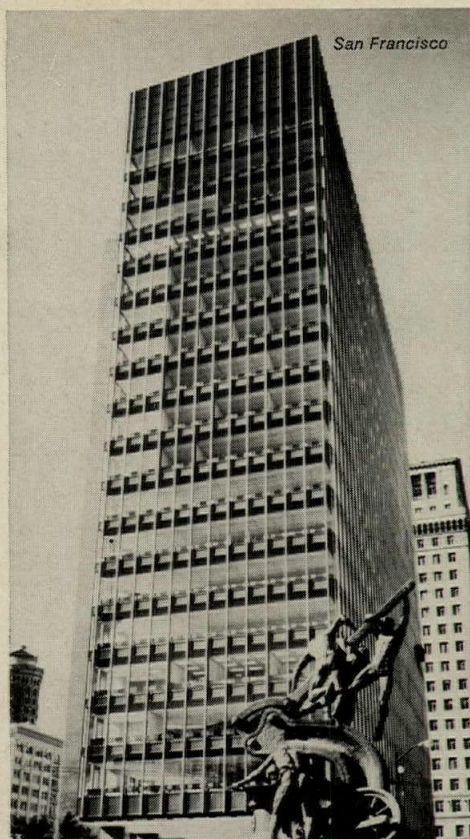
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San Francisco

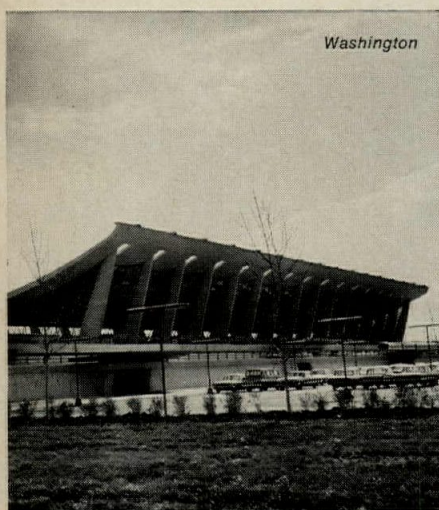
office buildings . . .



Baltimore

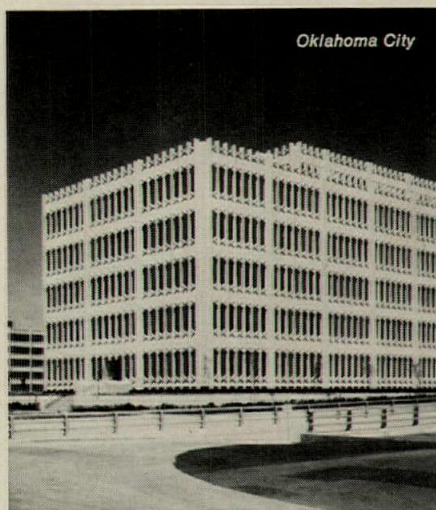
hospitals . . .

These buildings have one thing



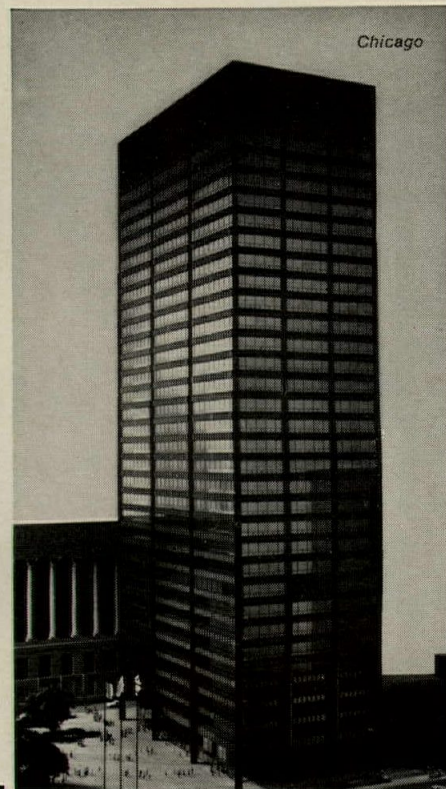
Washington

airports . . .



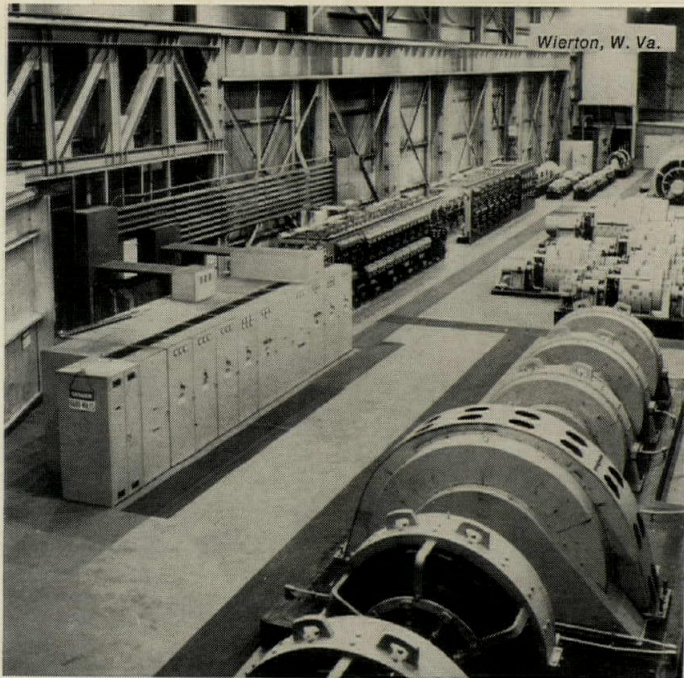
Oklahoma City

government buildings . . .

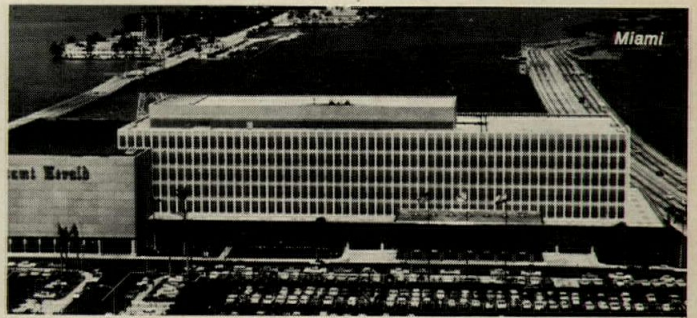


Chicago

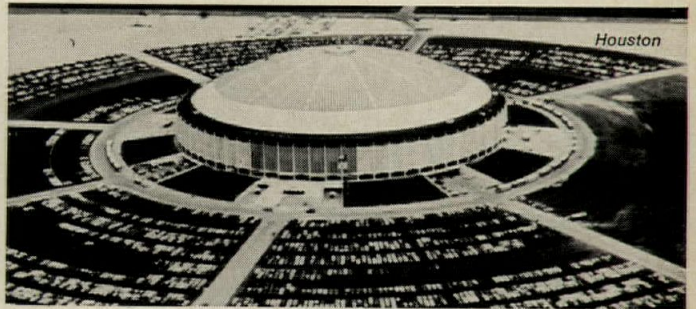
civic centers . . .



mill motor rooms . . .



newspaper plants . . .



sports arenas . . .

in common...clean air by AAF

Only AAF makes all kinds of air filters to solve all kinds of air-cleaning problems.

These are typical of the air-cleaning problems solved daily by AAF, from huge indoor sports arenas to sparkling-clean hospitals.

In specialized applications such as white rooms, laboratories, and even atomic submarines, AAF is on the job, keeping air super clean under critical conditions.

Whatever type of building, whatever

the air-cleaning requirements, AAF offers total capability for providing the optimum correlation of filter cost, filter efficiency, and filter maintenance.

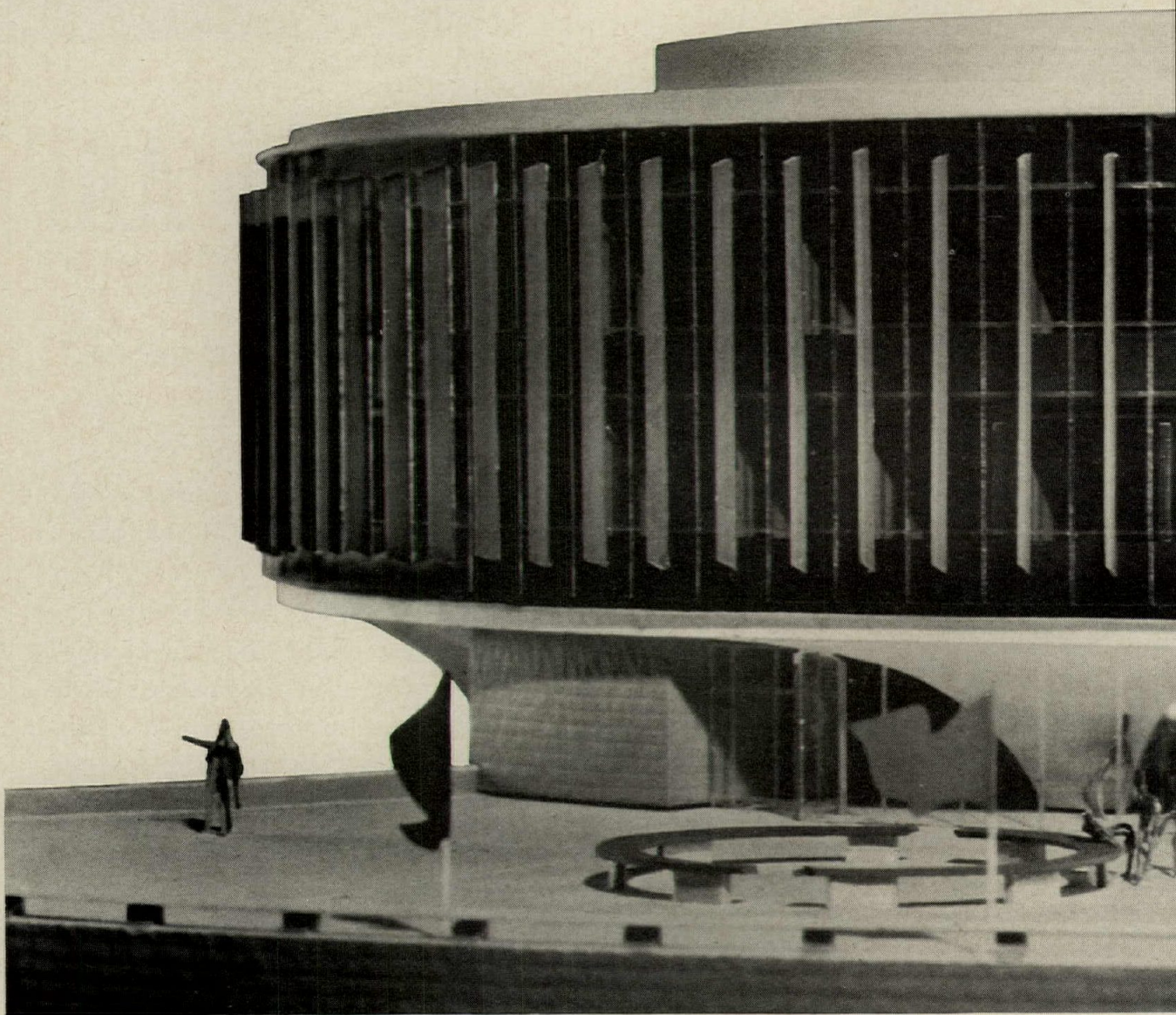
Ask your local AAF representative for information about the world's most complete line of air filters. Or write: Robert Moore, American Air Filter Company, Inc., 389 Central Avenue, Louisville, Kentucky 40208.



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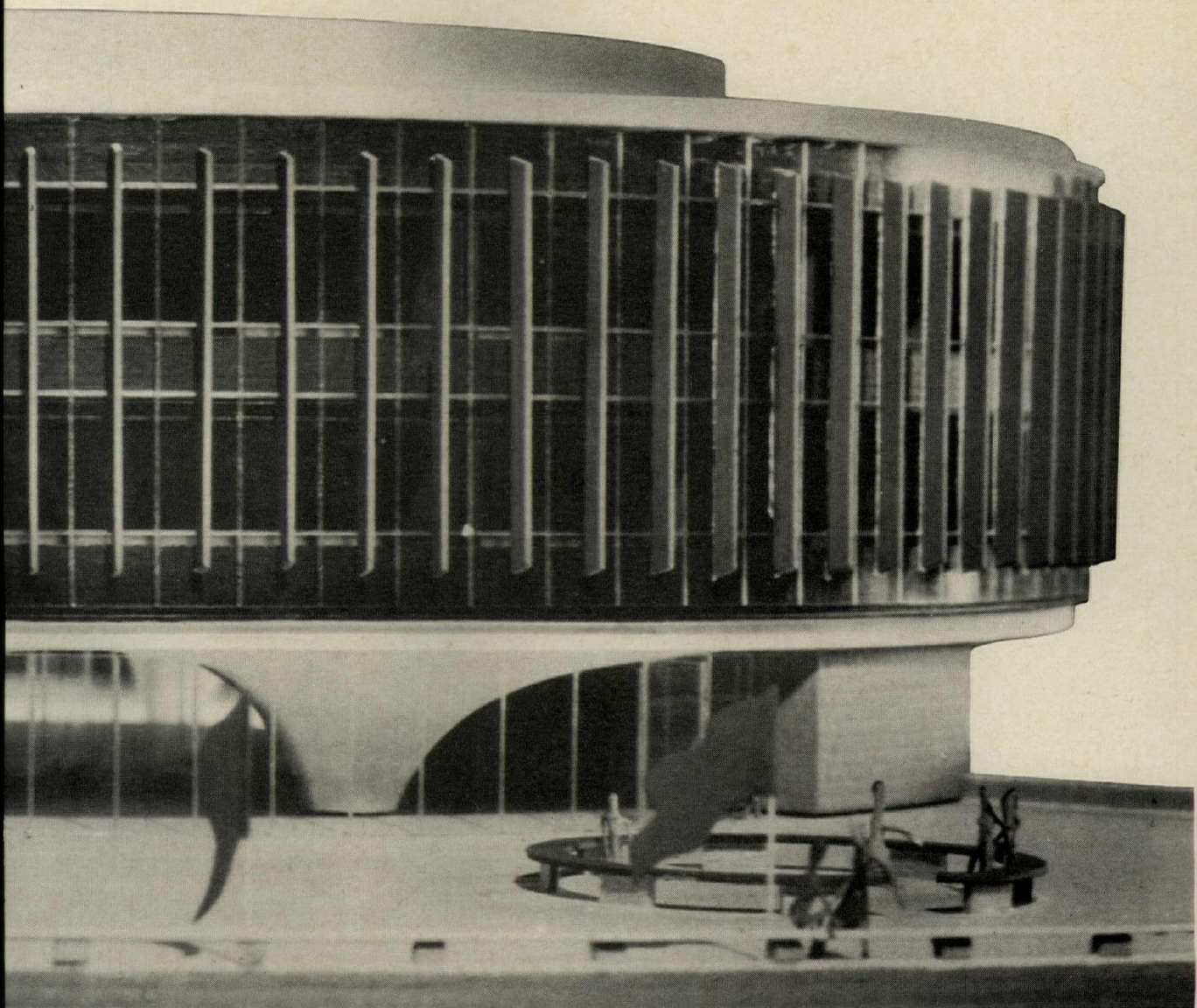
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Dormitories: Big Problem on Campus

Steel: Most Versatile Solution

All across the country, our colleges and universities are coming to grips with the enormous problem of student housing. Recent figures indicate that current enrollment is running ahead of available residential accommodations by about five to one.

In deciding how to plan new dormitories, colleges and their architects are finding that structural steel offers many advantages. Wide scope for aesthetic expression, shortened construction time, adaptability to existing architectural styles, low initial building cost . . . these are a few of the contributions steel can make to your student housing program. Be sure your architect fairly evaluates the new, economical steel techniques. Bethlehem Steel Corporation, Bethlehem, Pennsylvania.

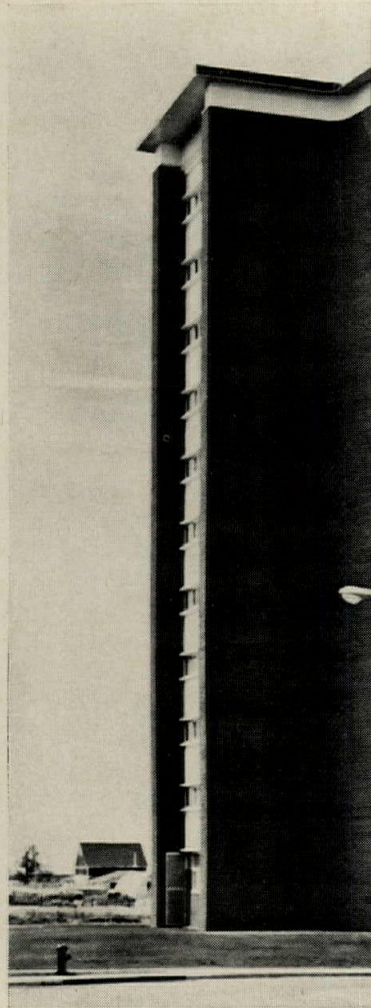


***Cornell University
Ithaca, N.Y.***

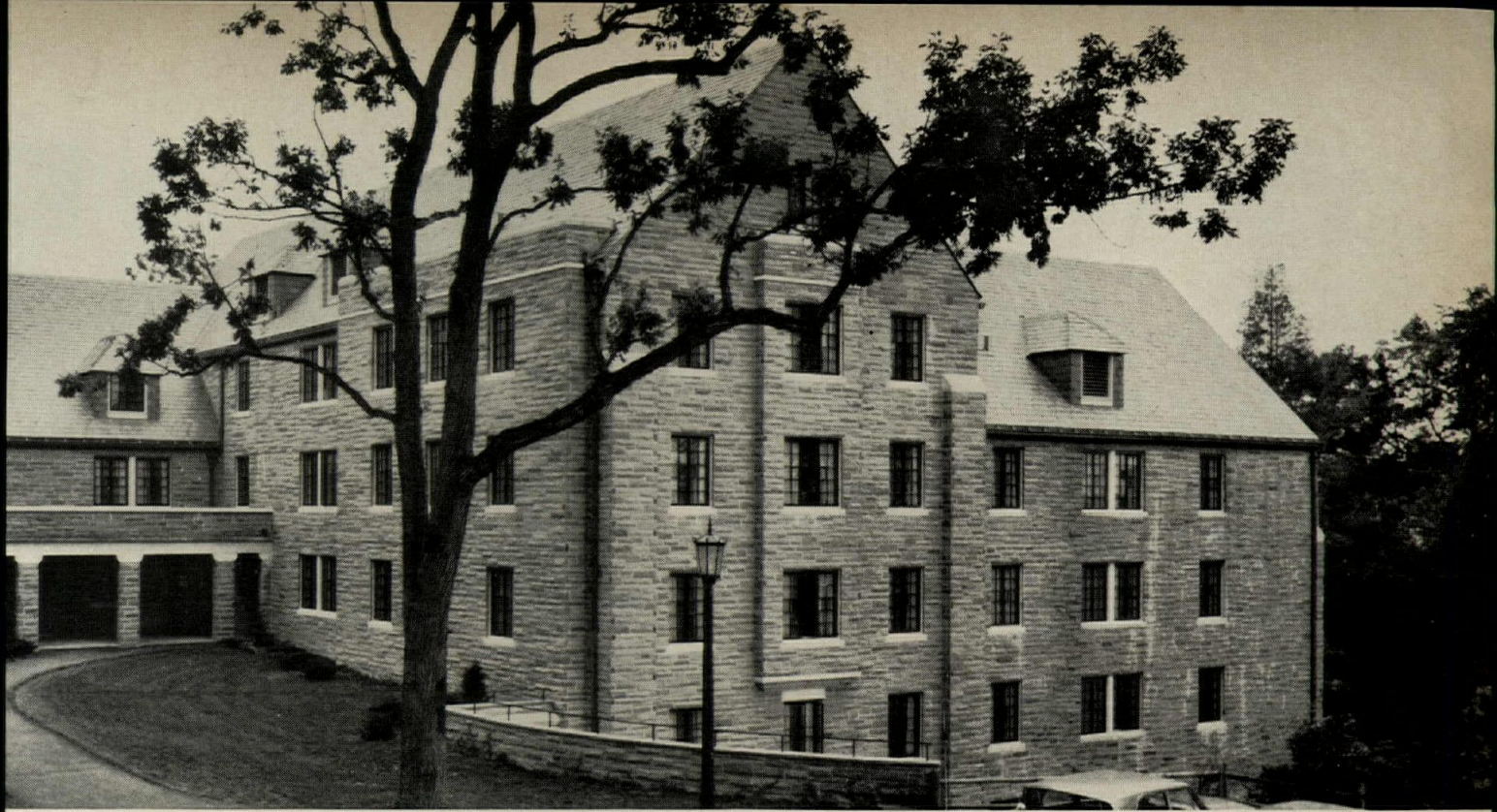


***Canisius College,
Buffalo, N.Y.***

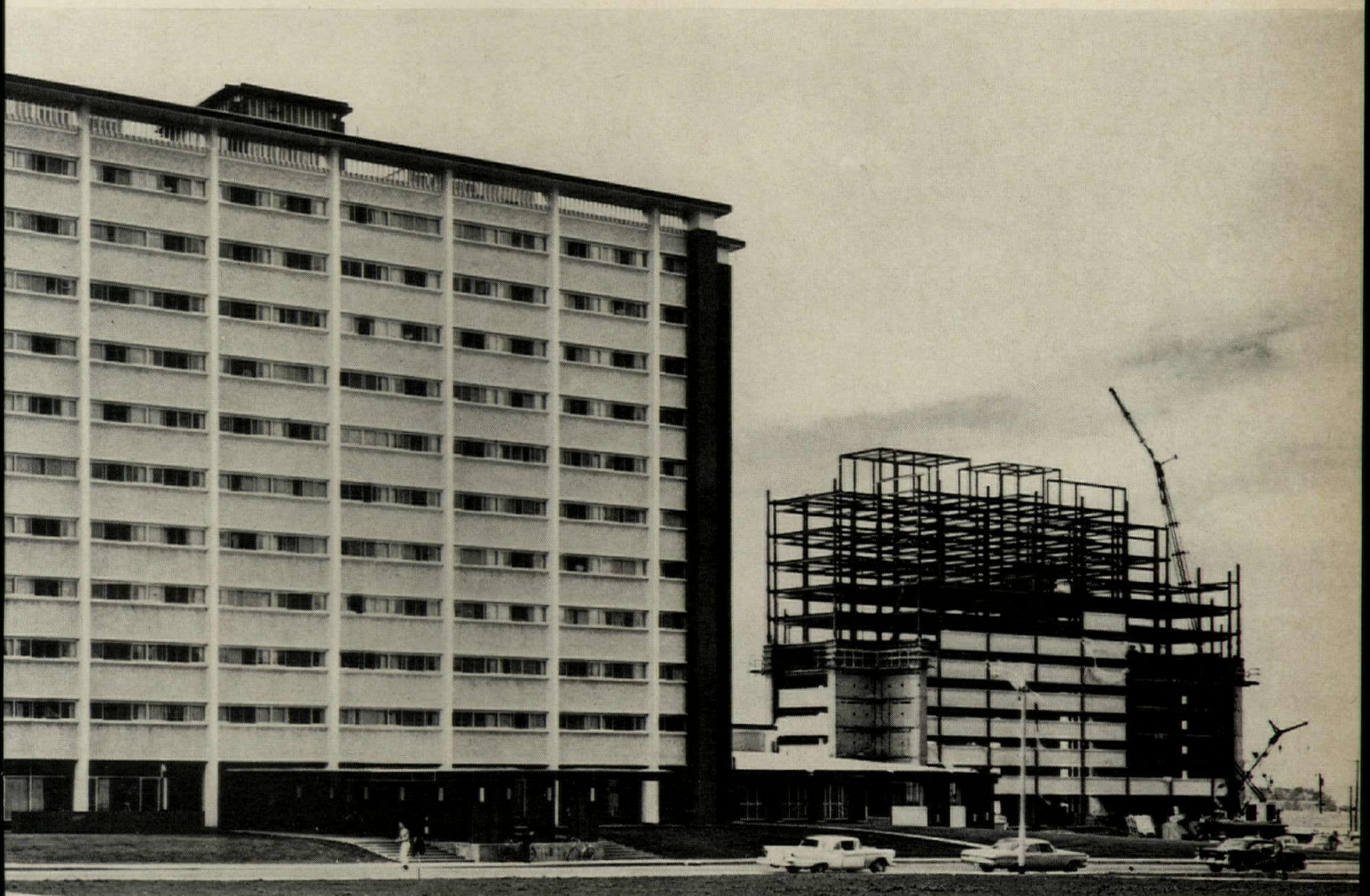
This 298-student dormitory is L-shaped. The steel frame permitted generous expanses of open space in the social areas of the building.
Architects: Pauly, Hauck & Welch



***Montana State
University,
Bozeman, Montana***



Charles Evans Hughes Residence Hall, for students in Cornell's law school, points up the adaptability of steel framing to traditional architecture, as well as to sloping terrain. *Architects: Eggers and Higgins*

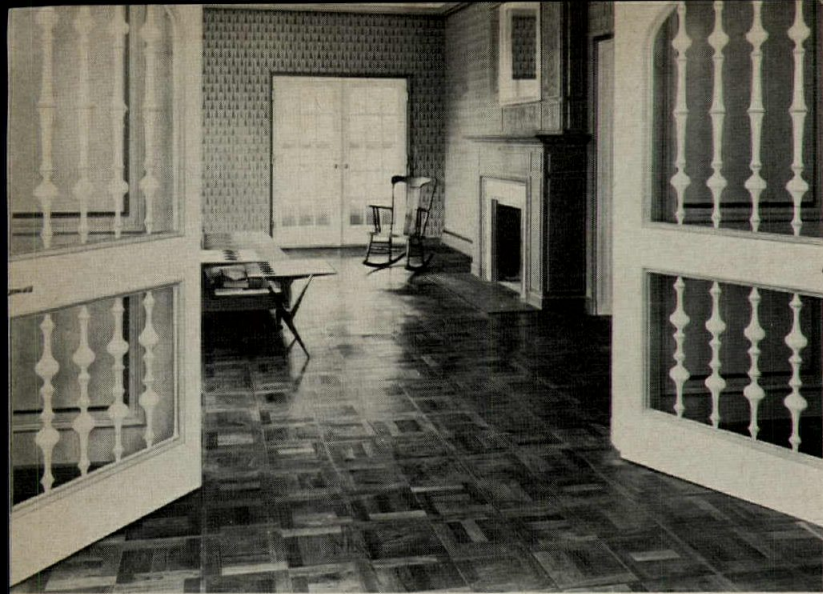


Hedges Hall is one of two 11-story dormitory buildings in which steel framing comes through as an architectural element. Steel's speed of erection brought substantial economies here. *Architects: Berg & Grabow, Associated Architects*

BETHLEHEM STEEL



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Swirl Pattern in the Long Island Home of Architect Joseph Mauro

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Consult *Sweet's Light Construction Catalog* for technical data and write Bangkok Industries for Custom Design Book.



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Herring-bone Pattern in Home Designed by Gerald Jerome, A.I.D.



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Keep New York Plastered.
THE PLASTERING INSTITUTE OF GREATER NEW YORK


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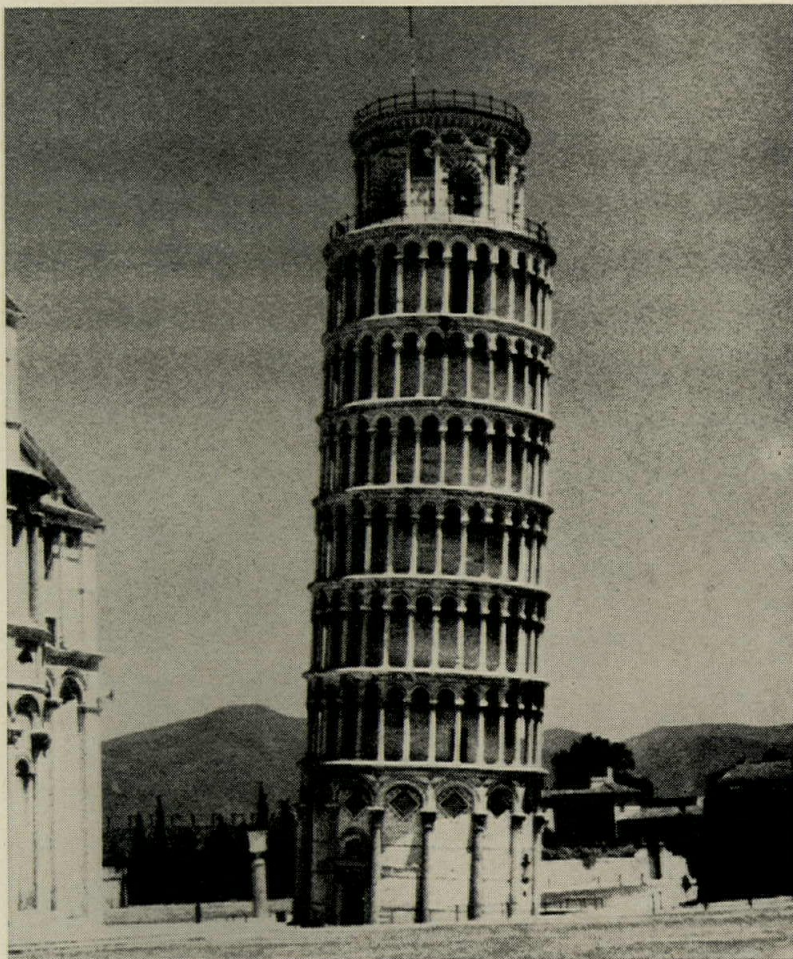
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For more data, circle 134 on inquiry card

◆ For more data, circle 40 on inquiry card

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takes the lowest bid
on air conditioning equipment?**



**He could get a sinking feeling
later. When you specify Carrier,
however, he's on solid ground.
Carrier never cuts quality in order to
cut price. Ours may cost a
little more...but in spite of this,
more people put their confidence
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Air Conditioning Company

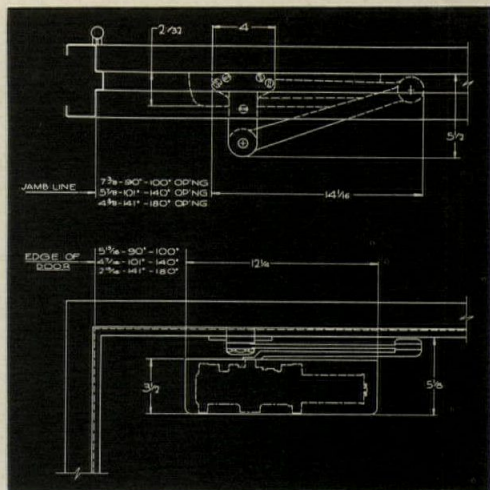
For complete product information, call or write your nearest
Carrier representative. He is in the Yellow Pages.

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LCN

for modern door control



Details of installation for stop-face-mounted "Smoothee" closer shown in photograph

Main features of the LCN 4110 Smoothee® Door Closer

- 1 Fully hydraulic, providing efficient, full rack-and-pinion control of the door
- 2 Easily adjustable general speed, latch speed and spring power (may be increased 50%)
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LCN CLOSERS, PRINCETON, ILLINOIS
A Division of Schlage Lock Company

Canada: LCN Closers of Canada, Ltd.
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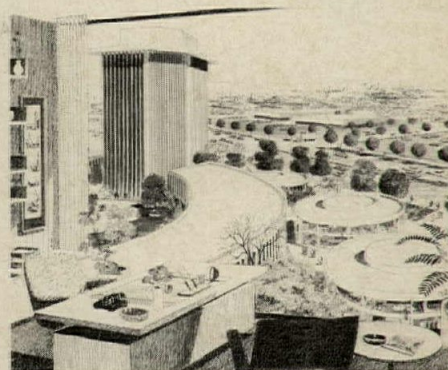
PHOTO: Auditorium Entrance, North Central High School, Indianapolis, Indiana; Everett I. Brown Company, Architects

167



Bank-office building is connected to parking facility

The 20-story bank and office building for the Marshall & Ilsley Bank now under construction in Milwaukee, will be faced with limestone mullions, opaque glass spandrels and bronze-tinted windows. The tower which will contain a gross area of 358,000 square feet, was designed by Garssold-Johnson-Wagner & Ilsley, Inc., architects-engineers. An adjacent seven-story structure, which has direct access to the bank will contain parking space for 420 cars and will house four drive-in banking windows. General contractor is Hunzinger Construction Company.




Gordon Sommers

Financial center designed as a series of concentric circles

The Del Amo Financial Center in Torrance, California is a \$30-million office building complex planned as a series of concentric circles. At the center of the circle will be a three-level circular parking structure. Surrounding the garage will be three four-story "ring buildings," separating three 13-story office towers. Circular two-story pavilion buildings will be set informally on the site. More than a million square feet of office space will be provided. Architects are Victor Gruen & Associates and planning consultants are Jack Bevasch & Associates.

◆ For more data, circle 42 on inquiry card

Big heating problem



NEW
CRANE
commercial
gas
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Lower,
narrower
design

Fewer burner
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AVAILABLE IN 33 SIZES

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New Crane Gas Boilers are lower, narrower and lighter. Designed to solve any large heating problem. From a six-flat to high-rise apartments.

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The boilers are smaller for all 33 sizes. Yet, the new, smaller boilers are more rugged with water working pressure up to 80 psi. The smaller boiler sections can be easily handled by two men and hydraulic jacks reducing installation time.

Over a dozen design features make the new boilers easier and more efficient to specify or install.

There's a choice of three ignition systems.

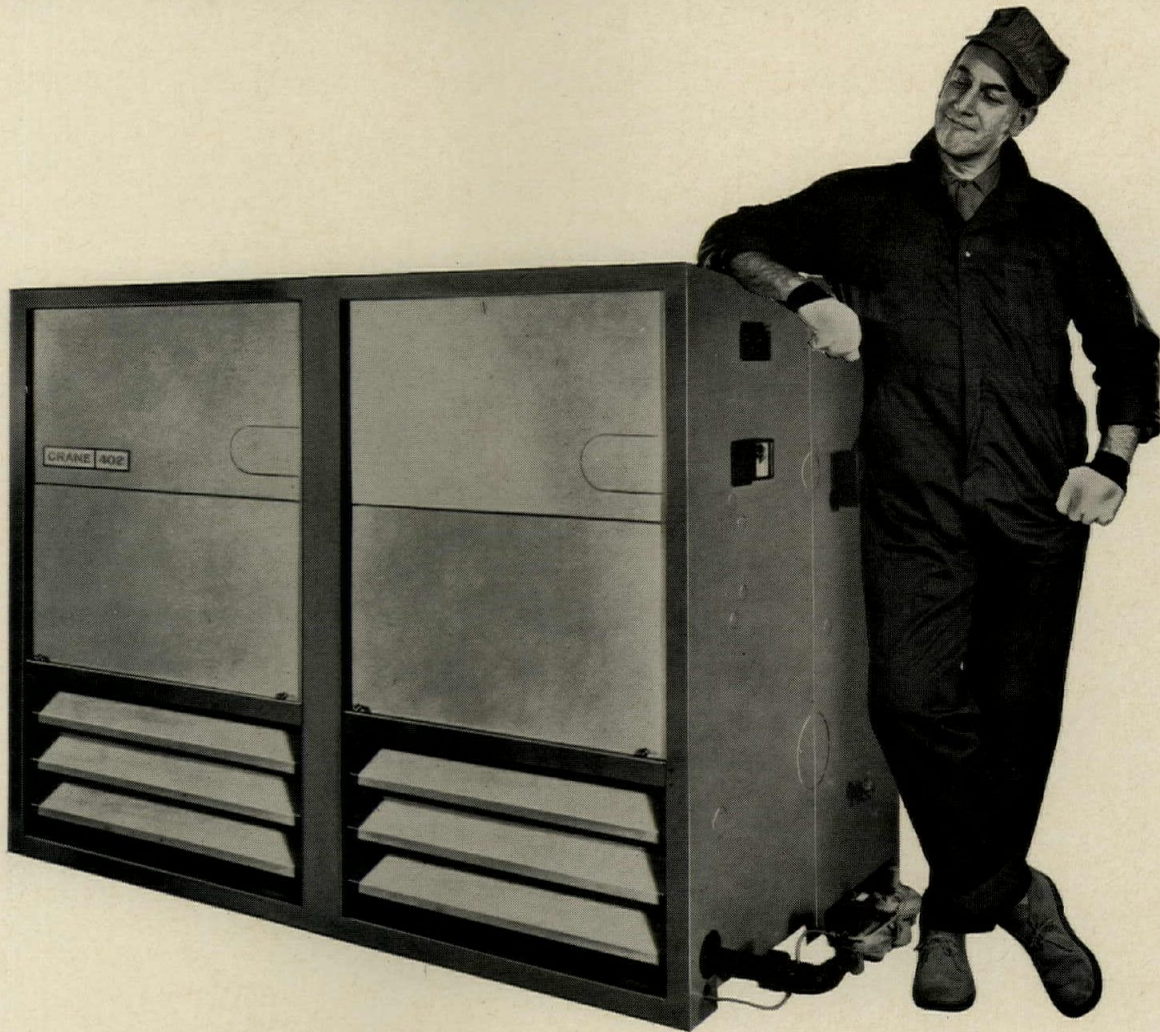
The standard AGA-approved system—the electronic pilot type system—or the non-ignition system which combines a unit runner tube with electronic controls.

The sturdy, cast iron sections are constructed with three nipples rather than just two. This allows uniform water flow within the boiler section for maximum heat transfer and economical operation.

All boiler sections have ground bead joints that are easier to install and make gas-tight.

Boiler sizes of 5 to 37 sections have A.C. input ratings from 680 to 6120 MBh. A 100 MBh increment between sizes provides a greater number of boiler sizes to meet design requirements.

ecome smaller when the boiler is smaller.

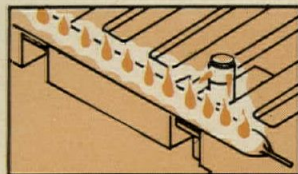


Mail the coupon for complete details. We think you'll agree with the new design features: Commercial boilers that are smaller in dimension. Bigger in capacity. Have the best ignition systems. And provide the trouble-free service of cast iron boiler sections and burners.

A.G.A. approved • I-B-R Rated
A.S.M.E. constructed
F.I.A. & Standard Controls

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PLUMBING • HEATING • AIR CONDITIONING



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TUBE IGNITION SYSTEM**
Pilot must prove within 15 seconds after start-up or gas supply shuts off. Fast starts reduce gas consumption and eliminate puff backs.

Crane Co., Dept. 008 4100 So. Kedzie Ave., Chicago, Ill. 60632

Send Bulletin ADJ-1809 with complete details.

Name _____

Company _____

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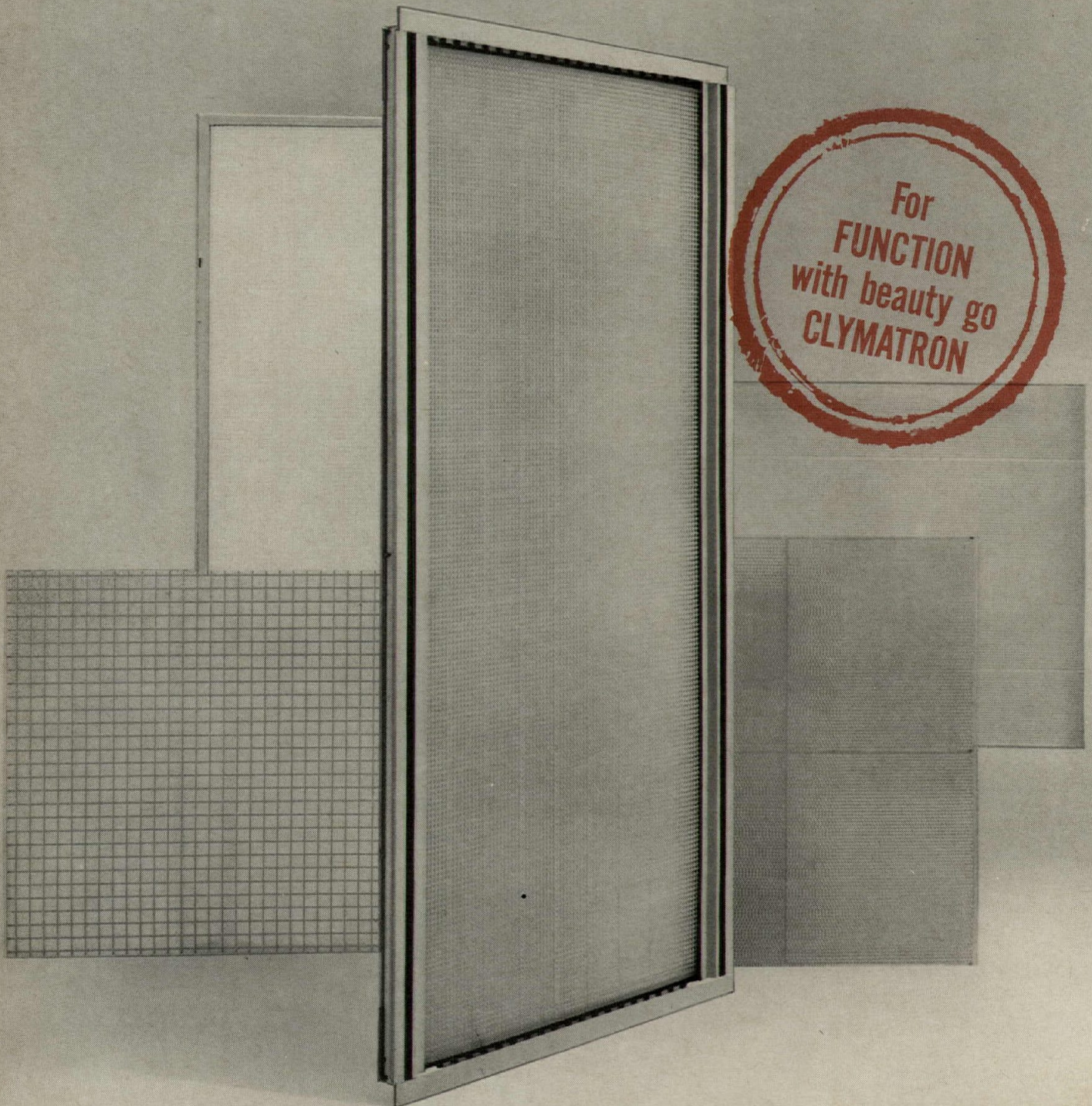
City _____ State _____

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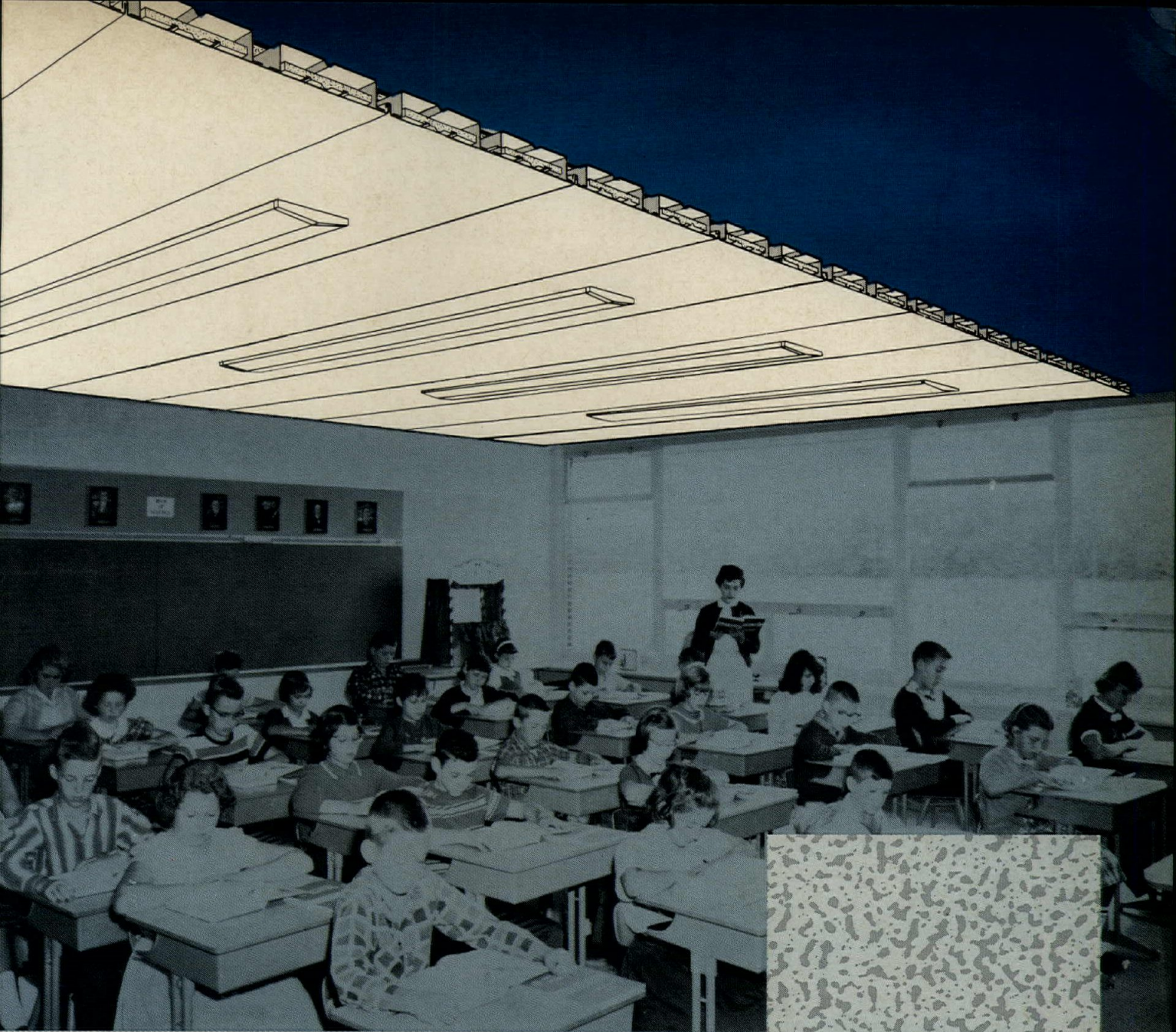
Meet CLYMATRON II, son of Clymatron. Better than its pa. Puts out more footcandles of cooler light. Better looking, too. Has extruded aluminum trim, regressed splay, frameless or framed enclosures. Besides lighting, Clymatron II handles air...lots more of it in fact, with a new adjustable baffle controlling its direction from vertical to horizontal...transfers heat...even provides total heating. In fact, it does so many things, it takes a brochure to explain the whole story. Better write for it!



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A DIVISION OF EMERSON ELECTRIC CO.



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embossed ceiling surface

You get an attractive embossed ceiling with Robertson Long-Span acoustical roof deck

Pictured above is true construction economy without sacrifice. In one unit you get an excellent long-span structural roof deck and an attractive, effective acoustical ceiling ready for field paint. Its embossed surface effectively reduces glare and reflections. The glass fiber sound absorbing material is protected against damage by the perforated steel. Moreover, no fire hazard is present since there are no combustibles involved.

Robertson Acoustical Decks are available in two styles and eleven types for varying load and span requirements. One style involves the flat perforated ceiling shown here. The other features a fluted ceiling with the perforations in the vertical webs. Troffer lighting can be installed easily in all types.

Write to H. H. Robertson Company for acoustical deck literature and specifications.

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Plants in Ambridge, Pa.
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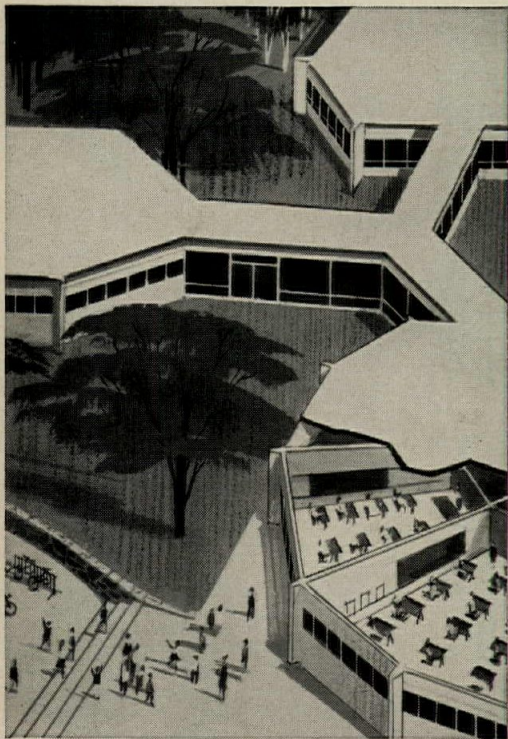


SUBSIDIARIES, PLANTS OR SALES OFFICES IN THESE COUNTRIES: AUSTRALIA, AUSTRIA, BELGIUM, CANADA, DENMARK, FINLAND, FRANCE, GERMANY, HOLLAND, IRELAND, ITALY, NIGERIA, NORWAY, SINGAPORE, SOUTH AFRICA, SWITZERLAND, SPAIN, SWEDEN, UNITED KINGDOM.

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Only all-electric you all these

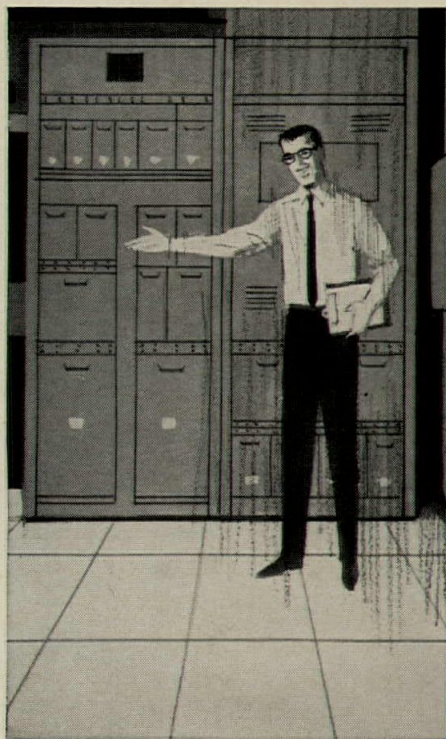
FLEXIBILITY OF DESIGN



The design simplicity of electric heating and cooling components permits you to design with far greater freedom and flexibility. And since no bulky furnaces or complex distribution systems are required, you can solve problems of office and room design with far greater latitude.

Witness the oval layout of the Pine Hill Elementary School, Pine Hill, N.J. Surrounding a central library and multi-purpose room are classrooms varying in shape and size. And rooms will be added as needed—in satellite clusters.

LOWER CONSTRUCTION COSTS



The most modern, efficient heating/cooling system you can specify can actually be the least expensive for your client to install. With an electric system, you can eliminate costly boilers, stacks, trenching and steam piping. Not to mention fuel storage and boiler rooms. (The boiler is replaced by a compact control cabinet, like the one seen above.) You would also eliminate attendant high installation costs.

How substantially can construction costs be reduced? By going All-Electric, the designers of the 60,700 sq. ft. Hampshire High School, Romney, W. Va., for example, lowered construction costs by \$62,900. A saving much appreciated by the local school board.

HEAT RECOVERY

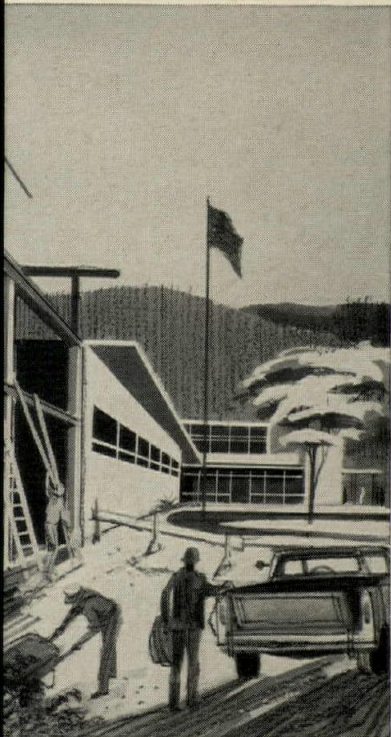


The principle of recovering heat from high-intensity lighting permits such impressive economies, that it seems sure to dominate the future of space conditioning. By deploying the recovered heat to the cooler parts of a building, or storing it for later use, the architect can effect extraordinary operating efficiency.

Example? The new All-Electric 94,500 sq. ft. engineering and administration building of Electronic Associates, Inc., Long Branch, N.J. So efficient is this building's heat-by-light system that during milder parts of the heating season it provides enough extra heat to carry over to other EAI buildings.

design can offer major benefits

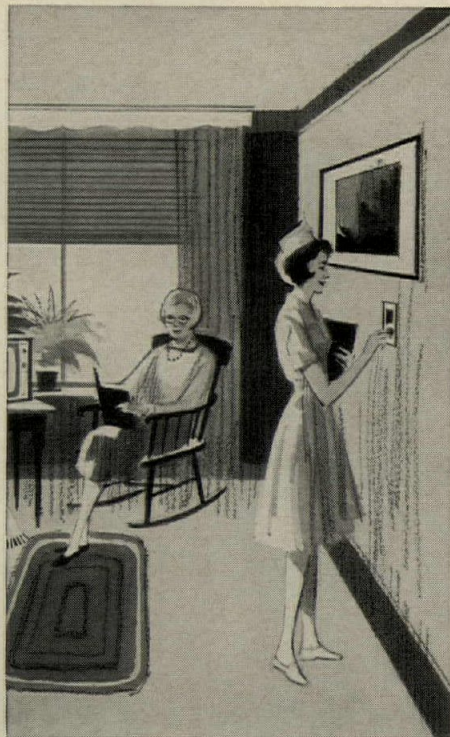
EASIER EXPANSION



Why is it much easier to expand an All-Electric building? Because you can forget about boilers and boiler capacity problems. And there's no need for concern about boiler rooms, fuel storage or stacks. Instead, expansion is accomplished with wiring and a compact control cabinet.

Example? Central High School, Olympia Fields, Ill., expanded from 103,500 sq. ft. to 159,685 sq. ft. at an estimated saving of \$38,610.

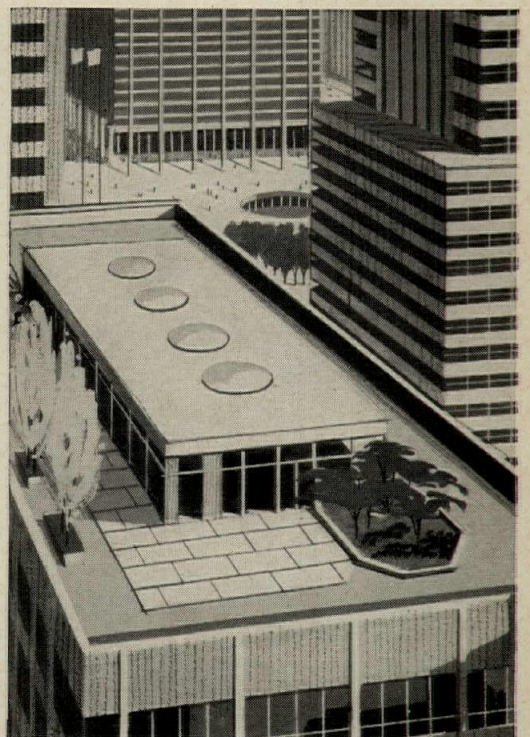
ROOM-BY-ROOM TEMPERATURE CONTROL



In many buildings, individual room temperature control is a must. Nursing homes require it for critical health reasons. Motels want it for economy. And it is also fast becoming standard in other buildings in which occupancy and activities vary daily from room to room; e.g. schools, churches and hospitals.

Only All-Electric design permits room temperatures to be controlled directly, either by occupants inside their rooms or by management from a remote central location...or both.

EXTRA RENTABLE SPACE



A penthouse serves best as a source of revenue—not as a storeroom for boilers, cooling equipment and fuel. That's one reason why the builders of the \$3 million People's Savings Bank Building in Bridgeport, Conn., chose All-Electric design.

By specifying through-the-wall electric heating/cooling units, they freed 4,800 sq. ft. of penthouse space for extra owner income. The added return on capital? \$15,000 per year.

Shouldn't you incorporate these All-Electric benefits into your next project? For more facts, call your electric utility company.

LIVE BETTER ELECTRICALLY

Edison Electric Institute, 750 Third Avenue, New York, N.Y. 10017

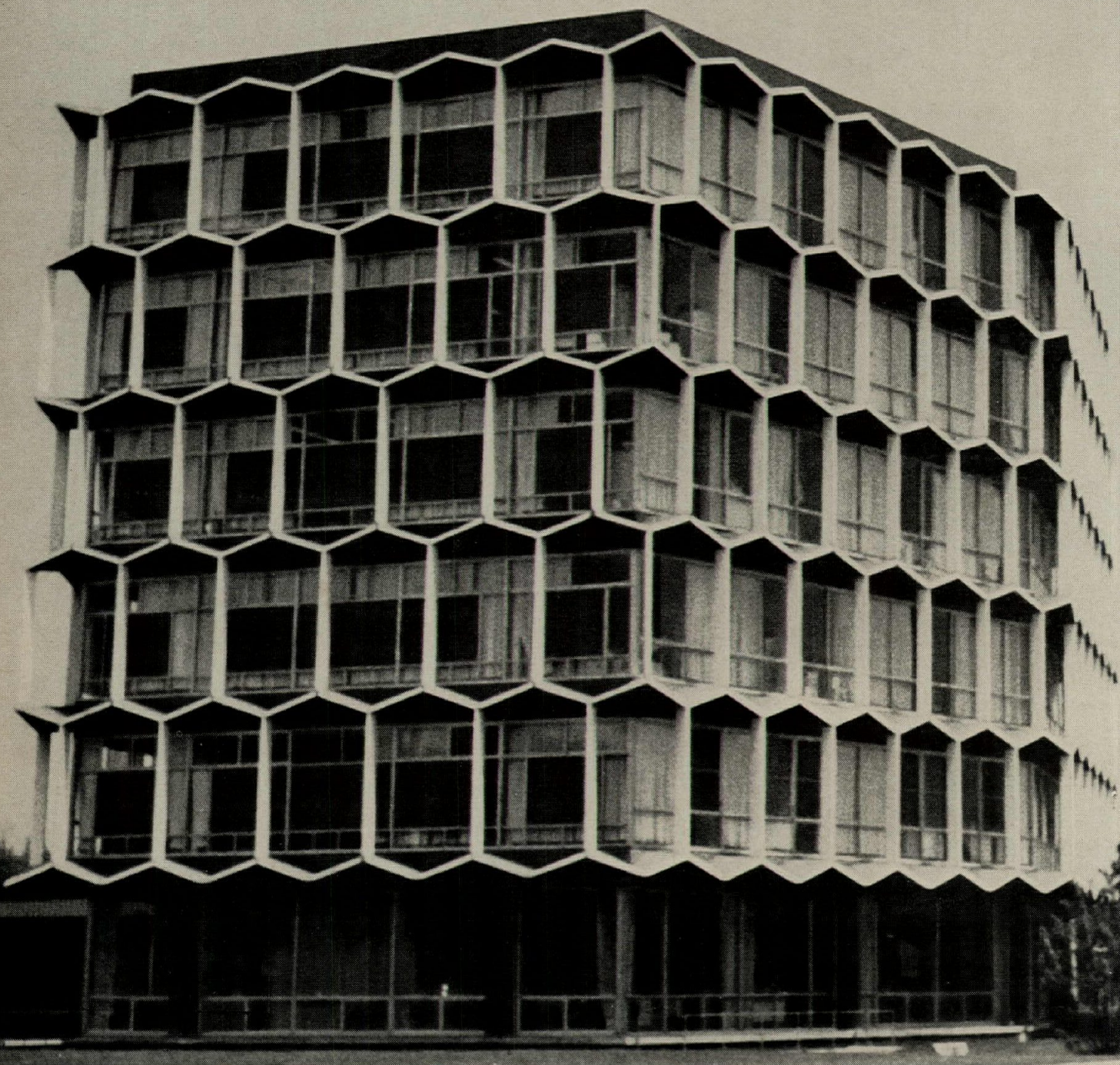


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for versatility and

reinforced concrete is the architects' design material

■ The versatility of monolithic reinforced concrete lets architects design with complete freedom for the achievement of structural beauty and individuality. In this school administration building, the architects utilized a reinforced concrete frame with elongated hexagonal openings to create a building of unusual architectural interest. Reinforced concrete's versatility also permitted the carrying out of the building's hexagonal motif into class room shapes. Use reinforced concrete in your next building. It eliminates the many design restrictions imposed by other construction methods



style!

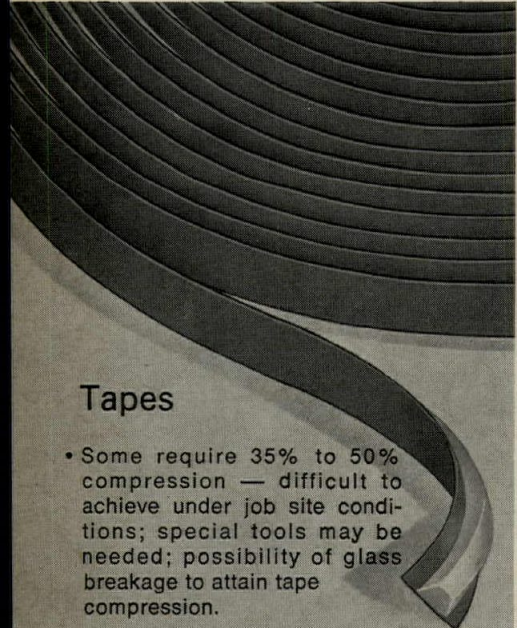


Chicago Teachers College, Chicago, Illinois
Architects: Perkins and Will, Chicago
General Contractor: Chell and Anderson, Chicago
Structural Engineers: Perkins and Will, Chicago

CONCRETE REINFORCING STEEL INSTITUTE

228 North La Salle Street • Chicago, Illinois 60601

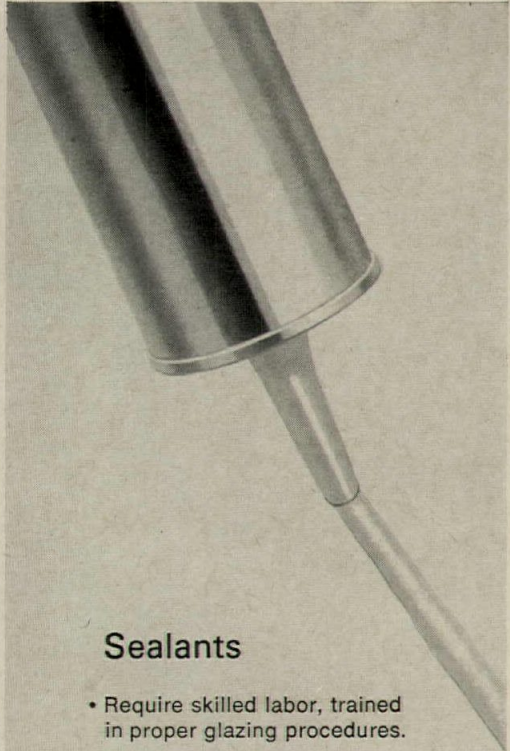
These glazing products do the job most of the time, but...



Tapes

- Some require 35% to 50% compression — difficult to achieve under job site conditions; special tools may be needed; possibility of glass breakage to attain tape compression.
- Most call for shims (interior and exterior) — improperly placed shims or missing shims cause leaks.
- Many demand careful placement — butting of tapes is critical. Corners of sash are vulnerable to leaks.
- Most present problems in controlling squeeze-out — which leads to excessive dirt collection.

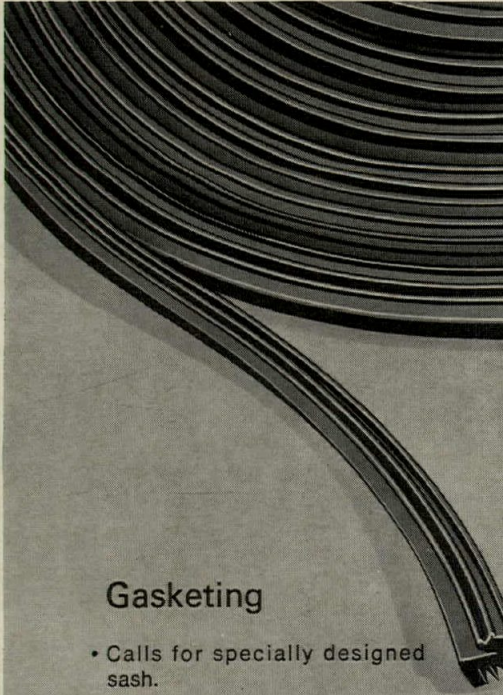
However, tapes do eliminate costly scaffolding.



Sealants

- Require skilled labor, trained in proper glazing procedures.
- Involve use of costly scaffolding.
- Necessitate careful placement of spacers and shims, or sealants can be "pumped out".
- Call for cut-off of the bead and clean-up.

However, sealants overcome the weakness of varying tolerances in glass and sash.



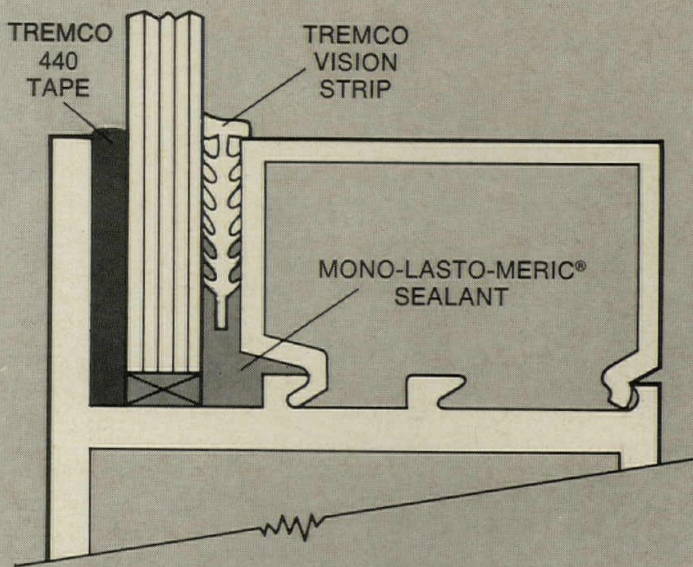
Gasketing

- Calls for specially designed sash.
- Demands close tolerances of glass, sash and the gasketing itself to achieve a weathertight seal.
- Often relies on a supplementary sealant to leak-proof joints.
- Not readily available in a wide variety of sizes, colors and shapes.

However, gasketing provides a clean, attractive appearance.

Each of the above often relies on other glazing products involving several suppliers.

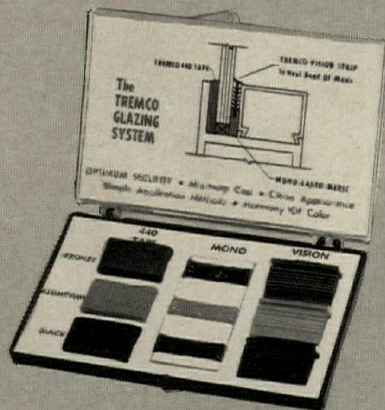
This modern, versatile Tremco Glazing System does the job all the time



Combines the best of "wet" and "dry" glazing methods • Proved performance on many jobs • Versatile — adapts to most windows • No scaffolding • No clean-up • No call-backs • No "leakers." Want to learn more? Write us.

A "systemized" approach to glazing providing:

- 100% Leak-proof Security
- Simplicity
- Economy
- Attractive Appearance



Send for specifications, descriptive data, or FREE sample kit.

Tremco provides you with a complete system . . . tape, sealant and gasketing — one source of responsibility.



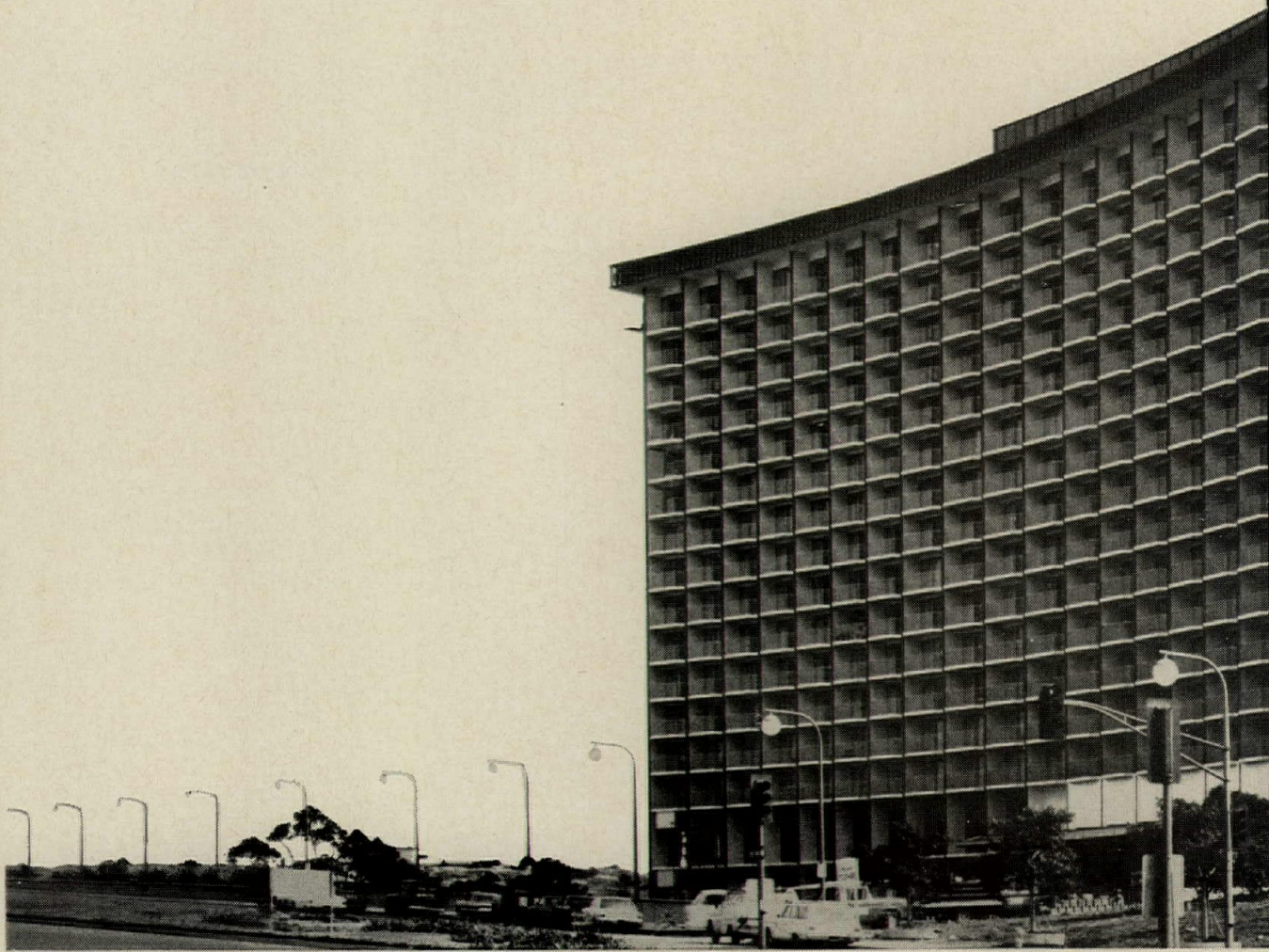
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Unique design to resist

The new Century Plaza Hotel in Los Angeles is 20 stories high and is located in earthquake Zone 3. In what is believed to be a first, the designers combined the ductility of the steel rigid frame and the stiffness of X-bracing to make this structure earthquake-resistant. The unique structural system permitted a story height of



earthquake forces

by 8' 10" with a floor to ceiling height of 8' 5½",
with no beams projecting into the rooms or cor-
ridors. This integration of structural and archi-
tectural space meant low unit cost and very low
weight per square foot of floor area.

This is another example of what can be accom-
plished with steel and imagination.


Architects—Minoru Yamasaki and Associates • Structural Engineers—
Worthington, Skilling, Helle and Jackson • General Contractors—
George A. Fuller Company, Inc. • Owner—Aluminum Company of
America • Operated by—Western International Hotels • Fabricators
and Erectors—American Bridge • Weight of Structural Steel—3,800
tons—ASTM A36



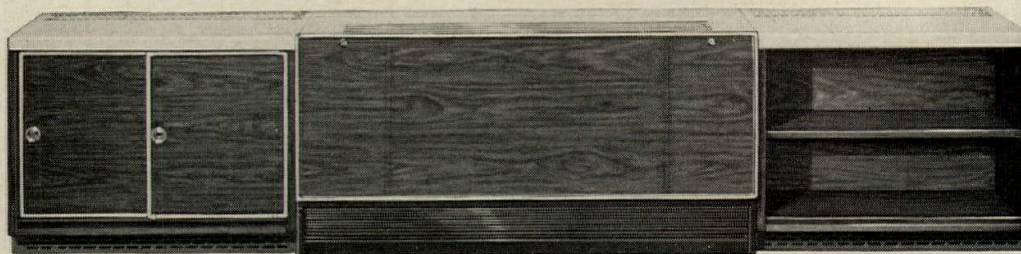
TRADEMARK

American Bridge

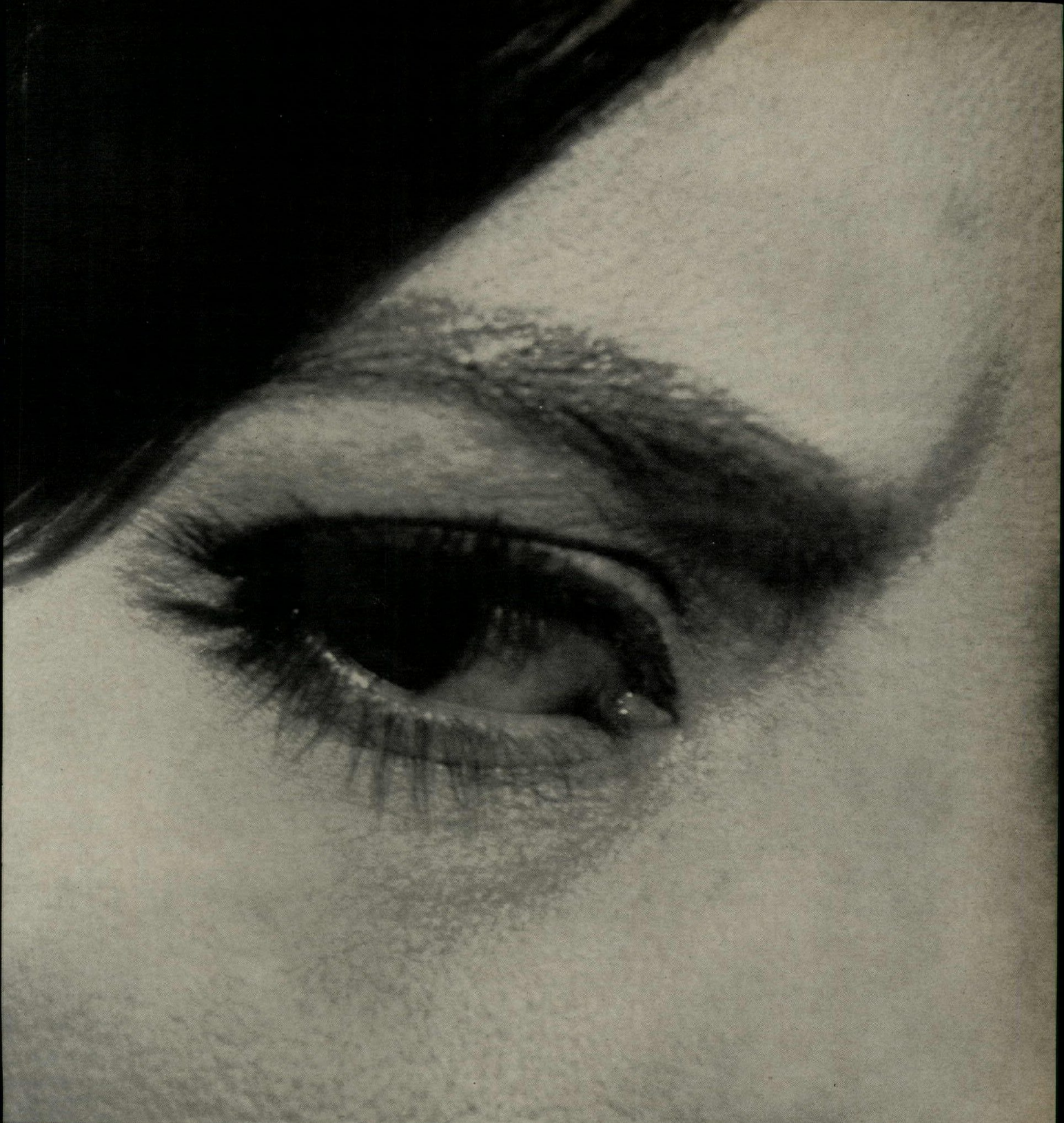
Division of United States Steel



The only time you'll hear a Modine



*Valedictorian and accessories come in decorator-color enamel and vinyl finishes.
Very attractive, yet not as costly as you might think. Ask for Bulletin V-1264.*



unit ventilator is when you're really trying

You won't hear it during class periods. Or conferences. Or even in the library.

Under normal schoolroom conditions Modine's Valedictorian unit ventilator *never* interrupts. We designed it that way from the smooth, purring motor to the thick, sound-deadening insulation—*whisper-quiet*.

As an all-season unit ventilator, Valedictorian performs the full air-conditioning function—or any part of it. A built-in "weather center" controls Modine's unique full-damper system. It stays sensitively alert to the class needs and responds instantly with fresh, filtered air at the right temperature.

Another Modine advantage: install Valedictorian now, postpone air conditioning until later. Next year, or any time—without spending a dime for converting Valedictorian — you can have cooling, too.

Call your Modine Representative or write us at 1510 DeKoven Ave., Racine, Wis., 53401.

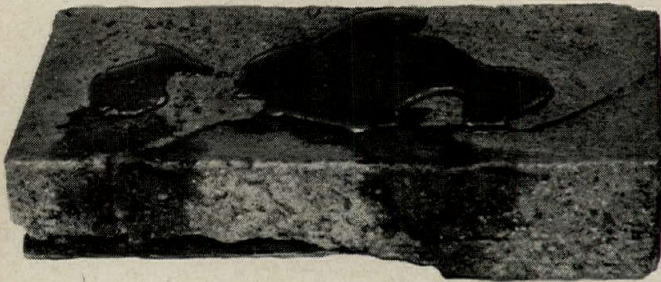
V-1542



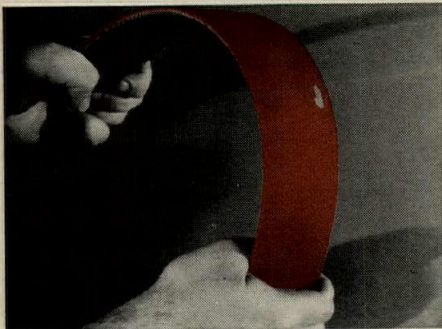
MODINE

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G-E Silicone Traffic Topping permanently hides unsightly surfaces, permanently protects new ones.



Waterproof. Traffic Topping prevents water penetration and moisture retention damage in concrete and other flooring construction materials. Protects against freeze-thaw cycles. Repairs previous damage. Ideal for outdoor ramps, platforms, walks, and traffic bearing roofs.



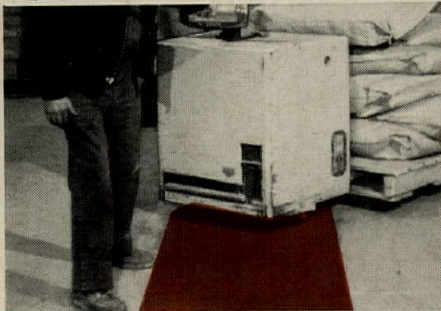
Permanently flexible. Made of silicone rubber, Traffic Topping keeps its resilience indefinitely. Won't harden, soften or become brittle, even at -65°F or 300°F . Provides a cushioned walking surface as it protects.



Quick, easy application. Traffic Topping adheres securely to most clean flooring construction materials, old or new. Needs no costly equipment. Cures to a tough, weatherproof surface. Looks great too. Six colors available.



Skidproof, too. Even when wet, Traffic Topping's textured surface assures safe, sure traction where it's needed most: pool copings, laundry rooms, public walking areas, tennis courts. And it even makes non-skid stair treads.



Wear resistant. Traffic Topping withstands wear and abrasion of shoes and vehicles. It's a superior surfacing medium for parking areas, garages, promenade decks, and light duty industrial floorings.



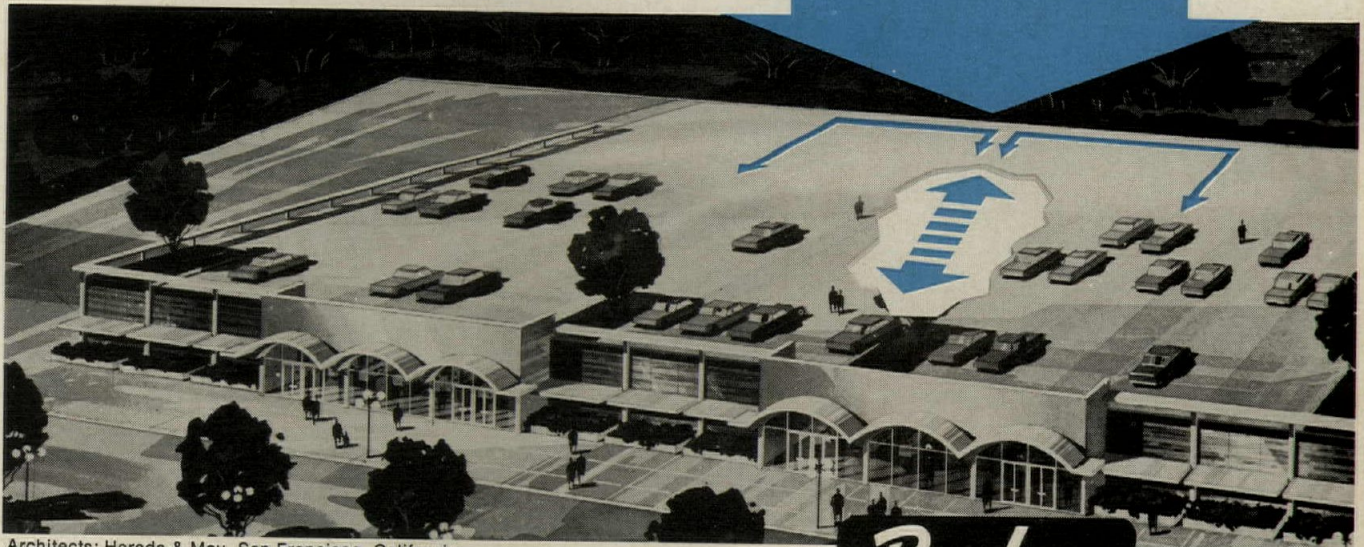
Fights chemicals. Because Traffic Topping resists many chemicals, organic acids, alkalis, salts and oils, it is an ideal surfacing medium for food processing and similar plants, where such materials present a problem.

For complete information and your distributor's name, write Section BG1248, Silicone Products Dept., General Electric Company, Waterford, N. Y. 12188

GENERAL  ELECTRIC

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SANDVIK
MOVATOR....



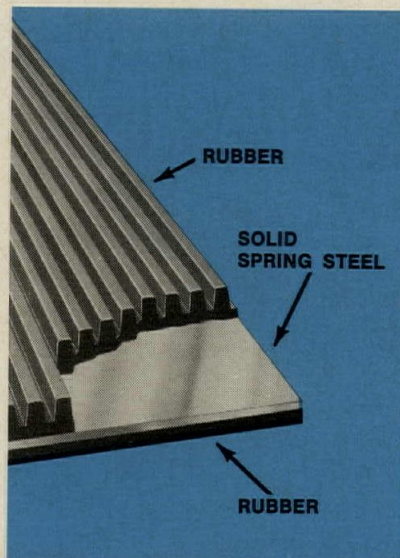
Architects: Harada & Meu, San Francisco, California

....Gives
**A Unique Solution To
Easier Shopping And Parking**



At this new store in San Francisco, Skaggs Pay Less Drug Stores' customers will glide with stepless ease from rooftop parking to the floors below and then up again with **loaded shopping carts**. They'll be riding on SANDVIK MOVATORS . . . moving walks of rubber-covered steel.

SANDVIK MOVATORS provide an exclusive combination of advantages . . . a heavy-gauge, one-piece endless belt of solid spring steel gives rigidity and no-stretching . . . grooved rubber covering assures safe, non-slip surface . . . SANDVIK wide-rib, narrow-groove tread and special landing plate design prevents heel-catching more positively than any other design. The MOVATOR installation for Pay Less is just one of many made by Sandvik in ten years of design, manufacturing, installation and service experience. Sandvik can apply this background to your requirements anywhere in the U.S.A. today. Write for SANDVIK MOVATOR booklet or contact your nearest Sandvik office.



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The CARADCO Casement Window Unit

The **SAFEST** window in the world
..... for a builder to invest in

Builders need windows they can bank on for maximum value. The Caradco Wood Casement is that kind of window. Check its qualifications:

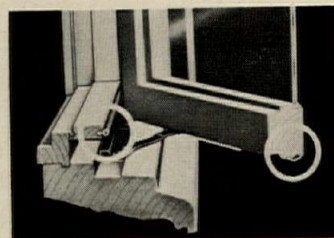
- **STRENGTH AND DURABILITY**—Vital joints of frame are dovetailed. Preservative treated. Hinge tracks and outside weatherstrip are stainless steel.
- **WEATHERPROOF**—The twice-around weatherstrip system (stainless steel outside, tubular vinyl inside) is doubly effective.
- **LONG TERM SAVINGS**—Vinyl glazing for units with insulating glass requires

no maintenance, saves expense. Unit's overall efficiency saves fuel.

• **PROTECTION** — Concealed hinges, dependable locks and operators protect against break-ins.

• **THE RIGHT COMBINATION**—Unitized construction permits unlimited combinations without need for one piece sills.

• **SAFE** — Safe to invest in because its features add up to **salability** ... to homebuyers who want **their** window investment protected, too.



CARADCO, inc. Dubuque, Iowa

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A.I.A. revises basic contract documents

Changing interpretations of liability and broadening scope of architectural activity have spurred revisions to basic contract documents in an effort to stem the rising tide of litigation and clarify professional relationships.

The AIA's Commission on Professional Practice has completed its revision of the four principal contract documents: *A 201—The General Conditions of the Contract*; *B 131—The Owner-Architect Agreement*; *A 101—The Owner-Contractor Agreement*; *E 301—Standard Filing System and Alphabetical Index* which has been replaced by a new document—*K103—The Uniform System*; together with the related chapters of the Architect's Handbook of Professional Practice.

Hold-harmless clauses precipitate architect-contractor dispute over limits of liability

The 1966 edition of A.I.A. Document A 201, "The General Conditions of the Contract for Construction" contains a wholly new indemnification clause about which there has been much discussion ending in open disagreement between the A.I.A. and the Associated General Contractors. For the first time, the A.G.C. has withdrawn its traditional endorsement of the document and has recommended an informational and educational program to all A.G.C. chapters and to all contractors, pointing out the "serious deficiencies, inequities, and other problem areas" associated with the indemnification clause.

The A.I.A. is also scheduling a series of seminars to be held at various regional and chapter meetings with the object of explaining the new clauses.

In its information circular "General Conditions of the Contract" the A.I.A. explains the inclusion of the indemnification clause and the reasons why it went ahead with publication despite the resistance of the contractors: "The situation covered in the indemnification provision is the type where, during the construction period an employee of the contractor or a member of the public is injured, or where there is damage to property other than the work itself, resulting from negligence of the contractor or his agents or employees, but where there is also a claim that the architect has been negligent or that the owner is liable because of his duties as a property owner. Since the contractor is in control of the operation at the site, the primary negligence is ordinarily his, and the alleged negligence of the architect usually lies in his having failed to detect, in his visits to the site, the negligence of the contractor. Thus the negligence of the architect is of a passive or secondary nature. However, where a court or jury is sympathetic to the plaintiff and knows or suspects that the architect is insured, they sometimes have a tendency to extend the responsibility of the architect very far on these situations. Thus, on principles of basic fairness, it is justifiable

to require the contractor to indemnify the architect in these cases."

The architect's difficulties in these situations have apparently been aggravated as a result of the Workmen's Compensation laws, which normally limit the contractor's liability to the statutory rate of worker's compensation, but do not prevent the architect from being sued for an unlimited amount. Although the architect's negligence, in such a case, is less active than that of the contractor he may be liable for much larger sums of money, and the A.I.A. feels strongly that he needs the additional protection provided by the new indemnification clause.

The contractor's agreement to indemnify the owner and architect under the clause covers only cases of active error, omission or acts of negligence by the contractor or those for whom he is responsible. Discussions with the A.G.C. led the A.I.A. to reduce the indemnification "to the point where it offers only the minimum of protection to the owner and architect against third party claims where the contractor is actively at fault." The contractor is not bound to indemnify the owner or architect for damage or injury which can be attributed to a defect in the drawings or specifications.

A final, and important provision of the clause requires the contractor to insure this indemnification under his Public Liability insurance. (Legal reasoning and the clauses at issue are on page 93.)

Contractors protest hold-harmless clause is unwarranted shift of responsibility

The basis of the contractors' disagreement is that the new clause represents an unjustifiable shifting of responsibility

ARCHITECTURAL BUSINESS THIS MONTH

Building activity	83
Cost trends and analysis	87
Cost indexes and indicators	89
Practice/Contract law	93

from the architect to the contractor, and the main focus of their objection seems to center on the difficulty and increased cost to them of obtaining satisfactory insurance.

In order to try to obvert this criticism, the A.I.A. did submit the indemnification agreement to 10 large insurance companies to determine what their reactions would be. Generally speaking, the results suggest that satisfactory insurance is available at reasonable cost. For some time, the National Society of Professional Engineers has apparently been using an even broader indemnification clause, and inquiries made by the A.I.A. indicate that there have been no significant problems in obtaining insurance for this indemnification agreement.

New procedures and fee structure adopted for limited-profit housing

A new and more uniform set of schedules, fees and basic administrative procedures governing limited-profit housing programs has been adopted by New York State Division of Housing and the New York City Housing and Redevelopment Board. The goal: to expedite and simplify the execution of these programs; to allow reasonable compensation to all those involved; and to limit an individual's or firm's liability to those parts of the work for which they are directly responsible.

Under the old arrangements, the originator of a scheme had to assume

Reasonable men may resolve their differences

It seems fairly clear that additional protection from unreasonable claims against architects and owners is needed, and that a properly drawn, standard indemnification clause is the best way of providing it. But it is equally clear that the A.G.C.'s objections are based on a genuine fear that the wording of the new document may make their position untenable in practice. The A.I.A. is confident that experience with the indemnification agreement will prove the A.G.C.'s fears groundless and that the dispute will die a natural death.

At first reading, the wording of the documents does suggest that there might be complications in proving what does

and does not constitute a "negligent act" on the part of the contractor, whether "passive negligence" is always less culpable than "active negligence," and whether the introduction of such a clause could on the one hand give architects a loophole for insufficient supervision of a job, or on the other hand induce contractors to assume unnecessary control of certain aspects of the work. All these issues can only be worked out in practice and time will presumably give the answer. There can be no doubt that a reasonable indemnification agreement is necessary, but there remains the possibility that the wording of the new clause may require some modification before final agreement with all parties can be reached.

complete financial liability during all the initial phases of the work, and then hand complete responsibility to the contractor once a construction contract had been agreed upon. The new system recognizes two fundamentally separate, but essential services—development and construction—and allots fees and responsibility accordingly. A single development fee is provided out of which the general contractor's fee is paid by negotiation. The balance can be used by the originator in compensation for the risks he assumes and to allow him to pay for the services of additional consultants. Since

under this new arrangement, the contractor's risk and performance is limited to construction items only, the fees payable to the contractor are lower than under the previous system.

Architects' fees under the new program are computed as a combined, two-agency fee on the basis of the State housing agency's architects' fee schedule—less 10 per cent except where supervision is provided by the architect—and the City Housing and Redevelopment Board's component method of calculation. The over-all effect is an upward realignment of fee structures.

Architects promote communications with other professions

The deepening involvement of the architectural profession with the problems of environmental planning for "the whole man" is evidenced by the increasing number of interdisciplinary activities in which architects are taking part.

One notable example of this is the Joint Committee on Environmental Health recently formed by representatives of the A.I.A. and the A.M.A. with the object of "studying, developing and recommending medical and health guides and criteria for incorporation into architectural design and urban planning practice." Problems of lighting, noise, temperature, air quality, and vital health statistics will be considered in the context of man's response to various aspects of his environment. Joint chairmen of the committee are James H. Sterner, M.D., of Rochester, N.Y., and Edward H. Matthei, AIA, of Chicago.

■ Concern with man's mental, as well as his physical state, also comes within the architect's sphere of influence. Architec-

tural psychology was the subject of a research conference—supported by a grant from the American Nurses Foundation—which took place last May at the University of Utah, under the direction of Dr. Calvin Taylor of the Department of Psychology and Professor Roger Bailey of the Department of Architecture.

The conference was a five-year follow-up of the first national conference of its kind and was aimed at bridging the gap between architectural design of health-care institutions and the environmental needs of the patients they serve.

Some 30 American and European research leaders in architecture, design, nursing, anthropology, psychiatry and systems-development took part in the conference, which also invited observers from the U.S. Public Health Service, the A.M.A., the A.I.A., A.H.A., and others to attend including a representative from the British Design and Research Unit.

One interesting topic raised at the conference was the possibility of involving nurses and representatives of

other branches of medical care in the training and practice of architects working in the hospital building field.

■ Practical evidence of architectural collaboration with other segments of the building industry is supplied by a number of professional announcements which arrive on one's desk from time to time. The architectural firm of Lord & Den Hartog, for example, has become affiliated with engineers Parsons, Brinckerhoff, Quade & Douglas, who have also announced an affiliation with National Electric Service Corporation, a firm of utility cost consultants and engineers.

■ On the same theme, architects Perkins and Will have announced the establishment of a subsidiary engineering corporation which will operate under the name P&W Engineers, Inc., and will be headed up by Edward C. Colin, who was partner in charge of electrical, mechanical and structural engineering services in the architectural firm's Chicago office.

COMMENT AND CONTRACT TABULATION

George A. Christie, Chief Economist

F. W. Dodge Company,
A Division of McGraw-Hill

Suburbia: where the action is in stores

The lyrics of a popular song tell us that *Downtown* is a real swingin' place. And this may be so if you're a teenager looking for kicks. But if you're a retailer (or his architect) looking for a store site, the suburbs are still the place to build.

Data made available not long ago finally verified statistically what just about everyone has known right along from personal experience—the balance of retailing power has shifted from "downtown" to the suburban shopping center.

Actually, it's been more than a decade since the central business districts of our major metropolitan areas relinquished the lead to their outlying communities. As early as 1954, the retailing experience of more than a hundred top cities showed that downtown stores took in just under half of the total sales of shopping goods stores. (These stores include general merchandise, apparel, accessories, furniture, and home furnishings; they do not include food and drug stores or restaurants.) And in the decade or so since 1954, the central business district has continued to lose ground steadily so that by 1963 downtown stores were

selling a mere 30 per cent of the total.

Several factors are involved in this crescendo of the suburban cash register jingle—some of them more important than others. By itself, the shift in the number of buyers from central city to suburb—the oft-heard-of "postwar suburban exodus"—just isn't enough of an explanation. In the middle fifties the suburbs held about 45 per cent of the people and rang up about half of the total shopping volume; 10 years later the suburban share of the population had only expanded to 50 per cent, but this group now does well over two-thirds of the buying.

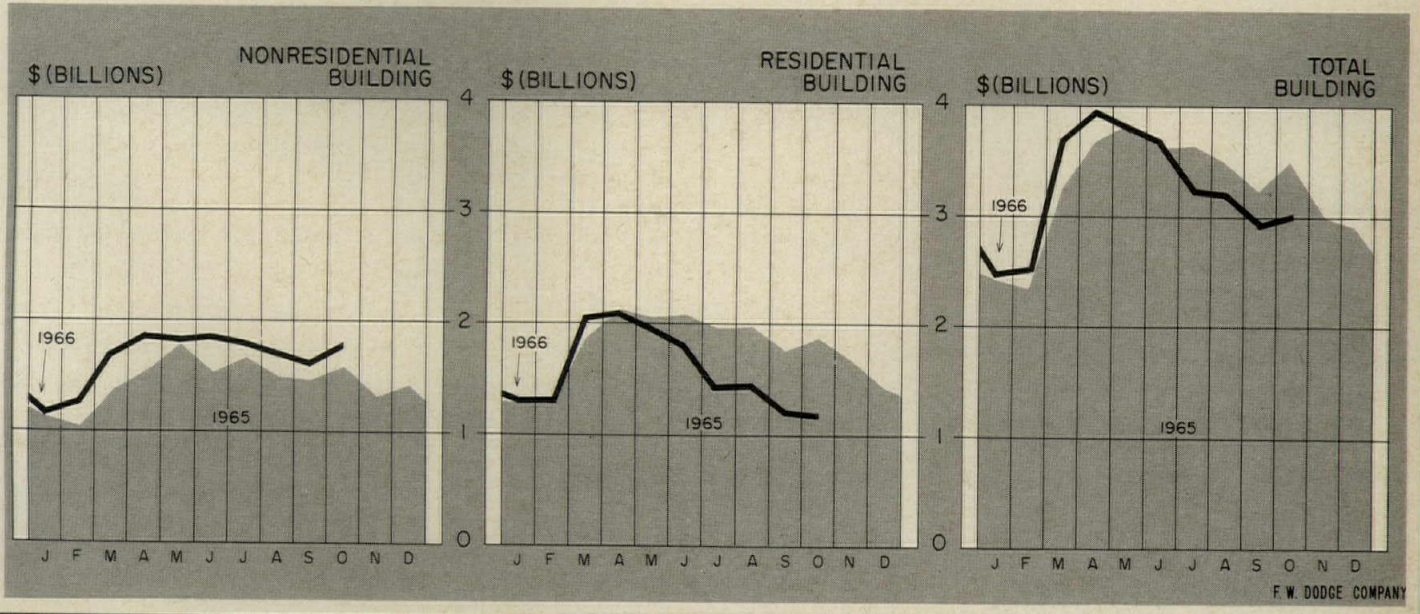
What, then, accounts for the disparity? Is it the popularity of the sleek new suburban stores themselves? A lot has been said about the stimulating effect that new, well-designed, uncluttered, air-conditioned stores with ample parking facilities can have on sales. Unquestionably these factors played a role in the ascendancy of the shopping center, yet few would argue that they have been more than marginal.

While it is true that there is a great deal of difference between today's newer

suburban store and its older downtown counterpart, there's been an even bigger change in the customer. The numerical proportions of city and suburban populations haven't changed much over the decade, but the concentration of buying power has shifted markedly. The real impact of the move to suburbia has been on the composition of the populations of the two areas. As higher income families moved out, their place in the city has been occupied by the elderly, the young, the non-white, and less-educated. It is the widening income gap between the city dweller and the suburbanite that explains most of the difference in retail sales to these similar-sized groups.

Retailers, who are highly sensitive to this trend, were quick to build suburban stores during the late fifties and early sixties. Is the trend still going on? If a sample of leading metropolitan areas which make up almost a third of the nation's entire store building is any kind of a gauge, last year showed that the suburban locations were still responsible for by far the greater amount of new retail store construction.

Building activity: monthly contract tabulations





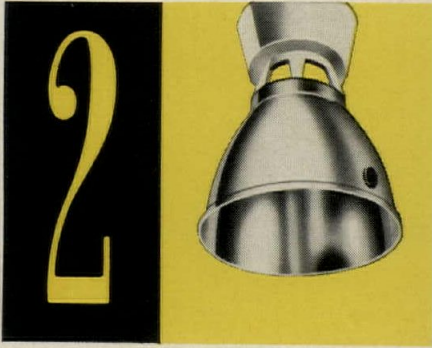
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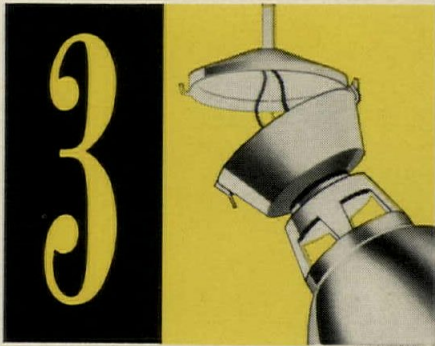
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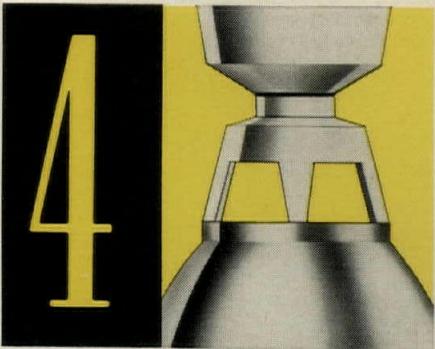
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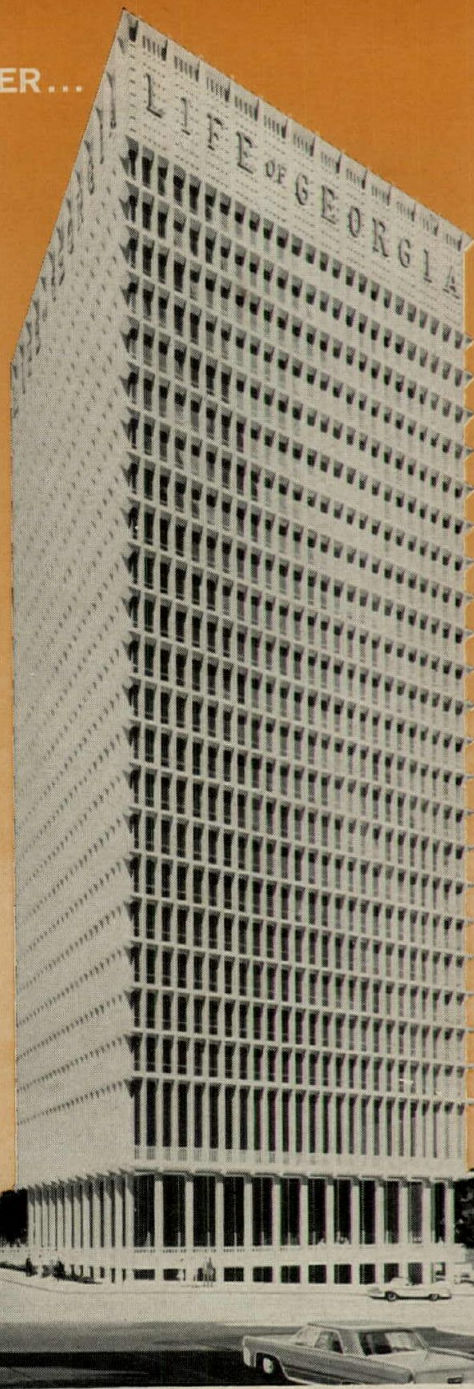
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The firm of Brewer & Mundy had good reason for specifying copper plumbing for this 29-story, 414,200 sq. ft. area building contributing new beauty to Atlanta's skyline. ■ It is lighter, easier and faster to work with, so installation costs are less. ■ Copper tube and the compact fittings can be placed in areas where other piping would be too bulky and cumbersome. This advantage, if used in the engineering stages, often results in construction economies and more useable space.

The engineering firm also pointed out that "dependability" was probably the most important reason for recommending copper. In multistory buildings, repairs to the plumbing system are difficult and costly work. ■ Copper eliminates the possibility of rust-caused trouble in future years, and solder connections, tube to fittings, are superior to threaded joints for leak-proof joints.

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TRENDS AND ANALYSIS

Lawrence C. Jaquith, Economist

McKee-Berger-Mansueto Inc.

Construction Consultants

Building slowdown has small effect on materials prices

A 20 per cent decline in residential and commercial construction over the first 10 months of 1966 has had less effect on most supplying industries than might be expected. And even with a possible 33 per cent drop, many prices would still hold at present high levels.

Impact of decline is spread out among several industries

All supplying industries—lumber, glass, mining, right through to agriculture—contribute a measurable percentage of their output either directly or indirectly to construction. When the amount of building changes, we can determine the effect on other industries.

But so many industries are related only in part to construction activity that the impact of the slowdown has been spread thin throughout the economy. Actually, most construction-related industries experienced less than a 2 per cent reduction in output.

Over the period of construction decline, the GNP rose considerably. This means that although demand for building materials decreased because of the construction slow-down, it was offset by increases in demand from other sectors. The result is that *net* changes in the output of supplying industries has been relatively small.

Slight easing of pressure on production has slowed price increases

In situations of high capacity utilization, as we have had this past year, prices are extremely sensitive to even minor changes in output. Because of this, the upward trend in prices has tapered off somewhat. However, as long as demand

from other sectors of the economy is high, we should not expect any substantial across-the-board price reductions.

The lumber industry has been hard-hit, since 25 per cent of its output goes into construction. On the West coast, overall weekly shipments have declined 5 per cent off the yearly average. The drop is greatest in shopgrade lumber—down 23 per cent. Shipments for all grades of dimension lumber have declined 7 per cent.

The real problem is the selective shift in demand—down and up

The big problem is not a decline in total demand for lumber products, but the changes in demand for various items. For example, shipments of the common grades for industrial use have actually *increased* 6 per cent. To meet these changes lumbermen are rushing to convert production facilities. Those unable to make the necessary conversions, particularly plywood producers, are faced with the prospect of shutting down—and several have.

Two-by-four studs are selling for \$44 a thousand board feet at the mill, yet ties are bringing in \$73/1000 BF. In lumber for construction use, price reductions have gone into effect in 11 major cities. However, the market has probably bottomed out and in the short run current price levels will hold. There have been some actual increases in at-the-mill prices for some products.

Don't expect price reductions on materials in demand for defense use

There will be price increases in some materials of defense priority:

GYPSUM: Effective February 15th, manufacturers of gypsum products will increase their prices an average of 5 per cent. The reasons cited will be rising labor and raw materials costs.

ALUMINUM: Despite administration pressures, the prices of fabricated aluminum have been quietly raised almost 5 per cent in the last 12 months. Some of these increases have been accomplished by eliminating various forms of price shading and quantity discounts.

An expected boost in the price of aluminum ingot coming up in February will result in still another increase in fabricated products. Since industry profits are lower than in many other sectors, it probably won't be the last.

COPPER: Prices have been volatile and unpredictable for the past year, with increases still occurring in an erratic manner and with shortages in some states.

The basic problem is that world supply could not respond to sharp increases in demand. But major producers are reaping huge profits—prices increased at upwards of 60 per cent in 1966.

In Zambia, political crisis is threatening crucial production. Chilean producers plan another price hike—possibly as much as 33 per cent. And in the U. S., Anaconda is struggling to meet defense needs but enjoyed a 55 per cent increase in profits this year.

The government released 150,000 tons of copper from its stockpile, but long range price effects will be negligible—especially for the consumer.

With little reason to be optimistic about the future price of copper products, many architects are taking a hard look at substitute materials.

The separate-trade contract affects management costs and fees**Where states require split-contract bidding on public work costs may go up, quality down**

Many of the larger industrial states now require separate bids from contractors and sub-contractors on public building projects. This trend seems to reflect the

growing influence of sub-contractors, particularly those specializing in the heating, ventilating and air conditioning, plumbing and electrical trades, whose work may now amount to as much as 30 to 50 per cent of the total cost of the construction project.

GC's are leery of incompetent subs in boom times

During peak periods of construction activity, when demand for all kinds of building work is high, many less-experienced sub-contractors are likely to bid for public projects. General contractors,

however, are often unwilling to work with these smaller and sometimes ill-equipped sub-contracting firms, and frequently decide that private work has less risk for them. There has, in fact, been a noticeable decline in the number of general contractors willing to bid on public projects in this type of situation.

Approved lists tend to restrict competition and increase costs

To lessen this reaction from general contractors, a state may decide to establish an approved list of sub-contractors. But this policy only compounds the difficulties, since by restricting competition it tends to raise costs.

The split contract system becomes most objectionable—and costly—when the number of “prime” sub-contractors is expanded to include several categories of minor trades. Some states have already expanded the system in this manner.

Most architects, operating under the fee structures that are applied to most

public work, prefer a single contract, since it is less time consuming, less difficult to administer and has a more clear-cut hierarchy of responsibility. The issue is, however, still very much a live one.

A dearth of skills in construction management calls for action

Conditions are now rapidly developing, especially in private work, under which architects may learn to live with the split contract system, and take such measures as they can to make it work. General contractors in many cities are feeling the combined effects of two facts of business history: (1) their own acceptance of the role of brokers of sub-contracts rather than managers of construction; and (2) the increasing weight and influence of mechanical, electrical and other sub-contractors as their share of the building budget increases. The result has been an increasing resistance of large sub-contractors against working under (and with profit to) general contractors who make

only limited contributions to the work.

Thus, in any city where big-building construction activity is high, the number of general contractors with both management and field capabilities for large jobs is likely to be insufficient for the work load. Consequently, either some jobs must be held up entirely or the capacities of even the largest general contractors are spread so thin as to risk costly delays and poor construction supervision. Architects are then exposed to harassment and liability.

The solution in at least one large architectural office has been to set up a construction management department which works directly with subcontractors, schedules the overall work and supports on-the-job supervision. Fees for this work are successfully worked out as a saving of middle-man profit and expedition of the job. Certain contractors and consultants see opportunities for real construction management service in this handwriting on the wall.

Stabilizers sought for spiraling construction wage costs

Guaranteed annual wage plan casts a long shadow

Architects and contractors were jointly concerned when, under the euphemism, “Extended Earning Opportunities Plan,” the concept of the guaranteed annual wage was introduced into a construction wage dispute last summer by Secretary of Labor Willard Wirtz. The occasion grew out of the Labor Department’s review for conformity with Administration guidelines of a tentative settlement reached earlier between Local 825, International Union of Operating Engineers and the Associated Contractors of New Jersey. Although the eventual settlement differed little from the original (and neither contained an annual wage agreement), the controversy that revolved around this innovative issue seems likely to repeat itself. The reasons: seasonal fluctuation in construction is costly to both labor and employers, and new devices for stemming its cost-increasing pressures are a legitimate concern on both sides.

Contractors see millions in added costs of annual wage plan

The New Jersey contractors estimated that the “extended earnings” plan would add more than \$4 million a year—60 cents per man-hour—to present costs. Evidently the assumption was that the union would continue to press for higher wage packages as in the past. Quite possibly this is valid, although the Labor Department, in promoting the plan, emphasized their intent to retard the trend toward excessive hourly wages.

In essence, the plan was to establish a 1600-hour wage minimum for those who had worked more than 700 hours in the previous year. It was to be funded by contributions from both union and employers.

The union had reservations about uneven distribution of annual benefits

The union’s willingness to forego the plan this time around suggests to some that it too had reservations about it. To be eligible for benefits, a member would have to work less than 1600 but more than 700 hours a year. About 25 per cent of members were in this category, and many of those had sufficient earnings from other activities to exclude them from the plan. The inference is that most of the union members, already earning more than the proposed minimum through wage increases put through ostensibly to offset seasonal unemployment, would lose that leverage.

But rising costs of seasonal fluctuation are hurting both sides

Despite technical innovations that permit more winter work in construction generally, seasonal fluctuations have actually been increasing in amplitude. Obviously the tradesman suffers from seasonal unemployment which, in construction alone, has accounted for 10 per cent of *all* unemployment since World War II.

Some of the added costs incurred by contractors as a result of seasonal swings are: increased unemployment insurance

and other fringe costs; overtime wages in peak periods that are estimated to cost the industry as a whole about one billion dollars a year; negotiated wage increases that attempt to offset lower incomes in slack periods.

So the annual wage will get further study as building rates recover

Whether or not the annual wage will be a central issue again this year will depend largely on how quickly the industry recovers from the decline in residential housing. If over-all gains are made, unions will be in a better bargaining position and contractors more receptive to comprehensive wage proposals. Under these favorable conditions, the Department of Labor would be more likely to seek an opportunity to re-introduce some version of the plan—probably at a regional level, possibly in New Jersey, but necessarily in some state where the economic climate is exceptionally good.

A serious drawback to the initial proposal was the lack of any comprehensive estimates or real knowledge as to its actual cost. The U. S. Department of Labor and the State of New Jersey are now conducting a study to determine this. For this reason, and because seasonal unemployment is a serious problem, we may expect to hear more of the extended earnings plan.

For architects and others concerned with long-range and preliminary estimates of large works, any stabilizing effect, at whatever level of actual costs, is bound to be welcome.

INDEXES AND INDICATORS

William H. Edgerton
 Manager-Editor, Dow Building Cost Calculator,
 An F. W. Dodge service

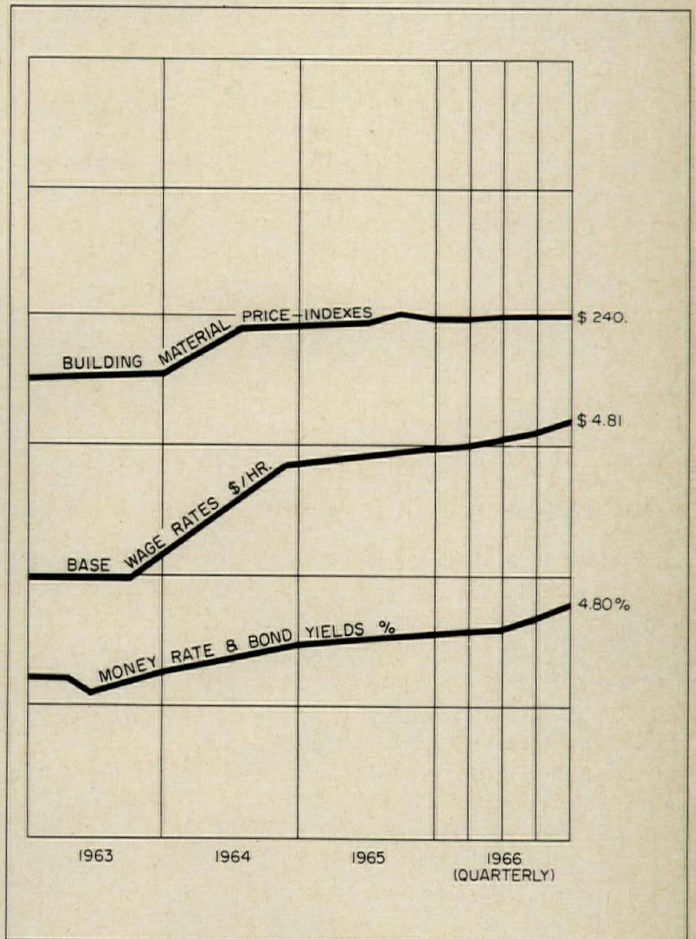
JANUARY 1967 BUILDING COST INDEXES

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			
Atlanta	7.2	314.9	334.1	+2.58
Baltimore	7.7	278.4	296.1	+1.82
Birmingham	7.5	255.3	274.5	+1.92
Boston	8.5	251.0	265.7	+1.63
Chicago	8.9	309.2	325.2	+2.79
Cincinnati	8.8	265.5	282.2	+1.57
Cleveland	9.2	287.2	305.2	+2.87
Dallas	7.7	261.0	269.6	+2.34
Denver	8.3	283.2	301.1	+1.19
Detroit	8.9	286.2	300.5	+4.28
Kansas City	8.3	250.0	264.6	+1.79
Los Angeles	8.3	283.0	309.7	+1.88
Miami	8.4	274.1	287.7	+2.34
Minneapolis	8.8	275.5	292.9	+1.54
New Orleans	7.8	248.6	263.4	+1.36
New York	10.0	289.4	311.3	+2.32
Philadelphia	8.7	276.3	290.0	+2.06
Pittsburgh	9.1	258.6	275.0	+1.76
St. Louis	9.1	275.9	292.3	+2.63
San Francisco	8.5	360.9	394.9	+4.72
Seattle	8.4	252.7	282.4	+2.27

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

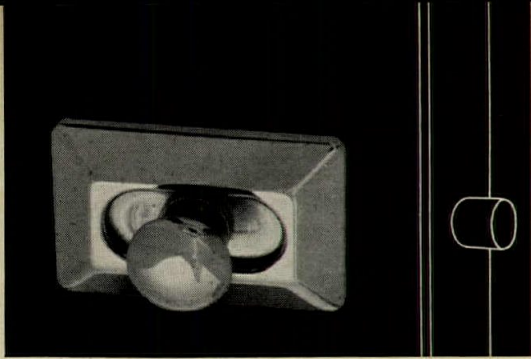


HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

Metropolitan area	1941 average for each city = 100.00															
	1952-1964							1965 (Quarterly)				1966 (Quarterly)				
	1952	1959	1960	1961	1962	1963	1964	1st	2nd	3rd	4th	1st	2nd	3rd	4th	
U.S. Average	213.5	255.0	259.2	264.6	266.8	273.4	279.3	279.5	281.0	288.7	284.9	286.3	287.3	290.4		
Atlanta	223.5	283.3	289.0	294.7	298.2	305.7	313.7	313.9	317.9	320.6	321.5	322.2	323.3	328.5	329.8	
Baltimore	213.3	264.5	272.6	269.9	271.8	275.5	280.6	280.5	281.0	284.7	285.7	288.6	289.6	289.4	290.9	
Birmingham	208.1	233.2	240.2	249.9	250.0	256.3	260.9	261.2	264.1	264.9	265.6	267.1	268.1	269.7	270.7	
Boston	199.0	230.5	232.8	237.5	239.8	244.1	252.1	251.7	252.6	256.3	257.8	258.5	259.6	260.9	262.0	
Chicago	231.2	278.6	284.2	289.9	292.0	301.0	306.6	306.5	307.3	310.2	311.7	312.6	313.7	318.9	320.4	
Cincinnati	207.7	250.0	255.0	257.6	258.8	263.9	269.5	269.4	270.2	272.9	274.0	274.7	275.7	277.2	278.3	
Cleveland	220.7	260.5	263.1	265.7	268.5	275.8	283.0	282.3	283.4	290.8	292.3	293.0	294.1	299.2	300.7	
Dallas	221.9	237.5	239.9	244.7	246.9	253.0	256.4	256.9	257.9	259.5	260.8	261.7	262.6	265.8	266.9	
Denver	211.8	257.9	257.9	270.9	274.9	282.5	287.3	287.3	288.2	292.7	294.0	294.6	295.5	296.6	297.5	
Detroit	197.8	249.4	259.5	264.7	265.9	272.2	277.7	277.7	279.3	283.5	284.7	285.5	286.5	295.7	296.9	
Kansas City	213.3	239.6	237.1	237.1	240.1	247.8	250.5	251.2	252.0	255.0	256.4	257.3	258.2	260.0	261.0	
Los Angeles	210.3	263.5	263.6	274.3	276.3	282.5	288.2	288.9	289.7	295.8	297.1	298.0	298.6	301.6	302.7	
Miami	199.4	249.0	256.5	259.1	260.3	269.3	274.4	274.4	275.4	276.6	277.5	278.4	279.2	282.9	284.0	
Minneapolis	213.5	254.9	260.0	267.9	269.0	275.3	282.4	283.4	283.6	283.9	285.0	285.7	286.6	288.3	289.4	
New Orleans	207.1	237.5	242.3	244.7	245.1	248.3	249.9	250.5	253.1	255.1	256.3	257.1	258.0	258.8	259.8	
New York	207.4	260.2	265.4	270.8	276.0	282.3	289.4	290.2	294.0	296.0	297.1	297.8	298.7	302.8	304.0	
Philadelphia	228.3	262.8	262.8	265.4	265.2	271.2	275.2	275.5	276.4	279.5	280.8	281.7	282.6	285.3	286.6	
Pittsburgh	204.0	241.1	243.5	250.9	251.8	258.2	263.8	264.0	264.9	265.9	267.0	268.9	270.1	270.7	271.7	
St. Louis	213.1	246.9	251.9	256.9	255.4	263.4	272.1	272.9	276.1	279.9	280.9	282.2	283.2	287.0	288.3	
San Francisco	266.4	321.1	327.5	337.4	343.3	352.4	365.4	366.6	366.9	367.7	368.6	376.2	377.7	384.7	386.0	
Seattle	191.8	232.7	237.4	247.0	252.5	260.6	266.6	265.1	266.3	267.8	268.9	271.1	272.1	273.9	275.0	

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

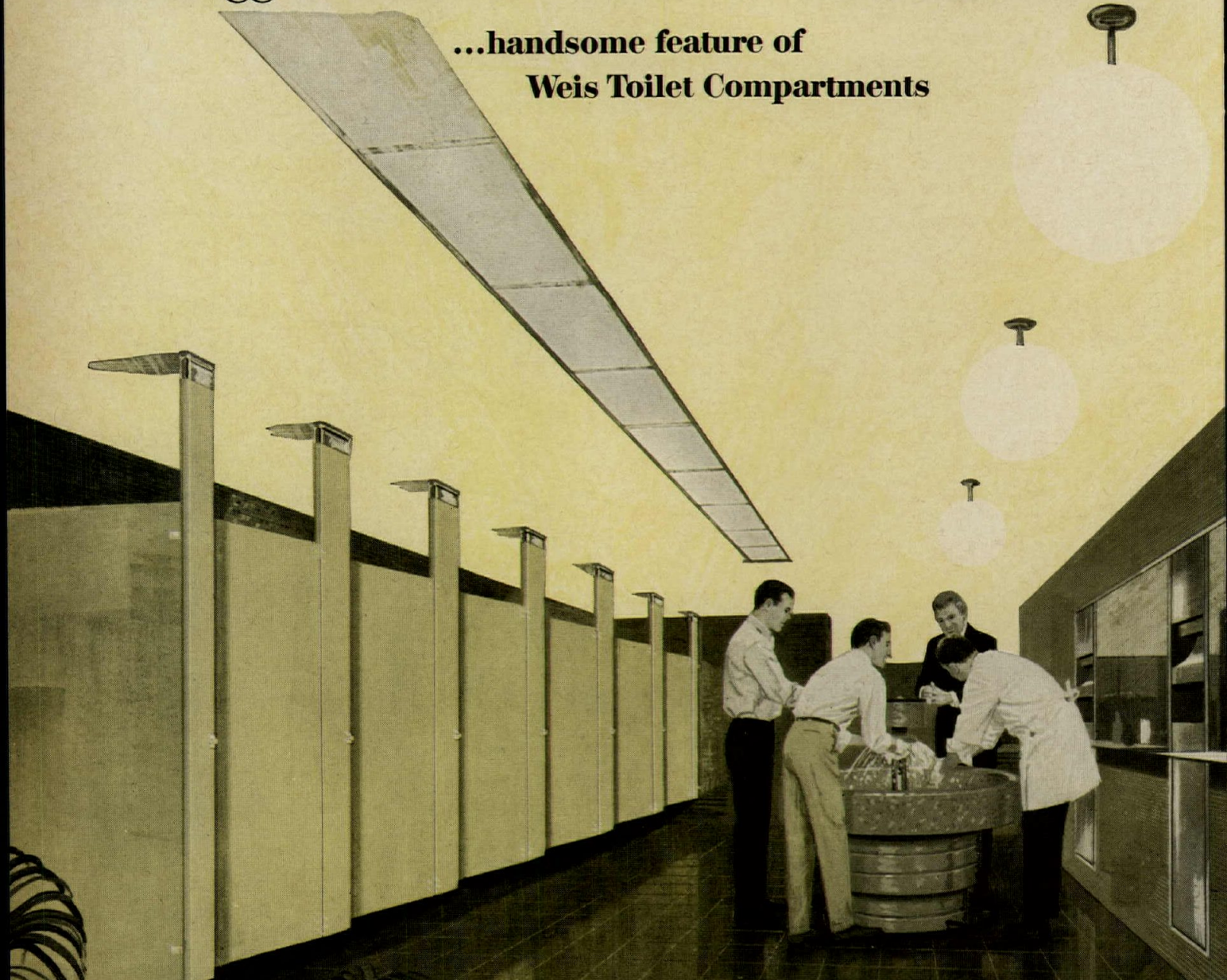
the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0 ÷ 200.0 = 75%) or they are 25% lower in the second period.



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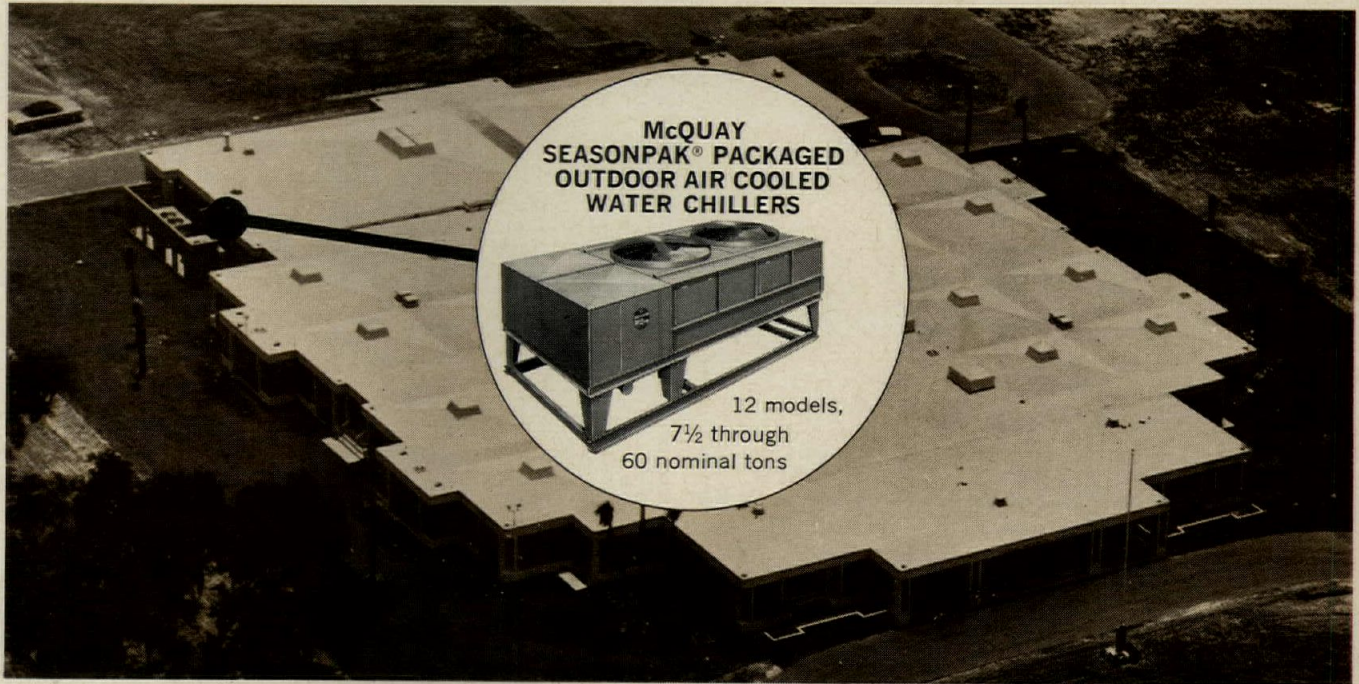
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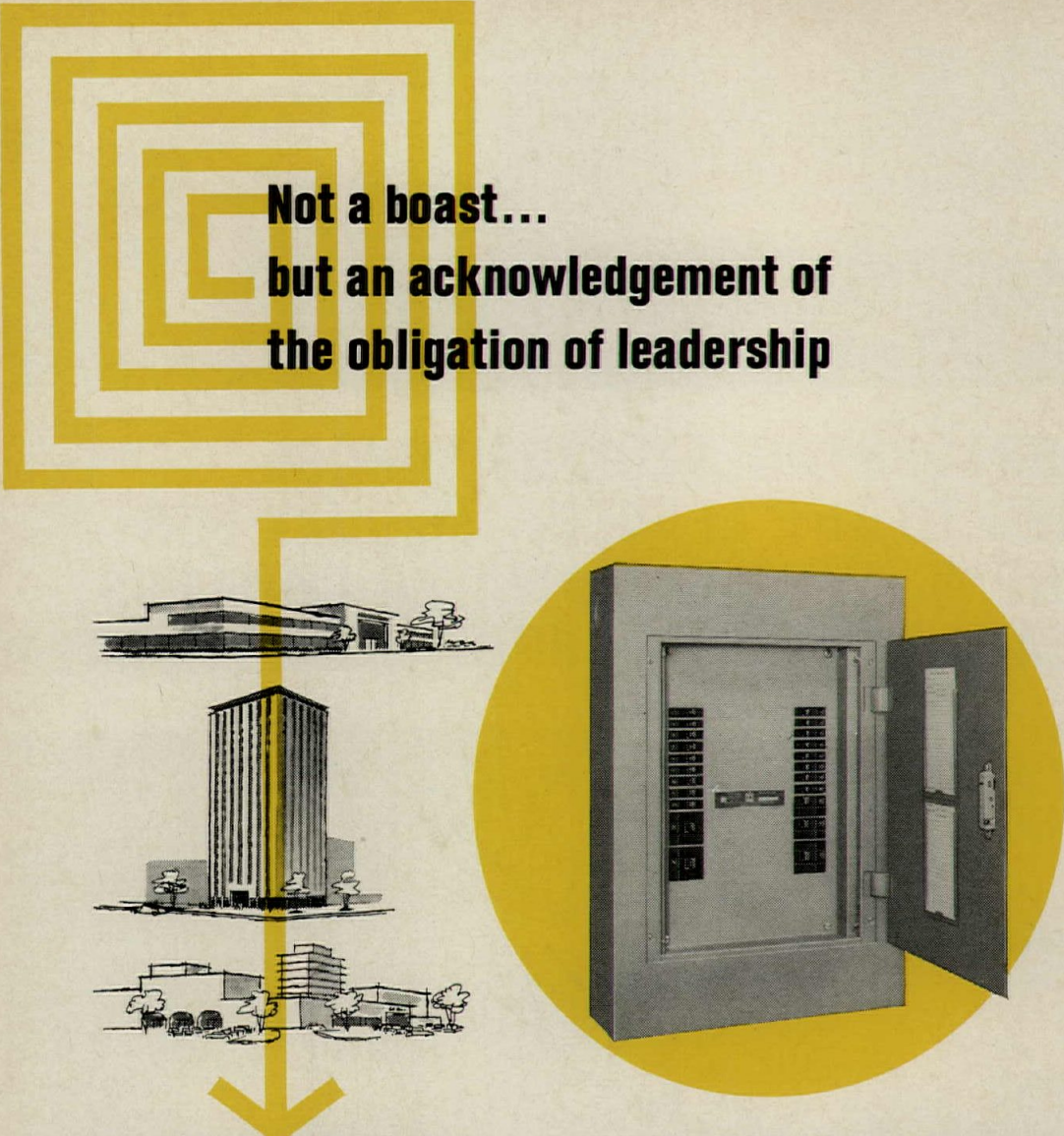
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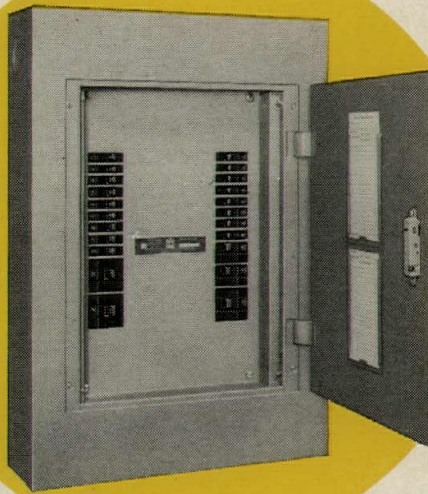
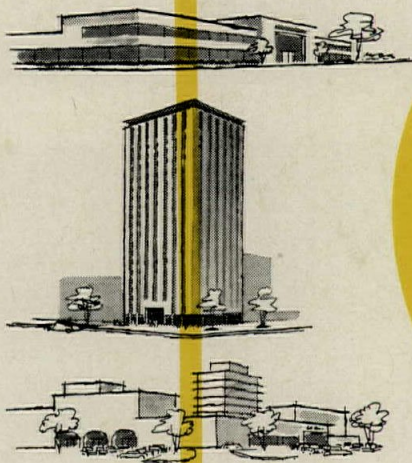
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The legal background of document revisions

Technical, legal and social pressures are extending architects' responsibilities

The revisions (page 81) were prompted by changes in the scope, techniques and pattern of architectural practice today, and were designed to keep the architect in step with the complex demands being made upon him. The A.I.A. defines four principal and pressing reasons for making these revisions:

- *The increasing complexity of modern technology, which leads the general public to expect the architect to have a higher level of technical proficiency and competence on a broad front.*

- *The abandonment of the principle of privity of contract, which is in effect the gradual breaking down, through various legal decisions, of the requirement for the existence of a formal contractual relationship before one party can be included within the scope of another's liability. It is only quite recently, for example, that architects have been held to have a responsibility to third parties (such as tenant occupants) outside the contract.*

- *The advent of the concept that someone should compensate those persons injured or otherwise damaged through the operations of society. A gradual social evolution toward the idea that governments should provide some kind of socialized insurance for individual citizens has influenced the courts toward the finding of liability without fault, that is to say, awarding compensation regardless of who or what is at fault.*

- *The growth of a social philosophy that favors "spreading the risk," which has led the courts to a tendency to assess larger damages where insurance is involved. This in turn has brought about a general increase in damage assessments, even when insurance is not involved.*

Legal counsel explains points of law

bearing upon document changes

These trends, in conjunction with the generally improved organization of plain-

tiffs, have made the architect more vulnerable to various types of claims and liability, for which he is often—in the view of the A.I.A.—ill-equipped to deal. The document revisions are an attempt to obviate some of these difficulties; have been drawn up under the supervision of legal counsel who outlined the following approaches of basic legal principles:

- *Tort liability* is imposed on one person for an injury to another person or to property. It is not dependent upon a written agreement or any contractual relationship between the parties but arises because the law imposes a duty to do or not to do certain things. Consider the case of an architect who has designed an apartment building with a marquee at the front. Two years after construction, the marquee falls on people boarding taxi cabs. It fell because only 11 supports were called for in the design where 12 should have been, and the contractor installed only 10. The architect breached his duty to design a safe structure. The breach was the cause of the injury to the boarding passengers and to the taxi cabs and all of them were within the scope of foreseeable danger. The fact that the con-

tractor was also negligent is not important as a factor in decisions affecting the architect's liability.

- *Contractual liability* arises out of an agreement between parties. It is usually written, it may be oral, or it may be implied by law. The 1966 edition of B 131, Owner-Architect Agreement, has been expanded particularly in the paragraph dealing with the architect's services during the construction phase. This now dove-tails with the responsibility assigned to the architect in A 201, the General Conditions. When the owner signs the agreement to employ the architect, he will know what functions the architect intends performing during the construction phase. This is significantly better than having these functions revealed to the owner when the Owner-Contractor Agreement is prepared and the General Conditions completed, particularly because the architect is not a party to that contract.

- The law will hold a professional to a greater *standard of care* than a layman and the law looks very critically at exculpatory language that endeavors to relieve

Wording of the new indemnification clause

The three clauses around which the controversy centers are numbered 4.18 (1, 2, and 3) in the revised Document A 201, and are worded as follows:

"4.18.1 The Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, re-

gardless of whether or not it is caused in part by a party indemnified hereunder.

"4.18.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

"4.18.3 The obligations of the Contractor under this Paragraph 4.18 shall not extend to any claim, damage, loss or expense which is attributable in whole or in substantial part to a defect in drawings or specifications prepared by the Architect."

a professional of his responsibility to perform his professional functions in accordance with the standards of his profession. The architect should not insert in the agreement with the owner language that will relieve him from responsibilities that he, in his role as a professional, should properly assume.

- *Apparent authority* has always been confusing to non-lawyers. It means that, when one knowingly lets another appear to have authority to act for him, he will not be permitted to deny that authority existed if a third person has reasonably assumed that such authority existed and relied upon it.

This is important in the case of the project representative. He is the architect's agent. The extent to which he may act on the architect's behalf should be reduced to writing and shown to the contractor. Otherwise, the contractor may be justified in assuming that the project representative can speak on many matters for the architect and the architect will not be permitted to deny the existence of greater authority than he intended. This is why B 131 and A 201 both require preparation of an exhibit to state the project representative's authority. Many architects prefer not to show such instructions to the contractor but this may produce a worse result from the architect's point of view than he bargained for.

- *Inducing reliance* in the normal owner-architect-contractor relationships: If one undertakes performance of an act for another which if not done carefully can cause personal or financial loss, he must

do the act diligently and without negligence. By one's actions, he may induce another to rely on him for a result:—"Don't worry, I'll take care of that," is a typical example. Statements like this can defeat carefully worded language in an agreement. In the matter of preparing estimates, this can become very important. The new language in B 131 makes it clearer that the architect's estimates prior to actual bidding cannot be expected to be 100 per cent accurate.

- *Several people may be responsible for one injury*: the owner, the architect, the engineer and the contractor may all be liable to the person injured by the fall of the marquee. Each may be liable because of his own negligence. The concurrent negligence of another is not an excuse if one has been negligent himself. The fact that one is more negligent than another is not an excuse. The courts will not decide which of several defendants is the more negligent. If a pedestrian were hurt when the marquee fell, he might be able to sue successfully: (1) the owner for maintaining an unsafe marquee; (2) the engineer for not designing proper supports; (3) the contractor for not following specifications; and (4) the architect for not observing that the contractor did not follow the specifications. The pedestrian might sue any of them separately and recover in full, or he might sue them all jointly and each would have to share equally in the verdict. The courts are not inclined to decide between those who are jointly negligent. This is important to remember when considering the matter of indemnification and should be held in mind in evaluating new clauses.

- A related consideration is *safety precautions* during the construction phase. Previously, the architect's responsibility for safety has not been clear, but the new language in A 201 clearly makes the matter of safety precautions the responsibility of the contractor. However, if the architect's design involves unusually hazardous tasks, he must provide certain safety instructions in the drawings or specifications, i.e. shoring the sides of an excavation next to a large skyscraper, since the contractor should not be expected to know how this is to be done. The same is true in the case of using new materials that are hazardous to the health of the employees.

- The last concept is: whenever there is a *right*, there is a corresponding *duty*; whenever there is a *privilege*, there is a corresponding *responsibility*. The architect should consider the agreement with this in mind. An important example is the right to direct the contractor to stop the work. If the architect has the right to do so it is implicit that, under certain circumstances, he has the duty. His failure to do so constitutes negligence.

The legal principles discussed above have formed the basis for the revision of the contract documents, every word of which "has been literally dissected and analyzed in the light of today's conditions of practice"—according to Charles M. Nes Jr., president of the A.I.A. Further, the utmost care has been taken to be sure that none of the assurances implicit in previous documents has been omitted so that those accustomed to their use can continue to do so with confidence.

A look at the architectural profession in Britain

Architectural practice and procedure in Britain is the subject of a recent booklet brought out by the Royal Institute of British Architects, 66 Portland Place, London W1, for overseas visitors who may want to know about the logistics of the profession and how and where to get further information.

Some of the statistics included make an interesting comparison with the situation in this country. Of a total population of some 54.5 million, 20,000 are registered architects, and 86 per cent of them are members of the R.I.B.A. Another 15,000 unqualified assistants and students are also employed in architects' offices throughout the country.

It is estimated that between 60 and 70 per cent of new building work—valued at about \$6 billion in 1965—passes through architects' offices. Public building programs play an important

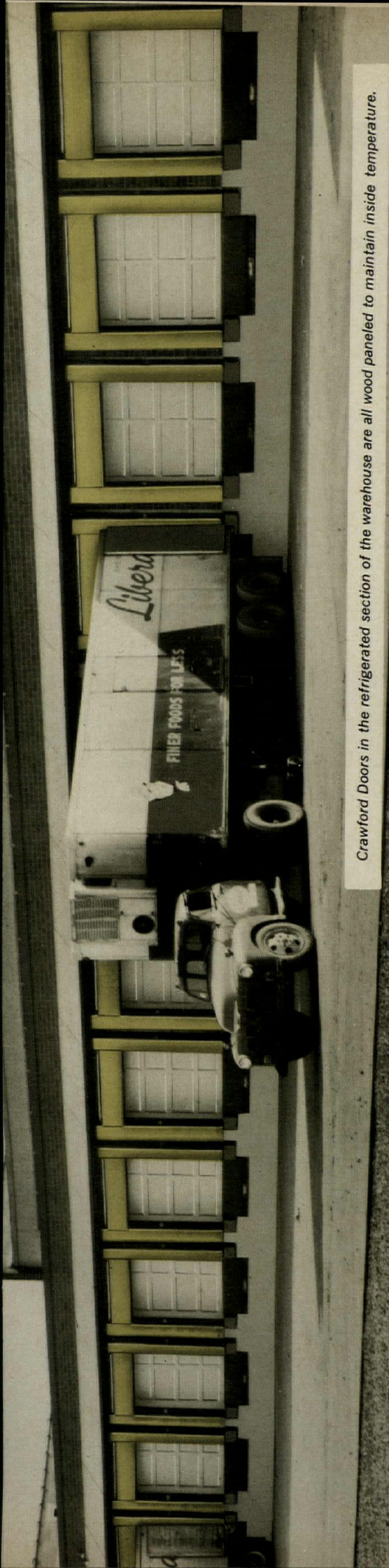
part and have increased considerably since the end of the war. There has been a corresponding growth in the number and responsibilities of public offices. Some 39 per cent of RIBA members now work in the public service.

- The subject of cost control has received considerable attention in Britain in recent years, and in this connection it is interesting to note that the quantity surveyor, who is responsible for estimating costs of labor and materials and for advising on costs, has separate professional status on his own account, is one of the principal consultants involved in an architectural project, and has his own professional institution.

- The R.I.B.A. offers quite a good service for overseas visitors. Its international section will give information on buildings to

visit—both old and new—and if sufficient time is available, visiting architects can often be referred to government departments, research organizations and private architectural offices around the country. Visitors are admitted to R.I.B.A. meetings and exhibits and may use the Institute's Library.

- Architectural visitors to Britain will find the new booklet helpful as it does outline the scope of the R.I.B.A.'s function, describes briefly the educational system for architects, the necessary qualifications and relation with other professions as well as providing names and addresses of architectural journals, booksellers specializing in architectural literature and other relevant public and private organizations. Existing French and English versions are to be followed shortly by Spanish and German editions.



Crawford Doors in the refrigerated section of the warehouse are all wood paneled to maintain inside temperature.

Liberal Markets, Inc. installs 30 Crawford Doors and Dor-Seals to shut out weather, retain processed air and controlled temperatures and preserve perishables.

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- SPECIAL DOOR EQUIPMENT:** Crawford Dor-Seals on every door to protect merchandise, save processed air, maintain required temperature, exclude dust, dirt, fumes.
- ARCHITECT:** William Leviton, 11 W. Monument St., Dayton, Ohio
- CONTRACTOR:** Leviton Construction Co., Dayton, Ohio
- CRAWFORD DOORS and DOR-SEALS:** Furnished and installed by Crawford Door Sales Co. of Dayton, Englewood, Ohio

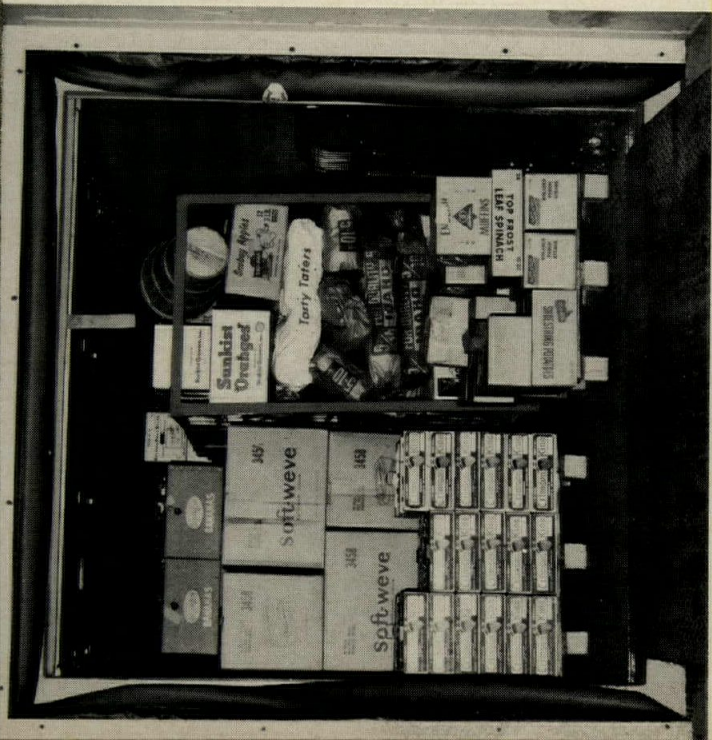


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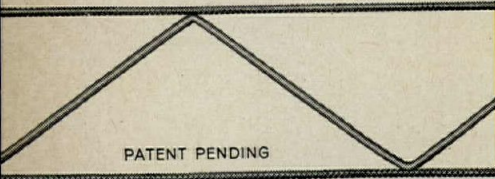


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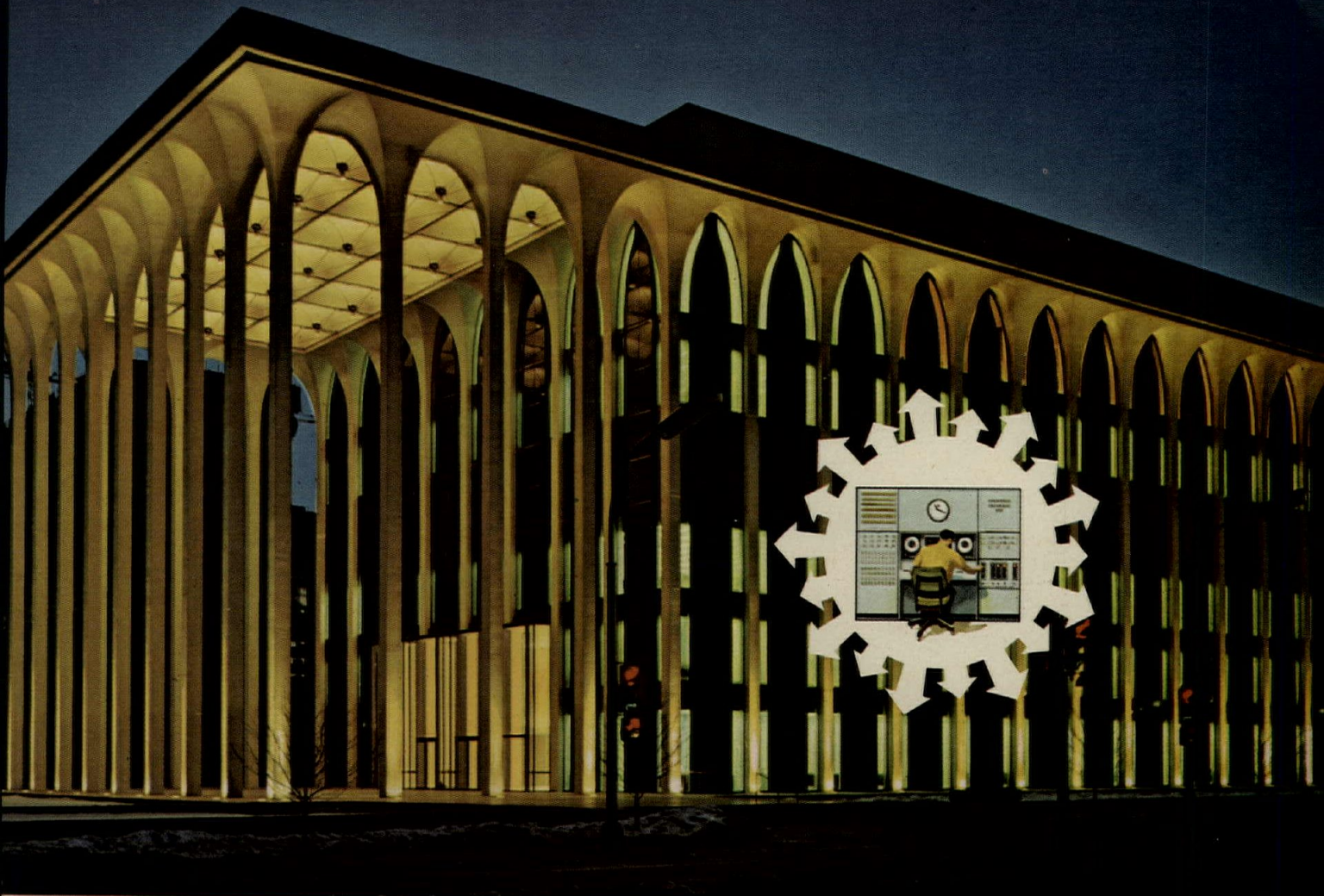


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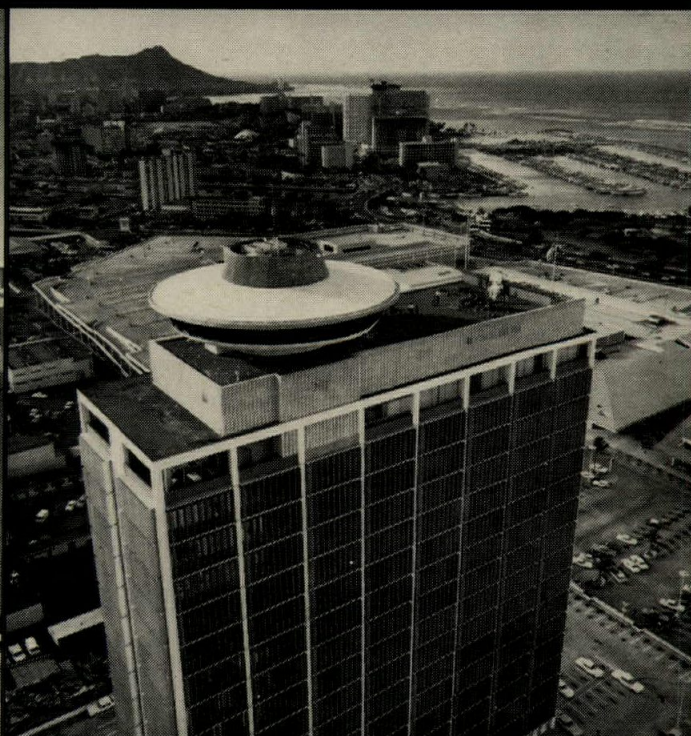
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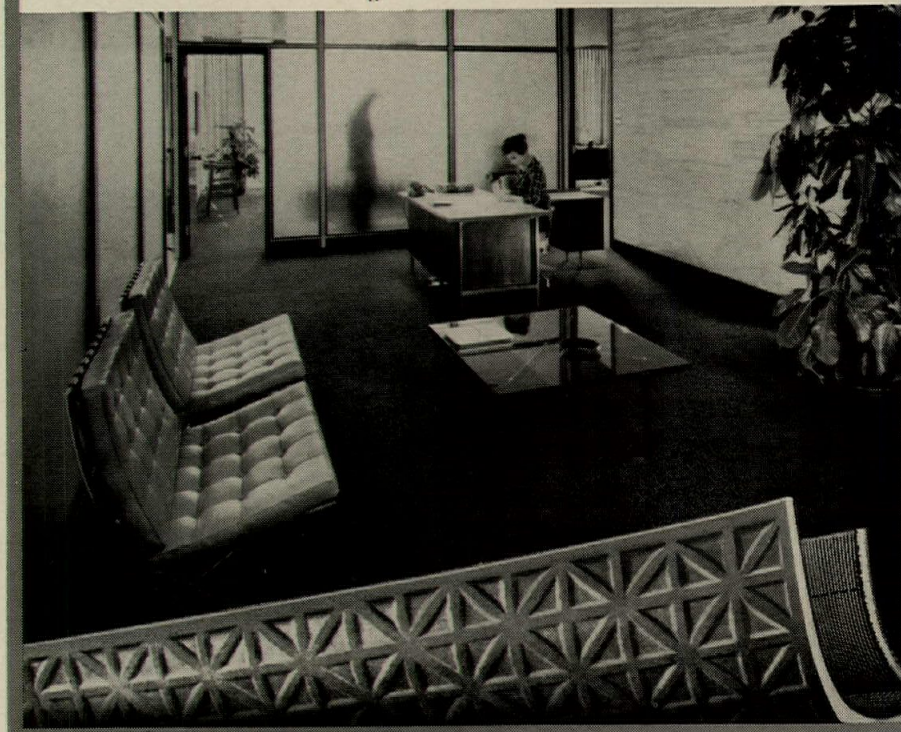
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*From tests conducted by Geiger & Hamme of Ann Arbor, Michigan, one of America's foremost sound laboratories.



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My hope," writes Edmund N. Bacon, "is to dispel the idea, so widely and uncritically held, that cities are a kind of grand accident, beyond the control of the human will, and that they respond only to some immutable law. I contend that human will can be exercised effectively on our cities now, so that the form that they take will be a true expression of the highest aspirations of our civilization. Given a clear vision of a design idea, the multiplicity of wills that constitutes our contemporary democratic process can coalesce into positive, unified action on a scale large enough to change substantially the character of a city."

The city as an act of will

The statement above and the design analysis of the classic cities which follow have been adapted from "Design of Cities," copyright ©1967 by Edmund N. Bacon, to be published this spring by The Viking Press, Inc. Architect Bacon, executive director of the Philadelphia City Planning Commission, has spent a lifetime in the study of the great cities of the world, those which have vanished and those which, still surviving, share the great urban problems of the present. In his book, which has been many years in preparation, he meticulously analyzes as conscious works of art almost every city, large or small, that has ever been loved for its outstanding beauty. The editors of ARCHITECTURAL RECORD chose to adapt his chapter on the cities of antiquity because in these ancient places, the design idea which Bacon so imaginatively perceives, and considers so relevant to the planning of today, achieved its earliest, clearest, and most brilliant expression. All that follows is in Bacon's words . . .

“... architectural form ... can channel the movement of people ... influencing the nature of their responses.”

Few of us can stand before the Parthenon without being painfully aware of the wide range of responsive sensitivity which the Greek citizen must have possessed and which we in the 20th century appear very largely to have lost.

In the long run the designer can stimulate in individuals new areas of awareness by the force of his product, but this is a slow and uncertain direction of effort. Alternately, through the architectural form of his structure, he can channel the movement of people through purposeful routes of movement and points of pause, influencing the nature of their responses.

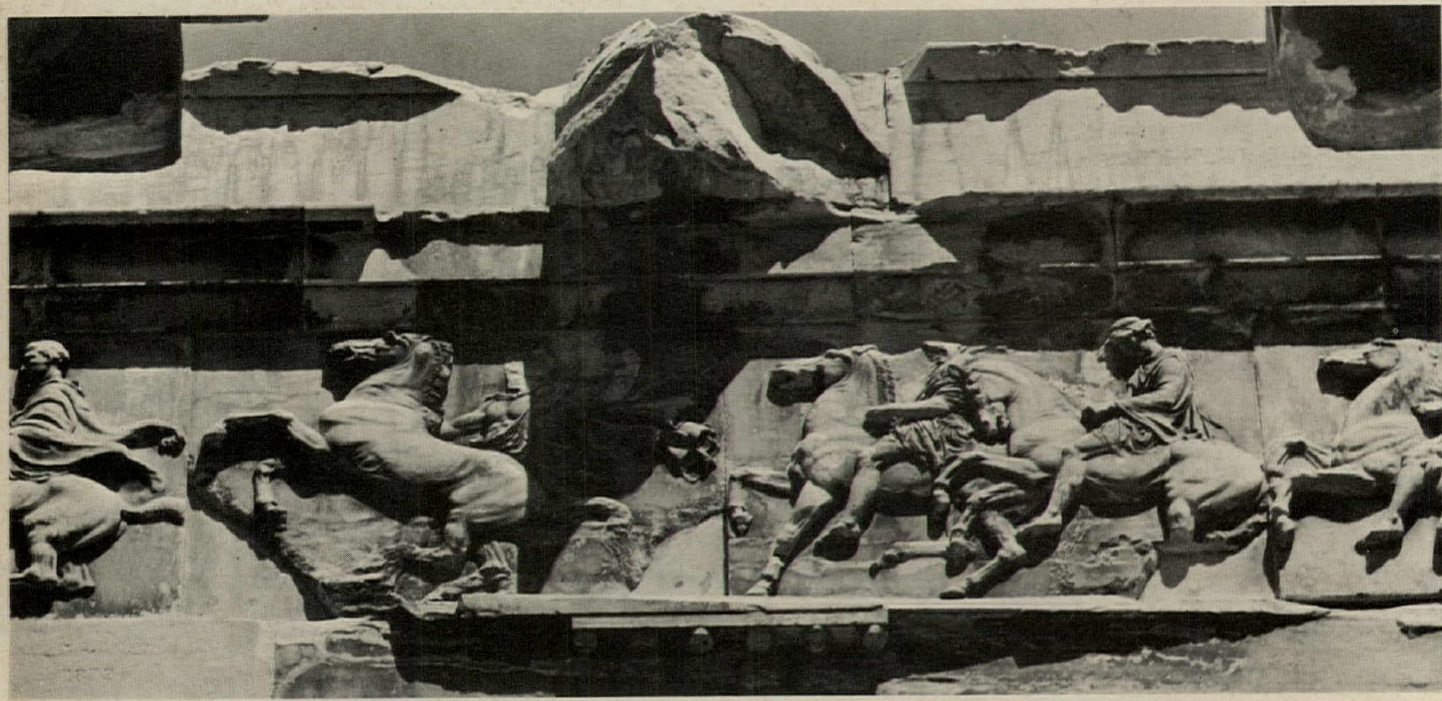
One of the most brilliant historic examples of a human channel of movement is the Panathenaic procession in ancient Greece. It occurred every year—and in an especially rich manner every four years—as a major event in the civic life of Athens. This procession (the subject of the Parthenon frieze illustrated below) took place along a clearly marked route extending from the Dipylon Gate at the city wall, across Athens and up the slopes of the Acropolis to the culminating point, the statue of the goddess Athena. While this route was used by the citizens of Athens every day of their lives for a multiplicity of purposes, its use must always have raised association with the brilliant and beautiful procession all of them had witnessed since childhood. The degree to which this procession was in the collective consciousness of Athens is shown by the end of the

Oresteian Trilogy of Aeschylus. Here, jointly, both the actors and the audience created the last scene, moving out of the theater down to the city of Athens along the Panathenaic Way.

This procession was not primarily to provide a spectacle for the onlooker, but rather to create an event in which many could take part. Thus the citizen became both actor and audience, affecting and being affected by the collective event.

From the time of its first beginning in archaic days, the Panathenaic procession and the sensations of those taking part in it gave the central theme to the development of Athens. From that time on, much of the architectural effort was directed toward providing punctuating points in the experience of its movement, toward adding a note to the rhythm set by previous generations. But the conceiver, the promoter, the architect, and the builder of these injections into a sequence of sensation were themselves the product of the cumulative effect of moving over the Panathenaic Way, and so were automatically attuned to the demands of its accumulated rhythms.

With these basic points once established—the simplicity of the single central movement system through the city, the understanding of the value of memory and of response to forms—we can now view the Panathenaic procession not merely as a spectacle, but as the central organizing force in the architectural and planning development of Athens.



**In Athens: "Here is architecture which interlocks,
buildings which reach out across space to other buildings . . ."**



The forces projected by mass into space, which act upon the participators as they move about in that space, cannot achieve full effectiveness unless the architecture is related to the special demands imposed by them. This is demonstrated in the photograph, which was taken within the Hephaisteion. Directly above, the view is across the agora to the Stoa of Attalos. The stoa was built in about 140 B.C., some 300 years after the Hephaisteion, as a protected meeting place for the citizens of Athens. Some distance to the left of this picture lies the Dipylon Gate. The Panathenaic procession moved across the agora between the Hephaisteion and the Stoa of Attalos, winding its way up the slopes of the Acropolis. The Parthenon is seen on the right in the picture above. This picture demonstrates how an architecture which has a discipline developed over a long period of time can relate to a specific city problem. Here is architecture which interlocks, buildings which reach out across space to other buildings, each one firmly implanted in the space in which it is located and creating interrelations and tensions between. Rhythms in the foreground are repeated

in the background. The temple on the Acropolis contains the same kind of rhythmic pattern as the covered colonnades of the marketplace.

This serves to remind us of the contemporary problem we face of bland buildings that lack the necessary elements for interaction. The development of each building as an entity in itself, often in an attempt to establish a new stylistic mode, tends to repel rather than attract interaction with other buildings. Worse still is the development of buildings that are devoid of any character at all, curtain-wall buildings which neither reach out into space nor receive space into themselves, sterile buildings which stimulate no desire and evoke no response.

What we need today is a new policy for design, not one that is dependent on stylistic imitation, but one that incorporates the qualities displayed here. If we are to establish tensions across movements in our urban spaces, how much more careful we must be when we compare the demands of the fast movement on the expressway with that which was needed to create harmony along the Panathenaic Way.

"... the position and size of the Parthenon are comprehensible only when it is viewed in relation to the entire Panathenaic sequence."

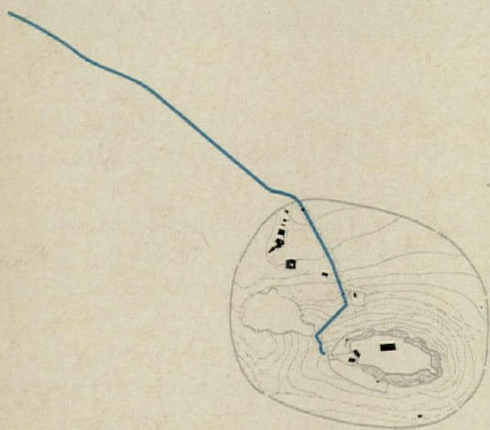
As we have just seen, the Panathenaic Way was far more than a city street; it was part of a system of regional movement which linked some of the most sacred places in Greece. From earliest times it joined the route which led from the mystic grottoes of Eleusis across the Greek countryside, through the Daphnae pass to the Dipylon Gate of Athens. As it continued diagonally across the originally amorphous space of the agora or marketplace, and on up the slopes of the Acropolis through the Propylaea to the statue of Athena, it served both as the sacred way and also as the main street of Athens. It was the central spine along which occurred the principal mercantile, industrial, and political activities which made up the life of the city. Indeed the position and size of the Parthenon are comprehensible only when it is viewed in relation to the entire Panathenaic sequence.

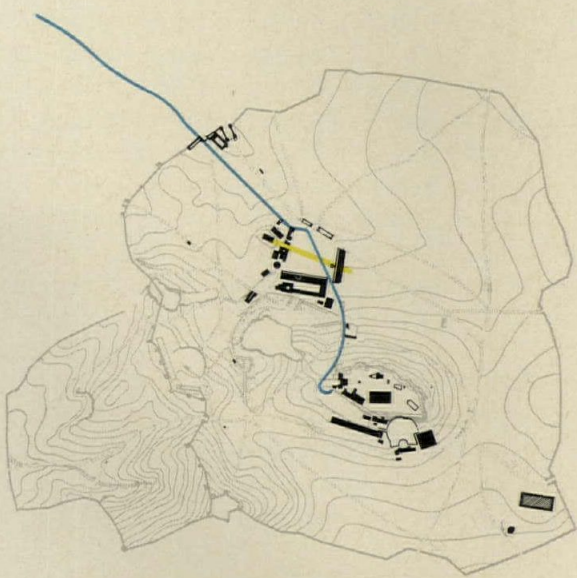
The drawings below demonstrate the evolution of the form of Athens. The route of the Panathenaic Way is indicated

in blue, the thrust or shaft of space from the Temple of Hephaistos (the Hephaisteion) is shown in yellow, and the principal buildings as they developed are indicated in black. Here we see the evolution of the form of the agora integrated with the design and development of Athens as a whole.

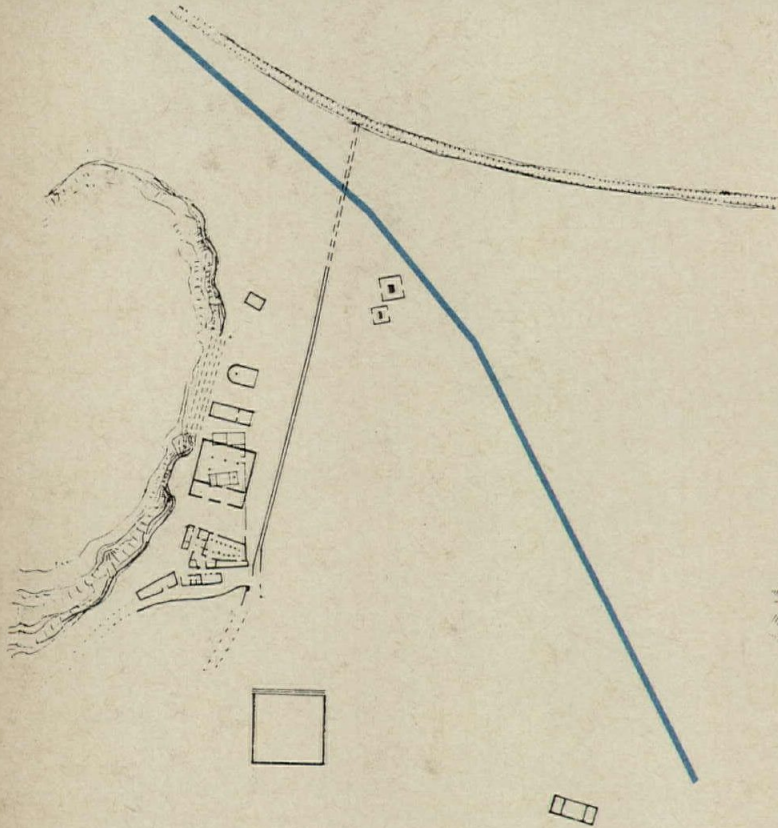
The superb placing of the Hephaisteion, the product of a deliberate act of will, part of the way up, but not at the highest point of, the long ridge adjacent to the Panathenaic Way, set into motion a shaft of space which, by its intersection of the movement along the Panathenaic Way, establishes a point in space. This became a significant design element in the subsequent development of the agora.

The design of the Hephaisteion itself is perfectly conceived to generate force of sufficient intensity to animate all the events that happened around it. The patch of sky between the columns on the left emphasizes the interlock between the structure of the temple and the shaft of space perpendicular to the ridge.





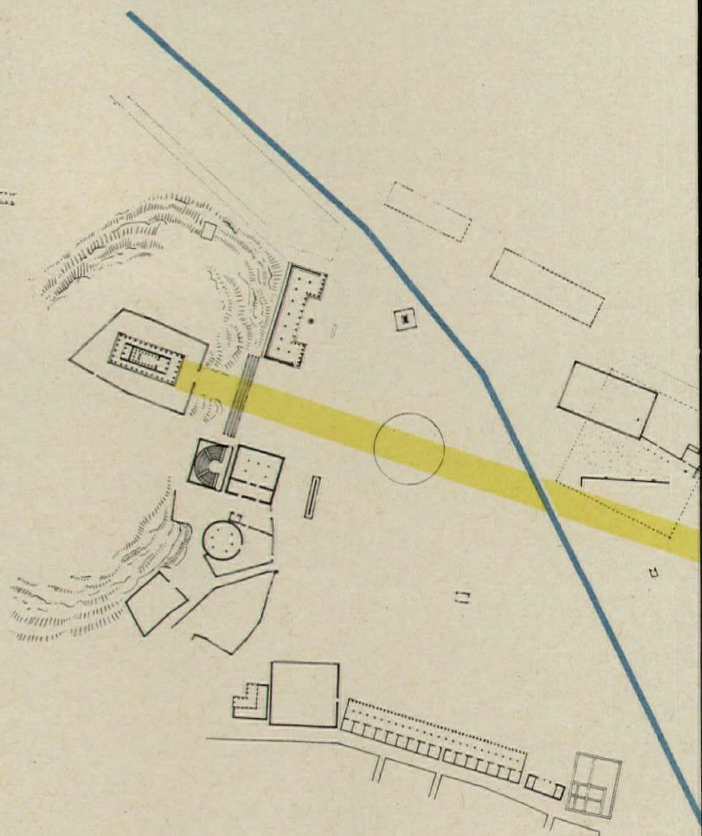
"... the form of the Athens agora as an idea was so powerful, so fresh, that today, some 2,000 years after its creation, men are still rebuilding and restoring it."



500 B.C.

The Panathenaic Way, shown in blue, passes diagonally across the somewhat amorphous marketplace, and past the government buildings strung out along the base of the ridge to the west. To the south was the old *bouleuterion*, or Council House, a square structure with five interior columns. And to the north were three small temples.

The drawings on these pages are based on John Travlos's work on the growth of Athens from the earliest times to now.

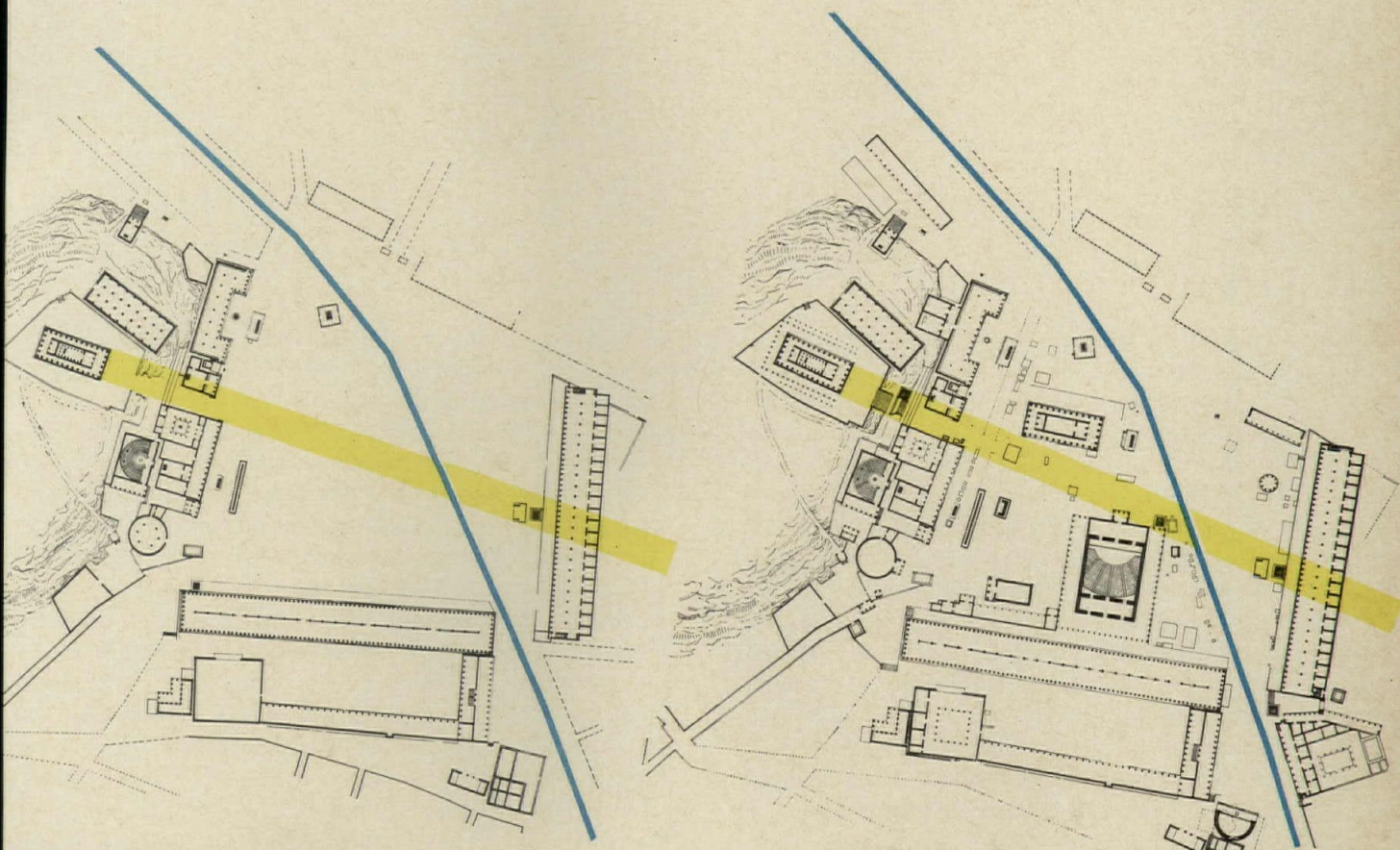


420 B.C.

The second illustration shows the development of the agora soon after the Hephaisteion had been built. Here, the shaft of space (in yellow) set into motion by the Hephaisteion begins to make its influence felt as an ordering element. The new *bouleuterion* with its semi-circular stepped seats is built into the hillside behind the old one, and the cylindrical *tholos* sets into motion a vertical influence to counterbalance the horizontal shaft. The Stoa of Zeus sets a long horizontal line at the base of the hill, and the broad flight of steps furnishes a fine visual base for the temple. These steps served as spectators' seats for activities in the agora. The circle represents the orchestra for the theatrical performances which took place in this area up to the time the theater was built on the slopes of the Acropolis.

Since the movement of the Panathenaic Way is directional, it seems natural that the first major architectural work defining the space of the agora, the south stoa, should be built where it was, facing the line of march and powerfully punctuating the experience of movement along it.

The definition of the edges of the space of the agora remained amorphous, but the influence of the now clearly established design structure continues its work.



HELLENISTIC PERIOD

In this plan the agora is in the full maturity of its development. The old *bouleuterion* is now replaced by the *metroon*, which provides a long horizontal base line of a colonnade complementary to the earlier Stoa of Zeus to the north. The area before the Hephaisteion is crowded by the new Temple of Apollo Patros, but the shaft of space projecting from it is still respected.

The south stoa has been rebuilt at a different angle and the new middle stoa has been added, so that the space of the agora is better contained. The Stoa of Attalos, built perpendicular to it across the Panathenaic Way, defines the east side of the square. These two buildings provided a powerful architectural enframement for the heart of the civic life of Athens, and together they set the visual interrelationship across the space of the square. Through their design, the rhythm of highlights and rectangular shadows, they infuse the space with spirit.

SECOND CENTURY A.D.

As shown here, the space of the agora was modified as the pressures of the growing civic life pressed in upon it. The new Temple of Ares injected itself in the space in front of the Stoa of Zeus, and many fountains and statues were added to the plan. The clean open quality of uncluttered space of the earlier periods is gone, and in its place confusion has set in.

Symptomatic of the architectural disaster to come is the huge, clumsy structure of the Odeion, an indoor meeting hall designed to hold a large number of people. Its ungainly mass throws the sensitive and delicate buildings of the earlier periods out of scale. Affected also is the space relationship of the Odeion with the Hephaisteion, whose dominance as a design force is seen to be on the wane.

From this time on, the agora deteriorated until it was destroyed in 267 A.D. by the Herulians. However, the form of the agora as an idea was so powerful, so fresh, that today, some 2,000 years after its creation, men have been motivated once more to clear its spaces and to rebuild at least one of the defining structures so that the ancient buildings that remain can reach out across the historic spaces and find a response.

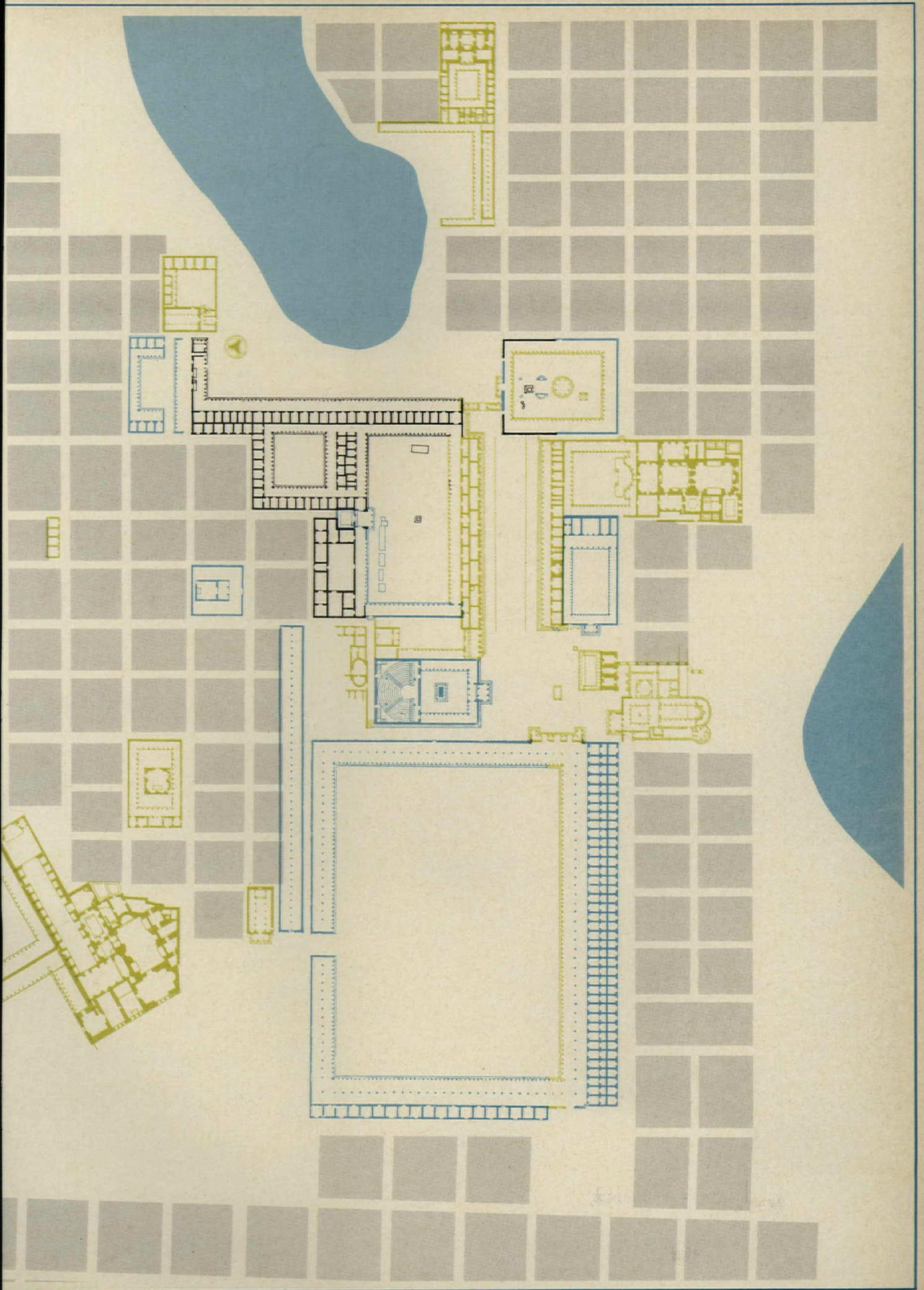
“Miletus . . . shows how it is possible to develop forms of tremendously dynamic quality as counterpoint to the rigid discipline of the gridiron plan.”

Miletus, influenced by the great Greek city-planner Hippodamus, is one of the most splendid city plans ever made. It shows how it is possible to develop forms of tremendously dynamic quality as counterpoint to the rigid discipline of the gridiron plan. The repetitive module of the regular rectangular blocks which constitute the residential part of the city sets up a rhythm which is the basis for the composition of the public parts of the city, the temples, the gymnasia, and the stoas facing inward onto the agoras and out toward the harbors. Furthermore, within this rhythm it was possible to compose in three widely separated periods according to the three very different approaches to design: the Greek work of the end of the fourth century B.C., shown in black on the map on the opposite page; the Hellenistic remodeling in the middle of the second century B.C., shown in blue; and the Roman work from the second century A.D., shown in yellow. Below is a photograph of part of the Greek stoa facing the harbor.

The difference in philosophy of each of these periods is

strikingly expressed in the different form of the masses and the open space. The Greek work involves the minimum of construction necessary to articulate the space for man's use, to bind the free-flowing space of the agora with the shore of the harbor, to set up a rhythm of columns and bays, but not to enclose or confine the spaces. The Hellenistic work is more extensive than the Greek; emphasis is placed on symmetrical arrangement of architecture, giving a more formal character to the civic open spaces. Architectural forms project into the spaces, defining but not enclosing them; angular forms in different directions set up dynamic interactions. During the Roman period all the projecting arms were incorporated into colonnades completely surrounding courts. The spaces were divided into separate units, each of a formal rectangular shape, reflective of the Roman philosophy of dividing life into different rituals, each with its own special space and architectural expression. The work of five centuries all stemmed from the basic design of Hippodamus's rhythmic square.





"The Delos agora demonstrates a method of design which is capable of expansion by increments . . . which can reorient and reintegrate itself on an ever-increasing scale."

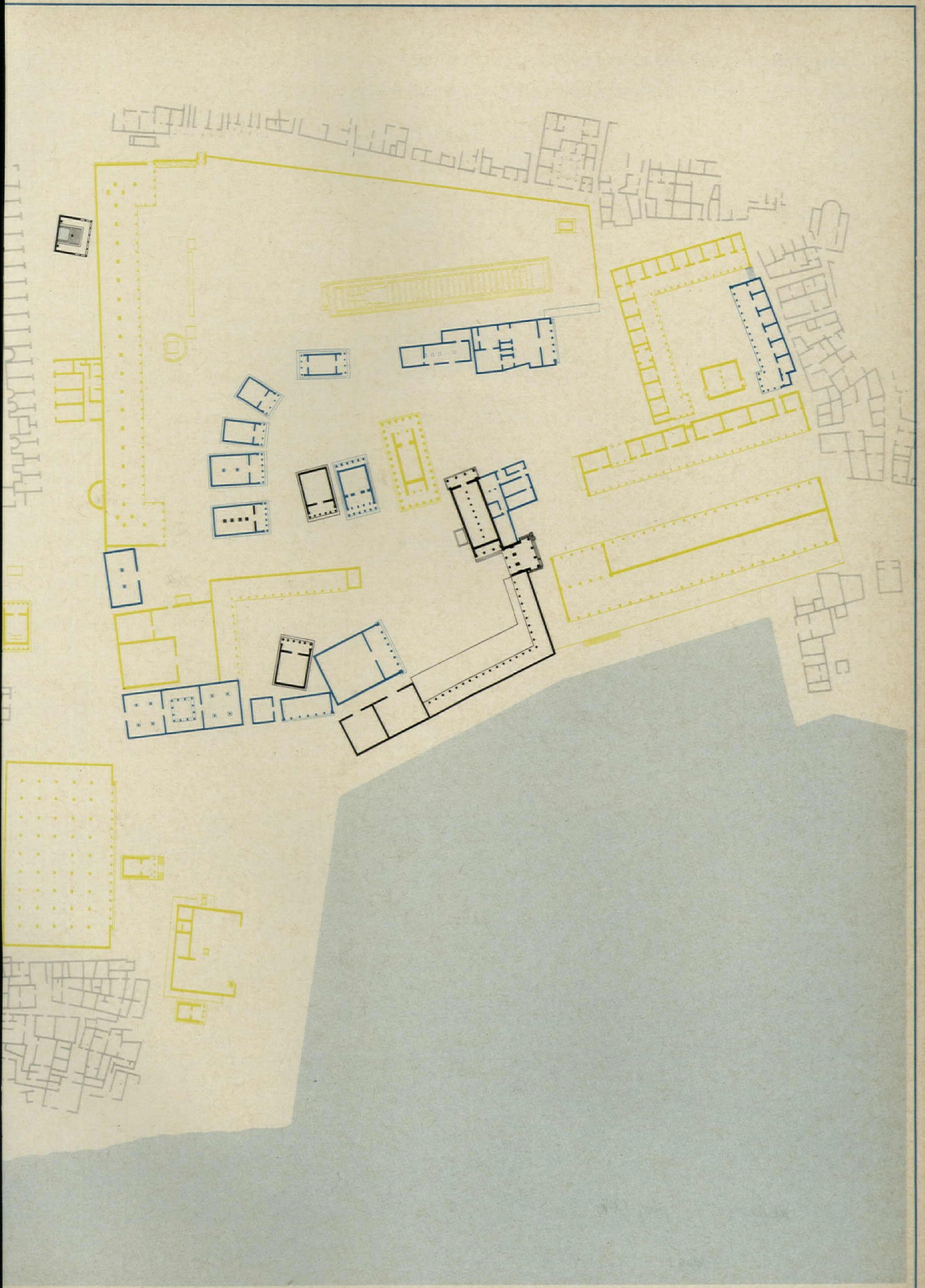
The plan of the heart of Delos, on the Aegean island of Delos, shows the evolution of the forms of the buildings and the open spaces, embodying many of the design principles contained in the plan of Camiros. In black is shown the Greek construction of the sixth century B.C., in blue the construction from 417 to 314 B.C., and in yellow all later work. This plan demonstrates the way in which the city responded to the pressures of population growth. Here we have a method of design which is capable of expansion by increments, which can grow and extend and, as it does so, reorient and reintegrate itself on an ever-increasing scale. The L-shaped architectural forms angled in relation to one another to produce dynamic residual spaces have provided a city center of extraordinary richness. Under this scheme ancient shrines have been preserved and have retained their identity although encompassed by new forms. There is no lack of boldness or breadth in the expanded plan,

yet the intimacy of inherited tradition is maintained.

Along the quay, the two buildings, subtly angled and positioned in relation to each other, provide a powerful statement of man-made order and give impetus to the city forms that progress up the hillsides. The entrance into the central area of the agora is through the series of controlled and architecturally defined spaces leading off the broad paved areas along the quay. The plan adapts itself over the years to the expanding scale of the structures and the spaces culminating in the vast scale of the Italian Agora, at the left of the drawing, which still sits comfortably alongside the older work.

As in Athens, it is quite possible that the agora in Delos was developed beyond its finest point and became cluttered with an excess of minor structures, yet as it stands in ruins it has the freshness, spirit, and free statement of human values that characterize some of the finest work today.





“... classical Rome was based not on an over-all design structure, but on the gradual accumulation of self-contained building complexes.”

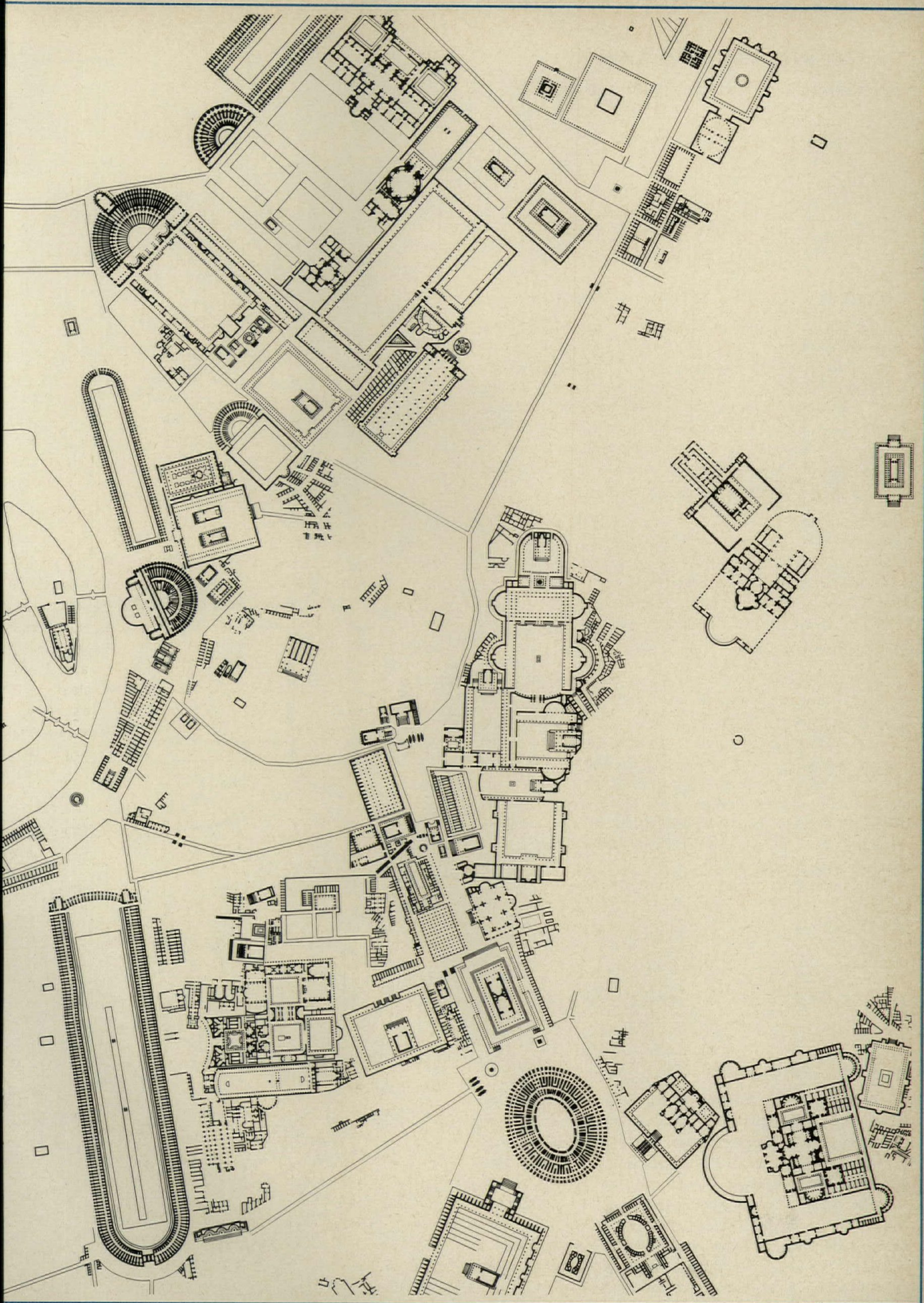
Whereas the Greeks developed the highest expression in Western civilization of the flow of life as a total organic unity, and built their cities accordingly, the Romans achieved and sustained a rational order which was made possible only by the fragmentation of functions into separate units. The Greek principle, based on the interaction of tension in a delicately balanced equilibrium, was highly unstable and, indeed, lasted only a few short years. Just as the vast Roman Empire, headed by one of the most stable governments the world has ever known, was based on separate, individually governed cities and provinces, so classical Rome itself was based not on an over-all design structure, but on the gradual accumulation of self-contained building complexes. Each of these was designed to serve a discrete function, and each was interrelated to its neighbors. The whole design was held together by the sheer mass of its individual elements, each bound to another by the friction of compression caused by the ever-growing city.

Perhaps insight into the essential differences can best be obtained by comparing the Panathenaic Way of Athens with the route of the Triumphal Procession in Rome. Here one might say that the movement system, instead of being extended the length of the city, was coiled into a single self-contained, self-completing circuit in a space specially set aside for the

purpose—the Circus Maximus, at the extreme left of the photograph below. True, after many times around the Circus, the procession, according to ancient tradition, proceeded to the Capitoline Hill, where the victor laid down his arms in the Temple of Jupiter. This, however, was the secondary rather than the primary expression of the victory parade.

The method of growth by accumulation of massive, self-contained units of building, each cheek by jowl with ones built before, each held firmly in place by the powerful force of compression, proved to be adaptable to the change in scale of a growing city. The purity of the geometry, the use of cylinders, half-cylinders, half-spheres, and elliptical prisms, contrasting with rectangular forms, produced areas of great architectural excitement. These were held together by the rhythm of the unifying post-and-lintel colonnades and similarly scaled rows of arches. Even where high vaults were used, entirely different in dimension from the older trabeated temples, the spaces within the vaults were penetrated by screens of a post-and-lintel columnar construction which brought the scale down to one consonant with the rhythm of the rest of Rome's architecture. Without the modular unity of this kind of architectural expression, the massive forms of ancient Rome would have canceled one another out and ended in chaos.

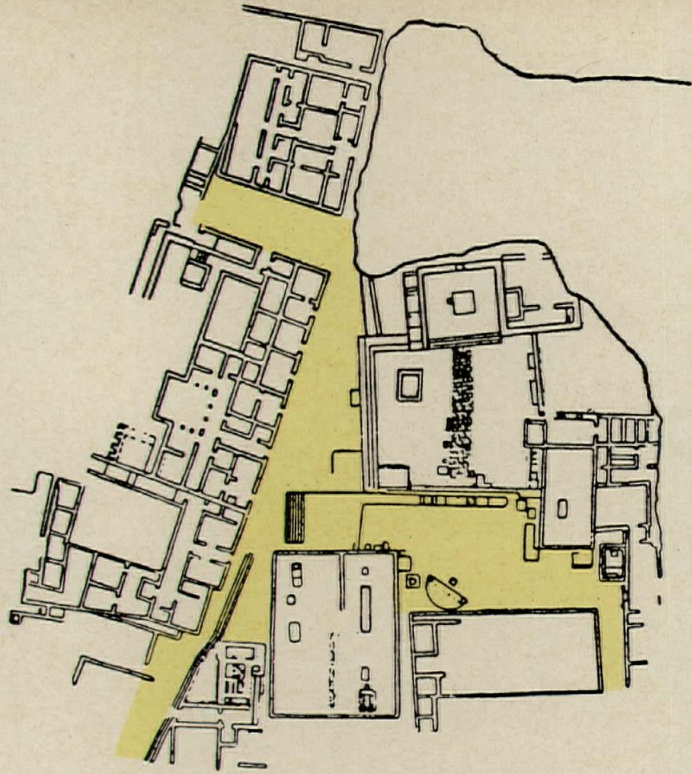




"There are six concepts of city growth . . . basic themes which occur again and again."

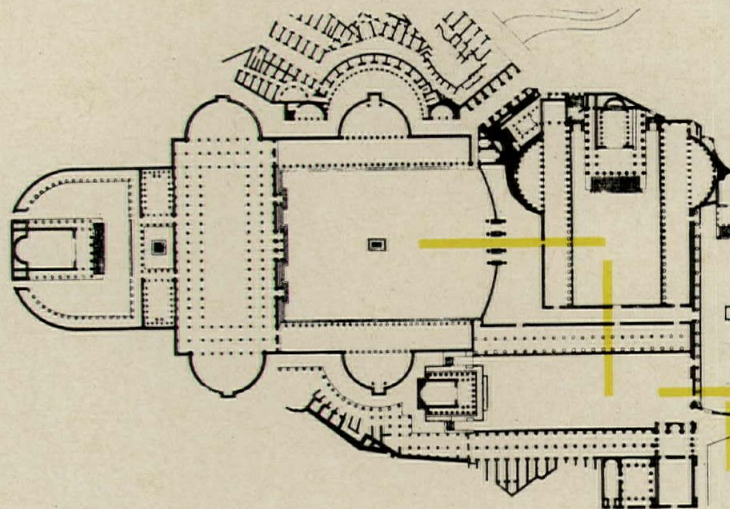
GROWTH BY ACCRETION—SPACE AS CONNECTOR

This is a method used by Greek designers with superlative skill. Each new building, internally ordered around one axis, is so placed in relation to existing buildings that an angular volume of space is created which binds the two together. Coherence is maintained by the tension between buildings across the angular space. The elegance and beauty of the spaces created, as here in Camiros, and the endless variety of interrelationships between the internally disciplined buildings provide a principle for city design applicable to problems today.



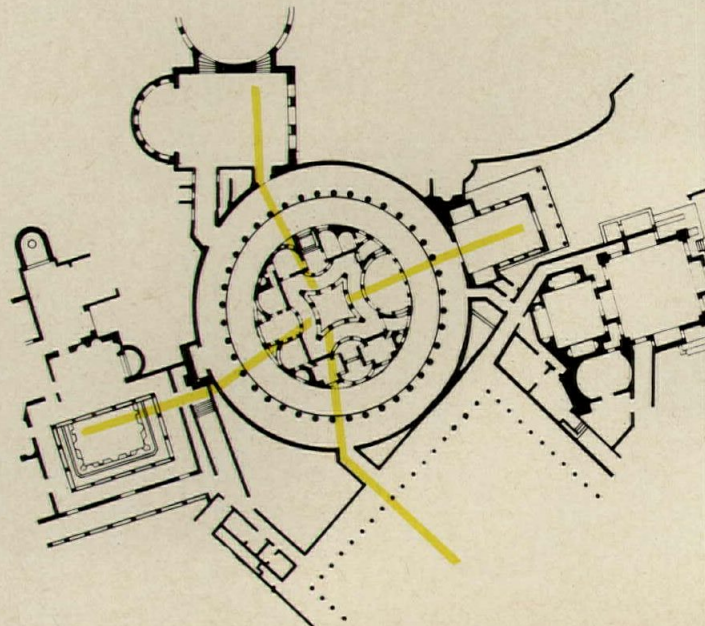
AXES AS CONNECTORS

When the Greek sensitivity gave way to the Roman love of order and logic, a new element was introduced in large-scale design, that of interlocking axes. Thus the five "new" fora of Rome, built one after the other by emperors, lie next to one another, with little or no space between. The central axis of each building was made exactly perpendicular to that of the one before, producing a system of cross axes that unified the whole. Because of their interrelationship, designs which in themselves are very formal and perhaps rather sterile create a dynamic over-all result.



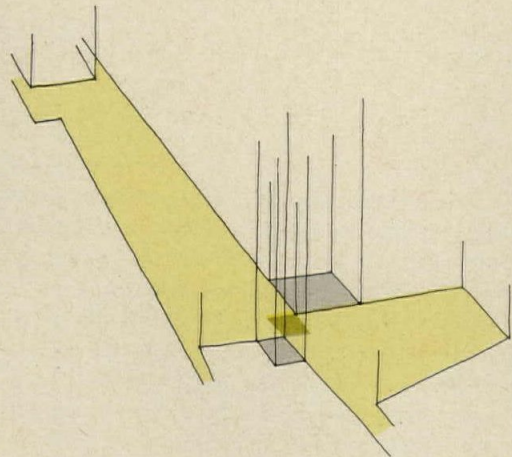
MASS AS CONNECTOR

In the later period of the Roman Empire, notably under Hadrian, a new freedom of design crept in, a return to large-scale site-planning based on a variety of angular relationships. The Romans developed a far greater variety of architectural forms than did the Greeks. Curved structures such as exedras, rotundas, and cylindrical colonnades offered a wide range of angular sub-axes which could interlock various parts of the composition. Thus, in Roman work, such as Hadrian's villa, at left, it was curved building mass which bound together the various parts of a many-angled composition.



GROWTH BY ACCRETION— INTERLOCKING SPACES AS CONNECTORS

During the medieval period, up to the 15th century, cities often grew around rectangular spaces. These gradually took form as individual buildings were built around their periphery. In Todi, Italy, an extraordinary result came about through the conception of two interlocking prisms whose corners overlapped to create a single intensive volume of space. The latter was strengthened and emphasized by the construction of two tall towers which contributed a vertical force at the point of juncture. This principle is seen in many forms in medieval cities.



GROWTH BY TENSION

At the beginning of the baroque period the ordering principle in the growth of the city of Rome was the establishment of lines of force which defined the tension between various landmarks in the old city. The interrelationship of these lines and their interaction with the old structures set into play a series of design forces which became the dominating element in the architectural work along them. Here the cohesive element is a line of force rather than a volumetric form.

GROWTH BY EXTENSION

Still a different concept is a line of force extending outward from the point of origin in the city and establishing an ordering principle that penetrates the adjacent land area. The Champs Elysees in Paris dramatically illustrates this. There, in the extension of the mediievally conceived garden of the Tuileries Palace, we can trace the line of propulsion which thrusts farther and farther into the surrounding countryside. This first thrust was joined by a series of similar ones which set up a network of design systems that were capable of indefinite extension.

While there are many other modes of city growth, the six concepts are basic themes which occur again and again.

About the book



Edmund N. Bacon

The foregoing pages from "Design of Cities" are but one part of one section of Bacon's persuasive argument that cities should be shaped by a conscious act of will. "The form of a city," says he, "is determined by the multiplicity of decisions made by the people who live in it. In certain circumstances these decisions have interacted to produce a force of such clarity and form that a noble city has been born. It is my premise that a deeper understanding of the interactions of these decisions can give us the insight necessary to create noble cities." By deliberately limiting his focus to exclude the political, social and economic forces which have always helped shape man's cities, Bacon is able to give the esthetic forces the concentrated emphasis and detailed exposition which they deserve. The book has four parts. The first sets forth basic urban design principles as they apply to building masses meeting the sky or meeting the ground, as points in space, as convex or concave surfaces, as recession planes, or as elements of design in spatial depth. A study of the design uses of ascent and descent leads Bacon to the development of his concept of simultaneous movement systems.

The second and largest portion of the book attributes the beauty of certain carefully selected cities to the imaginative use by gifted men of these basic design principles. Ancient and medieval cities are analyzed, as well as the urban design of the renaissance and baroque periods. Paris, St. Petersburg and London are included in Bacon's discussion of nineteenth century European design, as are Copenhagen, Greenwich, Nancy and Bath. A fascinating section entitled "Vitruvius Comes to the New World" reveals that the colonial American cities of Savannah, Philadelphia, Washington and Ottawa possessed a strongly enforced 'design idea' which guided their growth. The title "Le Corbusier and the New Vision" announces that Bacon has begun his critique of the contemporary city, and he includes those most strongly influenced by or designed by Corbu—Chandigarh, Brasilia and Rotterdam.

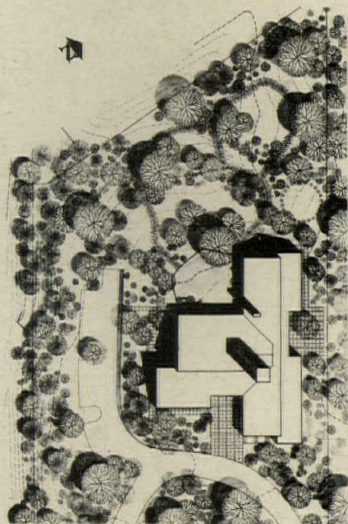
Following this comprehensive exposition of the 'design idea' at work through the ages, the author discusses its application to modern Philadelphia, the city whose development he has guided for many years.

ILLUSTRATION CREDITS: p. 114 photo: Mavroyenis, Athens; p. 115 photo: Mavroyenis; p. 116-117 city plans: drawn by William L. Bale Jr. after John Travlos; p. 117 photo: Edmund N. Bacon; p. 118-119 city plans: drawn by William L. Bale Jr. after John Travlos; p. 120 photo: Edmund N. Bacon; p. 121 city plan: drawn by William L. Bale Jr. after Theodor Wegand and Armin von Gerkav, Milet (vol. 1, book 6: Der Nordmarkt und der Hafen an der Löwenbucht), Staatliche Museen, Berlin, Walter de Gruyter & Co., Berlin and Leipzig, 1922; p. 122 photo: Roger Viollet, Paris; p. 123 city plan: drawn by Alois K. Strobl based on publications of the Ecole Française d'Athènes, Exploration Archéologique de Delos, Editions E. de Boccard, Paris; p. 124 photo: Ernesto Richter, Rome, Model of Classical Rome, Museo della Civiltà Romana; p. 125 map: drawn by A. Strobl after Studi per una Operante Storia Urbana di Roma, Centro Studi di Storia Urbanistica and Consiglio Nazionale delle Ricerche, 1963 and other sources; p. 126 upper drawing: from E. Kirsten and W. Kraiker, Griechenlandkunde, Carl Winter Universitätsverlag, Heidelberg, 4th ed., 1962—middle: from A. V. Bunin, History of the Art of Urban Planning (in Russian), Moscow, 1953—lower: based on the plan of Scuola degli Ingegneri of Rome, 1905; p. 127 diagrams: drawn by Laurence Sherman (upper)—Eliot Arthur Pavlos (middle)—James Nelson Kise (lower).

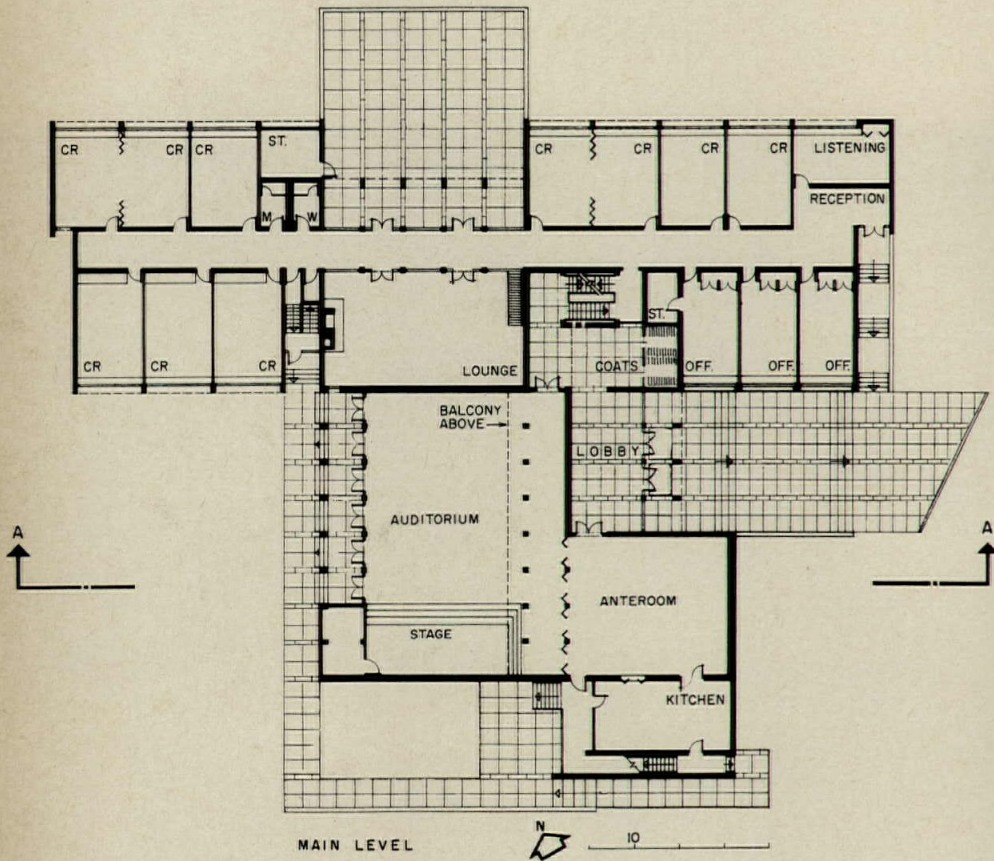


J. Alexander

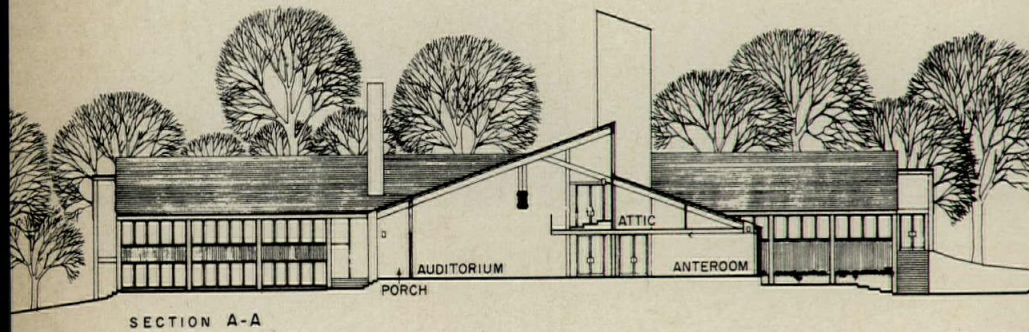
UNFORCED SIMPLICITY FOR A UNITARIAN CHURCH



This Unitarian church conveys the atmosphere of a religious building without structural gymnastics or elaborate transliterations of historical forms, and its unforced simplicity is highly appropriate to the intellectual religious philosophy it houses. The character of the site, a wooded knoll in a suburb of Washington, D. C., was an important design influence. The fact that the congregation elected to build the major portion of the program at once meant that architects Keyes, Lethbridge and Condon could place the church in such a way that the mass of the auditorium is offset by that of the two-story classroom wing, located a half-level above and a half-level below the floor of the meeting room itself. The church thus becomes a very close part of its hillside site and forms a unified composition that reads as a single building. Parking and access roads have been sensitively sited, and all new planting was chosen to preserve the character of the existing landscape.



J. Alexander



Coming through the main entrance to the church, the arriving members of the congregation find themselves in a story-and-a-half space whose ceiling slopes up, away from the door. Turning to the right, they next enter a continuation of the same space, except that it is now deeper, so that the roof goes up high enough for there to be a balcony underneath it. Those entering the main auditorium will walk under the balcony and turn to the left, those bound for the gallery will go up a double flight of stairs—situated within the bell tower and thus a narrow shaft of space—and then come back across the balcony and straight into the gallery of the church.

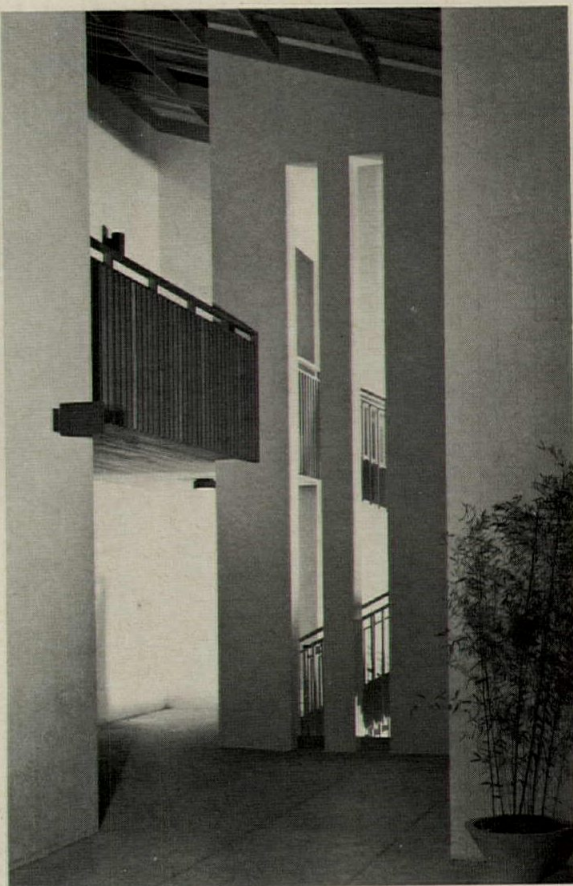
The structure combines steel, brick bearing walls and wood, with the major spaces being taken in steel, which is partially cased in wood. Light entering the clerestories is controlled by fixed wood louvers. White-painted brick, natural wood finishes and ochre paint are used throughout the church.



J. Alexander photos

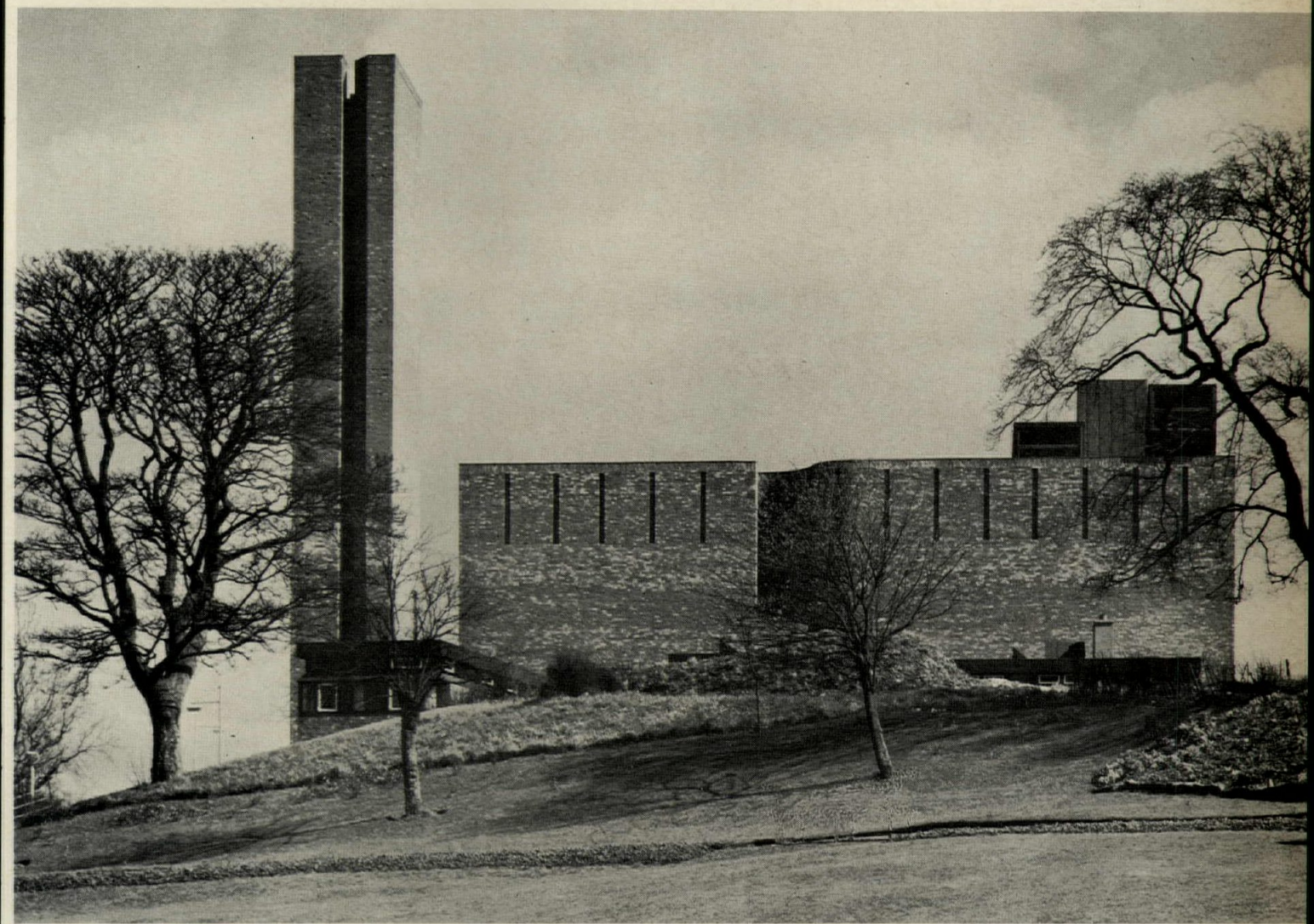


Above: porch leading from the auditorium. At right: part of the sequence of entrance spaces. Below: steps leading to the main entrance. Smaller steps at far right lead to the church office.



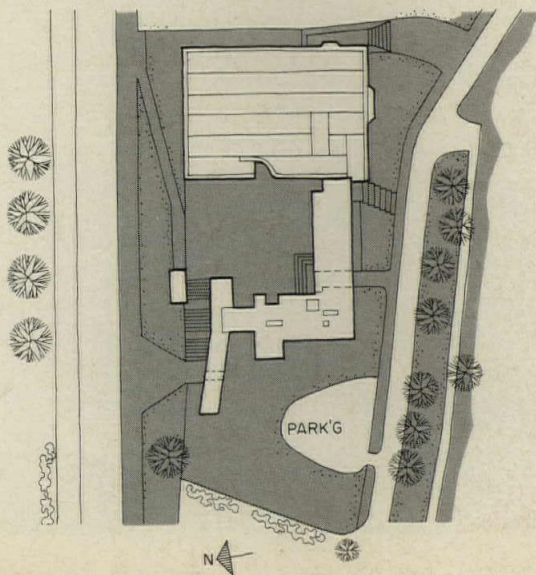
RIVER ROAD UNITARIAN CHURCH, Bethesda, Maryland. Architects: *Keyes, Lethbridge & Condon*; structural engineer: *Robert A. Weiss*; mechanical engineers: *Kluckhuhn & McDavid Company*; landscape architect: *Lester A. Collins*; general contractor: *Furman Builders*.





G. F. Wilson

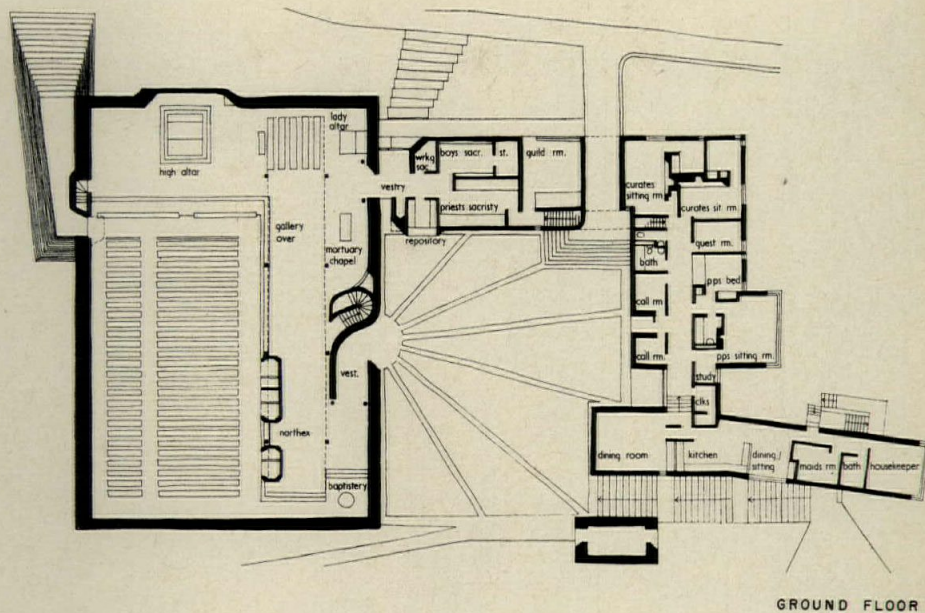
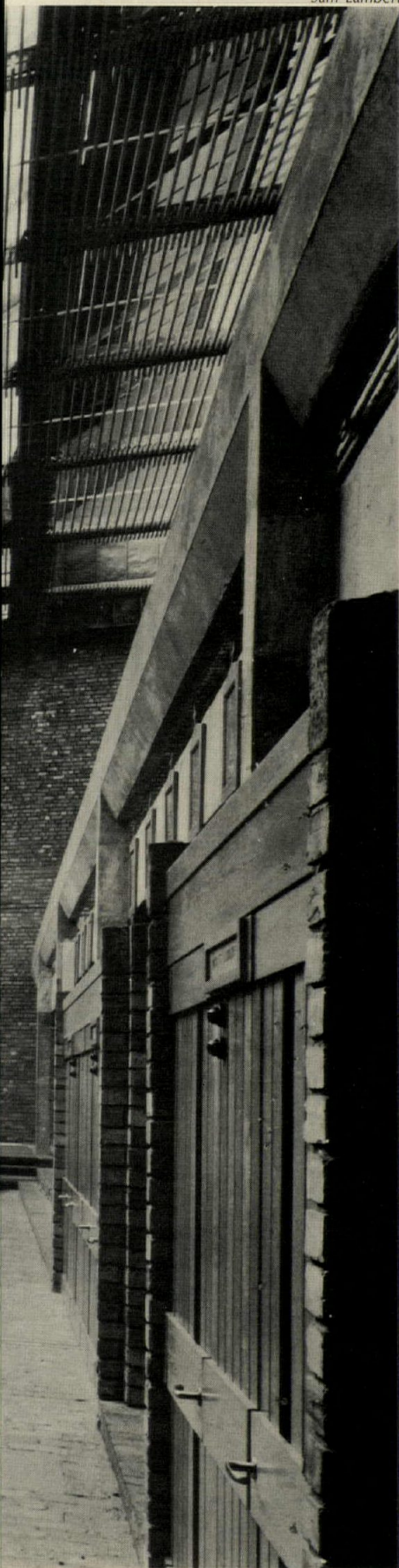
AN AUSTERE AND MONUMENTAL CHURCH IN SCOTLAND



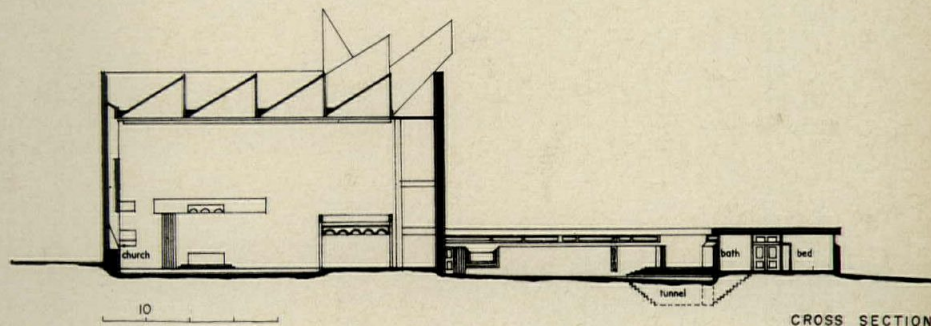
This church near Glasgow is so massive that the small buildings that form a forecourt around the entrance become almost invisible by comparison. This effect was deliberately sought by the architects, the firm of Gillespie, Kidd and Coia, so that the church would be clearly differentiated from the domestic scale of the East Kilbride neighborhood in which it is situated. Such austere monumentality captures the quality of traditional northern European brick church architecture, although the design substitutes traditional construction details for historical ornament. The interior shows that the architects are not unaware of Ronchamp, but the effect is not Corbusian. Nor does the interior resemble the rib cage of some prehistoric monster, as so many recent churches in Germany and Switzerland have done, although the church's dominating bulk, defined by structure, represents a point of resemblance to the "monster" school of ecclesiastical design.



Sam Lambert



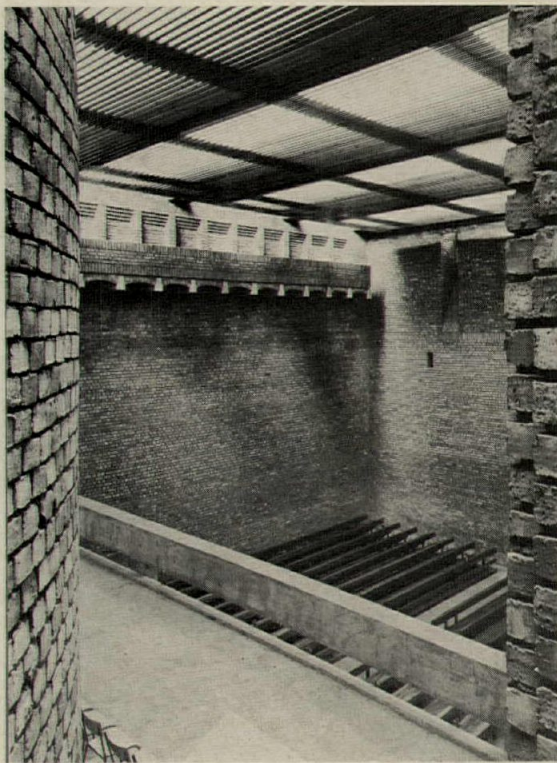
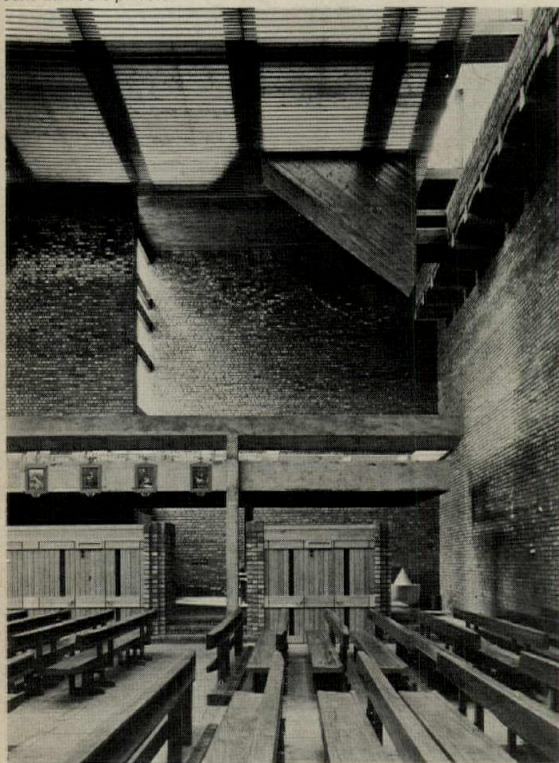
GROUND FLOOR



CROSS SECTION

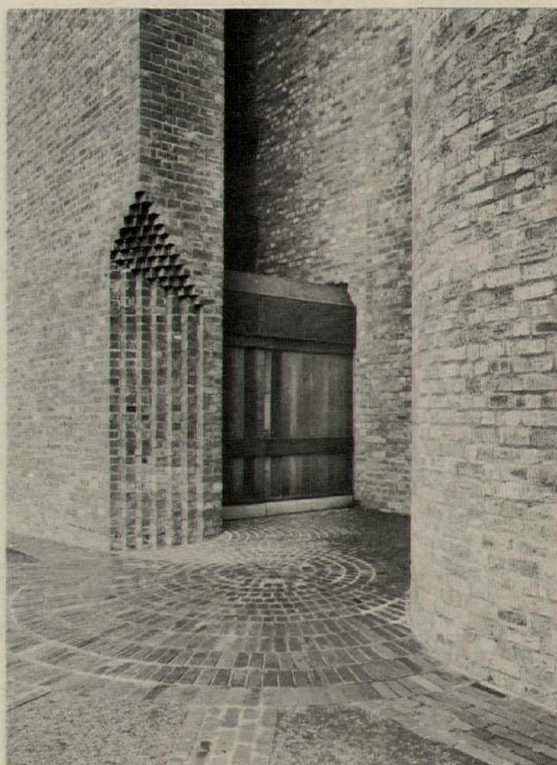
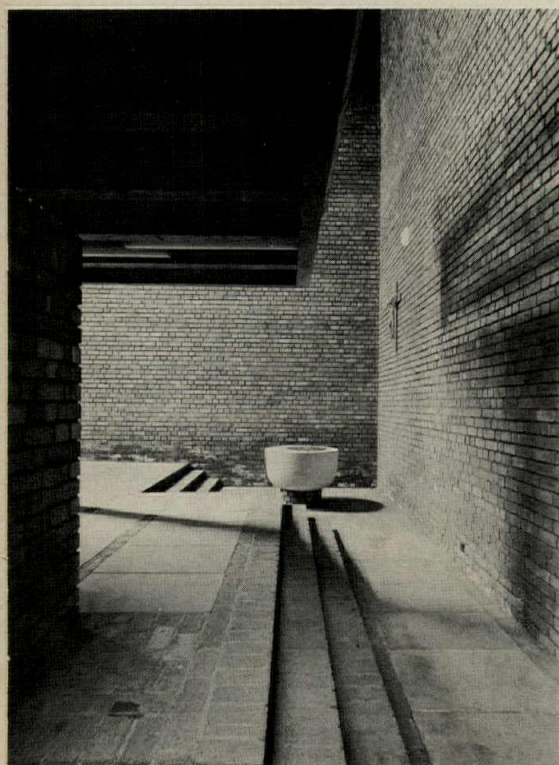
The plan of the church, which seats approximately 800, is in the form of a broad rectangle, with a free-standing side gallery under which are a small chapel, confessionals and the baptistry. The entrance is a tall slot-like opening let into the west wall and curving away from the body of the church. The east wall is deeply pierced, recessed and modeled to form what the architects call "an expressive enclosing surface." The walls are of a rough-textured face brick both inside and out. The floor is of large-scale stone paving, with brick trim, and the ceiling consists of varnished pine slats concealing a steel-framed roof with standard steel glazing units. Three tall, copper-clad skylights, projecting high above the roof line throw directed lighting down on the sanctuary. Subsidiary buildings include a presbytery for the parish priest and two curates, sacristies and guild rooms. The 90-foot-high bell tower consists of two brick slabs, with slatted-timber infilling.

Sam Lambert photos



Above: view looking towards gallery and confessionals, and view looking down into the church from the gallery. Below: the baptistry and the main entrance.

ST. BRIDE'S CHURCH AND PRESBYTERY, East Kilbride, Scotland. Architects: *Gillespie, Kidd & Coia*; general contractor: *A. Mitchell & Sons*.

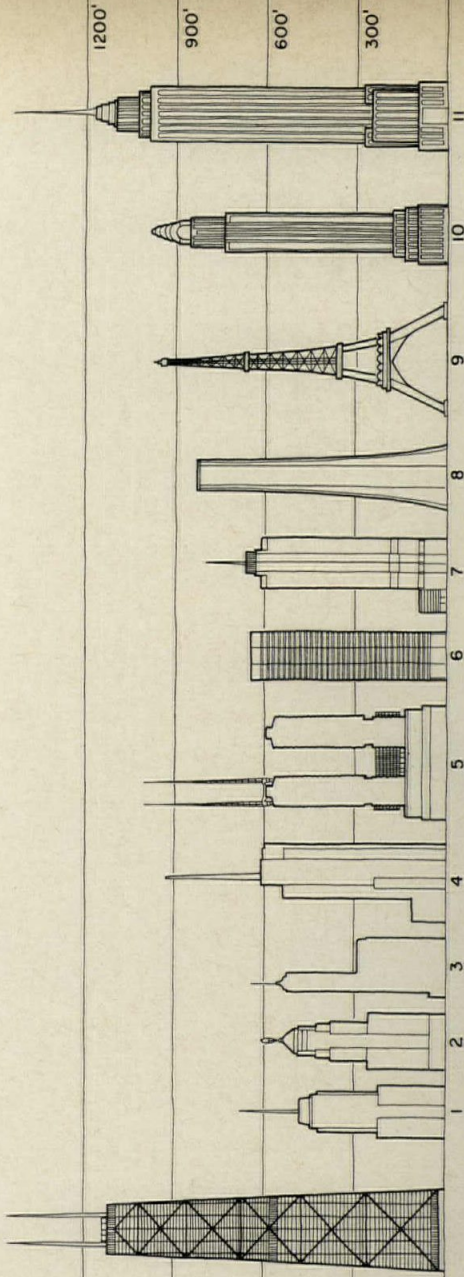


CHICAGO'S MULTI-USE GIANT

Next year, when the John Hancock Center is completed, Chicago visitors will probably be asking, "What is that tremendous black building? Why does it have sloping sides? Why those big X's?"

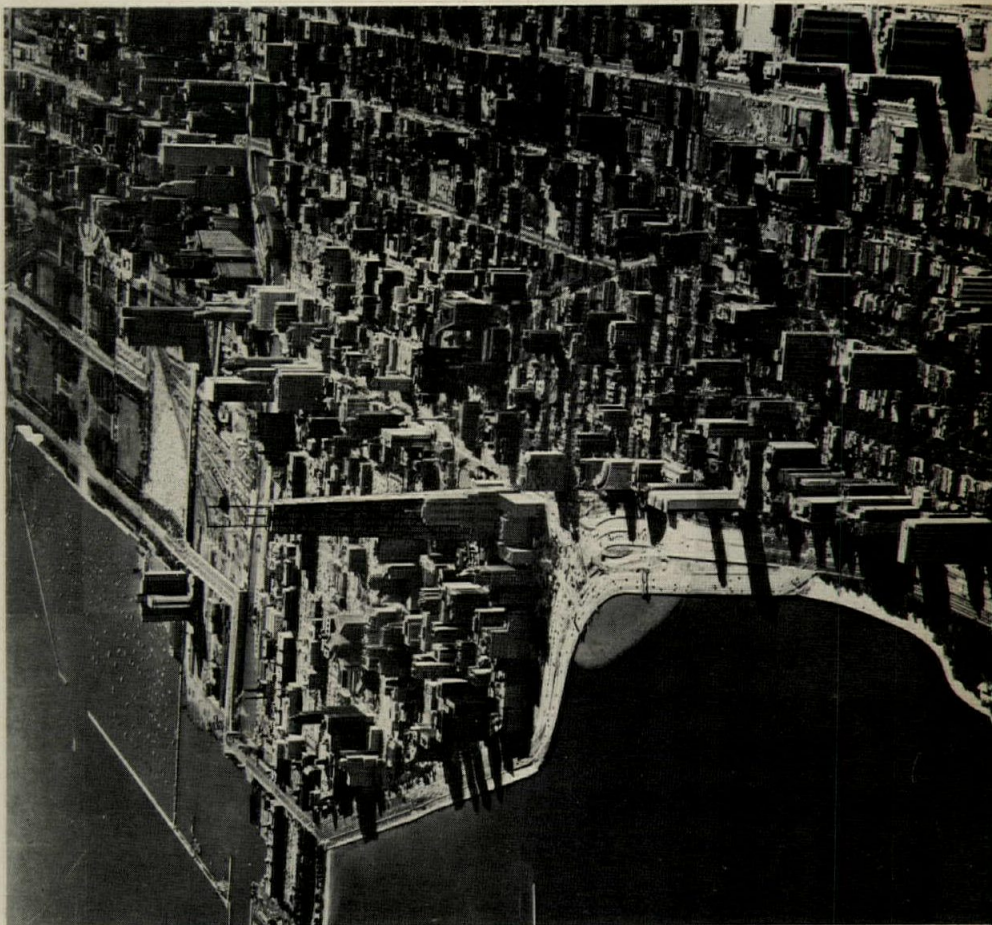
Although the building's steel frame is just beginning its upward growth, its design—by architects and engineers Skidmore, Owings & Merrill—has reached the final stage of development, so that these questions, and others, can be dealt with.

The 100-story John Hancock Center will join the burgeoning group of large, multi-use projects being planned and built both here and abroad. It will provide apartments, office space, parking, central area commercial space, and neighborhood convenience shops—all in a single, gracefully tapering tower that will rise 1,104 feet above North Michigan Avenue and occupy only 40 per cent of its block-sized plot. Such diverse occupancies will result in 24-hours-a-day land use; and the structure's relatively small ground coverage will introduce some much-needed pedestrian space at ground level. The multi-use nature of the development is such that it is not expected to add population to the already densely settled neighborhood.

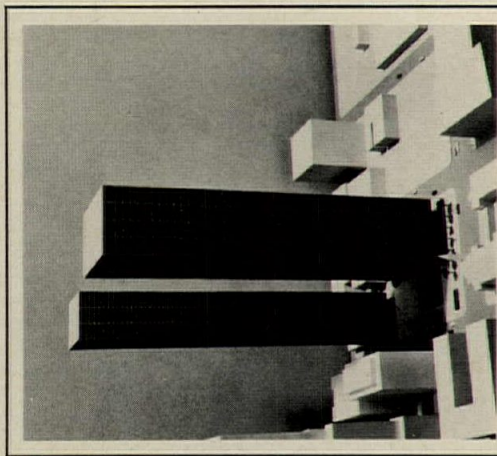


The John Hancock Center will dwarf all the other skyscrapers in Chicago; will be the tallest structure west of the Empire State Building. The 100-story Hancock tower will reach 1,105 feet and will be

- surmounted by twin antennas rising 1,449 feet above North Michigan Avenue. Comparative heights:
1. American National Bank, Chicago, tower 482 feet, antenna 683 feet.
 2. Chicago Board of Trade, tower 531 feet, sculpture 686 feet
 3. Kemper Building, Chicago, tower 555 feet, antenna 749 feet
 4. Prudential Building, Chicago, tower 601 feet, antenna 914 feet
 5. Marina City, Chicago, towers 588 feet, antennas 969 feet
 6. Chicago Civic Center, tower 631 feet.
 7. 1000 Lake Shore Plaza, Chicago, tower 640 feet, antenna 800 feet
 8. First National Bank, Chicago, tower 800 feet.
 9. Eiffel Tower, Paris rises 954 feet.
 10. Chrysler Building, New York rises 1,046 feet.
 11. Empire State Building, New York, top of antenna 1,472 feet.

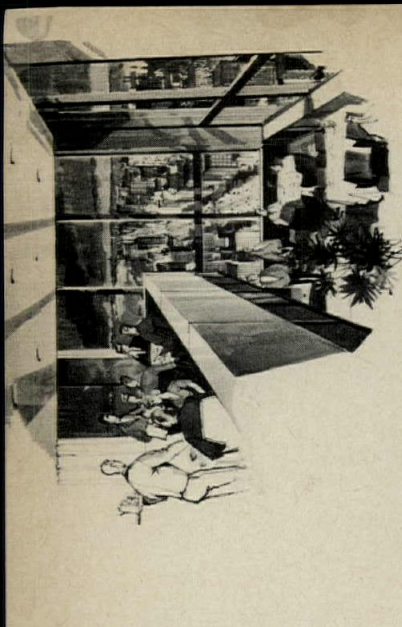


But how about the tapering form of the building? There is a great deal more to that taper than meets the eye, although one might justify it on purely esthetic grounds—arguing that the gently sloping sides create a more graceful and stable form than would the familiar classic rectilinear steel cage. Beyond the esthetic, however, other design determinants began to accrue the day builder-developer Jerry Wolman approached SOM in Chicago and asked for their ideas on the best

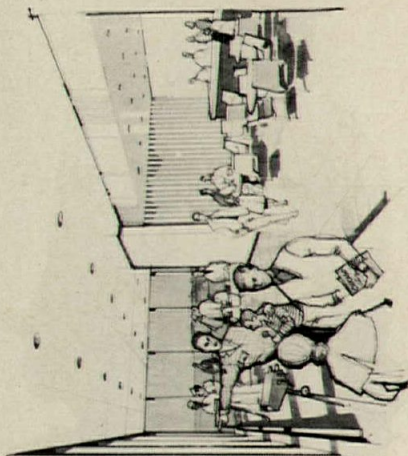


The original scheme consisted of two towers—a 70-story apartment building and a 45-story office building—shown here in model photo and plan. This idea was soon eliminated, however, due to the many advantages of a single tower, as explained in the text.

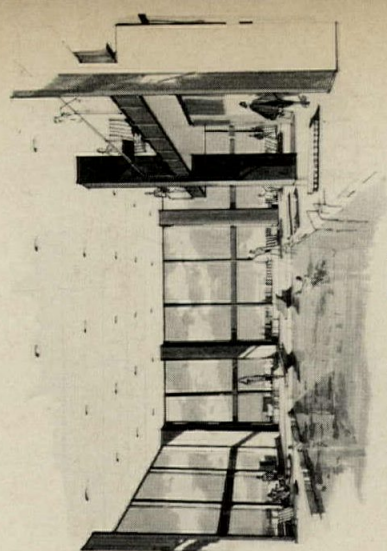
way to develop a North Michigan Avenue property two blocks north of the water tower. This is Wolman's first Chicago venture. Basing their suggestion on the nature of the neighborhood, SOM advised multi-use, in order to gain an income on a continuous use basis. The



A luxury restaurant will occupy the top two rental floors—95 and 96, will be reached by special express elevators from ground level.



The 94th-floor observatory will overlook a panorama of four states; will have a bar and display area.

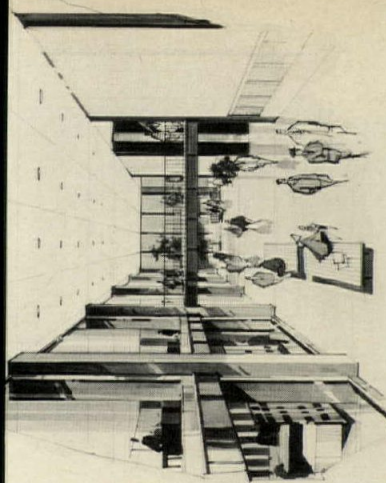
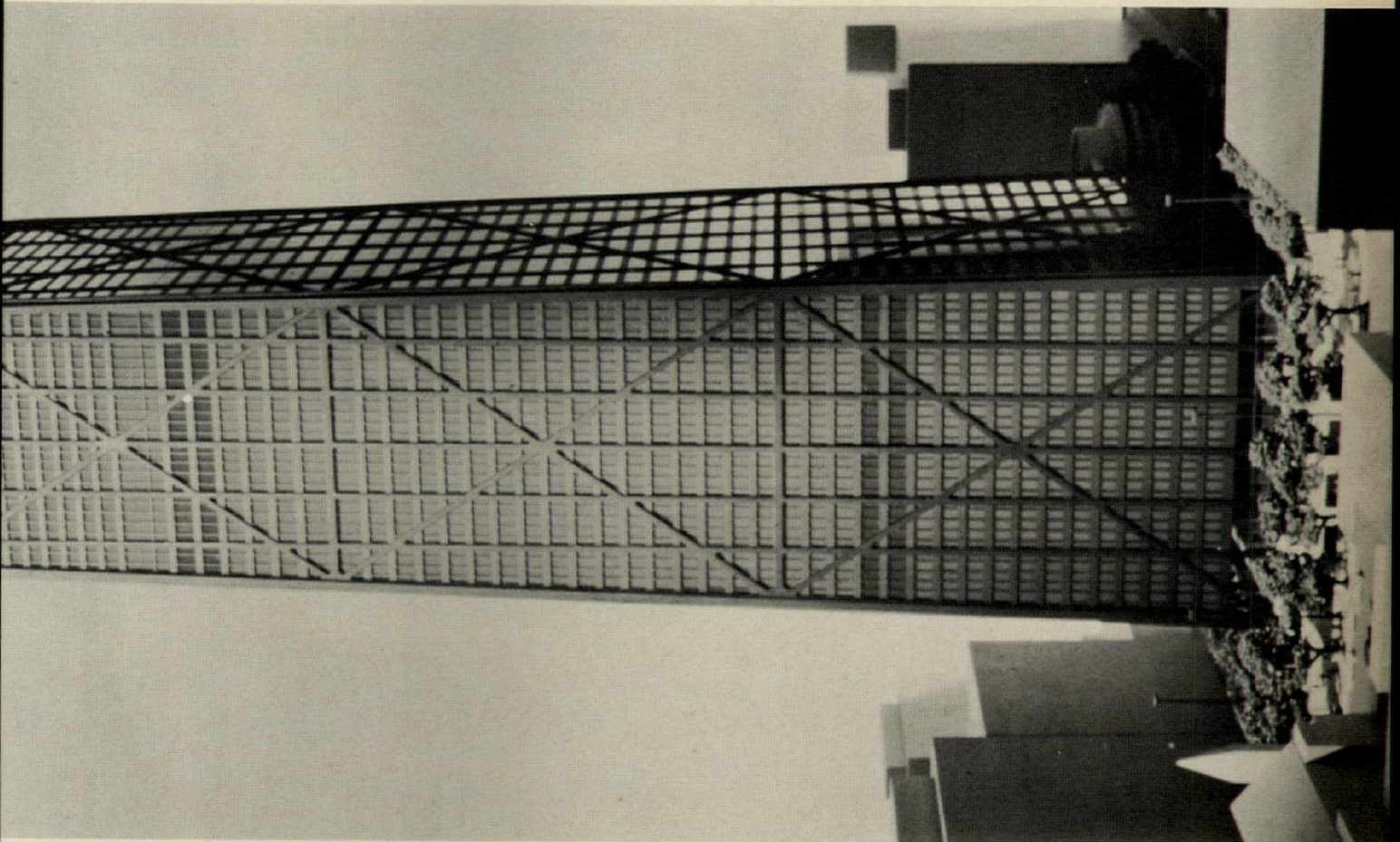


A year-around swimming pool and health club for apartment tenants will be located on sky lobby level.

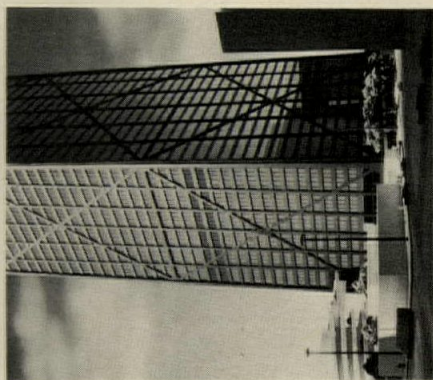
neighborhood can be described as both high-class commercial (stores and office buildings) and high-class residential (apartments), located on the edge of the "Gold Coast." Such an area is probably not unique, but certainly not common. Its character was heavily influential in setting the program.

The first design was thus a straightforward one that placed two towers on the plot: a 45-story office building and a 70-story apartment, which worked out to about the same over-all height. This parti covered a large part of the plot, so little open area was left at ground level. Considerable difficulty was also experienced in arranging the two towers—in relation to each other and to the micro-environment—so occupants would have adequate privacy, quiet, and outlook. During a meeting dealing with a discussion of such matters, someone suggested, "Why not put one tower on top of the other?" This, then, became the next step: placing the slim apartment element atop the slightly broader office block.

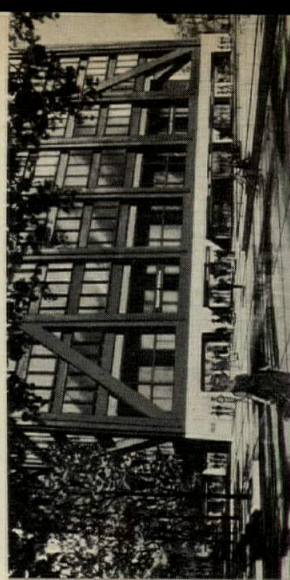
In studying and developing the resulting king-size tower, it was necessary to deal with three principal considerations: shape, the elevator system, and structure. The pyramidal form seemed to follow naturally, since a large number of the apartments will be singles or efficiencies—popular in this part of the city—which require a greater depth from outside wall than those with two, three, or four bedrooms. Thus, it seemed logical to make the lower floors of the apartment element larger, and locate the smaller apartments there; an arrangement that places the heaviest elevator traffic at the bottom of the apartment block, where it should be. Further, the large and expensive apartments can then occupy the top portion of the shaft, thereby acquiring maximum measures of privacy, quiet, prestige, and outlook. The office block, larger in depth than the apartment element—for greatest area efficiency and



The apartment sky lobby, on floors 44 and 45, will provide a coffee shop, commissary, laundry, drug store, mail center, and recreation facilities.



Attended parking, on floors 6 through 12, will be reached by a one-way spiral ramp at the rear of the building



Travertine will be used as the finish for the plaza and ground floor of the building. The Michigan Avenue entrance will feature a sunken pool.

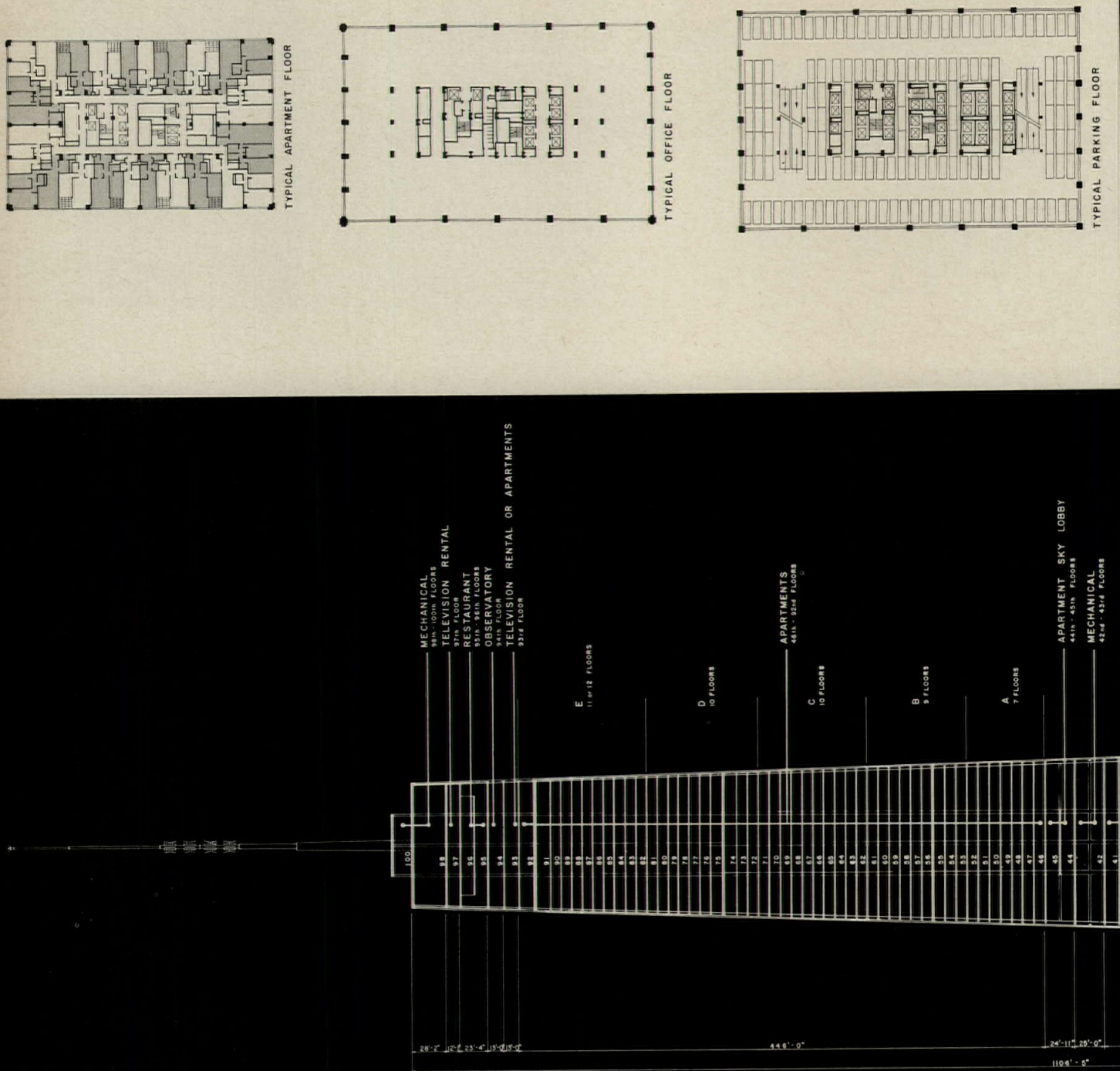
optimum income—then logically takes its place as the broader base portion of the tapering shaft.

As for vertical transportation, elevators can be managed by providing a sky lobby for the apartment tower, thus making it possible to stack elevator banks one above the other. Without such stacking, the premium—in terms of floor area pre-empted by continuing shafts—would be too great to justify the multi-use scheme and the 100-story building.

The tapering form made sense as the structural design was developed, since the multi-function tower could be handled as a single building with a continuous outer sheath. Within this idea, floor heights could vary and not alter the basic concept—as indeed they do, in the ratio of four apartment floors to three office floors. The indeterminate and highly efficient structure was conceived as a rigid, rectangular tube, with its trussed walls carrying all the principal stresses. Floor slabs will provide secondary lateral stability; the core will support only itself and a portion of the floor load.

Designer-in-charge Bruce Graham explains, "We ran the gamut of shapes, our object being to find a natural and expressive one: natural for the steel frame, expressive of structure and function. Our parameters were depth and shallowness of space. We ran a variety of pyramidal forms through the computer to test them for both functional and structural performance and efficiency. I think we came up with the optimum possible for the program."

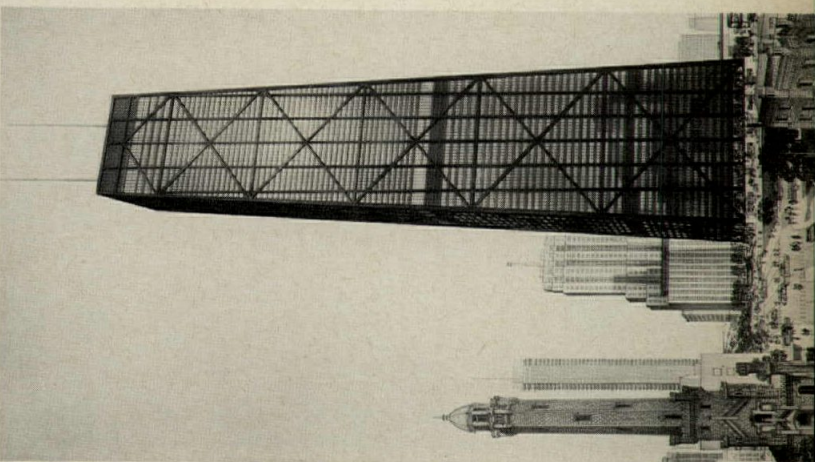
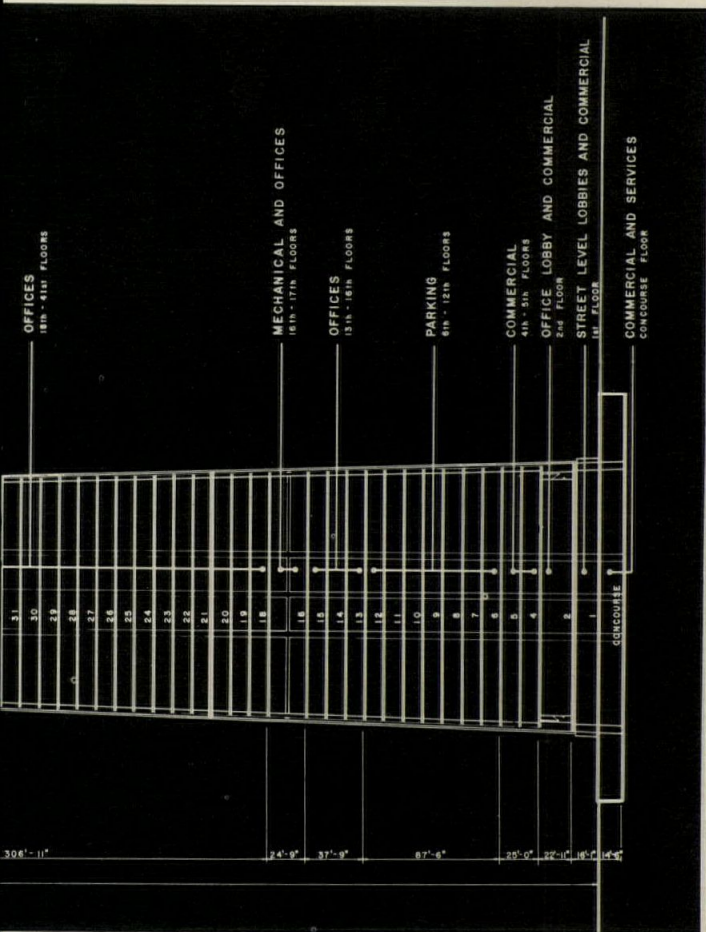
The diagonal bracing accounts for the high (probably unmatched) efficiency of the structure, which is capable of supporting a 100-story building on a steel frame that weighs only 29.7 pounds per square foot of floor area. The majority of tall buildings require from 45 to 50 pounds of steel per square foot; the Chase Manhattan project runs 48; the Chicago Civic Center 45. SOM partner



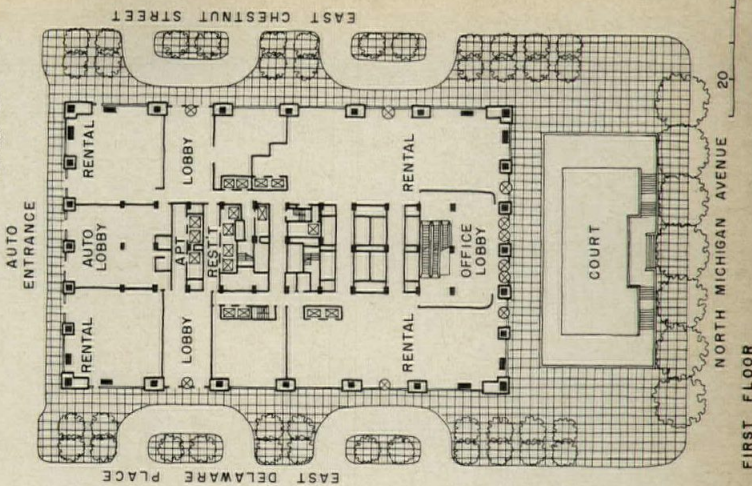
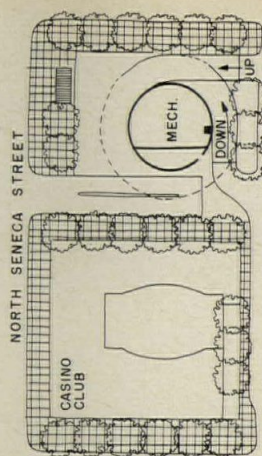
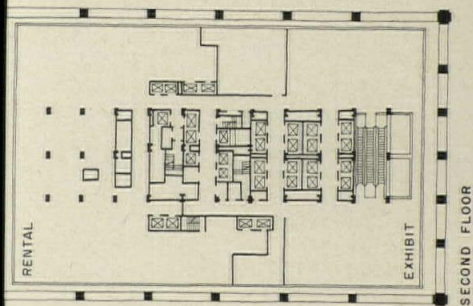
Bill Hartmann says, "The John Hancock diagonals are worth 15-million dollars—this is the saving made by using diagonals instead of the alternate system of rectilinear Vierendeel trusses. Actually, this particular steel frame will be furnished and erected for about one-half the cost of a conventional steel cage with perpendicular walls." Esthetically, the pattern of X's may raise some conservative eyebrows, but the diagonals' *raison d'être* is so completely justified, and their tracery so tastefully handled, that this observer finds it difficult to fault them. Rather, one finds that the manner in which the parade of diminishing X's overlays, yet reinforces, the rectilinear pattern of spandrels and columns, sets up a dynamic geometry that lends appropriate scale and visual interest to the giant facades that might otherwise overwhelm nearby buildings. Happily, these diagonals—unlike those in other structural walls—will not act visually to deny the expression of recurring horizontal floors, but will in actuality strengthen it. The nighttime appearance of the building will of a certainty be both structurally expressive and sensually exciting.

Twin TV antennas will rise above the shaft to provide a needed termination for it. It appears possible—and even likely—that these new antennas may put the others in Chicago out of business. If this happens, the city's skyline will benefit—for the antennas help this design as much as those atop Marina City's twin towers despoil its appearance.

In designing the apartments the architects were anxious to achieve—among other qualities—complete quiet, insofar as possible. To this end, electric panels in the ceilings will provide radiant heat during the 10-month period when heat is necessary. Cooling will come from through-wall units with flush grills in spandrel panels. The sky lobby for the apartment tower will have carefully controlled access, and will be reached by



The section above shows how the building will be divided vertically according to function; the plans at right are of selected key floors, matched in scale to give a relative idea of the building's taper. A luxury restaurant will occupy two floors immediately below the TV antenna facilities at the top of the tower; the observatory will be located immediately below the restaurant and at the top of the 48 floors of apartments. The two-story sky lobby—for apartment tenants and guests only—will occupy the 44th and 45th floors, served by express elevators. Mechanical equipment will be housed on these floors: 98 to 100; 42 and 43; 16 and 17. Office space will occupy 28 floors, from 13 through 41; seven floors of parking will extend from 6 through 12—entered at 6; the lower portion of the building, through the 5th floor, will be turned over to commercial rental and entrances.



high-speed elevators from ground level. Its two-story space will be occupied by service and recreational facilities. A luxury restaurant and observatory on the top floors of the apartment block will also be served by additional special elevators.

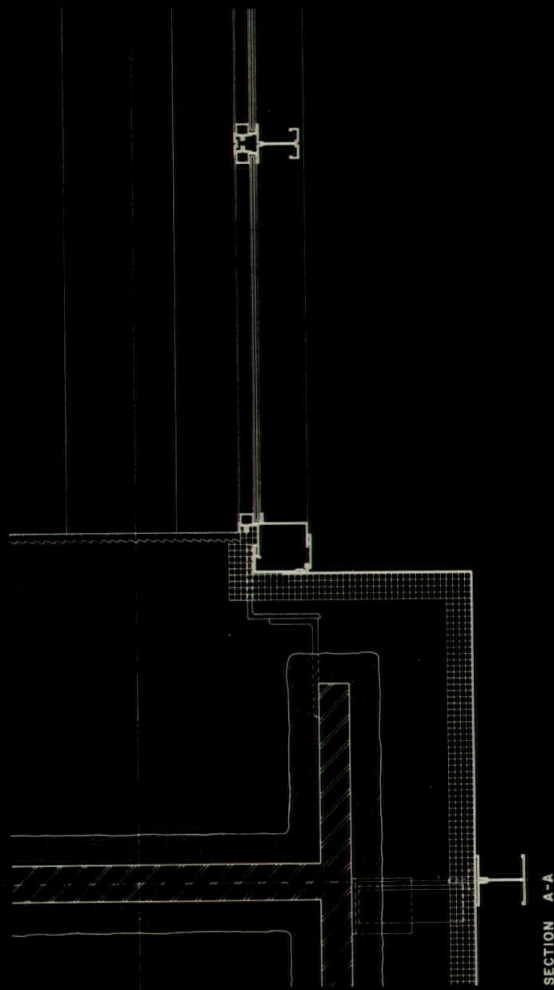
All offices will be arranged on a grid of five-foot modules; a reasonable scheme since peripheral columns will be parallel on a corresponding pattern. Seven floors of parking will be located immediately below the 24 office floors and immediately above the six floors of commercial and lobby space that comprise the bottom of the building. Parking floors will be served by a one-way ramp system at the rear of the building. Of special interest is the manner in which the ground floor plan (page 141) effectively separates—yet accommodates—the several kinds of pedestrian traffic that must be dealt with at this level.

The structural frame will be clad in aluminum with black anodic coating; the bronze-tinted glass will be held in frames of bronze-colored anodized aluminum, and will be cleaned from a travelling, extensible scaffold running on rails attached to the columns.

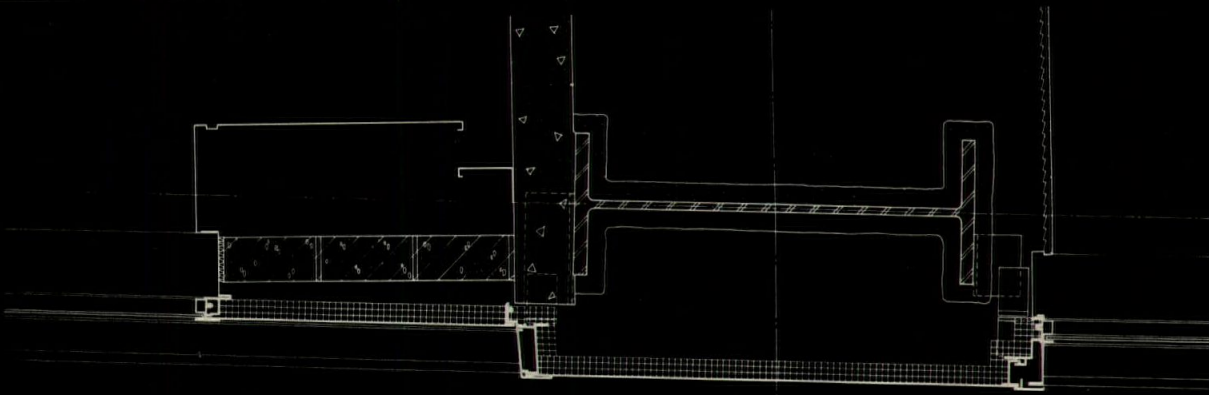
In the context of the evolution of tall building construction, the John Hancock Center will stand as the newest—and most advanced—example of the growing tendency to regard outer walls as structural elements, as opposed to the traditional skeleton-and-skin system. Here—where the concept is that of a "trussed tube," as SOM engineer Fazlur Khan puts it—all columns on each face of the tower will be equally loaded, and the usual premium for great height will be avoided, because the diagonals will carry both vertical and wind loads. The principle governing the placing of the diagonals is that they must always meet the rectilinear pattern of spandrels and columns in a common point. To accomplish this, both the slope of the diagonals and the floor heights vary—but only



PARTIAL ELEVATION



SECTION A-A

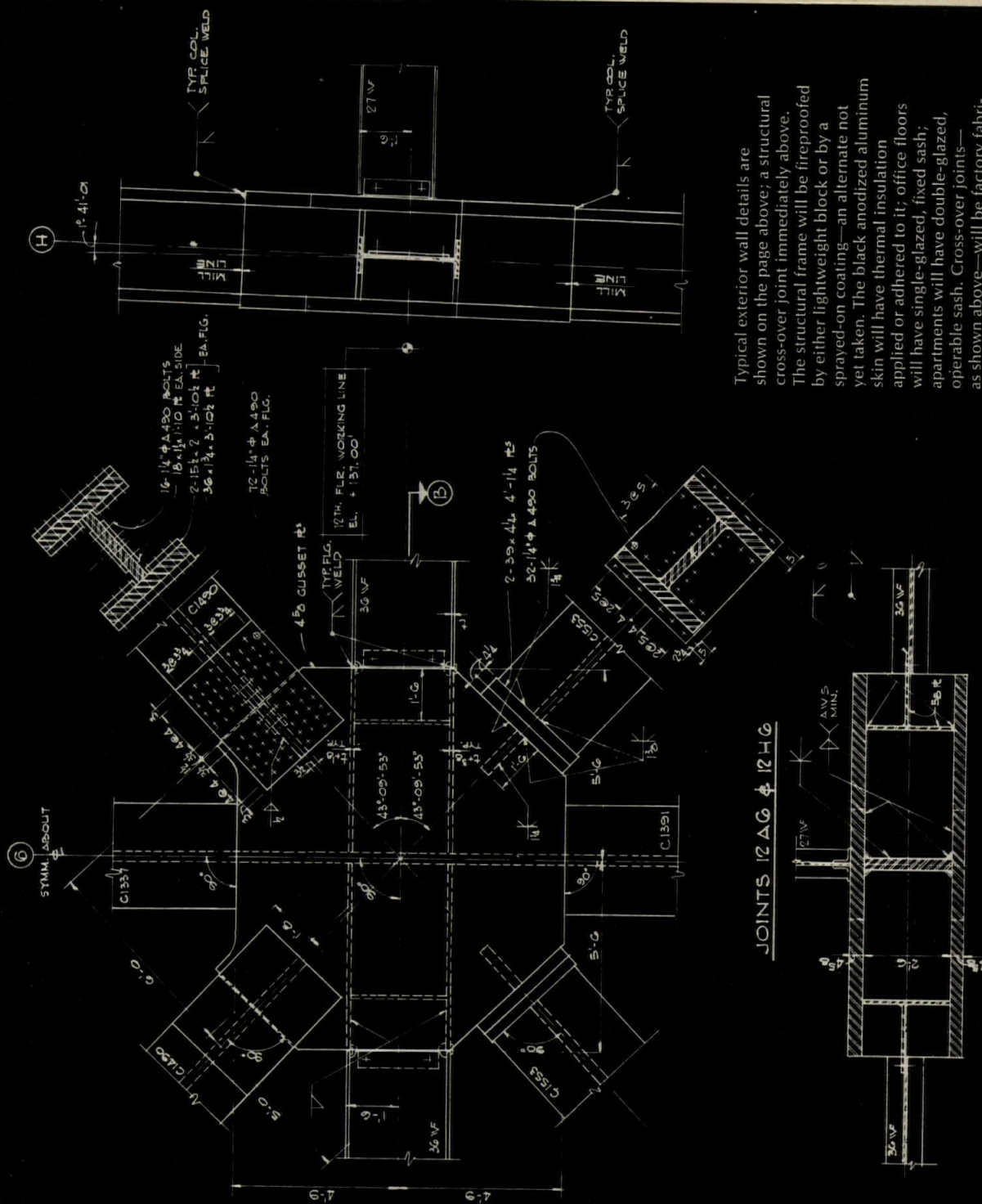


SECTION B-B

within close limits. To further this geometry, and simultaneously maintain the five-foot office module, columns are spaced at 40 feet on the long sides and at 25 feet on the ends of the shaft. The result is a highly organic structure that seems, in Khan's words, "almost to grow," and to set up a unique system of stress distribution in which a load applied at any point is quickly absorbed and becomes uniformly distributed only a short distance below its point of application. The effect is essentially that of a solid bearing wall. The nature of the system is such that the repetition of diagonal crosses increases its over-all effectiveness. One might say that this kind of structure has to grow in order to develop its full integrity as a concept.

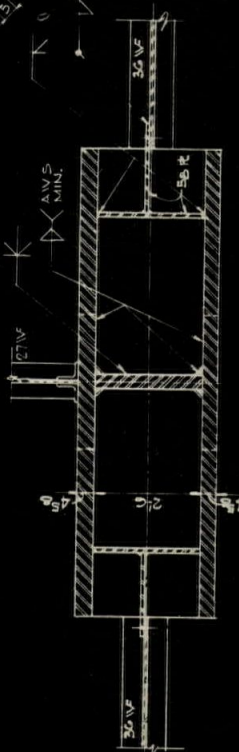
Since all wind loads will be carried by the outer walls, a model was tested in a wind tunnel and 7,400 data gathered on 208 vital points. It was found that the maximum pressure occurred at a level 70 per cent of the way up the tower, or at a height of 700 feet. It was further determined that the tapering shape of the building was efficacious in reducing the effect of wind pressure, since it offered less "sail area" than a rectilinear form.

Each column will be supported by a caisson reaching down through layers of clay and sand to bedrock, which lies at an average depth of 140 feet. Caissons were constructed by digging a hole of specified diameter (many were 10 feet), lowering a steel tube therein until it came to rest against the rock, then filling the tube with concrete. The John Hancock tower will also have an egg crate system of concrete grade beams extending into the clay to the 28-foot point. The tops of these beams will be tied together by a concrete slab; and the entire system will serve to anchor lateral forces into the clay, thereby eliminating the possibility of any lateral stress being transmitted to the caissons. To meet progress schedules, actual construction of foundations and



Typical exterior wall details are shown on the page above; a structural cross-over joint immediately above. The structural frame will be fireproofed by either lightweight block or by a sprayed-on coating—an alternate not yet taken. The black anodized aluminum skin will have thermal insulation applied or adhered to it; office floors will have single-glazed, fixed sash; apartments will have double-glazed, operable sash. Cross-over joints—as shown above—will be factory fabricated, so field construction can be largely bolting. The massive, all-welded joint assemblies will be heat-treated to eliminate internal stresses set up during the welding process, to become, in effect, monolithic pieces of metal.

JOINTS 12AG & 12HG

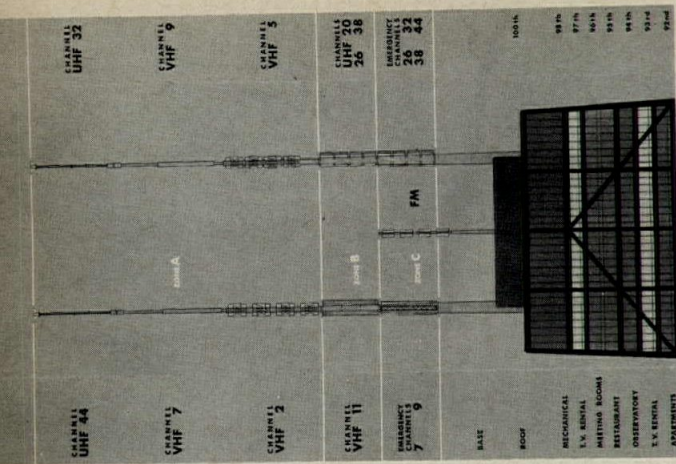
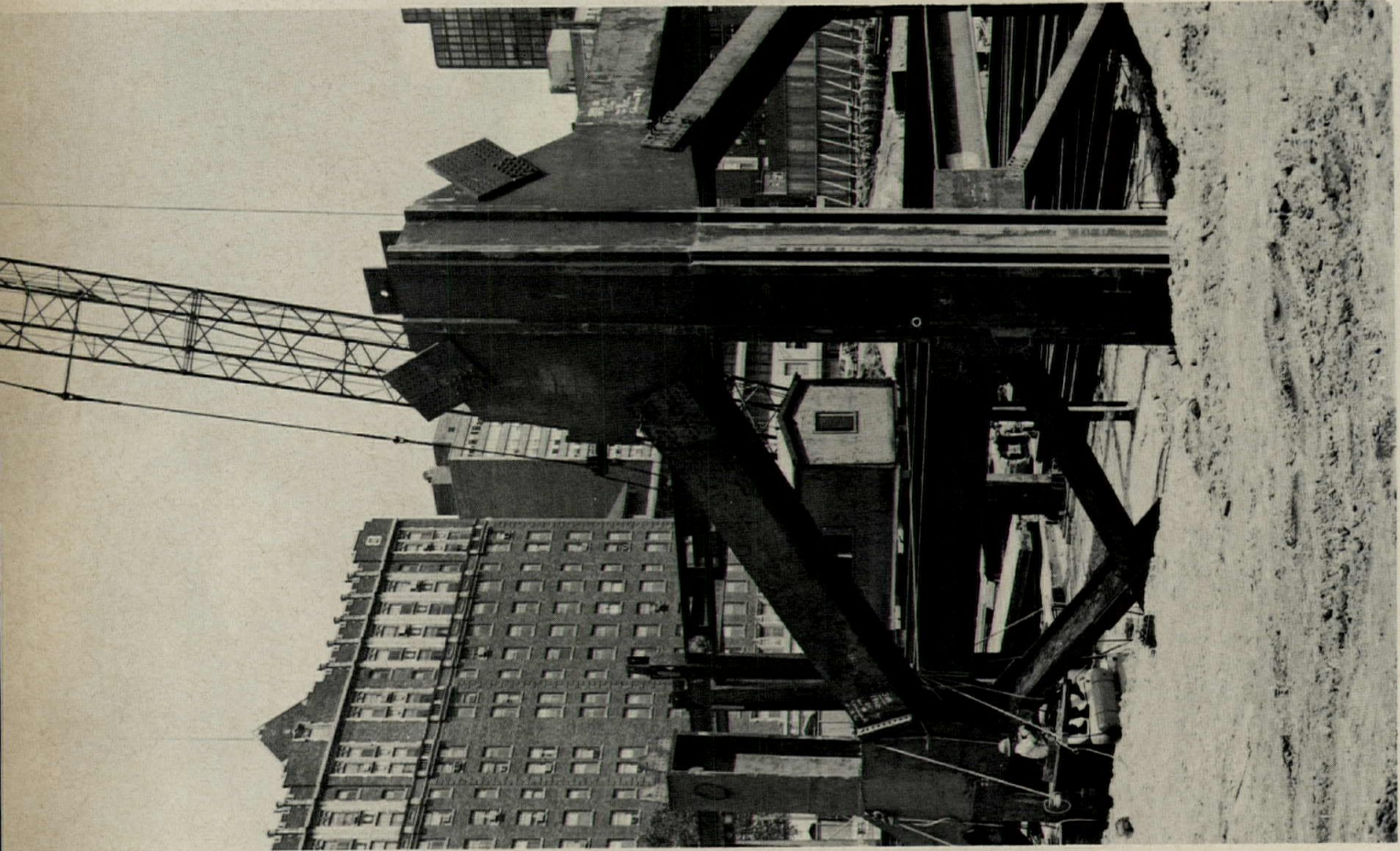


steelwork—and then curtain wall—had to be going ahead as the remainder of the project was being designed and detailed. Thus, the architects officially started work January 1, 1965; let a scope contract for steelwork four months later; were ready to negotiate the elevator contract at the same time; and were developing final details of the curtain wall simultaneously. (For information on a mishap that delayed work during foundation construction, see page 167.)

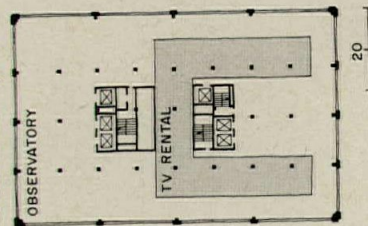
Considered in its broader implications, the John Hancock Center will be significant as a distinguished member of the growing family of multi-use projects, exemplifying the recent large-scale projects that are becoming an important new dimension in the latter-day urban scene. The Hancock tower will also take its place as an example of the most advanced structural thinking as it affects tall building design; a tower that will be peculiarly and decidedly at home in Chicago, mother-city of the skyscraper. And, as architect Bruce J. Graham points out, "The scale of the project has in the final analysis allowed the participation of many talents and disciplines in the design process. These talents must—in the end—be called upon to share in the problem of building our cities."

—James S. Hornbeck.

JOHN HANCOCK CENTER, Chicago. Owner: Jerry Wolman; financing: John Hancock Mutual Life Insurance Company; architects-engineers: Skidmore, Owings & Merrill, Chicago—William E. Hartmann, partner-in-charge; Bruce J. Graham, partner-in-charge of design; Albert Lockett, partner-administrator; Richard E. Lenke, project manager; Robert Diamant, senior design engineer-structural; Richard Warfel, project engineer-mechanical and electrical; structural consultants: Paul Weidlinger and Ammann & Whitney; lighting consultant: Edison Price; acoustical consultants: Bolt, Beranek & Newman; general contractor: Tishman Construction Company.



The twin TV antenna masts will rise 344 feet above the building proper; each will accommodate four channels. Thus the building will be able to handle all the channels assigned to the Chicago area. The lower central mast will be used for FM radio channels. The height was set by the Federal Aviation Agency on the basis of a 1,400-foot ceiling. Since a variance of 50 feet is permissible, the top of the masts has been set—of course—at 1,449 feet.



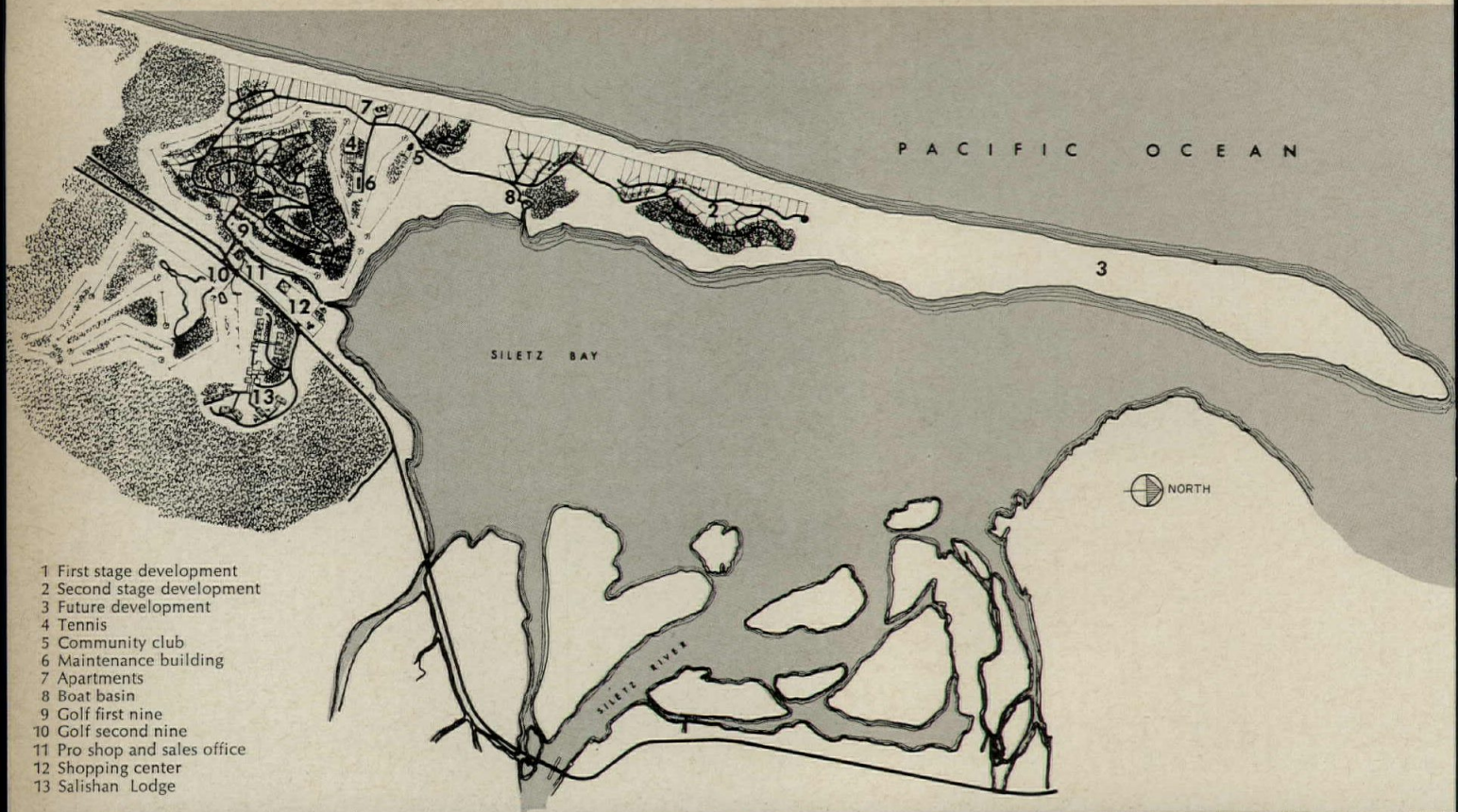


The Lodge at Salishan—a residential and recreational development on the coast of Oregon—looks, as its owners and their architect intended, “as if it had been dropped into the woods.” The lodge buildings belong to the site in an easy, natural way, enhanced by the use of one material—wood, 1.5 million board feet of it, in various forms—in one color, throughout, detailed simply in the nature of the material. It is incredible that their actuality represents a total time lapse, from design contract to completion, of only 11 months.

RESORT DESIGNED TO FIT A SCENIC SITE

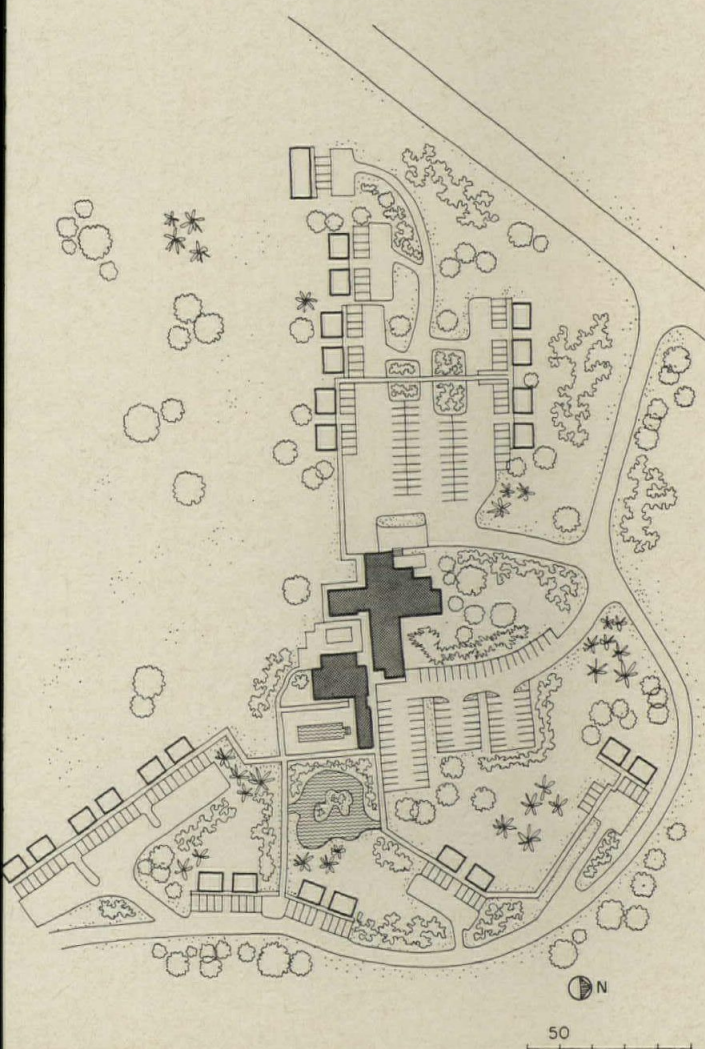


SALISHAN



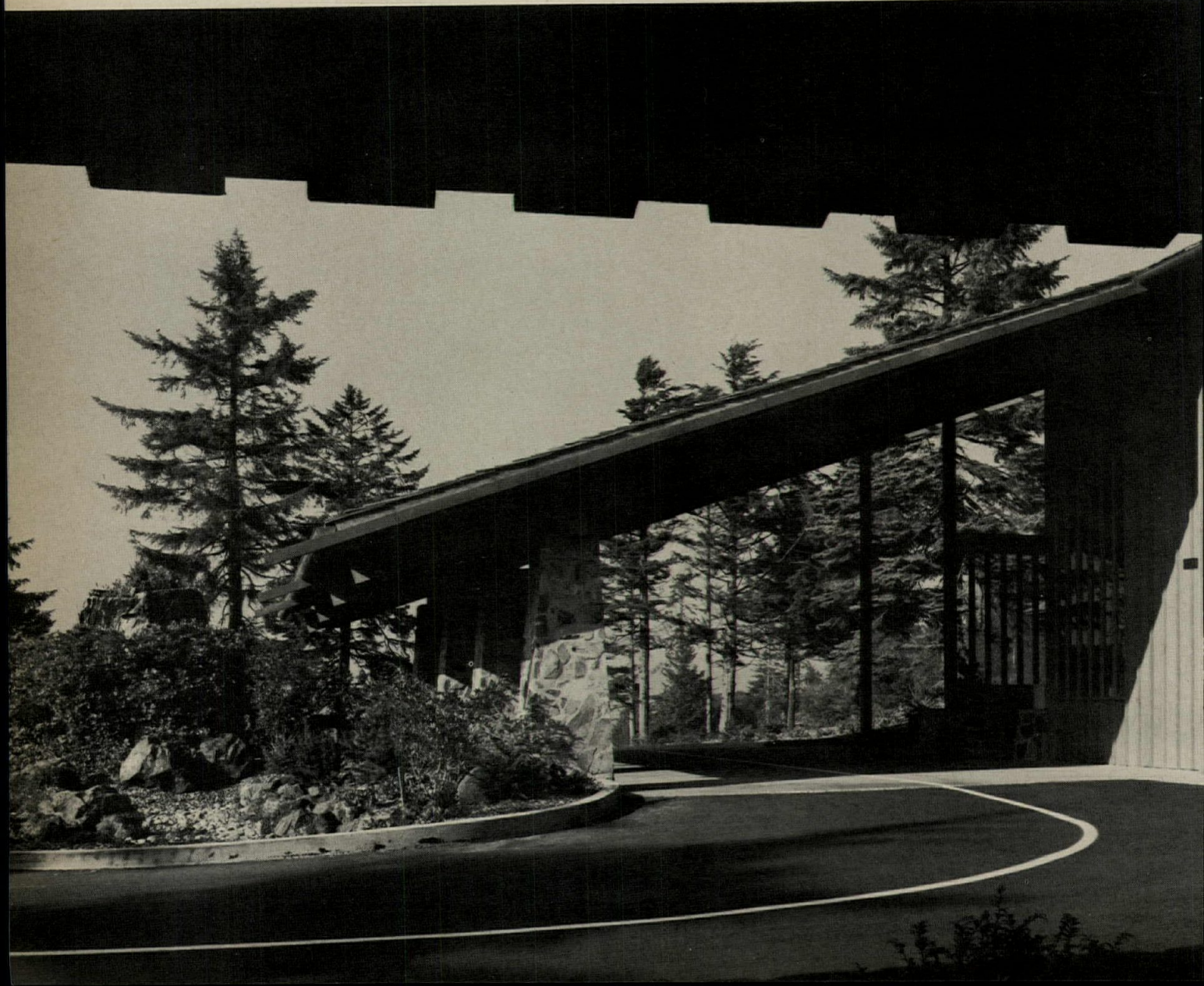
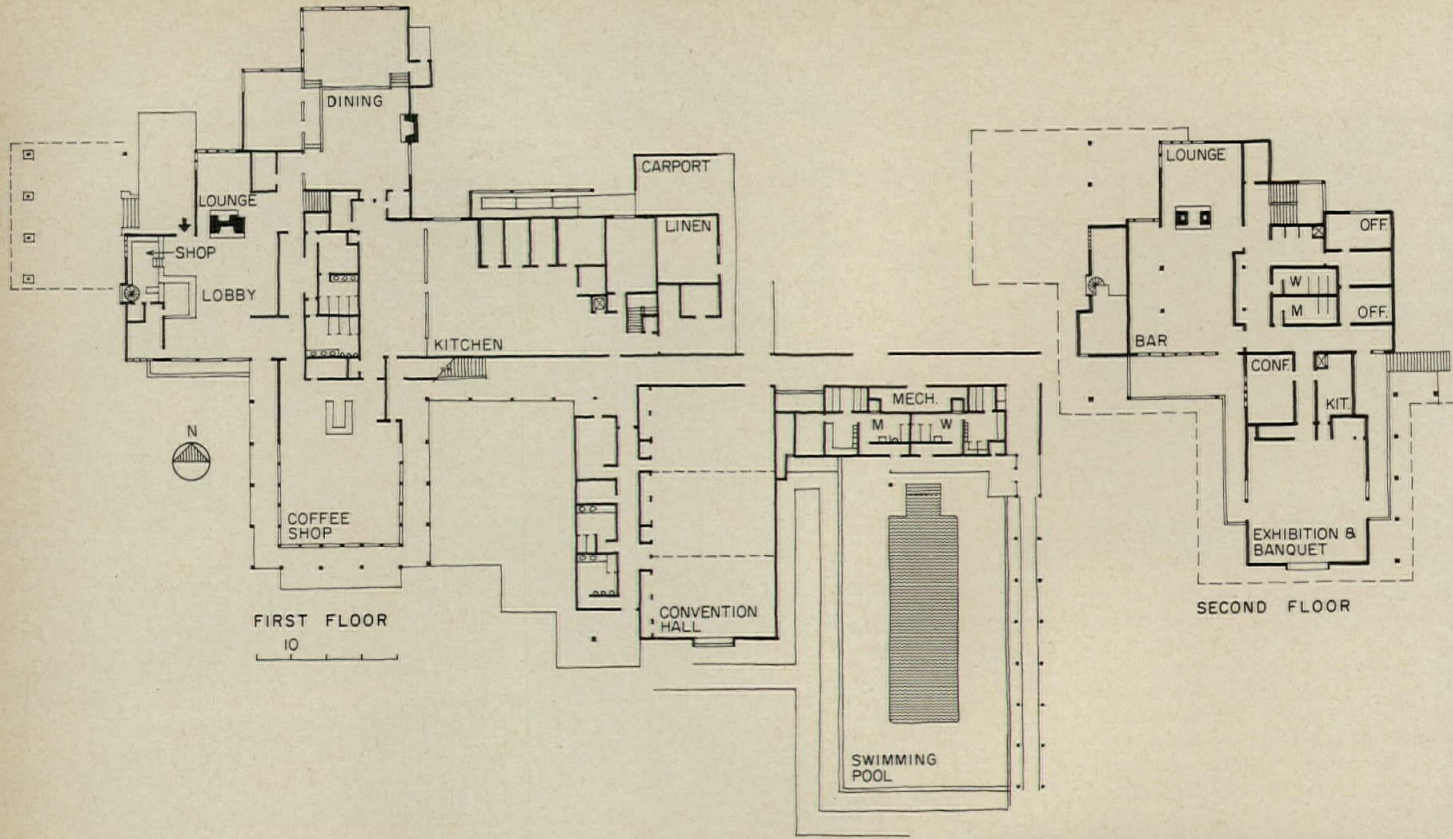


The landscaping, "in the spirit of the natural grandeur of the place", as landscape architect Barbara Fealy says, makes use of natives such as salal and kinnikinnik for ground cover, huckleberry and broom, pines, spruces and hemlocks with such skillful and sensitive handling that it is difficult to determine what is by design and what by nature. Covered walks connect all buildings. Master site plan architects were Skidmore, Owings and Merrill.



The Lodge

Salishan Lodge, part of a 600-acre ocean front development on the central Oregon coast, consists of 14 buildings: the main lodge building with the public rooms and convention facilities, 12 eight-unit guest room buildings and one four-unit apartment building. Six of these buildings flank the main building on rolling hills to the north and south; the rest form a formal court in front. As many of the existing trees as possible were saved, and these—spruces, firs, hemlocks and pines—tower over the low-pitched roofs of the guest units. In such a setting, wood is a highly appropriate material and, as used here, attains the rare combination of naturalness and sophistication. Exterior walls are rough sawn board-and-batten, the vertical lines complementing the trees around the buildings; balcony enclosures are faced with exterior plywood, also rough sawn; hemlock columns supporting the deck outside the bar are octagonal in shape; roofs are covered with cedar shakes. Some of the details were worked out on the spot with craftsmen on the job, some were craftsmen's inspirations, but everything is straightforward, honest, without pretense. "What we have tried to do," says John Storrs, the architect, "is to take this piece of ground and leave it the way it is, relative to nature. Nature and the presence of greenery and trees are neglected factors in resort planning, yet these are the very things that give a sense of relaxation. I don't know whether what we have done is an architecture of restraint or of boldness. Perhaps it is a combination of both."



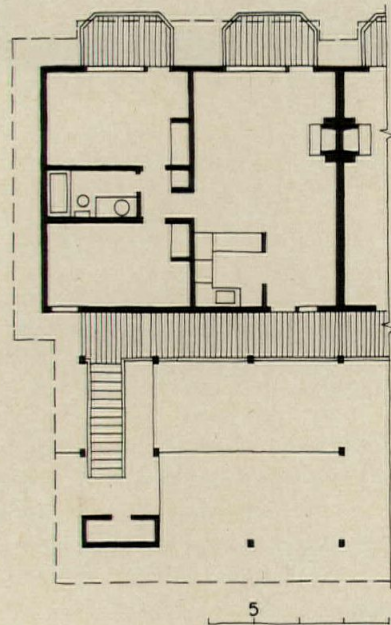
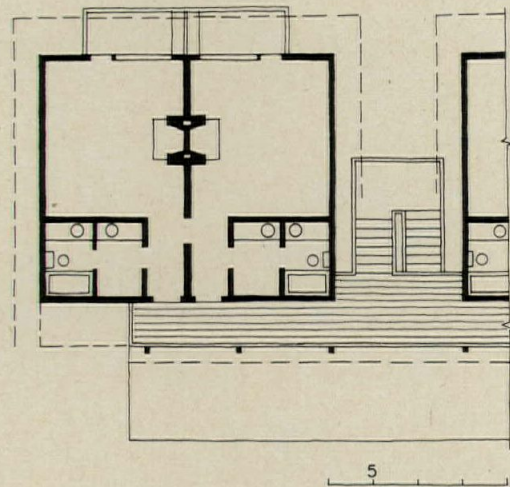


Art as an integral part of Salishan's design was a major premise of the architect. In addition to a collection of paintings and prints for display in the public areas of the Lodge, four major works of art by Northwest artists were commissioned as part of the building. Included among these are the mural screen behind the bar (left) by Eugene Bennett and the carved wood panels in the dining room by LeRoy Setziol. Globes on the bar chandelier are Japanese glass floats picked up on nearby beaches; other furnishings in the bar were designed by Henry Janders. The Lodge entrance is from the *porte cochere* (opposite page).

Public rooms

The public rooms—dining and banquet rooms, bar, and coffee shop—are in the main Lodge building, accessible to travelers along U.S. Highway 101 (which bisects the Salishan property just below the Lodge) and central to the guest units. Since the Lodge site is a promontory 70 feet above the highway, most rooms have superb views, over Siletz Bay to the ocean, over the golf course, or over the wooded Salishan development to the ocean. Large glass areas in all rooms take advantage of these views, and make the natural beauty of the surrounding area a part of the experience of each room. The three-level dining room looks out to the wooded entrance road and the bay and ocean beyond; the coffee shop overlooks the golf course, Salishan Lake and the mountains to the south; the bar looks both south across the golf course and north to the ocean and the bay. The lobby's end wall opens to the golf course. Except for the lobby and the coffee shop where acoustical plaster is used for the ceiling, and the dining room where the upper walls are of plaster, the interiors are of wood—paneled, board and batten, tongue and groove. Two other public rooms on the second floor provide for special occasions: the board room, for small dinner parties or for meetings, and the gallery, designed for exhibitions, displays, meetings and movies as well as for banquets. Earth colors used in all rooms were chosen to complement the wood paneling and ceilings. A large meeting room for conventions adjoins the main Lodge building.





Guest rooms

The Lodge has 100 guest rooms in 13 separate two-story buildings connected by covered walkway to the main building. Twelve of these contain eight units each; the thirteenth has four apartment units, each with two bedrooms. A central stairway divides each building; parking for each unit is provided in the carport which is part of each building. Individual balconies, with rails of weathering steel, and fireplaces in each unit are special features. Prefabrication reduced construction time for each building to seven weeks.



SALISHAN LODGE, Gleneden Beach, Oregon. Developers: Salishan Properties, Inc. Architect: John Storrs; structural engineer: James G. Pierson; mechanical engineer: Keith Kruchek; electrical engineers: Athay and Nonus; landscape architect: Barbara V. Fealy; interiors: Henry Janders, Dohrmann Company; general contractor: A. J. Bennett.

INDUSTRIAL BUILDINGS

An industrial plant must be—first of all—an efficient production machine. But the importance and benefits of attractive surroundings and worker comfort are being accepted in many industries. The seven buildings that make up this study help to prove it.

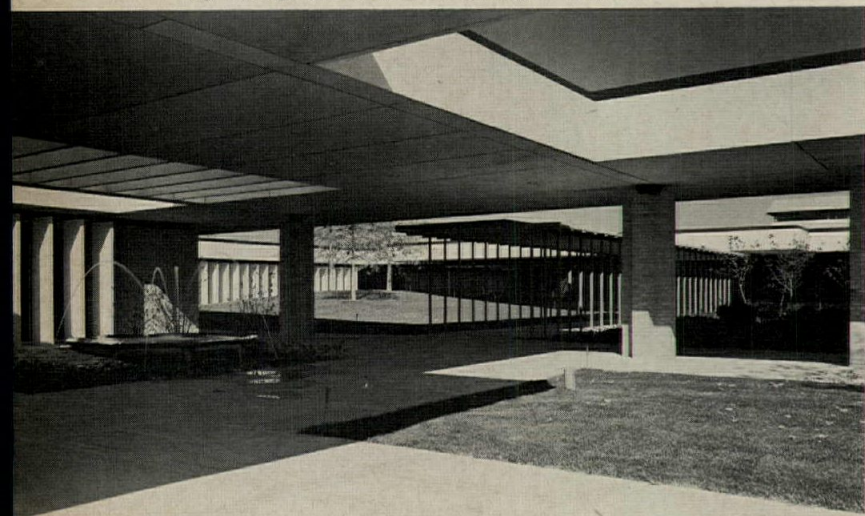
When asked "As you go about the design of a project, what is the most important consideration?" a great majority of architects will answer, "people." This is the right answer, but in the case of industrial building design, has not always applied. Traditionally, the emphasis was on industrial processes, flow charts, materials handling, power-distribution systems, and such. Today, these continue as necessary and important factors, but we find industrialists—and their architects and engineers—concerned also with providing a working environment as pleasant as possible for their employees; and in finding ways through design to improve worker morale and build up the pride in job feeling. Achieving these results in better quality of work and less turnover. Also, many companies are becoming increasingly aware of their obligation to present an attractive face to their community, and of a desire to make their plant a showplace, not an eyesore.

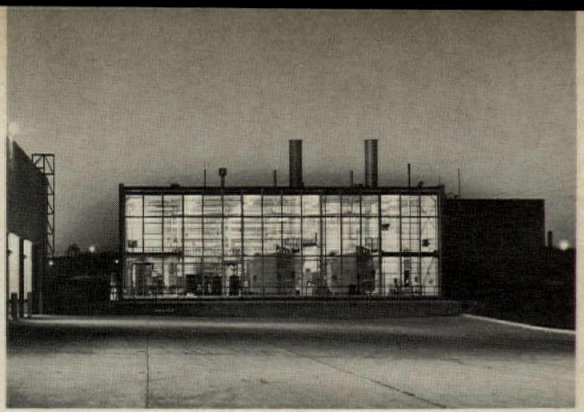
The seven buildings—or complexes—in this study were selected as examples of some or all of the foregoing ideas in being. Each has in common with the others the admirable quality of good design in the visual sense. The extent to which they provide the other factors we have discussed is a further measure of their quality as industrial architecture.

—James S. Hornbeck



The 54-acre site is located about 12 miles north of Cincinnati, and possesses the pleasing character of the partly wooded, gently rolling countryside. The building presents its principal facade and visitors' entrance to a freeway that bounds the property on the south (left in plan at right), while the employees' dining room faces a quiet grove of trees to the west. Visitors enter through an open pavilion leading to a covered walkway through a courtyard containing a fountain.





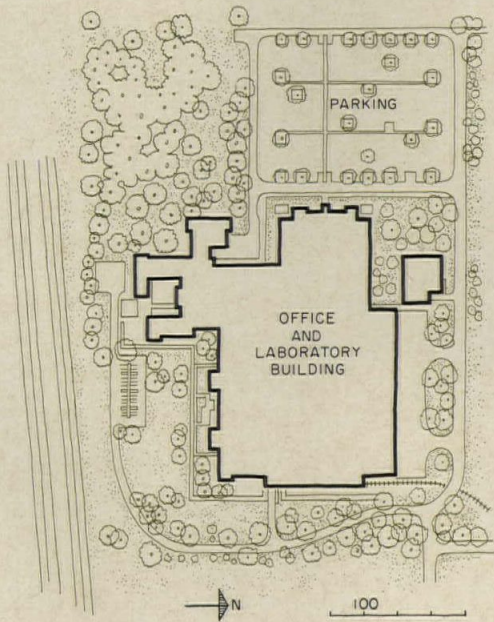
1

AN APPEALING ENVIRONMENT FOR FEMALE EMPLOYEES

In setting up the program for this new Avon Products center near Cincinnati, the owner strongly requested the architect to design a building which would provide a cheerful, efficient, and attractive environment for the company's employees—most of whom are women. This request was motivated by a desire to attract them initially, and then to gain and assure the continuance of their services and respect. Beyond meeting this concern for employee well-being and filling the need for a smoothly functioning manufacturing and distribution facility, a further request had to be met: Architect Sol King says, "The company also set forth the goal of building a center that would portray its sense of responsibility to the community, and reflect the warmth and friendliness associated with its sales representatives."

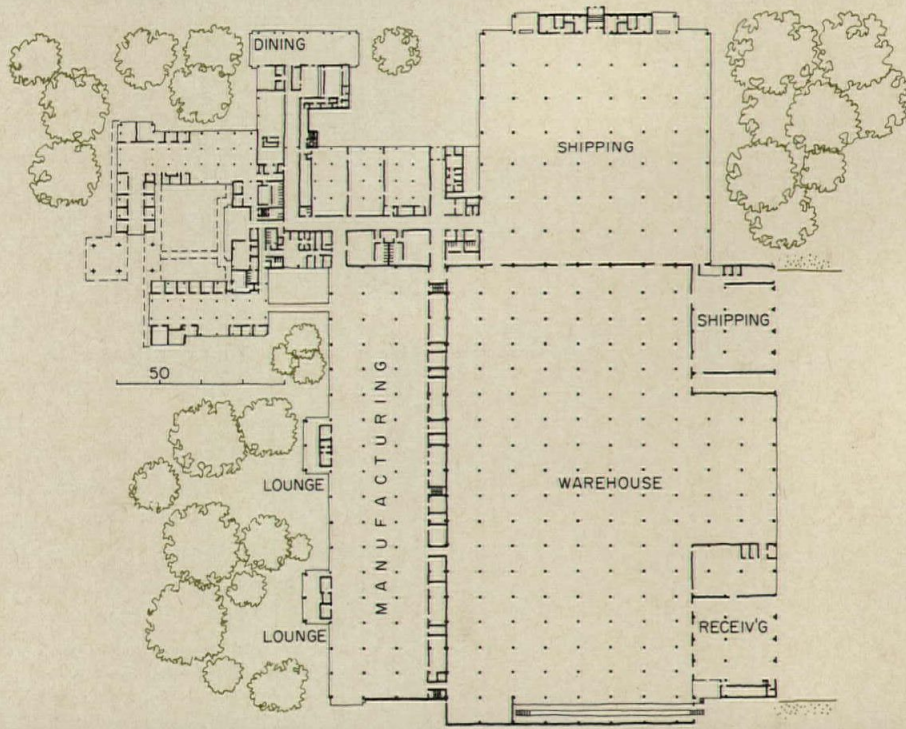
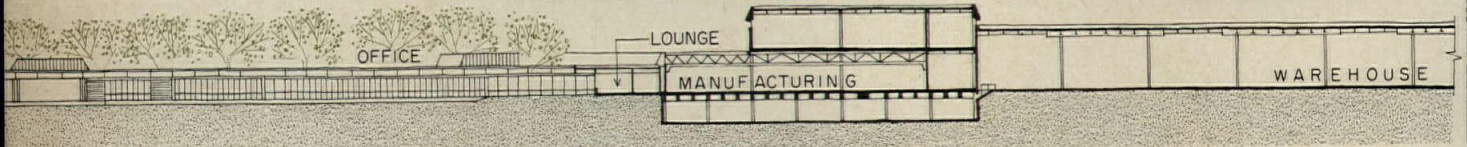
The design emphasizes the horizontal, and the building's volumes are disposed in an irregular pattern in order to achieve a human scale and give the center an inviting appearance. The canted metal roof planes over high areas add to this effect.

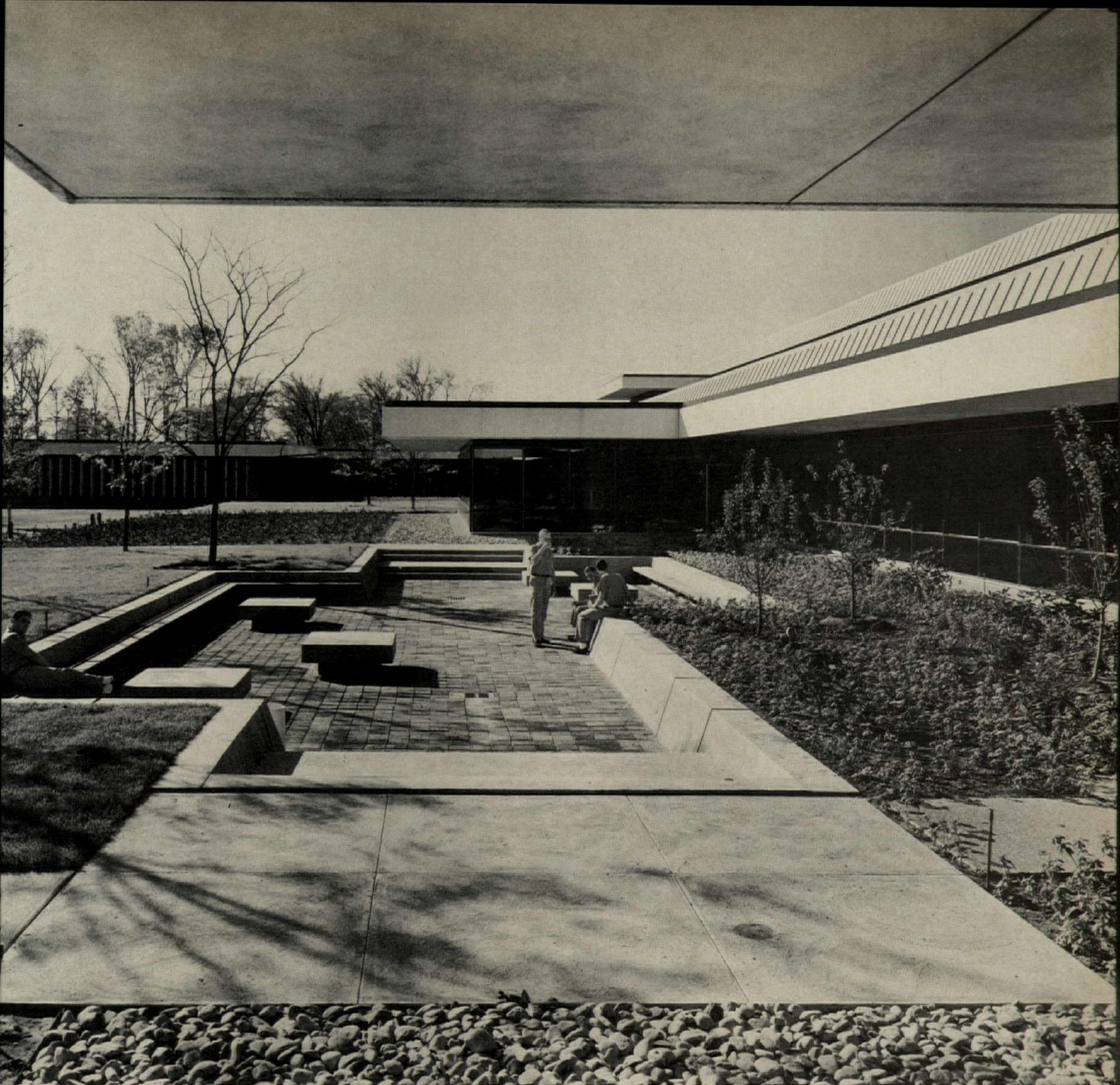
MANUFACTURING, SALES AND DISTRIBUTION CENTER, Avon Products, Springdale, Ohio. Architects and engineers: Sol King, architect—Albert Kahn Associated Architects and Engineers, consultants; general contractor: Frank Messer & Sons.



Balthazar Korab photos





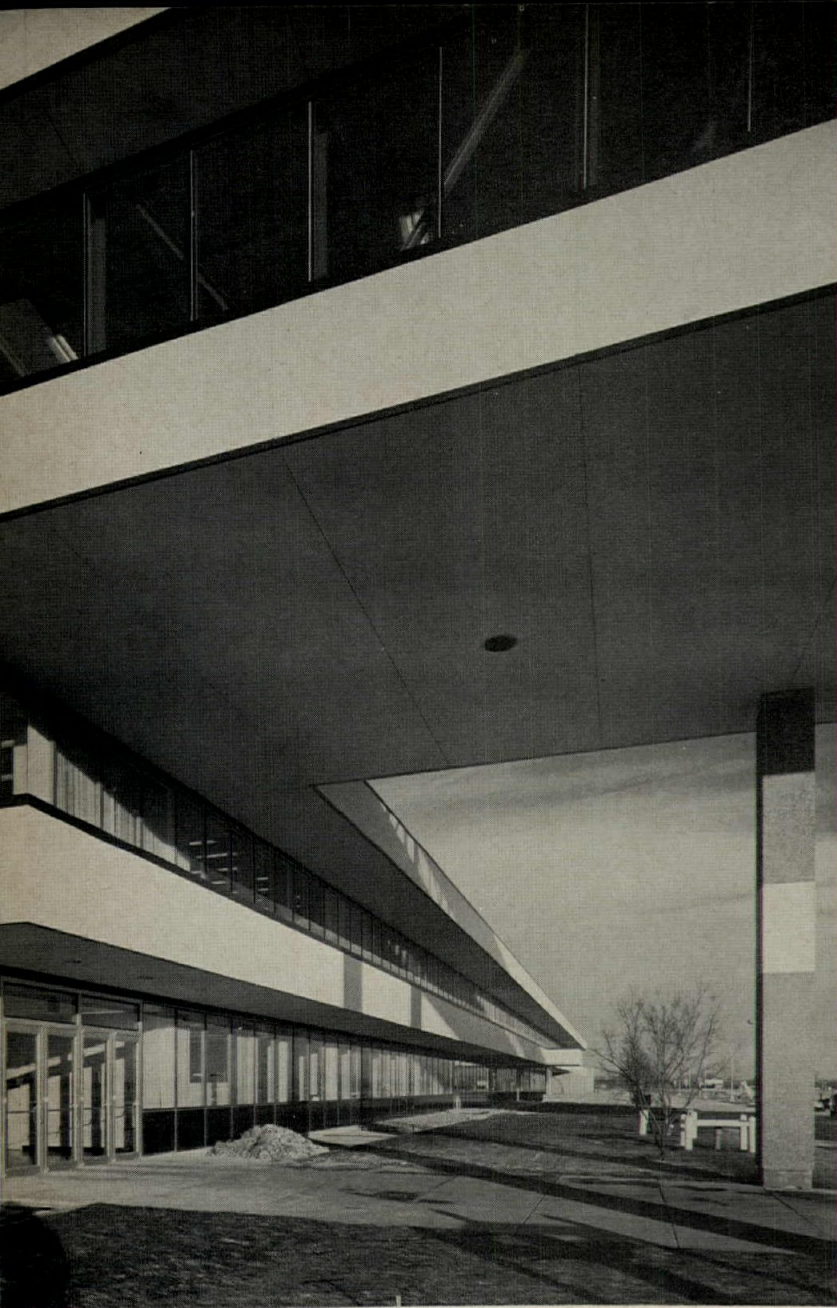


The two employees' lounges are an unusual feature. Interior and exterior views of them are shown at top left and top right; they appear as projections in the plan and section above, left. Here, employees can enjoy a break from routine.

The 14½-acre plant is sheltered by a single roof, and is of steel frame construction. The exterior walls are of face brick and gray heat-absorbing glass; the overhang fascias of precast concrete with an exposed white quartz aggregate. Further visual interest is added by the vertical patterning of the sun baffles, of similar white concrete.

A computer-controlled conveyor system for the warehousing and shipping operations is an interesting innovation. All orders are assembled, on the dock, mechanically.





2

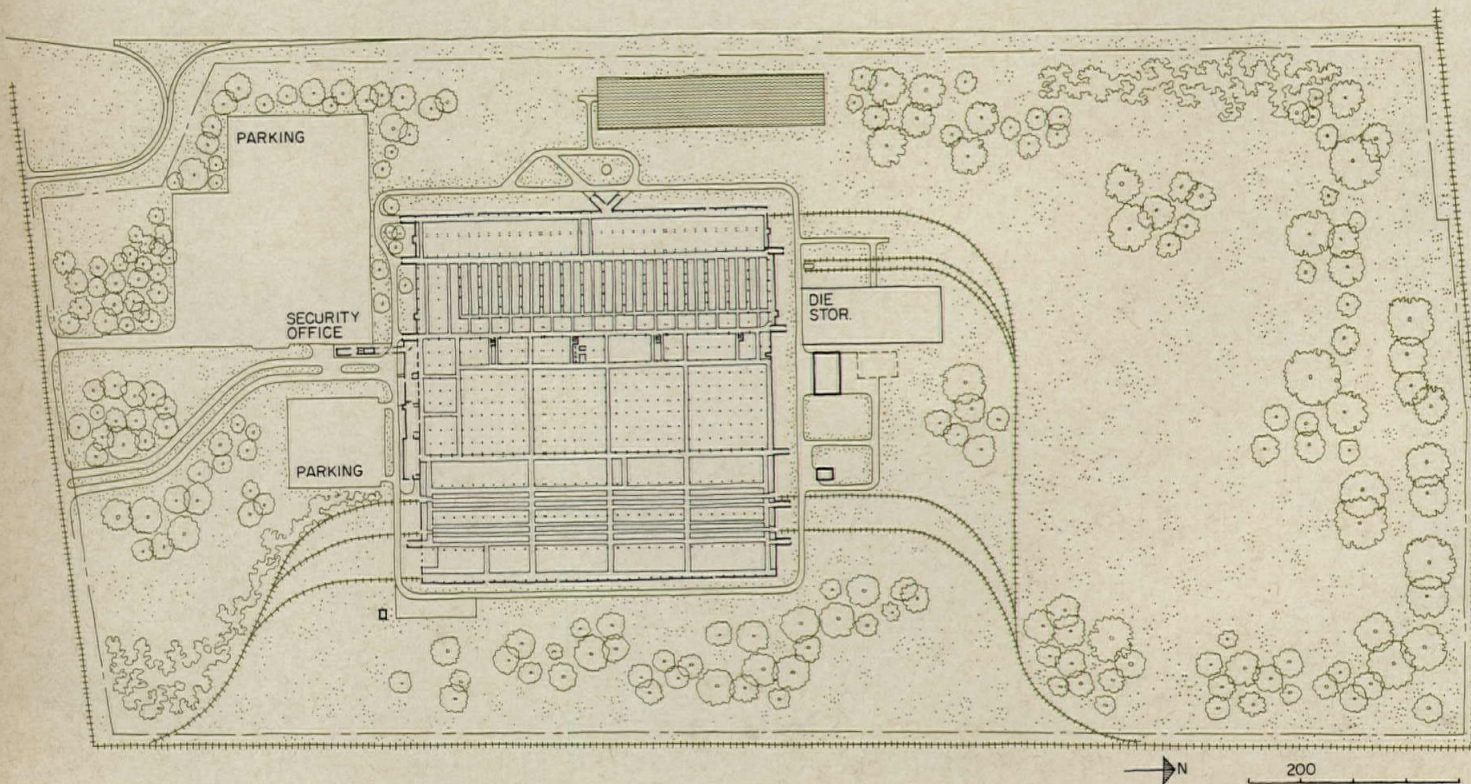
GOOD DESIGN AND AMENITY FOR A VAST AUTO PLANT

The design for this Ford stamping plant has an ordered simplicity and clean strength entirely suitable for such expansive, large-scale industrial projects—surely an element in bettering worker morale and productivity. In addition to performing its role as a manufacturing facility, this vast building—of 2.5-million square feet—provides many special facilities and amenities for its 4,000 employees.

For safety and convenience, workers enter the building from their parking lot by way of moving stairways and a covered bridge—spanning a heavily used driveway—to arrive on a mezzanine housing locker and shower rooms, and other employee facilities. There are two cafeterias seating 700 which are open 24 hours a day, a bakery, a fully equipped medical department, a store for safety shoes, a meeting room, a training classroom, and recreation areas. Workers reach their stations by interior stairs.

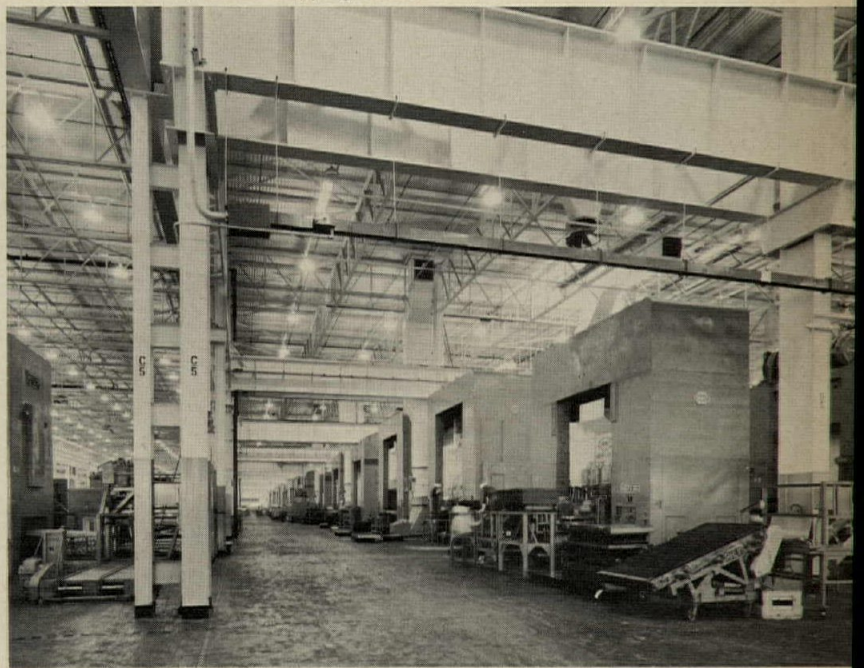
STAMPING PLANT, Ford Motor Company, Woodhaven, Michigan. Architects and engineers: *Albert Kahn Associated Architects and Engineers*; general contractor: *Barton Malow Company*.

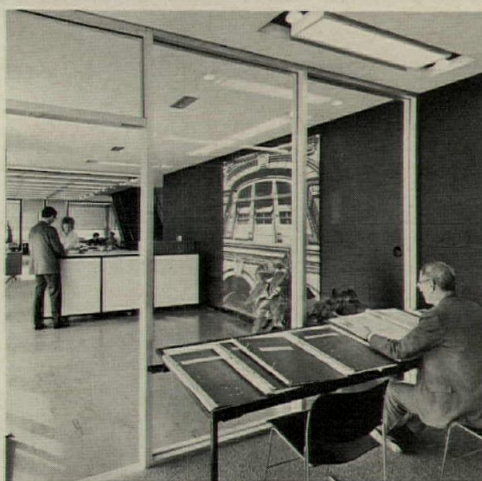
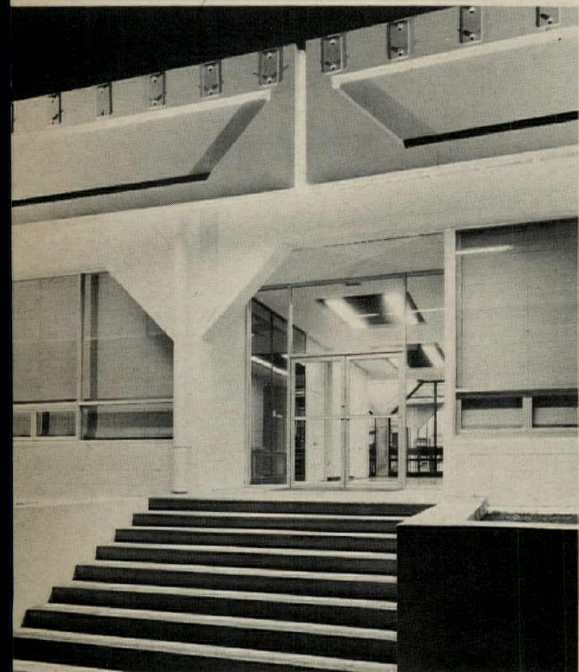
Lens-Art photos





The factory plan developed from flow charts and provides straight line operation. Material moves from west to east, from receiving and storage through blanking and press rooms, emerging from the assembly area as end items for storage in the push-through areas which open directly to the shipping docks.





Since hurricanes and flooding are a recurring problem on Galveston Island, the 13-acre site was filled to the 6-foot level, the plant area to 10, and the main floor was brought to a 14-foot elevation. The *in situ* concrete structure rests on piling, and consists of a flat plate first floor—to support the machinery loads—with a superstructure in which the girders are haunched to the columns to furnish extra resistance to hurricane wind forces. The roof is supported by precast T-beams.

The Galveston News has a distinguished history; was the first Texas daily.





Frank Lotz Miller photos



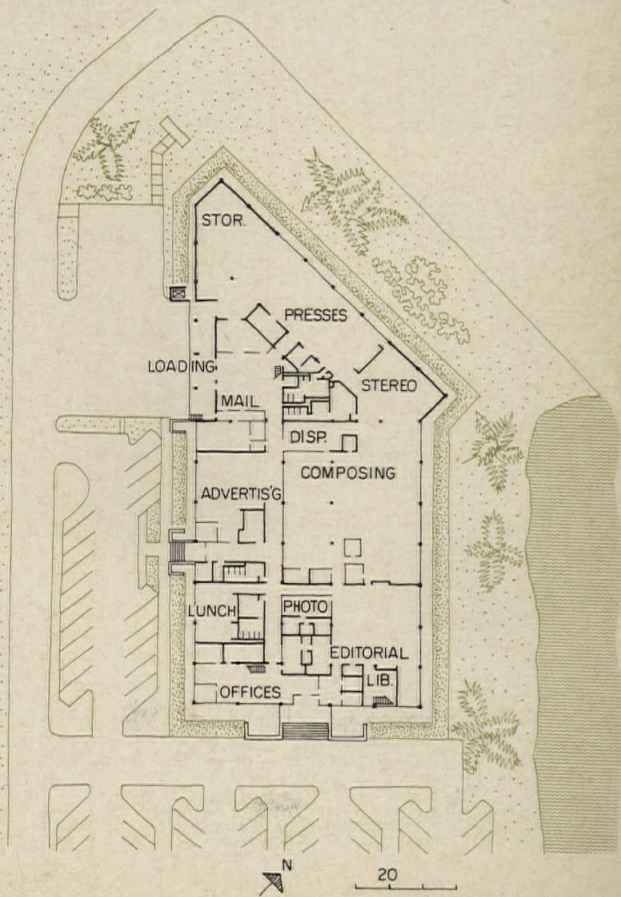
3

OPEN PLANNING CREATES A ONE CLASS PLANT

Architect Howard Barnstone reports that the glass partitions in this Galveston newspaper plant "allow free view back and forth across the various departments, thus help psychologically to erase some of the formerly strong divisions between various work groups. The composing room crew, the editors, the pressmen, the advertising staff, all know each other—see each other at work—and a friendly *esprit de corps* is thus promoted."

The plan of the building reflects the production process, in which copy of two kinds—editorial and advertising—is fed simultaneously into the composing room, then through stereo and on to the presses. Newspapers then go by overhead conveyor to the mail room and to the waiting trucks at the dock.

THE GALVESTON COUNTY PUBLISHING COMPANY, Galveston, Texas. Architects: *Howard Barnstone and Eugene Aubry*; consulting architect for newspaper plant: *William Ginsberg & Associates—Harold Cooper in charge*; Newspaper Association consultant: *Robert Wentworth, Southern Production Program*; landscape consultant: *Lee Marsters, Jr.*; structural engineer: *R. George Cunningham*; mechanical engineer: *D. Dana Price*; general contractors: *P. G. Bell Company*.





The landscaping plan was based on the use of natural features of the terrain, modified to build up a harmonious atmosphere. A ravine—fed by five natural springs—was widened and expanded to create a one-half-acre lake; the entrance road, lined with magnolia trees, was arranged to lead visitors into a parking lot fronting on a plaza with flowering trees and shrubs, thus creating a main entrance. Where not planted, the plaza is paved with clay tile.



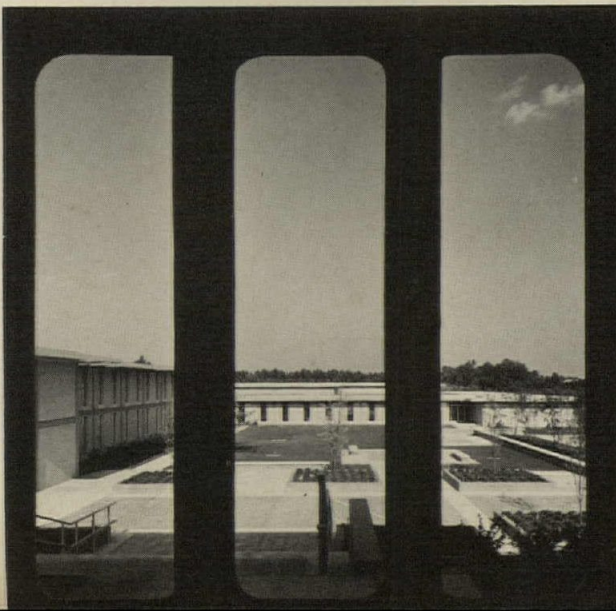
4

CAMPUS-LIKE ATMOSPHERE FOR AEROSPACE RESEARCH

Landscaped courtyards and the spaces between buildings—as well as the buildings themselves—work in harmony to produce an inviting and stimulating atmosphere for research for this new, 46-acre Lockheed-Georgia facility near Atlanta.

The complex is made up of three interconnected buildings containing labs and offices, and a separated central facilities unit. The interconnected structures are devoted to major research in the physical sciences, material sciences, aerospace sciences, and systems sciences. For uniformity and flexibility, all offices are planned over a 3-foot modular grid pattern and are partitioned by movable units 9 by 15 feet in size. Laboratory spaces are contained within a 30-foot-square structural bay pattern, and have 15-foot ceilings. The central facilities building houses administrative offices, central mechanical plant, maintenance shops, and an auditorium seating 200. The site adjoins Lockheed's engineering and manufacturing center, making machine shops, computers, and test runway readily available.

LOCKHEAD-GEORGIA RESEARCH CENTER, Marietta, Georgia. Architects: *Aeck Associates*; structural engineer: *Harry G. Hunter*; electrical engineers: *Blakely-Daniel & Associates*; mechanical engineers: *Lazenby & Borum*; landscape design: *Edward L. Daugherty*; general contractor: *Capital Construction Company*.





Balthazar photos

5

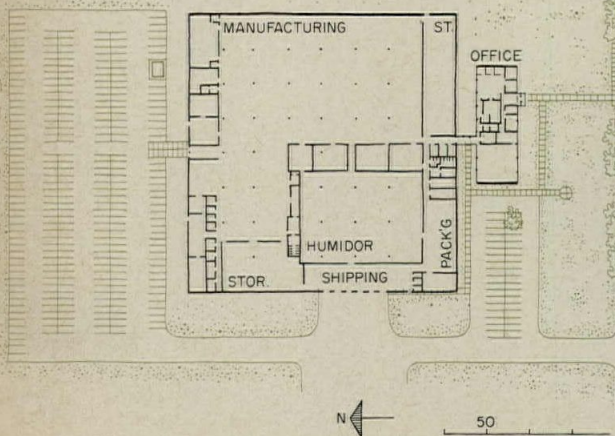
WINDOWLESS PLANT ENHANCED BY COLOR AND PLANTING

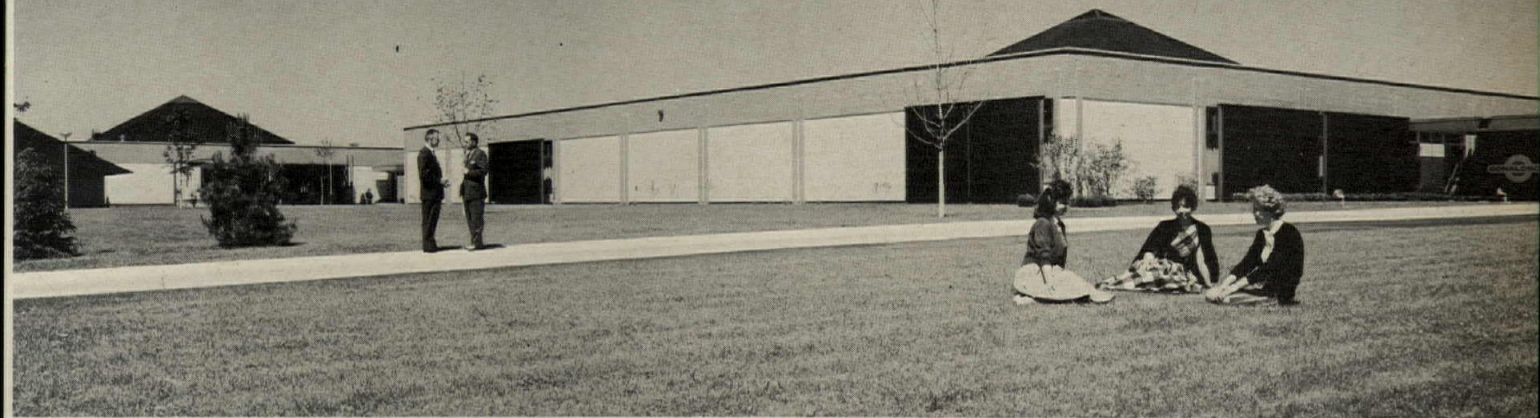
In designing this 104,000-square-foot cigar factory in Ohio, architect Redstone points out that "every effort was made to relate the plant and office block to the site and to nearby transportation. Color and landscaping were designed to enhance the employee environment to the fullest, making the factory a pleasant place in which to work. The smaller building houses offices and a cafeteria which overlooks a quiet, attractively landscaped area."

LIMA MAIN PLANT, DWG Cigar Corporation, Lima, Ohio. Architects: *Louis G. Redstone Associates*; process HVAC engineers: *Buensod-Stacey Corporation*; materials handling engineers: *Facilities Planning Service, Incorporated*; general contractors: *Stedke Construction Company*.

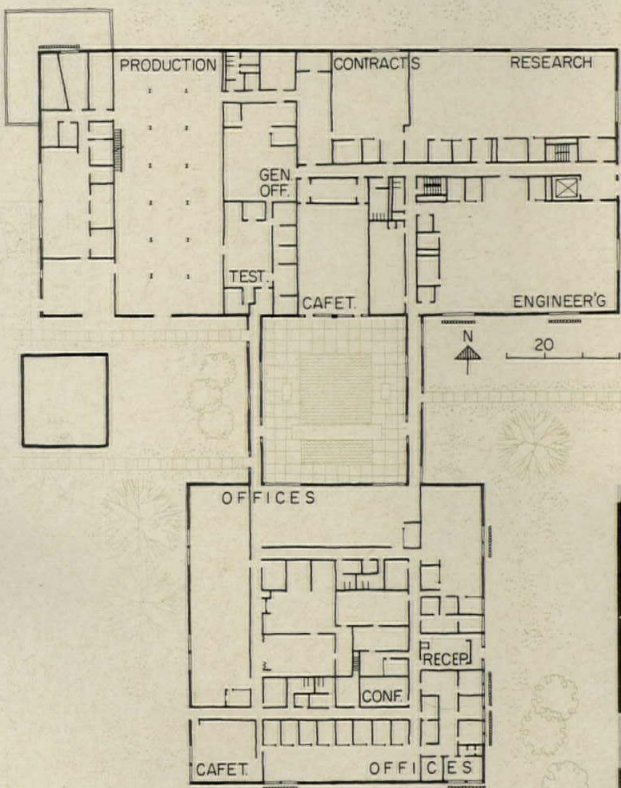


Condensation—a major problem due to required high humidity levels within the factory—led to windowless, vapor-tight, heavily insulated exterior wall and roof construction, and to the painting of all exposed interior metal with epoxy resin.





Warren Reynolds

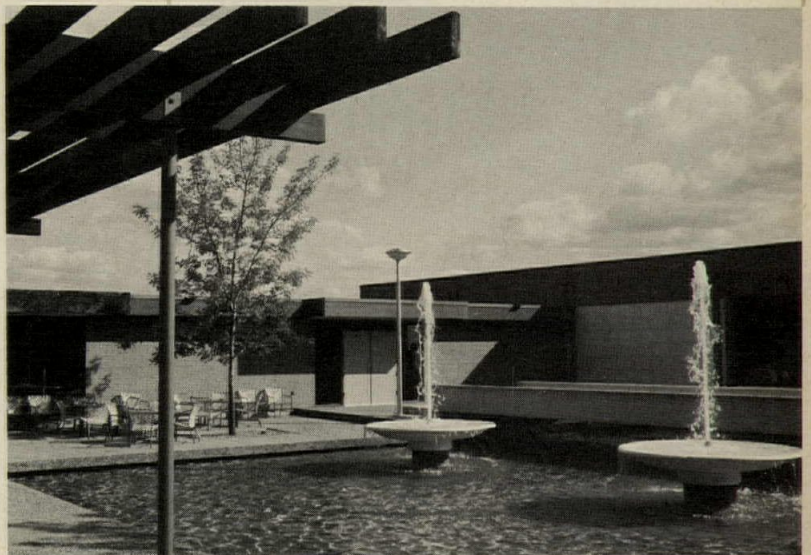


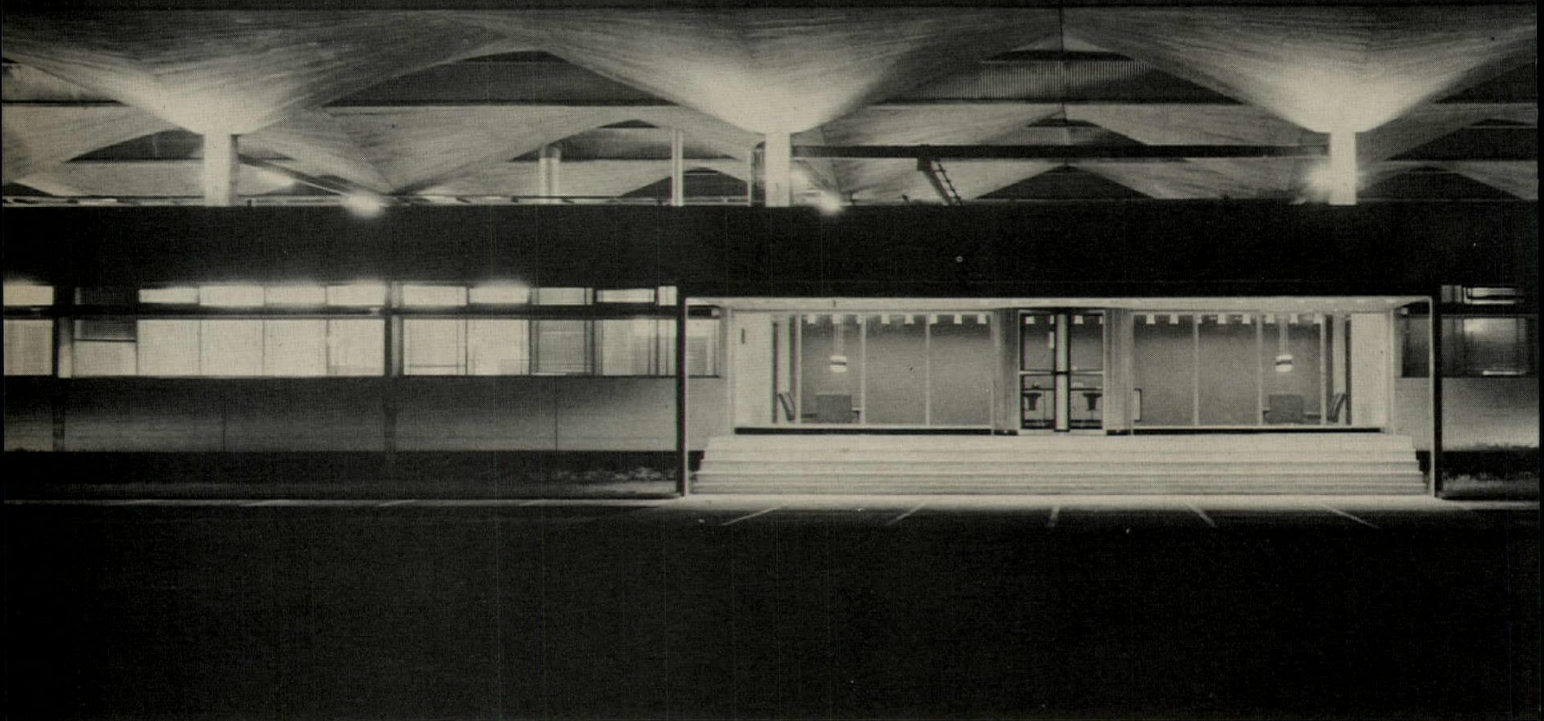
6

POOL AND FOUNTAINS SHIELD OFFICES FROM LABS

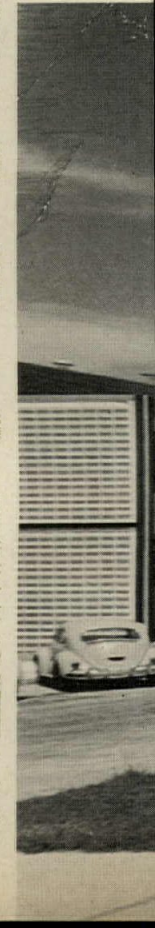
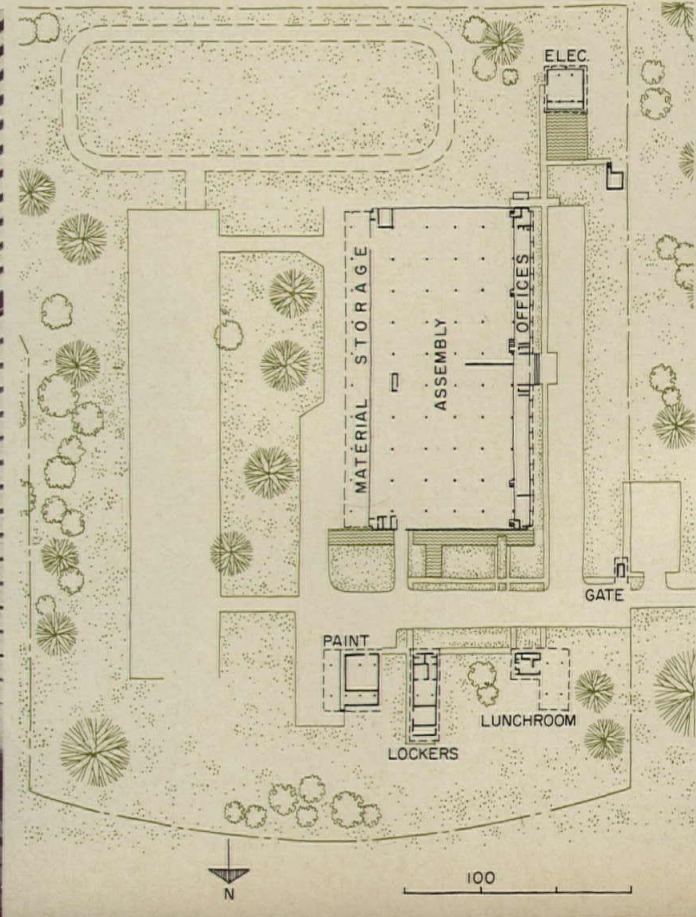
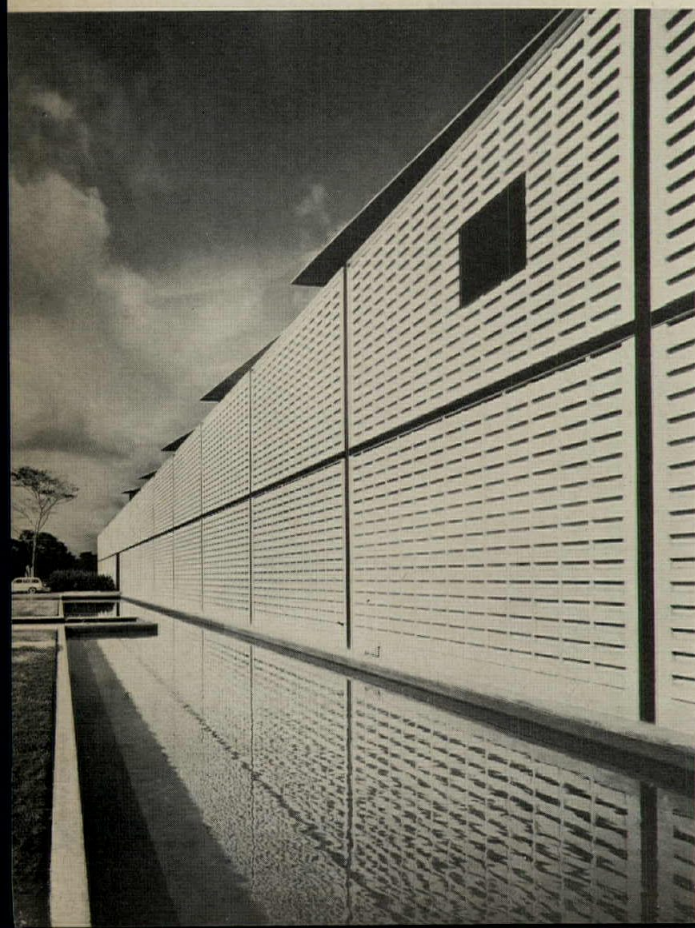
The two basic elements that comprise this industrial center—a research unit and an administrative unit—are completely separated because of the noise, vibration, and dirt created in the testing of industrial mufflers in the lab building. Two glass-enclosed passages connect the buildings and form a courtyard containing a pool, fountains, trees, and redwood pergola. An employees' cafeteria overlooks this scene, popular in summer months for outdoor lunches.

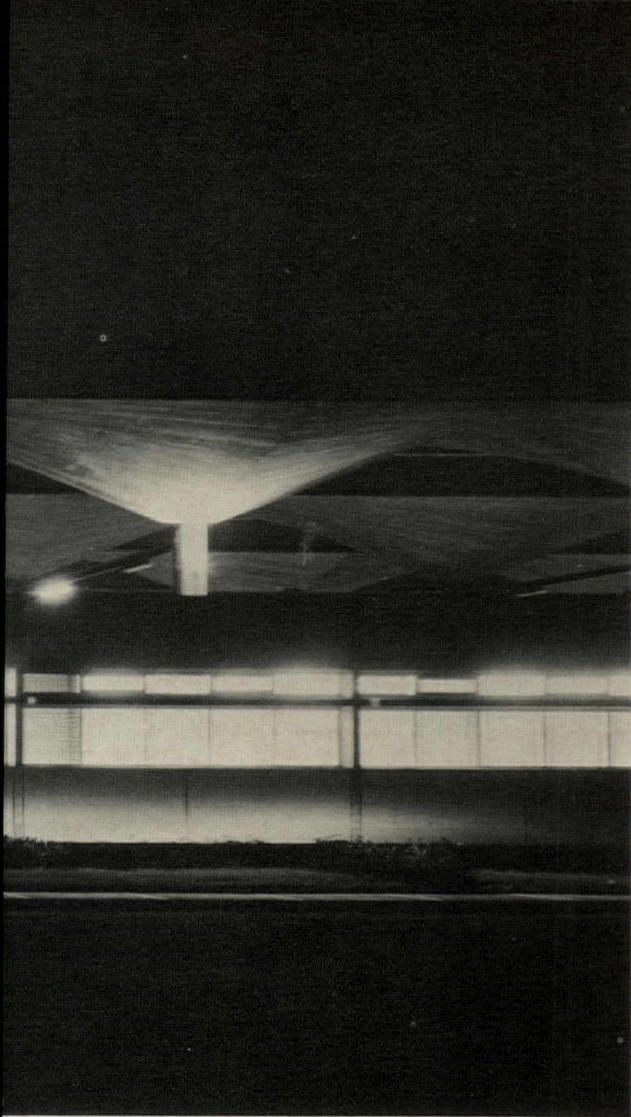
HEADQUARTERS AND RESEARCH FACILITIES, Donaldson Company, Bloomington, Minnesota. Architects and engineers: *Hammel Green and Abrahamson*—project architect, *Brian R. Morgan*; structural engineers: *Johnston and Sahlman*; general contractor: *Watson Construction Company*.





Following considerable study, the structural element chosen was the hyperbolic paraboloid, in a mushroom shaped concrete shell with central column, made hollow to conduct rain water. Such a structure was appealing because it was economical to build and maintain; safe as regards corrosion and fire; could be built with materials produced within the country; and provided a system easily extended for future requirements.





Heinrich Thede photos

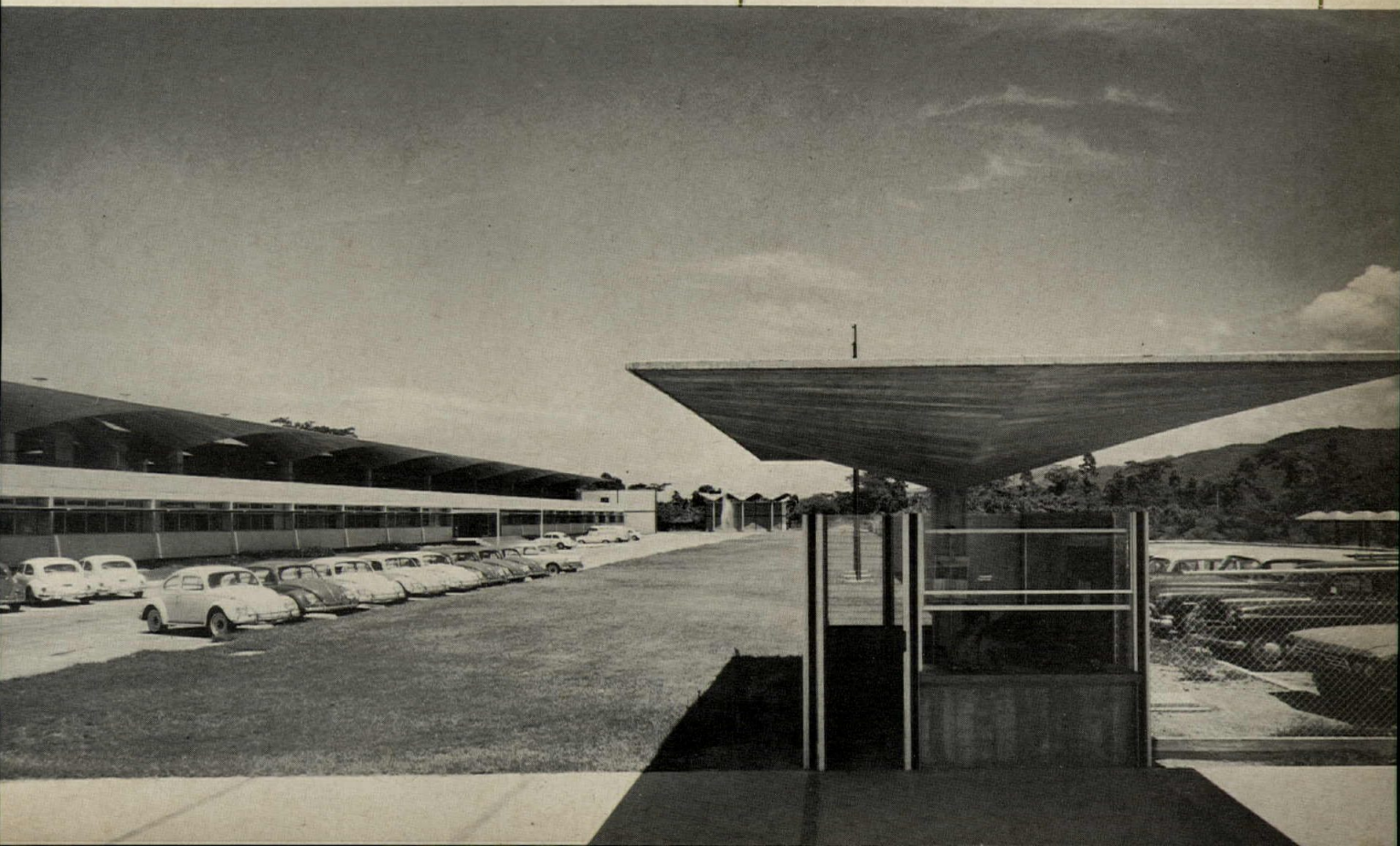


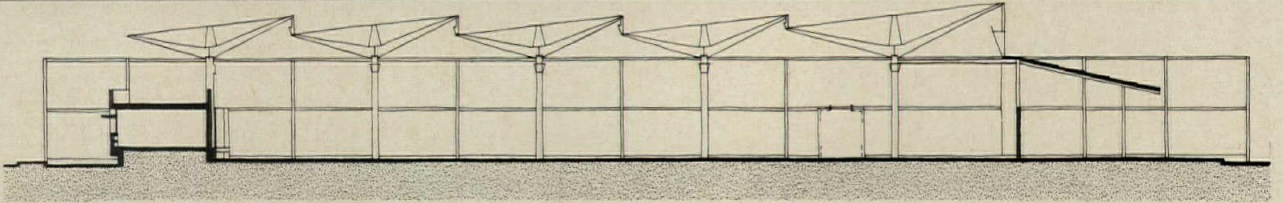
7

AUTO ASSEMBLY PLANT SET IN TREE-BOUNDED PARK

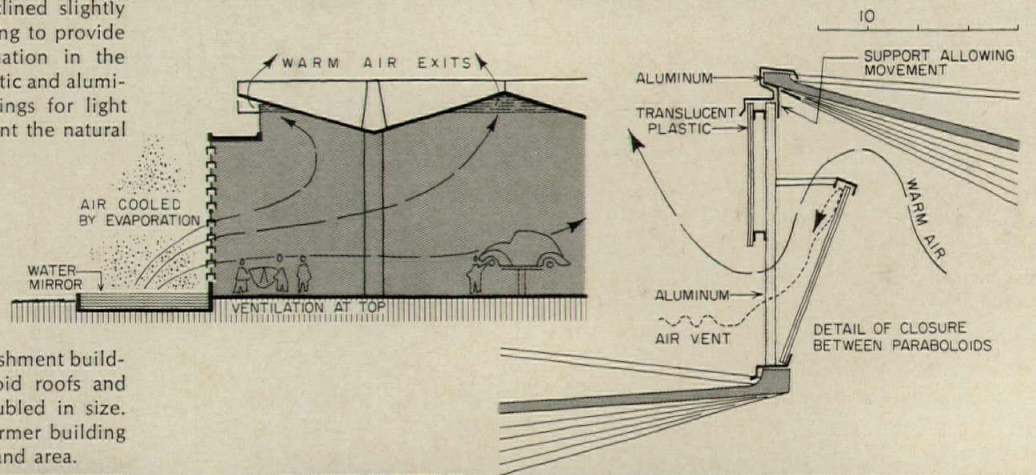
Describing the design of this Volkswagen plant in Venezuela, architect Dirk Bornhorst says, "The privileged location of the complex within a large park with broad expanses of lawn surrounded by wooded areas, guarantees fresh air free of dust and impurities—highly important for the industrial process and for good working conditions. Special emphasis was placed on creating a satisfactory working environment, and an attractive plant. No one will deny the importance of the favorable impression the clean lines of a well designed factory produces in its employees. Attractive surroundings invariably tend to create a sense of pride and responsibility in the worker, which is reflected in work of greater precision, and accordingly, of superior quality."

VOLKSWAGEN ASSEMBLY PLANT, Palma Sola-Moron, Venezuela. Architect: *Dirk Bornhorst*; collaborating architect: *Pedro Neuberger*; soil study: *Ramon Espinel*; structural engineers: *Oficina Tecnica Johansson and Richter*; paraboloid structural consultant: *Cubiertas Ala de Venezuela*; general contractors: *Constructora Star*.

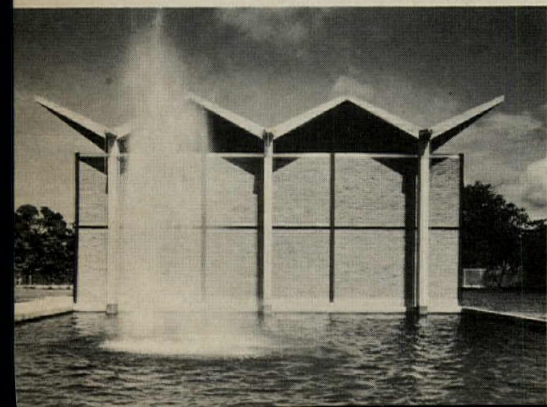




The concrete parabolooids are inclined slightly in the long direction of the building to provide sawtooth ventilation and illumination in the roof, controlled by translucent plastic and aluminum skylights (see detail). Openings for light and air in the end walls supplement the natural overhead ventilation effectively.

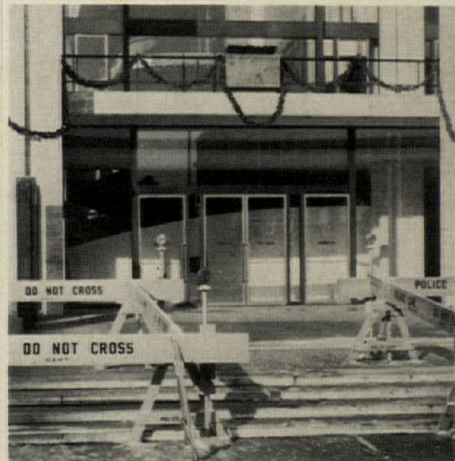


The storage, paint, locker and refreshment buildings (below, right) have paraboloid roofs and are disposed so each can be doubled in size. The electric generator and transformer building (below, left) is near greatest demand area.



Visitors trip on steps outside the new Met

Police barricades now line the steps leading from the Lincoln Center Plaza to the entrance of the new Metropolitan Opera House as a result of a rash of accidents that has occurred since the opening in September. Theatergoers and tourists



have been tripping over the four shallow travertine steps, and sometimes falling as a result. One theory advanced as to the cause of the problem is that the color of the steps blends in with the surrounding buildings during the day, and that there is not enough light shining on them at night. On one side of the steps an improvisation has been made to post-mounted downlights—floodlamps extending below the downlight “cans” have been installed to shine light on the steps.

But perhaps more to the point is the fact that the risers are only 3-in. high and the treads 25-in. wide. Thus the pitch of the steps falls more in the category of a ramp than steps. Time-Saver Standards, McGraw-Hill, 1966 suggests that, “Risers from 5 in. to 6½ in. are suitable for exterior and ‘grand’ interior stairs.” This same source indicates that the New York

City building code requires that the product of the riser dimension and the tread dimension not exceed 75 in. for interior stairs. In Graphic Standards by Ramsey and Sleeper, the critical angles given for stairs lie between 20 degrees and 50 degrees. The stairs angle at the Met is less than 7 degrees. The long stairs in Grand Central Station from concourse to street have 6-in. risers and 13-in. treads. Stairs to the main entrance of the New York Public Library on Fifth Avenue have 6-in. risers and treads as wide as 15 in.

No visual announcing devices have been employed such as railings for the daytime and lights in the risers for nighttime signaling.

Defective caissons delay John Hancock construction

Steel erection was reported near resumption on S.O.M.'s 100-story John Hancock Center in Chicago last month after being stopped in August because of the discovery of a defective caisson column foundation. Construction was halted when a caisson, designed to take 300 tons, sank under the load of a 12-ton column section. Core drilling showed a 14-ft. void in the 8-ft. diameter caisson which sank—the void starting at 50 ft. below grade. A lesser void was discovered in a 6-ft. diameter caisson and three other caissons were found to have foreign material in them.

THIS MONTH'S AE SECTION

Designing building exteriors with sealants in mind.....	169
Instant rehab not so instant.....	175
Building Components: guidelines to silicones for masonry.....	181
Product Reports.....	183
Office Literature.....	184

Core drilling was performed on all 56 of the caissons to check their integrity. Two holes were drilled in each column, and a sound transmitter was lowered in one hole and a receiver in the other to check on the thickness and strength of the concrete. The technique was similar to that used in oil exploration and was adapted for this application by Paul Weidlinger, New York consulting structural engineer.

The faulty caissons are reported to have been repaired by excavating next to each of them, cleaning out the foreign material from the voids and packing them with concrete.

The technique for constructing these caissons—which has been used with several construction variations for a number of years—was to drill a hole down to rock, insert a steel casing and lower it until it was firmly resting on the rock layer, and then to start placing concrete. With this technique the casing is sometimes left in the ground, particularly if there happen to be underground water problems. But when soil conditions are felt to be suitable, the casing may be pulled out as the concrete is poured—the usual reason being to cut the cost of the foundation work. The bottom of the casing is maintained below the concrete level to prevent soil intrusion, but this differential is purposely kept low so that the concrete will not stick to the casing and cause discontinuity in the caisson column.

Engineers familiar with this foundation technique say that when difficulties occur these may be due to (1) pulling the casing above the level of the concrete, allowing soil to intrude into the space; (2) pouring concrete too fast so that it sticks to the casing and forms plugs when the casing is pulled; and (3) seepage of groundwater into the caisson hole which,

if sufficient, can float concrete.

At John Hancock, substantial lengths of the 130-150-ft. casings were pulled after being cut by a welder lowered into the hole. The remaining length, bearing on rock, stayed in the ground. The soil at the site consists of layers of clay and sand down to a rock shelf averaging 140 ft. below grade. There is a caisson under every column of the building, plus an egg-crate of concrete grade beams extending down to 28 ft. below grade. This egg-crate anchors lateral forces into the clay, thus eliminating all lateral forces on the caissons.

Engineers seek approaches to rational design of glass

Reports of glass failures have become more frequent as sizes of glass lights have grown larger and more and more heat absorbing (tinted) glass has been used. While the number of failures is still extremely small in comparison with the total number of lights installed, architects, engineers and glass manufacturers obviously would prefer no failures. Thus designers and glass manufacturers are taking steps to reduce glass breakage to a minimum, even if they cannot now prevent it altogether.

Concern about large lights of plate glass in tall buildings has grown since the reported dramatic failure of 15 lights of glass on one occasion in the Chase Manhattan Bank building in New York City's financial district two years ago. Fortunately the glass, when it did come out, fell into an unfinished plaza. A theory held by many is that the negative pressures near corners of the building was a factor. While it is important for structural engineers to know what wind forces the building frame will have to resist, it is even more important for them to anticipate what the short-time wind loadings will be on glass and panels.

Evidence of progress being made in this area was presented at the fall meetings of the Building Research Institute where three engineers told of their employing wind tunnel testing to determine design wind pressure on tall buildings.

Fazlur Khan, project engineer on the John Hancock Center in Chicago by Skidmore, Owings and Merrill, told some of the results of tests on a model of this building in a 20-ft diameter wind tunnel at United Aircraft Research Laboratory. It was found that the surrounding buildings had little effect on the 100-story structure, and that maximum pressure did not occur at the top, but a third of the way from the top. Maximum pressure coefficient was 1.4 times the wind velocity. Khan also described how glass thicknesses were varied in the Chicago Civic

Center on the basis of estimated differences in wind pressures due to corner effects and differences in heights.

In addition to mentioning wind testing of a new building model in a wind tunnel at Purdue University, Anthony Nassetta, partner of Weiskopf & Pickworth, New York structural engineers, spoke of potential problems with heat absorbing glass. He noted that there is a build-up of edge stresses in tinted glass due to solar load, and that poorly cut glass edges and improper glazing settings and window shading can be responsible for cracks in this glass. Nassetta told of one building with large areas of tinted glass in which these lights were false loaded by pulling down the venetian blinds in order to determine if there were any defective lights.

That there can be a more rational approach to the determination of safety factors for glass was the theme of a paper by Leslie Robertson, partner in the firm of Worthington, Skilling, Helle & Jackson, Seattle and New York City. He showed first of all that the safety factor for glass is based on the theory of probability and that it will thus change with the degree of variation of strengths of glass. For example, the safety factor for tempered glass is much higher than ordinary plate glass—not just because it is stronger (five times) but because there is much less variation in strength. Once the safety factors have been determined for various thicknesses and types of glass for an assumed wind load, the engineer can show the building owner what sort of risk there is for a given glass design and how much it will cost to improve the risk, and how much better it is. Wind loads used in design are also based on probability. He gave an example of one building in which the risk was a breakage of 2.1 lights out of 3,750 with a return period of the design wind load of 10 years. By changing the glass thicknesses, the risk can be improved to 0.7 lights broken in 10 years but the premium in cost is \$21,500. These lights had an area of 28 square feet.

At the present time, glass company wind load charts are based on a safety factor of 2.5, which means that eight lights in one thousand may fail at design wind load.

The public reaction to building design

Reflecting on the dichotomy between architecture and engineering, I. B. Reynolds, a New Zealand architect, recently noted that: 1) the architect often has insufficient understanding of the behavior of buildings as total organisms; and 2) the engineer has perhaps a too-ready be-

lief in the principle that a nice straightforward resolution of functional requirements must look well.

In a paper presented to a joint meeting of New Zealand architects and engineers, Reynolds said that, "Of the two attitudes, I have often found the engineer's more flexible. I do not mean that the engineer is right. It is just that I've found the architect to be more pig-headed. There are two reasons for this: 1) the architect cares more deeply about the formal outcome of his labors, and is less given to compromise; and 2) he has no opportunity to appeal to calculation to prove his point. He is therefore driven to feeble rationalizations in order to avoid the ultimate defense of saying, 'Well, I think it looks better that way.'

"What the architectural profession has not the courage of its convictions to admit, nor the engineering professions the breadth of training to concede, is that ultimately this is the only argument that matters.

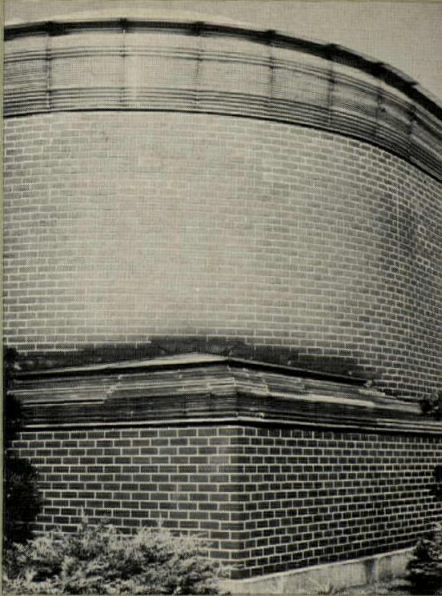
"Technical advances in structural design, greater use of and efficiency in service installations, closer control over artificial climate, more and more method in contract control and cost planning are often the central matters in daily work. But, when the building is finished, when one gets down, as the popular vocalist has it, to 'the real nitty gritty,' all that our fellow countrymen are aware of in the end is that we have materially altered their landscape—for better or worse."

New curtain wall manual to emphasize standards

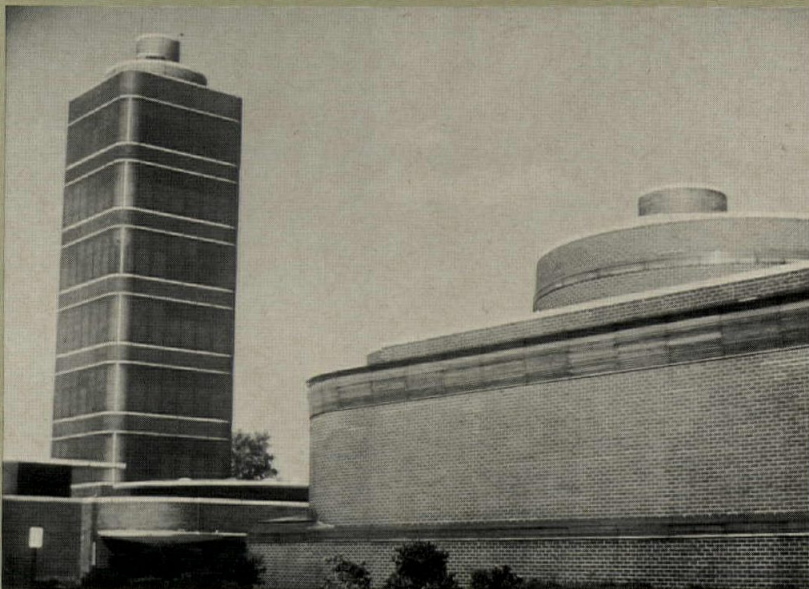
Substantial changes of content and viewpoint will be reflected in the new, revised edition of the *Metal Curtain Wall Manual* published by the National Association of Architectural Metal Manufacturers (NAAMM). According to an association announcement, recent technical advances constitute only one reason for revision of the manual; in addition, the association's Metal Curtain Wall Division, responsible for the manual, believes that revision was in order as a result of new objectives for the publication. Earlier editions had been intended to serve primarily as guides to architects, engineers, and specification writers; the new edition will also provide specifications and standards which can be adopted by code-writing agencies and authorities and which can serve as bases for quality certification programs. Revision of the manual is now approaching the final stages, with publication expected to begin early next year, according to Jack M. Roehm, vice-president, Kawneer Company Inc., and chairman of the Metal Curtain Wall Division.

Designing building exteriors with sealants in mind

By RANGER FARRELL



Glass tubes forming lighting bands in the famous Johnson Wax buildings by Frank Lloyd Wright were resealed with silicone starting eight years ago. Effects of the weather on the original oil-base glazing caused early failure of that material. The new silicone sealant is shown in small photo.



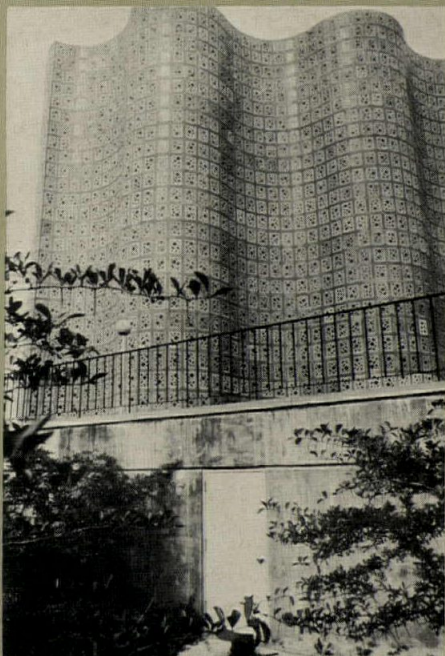
Though building technology has advanced rapidly, it was not until the last decade that the chemical industry was able to develop materials capable of coping with the problem of providing tightly, permanently sealed joints between building components. In the early 1950's, the chemical industry came up with the elastomeric or rubber-like materials which, unlike the old oil-based putties used for so many years, retain their rubber-like characteristics for many years. In spite of the presence of such materials which can retain their elastic properties over periods of many years, there are still many joint failures in modern buildings.

Although many confusing and conflicting claims as to the causes of failures are cited, only two seem to be genuine and significant, namely improper joint design and improper workmanship at the site. The former may be subdivided into improper selection or specification of materials, and improper dimensioning of the sealant bead. The latter may be broken down into improper or sloppy preparation of the surfaces of the materials to be joined, failure to maintain a steady, uniform dimensioned bead, and damage to uncured beads.

Severe test for a sealant

How well some of the new sealant materials perform is illustrated by the remedial work done on the glass tubing fenestration of the Johnson Wax building in Racine, Wisconsin, designed by Frank Lloyd Wright. Originally the Pyrex tubing was sealed with oil-base glazing compound, but this soon failed. Leaks occurred and a first attempt to correct the worst of these involved the use of glass-fiber-reinforced plastic. Except for the few of these coverings left, all the glass tubes are now sealed with silicone.

The development of silicone materials by Dow Corning and Corning Glass Company's interest in the tubing used in the Johnson Wax buildings, made it only natural that some of the earliest installations of these materials as



Glass-masonry mosaic blocks—inset between concrete structural elements—were sealed with elastomeric sealant for the Hall of Science in New York City by Harrison & Abramovitz. These particular joints will not experience much movement because the individual blocks are of small size. Joint width is more than adequate.

The author heads his own firm, Ranger Farrell & Associates, consultants in Tarrytown, New York. He was commissioned by Dow Corning Corporation to develop an architectural approach to the selection of building sealants and the design of joints.

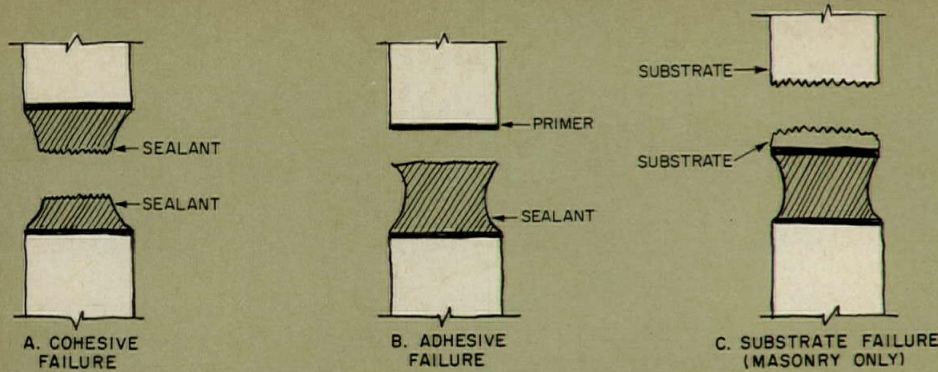
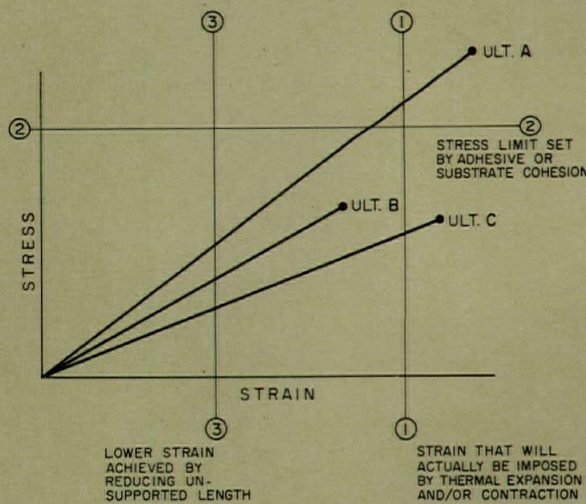


Figure 1: sealant failures are of two types—cohesive and adhesive. With the first type, the sealant itself actually ruptures when it is stretched beyond its elastic limit. With the second type, the sealant pulls away from the substrate if the adhesive attraction between materials is exceeded.

Figure 2: the sealant should have a low modulus of elasticity, but a high ultimate strength—exhibited by material C. When the maximum strain is imposed, the sealant will not have reached the adhesive stress limit nor its ultimate strength.



building sealants should take place in Racine. Some of this material has been in place as long as eight years, and there have been no leaks due to failure of the sealant.

The first research on silicone materials took place in the 30's and out of the investigations came a group of materials now referred to as "room temperature vulcanizing materials" or "RTV's". These materials are liquid in form until they absorb moisture from the air and are converted into a tough, rubbery material. In the 50's, silicone sealants were developed.

The resilience of a synthetic silicone remains virtually unchanged over a temperature range from -50 F to over 300 F—conditions so extreme as to never be encountered on the skins of buildings.

Joint design and construction

The design and execution of a proper sealant joint requires first that the architect detail joint dimensions which will permit contraction and elongation of the sealant without exceeding its elastic limit under the most extreme movement the building will experience.

The contractor's responsibility is to first prepare the substrate to receive the primer and then carefully apply the primer, itself. Next, he must be sure that proper sealant backing materials are used, and that the sealant is applied with proper tools to assure a bead of smooth surface and uniform dimensions, adequately bonded to the primer. A skillful workman can lay a bead of sealant which is free of gaps, ripples or bulges, even at complex corners.

Joints are either working joints or non-working joints—the first must take building movement; the second, relatively little. The primary source of motion with working joints is thermal expansion and contraction. The movement will occur both daily and seasonally. In some cases, the largest joint compression will be due to absorption of solar heat by surrounding materials. Certain sealants can adapt to gradual dimensional changes, but when subjected to rapid movement due to a quick temperature change, they may exhibit remarkably inelastic properties.

Failures that occur with elastomeric sealants are of two types: cohesive failure and adhesive failure. If one examines the ruptured faces of the two materials after a cohesive failure, both surfaces are still coated with sealant (figure 1a). That is, the sealant has ruptured within its very body. A similar examination of an adhesive failure would indicate that the sealant had all remained on one of the two plates and that the substrate material of the other was exposed (figure 1b). In

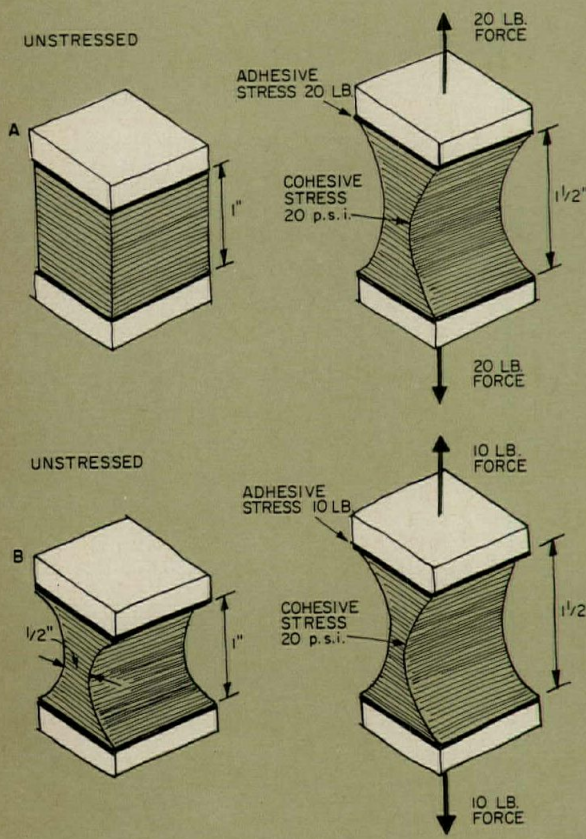


Figure 3a: it has been assumed here that it takes a 20 lb force to pull a 1-in. cube of sealant apart a distance of 1/2-in., or 50 per cent elongation. The cohesive stress is then in the neighborhood roughly of 20 psi throughout the sealant.

Figure 3b: if the sealant cube still has 1-in. square faces, but is narrowed down to more nearly 1/2-in. through its body, it may take only a 10 lb pull to extend the sealant 50 per cent. Now adhesive stress is only 10 psi, while cohesive stress is more nearly 20 psi. Thus by using a back-up material and a tooled joint, adhesive stress is less.

masonry joints, cohesive failure can also occur in the substrata (figure 1c).

A number of properties of building sealants are important for a clear understanding of joint design. Figure 2 shows stress-strain curves for three hypothetical sealant materials. From this figure, several things can be learned, both about joints and about sealants. There are two properties which a sealant must exhibit to assure that the sealant will not pull away from the substrate, nor, on the other hand, pull apart. These are a low modulus of elasticity and a high extensibility or elongation.*

For a joint connecting adjacent panels of a given size and for a given temperature variation from maximum to minimum, there will be some maximum strain which the joint will go through. This will occur whether there is sealant in the joint or not. This strain is indicated by the vertical line (1-1). Furthermore, for a fixed joint design there is a given stress or a force (pounds pull) beyond which the sealant will no longer adhere to the substrate. This is represented by the horizontal line (2-2). Looking at the stress-strain relationship of the three hypothetical products indicated in order, one can make these observations:

Material A has a high modulus of elasticity and a high ultimate strength. Because of its high modulus value, there will not be a cohesive failure within the material itself, and because of its high ultimate strength it can at least theoretically withstand the strain imposed upon it. However, because it reaches the adhesive stress limit before the deflection is reached, there will be an adhesive failure.

Material B has a low modulus of elasticity but also a low ultimate strength. Here the adhesive limit (line 2-2) will not be reached. But since the ultimate strength is low, this material is not capable of being elongated to the maximum strain—thus we will have a cohesive failure.

Material C exhibits both of the desired properties. Not only does the stress build up slowly—the material not reach the limits of stress set by the adhesives—but also its high ultimate strength permits it to elongate to the strain imposed by the building and, in fact, theoretically even more.

To illustrate the type of control that the joint detailer has, let us assume that for reasons other than the elastic properties of the material, it was the designer's desire to use Material B. Had he in his

original design employed unsupported lengths as great as, say, 10 feet, which established the strain indicated by line 1-1, he could redesign his building skin to provide 5-ft unsupported lengths, which would result in turn in one-half the strain being imposed upon the material. Line 3-3 illustrates the effect of such a redesign. With this lower strain imposed upon the sealant materials, any of the three sealants illustrated would fulfill the requirements of the joint.

To illustrate another and very important control the designer has on the elastic forces within a joint, figure 3 shows the importance of the proportions of the sealant bead. The block of sealant in figure 3a is a 1-in. cube, assumed here to be cut from a long 1-in.-high, 1-in.-wide bead. When the substrate blocks are moved apart by 1/2-in. (50 per cent elongation), a 20-pound force can be found necessary to induce the motion. This 20-pound force must be transmitted through both adhesive layers and also through the core of the sealant. Block A was designed to have a 1-sq.-in. cross-section both at the adhesive surfaces and in the center of the sealant. Thus there is a 20 psi stress at the adhesive layers and a 20 psi stress within the block. A better design for this same joint is illustrated in figure 3b. Here, by means of a shaped

backing material and a tooled front surface a shape has been obtained which still has 1 sq. in. for each adhesive layer but has only 1/2 sq. in. within the bulk of the sealant. Again a 50 per cent elongation can be imposed, but in this case only 10 pounds of force are required. Dividing the appropriate areas into this 10-pound force illustrates that we have cut the adhesive stress in half to a figure of 10 psi while still retaining a cohesive stress within the sealant of 20 psi. Both details A and B have an equal chance of cohesive failure, depending only on the ultimate cohesive strength of the sealant employed. The important point is that the thinner joint (figure 3b) subjects the adhesive layer to only half the stress and thus halves the probability of an adhesive failure. Notice that this is accomplished using about half as much sealant as in the unshaped joint. Thus this not only improves the properties of the joint but will also reduce the material cost.

Effect of temperature on design and installation

Many joints fail because designers are unaware of the extent of temperature variation of the substrate. Figure 4 illustrates a thermometer of substrate temperatures encountered in buildings. At first one might think these values extreme, but they nonetheless exist, and the joint must be designed to withstand the expansion or contraction on both the hottest day as well as on the coldest day within the building's life.

A point of major importance in joint design is the absorption of solar energy in materials, causing their temperature to rise well above the ambient air temperature surrounding the material. In a recent article (RECORD, May 1966) John I. Yellott discusses the influence of surface characteristics, particularly solar absorptivity, on surface temperature. The 230 F substrate temperature shown at the top of the chart has been calculated for oxidized, galvanized roofing backed with insulation in a hot climate where the ambient temperature can reach 120 degrees. Such a condition could readily exist in Arizona, for example. Mr. Yellott categorizes materials as either "hot" or "cool" materials. "Hot" materials readily absorb solar radiation but are reluctant to re-emit it and thus there is a build-up of heat. A "cool" material exhibits the opposite properties. Examples of "hot" materials are tarnished copper, oxidized galvanized sheet steel and stainless or aluminum sheet. Examples of "cool" material are white stucco, white lacquered surfaces and whitewashed roofing. Notice that the difference in substrate temperature between hot and cool materials may be as much as 80 degrees.

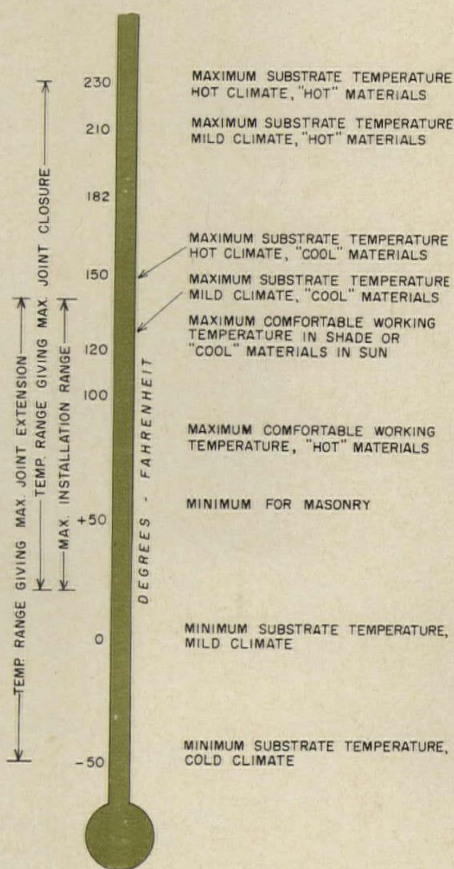


Figure 4: this thermometer indicates the maximum temperatures exposed to sun may reach; also temperatures at which sealants may be applied.

* Technically these terms differ in that elongation is a laboratory measurement and extension occurs in the field. Though they both refer to the same property of the sealant, elongation can only superficially indicate the allowable extension because laboratory control cannot be achieved in the actual building joints.

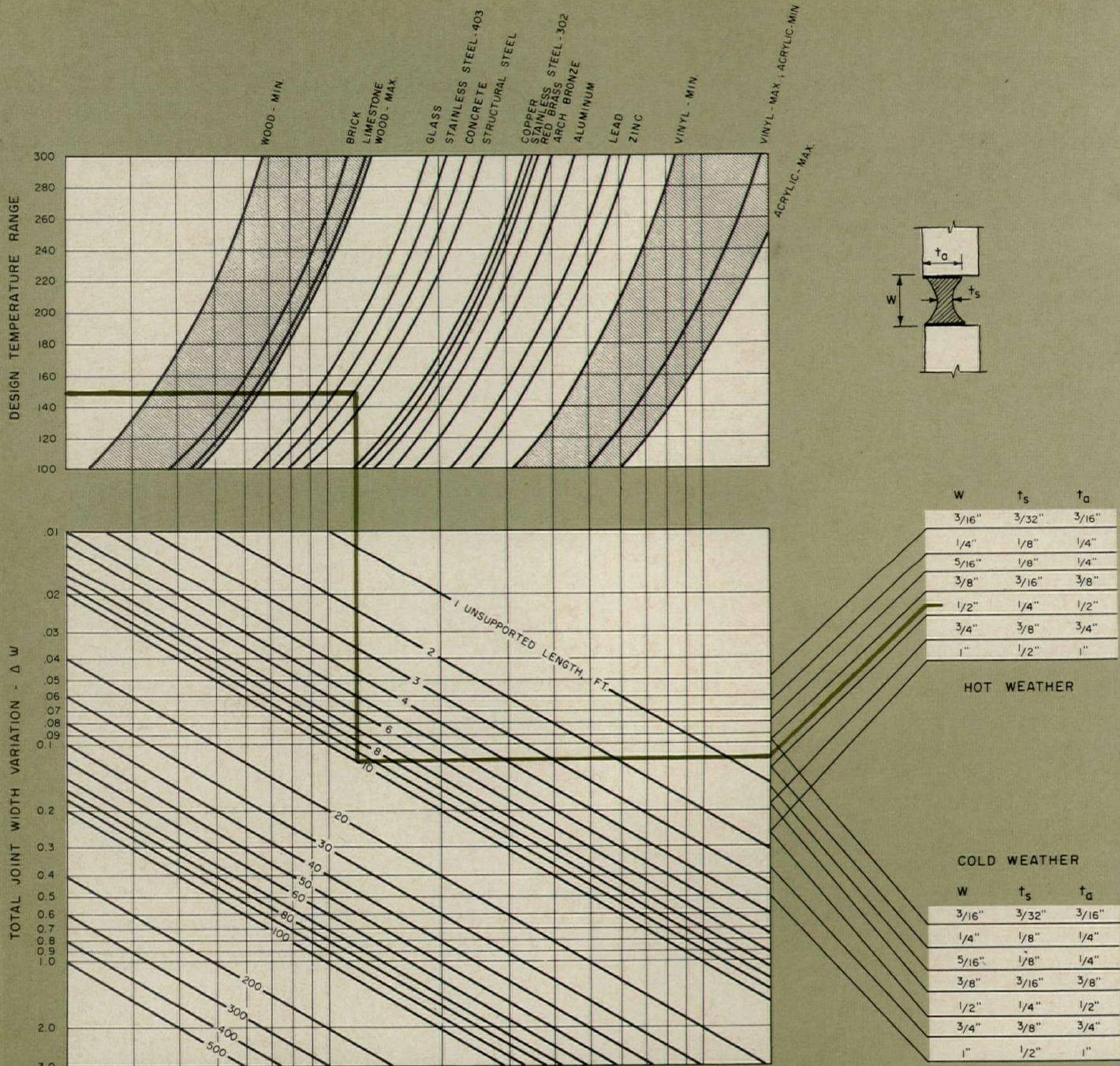


Figure 5: this chart permits the designer to easily determine joint dimensions once he knows the material to be joined and the range between application temperature and the highest or lowest temperature the material may reach in service. To use the chart, start at the upper left-hand corner with the appropriate temperature range and read horizontally to the curved lines corresponding to the material used for building component. Read downward from here until reaching the unsupported length of the panel. Reading horizontally to the left will give the amount of joint movement to expect. The same line followed to the right-hand side runs into a series of sloped lines. **Hot weather installation.** If the installation is to be made in hot weather, follow the top series of lines to the upper table. The width 'w' is approximately four times the anticipated

joint movement. As the most severe stress imposed on this joint will be tension during the coldest time of year, a wide joint is required to avoid adhesive failure. Thickness t_s has been chosen to provide a workable bead while assuring a minimum of pull applied to the adhesive layer. It is recommended that the adhesive contact area be a minimum of 1/4 in. **Cold weather installation.** The procedure for establishing joint dimensions for cold weather application is identical except the lower sloping lines and table are used. The same principles apply except that a factor of two between w and Δw has been allowed.

While many materials have laboratory elongations from one hundred to several hundred per cent of their unstressed length, tensile allowance of 1/4 of 100 per cent and compressive allowance of 1/2 have been used to allow for field conditions.

There is a definite, predictable limit to conditions under which the man working on the scaffolding can apply sealants. At a substrate temperature of approximately 140 F, touching the surface will be painful. Conversely, though the silicones extrude readily from the gun at such low temperatures, it will be uncomfortable for the man to work much below 20 F. With masonry materials an additional limitation is put on the working temperature because if application is made below 50 F there may be moisture condensation on the surface of the concrete, causing poor adhesion.

At the left of figure 4 are indicated three significant temperature ranges, the maximum installation range described above and two other ranges. If a joint is applied at the coldest application temperature when the building panels are contracted, in summer they will be subjected to temperatures as much as 210 F higher, the joints, unless properly sized, may be tightly closed. Conversely, if a material is applied at the hottest practical temperature the joint will, in winter, be made larger in an amount corresponding to a temperature range of 190 F.

This figure indicates that installation during cold weather is more conducive to successful sealant application than in hot weather since over most of the season the joint will be undergoing compression in various degrees and in winter will be subjected to far less tension than a hot weather installation.

The joint designer should make reasonable estimates, or on large important projects even precise calculations, to indicate the most suitable design temperature range to establish maximum joint elongation and closure.

Figure 5 permits a simple method of establishing joint dimensions if one knows the materials to be joined and the temperature range which can be anticipated between the application temperature and the most extreme temperature.

One very important factor is parabolic extension at the face surfaces of the sealant bead. This is illustrated by figure 6. Because of its elastic nature and the fact that it is not constrained at its exposed faces, those faces tend to assume the parabolic shape indicated by the curved lines of figure 6b. This line, for poorly designed joints, can be as much as twice as great as the actual opening of the joint as illustrated by the dimension Δw . This same phenomenon is also disadvantageous in that there is a tendency to peel the thin edge of the joint from the substrate, and most elastic materials have a lower resistance to peeling than to direct adhesion because the peel-stress is concentrated along a thin hair-

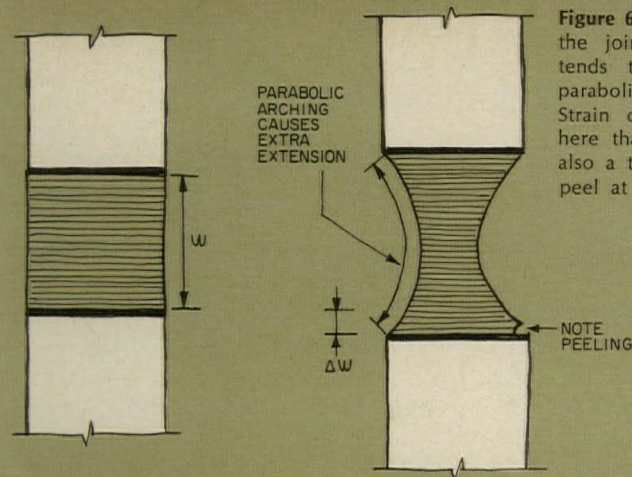


Figure 6: This sketch shows that as the joint opens up, the sealant tends to neck down, taking a parabolic shape on its free faces. Strain obviously is much greater here than in the center. There is also a tendency for the sealant to peel at the thin line along edges.

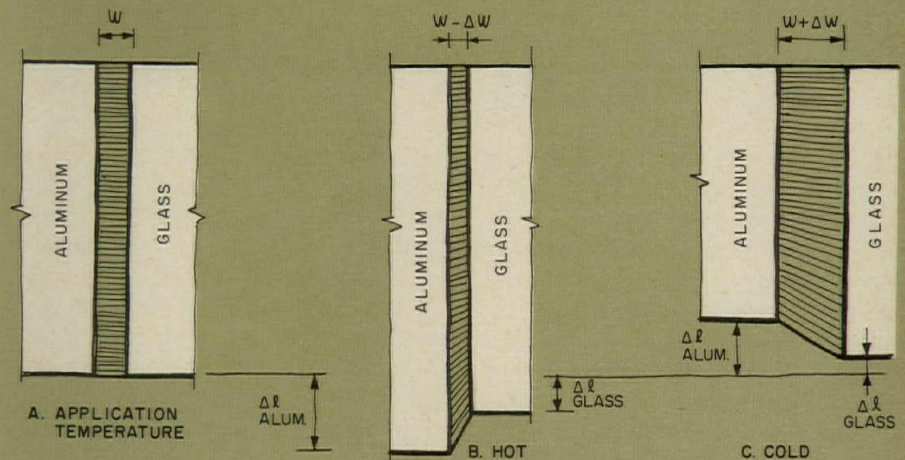


Figure 7: When materials having different coefficients of expansion are joined by a sealant, temperature change will result in a diagonal component because of the movement of the substrate materials in two directions.

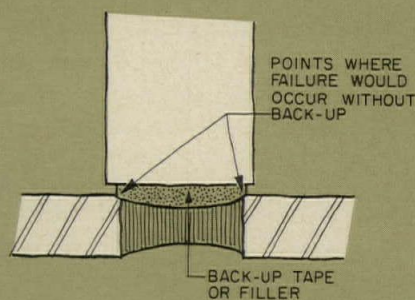
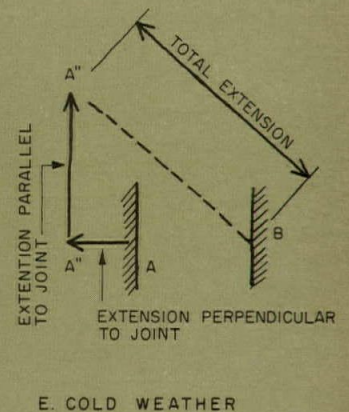
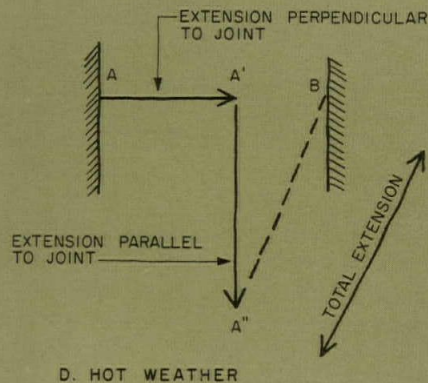


Figure 8: Back-up materials work as bond-breakers between adjacent materials which move relative to each other. If they happen to be bonded, the small length of the sealant between the two elements is elongated excessively with only slight relative motion.

line at the edge of the joint.

Fabrication tolerances of building materials differ widely. They are, however, a very important factor in establishing the width of fail-safe joints. The material needing closest attention in this regard is concrete. Estimates made by the British Building Research Station of tolerances on concrete panels show these can be as great as 0.4 in. for poured-in-place panels. Since these tolerances are virtually inevitable and cannot be "specified out" of the casting operation, the most effective way of handling them in joint design is to add the tolerance to the joint width recommended on figure 5. The adhesive thickness (t_a) and center bead thickness (t_b) should correspond to the newly determined joint width.

When unlike materials are being joined, there will not only be the direct component of width expansion or contraction of the joint indicated by Δw in figure 6, but an additional diagonal component may be imposed. If, for example, a large plastic skylight is to be sealed to a concrete curb, the plastic will expand at high temperatures much more rapidly than the concrete curb itself. Figure 7 shows not a section of a joint as all previous figures have, but an elevation. In hot weather, panel expansion perpendicular to the joint will compress the joint. This can be seen in figure 7d as the horizontal vector $A-A'$. At the same time, the aluminum panel will be extending parallel to the joint. If we assume that both the aluminum and glass are rigidly attached to the frame of the building at the top, these parallel extensions will be as indicated by ΔL aluminum and ΔL glass. These are also indicated by the vertical vector $A'-A''$. This diagonal effect will, in this case, be at a maximum at the bottom of the joint.

Figures 7c and 7e show the diagonal effect during cold weather. It is important to notice that in hot weather the diagonal effect can offset some or all of the sealant compression $A'-A$, or can put the lower portion of the sealant into tension. In cold weather the diagonal effect can only serve to increase tension in the sealant, thus correction of the joint width should be based on the total expansion indicated by $A''-B$ on figure 7e.

Equipment and application techniques

Application of elastomeric sealants is universally done with the familiar caulking gun. The most common form of gun is the hand-operated, cartridge-loaded gun of which a number of minor variations are available. More common in commercial installations are the bulk-loading guns. The latter, which are loaded either by withdrawing the gun rod

from the gun thus "sucking" sealant from a bulk container up into the barrel or by means of a special pump are available with capacities ranging from one pint up to one-half gallon. Air-powered guns are also available ranging from standard cartridge size up to two or more quarts in capacity. These may be operated from an industrial air line, a local air compressor or a compressed air tank mounted either on the staging or on a back-pack on the operator's shoulders.

Cartridges come in both spouted and spoutless varieties. The spouted variety nowadays almost consistently has a round, conical plastic spout which can be cut to size and shape by the applicator. Spoutless cartridge guns, as well as bulk-loading guns, can accept a variety of metal or plastic nozzles. These have openings of various shapes ranging in size from 1/16 in. dia. to two or three inches wide.

Application of the sealant can be divided into four steps: joint cleaning and preparation, joint priming, sealant application, and tooling. Cleaning of metals and glass is usually accomplished with cloth-applied grease solvents such as xylol, xylene, methyl ethyl keytone, etc. Masonry materials are more difficult to clean. The very least that is required is the rigorous use of a stiff wire brush and one of the grease-cutting solvents. If there is any evidence of either decomposition of the surface of the masonry and dusting or, in precast concrete, the shop application of waxes or other surface treatments, it actually becomes necessary to saw away a portion of the joint to expose clean, firm, virgin stone.

On most metals and glass these may be applied either with a paint brush or by rag. In general, the thinner the layer, the better. In fact a molecular coating will form an ideal prime for most materials. Each manufacturer recommends primers with which he has had both field experience and on which he has laboratory data. It is recommended in every case that the applicator follow the manufacturer's recommendations with regard to primer selection.

The back-up material is often the most important key to a good joint. Back-up materials serve two functions. First they act as a "bond-breaker," the function of which is to prevent the sealant bonding to two immediately adjacent materials between which there may be relative motion. Figure 8 illustrates the problem if two immediately adjacent materials are bonded together. The infinitely small length of sealant between the two elements is immediately elongated to several thousand per cent with only a relatively small degree of relative motion between the two elements.

The second function of a back-up material is to give shape to the concealed face of the sealant bead. The value of this shape in limiting the thickness of the bead at its center has been discussed previously. Occasionally a simple tape or coating is used as a bond-breaker. Back-up materials which can provide shape to the concealed side of the bead are recommended. These come in many forms, of which the best and most economical are formed cylinders of foamed white plastic. These are compressible and will not spread outwards towards the open face of the joint thus forcing the sealant out as would, for example, an asphaltic back-up. Furthermore, because they are white and do not contain tars or oils they will not stain the sealant nor affect its adhesion. Installation of a foam back-up within the joint does not run the common risk of other back-ups of contaminating the primer or exposed substrate during installation.

In the actual application of the caulk bead itself a proficient caulking technician will "push" the bead. This serves two purposes: in the first place it pushes sealant into the joint, assuring firm contact at the adhesive surfaces; and secondly the small "bubble" which rises ahead of the nozzle of the caulking gun serves as an adjustable reservoir which assists the applicator in keeping his bead uniform by varying his speed as a function of his observation of the size of the bubble. Were he to "draw" the bead with the gun leading it, a sudden discharge of sealant from the gun would result in a similar bubble but one which would be left behind the gun forming a bump in the bead, and when the sealant emerges too slowly gapping may occur.

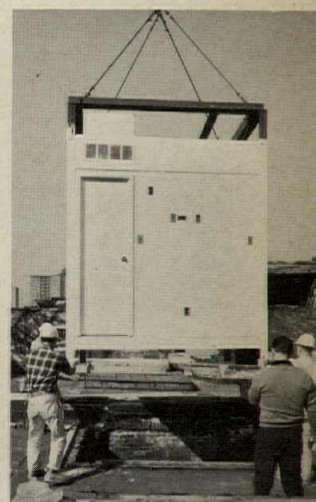
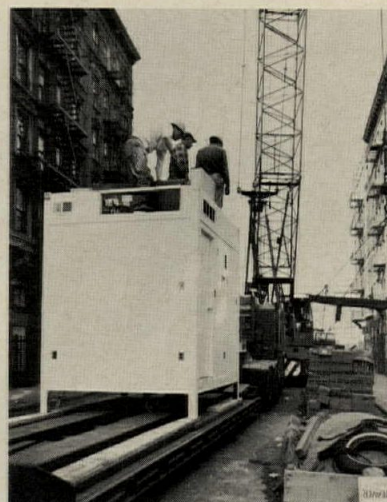
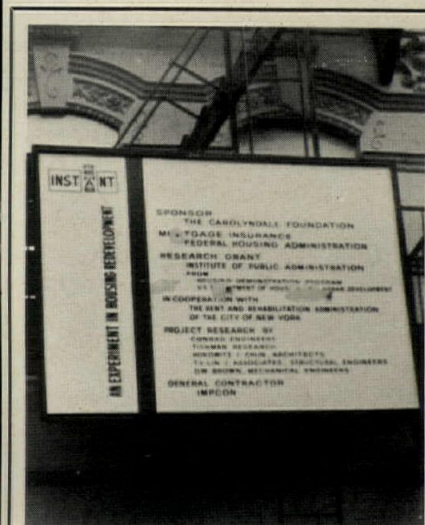
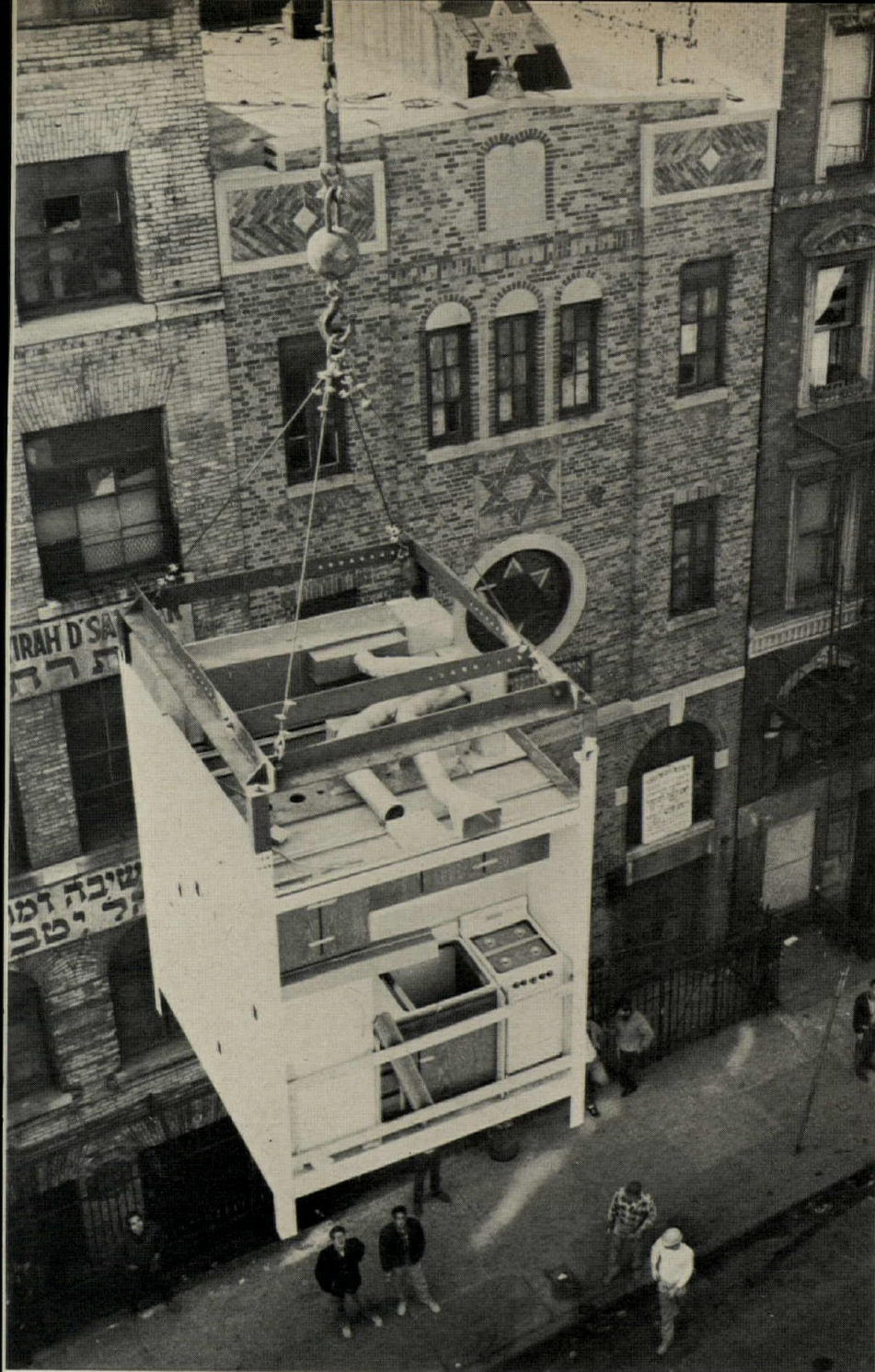
The final step in application is tooling, which serves two primary purposes. The most important of these is that it assures smooth, tight contact between the sealant and the substrate at the exposed edges of the bead. Secondly, tooling provides the required shape to minimize stresses at the adhesive layer while removing any bumps or irregularities along the bead and also at corners. In sealing around the perimeter of a rectangular panel, a competent applicator can make relatively smooth corners but will have difficulty keeping an absolutely smooth bead when he has completed the loop and comes back to the point where he started. Tooling can overcome both lumps and bubbles at the point where the head of the sealant bead meets its own tail.

In addition to the staff at Dow Corning Corporation, the author wishes to acknowledge the assistance of C. E. Folwell, plant engineering manager, S. C. Johnson & Company; David Brisk, Brisk Waterproofing Company; George Grenadier, The Grenadier Corporation; and M. Weiner, State Supply Company.

Instant rehab not so instant

Few ideas for rehabilitation have been more highly touted, or caused as much talk, as New York's drop-in kitchen-bathroom core concept. But the realities of old, sagging buildings and high costs of construction labor raise practical questions about both cost and speed for the new system.

Rehabilitation of city slum buildings is getting a big push from Washington these days, with the fervent hope that somehow technology will provide breakthroughs to the problems of cost and time. An experiment in this direction that has been getting widespread attention this year is the so-called "Instant Rehabilitation": Three five-story slum dwellings on New York's Lower East Side—whose structures consist of masonry bearing walls approximately 25 ft apart spanned by 3 by 10 undressed joists—are being outfitted with prefabricated kitchen-bathroom core units by Conrad Engineers of Van Nuys, California, headed by Edward K. Rice. First the 75-year-old tenement buildings are stripped down to masonry walls, exposed joists and sub-flooring. Then while vinyl-covered gypsum wall panels and hung ceilings are being installed, and the new aluminum windows are set in place, 8-ft-sq holes are sawed out of the centers of the roof and floors so that the prefabricated cores can be dropped in and set one on top of the other. Floors are shored up by screw jacks until the cores are finally in place. Then floor joists are supported by ledger



angles attached to the prefabbed cores.

Originally touted as a two-day rehabilitation effort—tenants were to move out one day and then 48 hours later the spanking new apartments were to be re-occupied—the entrepreneurs are now talking about six eight-hour working days.

Trouble with floor levels

While the kitchen-bathroom core units seemingly went in fast enough during a press demonstration last month—five core units were down in the hole by the end of the day—less noticed was the fact that so far the floor levels of the cores have been ending up higher than the sunken subfloors of the tenement buildings. The joists obviously have bowed considerably during the 75 years of superimposed load—one workman said as much as 6 in. in 25 ft. Whether the misalignment of floor levels was due, as variously suggested by technicians at the site, to difficulty of making accurate on-the-job measurements, or to a dimensional interference at the first-floor level, the cores in two of the buildings have had to be lowered to correct position by hydraulic jacks—after structural provisions were made for the lowering which in some cases amounted to several inches. The original floors were not brought up to level, but the new flooring, which consisted of flexible particle board sheets coated with plastic, could be bent to follow the curvature of the original subflooring. While the cores themselves could be leveled horizontally by rubber shims, there were no built-in provisions for adjusting the cores to a lower overall height.

The core comprises a small gas range, refrigerator, sink and cabinets in the kitchen, and tub with shower, lavatory, water closet and medicine cabinet in the bathroom. Heating of the apartments will

be by forced warm air from a horizontally mounted gas furnace at the top of the core which has provision in it for a future cooling coil. Wall registers in the core will discharge air into most of the apartment space. Where there is a separate bedroom this is served by a flexible duct. There is no peripheral heating. While special wall electrical appliance outlets have been provided for window air conditioners, it appears that it would be difficult to mount these in many places because of the casement windows used in many rooms which would require costly modification, and the fact that all of the windows appear to be only lightly attached to the window surrounds. While the aluminum-frame windows are designed to be adaptable to out-of-line window surrounds to allow "half-hour" installation, there were some good-sized gaps in several instances, and the aluminum window frames were pushed out of square. In addition, the various window head conditions had to be corrected by plywood fill-ins.

New room wiring has been run in surface mounted raceways to save labor, but it was obvious during the press demonstration that considerable time will still be required to pull wires to raceways, switches and core units.

Heating details

According to one Conrad Engineers representative at the site, the combustion air for the gas heaters may be provided through louvers in the outside walls introducing air to the hung-ceiling space, although it also could be taken in from the rooms themselves through louvers in the ceiling near the core. Apparently, because of the experimental nature of the project, an exception to the New York City building code was made to permit combination venting of the gas furnaces—that is, a common vent for five floors.

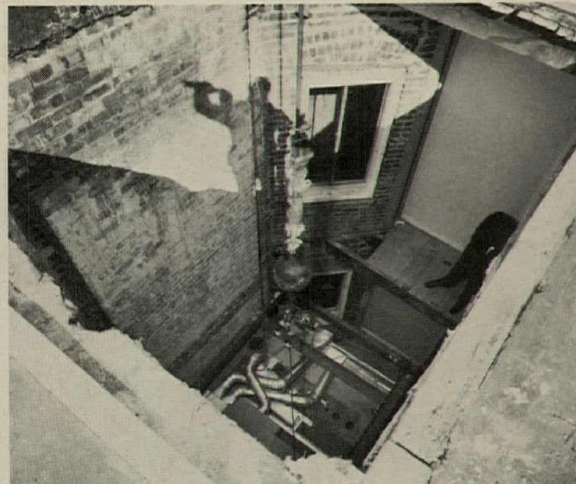
While this technique has been used before in other cities for multiple-floor apartment buildings, the core design will not allow more than a few inches vertical rise for the flue at the draft hood of the furnace before it is tapped into the common vent—usual practice is to provide at least 3-ft vertical rise.

Electric heating, while considered during the development stage, was deemed too expensive in operation. However the apartments are individually metered. With a single meter for the building—as used in certain new apartment buildings—a special electric heat rate could result in less costly heating.

The financing

The experiment is being sponsored by the Carol W. Haussamen Foundation, which has bought the three buildings on East Fifth Street in Manhattan. The Haussamen Foundation commissioned Conrad Engineers to undertake the development of Instant Rehabilitation under a grant from the Department of Housing and Urban Development, reported to be in the amount of \$420,000, which is being administered by the Institute for Public Affairs in New York. This Institute will, it is said, make an evaluation of the project upon its completion. Conrad Engineers, in addition to developing the core system and its adaptation to these particular buildings through the HUD grant is also making the core units with local union labor on Pier 27 in New York. They are brought by trailer uptown to the site. Conrad Engineers acknowledge that cost of the core built by construction union labor is about twice what it would be if the core could be manufactured in a plant as if it were an "appliance."

Cost of renovating the tenement buildings will average about \$13,000 per apartment in the three buildings, according to Mr. Rice.





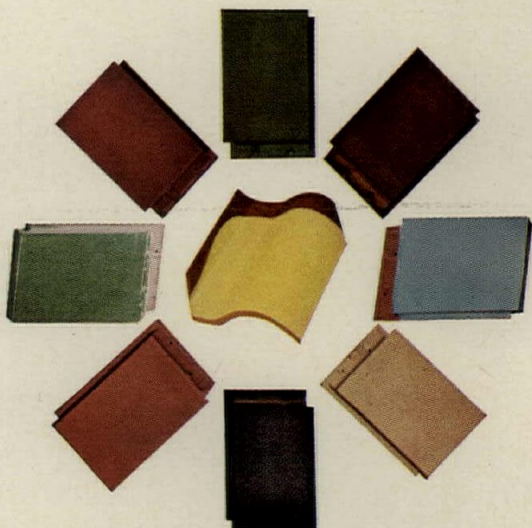
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BL-301 BI-LEVEL ACCESSORY FOUNTAIN — Safe, practical way to serve drinking water to adults and children. Designed for side mounting on any WM series water cooler. Gray baked enamel, stainless or vinyl-clad steel cabinets to match adjoining WM cooler. Waste outlet and water supply are integral with electric water cooler. Can also be installed as separate wall fountain.

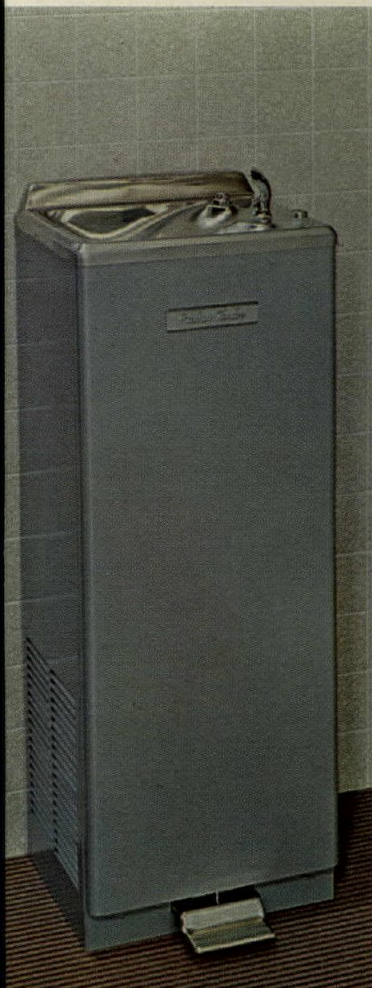
You provide a more satisfying drink of water with Halsey Taylor's exclusive, two-stream, mound-building, anti-squirt water projector. Two streams peak at a precise point to deliver a larger, more sanitary mouthful of cold water. And the unique overflow outlet in the hood guard makes this bubbler absolutely squirtproof. Guard and bubbler are a one-piece, heavy, chrome-plated forging. Constant stream height is maintained by an automatic stream regulator — never too high or too low, even though line pressure may vary as much as 50 pounds.

The five attractive water coolers shown here, with their clean, modern styling, are additional reasons why you should specify Halsey Taylor.

Before you buy or specify see the most complete line of electric water coolers and drinking fountain equipment available. Write today for new Halsey Taylor catalogs. Or look us up in Sweets or the Yellow Pages.

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THE HALSEY W. TAYLOR COMPANY
1560 Thomas Road, Warren, Ohio
For more data, circle 69 on inquiry card



What's come over steel?

The new Lyon concept:

QUIET STRENGTH...WITH FLAIR!

You're looking at the forerunner of what others *may* offer in steel furniture...later! Every inch is *totally* new; freshly designed to provide greater strength, soundproofing and elegance per dollar than ever before!

Lyon desk tops are sturdily constructed of two layers of steel, the lower layer continuously ribbed for maximum strength. We made them the main structural member, from which all other members stem. Result: the greatest beam and torsional strength in the industry.

Back panels are double wall type, with honeycomb filler for complete soundproofing. Lyon pedestals are continuous-welded tubular structures which completely gird the front opening. These too, are *fully* sound proofed. Our exclusive "lock-in-top" feature controls *all* drawers, provides for interchangeability of pedestals.

We've sculptured our steel carefully, for less massive appearance, more leg room. Complete serenity is provided by double-walled drawers, lubric plastic glides, and rubber bumpers. To top it all off, there's a choice of 9 lustrous 100% acrylic finishes that will last with the furniture.

Can such features come without a premium price? Certainly! See your Lyon office furniture dealer! Ask him about the "unprecedented 7*" Lyon advantages.

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For more data, circle 70 on inquiry card

A guide to silicone masonry water repellents

By C. A. Bergeson, Silicones Division, Union Carbide Corporation

Silicones—materials similar to masonry in chemical composition—provide durable and invisible water repellent coatings for protection of above-ground masonry. Treatment of commercial and institutional buildings is at present the major use, but residential applications of silicone masonry water repellents are increasing.

Masonry, unprotected from water, is subject to erosion, scaling and spalling damage in freezing weather, and the unsightly effects of efflorescent salts brought to the masonry surface. Water also carries dirt into the pores and crevices by capillary action resulting in permanent staining and discoloration. In addition, absorbed moisture can cause damage to building interiors, particularly peeling of paint. The treatment of masonry structures to provide water repellency is highly desirable for maintaining both appearance and utility.

Keeping water out

Two types of materials are available to keep water out of masonry—waterproofers and water repellents. A waterproofer is an impervious coating that seals the surface so that neither liquid water nor water vapor will penetrate. Tar, pitch, heavy resin coatings, and some paint coatings fall into this category. Waterproofers are extremely useful, but are generally restricted to below-grade application because masonry appearance is changed and water vapor is sealed in.

A water repellent, in contrast to a waterproofer, permits the masonry to "breathe." It keeps liquid water out but does not stop the movement of water vapor. However, water repellents, always permeable to some degree, are not used below grade because pressure greater than a 2-in. head can cause water to penetrate. For above-grade treatments this pressure limitation is not a problem. In selecting a water repellent for above-grade masonry, five different materials that can be considered are oils, waxes, (solutions in solvent), metal soaps, organic resins and silicones.

Water repellents

While oil spilled on a concrete floor makes the floor appear water repellent, it darkens and discolors the surface. Oil also makes a masonry surface tacky and when air-borne dirt clings to it, it gives a soiled appearance. Laboratory tests show that an oil does not really prevent water absorption. Water quickly penetrates the oil film and is absorbed into the masonry surface. Oil treatments of masonry are not durable because the oil is readily floated away.

Waxes are not tacky, as oils are, and are highly resistant to water. However, they function more like waterproofers than water repellents and don't do either job well. A wax deposit changes the masonry color, usually darkening it and giving it a waxy sheen, and clogs the masonry pores destroying breathing action. Initially, wax effectively reduces masonry water absorption, but this action is only short lived. Temperature fluctuations cause fractures in the wax deposit which serve as entry routes for water. Moreover, wax treatments are not durable. Because they have poor abrasion resistance and do not penetrate, waxes can be expected to wear away in less than a year.

In the metallic soap category, the most popular materials are calcium and aluminum stearates. These may be considered special waxes. They provide a certain amount of surface water repellency but seal or greatly restrict pore openings. Because the bond of the metallic soap with the masonry surface is strictly mechanical, water can find its way to the interface and be easily absorbed by the masonry surface.

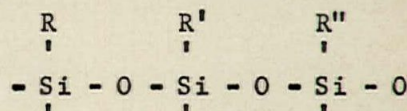
Organic resins applied to masonry in sufficient quantity to act as a water barrier change its color and appearance. Heavy coatings also seal masonry pores and prevent breathing.

Silicone masonry water repellents offer a superior type of protection. One coat penetrates about a quarter inch and does not change the masonry appearance. The pores are not sealed and entrapped moistures can escape. Since

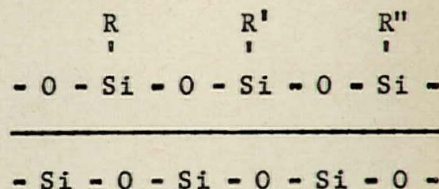
moisture cannot be absorbed, the rain serves to wash dirt off the masonry. Durability is assured by the strong bond of the silicone to the masonry.

The silicone mechanism

Because silicones, unlike any other water repellent, resemble masonry in chemical structure, a strong affinity results. Most masonries are largely silica or silicate with chemical structures containing -Si-O-Si-O-Si-O-chains. Silicones have the same polymer backbone structure, -Si-O-Si-O-Si- but also have organic chemical groups attached to the silicone atoms. A silicone water repellent can be depicted as follows, where R, R', R'' are organic chemical groups such as methyl- (CH₃-), ethyl- (C₂H₅-), and amyl- (C₅H₁₁-), etc.:



When a silicone is brought into contact with masonry, very strong attractive forces between the silicone and masonry come into play. This action is pictured in the following sketch of a cross-section of a masonry surface treated with silicone water repellent:



The chemical attraction causes silicone to bond so strongly to the masonry that a water film cannot enter the silicone-masonry interface. The diagram indicates that the organic chemical groups in the silicone structure are oriented in a direction away from the masonry. It is these organic chemical groups that provide the water repellency. A single molecular layer of silicone is sufficient.

Advantages

The chemical phenomena described can be translated into very practical advan-

tages. Because the silicone treatment deposits little more than a monolayer on the pore walls and masonry surface, the size of the pores are not significantly changed and breathing is not impaired. The strongly-bonded silicone water repellents effectively reduce water absorption, lasting for at least five years, more likely eight to 10 years longer than other treatments.

Types of silicone water repellents

There are several types of silicone water-repellents used for masonry treatment. In the form of resins, silicones are commonly used in an organic solvent dilution and occasionally in an emulsion. In some cases, silicones are applied in the form of water solutions of sodium methyl silanolate. Concentrations run 1 to 5 per cent of silicone in a water-repellent solution, depending on the nature of the solution and the masonry surface. Ordinarily one gallon of a silicone masonry water repellent solution will treat approximately 100 square feet of masonry surface.

Solvent-type silicone masonry water repellents are most often recommended and used for brick, concrete, stucco and terazzo surfaces. These contain 3-5 per cent silicone resin in mineral spirits, concentrations found to provide the most successful and economical treatment. For on-site use by contractors and painters, 3 and 5 per cent solutions are available from several hundred silicone water-repellent formulators. Properly formulated, solvent-type silicone water repellents will meet or surpass all of the composition and performance requirements set up by the U.S. Federal Government (SS-W-0010 and GSA-FSS), the Canadian Government (58-GP-2), the Port of New York Authority and the Philadelphia Board of Education (S-82).

Application of solvent-type silicones

One coating of a 5 per cent solution or two coatings of a 3 per cent solution of silicone is recommended. The average coverage of 100 sq ft/gal can be stretched for a dense substrate with a low porosity, but never beyond 200 sq ft/gal. Coverage should be reduced to 50-70 sq ft/gal for very porous substrates such as concrete or cinder block. Spray treatment is preferred; however, brush-on application using new, solvent-resistant brushes is acceptable.

For spraying, fluid-pressure-type spray equipment (rather than aspirator-type) should be used to avoid excessive solvent losses. If a second coat is to be applied, the first should be allowed to dry for two days. Wherever masonry is in contact with asphalt or tar-filled joints, or other materials that can be softened or dissolved by solvent, an adjacent strip

at least 6 in. wide should be carefully brush-treated. The remaining area can then be completed by spray application.

Surface preparation

Although silicone treatment of masonry is not difficult, unsatisfactory results may be obtained unless the surface is in proper condition. Before beginning treatment, it is necessary to insure that the masonry is thoroughly cured, dry and clean. The mortar joints should be allowed to cure for at least 3 weeks prior to application of the silicone solution.

Tar or asphalt residues on the masonry surface should be removed, by scraping and then blotting with solvent-dampened, clean rags. Complete removal is important since unremoved tar residue will be dissolved by the silicone solution, resulting in dark streaks and stains.

Masonry is commonly given an acid washing to remove efflorescence, which can cause darkening of the surface when silicone treatment is applied. While this effect is not permanent, sunlight restoring the original color in about two months, the acid should nevertheless be washed away before silicone treatment.

To assure a clean and dry surface, masonry should be thoroughly washed and rinsed 3 days to two weeks prior to the silicone treatment. Although water will suffice, a soap or detergent solution with mild scrubbing followed by a clean water rinse is advised to loosen and wash away dirt. Three days drying following a wash-down, or rain, will suffice at temperatures above 50 F but longer periods are necessary below 50 F.

Silicone treatment should not be begun if the temperature is below freezing and the possibility of entrapped frozen water exists. It is also important to postpone silicone treatment if rain is expected in the next few days.

Treatment of concrete block

Solvent-type silicone masonry water repellents impart a high degree of water repellency to concrete block or lightweight aggregate block. However, their effectiveness is limited by the large pores, which are actually more like channels. The size of these channels permits some water to enter after silicone treatment.

Recommended practice is first to coat the surfaces of concrete block with a cement-base paint, and then, in 21-30 days, treat with silicone. When it is not desired to use a prior grout or cement-based paint application, silicone treatment is still worthwhile since it will greatly reduce overall water penetration.

Treatment of limestone and marble

Because limestone and marble are calcium carbonate compositions and non-

siliceous (do not contain a silica or silicate), they are not amenable to treatment by solvent-type silicone masonry water repellents. The silicone does not exhibit a strong chemical attraction for the calcium carbonate surface so the conventional cure cannot take place. Occasionally a limestone will be encountered that has sufficient siliceous content for a solvent-type silicone solution to cure satisfactorily. But, in general, it is usually best to use a water-soluble or emulsion-type silicone solution for limestone and marble treatment.

Prior to full-scale treatment of limestone or marble, a test area should be evaluated for a two to four week period. Actually, this is a good practice before silicone treatment of any unfamiliar masonry. Certain problems, such as masonry colored salt migrations, are best corrected before treatment.

Emulsion-type silicones

Emulsions of silicone resin water repellents, nearly neutral to pH, can impart a satisfactory degree of surface water repellency. However, they are not normally recommended for general use on masonry because they do not penetrate the surface. Thus, durability beyond three months to one year is unlikely.

For limestone, recently developed silicone resin emulsions, prepared by adding catalyst and silicone resin to water, appear to provide effective, durable water repellent coatings. These 5 per cent near-neutral, emulsion solutions are applied by spray or brush, using the same procedure and coverage as with solvent-type silicones. Because of regional variations in limestone porosity and chemical composition, sample testing prior to overall treatment is essential.

Water-soluble silicones

Water-soluble silicones are generally sodium methyl silanolate solutions. These solutions are not effective on all masonry, and their high alkalinity makes them hazardous and difficult to handle. Contact with aluminum must be avoided because of corrosivity. Two-percent water-soluble silicone solutions (applied with care, using protective gloves and goggles) are often used for limestone treatment. Water-soluble silicone masonry water repellents have also found special application for highway treatment, and the treatment of brick at the manufacturing plant.

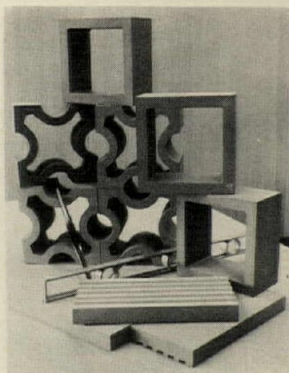
Manufacturers of masonry products also use solvent-type silicone solutions for factory treatment of decorative panels. By resisting deteriorative effects of weathering, masonry—treated with silicones either at the factory or at the building site—can retain much of its original beauty.

For more information circle selected item numbers on Reader Service Inquiry Card, pages 273-274



LUMINOUS CEILING / *Infinitem* makes possible unbroken luminous ceiling surfaces of any size or shape without modular dividing lines or conventional hanging grids. The ceiling is composed of 2-ft by 2-ft louvred panels fabricated of white-enameled .032 aluminum blades, and hanging runners of identical material which become integral members of the panels. Multi-level cuts along the blade edges provide the texture which appears to change with the viewing angle. Conventional acoustical treatments may be concealed above the louvre. ■ *Integrated Ceilings, Inc.*, Los Angeles.

Circle 300 on inquiry card

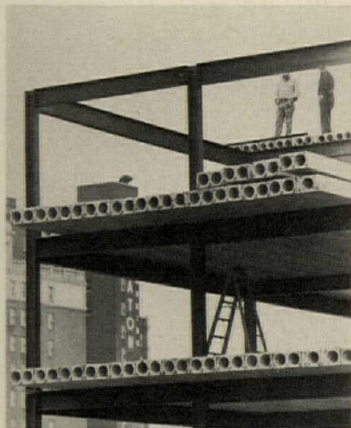


STRUCTURAL CLAY PRODUCTS / Non-skid floor brick and "maintenance-saving" screen tile are press-molded from select fire-clays and high-fired to ensure strength, low porosity, and high resistance to weathering, fading and spalling. Items are available in a variety of colors. ■ *Harbison-Walker Refractories Co.*, Pittsburgh.

Circle 301 on inquiry card

AUTOMATIC HEAT SET / Controls can have a vacation cottage warm and comfortable for weekend arrivals without wasting heat when no one is there. The dial on a seven-day program control takes exactly a week to make one revolution; the face of the dial is divided into sections for the time of each day. Preset trippers turn the heat on and later turn it off again, if the owners have decided not to visit the house after all. ■ *Tork Time Controls, Inc.*, Mount Vernon, N.Y.

Circle 302 on inquiry card



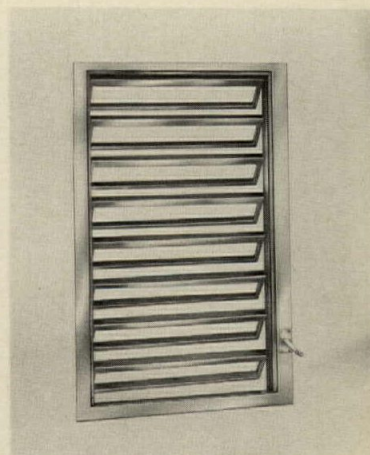
ROOF/FLOOR SLAB / A fully prestressed precast concrete floor and roof structural slab is available in a variety of thicknesses from 4 to 12 in. ■ *The Flexicore Co., Inc.*, Dayton, Ohio.

Circle 303 on inquiry card



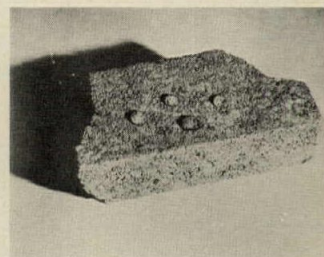
SKY-LIGHT / A luminaire sky-light "provides large luminous areas without the complications of custom luminous ceilings." The unit integrates smoothly with conventional ceiling tile or plaster, has no exposed hardware, and may be installed individually or continuously. ■ *Lightolier*, Jersey City, N.J.

Circle 304 on inquiry card



DETENTION WINDOW / This stainless steel top-pivoted awning window has been developed especially for correctional and psychiatric building use, for maximum or moderate detention. Operator mechanism is concealed in jamb frame (or sill) and is tamper-proof. Also available in aluminum or carbon steel. ■ *The William Bayley Company*, Springfield, Ohio.

Circle 305 on inquiry card



WATERPROOFING / *Chemstop* clear waterproofing is a colorless, transparent solution consisting of chemical solids that are dissolved in a clear hydrocarbon solvent. *Chemstop* will not stain or discolor the surface, say the manufacturers, and will extend the life of the paint. It will not affect glass and will not etch or cloud polished surfaces. *Chemstop* penetrates the surface and by a chemical reaction becomes an integral part of the material. The photo shows that water beads on the surface of porous concrete that has been treated with *Chemstop*. ■ *Tamms Industries*, Lyons, Ill.

Circle 306 on inquiry card

more products on page 188

OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Inquiry Card, pages 273-274

HEATING COILS / A 44-page illustrated bulletin describes heavy duty coils for power plant and industrial applications. Included for all coil types are outline drawings with tabulations of significant dimensions for system design and layout work. ■ American Standard, Industrial Division, Detroit.

Circle 400 on inquiry card

WALLCOVERINGS / A 12-page brochure introduces products and services available by explaining design, scale, color abilities and experience. ■ James Seeman Studios, Inc., Garden City Park, N.Y.

Circle 401 on inquiry card

CARPETING VS. FLOORING / A 16-page summary of the recent comprehensive study, "The Economics of Carpeting and Resilient Flooring: an Evaluation and Comparison," has been prepared by Dr. George M. Parks, designer and director of the project at the Wharton School of Finance and Commerce of the University of Pennsylvania. ■ Armstrong Cork Company, Lancaster, Pa.

Circle 402 on inquiry card

TOILET PARTITIONS / "There are no messages for posterity on Micarta toilet partitions" is a brochure outlining the specifications and characteristics of partitions surfaced with laminated plastic. The brochure reports that smudges, fingerprints, grease and cosmetics wash off and odors don't penetrate the surface. Mounted color samples are included. ■ Mid-South Manufacturing Company, Coral Gables, Fla.

Circle 403 on inquiry card

FOOD SERVICE PLANNING / Professor O. Ernest Bangs, Food Facilities Engineering, School of Hotel Administration of Cornell University, has prepared a booklet treating pertinent areas of food service planning. ■ Duke Manufacturing Company, St. Louis.

Circle 404 on inquiry card

CONCRETE ADMIXTURE / A 16-page booklet gives charts and graphs of authoritative data on the performance of *Pozzolith*, the water reducing-set con-

trolling agent; *MB-VR* air entraining agent; *Stearox* integral water-repellent for concrete and mortar; *MB-HC* water-reducing retarder; and *Omicron Mortar-proofing*, the water-reducing, plasticizing admixture for masonry mortar. ■ Master Builders, Cleveland.*

Circle 405 on inquiry card

REINFORCEMENT SYSTEMS / A 34-page manual on the design and detailing of welded-wire fabric reinforcement systems for structural concrete slabs presents some of the methods for both one-way floor slabs and flat and two-way slabs. Letterhead requests. ■ Wire Reinforcement Institute, Dept. DM-100, 5034 Wisconsin Ave., N.W., Washington, D.C.

SYNTHETIC RUBBER / A ready reference source of information on 18 building products with neoprene and Hypalon includes a series of data sheets that give both the advantages and limitations. A specification and physical properties chart is included. Letterhead requests for the *Elastomers Architectural File*. ■ E. I. du Pont de Nemours & Company, Elastomer Chemicals Dept., Wilmington, Del. 19898.

SEWAGE SYSTEM / An 8-page brochure explains *Hydr-O-Flush*, a system for heavy sewage of motels, hospitals, schools, churches, trailer courts, apartments, commercial waste sites and the like. The brochure indicates that the system may be installed either below ground or in a building. ■ Hydr-O-Matic Pump Company, Hayesville, Ohio.

Circle 406 on inquiry card

ROOF DECKS / "Now We Insulate The Insulation" is an 8-page booklet that tells about combining *vermiculite* insulating concrete with *Dyfoam polystyrene* vent board insulation. ■ Zonolite Division, W. R. Grace & Co., Chicago.

Circle 407 on inquiry card

CURTAIN WALL SYSTEMS / "A Significant Architectural Innovation" promises to aid architects in designing with *Ultimet* stainless steel wall framing. Archi-

tect Robert Martin Engelbrecht, A.I.A., in evaluating the system, created designs for five structures using the components. The renderings and design details for these buildings are included in the 36-page manual. ■ United States Steel Corporation, Pittsburgh.*

Circle 408 on inquiry card

STAINLESS STEEL / "New Horizons in Architecture with Stainless Steel" illustrates 16 applications of stainless steel for curtain wall framing, window and door framing, wall panels, and many more. There are comments on the practical and esthetic aspects of the particular application. ■ American Iron and Steel Institute, New York City.

Circle 409 on inquiry card

TILE FOR SCHOOLS / A new booklet entitled "Another Look at Summit High" emphasizes the performance record of vinyl asbestos tile floors in a modern school. The booklet includes the opinions of this New Jersey school's administrator on aspects of floor coverings. ■ Asphalt and Vinyl Asbestos Tile Institute, New York City.*

Circle 410 on inquiry card

PLASTIC PIPE AND FITTINGS / The New York State Building Code Council has issued recommendations on the use of ABS and PVC plastics pipe and fittings for drain, waste and vent use. The document also includes the text of the appendices of the pertinent Commercial Standards which cover installation procedures. ■ Plastics Pipe Institute, Hempstead, New York.

Circle 411 on inquiry card

OFFICE FURNITURE / Two 8-page color catalogs picture installations and individual product photos to illustrate two different styles of steel desks, files, and other furniture for private and general offices and for reception areas. There is a revised price list giving reduced prices for many items. ■ Bentson Manufacturing Company, Aurora, Ill.

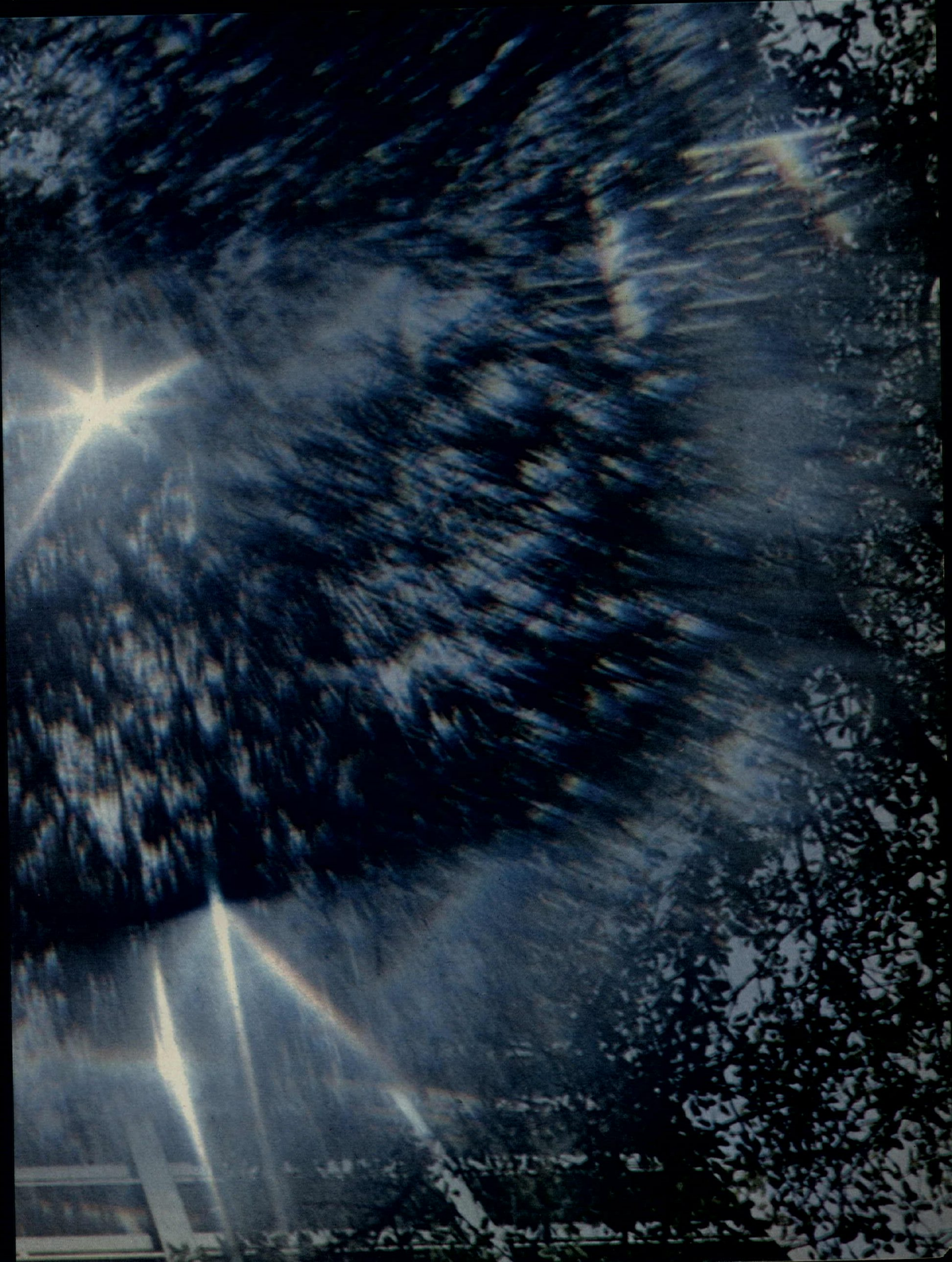
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*Additional product information in Sweet's Architectural File

more literature on page 223

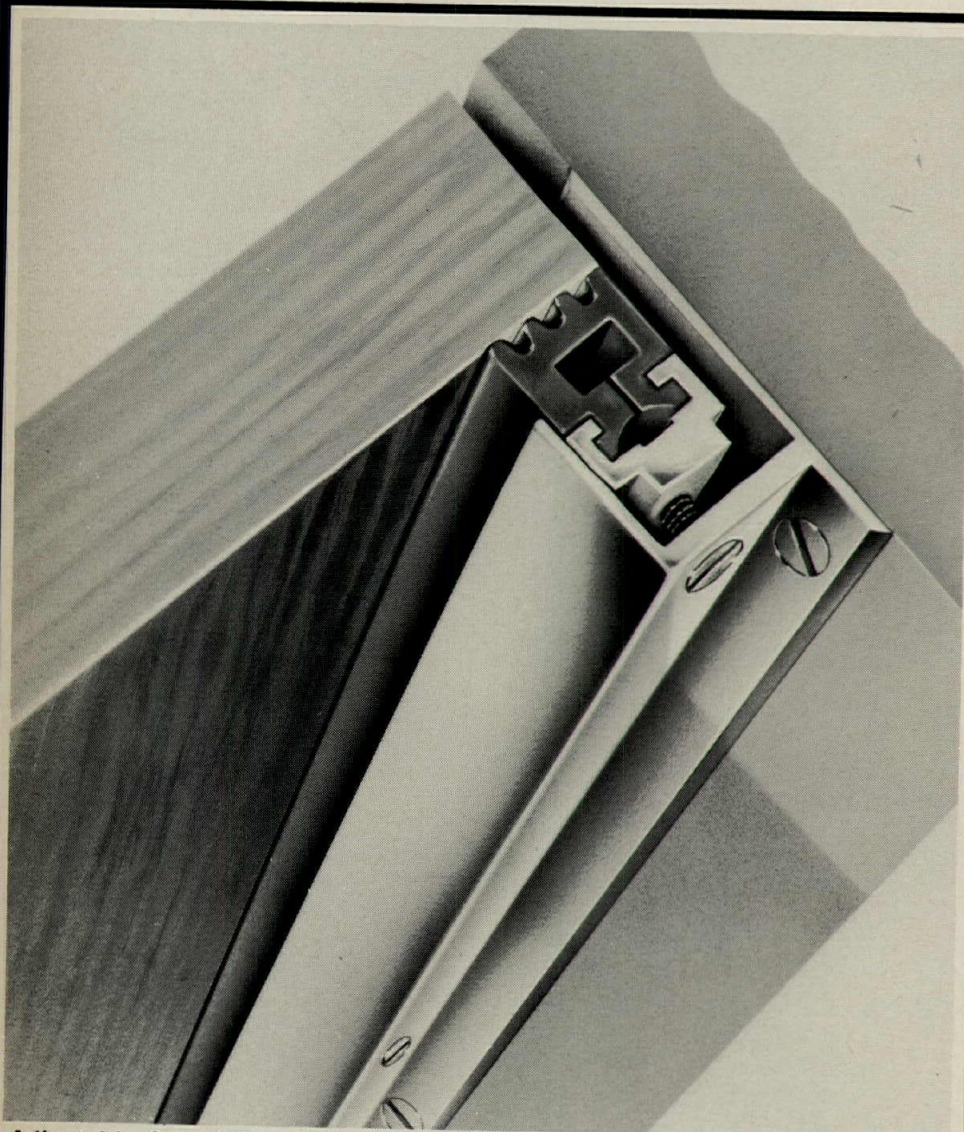
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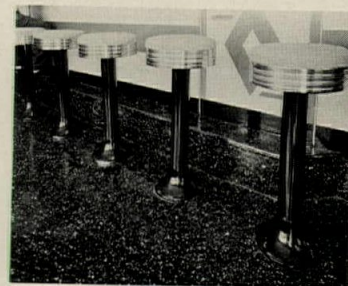
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For more data, circle 73 on inquiry card

continued from page 183

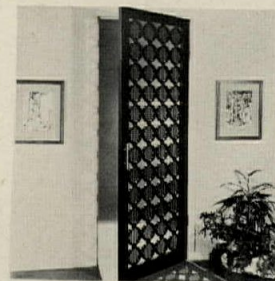
NON-COMBUSTIBLE URETHANE / Bar-Fire Urethane Foam has received a flame spread rating of 25 from Underwriters' Laboratories, thus achieving the classification of "non-combustible" from the National Building Code of the American Insurance Association. The foam insulation was made possible by Mobil Chemical Company's development of a new flame-retarding polyol. The foam works quickly to extinguish itself and the insulation itself suffers little fire damage to its efficiency. ■ Allied Chemical Corporation, New York City.

Circle 307 on inquiry card



SEAMLESS FLOORING / Porafloor, which never has to be waxed or buffed, may be poured over any type of flooring without extensive renovation. It can be applied directly to any surface, level or pitched; on stairways, around drains and ducts, and up coves, baseboards or walls. The flooring consists of a colored base coat liquid, a flake mix and a clear high-gloss top coat. The surface is not slippery when wet, resists acids and alkalis, is waterproof, impervious to food and ink stains, and virtually dent proof. Unlimited designs are possible. There is a five-year warranty against peeling, flaking and cracking. ■ Porafloor, Inc. Woodside, N.Y.

Circle 308 on inquiry card



GRILLE DOORS / A choice of four grille designs and a selection of colors are available for doors with open grille or with translucent fiber glass. Door shown is finished in matte-black lacquer. ■ Harvey Design Workshop, Inc., Lynbrook, N.Y.

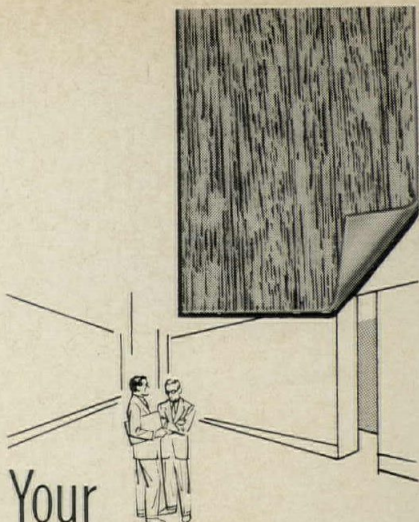
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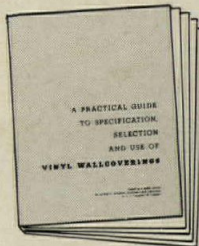
COATING / A cold-glazed vitreous architectural epoxy coating with a flame spread index of zero has been designed for exterior and interior use on any sound structural surface where a tile-like, acid resistant surface is required. The coating, available in a wide variety of colors and spatter effects, is waterproof and impact- and stain-resistant. ■ Preco Chemical Corporation, Plainview, N.Y.

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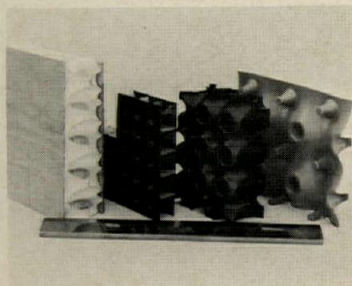
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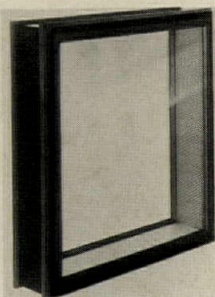
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For more data, circle 85 on inquiry card



LIGHTWEIGHT SANDWICH PANELS / *Halecore*, manufactured from reinforced thermosetting plastics and metals, is a series of folded and warped planes formed from flat sheet, resulting in double curved surfaces of several patterns. The core can be mated to itself or to face sheets by heat sealing, resin bonding, solvent bonding, spot welding or riveting. The material does not require adhesives or materials for integrity and may be formed into simple and compound curves without machining. Core pattern and geometry and material thickness may vary. ■ Halecore, Inc., Hermosa Beach, Calif.

Circle 316 on inquiry card



SOUND CONTROL WINDOWS / *Acousta/Glaze* factory double-glazed, hermetically sealed windows offer high performance sound control (40 to 60 STC) where sound transmission is critical—in auditoriums, recording studios, motels, airports or offices. Available in windows or window wall systems and in varying glass thickness and airspace with zipper gasketing. ■ Sitelines, Inc., Los Angeles.

Circle 317 on inquiry card

more products on page 206

For more data, circle 86 on inquiry card

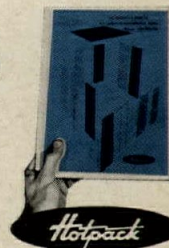


"... most comprehensive handbook on Pre-fabricated Environmental Rooms ever written!"

That's what architects and consulting engineers tell us. This new Guide gives you all the engineering facts needed for any installation requiring Prefabricated Environmental Rooms . . . in hospitals, universities, medical and institutional research facilities! Send for your copy today!

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Look, no structural columns!

**Mo-Sai windowalls
provide complete structural system.**

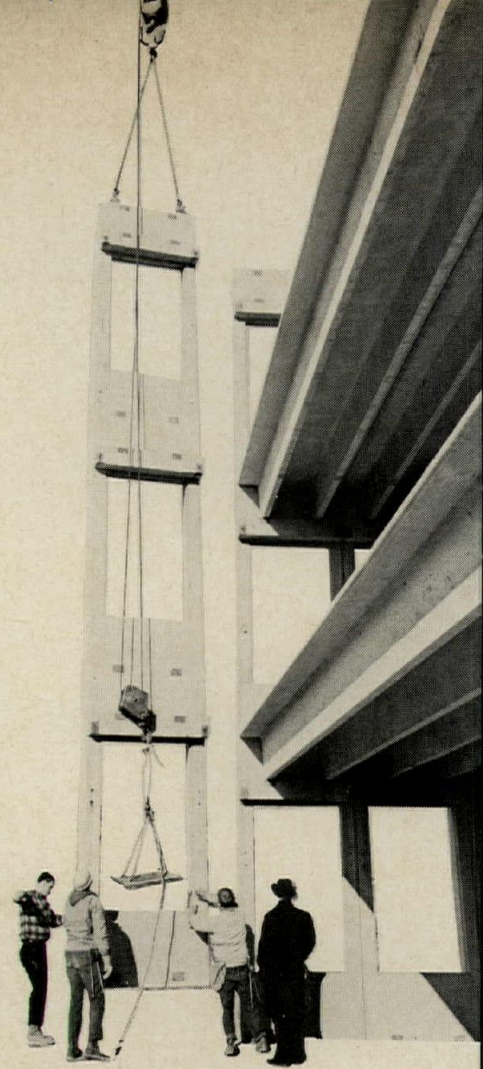
Concrete double "T's" span sixty feet of clear office space between structural Mo-Sai windowalls. There are no columns, juts, or load-bearing partitions to disrupt office planning. Three-story windowalls were custom cast under rigid Mo-Sai factory quality-controlled conditions.


The entire structural Mo-Sai shell and double "T's" were stored at the plant until needed and then erected from truck beds in eight weeks. Double "T's" rest on haunches cast on the back of the Mo-Sai units.

Exposed white quartz aggregates form the exterior surface. The interior was smooth-troweled and painted.

Consistent high quality is assured by Mo-Sai quality control and plant inspection standards. Insist on genuine Mo-Sai from one of the licensees shown below.

Edens Executive Center / Wilmette, Illinois
Architect: Lattin Smith & Associates
General Contractor: Joseph Duffy
Photos by: Cabanban Studio



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HARTER CONCRETE PRODUCTS, INC.
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OLYMPIAN STONE CO., INC.
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OOLITE INDUSTRIES, INC.
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PLASTICRETE CORPORATION
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READY-TO-POUR CONCRETE CO.
Idaho Falls, Idaho

SEKIGAHARA STONE COMPANY, LTD.
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SOUTHERN CAST STONE CO., INC.
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TEXAS INDUSTRIES, INC.
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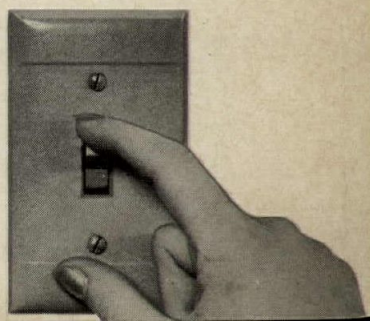
For more data, circle 87 on inquiry card



Skylight? No. **KLITE**[®]

This is K-44. The first 4' x 4' prismatic. A sky-size island of light. Beautiful. Like a BIG ONE should be. Sculptured in sparkling clear prisms that give you lighting as it should be. Don't compromise on white opal pans or louvers or two-piece enclosures. Go big with the BIG ONE. Specify K-44. You'll turn on 16 square feet of exciting lighting.

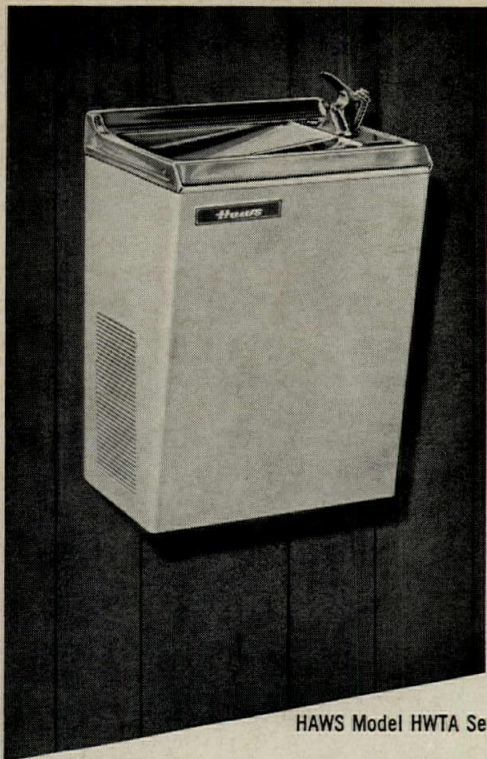
See!



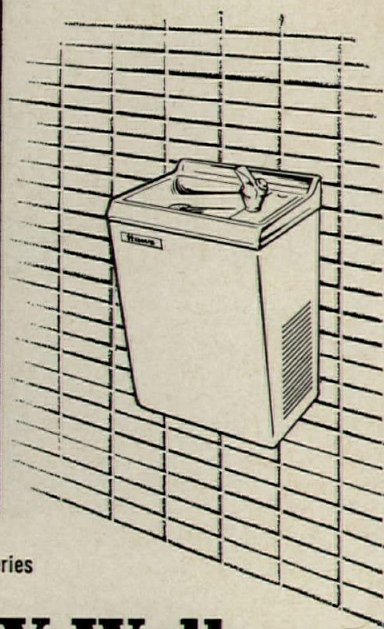
K-S-H PLASTICS, INC. • 10091 MANCHESTER • ST. LOUIS, MO. 63122

For more data, circle 88 on inquiry card

continued from page 203



HAWS Model HWTA Series

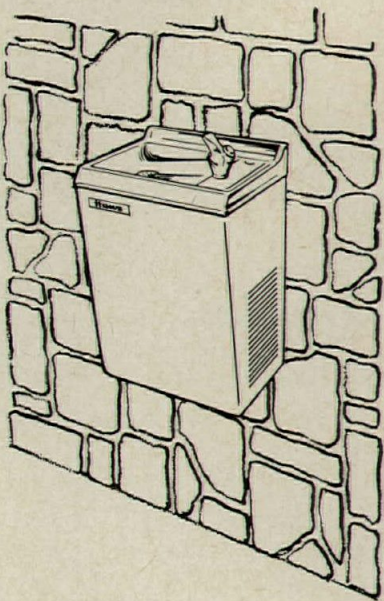


Mounts on ANY Wall...

Haws water cooler Model HWTA mounts off-the-floor on any wall—be it stone, masonry, wood panel, or concrete. The Cool Mist Grey baked enamel finish and stainless steel receptor harmonize with any interior decor.

Because it's wall-mounted, there's space beneath for cleaning equipment—no exposed fittings. And installation height may be varied for children and/or adults.

Compact Model HWTA wall-hung coolers are available in eight different models with capacities from 6 to 17 gph. Write or call today:



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For details and information on other Haws products—see your Haws catalogs on drinking fountains, emergency eye/face-wash fountains, drench showers and decontamination equipment; and dental fountain/cuspidor units.



For more data, circle 82 on inquiry card

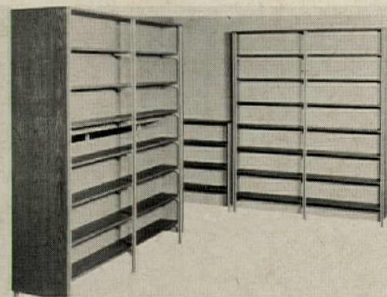


FOLDING DOORS / Four new veneers—select white birch, teak, Brazilian rosewood and cherry—are now available. On Pella wood folding doors and partitions. These four have been added to the standard range of ash, pine, oak, unselect white birch, and American walnut. Steel spring hinging is available, and 2-, 3- and 4-way end posts match the partitions and special tracks, including curves and switches, permitting an infinite variety of arrangements. ■ Rolscreen Company, Pella, Iowa.

Circle 318 on inquiry card

PASTEL PANELING / A process called *Super Microseal* puts royal red, Spanish olive, sunburst yellow, Danish blue, forest green or royal lavender in top-grade Western Pine so that the wood grain is not covered. Ordinary scrapes and scratches will not penetrate the pigmented layer and reveal bare wood. ■ General Plywood Corporation, Louisville, Ky.

Circle 319 on inquiry card



LIBRARY SHELVING / Units offered in both wall-attached models and free-standing book islands are of a modular construction system. Sizes are in steps from 36- to 108-in. widths, 42- to 83-in. heights and in 8-, 10- and 12-in. depths. Materials include aluminum framing plastic-laminates finished hardboards with metal shelf supports that are completely adjustable. ■ Modular Systems, Inc., Muskegon, Mich.

Circle 320 on inquiry card

more products on page 218

continued from page 184

AIR INTAKE UNITS / A 24-page bulletin shows the complete line of heated make-up air units for industrial and commercial applications. Besides fan and blower options, there are horizontal and vertical, internal or external installation options. All required accessories are detailed. ■ Hartzell Propeller Fan Co., Piqua, Ohio.

Circle 413 on inquiry card

PANELING SYSTEM / An architectural handbook describes the Videne prefinished paneling system and architectural grade doors. Color photographs and text present 14 wood grain and 34 solid decorator color panels and accompanying molding units. ■ The Goodyear Tire & Rubber Company, Akron, Ohio.

Circle 414 on inquiry card

LANTERNS / An 8-page catalog describes the Designer Series 67 which features 42 lantern styles in hanging, wall-bracket, and table models. Lanterns are shown in black, antique white, weathered brass and weathered copper. ■ Norwell Manufacturing Company, Taunton, Mass.

Circle 415 on inquiry card

VIBRATION AND NOISE CONTROL / A 7-page reprint of an article from the ASHRAE Journal is entitled "Vibration and Structure-Borne Noise Control." The article discusses the considerations involved, specification of appropriate deflection, and techniques which correct the problems. ■ Consolidated Kinetics Corporation, Columbus, Ohio.

Circle 416 on inquiry card

CARPET / A booklet entitled "A Report on Contract Carpet" reports that carpeting is "now becoming standard floor covering in many commercial and institutional interiors." The 22-page booklet goes on to explain just where carpet is being used and why. ■ American Cyanamid Company, New York City.*

Circle 417 on inquiry card

SHIELDING MATERIAL / A 16-page design manual introduces Tecknit SN/CU/FE gasket material "offering greater shielding increase than previous gasket metals." Manual also includes information on EMI/RFI gaskets for sealing and shielding. Total shielding effectiveness versus frequency is presented graphically and compares SN/CU/FE with other gasket materials. ■ Technical Wire Products Inc., Cranford, N.J.

Circle 418 on inquiry card

For more data, circle 96 on inquiry card

For more data, circle 97 on inquiry card

CIRCUIT BREAKERS / A 24-page illustrated bulletin includes graphs and charts for selecting current-limiting protection for electrical systems. ■ I-T-E Circuit Breaker Company, Philadelphia.

Circle 419 on inquiry card

STEEL DECKING / A 22-page design manual describes light-gage decking for both concrete formwork and reinforcing steel. There are 18 pages with load tables. ■ The R. C. Mahon Company, Building Products Division, Detroit.*

Circle 420 on inquiry card

ENVIRONMENTAL ROOMS / Pre-fabricated walk-in rooms with controlled temperature and humidity are the subject of a professional reference and engineering data brochure. The brochure explains that these rooms are rapidly becoming a critical factor in the design of research facilities in the fields of medicine, space and chemistry. ■ Hot-pack Corporation, Philadelphia.

Circle 421 on inquiry card

*Additional product information in Sweet's Architectural File

more literature on page 240



ROOF PERIMETER TROUBLES

SUCH AS: LEAKS AT EAVES—TAR DRIPPINGS AND WATER STAINS ON FASCIA AND WALLS

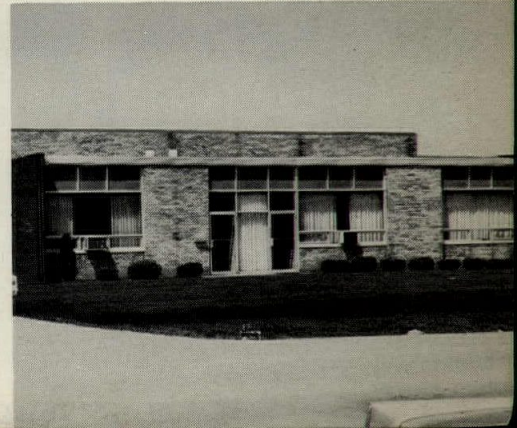
AVERTED BY THIS SYSTEM

Two cumulative benefits occur when the Hickman System is specified, (1) You can assure your client that utmost precaution has been taken to prevent water leaks at the eaves (and expansion joints, if any); (2) You have assurance of an adequate choice of fascia profiles so your exterior design is not limited . . . By nullifying the thermal reaction between the metal water dams and the roofing felts, the Hickman System stops cracking—roofs from leaking. Fascia in Kalcolors, porcelain and baked enamel colors and in a choice of profiles and depths is available. Another advantage—exterior walls will never be marred by tar drippings or water stains . . . Proof of Hickman benefits is given in the 8 Sweet's pages. Further proof will be found among the many architects and owners* who have used the Hickman Safeguard System since 1958.

*some typical owners are listed in Sweet's.

W. P. HICKMAN COMPANY, INC. 2520 INDUSTRIAL ROW. TROY, MICH. 48064
(313) 549 8484

TAR DRIPPINGS AND WATER STAINS CAN SURE MESS UP NICE WALLS.



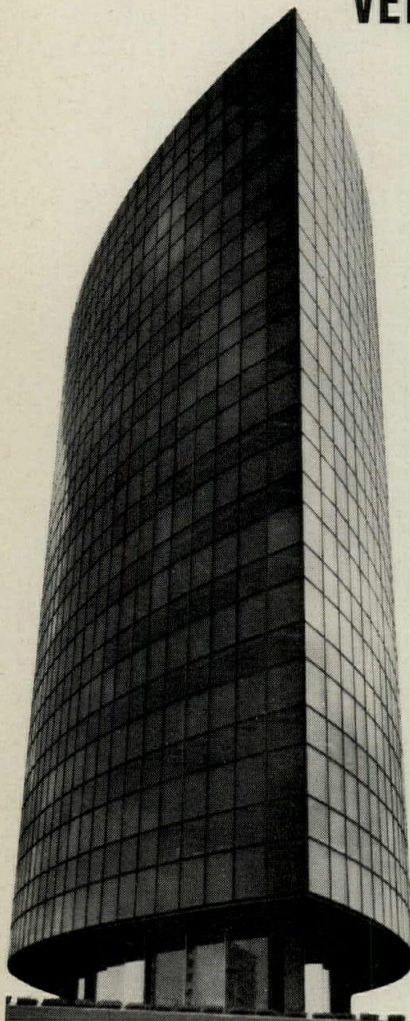
Planning an on-the-go office building? Specify a

Recordlift

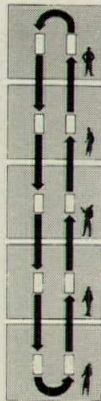
VERTICAL MAIL CONVEYOR BY



**Standard
Conveyor**



Phoenix Mutual Life Insurance Co., Hartford, Conn. *Architect:* Harrison & Abramovitz. *Contractor:* George A. Fuller Co.



The ultra-modern office buildings seen here differ greatly in architectural style—yet they do have one thing in common to give them remarkable functional efficiency.

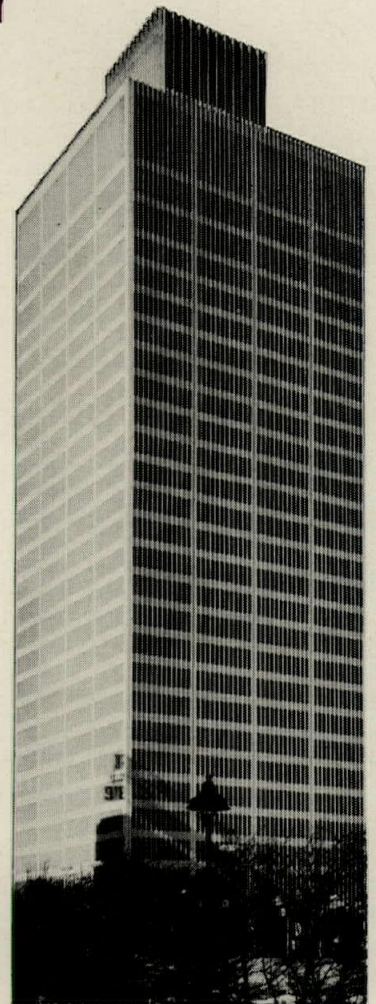
It's a STANDARD CONVEYOR Recordlift Vertical Mail Conveyor System, schematically illustrated at the left.

By providing fast, selective distribution of inter-floor mail and supplies, a Recordlift cuts operating costs by saving 100's of mailboy and messenger man-hours daily. Operation is

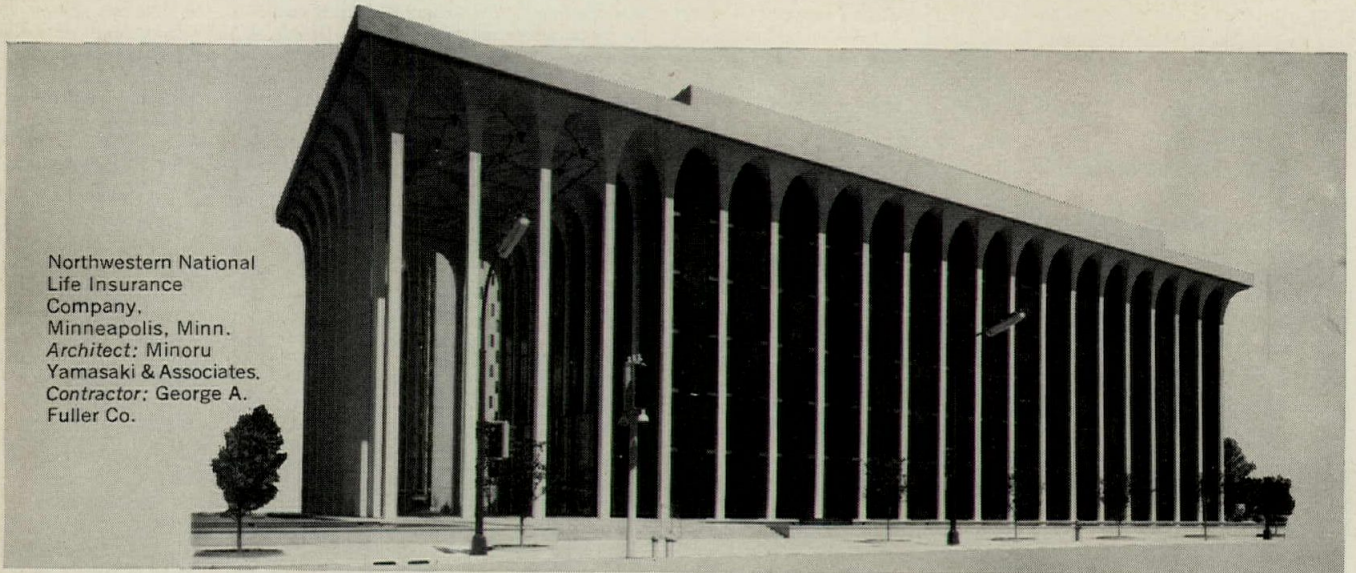
completely automatic . . . all you do is load the container, set the address and Recordlift delivers. *Automatically.*

It's the *proven* way to solve office building distribution problems! Ideal for hospital use, too!

Get details. Write for new illustrated Recordlift Bulletin 153. Describes operation, shows various addressing systems, gives dimensional requirements. Standard Conveyor Company, 312-A Second St., North St. Paul, Minn. 55109.

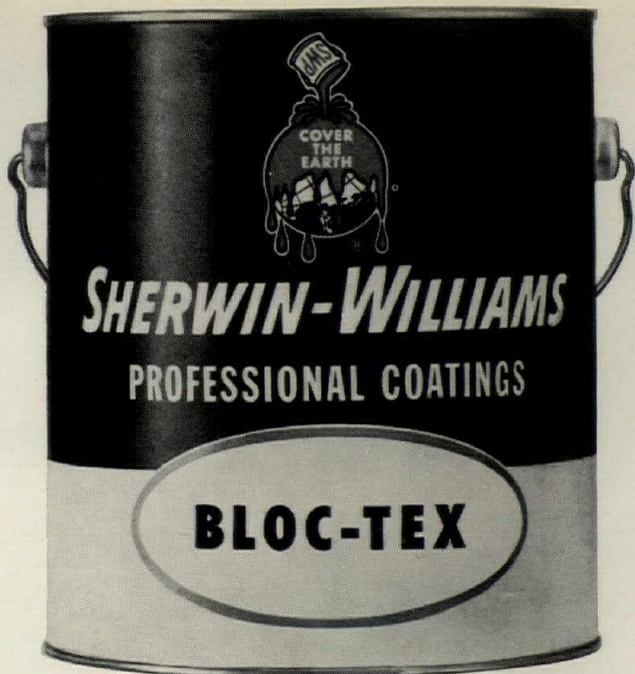


Michigan Consolidated Gas, Detroit, Mich. *Architect:* Minoru Yamasaki — Smith, Hinchman & Grylls. *Contractor:* Bryant & Detwiler Co.

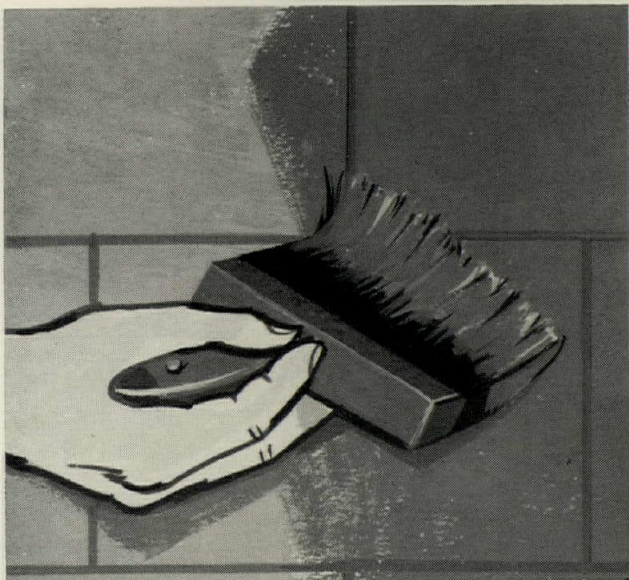


Northwestern National Life Insurance Company, Minneapolis, Minn. *Architect:* Minoru Yamasaki & Associates. *Contractor:* George A. Fuller Co.

For more data, circle 98 on inquiry card



Perfect Filler



For Concrete Block

Sherwin-Williams Bloc-Tex® is a new type of block filler that produces smoother and superior cement block surfaces. □ An entirely new aggregate-free filler, it may be applied easily by brush, airless or conventional spray. □ Quick-drying Bloc-Tex dries to touch in 2 hours. It may be top coated, if necessary, in 24 hours. When finished with two coats of masonry type paint, exterior surfaces will withstand the most severe weather conditions. □ For complete facts on Bloc-Tex for filling concrete block, use the coupon below.

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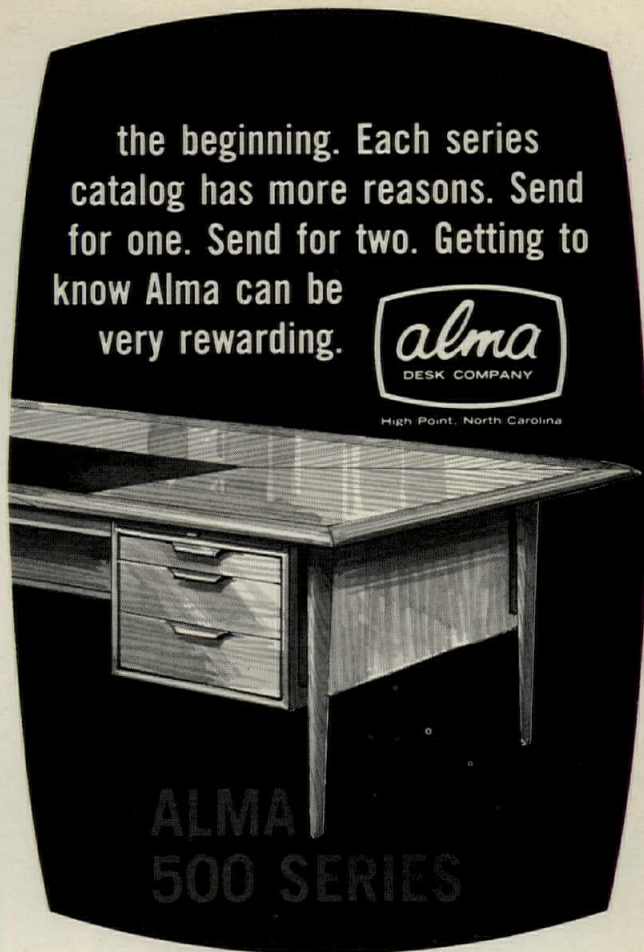
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Address _____

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For more data, circle 145 on inquiry card



For more data, circle 101 on inquiry card

NEW FIAT

MOP SERVICE BASIN CUTS COSTS—IMPROVES MAINTENANCE

- Easier to handle and install
- Stainproof/stays cleaner
- Molded under heat and extreme pressure for super strength.

MSB-3624 — 36" x 24" x 10"

Now you can have upgrade janitor's closets or maintenance rooms. MOLDED-STONE® from Fiat makes this mop service basin modern, attractive and fully functional, with greater utility and cleanliness. Features self-draining mop shelf, molded integral; cast brass drain; stainless steel dome strainer and line basket; crash-proof, extra-thick shoulders that need no protective cap. Super-strong MOLDED-STONE® cuts weight to 20% of masonry, provides a smooth, easy-to-clean surface.

See Sweets $\frac{25c}{Fi}$ or write for specifications.

FIAT PRODUCTS DEPARTMENT

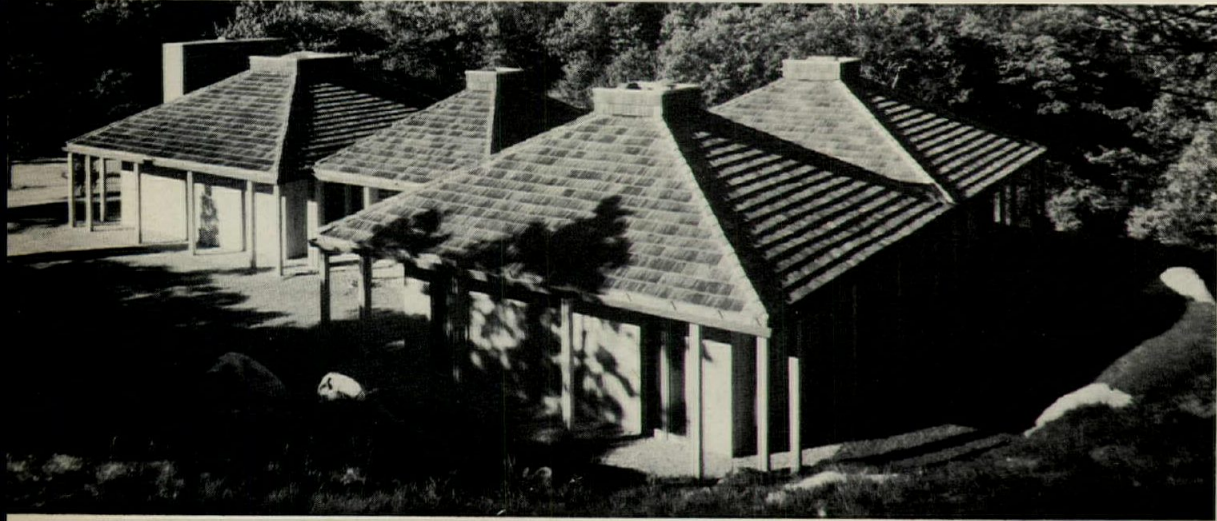
CYANAMID

Michael Court, Plainview, L. I., New York 11803

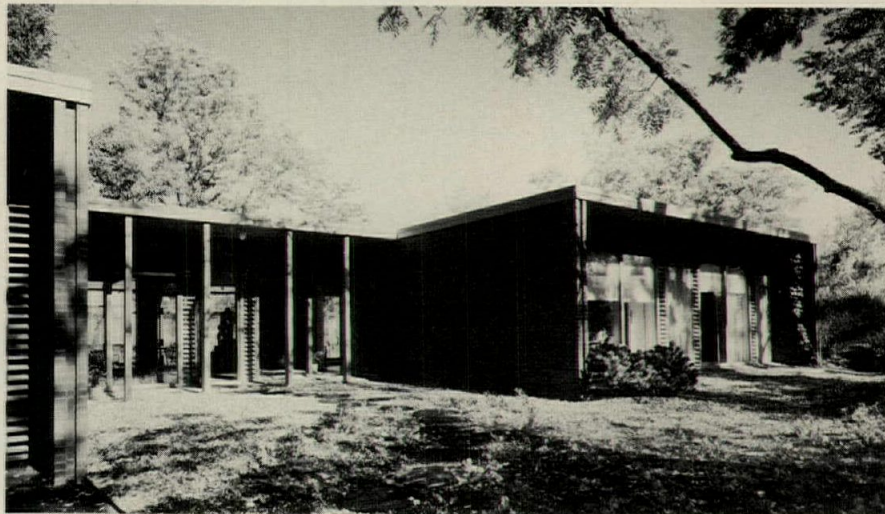
For more data, circle 146 on inquiry card



1



2



3

4



Coming in mid-May...
RECORD HOUSES OF 1967

Featuring...

The 20 Houses of the Year

A year in preparation, RECORD HOUSES OF 1967 will present the work of a wide variety of architects ranging from the well-known to talented unknown architects new to the ranks of major innovators. The houses will win for their architects and owners Architectural Record's coveted **Annual Award of Excellence for House Design**. All 20 award-winning houses are fully detailed with photographs (many in full color), plans and schematics. This highly visual presentation of each house, coupled with a clear statement of the problems and purposes behind its planning, will make RECORD HOUSES OF 1967 an ideal tool for opening your client's eyes to ways in which architecture can serve their individual needs, aspirations and way of life.

RECORD HOUSES OF 1967 comes to you as part of your subscription to Architectural Record. And again in 1967, RECORD HOUSES will be distributed to the nation's 23,000 foremost builders to accelerate the healthy trend toward greater architect-builder collaboration on tract housing. The house building and buying public will find it on sale at leading book stores.



5

FROM RECORD HOUSES OF 1966

- 1 Private Residence in New Canaan, Connecticut. Architects: Ulrich Franzen & Associates. Photo by Robert Damora
- 2 Private Residence, Martha's Vineyard Island, Massachusetts. Architect: Hugh Newell Jacobsen. Photo by Robert Lautman
- 3 Schramm Residence, Burlington, Iowa. Architects: George Fred Keck-William Keck. Photo by Hedrich-Blessing
- 4 Bassett Residence, Nassau Bay, Texas. Architect: Clovis B. Heimsath. Photo by Robert Murray
- 5 Same as 1

**ARCHITECTURAL
RECORD** 330 WEST 42ND STREET
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At work where soaring
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From shabby centers to sprawling suburbs, cities the world over are rebuilding... on a scale never before attempted. Products of Eaton Yale & Towne are there — wherever shining new towers soar tall or new elegance graces the suburbs.

Since our first YALE® pin tumbler lock was fitted to a door in 1868, lock and hardware products of Eaton Yale & Towne have set standards for security, safety, dependability and beauty in buildings and homes. Now, around the world we offer many more products to help builders get on with their big renewal jobs. Still others are on the way.

1. *Urban renewal in Cleveland: Erievew Tower—corporate headquarters of Eaton Yale & Towne—is a soaring symbol. YALE® locks and hardware are installed throughout this 40-story landmark.* **2.** *Hydronic heating and cooling systems for contemporary buildings are more efficient with DOLE® zone controls.* **3.** *Many new buildings feature TEMPRITE® water coolers for the comfort and convenience of occupants and visitors.* **4.** *Office buildings and institutions combine security with good looks when enduring, attractive YALE® interior and exterior locksets are specified.*



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AVANT GUARD.

What's avant these days? Lever handles. Especially if they have a pure look. Sleek, sophisticated, straight. But Yale makes sure they do something else besides look good. Guard.

YALE® LOOKS AS GOOD AS IT LOCKS
THE FINEST NAME IN
LOCKS AND HARDWARE



Jefferson
lever handle
shown
with
Yale
Mono-Lock.



continued from page 223

STEEL DOORS / "The Standard Steel Door and Frame Story" outlines the history and growth of the industry and describes the technical aspects of the products. ■ The Steel Door Institute, Cleveland.

Circle 422 on inquiry card

LIGHTING / A 72-page catalog shows 459 residential, decorative, public area and architectural products. ■ Globe Lighting Products, Inc., New York City.

Circle 423 on inquiry card

RESIDENTIAL LIGHTING / A 32-page catalog contains color illustrations of contemporary crystal, Georgian designs, early American reproductions in copper finishes and others. ■ PrestigeLine Inc., Amityville, N.Y.

Circle 424 on inquiry card

STAINLESS STEEL / Thirty-page illustrated data manual gives suggested practices for roofing, flashing, copings, fascia, gravel stops, and drainage. ■ American Iron and Steel Institute, New York.

Circle 425 on inquiry card

PUBLIC WASHROOM FIXTURES / "Operation Up-John" is a booklet explaining the program to promote off-the-floor plumbing fixtures. The 20-page booklet analyzes the various cost factors. Plumbing and Drainage Institute, Oak Park, Ill.

Circle 426 on inquiry card

ORNAMENTAL METALWORK / A 28-page book features suggested applications in treillage, screens and columns and railings. ■ Julius Blum & Company, Carlstadt, N.J.*

Circle 427 on inquiry card

ROOFING AND WATERPROOFING / Two specifications manuals on built-up roofing, waterproofing, and dampproofing contain case histories and design details in typical and varied critical areas of installation. ■ Koppers Company, Inc., Pittsburgh.

Circle 428 on inquiry card

PLYWOOD / Five publications give information on siding, underlayment, concrete forms, sheathing and components. Five others discuss properties and grades and give design specification and construction data. ■ American Plywood Association, Tacoma, Wash.*

Circle 429 on inquiry card

GLAZING / A 12-page brochure reports the principal causes of glazing failures, factors governing sealant selection and placement, minimum standards and basic recommendations for aluminum steel and wood sash. ■ The Tremco Manufacturing Company, Cleveland.*

Circle 430 on inquiry card

STEEL DETAILING / "Structural Steel Detailing" is a single updated volume of the previous three-volume "Structural Shop Drafting." The book includes examples of shop drawings and design calculations applicable to structural details. \$10 per copy. ■ American Institute of Steel Construction, 101 Park Avenue, New York City 10017.

WINDOW WALL / A technical data folder on Spectra-Guard window wall contains specification sheets, installation instructions and a sheet showing colors. The folder discusses the three-way protection against rust. ■ Carmel Steel Products, Downey, Calif.

Circle 431 on inquiry card

*Additional product information in Sweet's Architectural File



1 or 2 talking circuits
1 or 2 door opener buttons

New Apartment House Intercom

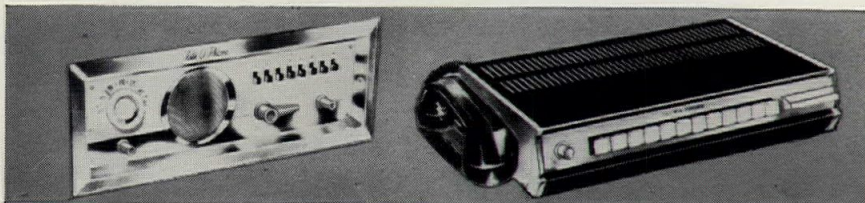
New TALK-A-PHONE

Provides instant and direct 2-way conversation between any Apartment and Vestibule . . . Greater Performance with Exclusive Talk-A-Phone Features:

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- 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.

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Send for Free Catalogs... Dept. AR-1

TALK-A-PHONE CO., 5013 N. Kedzie Ave., Chicago, Illinois 60625

For more data, circle 108 on inquiry card

◆ For more data, circle 107 on inquiry card

For more data, circle 109 on inquiry card

continued from page 244

firm **Caudill Rowlett Scott** of Houston, Texas.

Sam Chang Architect & Associates announce the incorporation of their firm which will remain in Honolulu at its present address in the Ala Moana Building, Honolulu, Hawaii.

Clark and Beuttler, Architects announce the retirement of **John F. Beuttler**. **Hervey Parke Clark** will continue the practice with **Alan E. Morgan** under the name of **Clark and Morgan** at 552 Mission St., San Francisco, Calif.

Thilo Steinschulte and **Robert D. Wynne** have been named partners in the architectural firm of **Barron, Heinberg and Brocato** in Alexandria, Louisiana.

James Edward Trainer has been elected to the Board of Directors of the engineering and construction firm of **Day & Zimmermann, Inc.**, Philadelphia, Pa.

Jacob Feld, Ph.D., **Dov Kaminetzky** and **Harold R. Cohen** have formed a partnership under the name of **Feld, Kaminetzky & Cohen**, consulting engineers to succeed the former association of **Jacob Feld** and **John V. Timoney**. The new practice will be at 115 East 32nd St., New York City.

Ken Fryar Associates will henceforth do business under the name **Ken Fryar Associates and Ronald Goodfellow, Architects** at their new address 114 York St., Michigan City, Ind.

Orlyn C. Lewis has joined the engineering consultant firm of **Hubbell, Roth & Clark Inc.** of Bloomfield Hills, Mich. as chief electrical engineer.

Ronald Beckman has been appointed the new Director of the **Institute for Research and Design** in Providence, Rhode Island. The Institute is a non-profit, research organization for the study of design problems and their economic and social effects.

Kelly and Pittelko, Civil and Structural Engineers of Seattle and Anchorage announce a change of the firm name to **Kelly, Pittelko, Fritz and Forseen**.

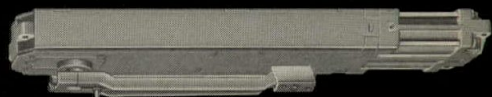
Donald Wagg has taken **David H. Hambleton, A.R.I.B.A., M.R.A.I.C.** into partnership and the Victoria, B.C. firm will be known as **Wagg & Hambleton**, architects and will be at 611 Courtney St., Victoria, B.C.

ADDENDUM

We regret that the photograph on page 136 of the December issue was not credited to **Wayne L. Schifflbein**.



TOUGH AND TENACIOUS



Rixson's No. 808 and 0808 series overhead concealed (in a 1 3/4" x 4" head frame) closers—Small in size yet tough enough to do the job—minimum maintenance—optimum door control safety.

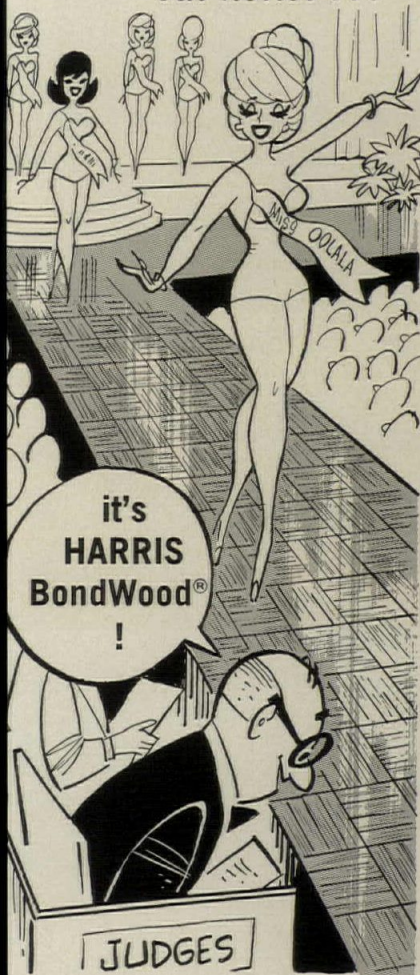
No. 808 for center hung, single or double acting doors—No. 0808 for independently hung single acting doors. Both offer adjustable closing speeds . . . selection of dead stop and/or automatic hold-open positions . . . pressure relief valve and mechanical back-check.

For all medium traffic doors of 200 lbs. or less . . . experience proves you cannot specify a better overhead closer.

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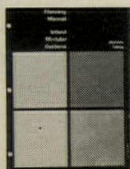


Architects and Engineers: Heery and Heery, Atlanta, Ga.
General Contractor: R & D Constructors, Inc.,
Chicago, Ill., Marietta, Ga.

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American Bible Society, New York, N. Y. **Architect:** Skidmore, Owings and Merrill, New York, N. Y. **Structural Engineers:** Weiskopf & Pickworth, New York, N. Y. **General Contractor:** Geo. A. Fuller Company, New York, N. Y. **Precast Producer:** Eastern Precast Company, Lower Squankum, N. J.

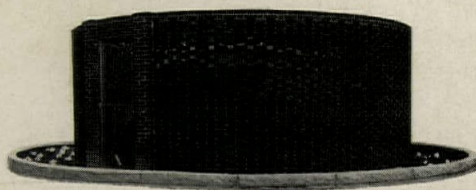
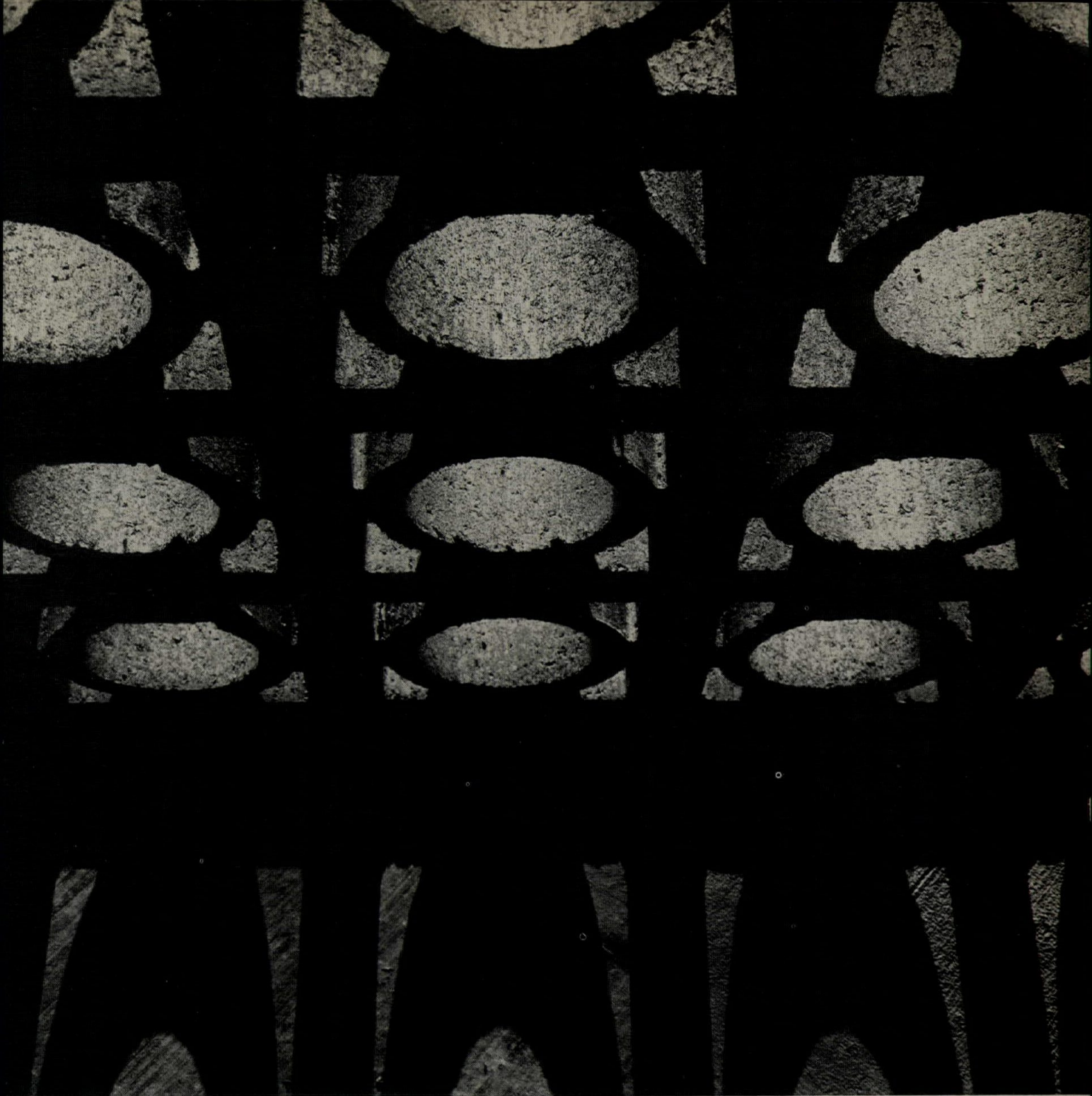


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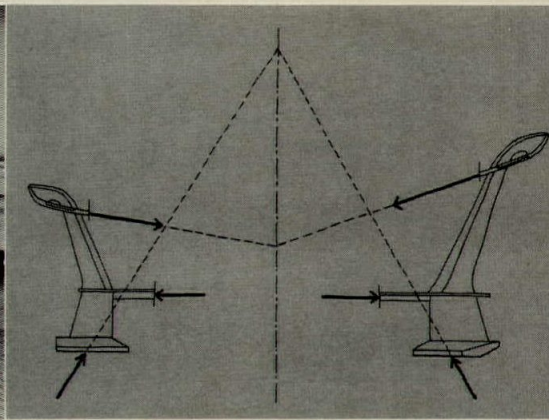
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Harbour Beach Club, Westhampton Beach, Long Island, New York. *Whittlesey and Conklin*, architects



Forces acting on frames. Dulles International Airport Terminal Building, Chantilly, Virginia. *Eero Saarinen and Associates*, architects



Detail of supporting arms. The Little Sports Palace, Rome. *Annibale Vitellozzi*, architect

The architect and structure

STRUCTURE: AN ARCHITECT'S APPROACH. By *H. Seymour Howard, Jr.* McGraw-Hill Book Company, 330 West 42nd St., New York, N.Y. 10036. 297 pp., illus. \$12.75.

The role of structure has become more and more an important aspect in the esthetic of new buildings. Its influence on the freeing of interior spaces, on the environmental design, on the efficient integration of the parts to the whole as well as the utilization of the whole, and on the economy of a building is becoming better understood. The degree to which today's architect is concerned with structure is perhaps the degree to which his awareness of new structural concepts must be assisted. Although structural concepts can be intuitively understood, the forces and stresses in the design of modern buildings are not as simple to understand as in the case of those of the post and lintel or the arch.

The approach taken in this book, namely what structural principles should the architect be aware of, makes the book exceedingly useful to architectural students, architectural historians, architects and engineers. The architect can see how his design concepts are made realizable through the composition of the body of the building. The engineer is given insight into the conceptual processes of the architect.

Structural principles are studied in

the first two chapters. Then, in order to show the application of structural principles to practical architectural design, seven contemporary buildings of varying size, material and function are lucidly analyzed. The relation of structure to architectural composition is examined and the mechanical behavior is calculated. The seven structures are classified according to whether they are minimum, adequate or "structural" structure—giving a good basis for a good understanding of the role of structure in *all buildings*.

By discussing the structure of specific buildings the book intends to show the procedures used in applying structural knowledge. To quote the author, "The completeness of the analysis (given each building) is a measure of the minimum competence which might be expected of an architect today. Although some knowledge may be passed on to the reader by the analysis, the hope is rather that, as an architect, he will be encouraged to make similar studies of his own buildings during the preliminary design stage. An architect is most interested in his own work; if he can find

simple, rapid methods to check his design he will use them."

Also, he indicates, "Although great architecture has been achieved with what we have classified as adequate structure, technical development tends toward greater and greater efficiency, toward what we have termed minimal structure. The common excuse about wasting material in order to save labor costs will fade away. While it may cost more to build a single structure which minimizes material, when a whole series of them is required, the most efficient design, using the least material, will ultimately be the least expensive. We believe that a relatively unexplored area is thus opened up for architectural development. There is a group of engineers whose native bent has led them into this area. We can expect many more architects and engineers to follow this ideal."

The structures chosen for analysis were the Tokeneke Elementary School, Darien, Conn., O'Connor and Kilham, architects; Harbour Beach Club, Westhampton Beach, Long Island, N.Y., Whittlesey and Conklin, architects; Westinghouse Electric Corporation, Molecular Electronics Division, Elkridge, Md., Vincent G. Kling, architect; New York University Student Dormitory, University Heights, N.Y., Marcel Breuer, architect; Chase Manhattan Bank, New York City, Skidmore, Owings and Merrill, architects; The Little Sports Palace, Rome, Annibale Vitellozzi, architect; and

continued on page 260

THIS MONTH'S BOOKS

REVIEWS

H. Seymour Howard, Jr., "Structure: An Architect's Approach" 258

Department of Housing and Urban Development, "Preserving Historic America" 260

BOOKS RECEIVED 260



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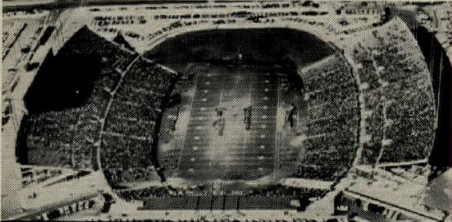
continued from page 258

Houston Astrodome*



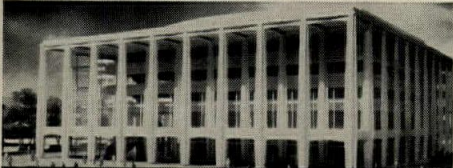
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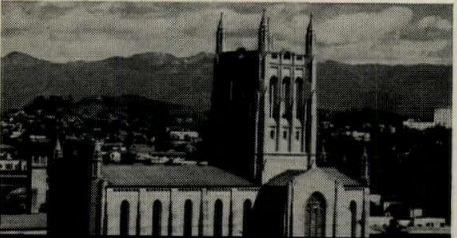
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BOOKS RECEIVED

PLANNING 1966, *Selected Papers from the ASPO National Planning Conference.* American Society of Planning Officials, 1313 East 60th St., Chicago, Ill. 60637. 276 pp. Paperbound, \$6.50.

MUNICIPAL REFUSE DISPOSAL, *Second Edition.* By the American Public Works Association. Public Administration Service, 1313 East 60th St., Chicago, Ill. 60637. 528 pp., illus. \$10.00.

REFUSE COLLECTION PRACTICE, *Third Edition.* By the American Public Works Association, Committee on Solid Wastes. Public Administration Service, 1313 East 60th St., Chicago, Ill. 60637. 525 pp., illus. \$10.00.

FURNITURE IN THE ANCIENT WORLD. By Hollis S. Baker. The Macmillan Company, 866 Third Ave., New York, N.Y. 10022. 351 pp., illus. \$17.95.

RICHARD NEUTRA 1961-1966, *Buildings and Projects.* By W. Boesiger. Frederick A. Praeger, Publishers, 111 Fourth Ave., New York, N.Y. 10003. 256 pp., illus. \$20.00.

IT'S TIME WE FACE AMERICA'S WATER PROBLEM. By the Caterpillar Tractor Co., News Service, Peoria, Ill. 16 pp., illus. Paperbound, no charge.

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REQUIRED READING

FREEWAYS. By Lawrence Halprin. Reinhold Publishing Corp., 430 Park Ave., New York, N.Y. 10022. 160 pp., illus. \$12.50.

THE HISTORIAN AND THE CITY. Edited by Oscar Handlin and John Burchard. The M.I.T. Press, 50 Ames St., Cambridge, Mass. 02142. 299 pp., illus. Paperbound. \$2.95.

THE ARTIST IN AMERICAN SOCIETY, The Formative Years 1790-1860. By Neil Harris. George Braziller, Inc., One Park Ave., New York, N.Y. 10016. 432 pp., illus. \$7.50.

STRUCTURE FORM AND MOVEMENT. By Heinrich Hertzl. Reinhold Publishing Corp., 430 Park Ave., New York, N.Y. 10022. 251 pp., illus. \$17.50.

HOUSES AND PEOPLE. By W. V. Hole and J. J. Attenborough. British Information Service, 845 Third Ave., New York, N.Y. 10022. 70 pp., illus. \$5.50.

VAULTED BRICK CONSTRUCTION IN GUADALAJARA, Number 18, Architecture at Rice University. Publications, School of Architecture, Rice University, Houston, Texas 77001. 56 pp., illus. No charge.

BUILDING WITH LARGE PREFABRICATES. By Bohdan Lewicki. American Elsevier Publishing Company, Inc., 52 Vanderbilt Ave., New York, N.Y. 10017. 460 pp., illus. \$25.00.

THE NEW JAPANESE PAINTING AND SCULPTURE, An exhibition selected by Dorothy C. Miller and William S. Lieberman. The Museum of Modern Art, 11 West 53rd St., New York, N.Y. 10019. 116 pp., illus. Hardbound, \$5.95; Paperbound, \$2.95.

THE AIRTIGHT CASE. By Joseph P. Lyford. Harper & Row, Publishers, 49 East 33rd St., New York, N.Y. 367 pp. \$7.95.

THE MODERN WORLD. By Norbert Lynton. McGraw-Hill Book Co., 330 West 42nd St., New York, N.Y. 10036. 179 pp., illus. \$5.95.

THE DYMATION WORLD OF BUCKMINSTER FULLER. By Robert W. Marks. Southern Illinois University Press, Carbondale, Ill. 232 pp., illus. \$10.00.

IMAGES OF THE UNIVERSE Leonardo da Vinci: The Artist as Scientist. By Richard McLanathan. Doubleday & Company, Inc., 277 Park Ave., New York, N.Y. 10017. 192 pp., illus. \$4.50.

THE PAGEANT OF MEDIEVAL ART AND LIFE. By Richard McLanathan. The Westminster Press, Witherspoon Building, Philadelphia, Pa. 19107. 325 pp., illus. \$6.95.

ITALIAN ARCHITECTURE, 1750-1914. By Carroll L. V. Meeks. Yale University Press, New Haven, Conn. 546 pp., illus. \$25.00.

MECHANICAL AND ELECTRICAL DESIGN OF BUILDINGS FOR ARCHITECTS AND ENGINEERS. Edited by Frederick S. Merritt. McGraw-Hill Book Company, 330 West 42nd St., New York, N.Y. 10036. 247 pp., illus. \$4.95.

JOHN WELLBORN ROOT. By Harriet Monroe, with an Introduction by Reyner Banham. The Prairie School Press, 117 Fir St., Park Forest, Ill. 291 pp., illus. \$8.50.

THE FOUNTAINS OF ROME. By H. V. Morton. The Macmillan Company, 60 Fifth Ave., New York, N.Y. 10011. 302 pp., illus. \$12.95.

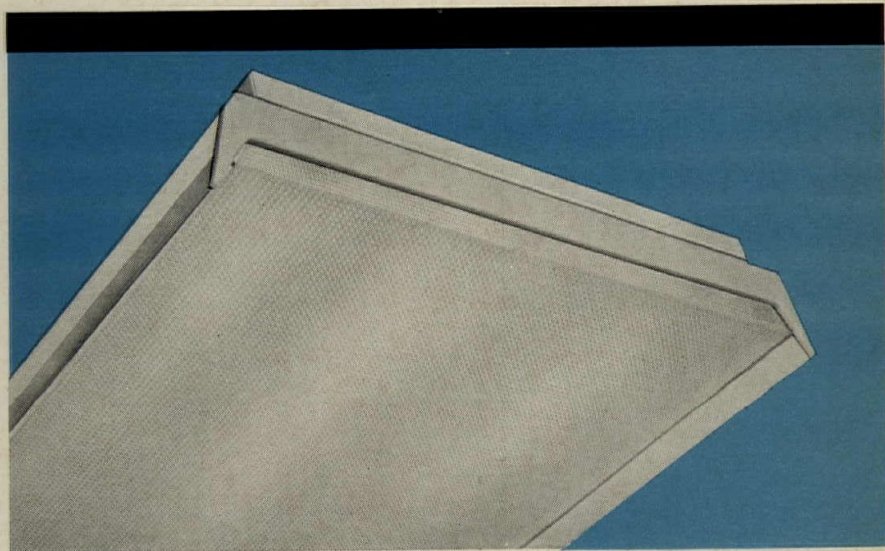
ARCHITECTURE OF THE ITALIAN RENAISSANCE. By Peter Murray. Schocken Books, Inc., 67 Park Ave., New York, N.Y. 10016. 268 pp., illus. \$2.95.

MATRIX COMPUTER ANALYSIS OF STRUCTURES. By Moshe F. Rubinstein. Prentice-Hall, Inc., Publishers, Englewood Cliffs, N.J. 07632. 402 pp., illus. \$17.95.

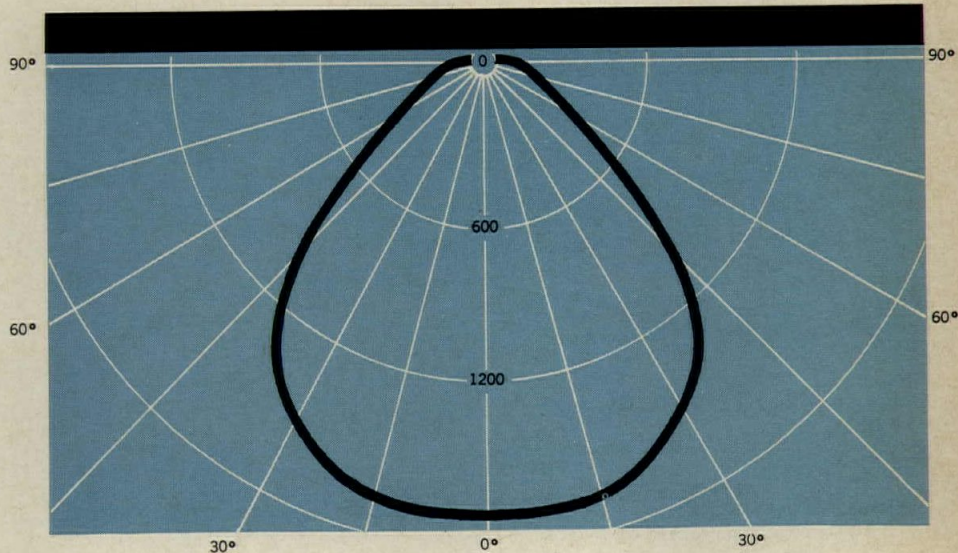
PLANNING GUIDE FOR RADIOLOGIC INSTALLATIONS. Edited by Wendell G. Scott. The Williams & Wilkins Company, Baltimore 2, Md. 297 pp., illus. \$9.50.

continued on page 266

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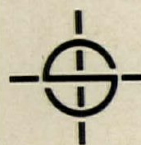


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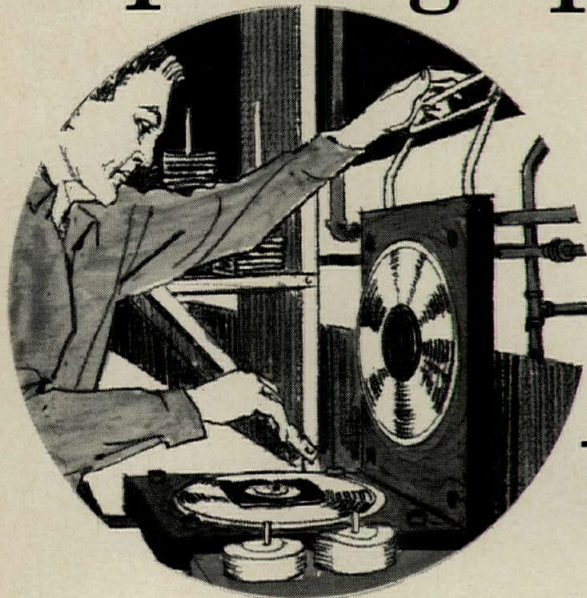
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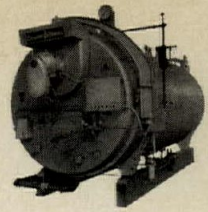



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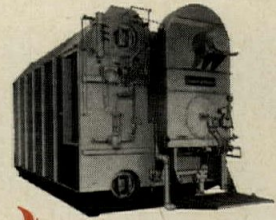



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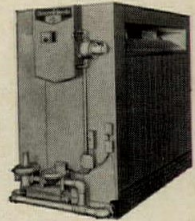
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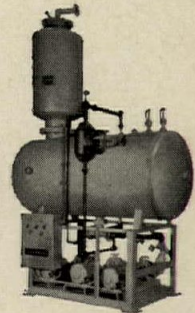
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continued from page 261

THE REGIONAL CITY, an Anglo-American discussion of Metropolitan Planning. Edited by Derek Senior. Aldine Publishing Company, 320 West Adams St., Chicago, Ill. 60606. 192 pp. \$7.50.

PLASTICS IN BUILDING. Edited by Irving Skeist. Reinhold Publishing Corp., 430 Park Ave., New York, N.Y. 10022. 466 pp., illus. \$18.00.

MATERIALS OF CONSTRUCTION. By R. C. Smith. McGraw-Hill Book Company, 330 West 42nd St., New York, N.Y. 10036. 376 pp., illus. \$8.50.

THE LIVING END. By Roger Starr. Coward-McCann, Inc., 200 Madison Ave., New York, N.Y. 284 pp., illus. \$5.95.

LOST CITIES OF ASIA. By Wim Swaan. G. P. Putnam's Sons, 200 Madison Ave., New York, N.Y. 176 pp., illus. \$15.00.

THE RISE AND FALL OF MAYA CIVILIZATION. By J. Eric S. Thompson. The University of Oklahoma Press, Norman, Okla. 328 pp., illus. \$5.95.

LIVING ARCHITECTURE: OTTOMAN. By Ulya Vogt-Goknil. Grosset & Dunlap, 51 Madison Ave., New York, N.Y. 10010. 192 pp., illus. \$7.95.

THE ARTS IN AMERICA: The Colonial Period. By Louis B. Wright, George B. Tatum, John W. McCoubrey and Robert C. Smith. Charles Scribner's Sons, 597 Fifth Ave., New York, N.Y. 10017. 367 pp., illus. \$15.00.

FRANK LLOYD WRIGHT, His Life, His Work, His Words. By Olgivanna Lloyd Wright. Horizon Press, 156 Fifth Ave., New York, N.Y. 10010. 224 pp., illus. \$7.50.

MAXWELL'S INTERNATIONAL SUBJECT BIBLIOGRAPHY NO. 18—ARCHITECTURE. Compiled and edited by the editorial staff of the Documentation & Procurement Center, Maxwell Scientific International Inc., 44-01 21st St., Long Island City 1, N.Y. 116 pp. No charge.

NEW YORK STATE HISTORICAL ASSOCIATION SELECTIVE REFERENCE GUIDE TO HISTORIC PRESERVATION. Frederick Rath, Jr., General Editor. New York Historical Association, Cooperstown, N.Y. 133 pp., Paperbound, \$3.50.

THE AMERICAN ASSOCIATION OF ARCHITECTURAL BIBLIOGRAPHERS PAPERS, Volume III, Walter Gropius. Edited by William B. O'Neal. The University Press of Virginia, The Rotunda, Charlottesville, Va. 140 pp. \$5.00.

THE NEW SCHOOLHOUSE. By Alfred Roth. Frederick A. Praeger, Publishers, 111 Fourth Avenue, New York, N.Y. 10003. 304 pp., illus. \$15.00.

PRESERVING HISTORIC AMERICA. By the U.S. Department of Housing and Urban Development. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. 80 pp., illus. Paperbound, \$1.00.

WATER AND WATER USE TERMINOLOGY. By J. O. Veatch and C. R. Humphrys. Thomas Printing & Publishing, Ltd., 724 Desnoyer St., Kaukauna, Wisc. 54130. 375 pp., illus. \$12.95.

RETIREMENT HOUSING IN CALIFORNIA. By Rosabelle Price Walkley, Wiley P. Mangum, Jr., Susan Roth Sherman, Suzanne Dodds and Daniel M. Wilner. Diablo Press, Box 7084, Berkeley, Calif. 94717. 134 pp. Paperbound, \$2.95.

PLANNING FOR A NATION OF CITIES. Edited by Sam Bass Warner Jr. The M.I.T. Press, 50 Ames St., Cambridge, Mass. 310 pp. \$8.75.

GREAT HOUSES OF AMERICA. By Henry Lionel Williams and Ottalie K. Williams. G. P. Putnam's Sons, 200 Madison Avenue, New York, N.Y. 10016. 295 pp., illus. \$17.95.

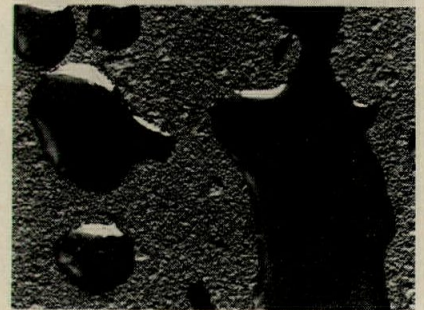
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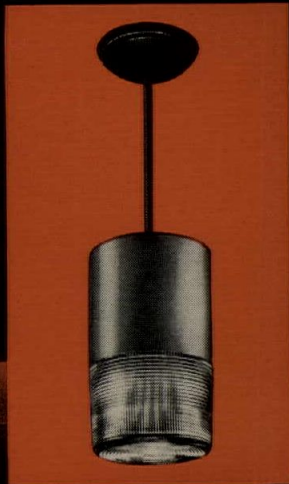
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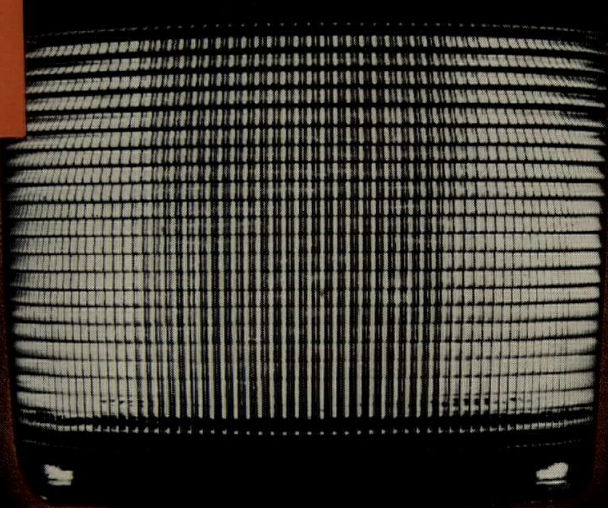
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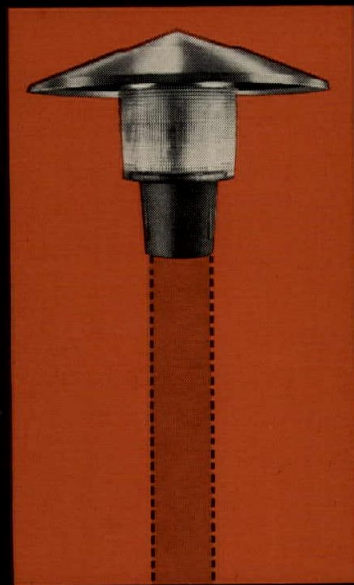
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Why do so many corporations contribute to America's colleges?

1. () they want to help the colleges

You were right if you checked No. 2.

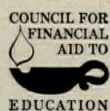
American corporations want to make sure there will be enough college-trained leaders to fill the management jobs open today and in the future.

This is good insurance for business.

And the need, we must remember, isn't getting smaller.

World trade is developing fast; business is getting more competitive, more complex; science is introducing new products and processes rapidly.

College-trained men and women are needed, in increasing numbers, to plan and direct the activities of business.



Published as a public service in cooperation with The Advertising Council and the Council for Financial Aid to Education

2. () they need the leaders colleges train

But the colleges can't do the training job alone. They need classrooms, laboratories and facilities, yes. But even more, they need backing to maintain a staff of top-notch teachers.

This is the human equation that makes the difference in reaching the **margin of excellence** needed in the U.S.

This is everybody's job, but especially industry's.

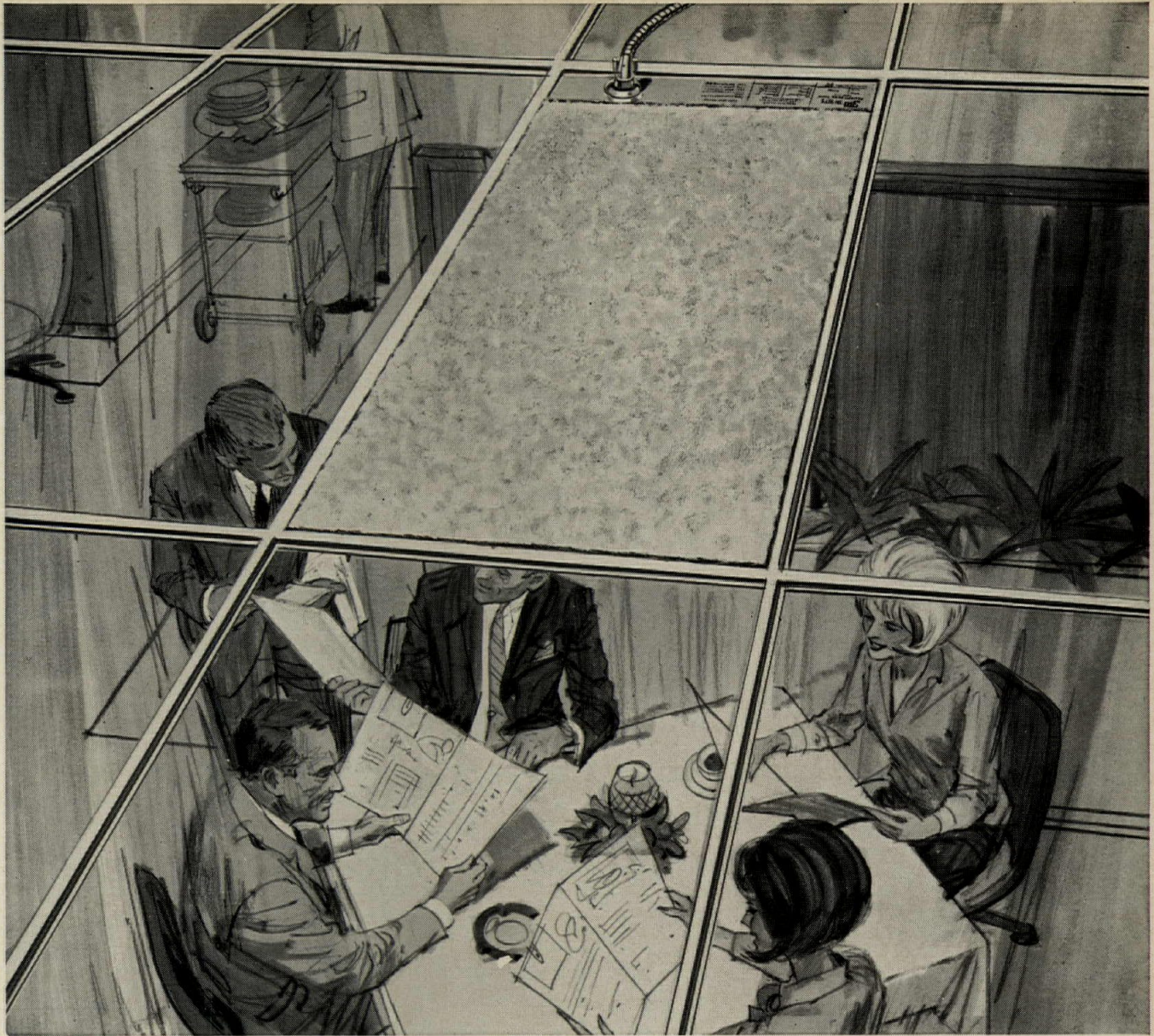
Of course American business wants to help the colleges, so you were also right if you checked No. 1. College, after all, is business' best friend.

GIVE TO THE COLLEGE OF YOUR CHOICE

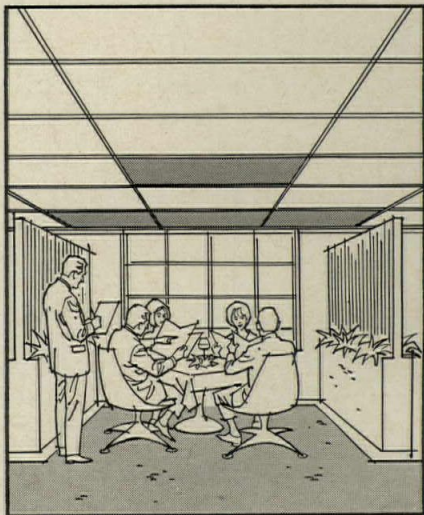
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If your clients cater to comfort, why not drop in a heating system like this?



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Even a gourmet dinner is more enjoyable if the diners are comfortable. And they will be. Everyone is, with a heating system incorporating new 3M heating panels.

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ADVERTISING INDEX

Pre-filed catalogs of the manufacturers listed below are available in the 1967 Sweet's Catalog File as follows.

- A Architectural File (green)
- I Industrial Construction File (blue)
- L Light Construction File (yellow)

A	
Aerofin Corp.	196
Air Devices, Inc.	104
A Allen Industries, Inc.	100
Alma Desk Company	227, 229, 231, 233, 235
A-I Altec Lansing Corp.	260
A-I Amerada Glass Corp.	32
I American Air Filter Co.	54-55
A-I American Bridge Division, U.S.S.	74-75
L American Furnace Co.	106
Anaconda American Brass Co.	86
A-I-L Armstrong Cork Co.	2nd Cover, 1, 207
A Art Metal, Inc.	108
B	
A Bally Case & Cooler, Inc.	26-27
L Bangkok Industries, Inc.	60
Behr Manning Co.	22-23
A-I Bethlehem Steel Corp.	58-59
Blue Diamond Gypsum Div., The Flintkote Co.	32-3
A Bobrick Corporation, The	244
A-I Borden Metal Products Co.	45
A-I Bradley Washfountain Co.	226
C	
A-L Caradco, Inc.	80
A Carnes Corporation	28-29
A Carpenter & Co., L. E.	203
A-I-L Carrier Air Conditioning Co.	61
A Ceco Corporation	216-217
A Cincinnati Time Recorder Co.	192
A Cleaver Brooks Co.	262-263
Commercial Carpet Corp.	16-17
A-I Concrete Products, Inc.	31
Concrete Reinforcing Steel Institute	70-71
A Connor Lumber & Land Co.	266
A-I Cookson Company	242
Cramer Industries, Inc.	227
A-L Crane Company	64-65
A-I Crawford Door Company	95
D	
Day-Brite Lighting Div. of Emerson Electric	66
Day & Night Mfg. Co.	98-99
Devcon Corporation	227
A Dover Corp., Elevator Div.	2-3
A-I-L Dur-O-Wal, Inc.	96
E	
A Eastern Products Corp.	3rd Cover
A-I Eaton Yale & Towne Inc.	238
Eaton Yale & Towne Inc., Yale Div.	239
Edison Electric Institute	68-69
A Eggers Hardwood Products Corp.	30
Electric Heating Association, Inc.	213-214
A-L Engineered Products Co.	233

F	
A-L Fiat Products Dept., American Cyanamid Co.	235
A Follansbee Steel Corp.	272
G	
A-I-L General Electric Co.	38-39, 78, 84-85, 101
A-I-L Georgia-Pacific Corp.	251-252
Greenberg's Sons, M.	32-2
A Guth Co., Edwin F.	267
H	
Hadco Products, Inc., sub. of Esquire, Inc.	189
A-L Harris Mfg. Co.	247
A Houghton Elevator Co.	233
A Haws Drinking Faucet Co.	206
A Hickman Co., W. P.	223
A-I Hillyard Chemical Co.	103
Holophane Co., Inc.	195
L Honeywell	97
Hotpack Corp.	203
I	
A-I-L Inland Steel Products Co.	248-249
J	
A Jamison Cold Storage Door Co.	47
K	
A Kaiser Aluminum & Chemical Corp.	186-187
I Kelley Co., Inc.	106
A-I-L Kentile, Inc.	7
A-I Kinnear Mfg. Co.	228
Krueger Mfg. Co.	21
K-S-H Plastics, Inc.	205
L	
A LCN Closers, Inc.	62-63
A-I Lead Industries Assn., Inc.	37
A-I-L Libbey-Owens-Ford Glass Co.	56-57
A Lightolier, Inc.	241
A Loren Cook Co.	229
A Ludowici-Celadon Co.	177
A Lyon Metal Products, Inc.	180
M	
A-I Mahon Co., R. C.	14-15
Marley Company	257
A McPhilben Lighting Div., Emerson Electric Co., Inc.	50
McQuay, Inc.	91
Medusa Portland Cement Co.	250
A-I-L Mississippi Glass Co.	245-246
Mobay Chemical Co.	49
Modine Mfg. Co.	76-77
A Mo-Sai Institute, Inc.	204
A Mosaic Tile Co.	243

N	
A-I-L National Gypsum Co.	52-53
A Nevamar Co. Div., National Plastic Prods. Co., Inc.	102
Norris Dispensers, Inc.	229
O	
A Otis Elevator Co.	20
P	
A-L Panelfold Doors, Inc.	185
A-L Pella Rolscreen Co.	197-198
A Pemko Mfg. Co.	60
A-I Pennsalt Chemicals Corp.	215
Pilkington Brothers Limited	234
A-I-L Pittsburgh Plate Glass Co.	208
Plastering Institute of Greater New York	60
Ponderosa Pine Woodwork	107
Portland Cement Association	109 to 112
Pratt & Lambert, Inc.	113
A-I Prestressed Concrete Institute	202
Price Pfister Brass Mfg. Co.	24-25
R	
A-I Raynor Mfg. Co.	190
A-I Republic Steel Corp.	51, 264-265
A Reynolds Metals Co.	253 to 256
A Rixson, Inc.	247
A-I Robertson Co., H. H.	67
A-L Rowe Mfg. Co.	48
S	
A St. Charles Mfg. Co.	18, 105
St. Joseph Lead Co., Metals Div.	199
Sandvik Steel, Inc.	79
Schemenauer Mfg. Co.	225
A Schokbeton Products Corp.	34
A-I Sherwin-Williams Co.	235
A Simmons Company	209 to 212
A-I Sloan Valve Co.	4th Cover
A-I Smithcraft Corp.	261
A Sonneborn Bldg. Prods., Inc., sub. DeSoto Chemical Coatings, Inc.	193-194
Southern California Edison Co.	32-1
So. Calif. & So. Counties Gas Cos.	32-4
A-L Southern Pine Association	232
Square D Company	92
A-I Standard Conveyor Co.	224
A-I Steel Deck Institute	200
A-I Steel Joist Institute	259
Sweet's Catalog Service	271
A-I-L Symons Mfg. Co.	50
T	
Talk-A-Phone Co.	240
A-I Taylor Co., The Halsey W.	178-179
A-I Thiokol Chemical Corp.	19
A-I-L 3M Company	269
A Tile Council of America, Inc.	191
A Tremco Mfg. Co.	72-73, 230
Trinity White, General Portland Cement Co.	8
U	
A-I United States Steel Corp.	266
A-I United States Steel Corp. (subs)	74-75

Index to buying information

V

A Vogel-Peterson Co. 218

W

Wakefield Lighting Div.,
Wakefield Corp., ITT 201

A Weis Mfg. Co., Inc., Henry 90

Wenger Corporation 231

Wheeler Reflector Co., Inc. 12

A-1 Wide-Lite Corp. 33

A Wilkinson Chutes, Inc. 231

Woodwork Corp. of America 11

Wool Carpets of America 219 to 222

A Wooster Products, Inc. 106

Y

Yale Div., Eaton Yale & Towne Inc. 239

Z

I Zero Weather Stripping Co., Inc. 188

A



ARCHITECTURAL
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I



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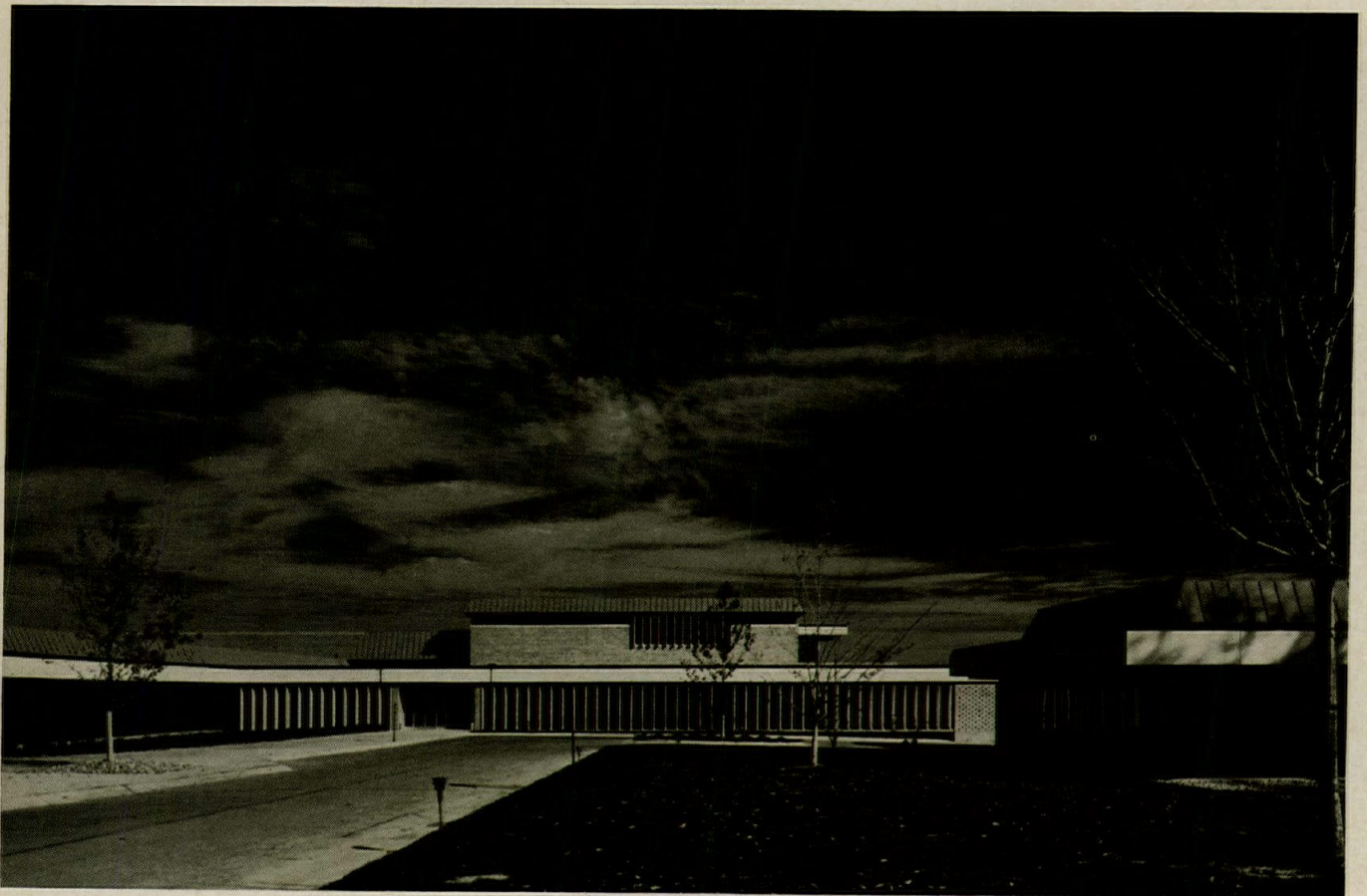


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