MAGAZINE OF BUILDING

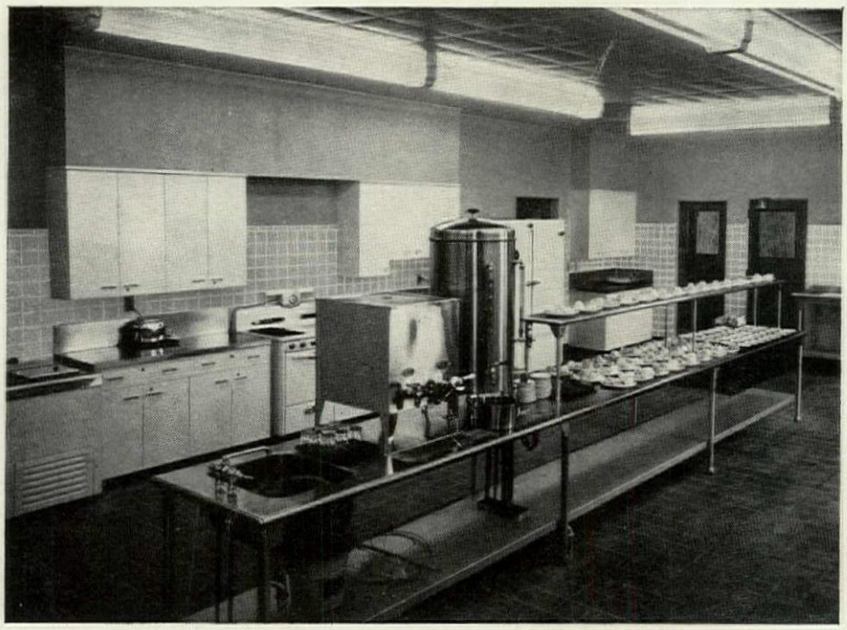
architectural **forum**

September 1952

housekeeper's helper

when keeping house is a business proposition

...new colors of easy-to-clean Suntile



Cleanliness is a dollars and cents matter in industrial kitchens or cafeterias, in food or drug plants, laboratories or public buildings. In fact, cleanliness is a "must."

Your selection of the right material for walls and floors will have much to do with the cost as well as the ease of cleaning and maintaining these interiors.

For instance, real clay Suntile has a hard, impervious glazed finish that is easy to clean with inexpensive soap and water. Dirt, grease, and smudge find no haven with Suntile. Costly, periodic redecorating and refinishing are ended practically for the life of the building.

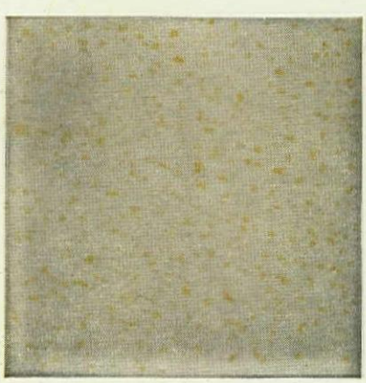
Beyond this, however, Suntile has *color* advantages that also aid "housekeeping." New mottled tones of Suntile tend to resist soiling and reduce the necessity for "mirror-like" maintenance.

This very practical result is typical of the new Suntile functional color line. Better lighting, increased production, fewer accidents and higher employee morale are other results with sound business advantages.

HOW TO SELECT COLORS THAT ARE RIGHT for commercial, industrial and institutional interiors is discussed in our new descriptive booklet "Suntile Functional Color Recommendations." Your Authorized Suntile Dealer will give you a free copy or you may write us direct, Dept. MB-9, The Cambridge Tile Mfg. Co., P. O. Box 71, Cincinnati 15, Ohio.

Suntile

GRAY HAUTEVILLE 734
a neutral tone
of great service



Suntile Gray Hauteville is a mottled gray tone. Gray has widespread use in many different types of interiors. The mottled effect makes it even more practical. This new gray is a warm, neutral color that avoids the "faded" tints of the past. It helps to control glare and create working conditions where vision is at its best. For obvious reasons mottled gray tends to combat dirt, smudge and stains. Suntile Gray Hauteville is but one of the functional colors in the new color line developed by Faber Birren, noted color authority, and The Cambridge Tile Mfg. Co.

WEST COAST OFFICES

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The Cambridge Tile Mfg. Co.
1335 South La Brea
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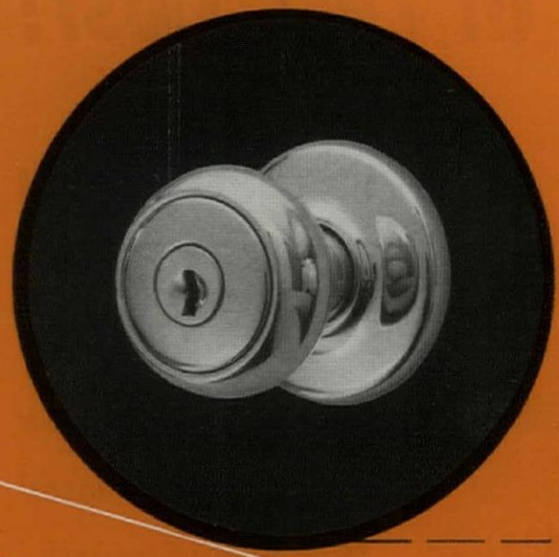

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how a lock is made
"Locking Up" shows how a modern cylindrical lock is manufactured.

keying procedures
"Securely Yours" illustrates all phases of keying procedures from maisoning to master-keying.

powder metallurgy
"Precision Parts From Powdered Metal" demonstrates a modern method of producing parts.
Kwikset will gladly arrange to show these sound, color films to your organization at no cost.

Write: Room 201, Kwikset Sales & Service Co., 516 East Santa Ana Street, Anaheim, California

Produced by Audience Tested Productions, Los Angeles, California

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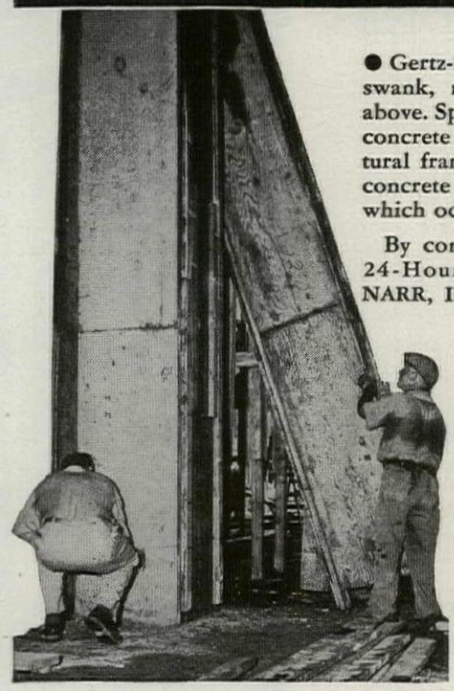

● Gertz-Flushing, north-shore Long Island's swank, new department store, is shown above. Speed and economy both considered, concrete got the owner's nod for the structural frame of new addition as well as for concrete alterations to the old bus terminal which occupied part of the site.

By concreting throughout with 'INCOR' 24-Hour Cement, FOSS, HALLORAN & NARR, INC., cut form requirements to the bone . . . top speed with 50% less forms! Stripped in 24 hours, where necessary, dependable 'Incor'* high early strength kept the complicated job on schedule all the way.

Concrete work was completed a week ahead of schedule, making it possible to finish the job and open the store 25 shopping days before Christmas . . . thanks to concreting know-how and typical performance of America's FIRST high early strength portland cement. *Reg. U.S. Pat. Off.

B. GERTZ, INC., Flushing, N. Y.
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THE MAGAZINE OF BUILDING

architectural **forum**

SEPTEMBER 1952

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Published by TIME Incorporated

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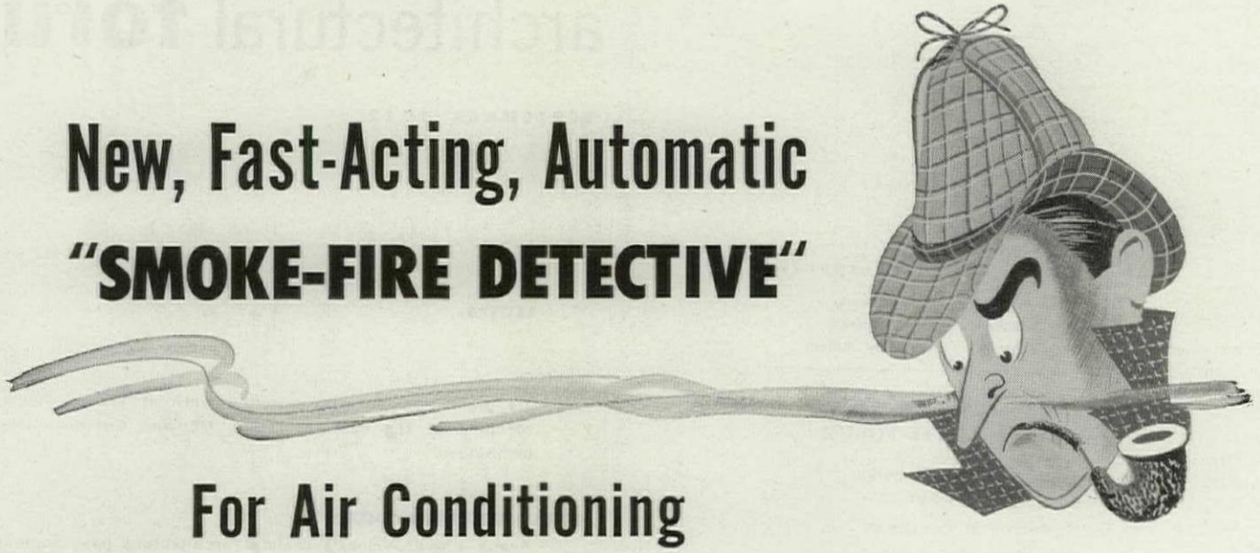
VOLUME 97, VOLUME 3

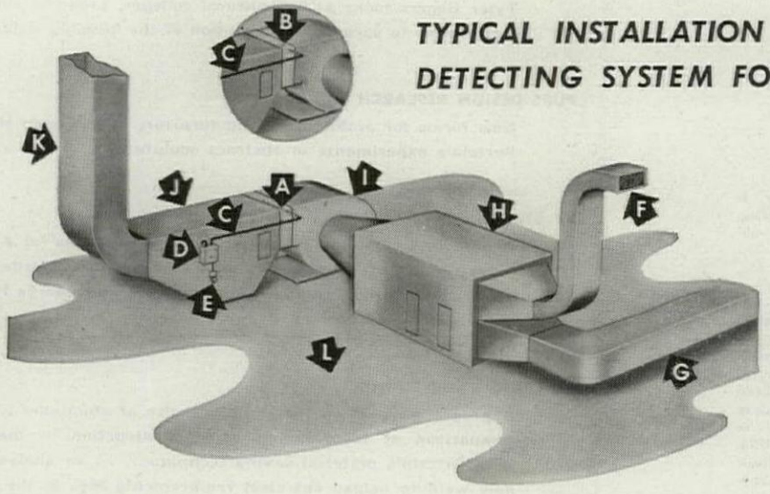
New, Fast-Acting, Automatic "SMOKE-FIRE DETECTIVE" For Air Conditioning



Smoke in your air conditioning spreads fast . . . causes panic, spoilage and needless expense . . . now all can be avoided by installing a modern, fully approved C-O-TWO Automatic Smoke Detecting System.

Smoke, smoldering and fire are spotted in the incipient stage anywhere throughout the air conditioning ducts, as well as via the return air from air conditioned spaces. Four types of smoke detectors and several different installation arrangements are available to fit your particular needs . . . for small air conditioning units, for large air conditioning systems, and whether with or without electrostatic precipitators. All C-O-TWO Automatic Smoke Detecting Systems function by drawing continuous air samples through simple piping to a smoke detector. The first trace of smoke sets off an alarm, based on an exclusive operating principle . . . no chance of smoke spreading . . . the air conditioning instantly shuts down, dampers close and fire extinguishing systems actuate.

Act now for complete free information and descriptive literature on this newest contribution to modern fire fighting. An expert C-O-TWO Fire Protection Engineer will be glad to help you in planning economical, fully approved fire protection facilities without obligation. (Special assistance rendered to qualified air conditioning contractors.)



TYPICAL INSTALLATION C-O-TWO AUTOMATIC SMOKE DETECTING SYSTEM FOR AIR CONDITIONING DUCTS

- A perforated smoke accumulating pipe
- B smoke accumulating pitot tube (alternate)
- C pipe line for carrying continuous air samples to smoke detector
- D smoke detector
- E audible alarm
- F fresh air intake and duct
- G return air duct
- H air cleaning unit
- I air fan
- J air cooling and heating unit
- K supply air duct
- L floor level

TRADE MARK C-O-TWO REG. U.S. PAT. OFF.

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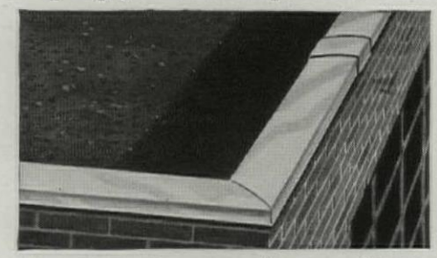
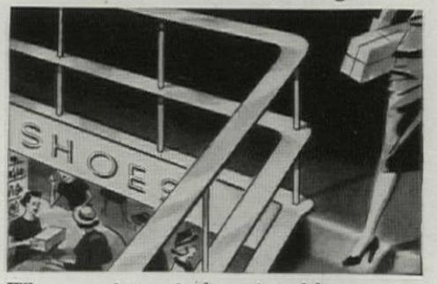
Architectural Service

Copings, Gravel Stops and Facia



Aluminum copings, gravel stops and facia, whether employed separately or combined in an extruded design, serve a decorative as well as a functional purpose. Attractiveness, durability and freedom from destructive and disfiguring rust are a few of the advantages aluminum provides in this application. Standard copings and gravel stops, both with and without facia, are available in Reynolds Aluminum extruded shapes for most needs. Special designs can be made inexpensively, even for relatively small requirements.

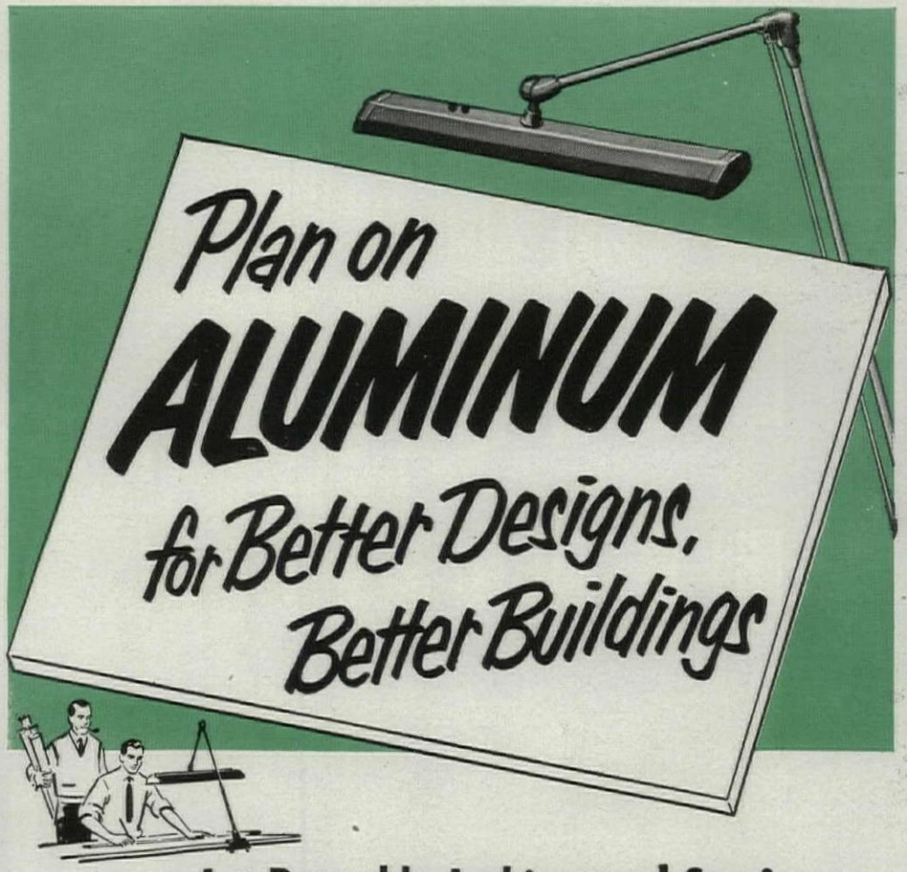
Attractive Interior Railings



When a staircase is the point of focus, specify the rich, quiet tone of aluminum railings for stores, hotels and other commercial buildings. Aluminum is attractive but not distracting. It blends well with all color schemes, and when properly finished, is practically maintenance free. It designs well, too. Reynolds standard handrail and baluster sections permit a wide range of expression. And the flexibility of aluminum extrusions offers virtually unlimited design freedom on an economical basis.

Modern Fire Escapes

Protect the beauty of well designed buildings by specifying rustproof, rotproof, nonstaining aluminum for fire escape construction. Strong, lightweight aluminum fire escapes never need painting and require practically no maintenance . . . save important money for the building owner especially in installations where corrosive industrial fumes are prevalent. Savings made possible by the lighter structural load and easier erection frequently offset the small added material cost. Write to Reynolds for details on these and any other architectural aluminum applications.



Let Reynolds Architectural Service Help You Get the Most From Aluminum

Buildings that begin on your drafting board are sure to be *better* buildings if your plans include attractive, corrosion resistant, strong, lightweight aluminum . . . the modern metal that complements modern designs.

To get the maximum advantage of aluminum's design flexibility and other unique characteristics, make use of Reynolds Architectural Service. This service is available to aid you in solving special design problems. It's Reynolds way of saying: "Here's help toward getting the very most from aluminum."

Be sure to consider the benefits of standard aluminum products in your planning, too. A variety of aluminum windows, doors, hardware, light fixtures, awnings, insulation are made from Reynolds Aluminum by other manufacturers. These concerns have learned to rely on the high quality of Reynolds complete line of aluminum mill products—extruded shapes and tubing, structurals, sheet, wire, rod and bar. And remember—*aluminum is the only mass-produced metal that costs no more today than before World War II.*

For complete architectural aluminum information, call the Reynolds office listed under "Aluminum" in your classified directory or write direct.

FREE BOOKLET!

Send for your copy of Reynolds Architectural Folio today! A complete, up-to-date kit on architectural aluminum. In loose leaf form with drawings for direct tracing. Free when requested on business letterhead. Write to **Reynolds Metals Company, 2528 So. Third St., Louisville 1, Ky.**

REYNOLDS METALS

REYNOLDS ALUMINUM

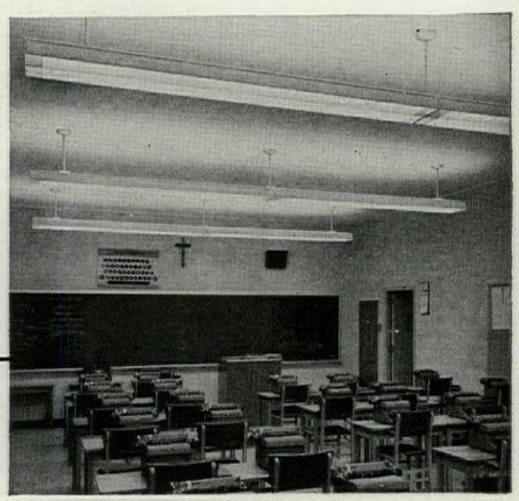
MODERN DESIGN HAS ALUMINUM IN MIND

ST. EDWARD HIGH SCHOOL
LAKEWOOD, OHIO

Geo. S. Rider Co., Engineers

Cleveland, Ohio

Founded in 1949, St. Edward High School for boys is conducted by the Brothers of Holy Cross. This new $2 million school building was dedicated April 26, 1952. It boasts the most advanced educational aids and athletic facilities.



IN THE TYPING ROOM—Here, where young eyes must concentrate on close, exacting work, "LUVEX" pours an even flood of glareless illumination into all parts of the room. No danger of squinting, eyestrain-hampered students in this classroom.

George I. Chittenden
Electrical Engineer
Geo. S. Rider Co.

lighting by DAY-BRITE'S "LUVEX"

here's why... Better than 80% of learning comes through the eyes.

The Geo. S. Rider Company embodies that fact in their philosophy of school design. They place *good lighting* high on their list of essentials.

George I. Chittenden, the Rider Company's electrical engineer, went to fluorescent lighting in St. Edward High to gain efficiency and lower operating costs.

After careful analysis, he selected Day-Brite's slimline "LUVEX" to handle the lighting job in all critical seeing areas—because . . . "LUVEX" gave him extremely high efficiency —over 83% . . . an all-metal fixture for greater safety . . . a hot-bonded enamel finish that doesn't crack, chip or yellow with age . . . a rigid, one-piece interlocked louver assembly . . . louver spacing wide enough to permit easy cleaning . . . simple relamping from the top without disturbing a single part of the fixture.

And "LUVEX" cinched its selection by testing out on ease of installation. "LUVEX" runs, suspended on adjustable "A-J" hangers, may be laid in and lined up later—permitting trim, perfectly aligned rows at a big savings in tempers, time and money. Fixtures are easy to handle, won't bend, flex or sag. Knockouts are plentiful and uniformly aligned and through wiring is simplified by self-bushed holes in ends of the chassis.

here's how... The typical St. Edward classroom is 22′ x 32′ with a ceiling height of 11′6″. In these rooms, Mr. Chittenden used four rows of "LUVEX" running crosswise, suspended on 18″ "A-J" stems. "LUVEX" is one of the very few louvered fixtures on the market with comfortable crosswise shielding.

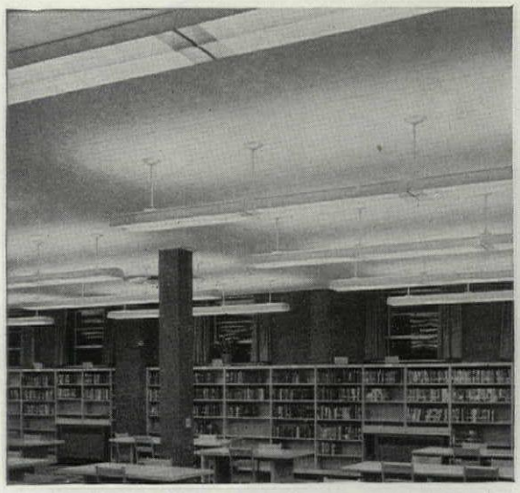
This layout produces excellent distribution and intensity. Average maintained intensity of illumination is 40 footcandles on the desk tops and 30 footcandles on the chalkboards.

Other classrooms such as the typing room, woodworking shop, band room, etc., are similarly equipped with "LUVEX" with intensities ranging from 35 to 55 footcandles, depending on the seeing task involved.

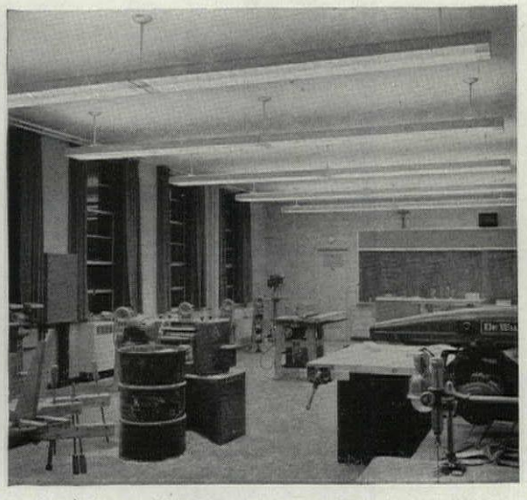
All corridors and the cafeteria are lighted by Day-Brite fluorescent glass-enclosed troffers.

here's proof... Here's another link in the ever-growing chain of evidence that "LUVEX" is the first and natural choice for school lighting. Architects and engineers everywhere are endorsing "LUVEX" by specifying it for new and remodeling school jobs.

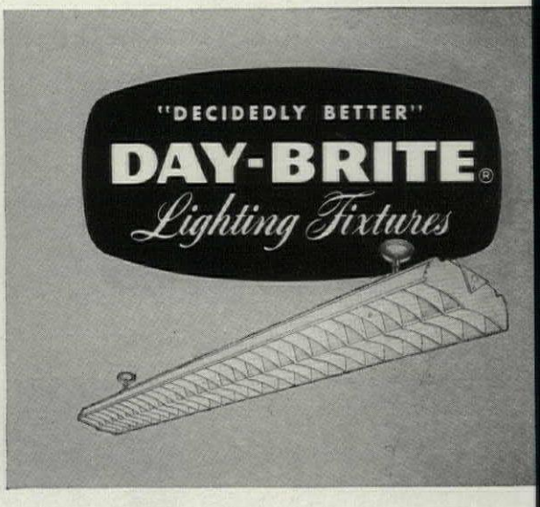
If there's a school project on your board or one coming up, it will pay you to get the full "LUVEX" story. Write today.



IN THE LIBRARY—The huge library with a shelf capacity of 10,000 volumes is a comfortable place for study beneath its installation of eighteen 12′ rows of "LUVEX." Intensity averages from 45 to 50 fc.

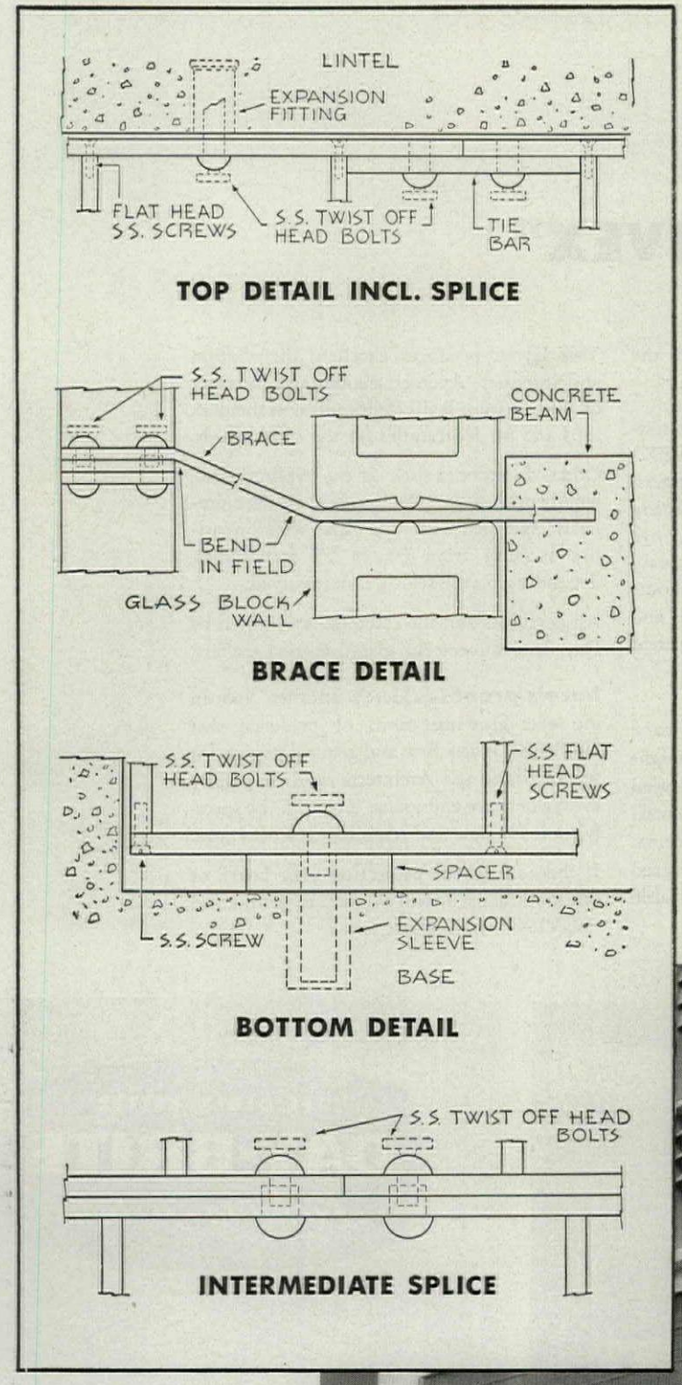


IN THE WOODWORKING SHOP—Good lighting is a must in this well-equipped shop. 55 footcandles of "LUVEX" illumination guarantee easy vision and greater safety for boys working with the power tools.



LUVEX PRODUCT DATA: CONSTRUCTION—All metal. Die-formed and welded steel throughout. Ends, sides, center louver, lateral louvers completely pre-assembled and interlocked into rigid, one-piece enclosure. FINISH—HOT-BONDED SUPER-WHITE enamel. WIRING—Certified ballasts, individually wired for unit or continuous installation. UL Approved. AVAILABLE—for two or four 75-watt slimline lamps, standard or 35/45 cutoff. Recommended for suspension mounting only—listing includes "A-J" hangers. Write for catalog sheets. Day-Brite Lighting, Inc., 5471 Bulwer Ave., St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

Stainless Steel Bank Facade



Here is an unusual stainless steel grille that protects the lobby of the new Banco de la República in Barranquilla, Colombia. It is at once functional, decorative, and—over the long pull—economical.

One of the largest of its type, the grille is more than 100 feet long, with vertical and horizontal members of 2½ by ½-inch polished stainless steel bars. It was fabricated in the United States and shipped in sections of convenient size. Assembly details and methods of fastening at lintel, base and floor beam are shown here.

The building itself is of reinforced concrete, 11 stories high, thoroughly modern and air-conditioned. In addition to grille and entrance, stainless steel was used for the vault and safe depository, and for architectural treatment of the lobby.

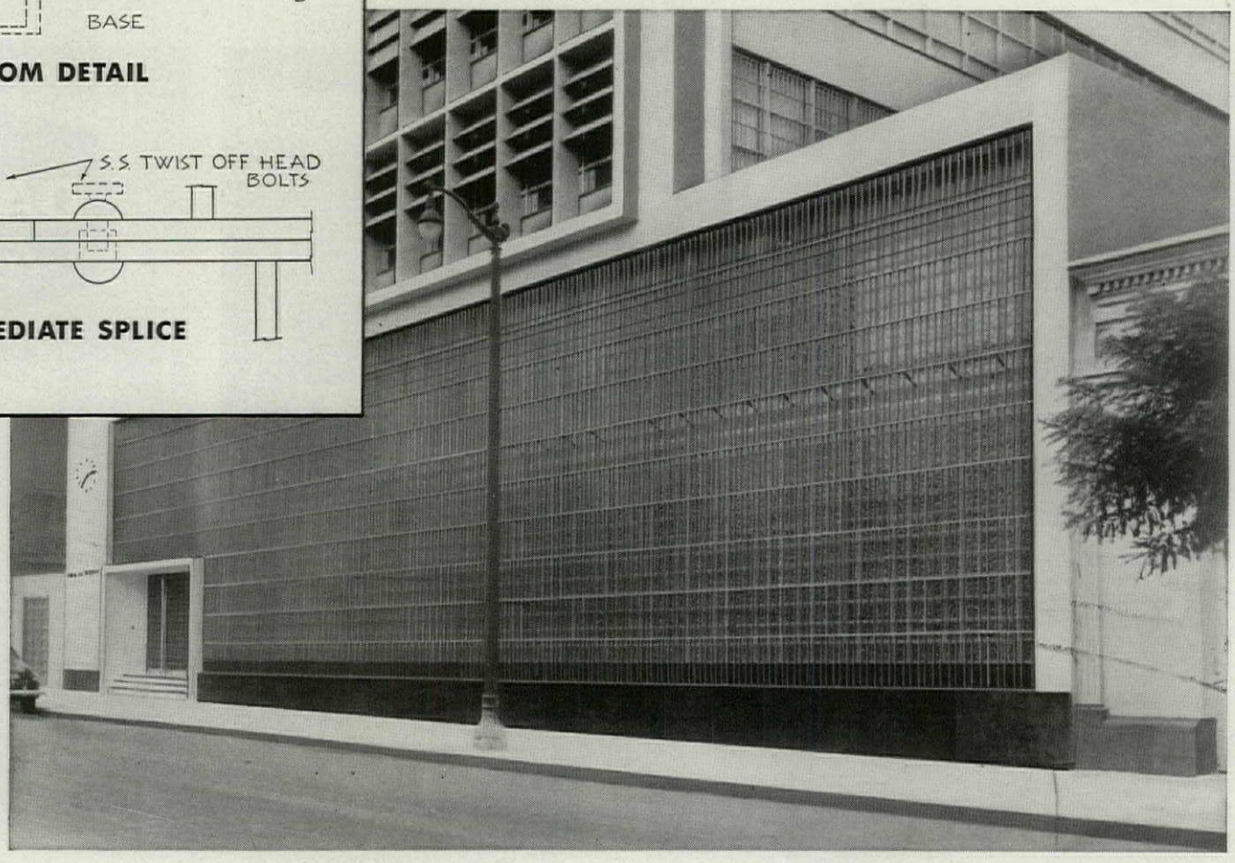
Today, chromium-nickel stainless steels like Armco 18-8, Type 302, are restricted by Government regulations. Yet chromium stainless steel like Armco 17, Type 430, is readily available, free from restrictions. It is suitable for most architectural applications except those in severely corrosive atmospheres.

For complete information on Armco Stainless Steel and its architectural applications write us at the address below.

Armco Steel Corporation

4182 Curtis Street, Middletown, Ohio • Plants and Sales Offices from Coast to Coast • Export: The Armco International Corporation

ARMCO



ARCHITECT:
CUELLAR, SERRANO, GOMEZ & CIA.
Bogotá, Colombia, S.A.

Some of the cracks shown in the picture at right are 2 inches wide! Above, they've disappeared, covered by a coating based on VINYLITE Brand Resins.

Data and photo on Dennis Chemical Co. and R. M. Hollingshead Corp. coatings, courtesy Surface Engineering Co., Wichita, Kansas.

Spray on Beauty-Shut out Weather

Here's a coating that covers surfaces with a tight, smooth elastic skin—bridges over cracks and scars—shuts out weather, moisture and fungus!

It's a coating based on VINYLITE Brand Resins—like those used to cover naval equipment after the war. Properly formulated, sprayed on fiber board, metal, concrete, or stucco, it stretches with structural movement, expands and contracts with temperature change. It's resistant to industrial fumes, oils, salts, and alkalies—stands up under abrasion and weather.

With a wide variety of colors, it makes a decorative, long-wearing vapor-sealing finish for interiors and exteriors alike. It increases thermal insulation and sound absorbing properties. Conventional spraying equipment readily applies it.

Whether you're tackling a giant structure or a bedroom—a hospital, school, bakery, or public building—protect it, make it look better, keep it on the job longer. Specify this coating based on VINYLITE Brand Resins. Correctly applied to new buildings or old, its tough, impervious skin will hold maintenance costs down, for it has the unique properties of VINYLITE Brand Resins that are so useful to scores of products in defense and basic industry. For more information and a list of suppliers, write Dept. NO-14.

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Don Morgan Photo

LEVER HOUSE, 390 PARK AVE., NEW YORK CITY
SKIDMORE, OWINGS & MERRILL, Architects, New York City. THE RAYMOND LOEWY CORPORATION, Interior Design, New York City. GEORGE A. FULLER COMPANY, General Contractor, New York City. J. I. HASS CO., INC., Painting Contractor, Jersey City, N. J.

Testimonial to Good Merchandising

. . . and GOOD PAINT

Lever House — a modern monument to successful merchandising — is likewise a practical testimonial to the Pratt & Lambert Paints and Varnishes that were used in it. This is only one of many new buildings for which architects have specified Pratt & Lambert products, secure in the knowledge that they will always look well and wear well.

The nearest P&L Architectural Service Department is always ready to assist in the preparation of painting specifications and distinctive color plans.

PRATT & LAMBERT-INC.

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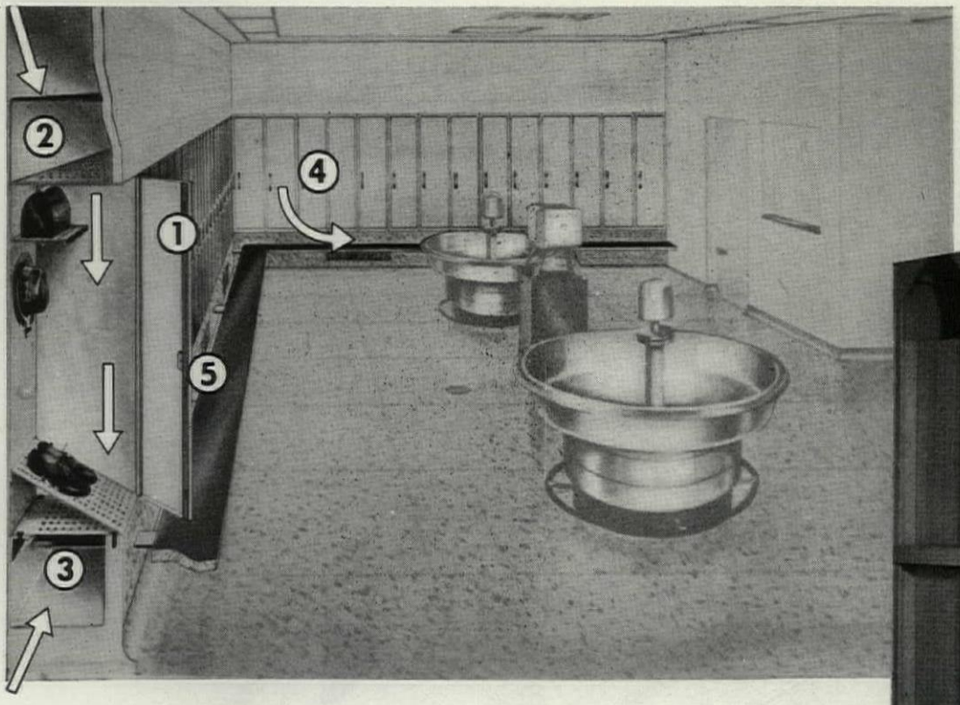
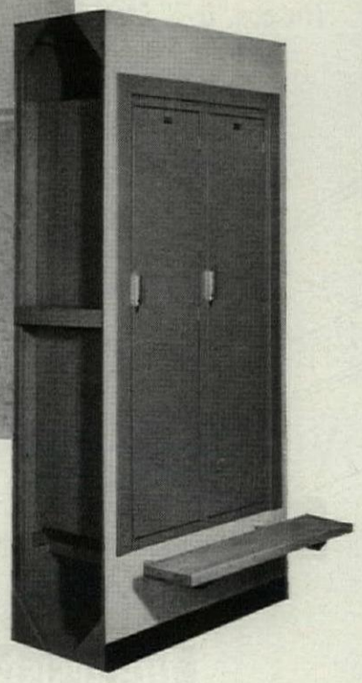


Check the features of these Scott-designed "AIRFLOW" lockers:

1. **Solid doors allow no odors to enter or escape.**
2. **Top plenum through which fresh air enters.**
3. **Base plenum through which stale air is exhausted.**
4. **Exhaust vent in locker island base carries off humid stale air.**
5. **Benches supported from the island base for convenience in cleaning.**



Something new in Locker Room Planning

NOW YOU CAN introduce self-contained ventilation into lockers without forcing stale air into employee locker rooms.

Your client knows it's good business to make his plant a pleasant, efficient place. Employee morale rises, absenteeism and costs are reduced. Odor-filled locker rooms have always been a plant problem area. To keep fresh air in these rooms, individually ventilated lockers are essential.

Developed by the Scott Washroom Advisory Service, new "AIRFLOW" lockers, equipped with solid doors, are designed to prevent unpleasant work clothing odors from escaping into the locker room area. Mechanical ventilation draws fresh air into each locker from the top plenum, forces stale air out the base plenum.

This is another example of the aid Scott Washroom Advisory Service Consultants offer to you who plan personal service rooms. This know-how gained from servicing more than half a million washrooms, is yours for the asking.

Contact Scott Washroom Advisory Service, Scott Paper Company, Chester, Penna.

Send for FREE Leaflet...
"Plant Washroom Designing"

Washroom Advisory Service, Dept. MB-9
Scott Paper Company
Chester, Pennsylvania

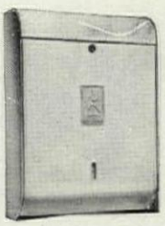
At no cost or obligation, please send me your study of personnel, traffic and maintenance problems, *"Plant Washroom Designing."*

Name_____

Company_____ Title_____

Address_____

City_____ Zone_____ State_____



SCOTT

Symbol of Modern Washrooms

Trade Mark "Washroom Advisory Service" Reg. U.S. Pat. Off.

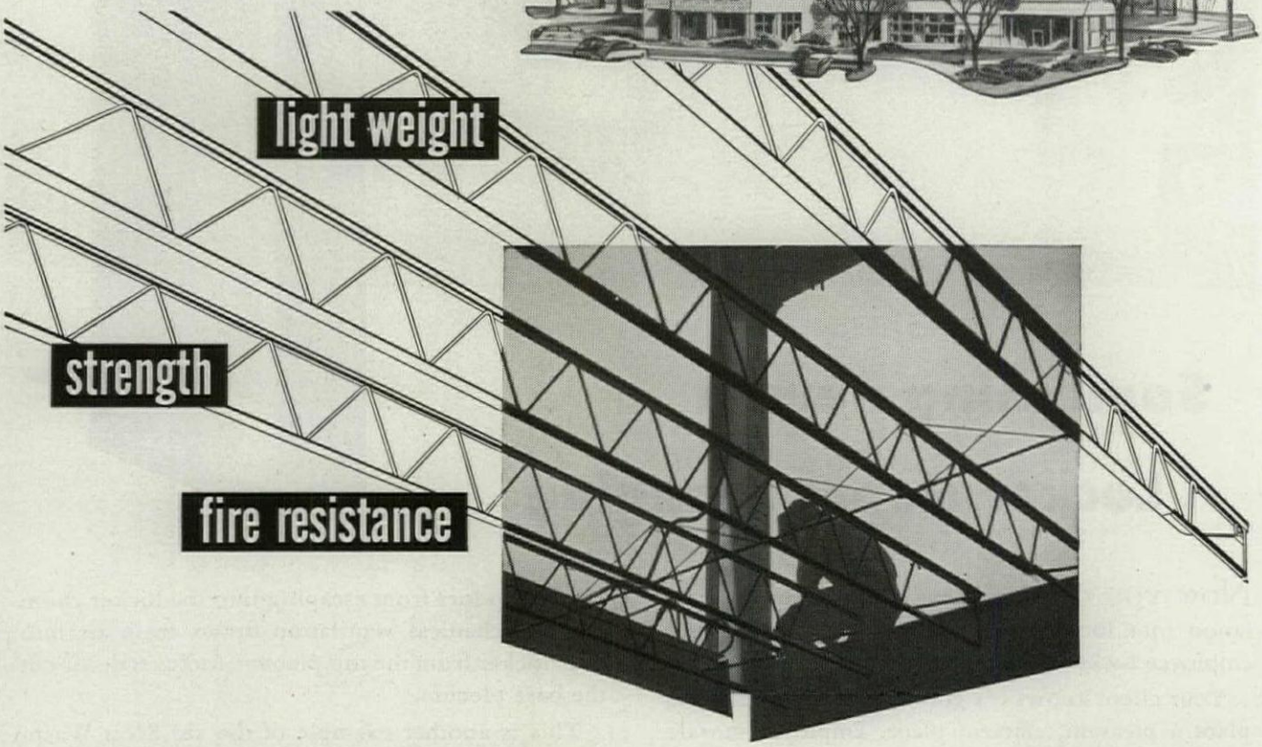
Architect Henry Sprott Long
of Long & Gatling says:

"We specified Truscon "O-T" Steel Joists for the Highland Tower Apartment Building to assure...

light weight

strength

fire resistance



Hundreds of structures such as the Highland Tower Apartments in Birmingham, Alabama, indicate the trend toward lower cost per square foot construction while assuring adequate strength and safety with Truscon "O-T" Steel Joists.

Light Weight. The light weight of Truscon "O-T" Steel Joist construction lessens the time and labor required for erection and also saves materials in the supporting framework and foundations. Every detail of joists and attachments has been perfected by practical experience to simplify installation and assure dependable results.

Strength. Wide, specially formed members for top and bottom chords impart stiffness to Truscon "O-T" Joists and keep them true to line. The continuous steel web member, of uniform diameter throughout its entire length, is securely welded to the chords by means of high pressure electric automatic welding.

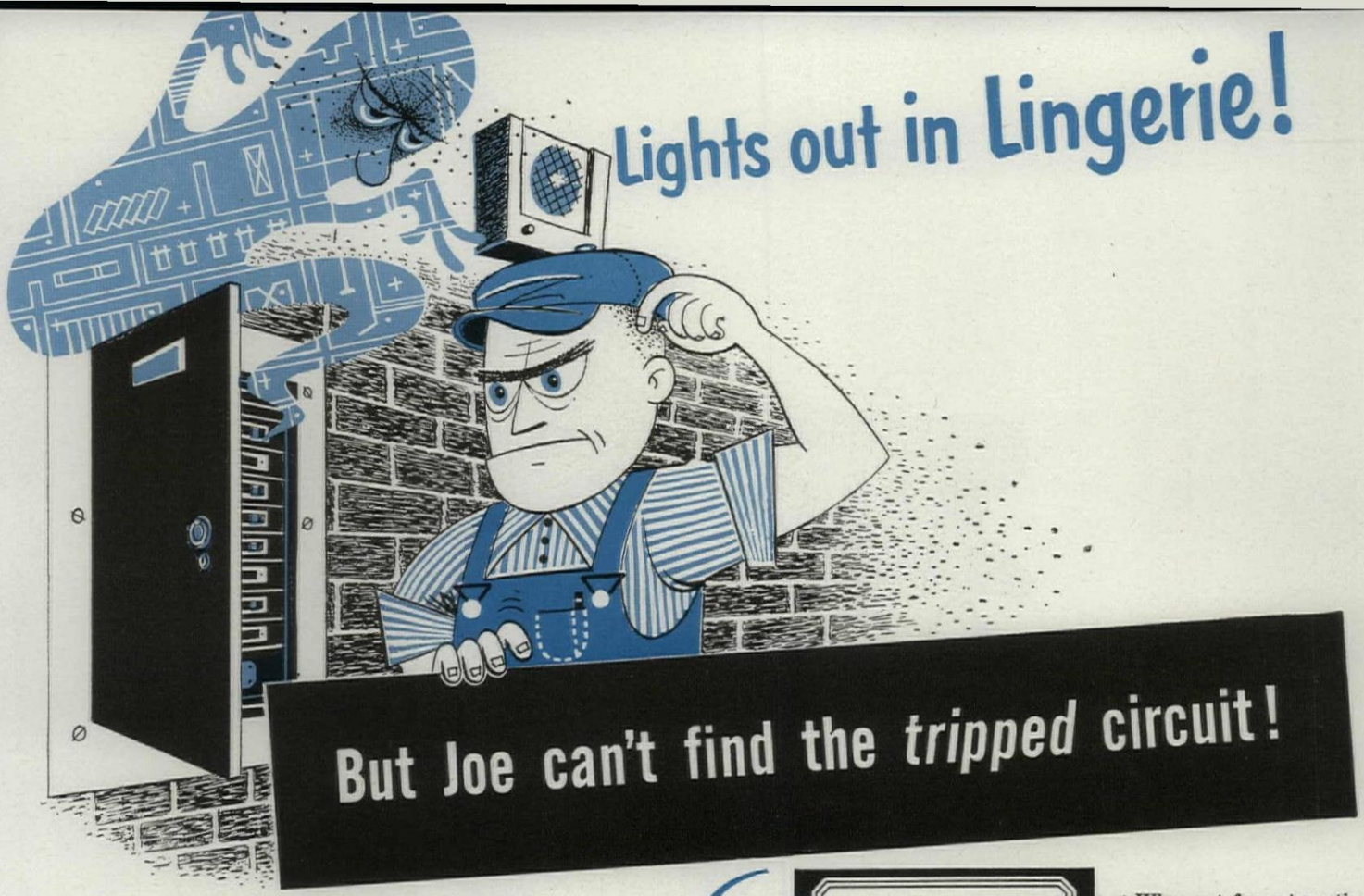
Fire Resistance. Fire tests prove that ¾ inch of cement or gypsum ceiling plaster protects Truscon "O-T" Open Truss Steel Joist Construction against high temperatures. The majority of insurance rating bureaus have recognized the merits of this construction and have accordingly given it a first-class fireproof classification.

See SWEET'S for complete specifications on Truscon "O-T" Open Truss Steel Joists. Write for illustrated literature describing the entire line of Truscon Steel Building Products.

TRUSCON® STEEL COMPANY
1102 ALBERT ST. • YOUNGSTOWN 1, OHIO
Subsidiary of Republic Steel Corporation

TRUSCON MARK OF MERIT PRODUCTS

TRUSCON a name you can build on



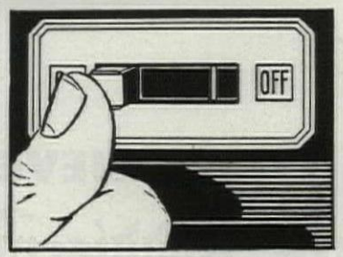
Lights out in Lingerie!

But Joe can't find the *tripped* circuit!

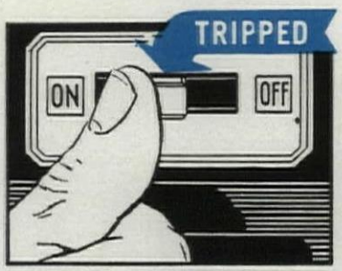
They're screaming for light in lingerie but they didn't say which block was out, so the panelboard directory is no help. And worse yet—the breakers themselves don't indicate TRIPPED—poor Joe! He just can't tell which breakers will restore service.

No need for confusion if the architect had specified 3-position I-T-E breakers throughout the entire electrical distribution system. With I-T-E, you see tripped circuits immediately, because *all* I-T-E breakers clearly show ON-*TRIPPED*-OFF. No searching or testing is necessary. Just reach out—and service is restored with the flick of the handle.

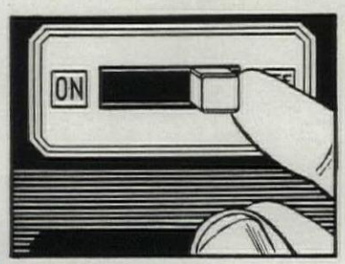
Don't let the Spec-less Spectre haunt your jobs. Make sure you specify modern, 3-position I-T-E Molded Case Circuit Breakers for all your panelboard jobs. Available from 10 to 600 amperes.



← When set for automatic over-current protection, breaker operation is similar to that of a quick make, quick break toggle switch. Note the indicator showing that the breaker is in the "ON" position.



← Upon automatic operation, the circuit breaker handle assumes a central position, clearly indicating that it has been tripped by an overcurrent. The device is operable in any position.



←To reset the breaker after automatic overcurrent operation, push the handle to the "OFF" position then back to the "ON" position. The circuit breaker cannot be held closed on an overcurrent.

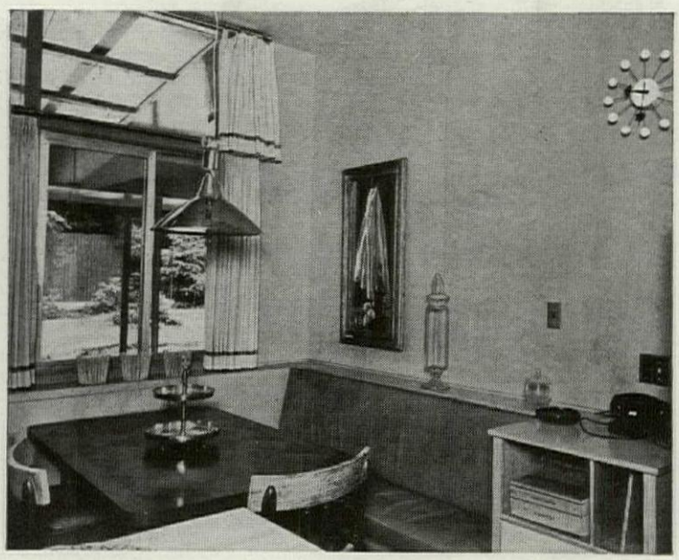
I-T-E

MOLDED CASE CIRCUIT BREAKERS

I-T-E CIRCUIT BREAKER CO. • 19th and HAMILTON STS. • PHILADELPHIA 30, PA.

CANADIAN MFG. AND SALES: EASTERN POWER DEVICES, LTD., TORONTO • EXPORT SALES: PHILIPS EXPORT CORP., N.Y. 17, N.Y.

YOU'LL NEVER NEED THESE . . .
WITH Roddiscraft PLYWOOD WALLS



NATIONWIDE Roddiscraft WAREHOUSE SERVICE

Cambridge 39, Mass. • Charlotte 6, N. C. • Chicago 32, Ill. Cincinnati 2, Ohio • Dallas 10, Texas • Detroit 14, Mich. Houston 10, Texas • Kansas City 3, Kan. • Los Angeles 58, Calif. • Louisville 10, Ky. • Marshfield, Wis. • Miami 38, Fla. Milwaukee 8, Wis. • New Hyde Park, L. I., N. Y. • New York 55, N. Y. • Port Newark 5, N. J. • Philadelphia 34, Pa. St. Louis 16, Mo. • San Antonio 6, Texas • San Francisco 24, Calif. • San Leandro, Calif.

RODDISCRAFT PLYWOOD PANELING PAYS FOR ITSELF

You can tell your clients that they'll never have to PAPER, PAINT or PATCH — when you specify walls paneled with Roddiscraft Hardwood Plywood.

Yes . . . the first cost is practically the last cost with Roddiscraft Hardwood Plywood.

Over a period of ten years or less the average cost of a paneling job will be no more than that of an ordinary plaster job using paper or paint finishes requiring constant maintenance.

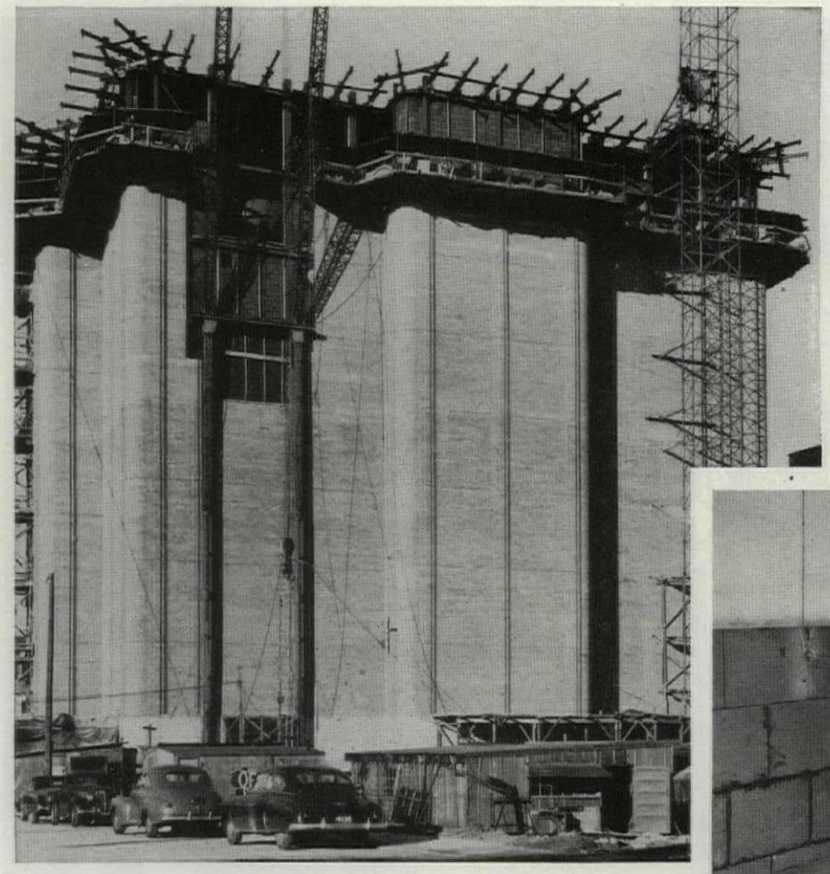
Beyond that period, the negligible amount of maintenance needed to preserve a Roddiscraft paneled wall results in real savings to the building owner.

Tell your clients about the economy features of Roddiscraft hardwood plywood paneling. It will mean client satisfaction for many years to come.

Roddiscraft

RODDIS PLYWOOD CORPORATION

Marshfield, Wisconsin



New stockhouse of the Miller Brewing Company, Milwaukee, Wisconsin, is the world's largest, with a capacity of 260,000 barrels. On walls and roof, FOAMGLAS helps maintain the required interior temperature of 20°F. Large photo shows exterior masonry wall being laid up against FOAMGLAS. The small photo shows the big light weight blocks of FOAMGLAS built up as a free-standing, self-supporting wall of insulation. Architect: Gregory G. Lefebrve, Milwaukee, Wis. Professional Engineer: Donald C. Wiggins of Lefebrve and Wiggins, Milwaukee, Wis. General Contractor: Walter W. Oeflein, Inc., Milwaukee, Wis. Insulation Contractor: Sprinkmann Sons Construction Co., Milwaukee, Wis.

Time meant money – so they saved a year

Miller Brewing Company needed an enclosed, well insulated building, and they needed it right now. By erecting free-standing walls of moisture-resistant FOAMGLAS on the steel frame, the building was ready for operation nine to twelve months ahead of schedule, even before the exterior masonry was completed.

In walls, on roofs and under floors of all sorts of structures, FOAMGLAS has proved the ideal aid for maintaining both normal and low temperatures effectively, over long periods of time. You can safely recommend it to your most exacting clients with full confidence that they—and you—will be completely satisfied.

Be sure that the latest data on FOAMGLAS is in your insulation file. We shall be glad to send you a sample of the material and copies of our latest booklets. Just drop the coupon in the mail today.

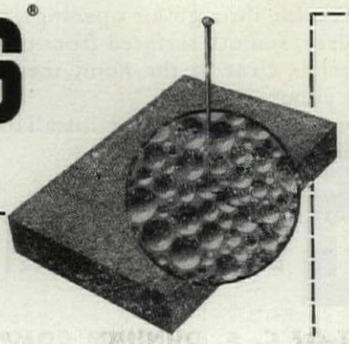
PITTSBURGH CORNING CORPORATION • PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation

The *best* glass insulation is cellular glass. The *only* cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and many other elements that cause insulation to deteriorate.



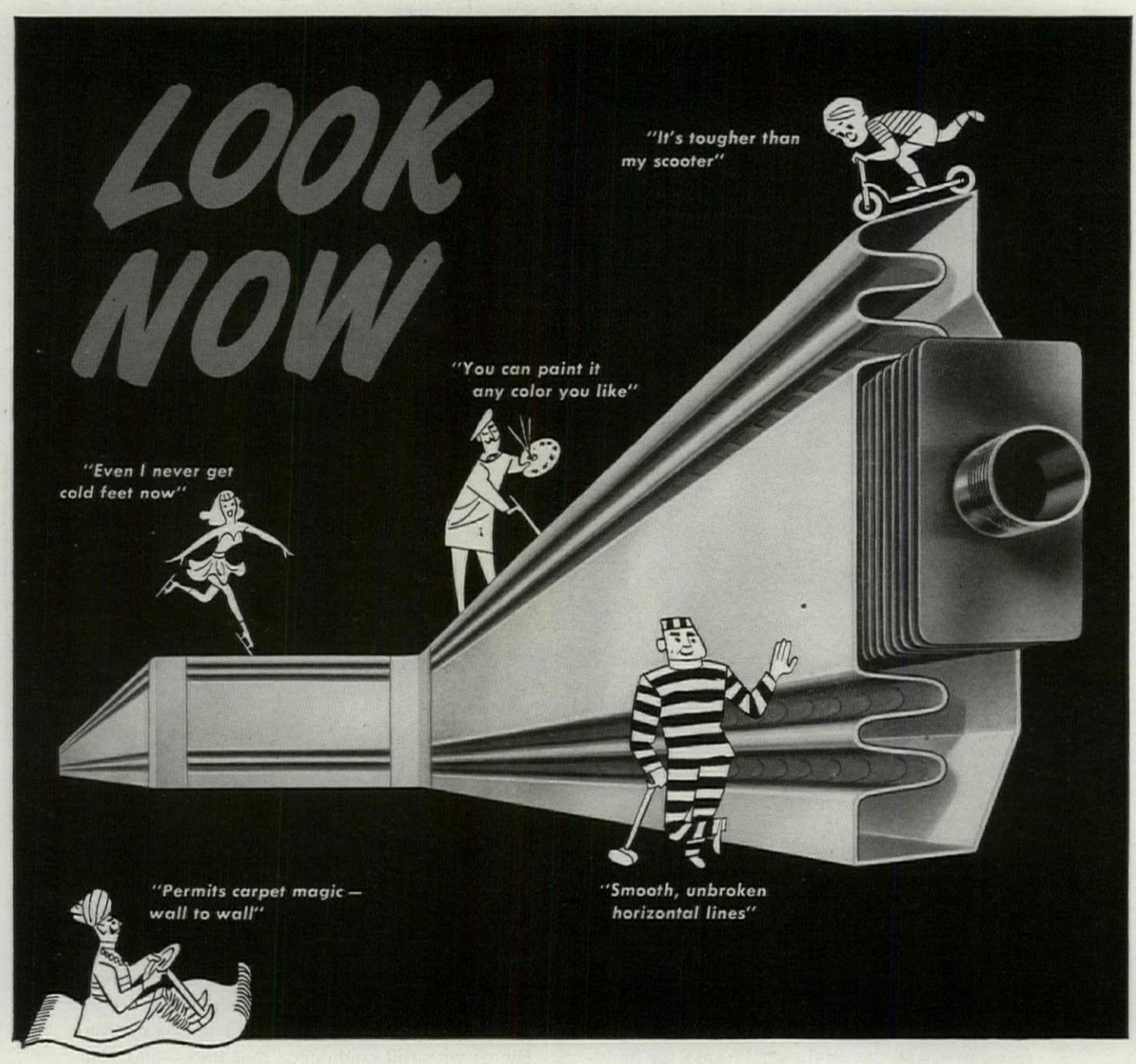
Pittsburgh Corning Corporation
Dept. C-92, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me, without obligation, a sample of FOAMGLAS and your FREE booklets on the use of FOAMGLAS for: Normal Temperature Commercial, Industrial and Public Buildings ☐ Refrigerated Structures ☐

Name.....

Address.....

City.....State.....



...if you want to see the heating element

You won't see any finned pipe heating element once you put in Dunham Baseboard. You know it's there, of course, by the way it performs.

But, once installed, Dunham Baseboard shows only straight, smooth, unbroken horizontal lines . . . no heating fins, no pipe, no piping connections are visible through air openings.

Dunham's unique, one-piece, smooth-surfaced front cover is easy to clean. Since it extends clear to the floor, there's no "cleaning under" problem, either.

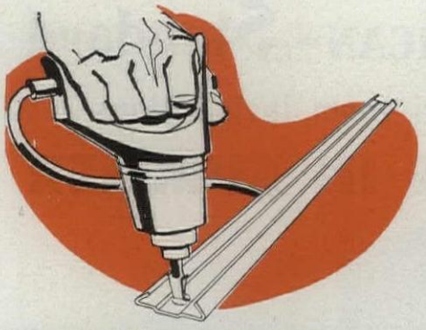
For a better looking, better heating, cleaner installation—better find out more about Dunham Baseboard.

Send for Free Bulletin

See how Dunham Baseboard fits into a wide variety of industrial, commercial, residential and institutional buildings. Complete data on materials, construction and capacities. For your free copy of Bulletin No. 639-D-5, write to C. A. Dunham Co., 400 W. Madison St., Chicago 6, Ill.

DUNHAM BASEBOARD HEATING

ANOTHER QUALITY PRODUCT OF C. A. DUNHAM COMPANY • CHICAGO • TORONTO • LONDON



JUST MOUNT THE BASE . . .

. . . LAY-IN THE WIRES

. . . PRESS ON THE CAP.

Offices of Richfield Oil Co., Los Angeles. NE 888 and 333 Metal Molding runs along ceiling and pillar at right. Left, NE Surfaceduct. Along the floor, NE 711-A Florduct.

NATIONAL ELECTRIC *raceways won this race in a walk*

TRICKY WIRING PROBLEM . . . LIMITED TIME

Richfield Oil had to contend with a tricky wiring problem—and limited time—when it leased a Los Angeles garage for temporary offices. There was no provision for light and telephone lines—and the reinforced concrete construction of the building made installation of hidden systems prohibitive.

A NEAT JOB . . . FAST!

Yet the problem was solved fast, easily, *neatly* . . . with interconnectable NE surface raceways. In some places the contractor used Surfaceduct along ceilings and down pillars; in other places two sizes of Metal Molding were used. And NE Florduct solved the problem of across-the-floor wiring to desks.

Final result was a smart, good-looking office—with adequate light, power and telephone facilities. Yet the entire job was finished well within the time deadline *at a reasonable cost.*

SEE YOUR ELECTRICAL WHOLESALER!

Whenever you have a rewiring problem in office or factory, insist on National Electric Surface Raceways. They're neat and easy to install, with *built-in* provision for fast relocation of wiring as needs change.

EVERYTHING IN WIRING POINTS TO

National Electric Products

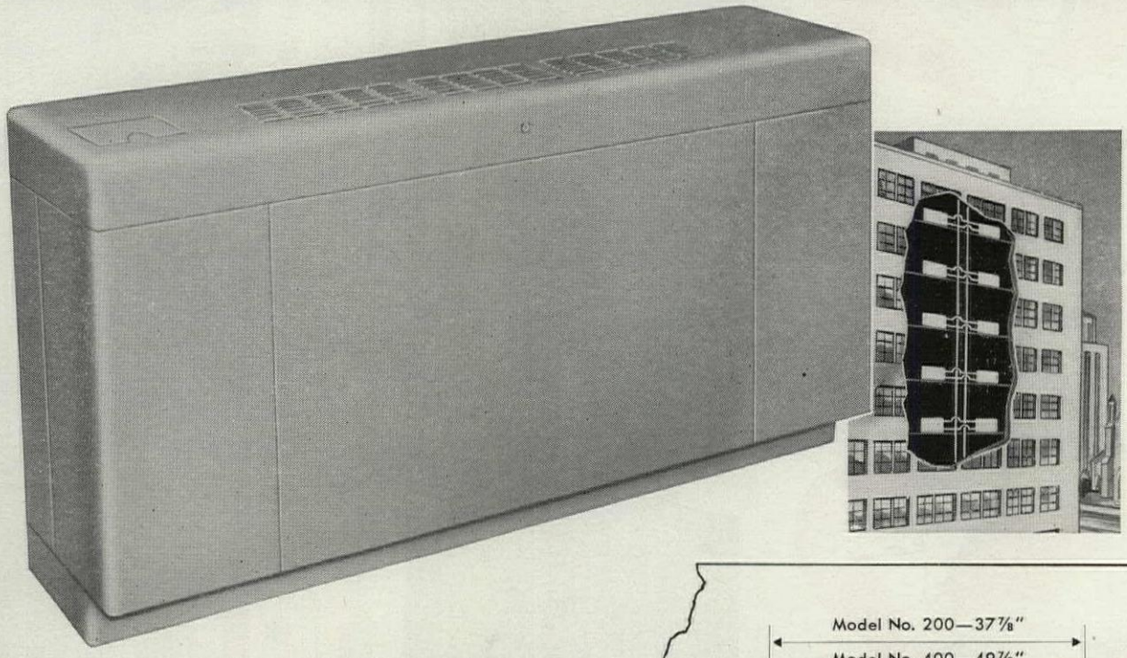
PITTSBURGH, PA.

Sold through leading electrical wholesalers everywhere.
3 Plants—6 Warehouses—42 Sales Offices

THE REMOTAIRE by AMERICAN-Standard

. . . a new remote type room conditioner for multi-room installations . . .

HEATS IN WINTER...COOLS IN SUMMER



● Here's year 'round comfort-conditioning for such multi-room installations as hotels, motels, office buildings, hospitals, apartments and residences.

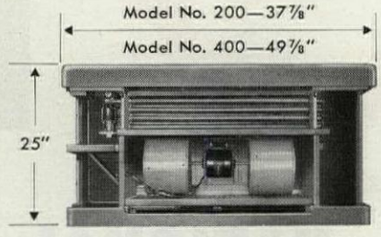
The Remotaire uses chilled or heated water supplied through a simple piping system from a remotely located central water chiller and heating plant. Designed for location under windows, the Remotaire can be free standing or recessed into the wall 4 inches.

Individual control of each unit allows the occupant to choose the room temperature that suits him best without affecting adjoining spaces.

The Remotaire is provided with an arrangement for introducing ventilation air through a wall aperture. However, ventilation air may be supplied by several other methods if desired.

Whether for modernization of an existing building, or in the planning of a new building, put this quality remote type room conditioner to work in the buildings *you* plan. For further information, send for descriptive literature—Form 298.

American Radiator & Standard Sanitary Corporation, Dept. AF-92, Pittsburgh, Pa.



THE REMOTAIRE IS SMARTLY STYLED, STURDILY CONSTRUCTED. All surfaces of the heavy-gauge furniture steel cabinet are bonderized and finished with a baked-on gray semi-gloss enamel.

IT'S EASY TO INSTALL . . . in both old and new buildings. Ventilation air can be introduced through a wall aperture or by several other methods if desired. Piping and electrical connections are easily made in spacious end compartments.

IT'S SIMPLE TO OPERATE . . . Individual control of each unit allows the occupant to choose the room temperature that suits him best without affecting adjoining spaces. Room ventilation can be adjusted with the fresh air damper located in each unit.

EASY TO CLEAN AROUND. The cabinet is designed with toe-step offset . . . allows maximum cleanliness of floor (and eliminates unsightly return air grille).

FLEXIBLE INSTALLATION. Coil is designed for either right or left hand connections and can be easily reversed in the field if necessary. Spacious end compartments with removable end panels provide ease of installation and allow more than a 90° horizontal wrench swing.

AMERICAN-Standard
HEATING-COOLING

Serving home and industry

AMERICAN-STANDARD · AMERICAN BLOWER · CHURCH SEATS · DETROIT LUBRICATOR · KEWANEE BOILERS · ROSS HEATER · TONAWANDA IRON

Lighting, Air Diffusion, Sound Control combined in a Wakefield Ceiling

Three environmental factors are controlled simultaneously by this Wakefield Ceiling:

1. From hidden fluorescent lamps, high level, low brightness light is diffused evenly through corrugated Plexiglas diffusers. Brightness contrasts are low; both direct and reflected glare are at a minimum.
2. Conditioned air is delivered into the room through the multiple openings at the edges of the corrugated diffusers. Although each of these spaces has an area of only 1.04 sq. in., their great number presents a large total area for low velocity air movement.
3. Sound is effectively absorbed by Fiberglas-filled perforated metal baffles, suspended from the diffusers.

The Wakefield method of combining efficient lighting, air diffusion and sound control in a luminous ceiling cuts building costs and results in a fixture-free, duct-free, architecturally discreet appearance.

Wakefield Ceilings have been installed in private offices, general offices, drafting rooms, art departments, display rooms, research areas, testing rooms, laboratories, control rooms, stores, auto show rooms and many other areas. *Write for your copy of a 34-page booklet. The F. W. Wakefield Brass Company, Vermilion, Ohio.*

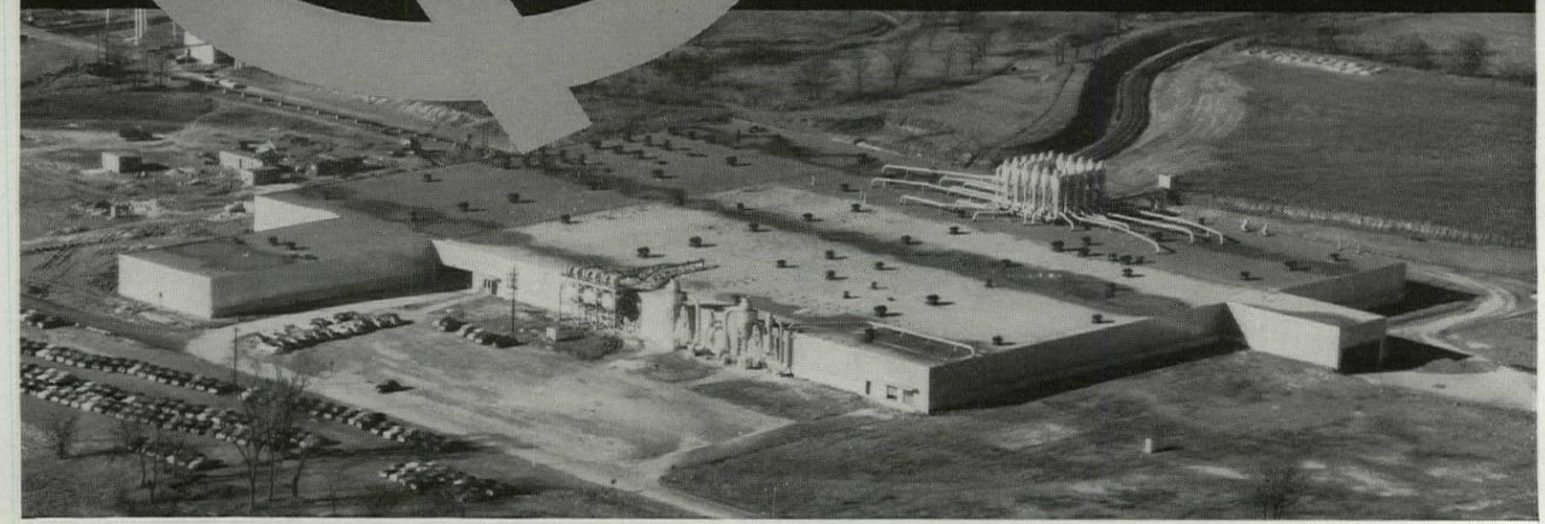
Room Area: 36'4" x 76'0"
Height of datum line: 12'6"
Height of Wakefield Ceiling: 11'0"
Distance Wakefield Ceiling to lamps: 13"
Lamps: 21 T-12 430 MA 96" Standard Cool White
Average footcandles: 45
Adaptation brightness ratios:
Ceiling 1 to 4
Baffles 1 to 1.2
Walls from 1 to 1.1 to 1 to 1.7
Background of seeing task 1 to 2.5
Seeing task 1 to 1
Floor 1 to 1.3
Furniture 1 to 3.3

THE EQUITY SAVINGS ASSOCIATION
Cleveland, Ohio
Architects:
Dalton-Dalton, Associates; Engineers
Cleveland, Ohio
Licensed Installer:
The Parker Electric Company
Cleveland, Ohio
Licensed Agent:
The General Electric Supply Company
Cleveland, Ohio

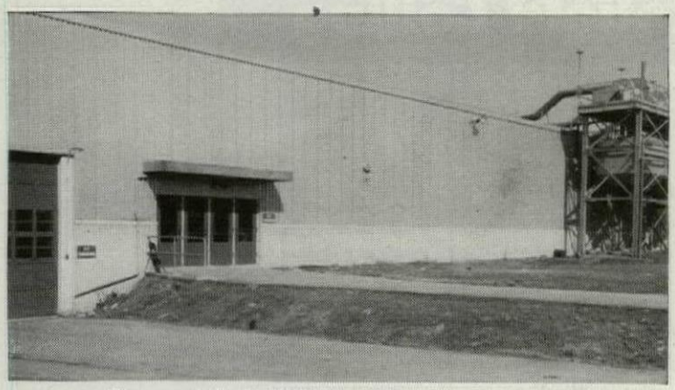
Wakefield Over-ALL Lighting

HOW TO ANTICIPATE PLANT EXPANSION

Q-PANELS



Air view of the FORMICA COMPANY'S building. Walls of Q-Panel were detached, moved forward and used again on the addition. A Q-Panel wall has the quality of a permanent wall but with the additional advantage of being removable to provide for plant expansion.



Close-up of the FORMICA plant shows the neat and attractive design formed by continuous Q-Panel fluted texture. Architects have achieved a great variety of design by combining Q-Panels with other materials for decorative effect.

From left to right—Mr. D. J. O'Conor, President of the FORMICA COMPANY, Mr. A. M. Kinney, President of A. M. Kinney, Inc., which designed the FORMICA plant and Mr. George H. Clark, Vice President in charge of engineering of the FORMICA COMPANY.

The FORMICA COMPANY built its new Cincinnati plant with Q-Panel walls, later removed the Q-Panels from two sides and re-used them on the addition. Note, in the air view, the older section has a lighter colored roof than the newer section.

ROBERTSON Q-PANELS can be taken down as easily as they can be erected—which is about nine minutes for a fifty-square-foot unit by a crew of only four men. Q-Panels provide you a good-looking wall, with erection and maintenance features that solve the peculiar construction problems which have arisen in the last ten years.

Q-Panels lend themselves to a great variety of designs. They are available in several fluted patterns. They require no maintenance, arrive at the site ready for erection either as a factory-assembled panel or a field-assembled panel. Do you have the details in your file?

Q-PANEL FACTS

MATERIALS—Metallic-coated Steel, Galbestos, stainless steel, aluminum on one or both sides.

SIZE—2'0" standard width. Lengths up to 25'0", depending on material used.

WEIGHT—Varies with metals selected but averages 4½ lbs. per square foot.

INSULATION VALUE—Superior to 12" of masonry with furred plaster. U-Factor—.14 B.T.U. in aluminum—.18 B.T.U. in steel.

STRENGTH—Great strength permits widest spacing of horizontal supports to meet the required wind load.

Write for Latest Catalog

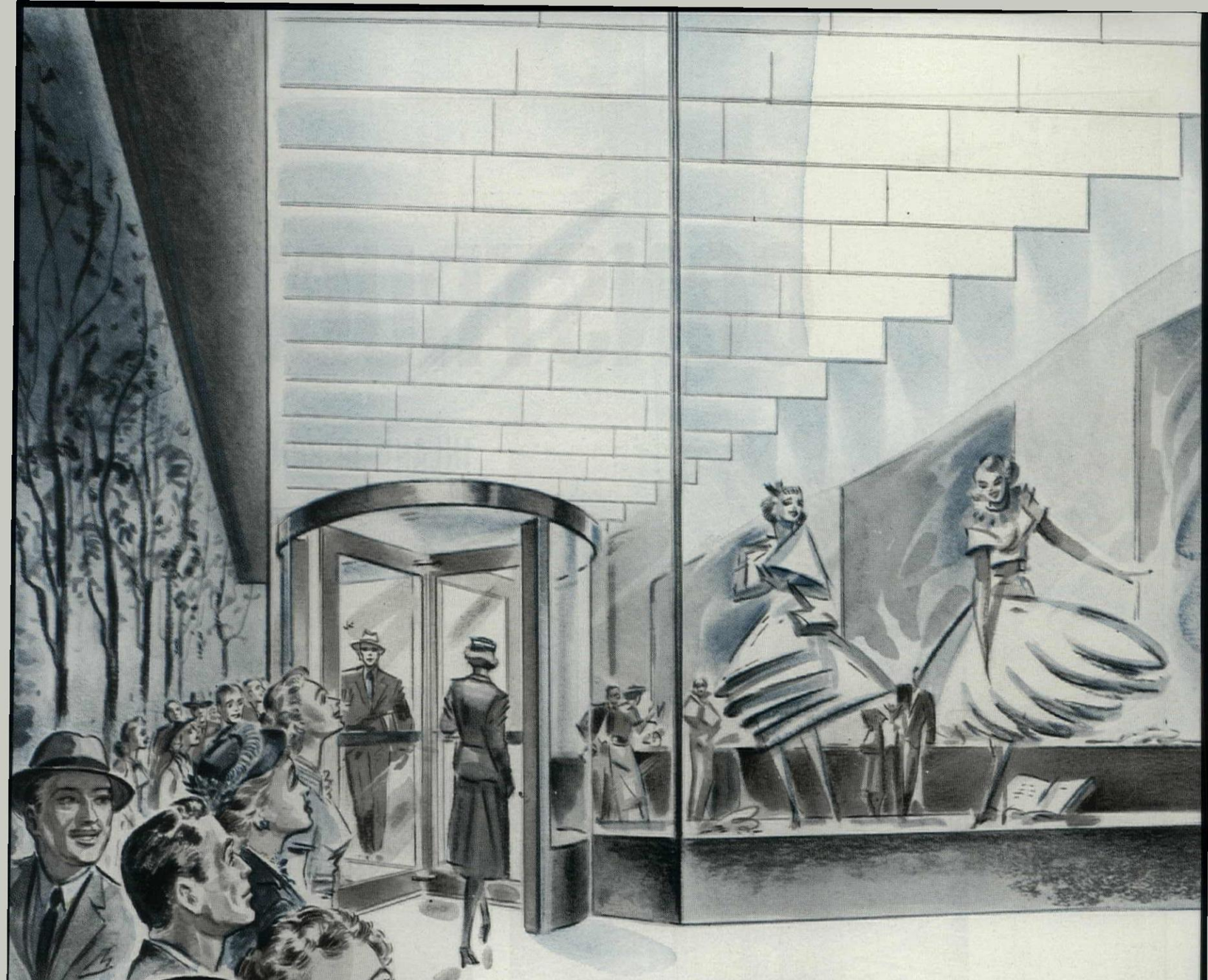
Q-PANELS

H. H. ROBERTSON CO.

2403 Farmers Bank Building
Pittsburgh 22, Pennsylvania

Offices in ALL Principal Cities in the U.S.A. and Canada

World-Wide Building Service



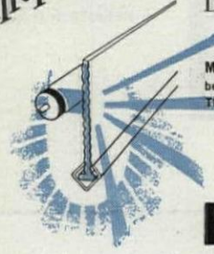
a new trend in better seeing
. . . through better comfort-brightness balance

More comfortable seeing means better living for Americans in all walks of life. It means quicker, easier, right-the-first-time selections for millions of shoppers. It means effortless learning to America's school kids. It means a new freedom from eye fatigue to the legions of office workers across the nation.

Benjamin "Grid-Lite" provides this much wanted, much needed seeing comfort by achieving a new high in comfort-brightness balance. Translucent diffuser shields are the secret! These make possible high light levels without awareness of the fact . . . more footcandles on the working surface without annoying brightness.

Benjamin "Grid-Lite", because of its variety of channel sizes and lamp lengths, adapts to practically any size room and location. Write for a free copy of Bulletin AD 5880. Benjamin Electric Mfg. Co., Dept. YY, Des Plaines, Illinois.

Improved Seeing Comfort means better Living for millions of Americans



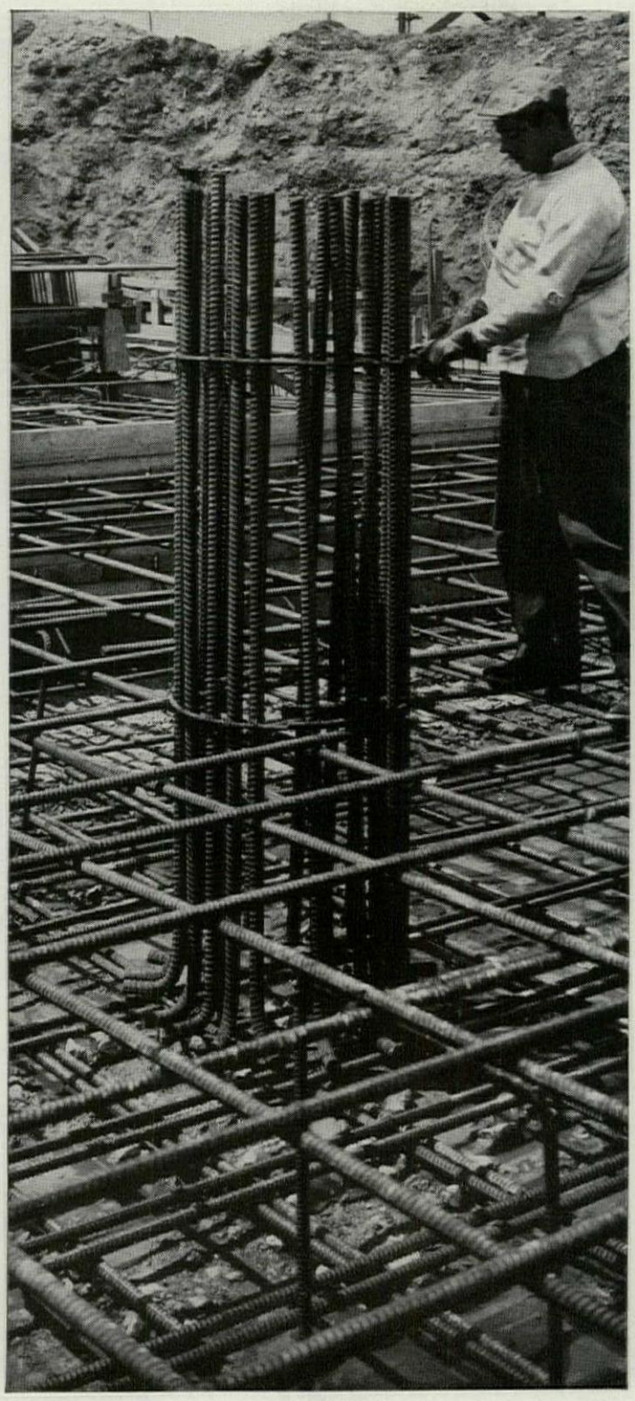
MORE LIGHT but LESS BRIGHT
because of these
TRANSLUCENT DIFFUSER-SHIELDS!

BENJAMIN "Grid-Lite" SYSTEMS

Sold Exclusively Through Electrical Distributors

B 6046

CONSTRUCTIVE



INLAND HI-BOND

The deep, reversed, double-helical ribs of Hi-Bond reinforcing bars provide a mechanical grip which gives maximum bond in concrete, thus permitting greater use of steel's potential strength in concrete construction. It also improves transfer of stresses, crack control and resistance to slip . . . advantages that will make possible higher design stresses and thereby lower construction costs. Hi-Bond meets standards set up by ASTM A 305.

INLAND STRUCTURAL SHAPES AND PLATES

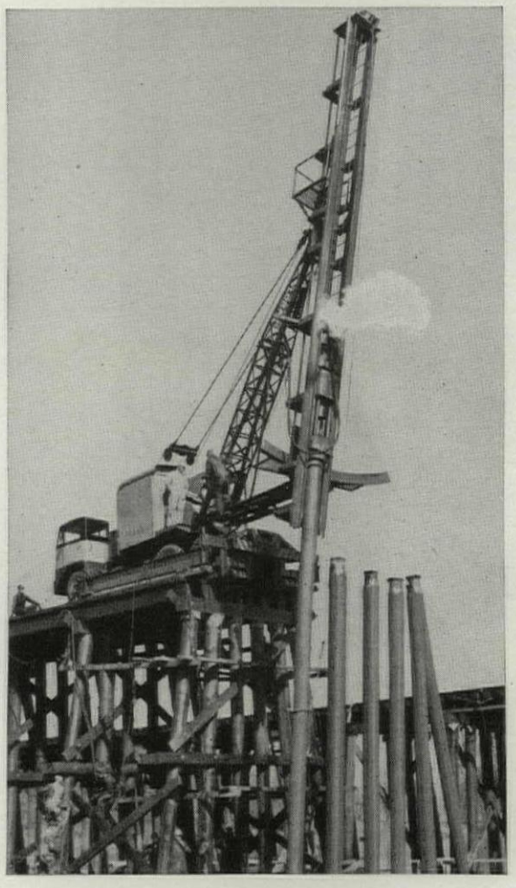
Inland's service on structurals and plates meets the most exacting requirements of today's construction and heavy equipment industries . . . in dependability of product and engineering cooperation with users. I-Beams, Angles, Channels and other standard structural sections, in a wide range of sizes, are rolled to all the standard specifications . . . also in Inland Copper-Alloy for increased resistance to atmosphere corrosion.

INLAND

IDEAS

INLAND 4-WAY SAFETY PLATE

On scores of products, on new bridges, in new buildings—and for replacement, maintenance and repair—this scientifically designed steel floor plate, with its exclusive raised lug pattern, provides positive traction in every direction. Tough, durable, strong, it stands up under heavy loads and hard wear. It can be readily sheared, welded, punched, flame cut, and shaped. It has no pores, no cracks, absorbs no liquids and is easy to sweep. Comes in a wide variety of patterns and sizes. Write for Bulletin FI.



INLAND CREOSOTE OIL

For better, longer-lasting preservation of timbers and wood piling. Inland-owned-and-operated coal mines, coke ovens and tar distillation equipment assure quality control at every step in production of Inland Creosote Oil. Its low benzol insoluble content of about 0.1% (American Wood Preservers Association specifications permit 0.5%) gives clean, deep-penetrating, longer lasting preservation.

INLAND SHEET PILING

Taking the punishment of driving and pulling—being driven, pulled and re-driven as many as 15 times—Inland Sheet Piling has been used and depended on by piling contractors for more than 25 years. Made with highly efficient interlocks for water retention, it gives excellent service on single and double wall cofferdams, cellular breakwaters, jetties, docks, bulkheads and retaining walls. Rolled from a special analysis steel, with the strength, toughness and uniformity to withstand extreme and continued stresses. Available with all necessary sheet piling accessories. In Inland Copper-Alloy, at slight additional cost. And Inland sheet piling specialists with broad experience are available to help you on sheet piling problems. Write for Booklet SP2.

INLAND STEEL COMPANY
38 S. Dearborn Street, Chicago 3, Illinois

LEVER HOUSE

combines safety and beauty with Weldwood® Fire Doors

The ultra-modern new LEVER HOUSE, in New York City is beautiful throughout. It is also smoothly *functional* and *safe* from top to bottom.

In fact, it was for these three qualities... beauty, utility and safety... that LEVER HOUSE selected Weldwood Fire Doors.

These *wood-faced* fire doors carry the Underwriters' Label for all Class B and C openings. Should a fire break out in any of the offices, it would be isolated. Should it attempt to invade from elsewhere, Weldwood Fire Doors, with their remarkable mineral core, stand ready to give the kind of protection for which they are famous.

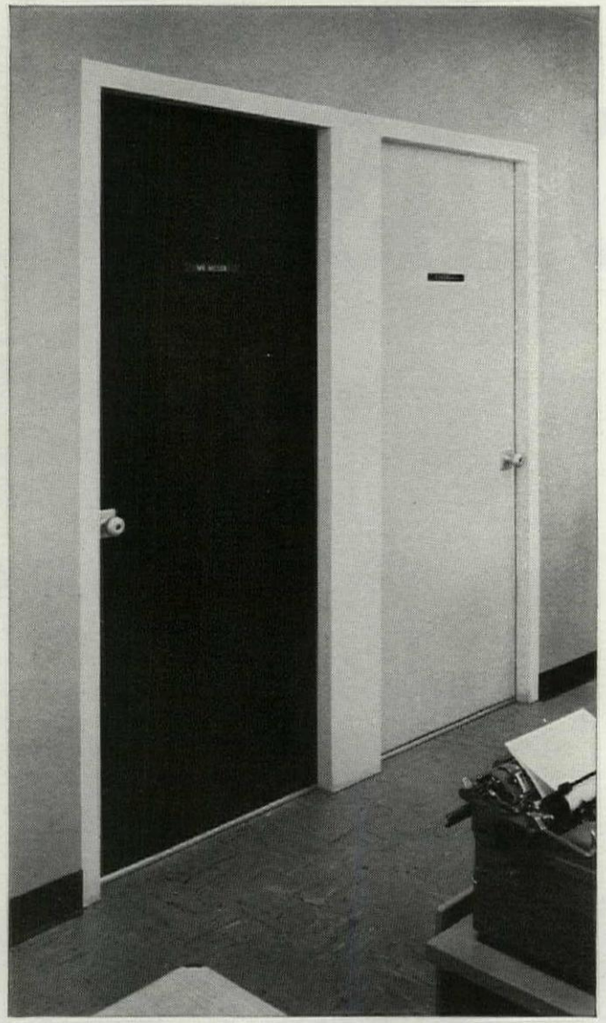
In addition, the Weldwood Fire Door is so dimensionally stable that when properly installed, it is guaranteed not to warp for the life of the installation.

Also, it is lighter in weight than other fire doors, which means that it opens and closes more easily.

The Weldwood Stay-Strate Door is available in the same wide range of beautiful hardwood faces as the Weldwood Fire Door... and offers the same advantages except that the edge banding is not fireproofed.

Like the Weldwood Fire Door, it has striking beauty...unusual light weight...exceptional stability ...extraordinary durability... and is proof against rot, vermin and decay.

Send for complete information about both these Weldwood Flush Doors today.



Weldwood Fire Doors in the LEVER HOUSE, New York City. Arch: Skidmore, Owings & Merrill.

WELDWOOD® FLUSH DOORS

Manufactured and distributed by

UNITED STATES PLYWOOD CORPORATION

World's Largest Plywood Organization

55 West 44th Street, New York 18, N. Y.

Branches in Principal Cities • Distributing Units in Chief Trading Areas • Dealers Everywhere

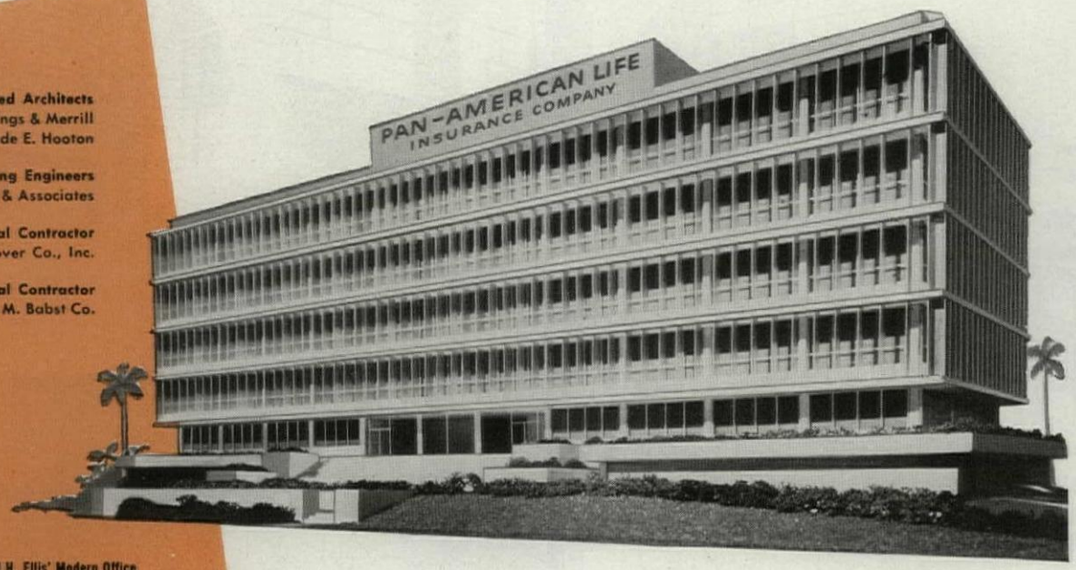
United States Plywood Corporation carries the most complete line of flush doors on the market, including the famous Weldwood Fire Doors, Weldwood Stay-Strate Doors, Weldwood Staved Lumber Core Flush Doors and Mengel Solid Core and Hollow Core Flush Doors, 1⅜" and 1¾" with a variety of both foreign and domestic face veneers.

Associated Architects
Skidmore, Owings & Merrill
Claude E. Hooton

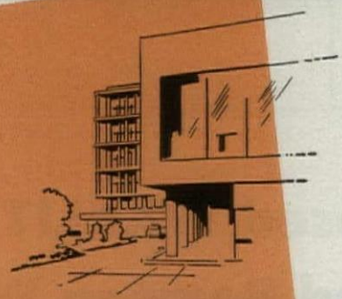
Consulting Engineers
Cary B. Gamble & Associates

General Contractor
George J. Glover Co., Inc.

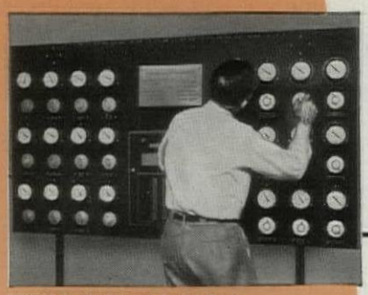
Mechanical Contractor
Emile M. Babst Co.



President Crawford H. Ellis' Modern Office



Typical Clerical Space



POWERS Air Conditioning Control Panel

POWERS air conditioning control

Helps Insure Maximum Comfort and Efficiency in

Famous PAN AMERICAN LIFE INSURANCE CO. Building
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In this unique louvered structure comfortable temperature and humidity conditions are assured regardless of the weather outdoors.

Employees are more efficient and alert, make fewer mistakes and turn out a better day's work in properly air conditioned work spaces.

Prominent insurance companies from coast to coast have found the year after year accuracy of dependability of Powers equipment a very profitable investment.

When problems of temperature and humidity control arise, contact Powers' nearest office. Our more than 60 years of experience gained in all types of prominent buildings may be helpful to you.

THE POWERS REGULATOR CO., SKOKIE, ILLINOIS
OFFICES IN OVER 50 CITIES
SEE YOUR PHONE BOOK

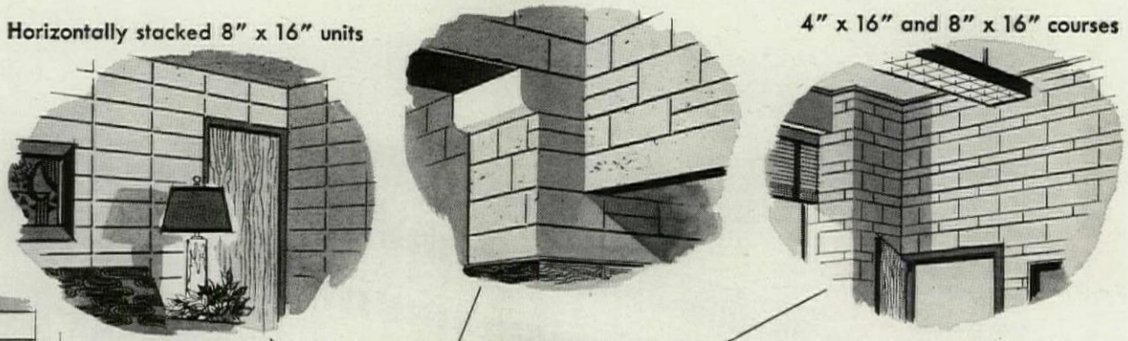
(a82)

POWERS CONTROL

Coursed Ashler variation with 4" & 8" units

Horizontally stacked 8" x 16" units

4" x 16" and 8" x 16" courses

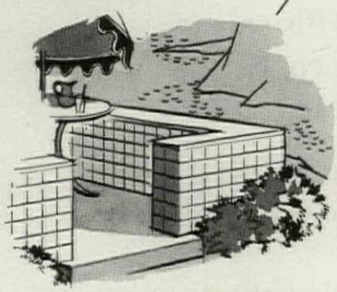


Basket-weave using 8" x 16" units

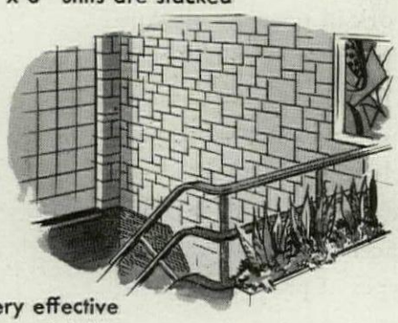
Theme and Variations

THE FAMILIAR THEME—8" x 16" FACE UNITS IN RUNNING BOND

Tooled horizontal joints; verticals wiped out



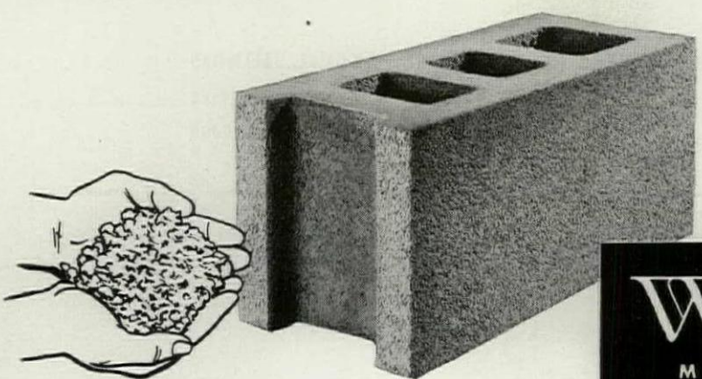
Here 8" x 8" units are stacked



A very effective patterned Ashler

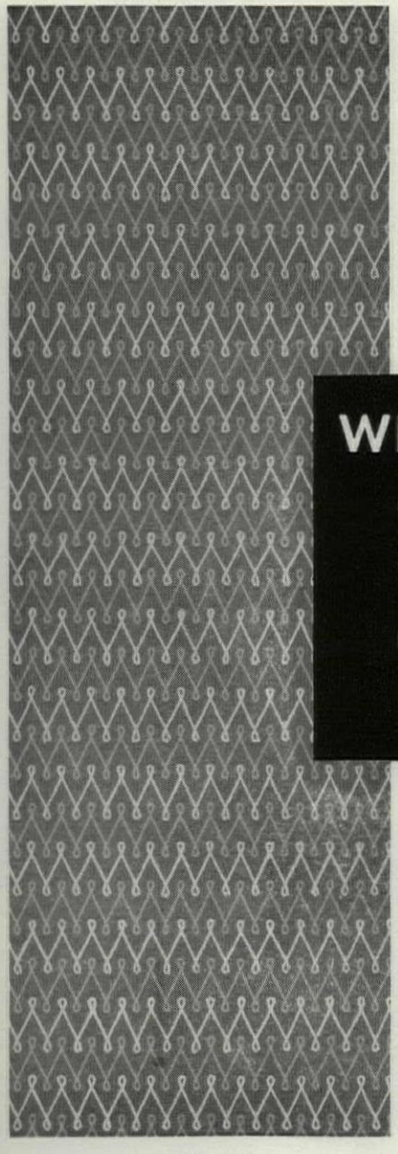
...with exposed WAYLITE Partitions and Bearing Walls

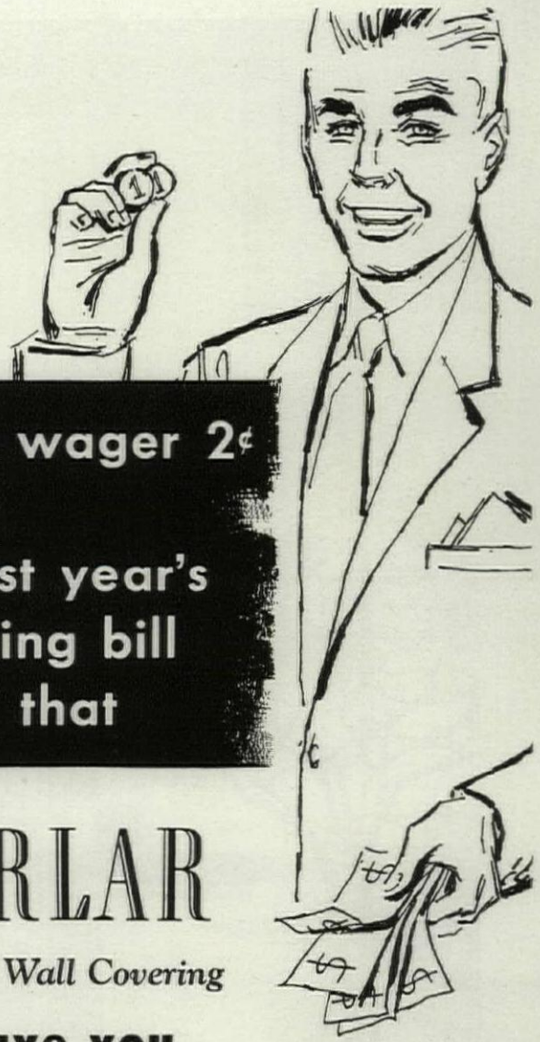
The vast musical literature of the world is limited to a maximum of 13 tones in any one octave . . . similarly there is a very wide range of harmonious effects to be obtained with Waylite masonry walls of any thickness . . . a few of the different handlings are shown here . . . they are achieved very simply. . . . Waylite masonry has adequate structural strength—superior thermal insulative qualities—and exposed Waylite interior walls need no acoustical treatment. The Waylite Co., 105 W. Madison Street, Chicago, or Box 30, Bethlehem, Pa.



WAYLITE

MASONRY UNITS





WILL you wager 2¢ against your last year's decorating bill that

VARLAR

Stainproof Wall Covering

can save you thousands of decorating dollars!

Varlar ENDS the wall soil hazards that run maintenance costs sky high . . . because Varlar is actually STAINPROOF! Smoke, grime, grease, crayon, lipstick, ink, Mercurochrome . . . and countless more stains that deface other walls . . . simply wash off Varlar with ordinary soap and water . . . up to 25,000 times without injury to surface or colors ! And, Varlar never fades . . . never streaks ! More than 180 extremely smart styles, including the distinctive new Travelers' Collection . . . give personalized, liveable interiors that are beautiful indefinitely. Decorate with Varlar and you'll redecorate only with plain soap and water . . . year after year.

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FREE TESTING SAMPLE *of*

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Please send FREE TESTING SAMPLE and full information on VARLAR Stainproof Wall Covering. I am particularly interested in VARLAR for

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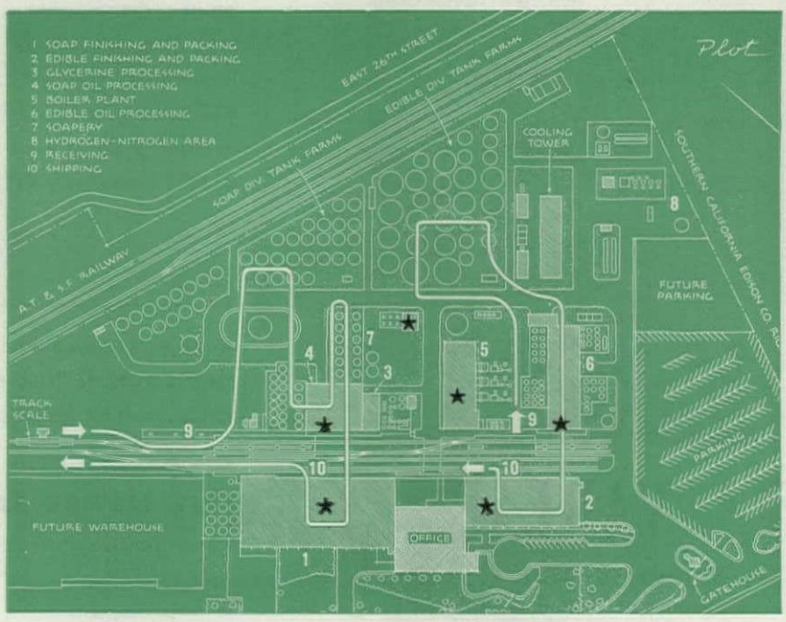
*City*_____ *Zone*____ *State*_____

VARLAR

Stainproof Wall Covering
a product of United Wallpaper, Inc.

Office building of the new Lever Brothers plant, Los Angeles, California, reflects the trend of today's industrial design.

★ Six Westinghouse Power Centers, spotted in black, are the heart of the plant's electrical distribution system which provides reliable service under all conditions.



PLANNED POWER PAYS

They matched modern plant design with modern power distribution

This 25-million-dollar Lever Brothers plant incorporates the most modern advances in design, layout and construction methods. And its system for distributing electrical power is as modern as the plant—assuring uninterrupted service under all conditions.

The secondary network system was specified in the early planning days by Bechtel Corporation—the engineers and constructors—with Westinghouse assistance. It contains six interconnected power centers that maintain service even though an electrical disturbance may fault a primary line. Secondary faults are isolated quickly. The ultimate in reliable power is assured.

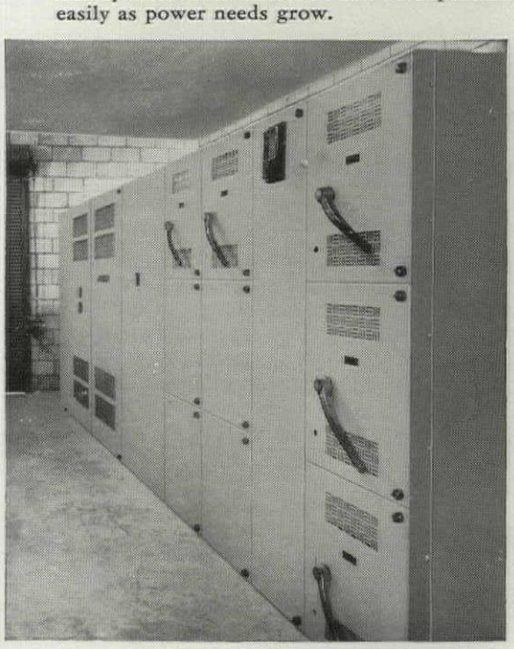
Early planning has also taken full advantage of the flexibility of factory-assembled Westinghouse Power Centers. These compact, standardized units save valuable space . . . minimize layout problems. Their dry-type transformers permit them to be located safely anywhere in the plant. Additional units can be added easily, as loads and capacity increase.

CONSIDER THIS: A plant's distribution system is a vital design consideration. It must be planned at the blueprint stage . . . treated as an integral part of the building or expansion program. Today, the power needs of a modern plant require this kind of planning—coupled with completely co-ordinated equipment.

Westinghouse offers you assistance on *both* of these requirements . . . and backs them with years of experience, gained throughout all industry. You benefit by getting more freedom in design techniques . . . by providing your customer with the best system economically possible for *his* plant.

There is one best system of distributing electrical power for *every* plant. Let Westinghouse help you select it on your next job. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94955

Space problems were minimized with six of these compact Westinghouse ASL Dry-Type Network Power Centers. They are standardized, factory-assembled units . . . can be expanded easily as power needs grow.



YOU CAN BE SURE... IF IT'S

Westinghouse

SYSTEM PLANNING

Sloane Koroseal Tile Supreme is installed throughout the Western Printing and Lithographing Co. building in Racine, Wisconsin . . . in all corridors and attractive offices, as well as the main entrance and handsome lobby shown above.

The floor that always makes a *grand entrance!*

KOROSEAL TILE SUPREME

provides luxurious beauty and quiet, underfoot comfort . . . defies heavy traffic . . . saves money through years of service and low-cost care.

A Sloane Koroseal Tile Supreme floor provides greater beauty . . . more service and economy than any other resilient floor made. Its all virgin-vinyl composition has unmatched color-clarity . . . plus unequalled toughness that assures service long after most resilient floors require repair and replacement. Grease, oil, acid, alkalies and strong soaps will not affect Koroseal Tile Supreme . . . the through-and-through colors won't fade or stain . . . and tests show that its indentation recovery is far superior to any other resilient floor.

You save money year after year on maintenance because the nonporous surface of Koroseal Tile Supreme stays beautiful with a minimum of care . . . dirt can't cling to it, or mar the smooth, tough surface . . . soap and water mopping keeps it clean and bright . . . even occasional waxing is optional.

Sloane Koroseal Tile Supreme comes in a beautiful range of 18 striking colors—either Marbletone or Crystaltone effect.

Send for complete details. Write Sloane-Blabon Corporation, Dept. F9, 295 Fifth Avenue, New York 16.

SLOANE Quality PRODUCTS

SLOANE *Koroseal** TILE SUPREME

*Koroseal is a registered trade-mark of The B. F. Goodrich Company.

SLOANE-BLABON CORPORATION • A DIVISION OF ALEXANDER SMITH, INC.

FINELINE • TEXFLOOR • TERANO • KOROSEAL TILE • RUBBER TILE • TREN-FLEX TILE • TRENWALL • TRENTONE

STOCKS OF COPPER are already in better shape at wholesale outlets. Contractors can now bid on the basis of adequate supplies of copper.

COPPER IS NEWS!

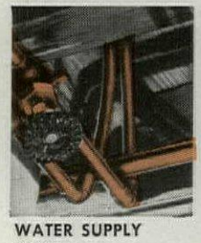
New NPA ruling substantially increases amount of copper permitted for residential work—and new Anaconda production facilities will help keep copper supplies rolling.

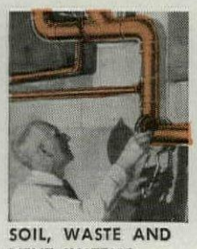
The amount of copper now allowed per family dwelling unit virtually means that once again copper may be used for all water piping, for soil, waste and vent lines, and for all sheet metal work required for the average-sized residence. And copper will continue to be available from Anaconda's new production facilities, such as the Greater Butte Project, the Chuquicamata development in Chile and Anaconda's newly modernized tube and rolling mills.

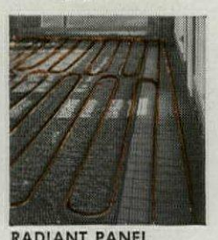
Now you can assure your clients that their plumbing and sheet metal work will give lasting service. For you can specify copper knowing that its labor-saving economy will add little, if any, to the total cost of their homes.

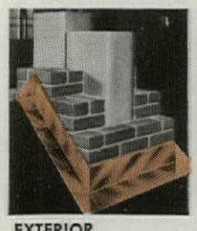
Every home you design is a *better* home when you specify copper. Every *client* becomes a more *satisfied* owner as year after year his plumbing and sheet metal work requires no attention or expense due to rust deterioration. The American Brass Company, Waterbury 20, Connecticut. 5205

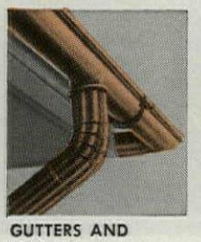
Don't forget—now you can use copper for:

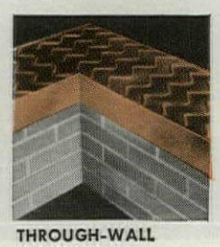

WATER SUPPLY LINES


SOIL, WASTE AND VENT SYSTEMS


RADIANT PANEL HEATING


EXTERIOR FLASHING


GUTTERS AND LEADERS


THROUGH-WALL FLASHING

BUILD IT BETTER WITH

ANACONDA®

COPPER

4 new apartments in a typical American City use 838 Dwyer Kitchens

Sherwood Apartments
109 Dwyer Kitchens

Shoreland Towers
238 Dwyer Kitchens

Essex House
390 Dwyer Kitchens

Frontenac Apartments
101 Dwyer Kitchens

All recently completed in Indianapolis, Indiana

With Dwyer Kitchens, builders of outstanding apartments win the triple triumph of conserving precious space, of providing luxury kitchen facilities for residents . . . of insuring enduring economy of operation and maintenance.

In compact units, from 4 to 6 feet wide, Dwyer Kitchens combine electric or gas range, refrigerator up to 6 cubic feet capacity with freezer compartment and push-button door, streamlined sink and range top and cupboard space.

Exclusive with Dwyer Kitchens are fronts and worktops of genuine vitreous porcelain. Never need repainting, dirt and soil wash off . . . and the gleaming whiteness lasts forever.

Write today for new illustrated brochure: "From Apartment on the Drive to Cabin in the Woods."

DWYER

PRODUCTS CORPORATION

Dept. AF952, MICHIGAN CITY, INDIANA

Sanymetal*...

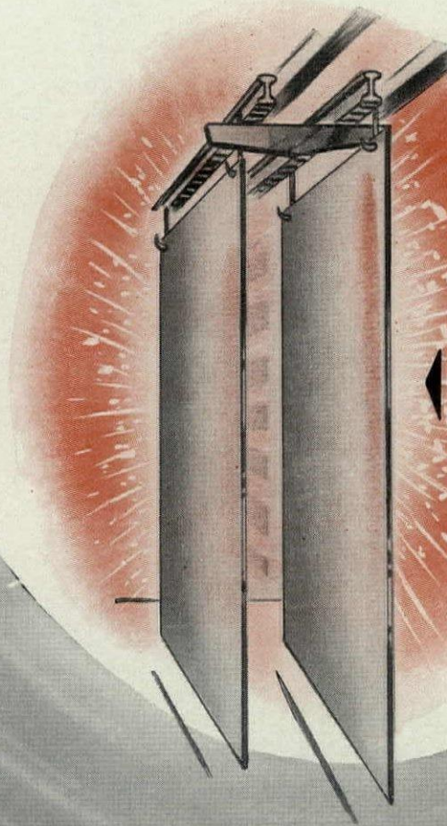
* Trade Mark Registered

...uses the ageless and fadeless material

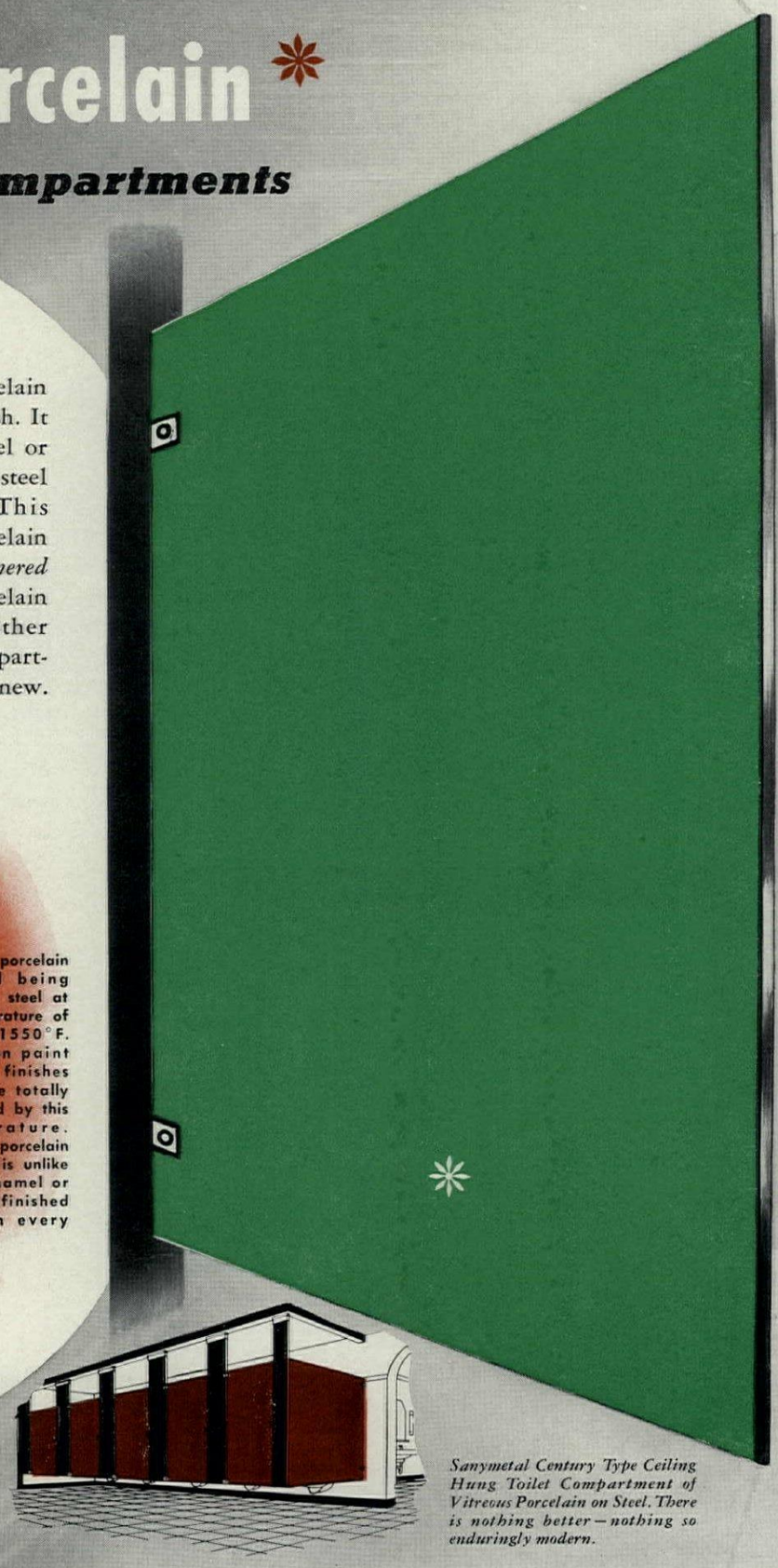
Vitreous Porcelain *

on steel for toilet compartments

Sanymetal "Porcena" (Vitreous Porcelain on Steel) is a *material,* not merely a finish. It is in every respect unlike *painted* enamel or lacquer finished steel because it is fused to steel at a temperature of 1350°-1550°F. This impregnates the steel with vitreous porcelain enamel to the extent that it *cannot be hammered out.* Sanymetal "Porcena" (Vitreous Porcelain on Steel) is incomparable with any other material commonly used for toilet compartments. It is a lifetime material that stays new.



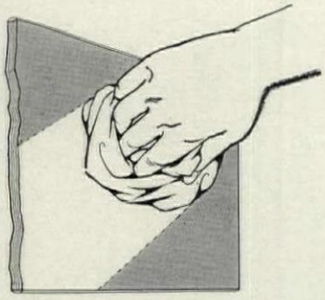
Vitreous porcelain enamel being fused to steel at a temperature of 1350°-1550°F. Baked-on paint enamel finishes would be totally destroyed by this temperature. Vitreous porcelain on steel is unlike *paint* enamel or lacquer finished steel in every respect.



Sanymetal Century Type Ceiling Hung Toilet Compartment of Vitreous Porcelain on Steel. There is nothing better—nothing so enduringly modern.

Name a material that can equal it!

Sanymetal uses vitreous porcelain on steel for toilet compartments not only for its enduring beauty and fadeless colors, but because of its durability, low cost maintenance, cleanliness, resistance to acids, defacement and abuse. Vitreous porcelain on steel is a product of the white heat of the enameling furnace that is as new as tomorrow—and as old as time! *No other material is so ideally suited for toilet compartments because it provides the utmost in sanitation and a degree of protection against obsolescence that is otherwise unobtainable.* The sure way to perpetual cleanliness and a strictly modern rest room is to install Sanymetal Vitreous Porcelain on Steel Toilet Compartments. They are suitable and practical for all types of buildings—even for rest rooms and shower rooms in industrial plants.



Vitreous porcelain on steel provides these features that *cannot be duplicated by any other material* suitable for toilet compartments:

It is a non-porous material with the hardness of glass and the strength of steel.

It greatly exceeds the strength and durability of other materials; often acclaimed as a lifetime material because it does not fade, stain, rust or discolor.

It reduces the cost of maintenance to an all-time low; it is impervious to moisture, odors, ordinary acids, oils and grease, and is scratch resistant.

Its flint-hard, glass smooth surface can be kept as immaculately clean as a china plate. No pores to collect dirt, harbor germs or absorb odors and moisture.

Its gleaming, colorful beauty does not depreciate; vitreous porcelain on steel is the ageless finish of fadeless colors and will not tarnish or peel.

Sanymetal "Porcena" (Vitreous Porcelain on Steel) Toilet Compartments are available in several different styles and a wide range of fadeless colors (refer to Sanymetal Catalog 89 for complete range of exact colors). Only Sanymetal offers "Porcena" (Vitreous Porcelain on Steel) Toilet Compartments. Ask the Sanymetal Representative in your vicinity to demonstrate the unusual and exclusive features of Sanymetal Vitreous Porcelain on Steel Toilet Compartments.

A FEW BUILDINGS, SELECTED FROM HUNDREDS, IN WHICH SANYMETAL PORCENA TOILET COMPARTMENTS HAVE BEEN INSTALLED:

Newark City Hall, *Newark, N. J.* • Virginia Polytechnic Institute, *Blacksburg, Va.* • Baker Hotel, *Dallas, Texas* • Southern Railway System, *(Several Locations)* • Hill School, *Sandusky, Ohio* Norfolk & Western Railroad, *Portsmouth, Ohio* • Krauss Dept. Store, *New Orleans, Louisiana* Pennsylvania Railroad, *(Several Locations)* • Charlotte Memorial Hospital, *Charlotte, No. Carolina* Scott Paper Co., *Chester, Pa.* • Y. M. C. A. Bldg., *Springfield, Ill.* • Pacific Telephone & Telegraph Co., *Los Angeles, Calif.* • Lever Bros. Co., *Los Angeles, Calif.* • Otis Elevator Co., *New York, N. Y.* Kiplinger's Agency Building, *Washington, D. C.* • Stonecutter Mills Corp., *Spindale, No. Carolina*

THE SANYMETAL PRODUCTS COMPANY, INC.

1687 Urbana Road, Cleveland 12, Ohio

Sanymetal*

* Trade Mark Registered

Toilet Compartments, Shower Stalls and Dressing Rooms

YOUR CLIENTS SHOULD KNOW ABOUT

THESE USER-OWNED TELEPHONE SYSTEMS

FOR THEIR PLANTS, OFFICES, SCHOOLS

P-A-X Business Telephone Systems make any building *more efficient*

Inside telephone facilities will repay your careful attention in the planning of any building. For a properly designed inside telephone system—*entirely separate from the city telephones*—will make any building *work better!*

Hundreds of industrial, business and institutional organizations have learned this for themselves. They have stepped up work flow—tightened management control—improved customer service—with company owned P-A-X Business Telephone System.

P-A-X supplies fast, sure, automatic talking convenience, 24 hours a day. Direct economies from its use often pay for the P-A-X System within 3 to 5 years—and there are many *indirect* benefits as well!

You'll find the P-A-X story in Sweet's—and the address of the P-A-X representative, who can tell you more. Or just write or call:

AUTOMATIC ELECTRIC SALES CORPORATION
1033 West Van Buren Street, Chicago 7, Illinois
Offices in principal cities. Export Distributors:
INTERNATIONAL AUTOMATIC ELECTRIC CORPORATION

PAX is a system of "inside" telephones, separate from the city telephones, and owned by the user.

PAX is completely automatic and establishes all "inside" calls, within seconds, at any time!

PAX saves on city telephones and switchboard—permits marked economies in rented equipment.

PAX is manufactured by the originator of the automatic telephone.

PAX telephones and switchboards are identical in quality with your city equipment.

P-A-X business telephone systems

AUTOMATIC ELECTRIC

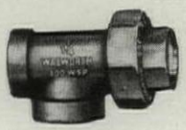
Pressure-Seal Cast Steel Gate Valve

Small Cast Steel Angle and Y-Globe Valves for high-pressure service

Walseal Bronze Strainer

Walseal Bronze Globe Valve

Walseal Bronze Elbow



Walseal Bronze Union End Tee

Walworth is proud to be aboard the S. S. United States

When the United States Lines, the Newport News Shipbuilding & Dry Dock Company, and Gibbs & Cox, Inc., naval architects, join forces to build the fastest, safest and most modern liner the world has ever seen, the selected materials and components have to be top quality. Walworth Pressure-Seal Cast Steel Gate, Globe, and Angle Valves, and Walworth Small Cast Steel Angle and Y-Globe Valves for high-pressure service are installed in the main steam lines of the S. S. United States. Brass and copper lines use large numbers of Walseal valves, fittings, strainers, and unions.

Knowing that Walworth valves and fittings are a vital part of the power arteries aboard this great ship, the proudest moment of Walworth's 110 years of manufacturing experience came when the new Queen of the Sea broke both the east and west trans-Atlantic speed records.

As we present our compliments to Commodore Manning and his crew, to the Newport News Shipbuilding & Dry Dock Company and its men, and to William F. Gibbs and his staff, we also compliment the men and women of the Walworth Company who gave of themselves to put quality into our products and this quality ship.

WALWORTH

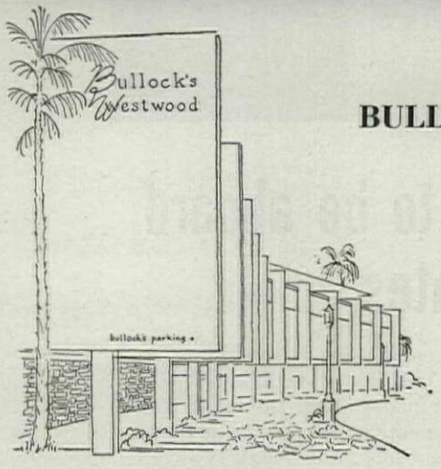
valves • fittings • pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

ACOUSTICAL MATERIALS AT WORK

Armstrong's Travertone was used in the attractive Bullock's Tea Room, as well as in the Employees' Dining Room.



BULLOCK'S DEPARTMENT STORE, Westwood, California

The architect for this smartly styled branch of Bullock's considered many factors in choosing the acoustical materials. Acoustical efficiency, beauty, and fire-safety were important. Another factor was the need for a material well adapted to the mechanical suspension system to be used.

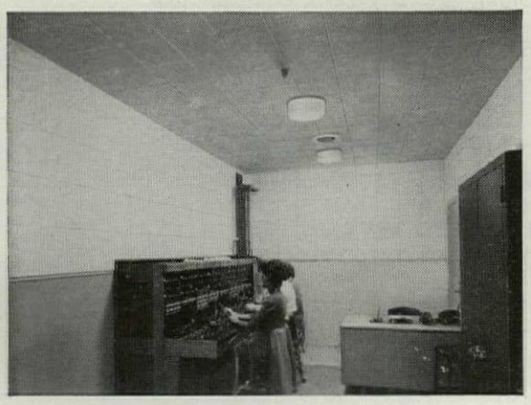
The architect met all these requirements with Armstrong's Travertone. A mineral wool tile, Travertone is completely incombustible. Its beautifully fissured surface blends well with this décor. It has high acoustical efficiency. Its strength and dimensional stability assure satisfactory performance when mechanically suspended. In addition, Armstrong's Travertone is ideally suited for installation with recessed lighting and ventilating fixtures.

Your Armstrong Contractor will be glad to give you full details on the complete line of Armstrong's Acoustical Materials. For the free booklet, "How to Select an Acoustical Material," write Armstrong Cork Company, 5409 Stevens Street, Lancaster, Pennsylvania.

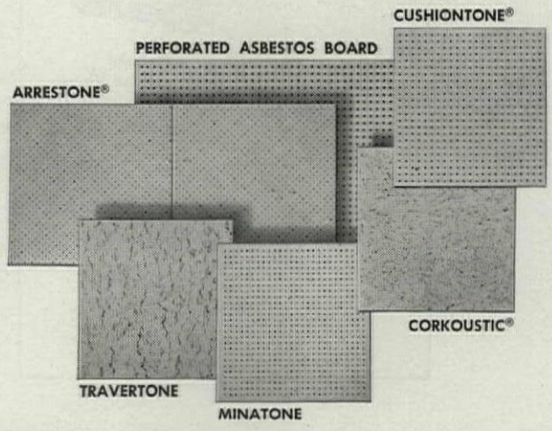
Architect:
Welton Beckett and Associates

General Contractor:
C. L. Peck

Acoustical Contractor:
R. W. Downer Co.



Ceilings and upper walls of the telephone switchboard room are sound conditioned with Armstrong's Cushiontone. Other office areas in Bullock's are also treated with this perforated wood fiber tile. Cushiontone raises efficiency and morale by absorbing irritating noise from telephones, typewriters, and other office machines.



ARMSTRONG'S ACOUSTICAL MATERIALS

Reni

CONSTRUCTION CONTROLLERS representing NPA at the Aug. 27 meeting of the Construction Industry Advisory Committee were, left to right: William C. Truppner, Richardson Bronson, Rufe B. Newman, Jr., director of the NPA Construction Controls Division, who presided; attorney Henry M. Heymann and Ed. M. Synan.

WASHINGTON DIARY

8/20 *NPA permits use on authorized construction of up to 500 tons of finished carbon conversion steel each for last quarter, 1952, and first quarter, 1953, without charge against CMP allotments (recreational building excluded). Amount ordered not to exceed 40% of carbon steel allotment for these periods. Later amended to include third quarter, 1952 (8/28).*

8/22 *NPA permits manufacturers to use foreign and used steel free of CMP control.*

6/11 *DPA grants more fast tax write-offs to 13,424 new or expanded facilities, with tax amortization of $22.1 billion.*

8/27 *NPA announces decline in copper deliveries during second quarter, 1952, hence less copper available for allocation.*

8/29 *NPA ups limit on aluminum inventories from 45 to 60 days during fourth quarter, 1952; revokes temporary suspension of inventory limits on copper and aluminum, as of October 1.*

9/5 *President Truman names Henry H. Fowler Director of Defense Mobilization, retains him as Administrator both of NPA and DPA.*

Scheduled NPA relaxations, huge backlog of work, brighten construction outlook

Construction's future continued to brighten this month. A substantial relaxation of NPA controls was scheduled for April 1, and possibly Jan. 1. Materials were becoming easier to obtain. By Oct. 1, and possibly sooner, Regulation X for residential credit would be history.

As the month began, the only doubtful matter was the future of credit restrictions for *nonresidential* construction after homebuilding credit is freed. By midmonth, reports from Washington suggested that the Federal Reserve wanted to close its books, scrap commercial construction credit curbs at the same time Reg. X mortgage restrictions were reduced to 5% down payments.

Putnam more cautious. But Economic Stabilizer Putnam was pressing to keep at least nominal control over nonresidential building credit—probably about a 70% mortgage financing ceiling. Putnam was fearful, it was said, that there might be an avalanche of shopping center and other commercial construction started on virtually 100% financing (through such devices as purchase-lease deals and second mortgages), and that it might be impossible to put a credit check on this again once the restrictions had been discarded.

Amusement ban to end. After the Aug. 27 meeting of its Construction Industry Advisory Committee, NPA announced that effective April 1 the ban on construction of recreational buildings would be lifted, and that other types of construction would qualify for greatly increased self-certification amounts of essential materials. The committee will meet again Oct. 29 to consider the possibility of shoving the materials relaxations ahead—perhaps to Jan. 1.

Breeding optimism was an Aug. 29 statement by Henry H. Fowler, who this month was advanced to Director of Defense Mobilization. Fowler declared that steel should be back "in balance" early next year at the latest. Other NPA officials intimated that virtually all CMP regulations may be ended by June 30.

Managing director H. E. Foreman of AGC had a cheerful report on construction market prospects. A tremendous "backlog" of needed building will still remain for several years even if 1952 turns out to set another volume record, as now appears likely, Foreman told the midyear session of the AGC governing and advisory boards. In the first eight months of this year a record $18 billion in new building was put in place, Foreman estimated, thus raising the possibility that last year's $31 billion record may be surpassed.

RFC eases direct federal building loans, studies $35 million culture, trade center

For more than a year, Reconstruction Finance Corporation supposedly has been limiting its business loans to those essential to the defense buildup or a vital civilian project. In an inflationary economy, it made no sense for the government to be restricting credit through the Federal Reserve while expanding it through RFC. One result: RFC loan applications have been dropping steadily. In fiscal 1952, they were about one third the volume of the previous year. Another result became an issue last month: was RFC backsliding on its loan policy?

There was evidence it had done so enough to become a bonanza source of credit for nondefense construction. Said one policy-making RFC official: "There are pressures for a more liberal loan policy. Not all of them come from outside. Of course, any applicant wants the policies to fit his needs. But there are also—within the agency—people who, naturally, do not want to lose their jobs. When the volume goes down, they get worried." Even RFC Administrator Harry A. McDonald indicated that the agency has been liberalizing its policies on loans to small business. But he insisted that assurance the government will get its money back is still a criterion for every loan.

On Aug. 8, for instance, RFC approved a first mortgage loan of $8,000 to chiropractor Louis Haydon of Arnett, Okla. to construct a clinic building. RFC officials admitted that they probably would not have made this "small business" loan except for its 50% VA guaranty.

Larger business loans for nondefense building, have included such commitments as these made the week of Aug. 21: A&P Corrugated Box Corp., Lowell, Mass., $1.5 million, construction and equipment; Herbert W. Gordon, Weston, Mass. electronics equipment, $75,000, construction; William Friedman, Greenville, Miss. scrap metals processor, $100,000, construction and new equipment, and Spenard Washeteria, Anchorage, Alaska, $12,000, construction and new equipment.

Huge Florida project. One of the largest loan applications on file with RFC is for $35 million to launch an Inter American Cultural and Trade Center northeast of Miami. This would include about $5 million for dredging and filling a 1,675-acre site, $12 million for installing roads and utilities, and $14 million for buildings including an auditorium, amphitheater and administration building.

Alaska sees biggest boom from aluminum as Alcoa plans for $700 million project

Aluminum was promising Alaska an industrial future and an infinitely greater prosperity and growth than it ever obtained from gold. Announcement of Alcoa's proposed Taiya project near Skagway was described by Governor Gruening himself as the "most important event in Alaska since its purchase from Russia." He specifically cited it as "overshadowing" the discovery of gold in '98.

Provided Congress cooperates by permitting Alcoa to acquire approximately 20,000 acres of land, and provided Canada grants water-use privileges, Alcoa hopes to start a $400 million smelting plant next year; later double its capacity with an addition costing $300 million more.

There also would have to be an entire new community of approximately 20,000 population.

Planners, builders unselected. Company officials stressed that the new town is to be an attractive modern community in all respects. "We don't want a company town," said Leon E. Hickman, vice president in charge of the project. "Alcoa will make it possible for the people to buy their own homes. The town will be built for families and the American family life. There will be facilities for butchers, bakers, and all the other activities found in a normal community."

On his return from Alaska to Pittsburgh early this month, however, Hickman disclosed that its Taiya "town planner" has not yet been engaged, nor is any particular person under consideration.

Pending congressional approval for the company to buy the necessary plant and town site, he explained, precise location of the future community isn't known—not even whether it will be on a hillside or level ground. For the moment only construction plans for the initial plant to produce 200,000 tons a year have been prepared.

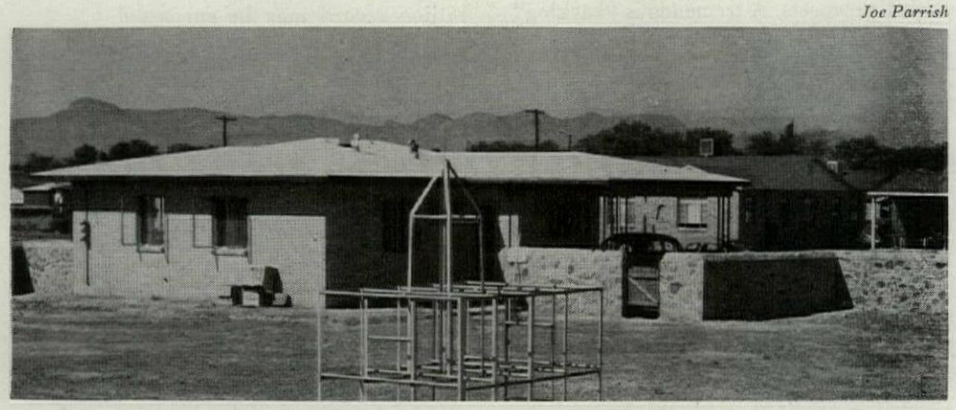
Company operation. Once the way is cleared, however, said Hickman, Alcoa will start giving contracts for the construction of housing and community facilities. Its Alaskan panhandle location will make it necessary for Alcoa itself to construct the entire community, he feels certain, after which the company will sell the various buildings to merchants and residents as fast as possible and on the most favorable terms it can provide.

No subsidy. The proposed Alcoa development involves no subsidies. Some factions in Congress might balk at authorizing sale of the necessary site to Alcoa, so as to prevent further growth of the nation's biggest aluminum producer. But such views seemed unlikely to prevail, particularly while the government is trying to expand aluminum production facilities for both civilian and defense uses.

The building industry would watch the Alaskan developments with more than casual interest.

Construction is already the largest single customer of the aluminum industry, using about one third of the total output, and is rapidly increasing its take with the introduction of many new construction products made of this strong, highly versatile lightweight material *(see p. 152)*.

Joe Parrish

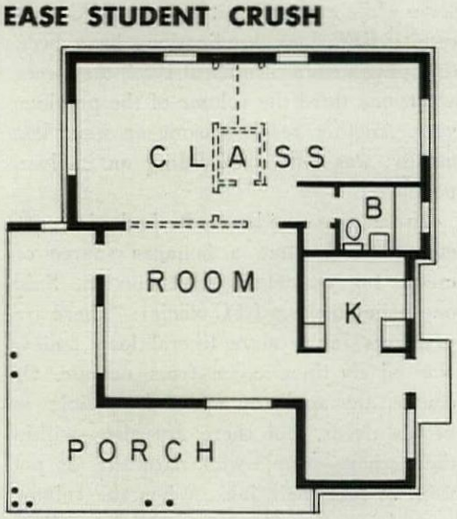


EL PASO BUNGALOW-SCHOOLS EASE STUDENT CRUSH

Rapid suburban growth and soaring enrollment in elementary schools posed a special problem for El Paso School superintendent Dr. Mortimer Brown because the city didn't want to abandon the pay-as-you-go basis on which it has operated for the last 15 years. Portable buildings, Quonset-type buildings and other makeshifts were considered and abandoned as expensive and impractical.

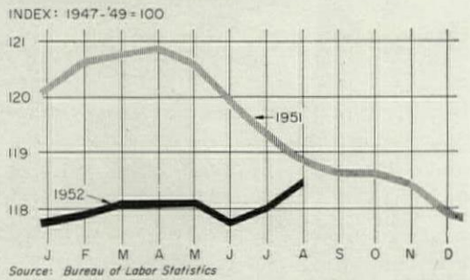
The novel solution approved by the school board can have living-room and bedroom partihouses (minus several interior walls). When no longer needed as schoolrooms the school board can have living-room and bedroom partitions installed *(see floor plan)* and sell the structures as regular houses.

Lots cost the city about $1,250 each, and construction cost for the eight units was $79,000 excluding architect's fees. Full bathrooms, sinks, kitchen steves and refrigerators are included so that first- and second-grade students who attend the schools, one class to a building, can be served hot luncheons. Construction costs also include stone walls enclosing playgrounds between "schoolhouses," which were erected on two, and sometimes three, adjoining lots.



Portable furniture is used; each unit will accommodate from 30 to 35 students. William G. Wuehrmann is the architect; and Ray Ward & Son, builders.

MATERIALS PRICES RISE



Source: Bureau of Labor Statistics

HALF POINT INCREASE from index of 118.0 to 118.5 put August average wholesale building materials prices just about equal with last year's prices. Rising steel prices were the chief cause of the slight jump.

NEW CONSTRUCTION ACTIVITY (expenditures in millions of dollars)

Type	June '51	June '52	June % Change	First 8 Months '51	First 8 Months '52	First 8 Months % Change
PRIVATE						
Residential (nonfarm)	956	1,053	+10.1	7,282	7,021	—3.6
Industrial	204	178	—12.7	1,302	1,544	+18.6
Commercial	108	97	—10.2	987	675	—31.6
*Total	1,971	2,042	+3.6	14,329	14,061	—1.9
PUBLIC						
Industrial	104	186	+78.8	558	1,101	+97.3
Military	108	152	+40.7	491	1,085	+121.0
Residential	56	54	—3.6	332	460	+38.6
*Total	971	1,110	+14.3	5,815	7,107	+22.2
Grand Total	2,942	3,152	+7.1	20,144	21,168	+5.1

* Minor components not shown, so total exceeds sum of parts. Data from Department of Commerce.

CONSTRUCTION EXPENDITURES for August rose 7% above last year's level, with the largest single gain in public industrial building. In contrast, private factory construction fell to 13% below a year ago, may be over the hump of defense expansion.

AFL building trades president endorses Eisenhower to obtain Taft-Hartley relief

Highly dissatisfied with the Democratic labor record for the construction field, Richard J. Gray, president of the AFL's Building and Construction Trades Department and building labor's principal spokesman, last month announced his personal support of Gen. Eisenhower for President.

After the Republican candidate pledged himself to seek amendment of the Taft-Hartley Act, which has proved onerous to construction labor and management alike, Sal Maso, president of the New Jersey council of the AFL department, announced he would individually stump that state for the General.

Although he has been "a life-long Democrat," Gray explained he feels that building labor will only be able to get off the Taft-Hartley hook under a Republican administration. Gray said "the party counts more than the man" in his opinion, and thus his backing for Eisenhower is not based solely on the General's personal appeal or position.

Committee rule captives. His logic: "You have to look beyond the nominees themselves to see what their promises mean. Sure, Stevenson has gone on record for some relief from the law ["scrapping it and starting all over again"], but how do we know he can deliver?

"It will probably be a repetition of what happened in 1948. The Dixiecrats will still be in control on Capitol Hill, and the inescapable fact is that they don't care a hoot about labor. . . . The Democratic party thinks they have us in their vest pocket and we have no place to go."

Southern conservatives won't actually bolt the Democratic Party, Gray believes, so as long as they hold onto their principal committee chairmanships through seniority, building labor will remain in the Congressional doghouse.

Finer outside Carolina. An outstanding example of the brush-off construction labor has been getting, said Gray, was the refusal of chairman Graham H. Barden of the House Labor Committee to hold hearings on the Senate-approved bill to exempt construction from Taft-Hartley certification election provisions. "Representative Barden comes from North Carolina and there are probably not 50 union members in his whole district," Gray explains. "There you have it."

In the Senate the measure rolled through without a hitch. This, says Gray, was largely due to the intervention of Republican Senator Robert A. Taft, who acted as a cosponsor of the amendment in conjunction with Fair Dealer Robert Humphrey of Minnesota. The seeming paradox of such political opposites getting together on a labor bill resulted from the joint demand of both management and labor for relief.

Background for dissatisfaction. Behind their virtually unanimous request for revisions in the Taft-Hartley Act lies what construction men consider a plague of ridiculous regulations:

- Both sides have maintained from the start that it is utterly unrealistic to attempt to apply the union representation provisions of the act to construction, where men are constantly moving around from job to job. Nevertheless NLRB has adopted the unbudging policy that as long as the law is on the books it will not grant any administrative exemptions.

- This uncompromising attitude by the enforcement agency has posed a problem that is by no means academic. Local chapters of the AGC and the unions representating their workers are constantly being hauled up for violations of the law. Usually the charge is brought by members of the machinists union. Because the International Association of Machinists does not belong to the Building Trades Department (though it is affiliated with the AFL) it is seldom a party to area-wide collective bargaining with contractor groups.

- Most recent example of the consequent feuding is the George D. Auchter Co. case from Jacksonville, Fla. now before the NLRB on appeal. Basis of the dispute is denial of work to a member of the machinists union. Acting on precedents established by the Board, the trial examiner has recommended that the northern Florida AGC chapter and the Carpenters District Council of Jacksonville be cited for discrimination. The penalty proposed is that the defendants jointly and individually be required to reimburse the applicant for wages lost during the period he was refused employment.

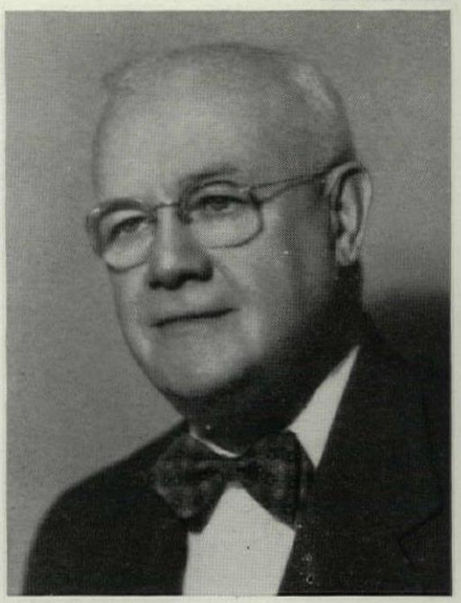
Change for better. Gray was sure building labor would receive more sympathetic treatment under a Republican Congress. Not only was Taft willing to "let bygones be bygones," he declared, but in the House Representative Samuel K. McConnell, Jr., ranking Republican on the Labor Committee, had the makings of an unbiased chairman.

As the AFL leader saw it, McConnell being from an eastern Pennsylvania district where "workers are people" will not adopt the "indifferent and even hostile attitude" displayed by southern conservatives.

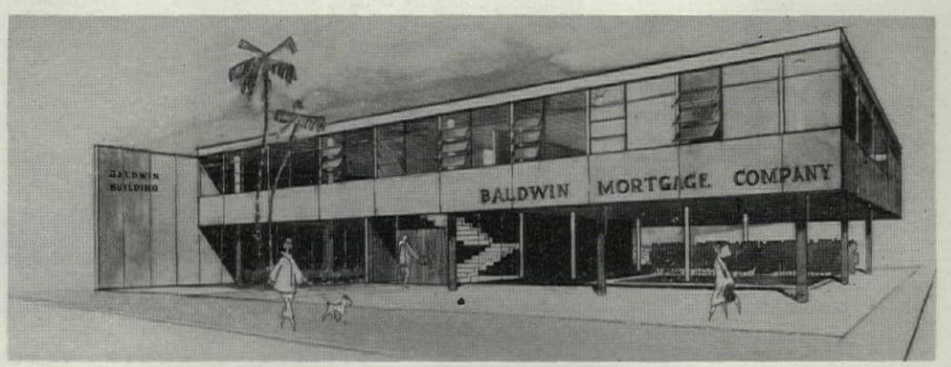
Going beyond the elimination of Taft-Hartley kinks, Gray was even inclined to question the whole theory of injecting the federal government into labor-management relations. "Instead of having college professors of economics waving rulers at us," he says, "maybe we would be better off if we would go back to the old days of letting hardheaded managers and practical union men sit down around a table and thresh out their own problems."

Also a matter of growing concern to the AFL leader: the increasing number of labor sections in so many different federal agencies, such as the Defense Department, AEC, GSA.

Blackstone Studios



RICHARD J. GRAY



PLANNED FOR UPWARD EXPANSION, this two-story structure being erected for the Baldwin Mortgage Company on Biscayne Blvd., Miami, has rented so well that third or fourth floors will be added at the start. Designed by Norman J. Dignum & Associates, structural engineers, ground floor will have 5' overhang to shade store windows. Upper-office floors will rely on Venetian blinds to block glare, and air conditioning as protection from heat.

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In addition to the glazed railing illustrated above, Hauserman *Movable* Interiors are available in a wide variety of types and elevations for all commercial and industrial offices, laboratories, schools and hospitals.

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Senate group dubious on "joint venture" contracts; Creedon given watchdog post

When the Senate armed services subcommittee headed by Sen. Lyndon B. Johnson (D., Tex.) released its interim report on Moroccan air-base construction last month, newspaper accounts featured the Congressional group's exasperation with Lt. Gen. Lewis A. Pick, chief of Army engineers. Headlines and stories all concentrated on the annoyed suggestion that army Secretary Pace "take appropriate action" against the general for not giving the committee "full, frank and comprehensive" testimony.

At midmonth, no such action had been taken by Secretary Pace against Gen. Pick, and none was expected before the general's slated statutory retirement next month.

Main points obscured. As usual, the personality dispute diverted attention from more pertinent recommendations of the Johnson report. These were not all original or strikingly profound. But one worth noting in the heavy construction field was that the several Defense Department secretaries "carefully consider whether the so-called joint venture is a proper organization for the performance of military construction, and whether in dealing with this hybrid type of organization the interests of the government can be fully protected."

Discussing the role of Atlas Constructors in what it described as a "fiasco" in North Africa that might cost taxpayers an extra $120 million over original $300 million estimates, the committee elaborated:

"It [a 'joint venture'] is not a corporation, and at best is a partnership in name only. It is a loose and legally vague arrangement. . . . Perhaps the proper approach in a situation of this kind would be to designate one of the five companies as the prime contractor and the others as subcontractors. In this way a clear and definite primary responsibility would be established. There may be valid arguments in favor of the 'joint venture' in projects of this size, but in our view they lose significance when weighed against the lack of firm leadership and centralized responsibility inherent in this type of hybrid setup."

Final judgment withheld. Adding that its investigation of Atlas was still incomplete, although it took note of the organization's general denials of responsibility for various undesirable conditions, the report said: "It does appear that especially in the early stages of the job the contractors were confronted with a series of difficult and somewhat frustrating situations. However, there seems to be no doubt that a considerable portion of the work is of poor quality. . . . The committee does not feel that it has sufficient evidence at this time intelligently to comment on the contractors' responsibility and does not wish to prejudge the matter." (Morrison-Knudsen Co. Inc., was "monitor" in Atlas, and the other participants were Nello L. Teer Co., Durham, N. C.; Ralph E. Mills Co., Salem, Va.; Blythe Bros., Charlotte, N. C.; and Bates & Rogers Construction Corp., Chicago.)

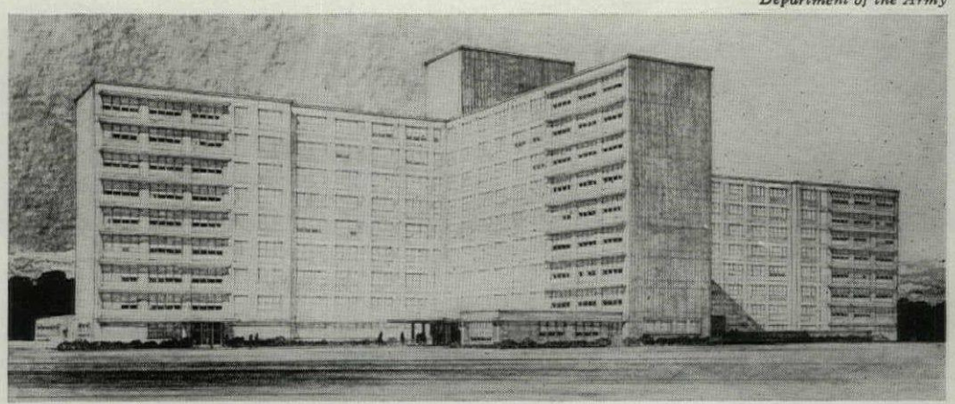
Thus the Senators dodged away from the heart of the matter: how much waste and inefficiency was unavoidable under the "crash" conditions originally established for the program. The report itself recorded several instances of the air force ordering suspension of work at different places. A Defense Department spokesman summed up the situation in a maxim: "When you want a thing bad, you get it bad."

Meanwhile, in one attempt to prevent the recurrence of any similar incident Defense Secretary Lovett appointed Frank R. Creedon to the new position of Director of Installations for the Defense Department. In his new role the former NPA construction controls chief will be in effect a personal reporter, watchdog and special inspector responsible for keeping the Defense Secretary posted on developments in the $3-billion-a-year military construction program—and situations that call for special attention.

CREEDON

Creedon was awarded the Medal of Merit, the nation's highest civilian honor, for his supervision of the Oak Ridge A-bomb plant construction during the war. Later he was Federal Housing Expediter for 18 months.

Department of the Army



500-BED ARMY HOSPITAL EXPANDS TO 1,000 BEDS WITH WING

Armed forces design hospitals for mass production; $133 million program planned

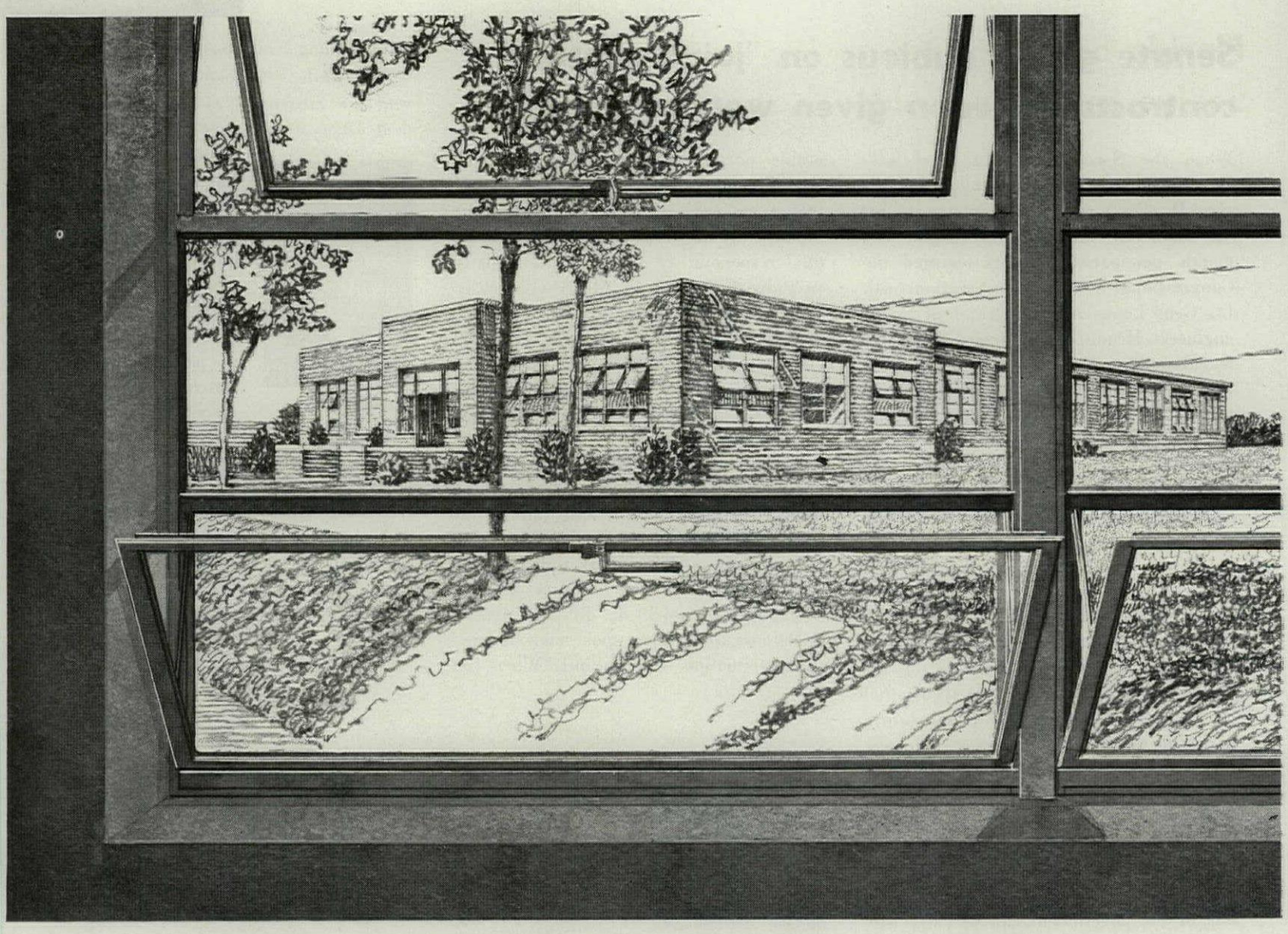
Unification of the armed forces was beginning to bring far reaching changes in designing military hospitals this month. In their new, $133 million military-hospital construction program, the army, navy and air force will use uniform basic designs drawn up with the aid of the Munitions Board, and adaptable to local site conditions by local architects.

To observers of the Pentagon's feeble progress at standardizing other structures common to all three services (like barracks and warehouses), the achievement of the Munitions Board task group for development of design requirements and construction standards for military hospitals came as a surprise.

Since its creation April 6, 1951, it had:

- Decided to design the new crop of military hospitals so they can be quickly expanded to double their original bed capacity in time of need;
- Assigned to each service the job of drawing basic plans for the size of hospital it uses most. (The navy will design an 800-bed unit on a 1,500-bed chassis. The army will design a 250-bed on a 500-bed chassis hospital and a 500 on 1,000 unit. The air force will handle all the smaller hospitals.)

Each service called in private architects to help develop the basic plans. With money all appropriated, the first of them was unveiled last month. It was the army's design *(above)* by York & Sawyer of New York for a 9-story, expandable hospital to accommodate 500 patients when built without the wing at the right, or 1,000 patients if the wing is added to the basic chassis. The army said it hoped to build four next year—at Ft. Benning, Ga.; Ft. Bragg, N. C.; Ft. Knox, Ky.; and Ft. Riley, Kan.



The Walton Company, Hartford, Conn. Consulting Architects: Moore & Salsbury, West Hartford. General Contractors: Bartlett-Brainard Company, Hartford. Engineers: Buck & Buck, Hartford.

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LUPTON METAL WINDOWS

Florida board probes waffle slab collapses; Seelye report upholds Youtz-Slick method

Last spring, an Atlas Terminals warehouse at Ojus, Fla. suffered three construction collapses while being roofed of precast waffle-block concrete by the Youtz-Slick lift-slab method. One 50′ x 50′ waffle slab dropped about 4′ while being hoisted into place (AF, April '52, p. 47). Another crashed after being raised and anchored in position. A third collapsed while undergoing a live load test of 450,000 lbs. or 45 psf.

Out of the mishaps arose professional malpractice charges against the structure's engineer, Louis G. Farrant of Miami, who specialized in reinforced concrete construction. Last month, while Florida's State Board of Engineering Examiners mulled over the accidents at a two-day hearing but reserved decision, a private engineering report gave the Youtz-Slick method a clean bill of health, inferentially blaming local misapplication for the trouble.

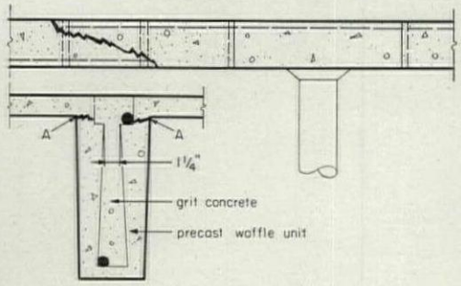
Private praise. The report confirming the efficiency and safety of the lift-slab method, provided adequately designed slabs are used, came from Elwyn B. Seelye, of Seelye Stevenson Value & Knecht, New York consulting engineers. This report was prepared for the licensor of the lift-slab process, the Institute of Inventive Research, so it could advise other licensees as to the cause of the failures in this instance. Scores of other Youtz-Slick operations have been carried on elsewhere without incident. Subsequently Seelye also was retained by the owner to test and reinforce the Florida building erected under Farrant's engineering supervision.

Seelye's report pointed out that each Atlas Terminal slab was supported on four posts with a 10′ cantilever slab on each side. "The collapse was in the nature of a circular shear failure at, or near, the edge of the solid cap," said this report, "and would be classed by engineers as a failure in diagonal tension."

According to this analysis the cantilever reinforcing steel and the positive steel overlapped each other by not more than about 2′ without any stirrups or bent bars to hang the bottom steel from the top cantilever steel, and the line of diagonal tension indicated in the accompanying sketch had no steel whatsoever crossing its path.

In addition, the Seelye report stated, there appeared to be a weak adherence between the top of the coffer and the side walls; "so much so, that cracks between the top of the coffer and the side wall were found." These cracks, said the report, were approximately at the level of the arbitrary crack marked AA in the sketch, "and in this condition would have been particularly bad in the case of the negative moment areas."

To reinforce the existing slabs, U bolt



yokes have been installed to cover all joists in the cantilever area which have a high shearing stress and in the transition areas between the negative and positive moments. These U bolts consist of 4″ x 9″ x ¾″ metal plates on the top of the slab and the bottom of the joists fastened together with ¾″ bolts. Since being reinforced "the building has so far safely undergone exhaustive tests which are still underway," the report declared.

Too little steel. At the Miami hearing, Jacksonville engineer John L. McCullough, who investigated the complaints for the board and preferred charges, testified that "not enough steel was used in these slabs and the bars used were not properly placed. In my judgment, the steel used was subject to about 125% overstress." In rebuttal, Farrant submitted data in support of his design for the particular type of slab that was used. This data, he said, was obtained before construction by Presan photoreflective stress analysis of mirrored models. He also offered reports from two testing laboratories and submitted a list of more than 100 projects he had worked on since he became a practicing engineer in Florida about five years ago after coming from England.

Three other charges against Farrant were also heard by the state board. Two involved alleged structural failure in four 23′ cantilevered roof beams in the Hollywood, Fla. munioipal bandshell, and excessive sag in a 29′ precast roof beam in the George Washington Carver School in Miami.

As part of his defense Farrant attributed the failures and faults that developed to material shortages that made substitutions for steel necessary, and to factors beyond his control. Verbal instructions to the general contractor for reinforcing the Carver school beam were not carried out, he declared. A fourth charge against Farrant was dismissed after testimony that an alleged deficiency in a service station had been corrected and that the Miami Beach building department had issued a certificate of occupancy.

Engineers' Centennial told of fabulous advances that impend in construction field

Construction shared the stage in the Centennial of Engineering convention in Chicago this month. Industry leaders among the 1,000 speakers who addressed the two-week sessions either pointed with pride to the contributions construction has made to American life and business or dwelt on the fabulous advances visible for building just over the horizon in new materials and techniques.

Past developments in materials and building methods have only been a shadow of striking advances that can be expected in the next few decades, said Walter C. Voss, head of MIT's Department of Building Engineering and Construction.

Catalogue of wonders. Pointing out that the use of atomic power will create the greatest kind of revolution in heating, motive power and research, while research will bring still more advances in new materials, Voss drew the following picture of important changes to expect:

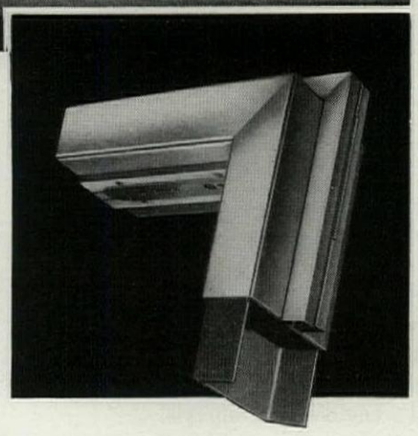
▸ "It may well be true that in the next 50 years we will see plastics developed to such an extent that all panels, doors, much of our hardware, trim, floor and wall coverings, and many of the applied finishes will be greatly improved and reduced in price. The development of light weight, cored units made of wood, fabric and metals will be phenomenal.

▸ "To predict the progress in the fields of heating and air conditioning would be a dubious task. Nevertheless, the cumbersome assemblage of pipes, fittings, ducts and appurtenances may well be replaced by radiantly heated walls and floors. The exterior walls of our buildings may become massive heating or cooling ducts. Hot or cooled air will provide the heating requirements and afford comfort without the use of extensive pipe lines.

▸ "Our structural frames will be quite different to allow for vertical ventilating shafts at many points. The excessive weights of concrete fireproofing will be reduced by the use of fire-resistant prefabricated shields, further allowing for ducts. . . . The tremendous amortization costs of seasonably useless equipment may well be eliminated.

▸ "Architectural details and planning will greatly affect the activity of manufacturers who will seek to provide materials and equipment to solve such challenges. . . . As architects realize that research, engineering and manufacture can solve many vexing problems, they will be more bold and adventurous in their designs. This will stimulate still further advances. . . . Our next 100

Architect: William G. Farrington, Parkwood Corporation, Houston, Texas



THIS CUT-AWAY VIEW of the free-standing Pittsburgh Doorway shows the 6"—10.5-lb. steel channel which is continuous through the massive extruded aluminum frame. The rugged beauty of the frame is enhanced by perfectly mitered corners.

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years of industrial activity will make our present excellent status seem provincial in retrospect."

Engineers in construction. Discussing the trend of engineers into command positions in the construction industry, former AGC president Dwight W. Winkelman approvingly noted the greatly increased emphasis engineering colleges have been placing on construction courses in recent years.

Particularly pleased that technical schools are now also giving greater attention to estimating and costs in their construction courses, and that "even design engineers are being encouraged to become cost-conscious," Winkelman happily quoted a recent remark by L. E. Grinter, vice president of Illinois Institute of Technology: "Believing as we do that only economical design is good design, we also emphasize costs to a greater extent than any other college except the College of Business."

Bank offers loans at 1% to stimulate modernization

Commercial modernization was given one of its most unusual boosts last month by Union National Bank & Trust Co., of Elgin, Ill. With no other strings attached the bank offered loans up to $7,500 at only 1% interest, repayable in one to three years, to any business-property owners or tenants who would use the funds "to finance store and shop-front and display-window modernization."

In three weeks 21 loans for a total of about $80,000 were being processed. "Modernization benefits all . . . builds our city," said a full-page newspaper advertisement announcing the bank's offer, good until Oct. 1.

Bank officers said bookkeeping expenses would actually cause them to lose money on the loans, but a better looking city would mean more business, and more business would mean more activity in other accounts for the bank. The bank is prepared to advance a total of $125,000 to $150,000 for this purpose.

Appraisal groups ratify plan for consolidation

Two appraisal organizations, the Technical Valuation Society, established in 1939 with headquarters in N.Y., and the American Society of Technical Appraisers, formed the same year with its headquarters in Los Angeles, have ratified plans for consolidation as the American Society of Appraisers. Daniel J. Hennessy, president of the Jamaica Water Supply Co., Jamaica, N.Y. is the first president of the new group, and Joseph A. Gallagher, Sr., president of American Right of Way and Appraisal Contractors, Los Angeles, vice president.

PEOPLE: Lohman heads National Capital Planning Commission; William Frederick Lamb dies

Reorganized and enlarged from 10 to 12 members under legislation enacted at the last session of Congress, the National Capital Planning Commission (formerly the Park and Planning Commission) had a new chairman: **Dr. Joseph D. Lohman,** 42, of Chicago. President Truman's appointment of a non-Washingtonian to the chairmanship caused anguish to some local groups but, as Dr. Lohman stated, future development of the Capital concerns not only citizens of the District of Columbia, but also of the whole world. The new chairman is a member of the legislative advisory committee of the Chicago Planning Commission and consultant to the AEC and TVA on housing community problems and human relations. He is best known in Washington as the staff director who prepared the 1948 report of the National Committee for the Elimination of Segregation in the Nation's Capital.

Colorado University's new department of architecture and architectural engineering will be headed by **Thomas L. Hansen,** who was chosen for his extensive background in architectural teaching, architecture and regional planning. From 1942-44 he was senior project planner for PHA in its Seattle office and, in addition to teaching at Washington State College, formerly was in charge of the architectural department at North Dakota Agricultural College.

HANSEN

After surviving for about a year as temporary head of the Calif. Public Works Department, **Frank B. Durkee** was named director of the agency last month by Gov. Earl Warren. Formerly deputy director under the late Charles H. Purcell, who retired last summer and died a short time later, Durkee was a newspaperman who studied law; he joined the department twenty-five years ago.

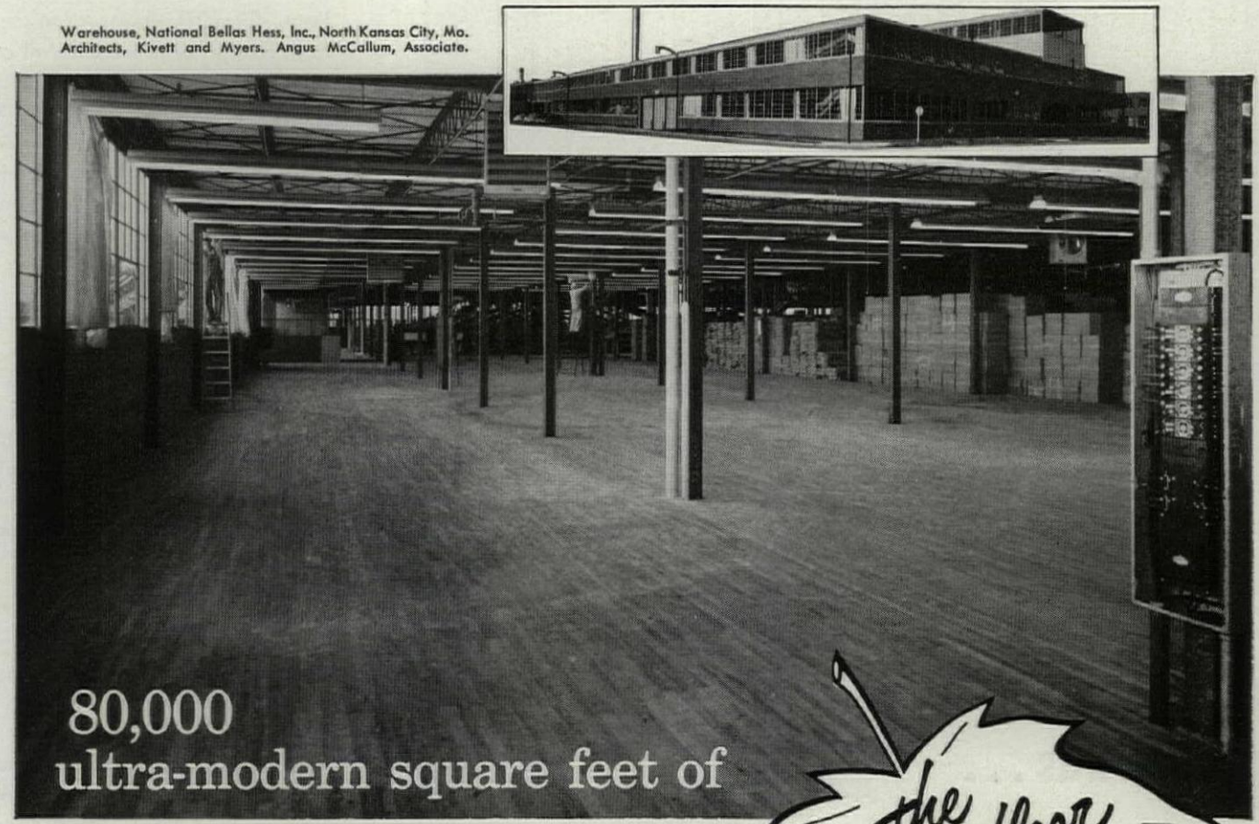
DURKEE

NAMED: **John M. Coates,** formerly counsel and vice president, as president of Masonite Corp., succeeding **Eugene Holland,** retired, who will continue as a consultant; **R. H. Morris,** formerly publisher of *American Builder Magazine,* as general manager of Ponderosa Pine Woodwork; **Frank M. Haines,** president of Standard Engineering Co., as president of the Washington Building Congress and chairman of its 15th anniversary celebration to be held Nov. 10; **Andrew J. Higgins, Jr,** as president of Higgins, Inc. (succeeding his father, who died Aug. 1) and **Frank O. Higgins** as vice president and general manager; **Harold M. Sylvester,** civil engineer for-

(Continued on p. 50)

POSING IN THE FORUM in ancient Rome impressed and amused these participants in the 1952 "AIA Post-Convention Trek to Europe." Bottom row, left to right, are Walter Rolfe and Mrs. Rolfe, David Horn, Mrs. Alben Froberg, Anna Lea Lelli, Paul Gerhardt, Richard Walker, Leon Chatelain. Second row: Mrs. Mary Broad, Alben Froberg, Paul Gaudreau and two guests, tour leader George Cummings, W. S. Lewis and H. A. Salisbury. Top row: Mrs. Chatelain, Abigail Lewis and Arthur Hooker. Twenty-one architects and members of their families made the five-weeks tour, visiting England, Sweden, Switzerland, Italy and France.

Warehouse, National Bellas Hess, Inc., North Kansas City, Mo.
Architects, Kivett and Myers. Angus McCallum, Associate.



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the finest floor that grows

• This modern warehouse, with its many interesting features of design and construction, drew national attention in one of the architectural magazines. For one thing—it provides nearly two acres of floor, with 200 lbs. per sq. ft. load rating. MFMA Third Grade 25/32″ x 2¼″ Northern Hard Maple flooring is laid over 2½″ x 6″ T & G sub-flooring.

The selection of this true economy grade of finish flooring will surely prove a wise decision over the years, for MFMA Third Grade is a thoroughly good, *sound* grade in every respect. The *resilient* smoothness of close-grained Northern Hard Maple speeds traffic and promotes comfort. Its cheerful brightness aids illumination. Its warmth, its tightness and its high resistance to denting and abrasion ease maintenance and—"there's always a new floor underneath" when refinishing becomes necessary. The MFMA trademark guarantees true dimensioning and conscientious grading. Northern Hard Maple flooring is available in regular Strip, Block and Patterned design.

See Sweet's
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Floor with **NORTHERN HARD MAPLE** *BEECH AND BIRCH*

merly with the Bureau of Yards & Docks, as director of field service for the Building Research Advisory Board; **Richard W. Frey,** formerly construction engineer for S. S. Kresge, as coordinator of construction for the Northland Shopping Center being erected for the J. L. Hudson Co.; **T. J. Kinsella,** formerly executive vice president, as president of the Barrett Division of Allied Chemical & Dye Corp.; **John B. Veach,** president of NLMA, as chairman of the newly revamped Lumber Survey Committee which reports quarterly to the Secretary of Commerce on nationwide lumber supply and demand; **William Blurock,** of Corona del Mar, as president of the new AIA chapter for Orange County, California; **Albert R. Williams,** as president of the Northern California chapter, AIA; **Paul Thiry,** as president of the Washington State chapter, AIA; and **Rheinhold Melander,** of Duluth, as president of the Minnesota Society of Architects.

DIED: **Robert H. Edwards,** partner of Edwards & Stoye, architects, Sayville, L. I., Aug. 14 at Sayville; **Harrison Smith,** 71, partner in Sanderson & Porter and design and construction superintendent for many federal ammunition plants, Aug. 21 at Greenwich, Conn.; **David Crooker Trott,** 79, former construction superintendent for the Treasury and PBS, Aug. 22 at Washington; **Hugh J. Fraser,** 54, vice president for plant operation, International Nickel Co., Aug. 22 at Montreal; **Ellis Stoneson,** 59, builder of Stonestown and other developments in San Francisco in association with his brother Henry, Aug. 23 at San Francisco; **Frank Gifford Tallman, Jr.,** 57, director of the E. I. du Pont office building dept., Aug. 27 at Greenville, Del.; **Mrs. Gail Sherman Corbett,** sculptress, memorial designer and wife of Harvey Wiley Corbett, Aug. 27 at New York; **William Frederick Lamb,** 68, of Shreve, Lamb & Harmon, one of the designers of the Empire State, Bankers Trust, General Motors, the new Best & Co. and other New York buildings, as well as structures at Cornell University, the Kent School and elsewhere—also a Fellow of the AIA and former member of the Federal Commission of Fine Arts and of the Municipal Art Commission of New York —Sept. 8 at New York; **Newton B. T. Roney,** 69, builder of the Roney-Plaza and ten other Miami Beach hotels, Sept. 8 at Philadelphia.

W. F. LAMB

John Goddard Belcher, 48, publisher of *Progressive Architecture* and vice presi-

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Up to 4′ x 10′ in any thickness or shape. Larger sizes can be fabricated.

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Seaporcel porcelain enameled metal on one side and Seaporcel porcelain enameled metal, stainless steel, galvaneal, aluminum or any other metal on reverse side.

FINISH:
In any color, with the exception of metallics,—and in many varieties of textures, such as,—terra cotta, granite, mottles, etc.

CORES:
Any cores with sound and heat insulating properties.

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Extremely light in weight, SEAPORCLAD is very easy to handle and install, with consequent lower erection costs.

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Requires only washing down with mild soap and water.

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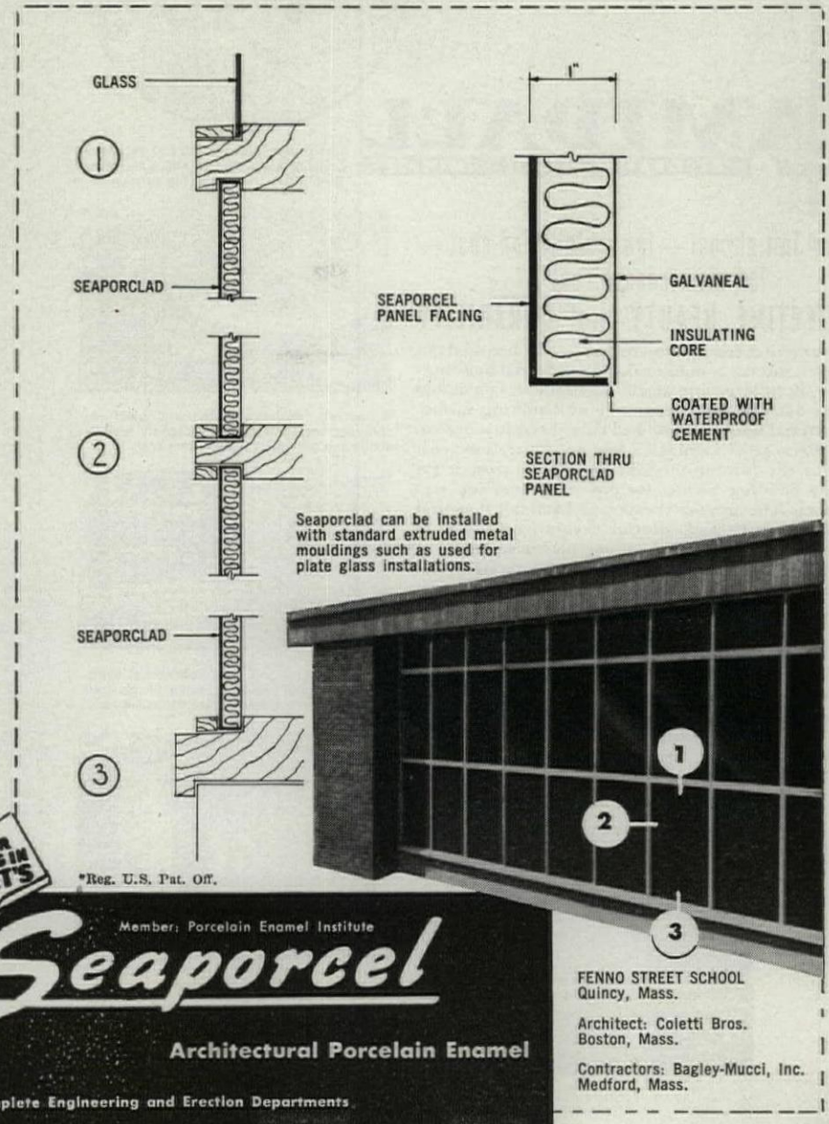

FENNO STREET SCHOOL
Quincy, Mass.

Architect: Coletti Bros.
Boston, Mass.

Contractors: Bagley-Mucci, Inc.
Medford, Mass.

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dent and director of Reinhold Publishing Corp., died Aug. 30 at Boothbay Harbor, Me. when his rented seaplane crashed on a take-off after failing to clear some trees. Formerly a resident of Winnetka, Ill., Belcher served as chairman of the building committee for the Darien, Conn. elementary and junior high schools, and also was chairman of the promotion committee of Associated Business Publications.

Legal snarl over low bid halts Boston hospital

Starting from scratch a second time, the Massachusetts Department of Public Health last month hoped to climb out of the queerest legal tangle seen by the Bay State construction industry in many years by awarding new contracts for $11 million Chronic Disease Hospital in Boston.

After considerable foundation work had been done all construction was halted suddenly and bids nullified in April, when the State Supreme Court ruled that the contract to the John Bowen Co., of Boston, had been awarded improperly in August '51. According to the court Bowen was not the lowest bidder ($158 under an offer by the J. Slotnik Co., of Boston). Bowen had failed to include in its bid approximately $20,000 of expenses for performance bonds by subcontractors, the court found.

Subsequently the Democratic state administration backed legislation that would have confirmed the Bowen bid despite the court nullification, but a Republican-controlled committee in the House blocked the measure.

Payment in suspense. The Bowen firm, according to Dr. William H. H. Turville, hospital superintendent, has been paid $789,000 for work performed between November and March. Its bill for work in April has not yet been paid. The state is not questioning the last bill, says Dr. Turville, but some readjustments in it in favor of the state might come about after a new contract is awarded.

At a legislative hearing, a representative of the Slotnik organization asserted that the Bowen firm had been paid more than a "fair price" for the work it had performed, and Slotnik declined to accept Bowen estimates of the value of completed work as a preliminary to taking over the contract as the actual low bidder. The Slotnik Co. referred to its attorneys a query whether the firm contemplated any further legal action to compel acceptance of its original bid with an adjustment for work already done. The attorneys said, "No."

Last month, the State advertised for bids to complete the snarled job, drew a prompt response from four firms. Bids were to be opened Sept. 12.

In this efficient kitchen tile is used on ceiling areas as well as walls, for easy cleaning.

NEW Booklet . . . modern short cut to LOWER *Maintenance* and HIGHER *Morale*

Kitchens, washrooms, locker rooms and similar areas can be the brightest spots in a factory, when walls and floors are tiled. They are bright spots for management because maintenance costs are low, and janitor costs are slashed to the bone. Bright spots for workers' morale, too, since unsightly washrooms are a major cause of labor unrest.

American-Olean's new booklet on Industrial Installations is packed with helpful facts. Pages of color photographs show actual installations. You preview colors and make selections from accurate color plates . . . ready-to-use specifications are included in this convenient, file-size reference booklet.

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Gentlemen:
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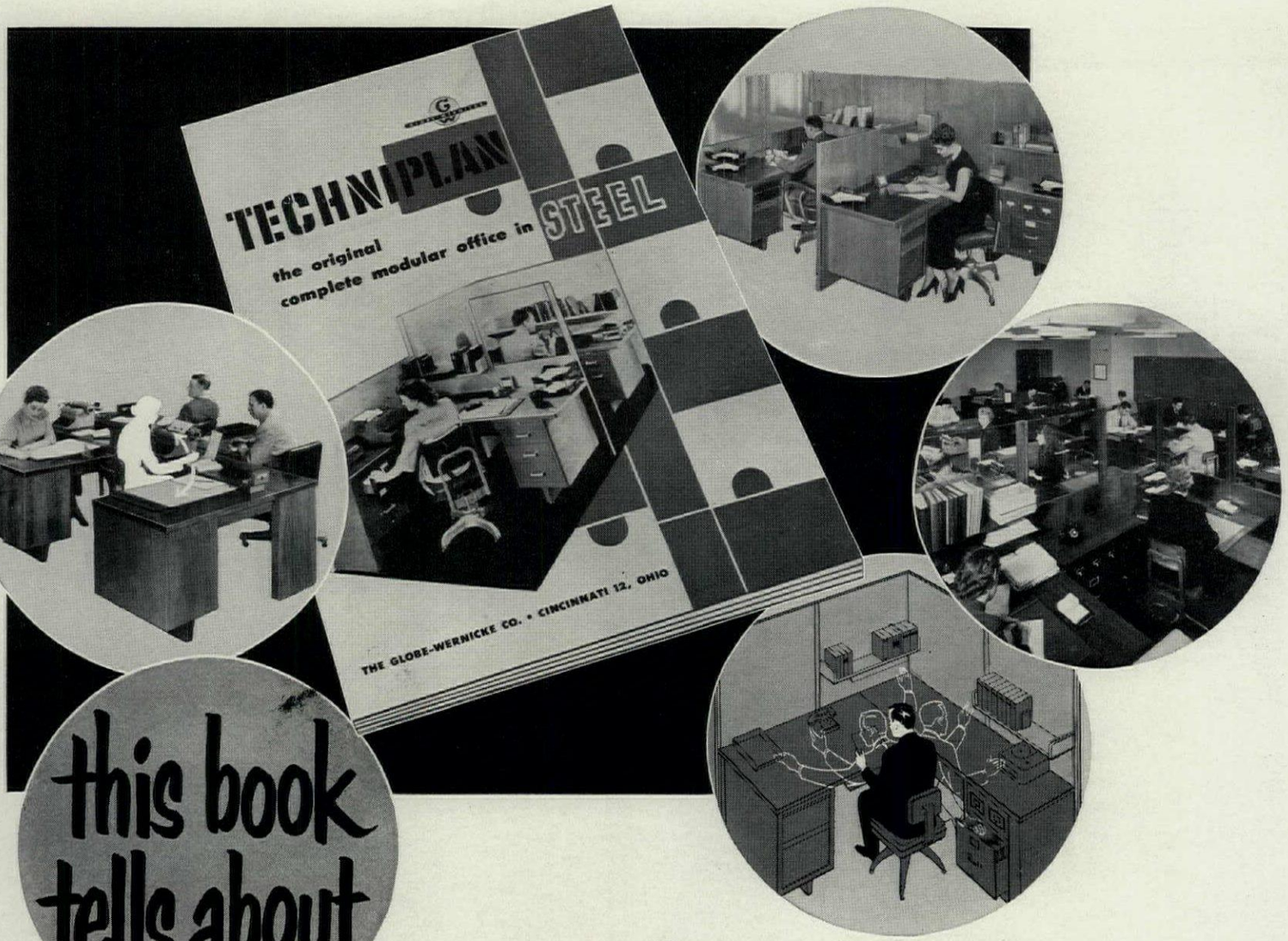

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You can eliminate bottlenecks and congestion by straightening your flow of work—and keep it straight as conditions change.

And you can present a proud, modern appearing office to the eyes of all—customers, prospects, and workers alike.

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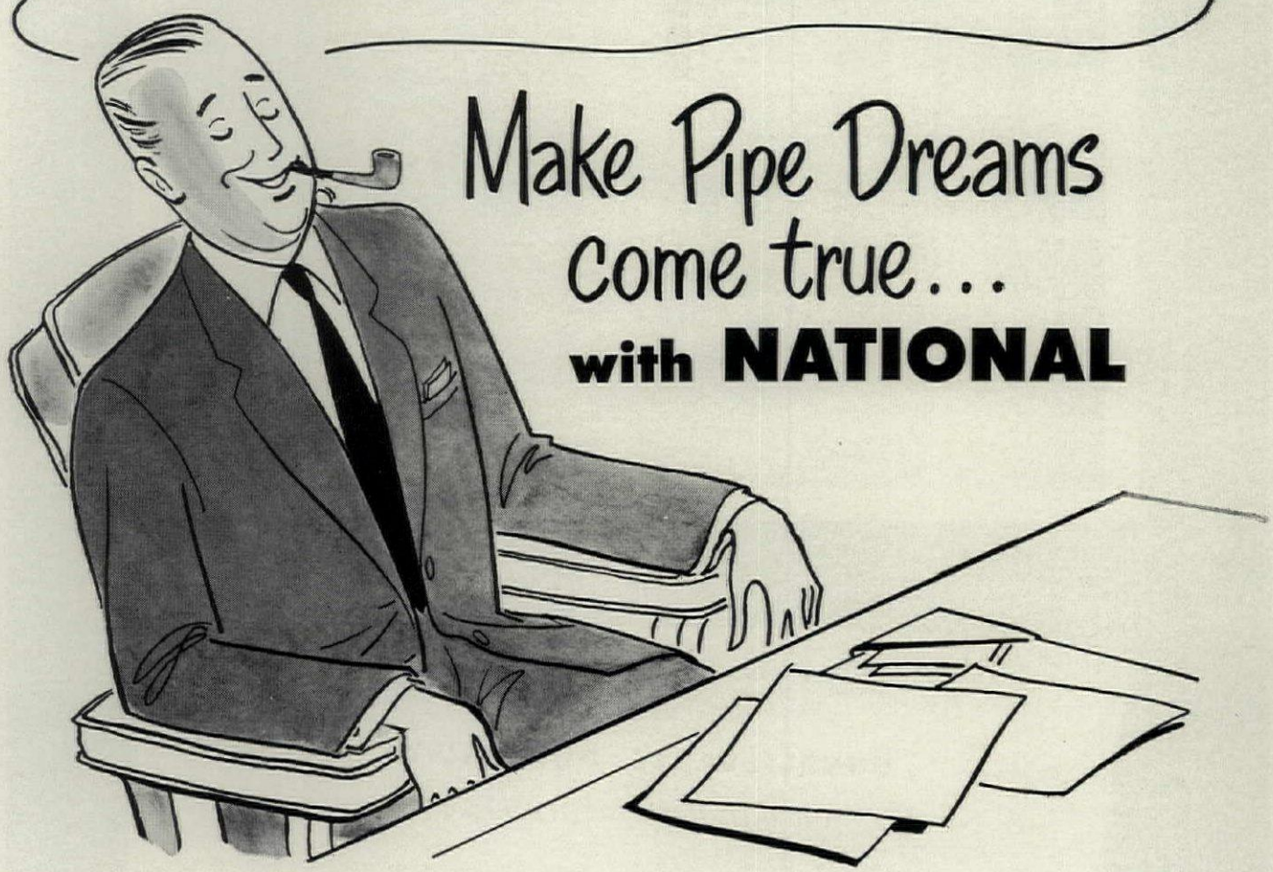

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That preference was earned by the uniform high quality and complete dependability that is built into U·S·S National Steel Pipe. From raw material to finished pipe, every step in its production is controlled by one responsible organization. Improved steel-making facilities, special manufacturing processes and the lifetime experience of many skilled craftsmen, combine to produce pipe whose metallic structure, strength, sound joints, superior welding, bending and threading properties, assure low cost installation and long trouble-free performance.

That is why shrewd pipe buyers—generation after generation—continue to specify National, whenever they need pipe. They know that it fits every purpose at a cost that fits every purse.

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UNITED STATES STEEL

Above: St. Vincent's Hospital, N. Y. Main Floor Corridor—Alfred E. Smith Memorial Building. Architect: Eggers and Higgins. Pastel Green Kalistron wainscoting. (Children's Floor Corridor also done in Kalistron).

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Color fused to underside of transparent vinyl sheet . . . backed by flocking

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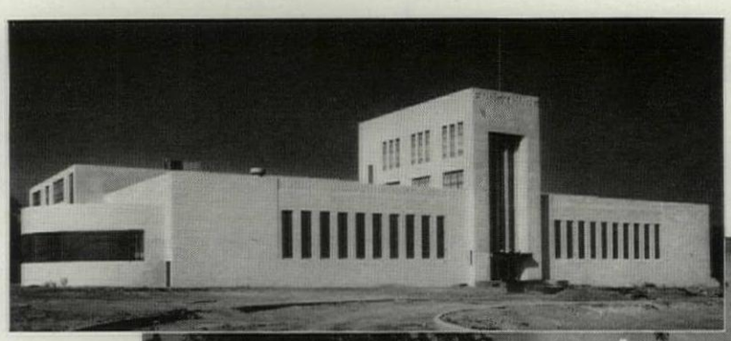
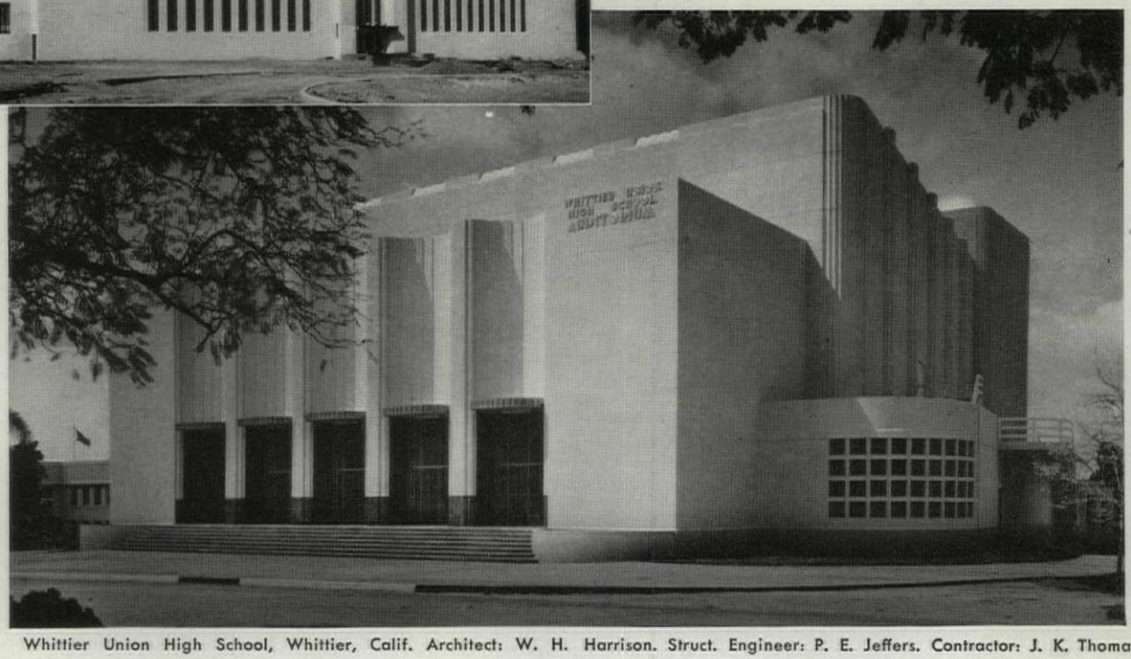
on school construction



Frostburg High School
Frostburg, Md.
Architect: R. H. Hitchins
Contractor: J. J. Bendik



Whittier Union High School, Whittier, Calif. Architect: W. H. Harrison. Struct. Engineer: P. E. Jeffers. Contractor: J. K. Thomas.

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Today, more and more schools are being built with reinforced concrete frames. Reinforced concrete requires from 60 to 65% less steel, permitting builders to stretch their steel allotments. Furthermore, reinforced concrete frames save money! In case after case, cost comparisons have proved the basic economy of reinforced concrete.

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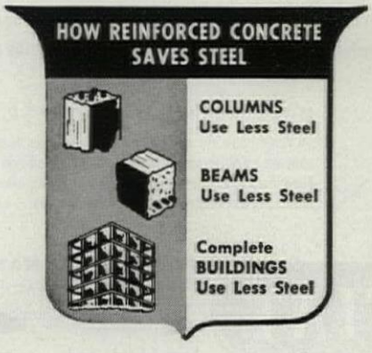

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LETTERS

CONSERVATION IN BUILDING

Sirs:

Congratulations to FORUM for focusing attention on one of the building industry's deplorably weak spots. BRAB's recommendations for conservation of materials and labor (AF, July '52) is a good job well done by a group of sincere, highly qualified men. Let us fervently hope that it will be put to practical and immediate use.

There are, unfortunately, too many bemused people in and out of government who have the notion that research is an end in itself, rather than a means to an end. When it becomes possible for the practical working builder in the field to avail himself of all of the proven research data presently buried in files over the country, that will be a great day indeed!

EARL W. SMITH, *builder*
El Cerrito, Calif.

Sirs:

The important features of the BRAB report are the broad principles it presents and its achievement in bringing together the technical men from the various federal agencies and thereby bringing into focus the variation in design practices, plans, and procedures followed by the several government agencies, including the army, navy and air corps. An awareness of a problem is the first step toward its solution. Already changes in procedures are being made.

As a member of BRAB, I was concerned lest the articles published about the report might place undue emphasis on the specific suggestions offered by the several panels of government technicians—a few of which are rather superficial and somewhat illogical; but FORUM fortunately did not overstress those details.

If the BRAB conservation activity results in a continuation of organized collaboration of the 13 federal agencies for the purpose of effecting greater uniformity in government building practices and recognition of national building standards, we of BRAB will consider our initial efforts toward conservation in building successful and headed toward far-reaching achievements in effecting improvements and economy in building construction.

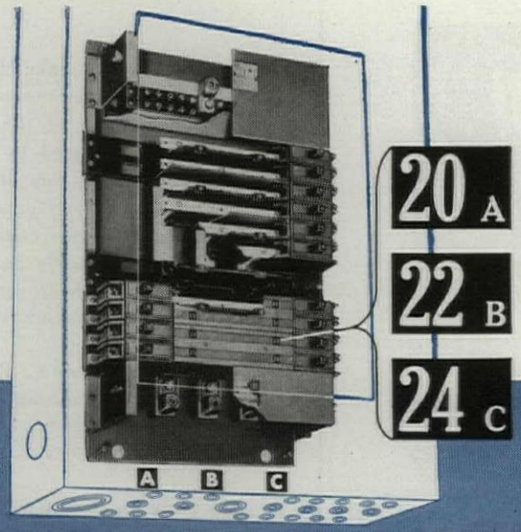
B. L. WOOD, *consulting engineer*
American Iron & Steel Institute
New York, N. Y.

Sirs:

I read your review of the BRAB conservation report to DPA with great interest and congratulate you on an excellent summary. You have highlighted the recommendations which most of those who participated in the development of the report feel are most important and offer the greatest potential for improvements in design and construction.

There is one point in connection with the reports of the advisory panels which I be-

(Continued on page 60)



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LETTERS

lieve you should make clear to your readers: these reports are presented by BRAB as the recommendations of the panels and are not necessarily endorsed by BRAB. The Board certifies as to the competency of the membership of the advisory panels, but representing all branches of the construction industry as it does, it is clearly not within the competency of the Board to act upon the diversified technical recommendations of the various panels.

HARRY C. PLUMMER, *director*
Engineering and Technology
Structural Clay Products Institute
Washington, D. C.

Sirs:

The story on the BRAB report is very excellent. It takes a complicated subject and briefs it well.

I wonder, however, whether the "Frank" Walker mentioned on page 114 is the same person as the "Ralph" Walker indicated on page 116. The name is "Ralph."

RALPH WALKER, *architect*
Voorhees, Walker, Foley & Smith
New York, N. Y.

▶ The Walkers who participated in the BRAB conferences were one and the same, and the name indeed is Ralph.—ED.

Sirs:

Your article lists BRAB's recommended live load intensities (*p. 117*) in terms of psi (pounds per sq. in.). They should be psf (pounds per sq. ft.).

MARTIN J. YOHALEM, *design engineer*
Proctor & Gamble Co.
Cincinnati, Ohio

Sirs:

Obviously . . . pounds per sq. ft.

R. F. BATCHEN, *research associate*
Building Panel Div.
Detroit Steel Products Co.
Buffalo, N. Y.

▶ Psf it is.—ED.

Sirs:

Your magazine should be complimented for its fortright approach on the important subject of "Conservation in Building" (AF, July '52). I also commend the public-spirited cooperation given BRAB by the professional men and the men from industry. While reports of this kind are difficult to prepare, the acceptance of such findings are even more difficult to put into practice. I hope that industry, the profession and, most important, the government agencies will initiate some of the suggestions in the BRAB report.

Many segments of the industry are conducting searching and productive research. I refer to private industrial, college and government laboratories as well as certain contracting and professional organizations. A tremendous amount of study on the problems of the construction industry is being carried on at all times, and I believe the sum-total

(Continued on page 66)

Radiantweld... THE SOLID WALL STEEL TUBING FOR RADIANT HEAT INSTALLATIONS EXCLUSIVELY

✓ *Greater Ductility*

Avon Radiantweld has been widely accepted by the trade for its extreme ductility. This special feature enhances its easy-to-bend qualities. One-man hand bending advantages serve the ends of lower cost installation plus new economies of handling a softer, stronger, more impervious tubing.

✓ *Higher Tensile Strength*

Avon Radiantweld steel tubing is ideal for hot water circulating systems because its inherent toughness is proof against damage and rough handling. Its higher tensibility coupled with greater ductility provides a solid wall steel tubing to match the most exacting installation requirements.

✓ *Extra Long Coils*

Longer coils (fewer joints) cut labor-time, eliminate soldering, costly annoyances of leaking unions. This special feature of Radiantweld serves the radiant heating field with important economies—easier handling and bending—reducing joining and soldering time—insuring leak-proof advantages that overcome time-consuming repairs when initial water tests are made. The ⅝" dia. now available in coils up to 160 ft. and the ½" dia. up to 225 ft.

✓ *Tested and Approved*

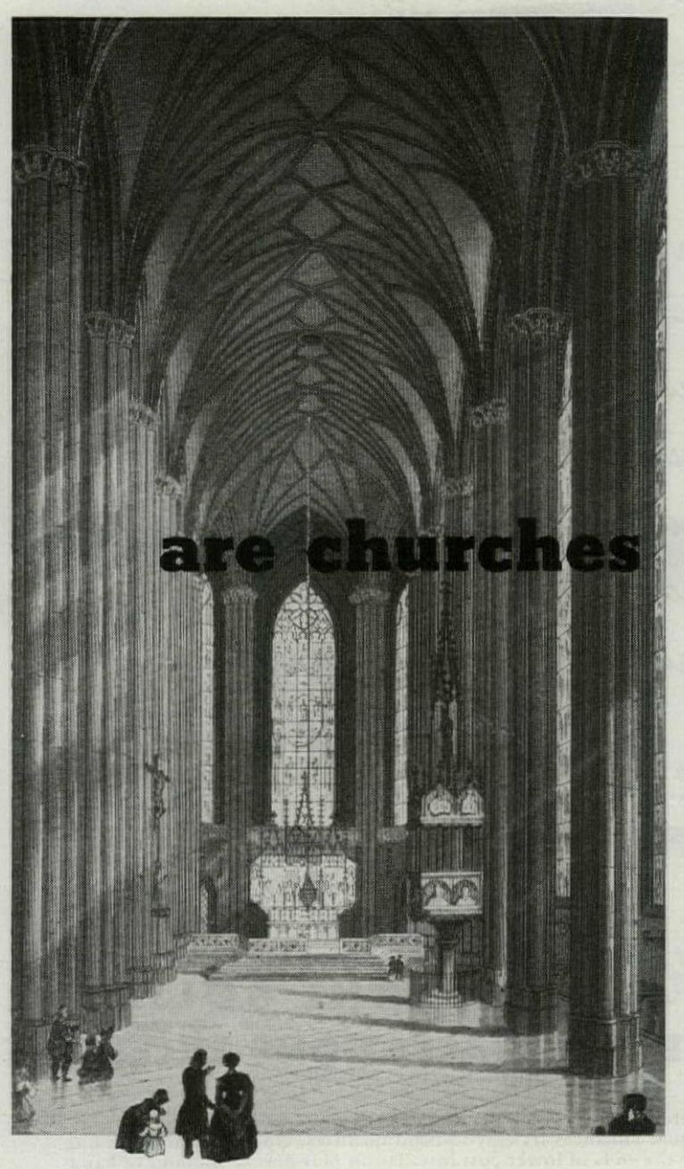
Avon Radiantweld is made by an exclusive fusionweld process and is then annealed and pressure tested up to 2500 p.s.i. It is rated as approved under the Re-examination Service of Underwriters' Laboratories . . . by the American Gas Association Laboratories . . . meets the requirements of FHA Government Building Codes. Has a Government specification rust-resistant bonded coating.

✓ *Used by the Leaders*

Radiantweld is specified and used by an ever increasing number of architects, heating contractors and some of America's largest production builders of individual homes and housing projects. Such acceptance is your insurance of a quality product—backed by the highest performance standards—with millions of feet of Avon steel tubing in use by automobile and refrigeration builders, electrical and hydraulic machinery manufacturers, toy, radio and miscellaneous industries.

MAY WE SUPPLY YOU WITH DETAILED INFORMATION?

AVON TUBE DIVISION HIGBIE MFG. COMPANY ROCHESTER, MICHIGAN



are churches going modern?

In design, it's hard to say. But you can be sure that they're going for modern comfort.

Surveys show that in the next few years, a large number of churches will be air conditioned.

Because air conditioning is one of the best investments a church can make. It increases attendance during summer months. It creates more interest in services by eliminating the distractions of discomfort, and of street noises coming through open doors and windows. And it means less cleaning and redecorating.

But for the architect, air conditioning in churches can present peculiar problems. Ducts and equipment must be concealed, equipment must be especially quiet. The system must be able to handle infrequent building capacities and sudden cooling loads. Frequently construction features, like high domes, add to the problem.

So it's important to get the best advice on air conditioning equipment and installation. And the Carrier dealer is the man to see for both. He is backed by Carrier's fifty years of experience in air conditioning all types of buildings. And with Carrier's full line of matched equipment in his hands, he can build an air conditioning system around any special problem a church can offer. Call him today. He's listed in your Classified Telephone Directory. Carrier Corporation, Syracuse, New York . . . *for 50 years—the people who know air conditioning best.*

Carrier

AIR CONDITIONING / REFRIGERATION / INDUSTRIAL HEATING

Fort Worth National Bank

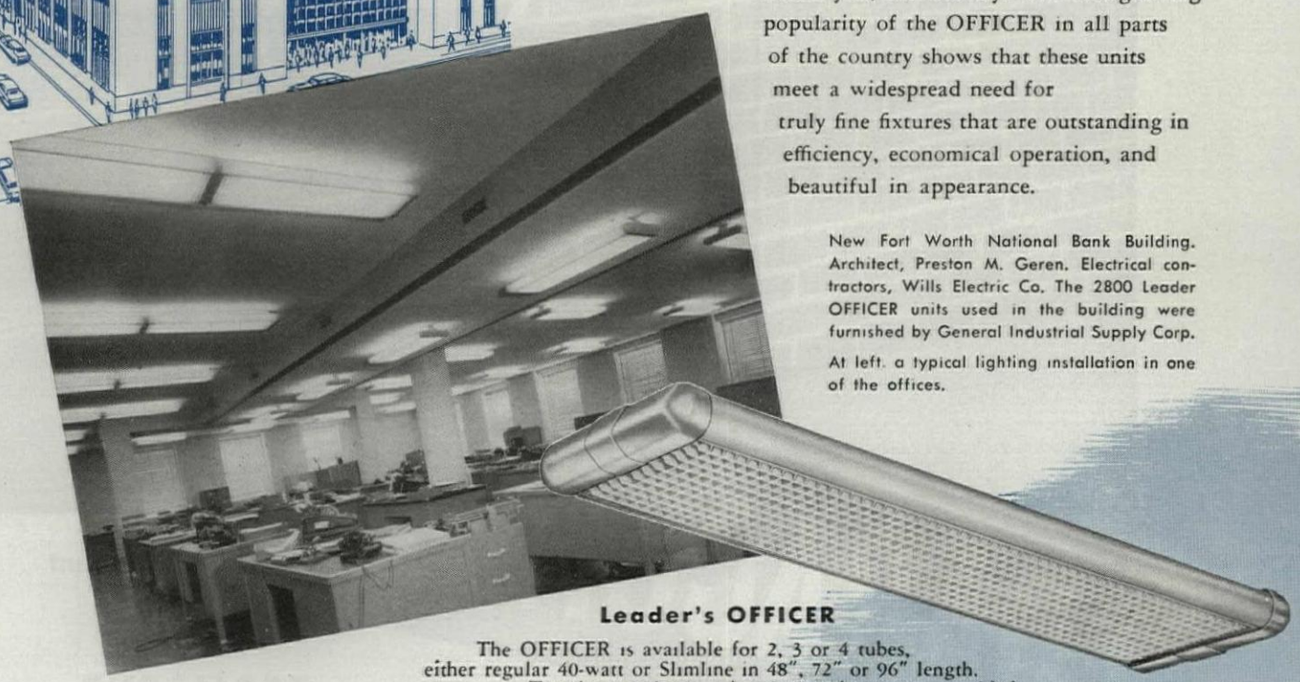
selects Leader

● The new Fort Worth National Bank Building, which provides the largest office space of any single building in the city, is lighted *throughout* with Leader's OFFICER fixtures. According to Mr. John Stanley, building manager, the reasons for selecting the OFFICER are that the "fixtures proved to be lower in maintenance—offered a higher light output—and made a more attractive appearance and styling . . ."

Thank you, Mr. Stanley! The ever-growing popularity of the OFFICER in all parts of the country shows that these units meet a widespread need for truly fine fixtures that are outstanding in efficiency, economical operation, and beautiful in appearance.

New Fort Worth National Bank Building. Architect, Preston M. Geren. Electrical contractors, Wills Electric Co. The 2800 Leader OFFICER units used in the building were furnished by General Industrial Supply Corp.

At left, a typical lighting installation in one of the offices.



Leader's OFFICER

The OFFICER is available for 2, 3 or 4 tubes, either regular 40-watt or Slimline in 48", 72" or 96" length. Translucent plastic side panel and injection-moulded one-piece plastic louver* with choice of 45° or 31° angle. Plastic will not warp or discolor. OFFICER units may be used singly or mounted in continuous rows, direct to ceiling or suspended.

*Made under patent No. 2566817

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Fully effective on new or old buildings.

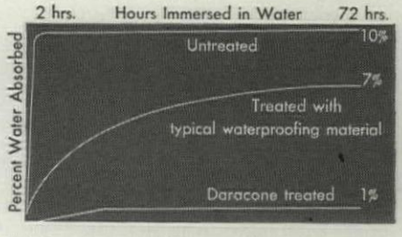
STOP LEAKS in above-grade masonry!

Now there is an easy, economical way to stop leaks in any type of exterior, above-grade masonry! DARACONE, a new, colorless, *high-silicone-content* water repellent, penetrates deeply into the masonry without affecting its appearance. It coats pores, fissures and cracks with an insoluble, non-oxidizing, invisible film of silicone. This effectively *stops* the capillary action by which water is absorbed. The pores and other voids are *not* clogged. It is the *repelling* action of silicone which keeps out water — even heavy, wind-driven rain.

DARACONE *also* ends the major cause of efflorescence. It protects against damage from freezing and thawing. It helps keep buildings clean, because water and suspended dirt *roll off* the masonry instead of being absorbed.

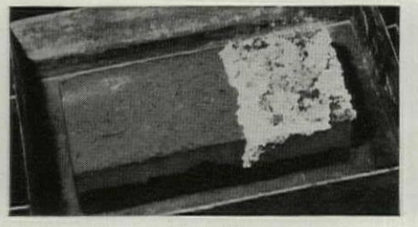
DARACONE can be quickly and easily applied in temperatures ranging from 100° to –15°. But remember, it will pay you to insist on DARACONE. Tests show that DARACONE is *durable* . . . will outlast other materials by a wide margin.

Write for full information now!



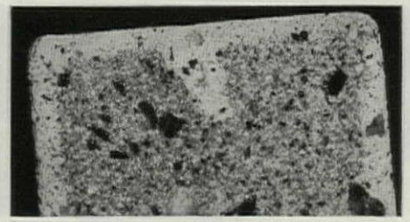
72 hour water immersion

After 72 hours' immersion in water, a moisture pick-up of less than 1% by weight proves DARACONE's greater ability to resist water absorption. Note that specimens treated with low silicone content material absorbed almost 7% moisture by weight, while untreated specimens absorbed 10% moisture by weight. All test specimens (mortar mix blocks made of 1 part cement, 1 part lime, 6 parts sand) were standard cured and immersed in ¼" water.



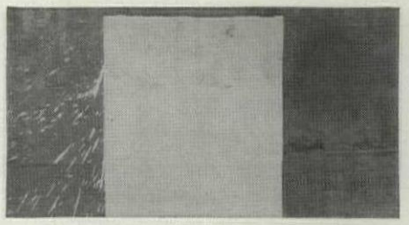
Daracone retards efflorescence

Half of the red clay brick had been coated with Daracone, and the other half left uncoated. Brick was placed in a 10% sodium sulfate solution. First traces of efflorescence appeared on the uncoated side within 24 hours; heavy bloom appeared in 72 hours. Note that the sodium salts *could not come to the surface* on the side coated with Daracone.



Penetration of Daracone

This sand lime brick was treated on all sides with Daracone, then cut in two. Cut section was immersed in water, then photographed. Light dry area around the edges shows the depth of Daracone water-repellency. Dark area shows wetting by water.



Concrete treated with Daracone

Before this concrete was wet down with a hose, the center was treated with Daracone. Note that the area treated with Daracone was so water-repellent as to remain completely dry and shows no darkening from water absorption. Also note the spatterings of Daracone which fell on the wall and made even those areas water-repellent!

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LETTERS

of this work equals or exceeds that being done in any other single great industry.

The crux of this situation lies in the lack of use and coordination of the research by designers and builders. I have long been an exponent of utilizing our giant laboratory of construction to test our new developments and verify or revise our old conceptions as experience makes our errors of commission and omission apparent. The industry needs a central clearing house for the evaluation of experience and the profession should promptly decide upon such a plan and develop ways and means to finance and disseminate coordinated information on materials, details, equipment, planning and the economic relations imposed by the interplay of these factors. BRAB presents an excellent spot for such coordination. Until some effort is expended in the collection, coordination and analyses of our continuing construction practices, the industry will continue to "waddle" in the atmosphere of great ideas without putting them to work in an effective and economic way.

WALTER C. VOSS, *head*
Department of Engineering & Construction
Massachusetts Institute of Technology
Cambridge, Mass.

CIRCULAR ROOMS

Sirs:

We were pleased to see pictures of the free-standing circular room developed for Webb & Knapp's offices by I. M. Pei and associates in the July FORUM as we have long admired the plans of the unconstructed houses designed by Frank Lloyd Wright for Ralph Jester in 1938, and for Paul Palmer in 1947, which utilize the principle of the freestanding circular rooms.

We hope the comment that Pei advanced beyond anything of the kind yet tried by the "old masters" of modern architecture did not include the "young" Mr. Wright.

RUTH AND GEORGE JAMES,
Huntsville, Ala.

MANHATTAN HOUSE

Sirs:

I have read your article on Manhattan House (AF, July '52) with a great deal of interest, and you should be complimented for having done such a thorough job. The subject lends itself to a really good story, and you seized the opportunity.

Keep up the good fight for good modern architecture.

WILLIAM LESCAZE, *architect*
New York, N. Y.

TALKING BUILDINGS

Sirs:

Granted that you publish the most significant buildings of today, you also have a sickening way of presenting them.

You will stop at nothing to pour out cellophane-wrapped words, even putting them in

(Continued on page 72)

accept no **estimate** of economy

LOOK at these *actual* STEAM COSTS

from a prominent Rhode Island Textile Manufacturer*

If more steam users kept accurate records, more would own **Superior** Steam Generators.

In 1951 these two **Superior** units supplied steam for heat and process at 125 psi. for a well known textile plant. Here are the results:

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Overall efficiency for 1951.....83%
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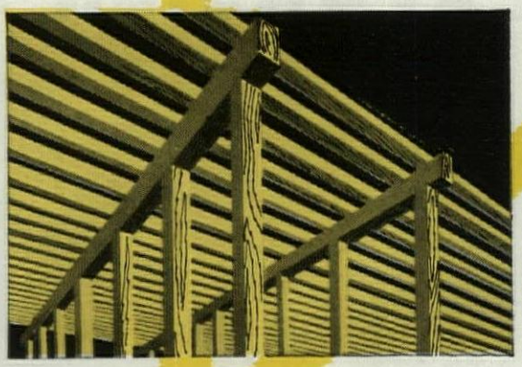

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☐ Valuable booklet, "Pointers on Penta" ☐ Sources of posts and treated wood

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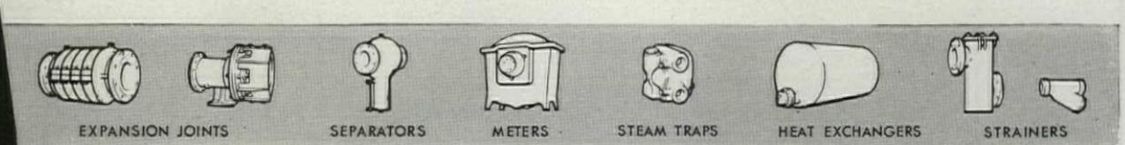

AMERICAN DISTRICT STEAM COMPANY, INC.
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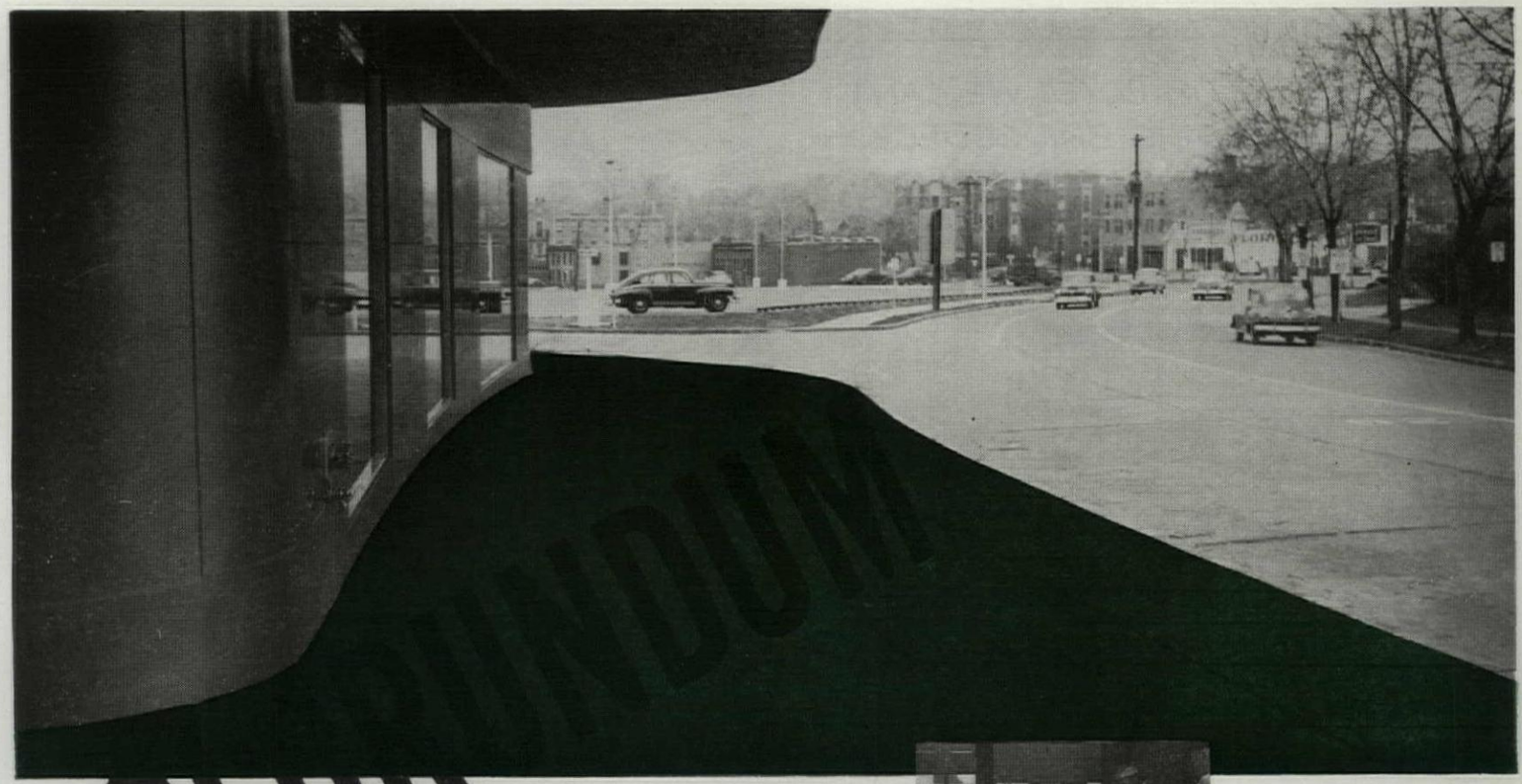


COLORUNDUM

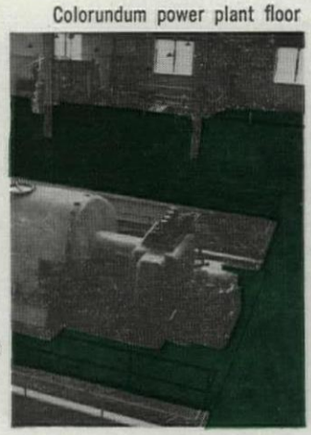
for colored concrete floors and sidewalks

use COLORUNDUM trowelled into the fresh concrete topping

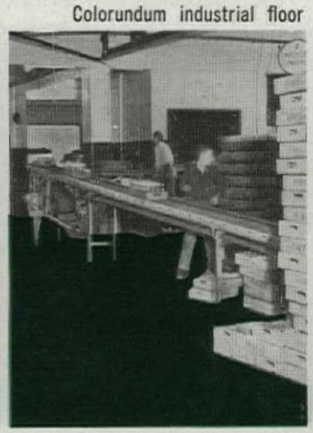
Colorundum
central fire station floor

All over the nation modern building design now includes the use of Colorundum in colored concrete floors, sidewalks, roof decks, industrial and other walkways and driveways. Colorundum is used widely in exteriors or interiors . . . as a wear-resistant and colorful concrete topping of long life . . . at practically the average cost of ordinary concrete. Decorative color combinations are often employed of red, maroon, brown, green, dark green, french grey, black. Colorundum is a dry powder ready for use, composed of coloring mediums, fused aggregates, water-repellent and hardening elements. Colorundum is dusted on and floated and trowelled into the fresh concrete topping. The non-slip, non-metallic surface makes it an ideal flooring on new concrete or when replacing old concrete floors or sidewalks.

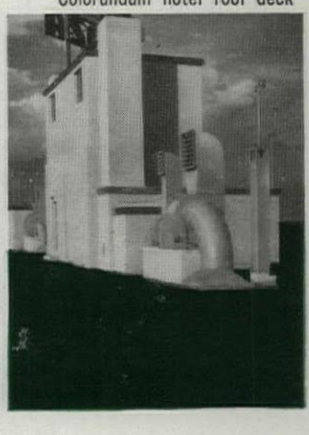
Colorundum power plant floor



Colorundum industrial floor



Colorundum hotel roof deck



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LETTERS

the mouths of the buildings themselves? Why, if I were Lever House (AF, June '52), I would sue you!

See what you have done—you even have me writing that way!

ENRIQUE LIMOSNER,
Berkeley, Calif.

FOR AN INDUSTRY MAGAZINE

Sirs:

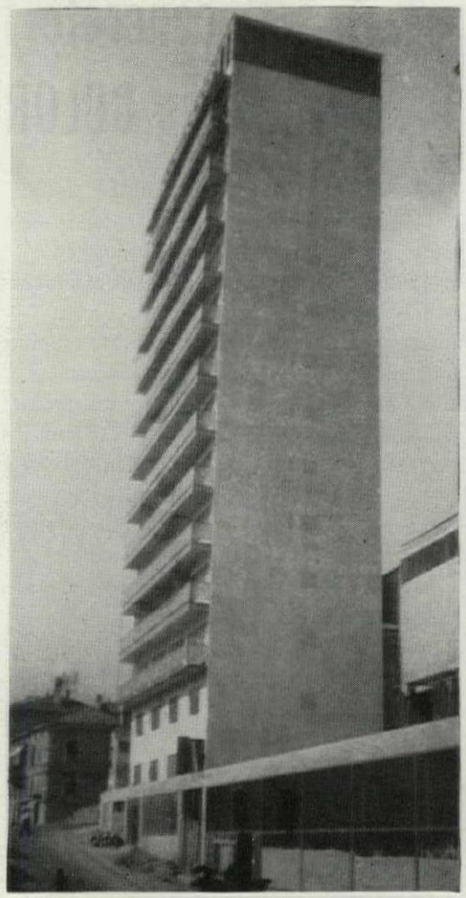
I congratulate you on the excellence of FORUM. I like the policy of having the magazine slanted to the whole building industry rather than to just the professional side. Such a policy bridges a long unfilled gap between architects, promoters, realtors and builders. Keep up the good work and maybe architects—as such—won't die on the vine.

RICHARD A. MORSE, *architect*
Tucson, Ariz.

YUGOSLAVIA'S "UN BUILDING"

Sirs:

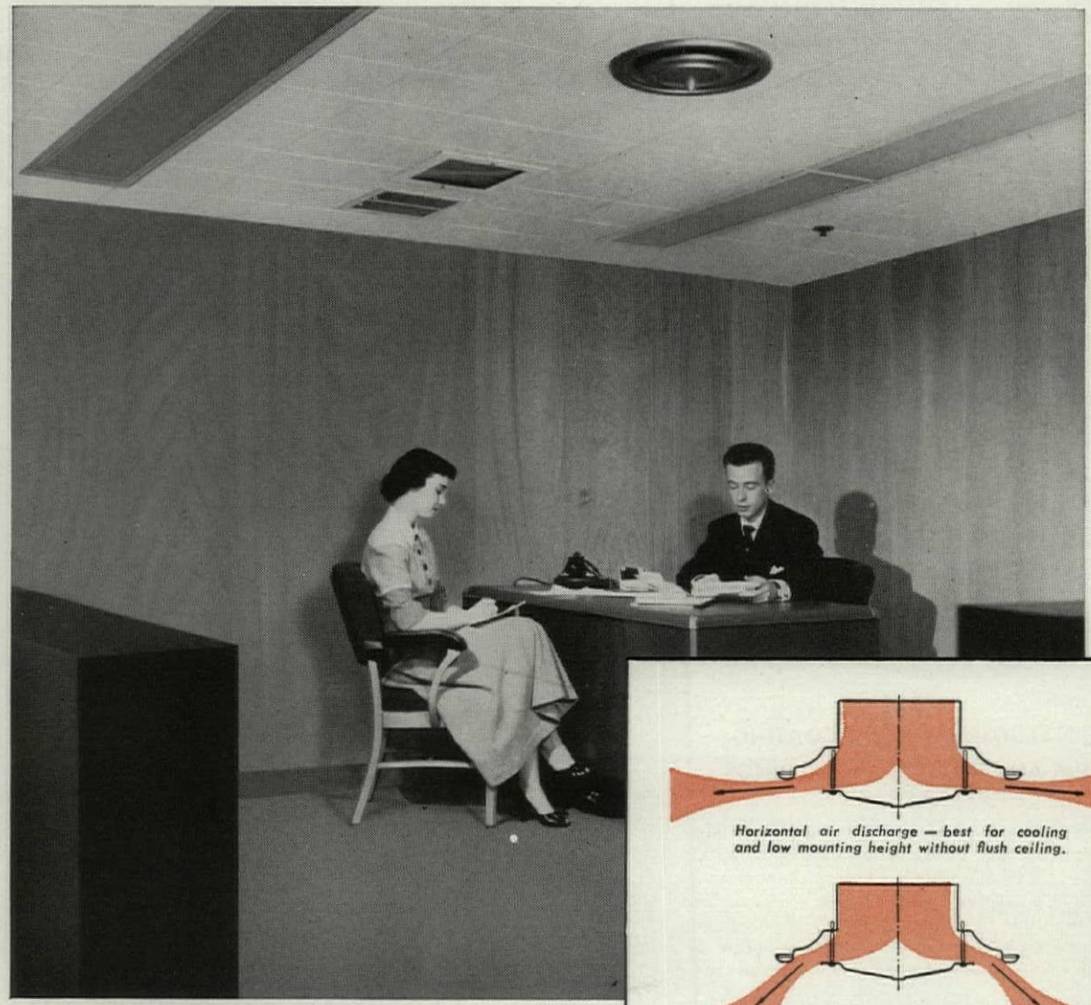
Incited by publication of the UN Headquarters Group in the April FORUM, I send you a photograph of the Culture-Home-Building of Susak, which I had designed in 1936 and which was finished shortly before the breakout of World War II.

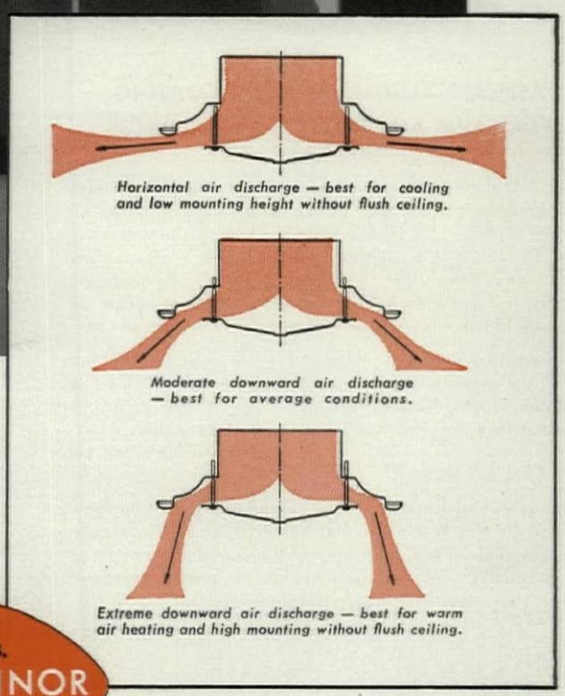


It is not so much my wish to point out the moment of certain analogies in its architectural structure, but that I would like to acquaint you with the architectural standard of my country, Yugoslavia.

(Continued on page 78)

Seneca Textile's new building, New York City. *Architects and Engineers:* Alfons Bach, Inc. *Contractors:* George A. Fuller Co.





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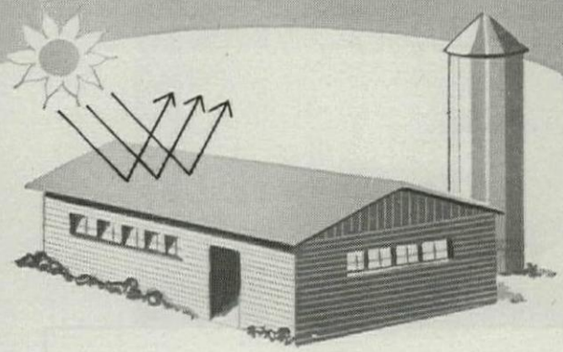

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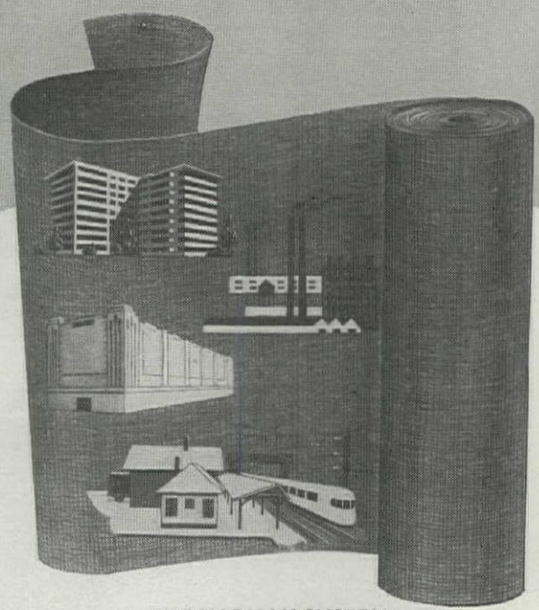
Karnak Asphalt-Aluminum Roof Coating as developed after extensive research by our laboratories combines carefully selected asphalts and vehicle with full leafing aluminum pigment. The result is a superior product which gives excellent protection and beautifies the structure coated. The aluminum particles leaf as the asphalt base dries, which forms a firm metallic shield that resists weather and reflects the hot sun rays.

Composition roofs are revitalized by the penetrating qualities of the asphalt which in turn is protected by this firm aluminum shield. Rustable metal sidings and roofs are protected against moisture and corrosion. One gallon covers approximately 250 to 400 square feet depending upon the type of surface area.

The quality of Karnak Asphalt-Aluminum Roof Coating is certified by the Warranty Seal which is attached to every container. This is your assurance of the manufacturers' integrity in supplying the best product for the money expended.



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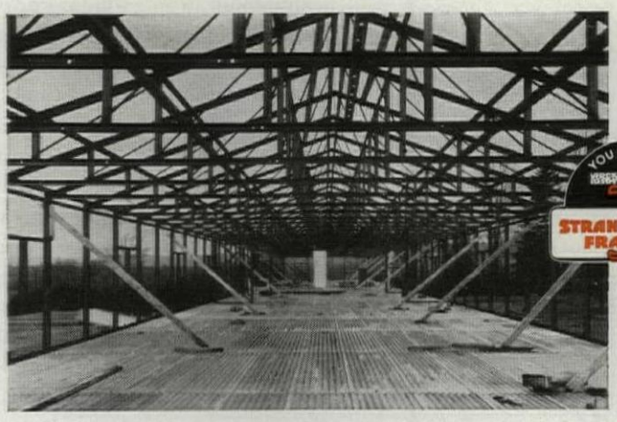
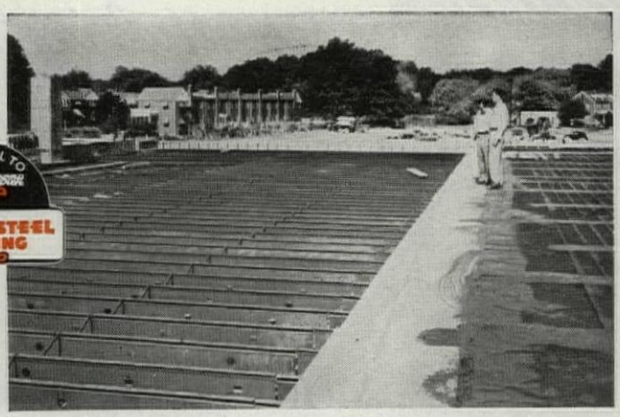
Stran-Steel framing members bring twofold savings when specified for commercial and industrial construction. There's the initial saving of time and money during construction—and the permanent saving over fire hazards. With Stran-Steel roof systems and floor joists, the destructive effects of fire can be reduced to a minimum.

Stran-Steel framing is easily adapted to modern design, has great rigidity, and is precision pre-cut for rapid assembly. The nailable feature of Stran-Steel framing allows a wide choice of collateral materials and speeds building close-in. Interior work can proceed before exterior completion, thus saving delay in sub-trade work.

Write for complete literature and specifications data on Stran-Steel framing; or see Sweet's Architectural or Builders' files.



Non-combustible Stran-Steel framing members were used for exterior walls, interior partitions, roof trusses, and floor joists in New York State Conservation Department building at Sherburne, N. Y.



Virginia Square Shopping Center in Arlington County, Va., uses Stran-Steel joists on the first and second floors and roof. Roof construction includes poured Pyrogyp deck plus built-up roofing.

FREE—Write us today for your file-size copy of our 138-page Architects' Reference Manual. Fully illustrated. Complete engineering tables.

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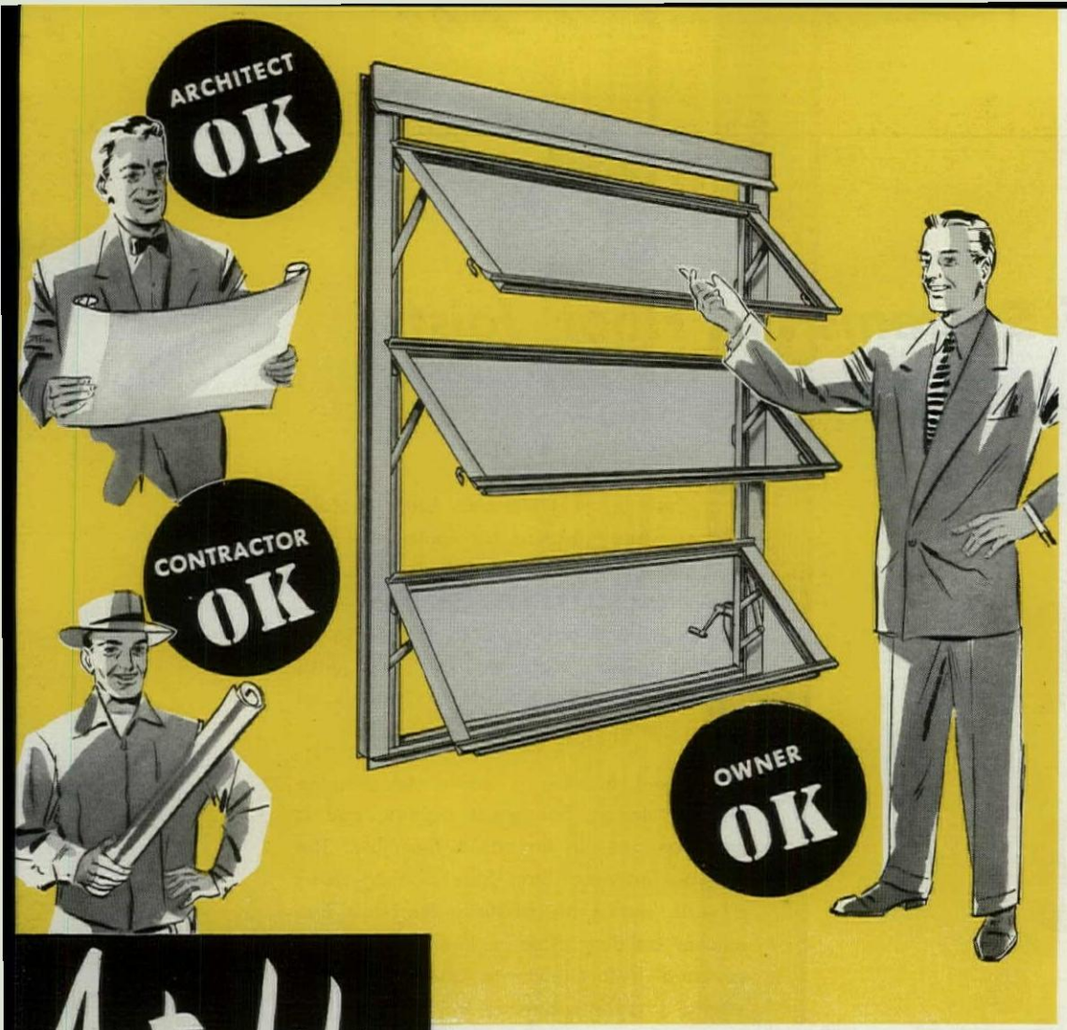
Stran-Steel Division Ecorse, Detroit 29, Mich.
NATIONAL STEEL CORPORATION

PRODUCER OF NAX HIGH-TENSILE STEEL

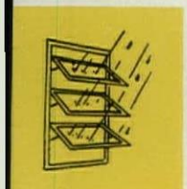


Auto-lok
AUTOMATIC LOCKING
PATENTED

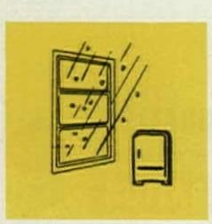
Aluminum WINDOWS

THE FIRST WINDOW TO MAKE

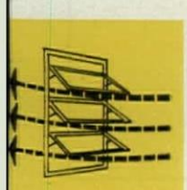
Weather
TO ORDER



FRESH AIR WHILE IT'S RAINING...no more running to close windows. Rain can't enter through slanting sash!



WARMER IN WINTER
..because it seals itself like a refrigerator... keeps heat in, cold out!



COOLER IN SUMMER
...because it opens widest...scoops air in and up...luxurious ventilation, but no drafts!

DO YOU KNOW
THE THREE STEPS TO *successful installation?*

The window the Architect specifies...*for his reasons* ...must work out to advantage for the Contractor...in terms of *trouble-free, economical installation.* Finally, from the Owner's standpoint, the successful window is the window that proves *most practical*...not only in the planning and construction stages, but through a lifetime of *maintenance-free service and attractiveness!*

PERFORMANCE COUNTS *first*

AUTO-LOK is the first and only window made that *successfully* meets all window requirements...in use as well as in every step of architectural planning and construction work. No other window *so completely* meets the "three-way" performance requisites that result in successful window installations.

IT WILL PAY YOU TO WRITE FOR THE "HOW" AND "WHY"!

LUDMAN *Corporation*

BOX 4541, DEPT. AF9, MIAMI, FLORIDA

sealed like a refrigerator

Tightest closing windows ever made!

PERFORMANCE FACTORS
of aluminum awning-type windows

Every day, more and more architects and contractors are turning toward aluminum awning-type windows. These newer, more modern windows are being specified for all types of construction, including factories, commercial buildings, apartments, hotels, schools, hospitals and homes. Over a period of years, the aluminum awning-type window has been subjected to rigid and exhaustive tests to determine its performance characteristics and operating efficiency under every known weather condition. This research has been carried on by the leading manufacturers in cooperation with leading architects.

THE "OPEN" WINDOW

One important advantage in favor of the aluminum awning-type window is that it can remain "open" to provide ventilation and fresh air circulation even when it is raining. Slanting sash is the answer. One aluminum awning-type window, the Ludman Auto-Lok, goes a step farther in this respect. The bottom sash of the Auto-Lok window is designed to remain slightly open, while the upper sash are closed tight and automatically locked. This feature allows for night ventilation and limited ventilation during inclement weather.

BETTER VENTILATION...easier to clean

Because of their outward projection, the vents in aluminum awning windows provide maximum possibility of attaining 100% ventilation. While not all awning windows can be opened to nearly 90 degrees (almost straight out) the degree of their opening can be predetermined by checking the manufacturer's specifications. In their wide-open position awning type windows can be cleaned from the inside. This very important maintenance factor cannot be underestimated. However, the basic design of the window must be checked. For, on certain of these types, where vents are pivoted on a fixed point, the top vent cannot be cleaned from the inside. The Ludman Auto-Lok window can be cleaned *completely*... all from the inside, top sash, too. This feature is accomplished by Ludman's uniquely designed operating hardware, in which the hinge points of the top sash float down with the mechanism when the window is opened to provide a convenient 6" opening between the top sash and the window frame.

AIR INFILTRATION

Paradoxically, the use of aluminum awning windows has for many years been retarded because of their generally unsatisfactory performance on the score of tight closure and elimination of air infiltration. Yet, today, the tightest closing window ever made is an awning

type window. This unit is Auto-Lok, developed by Ludman Corporation after many years of research. Its tight closing performance is made possible by its patented hardware, a self-locking device which automatically seals the window tight when closed. Auto-Lok hardware provides a closure *ten times tighter* than the popular established standards for casement windows and projected sash. Pittsburgh Testing Laboratory tests reveal that air infiltration through a standard, assembly line Auto-Lok window amounts to only 0.095 cubic feet per minute... a degree of weather-tightness heretofore thought impossible in any window. Though the Auto-Lok locking action is exclusive with Ludman, other manufacturers are beginning to use a vinyl plastic weatherstripping material similar to that which Ludman uses to weatherstrip the Auto-Lok unit.

SIMPLE OPERATION

The "one-hand" operation of aluminum awning-type windows is another feature that is very well accepted...and, in many instances, one of the important deciding factors in the selection of these windows. For example, this feature is important to hospitals, where busy nurses with a tray in one hand can still open or close the windows with their free hand...saving time and trouble. Each individual manufacturer utilizes a distinct type of operator to actuate the window operating hardware. Usually they have large gear boxes to generate the great amount of force required to actuate the torque bar window mechanism. Because of their size they extend over the face of the window sill into the room. Some have removable cranks and extension drives. A study of the operating hardware of all aluminum awning-type windows reveals the fact that Ludman, maker of the Auto-Lok Window, has the most efficient mechanism from the standpoint of easy operation and trouble-free service. The automatic, self-locking principle of the patented Auto-Lok operating device eliminates torque strain required to force the hinges in order to pull individual sash in tight against the frame. In fact, the Auto-Lok mechanism is so perfectly balanced and requires so little pressure that a child can operate the windows.

THE IDEAL WINDOW for any installation ...in any climate

The aluminum awning-type window is practical from every standpoint. Installations all over the world, in all climatic extremes, have proven their practicability. Their attractive horizontal lines make them entirely adaptable to all types of architectural design from cottage to skyscraper. Their rapidly growing acceptance is having a marked influence on architectural designs because their clean horizontal lines fit admirably into modern architectural styles.

LETTERS

The Culture-Home-Building contains two concert halls (the larger one of which has a stage and can be used for theatrical performances), the town library, the town museum, a hotel with restaurant and café as well as different premises for lease.

ALFRED ALBINI, *prof. of archi'l. design*
University of Zagreb
Zagreb, Yugoslavia

CITY PLANNER'S REBUTTAL

Sirs:

In FORUM's story on Philadelphia planning (Jun '52) you say "Unlike most city planners in the US, Edmund Bacon [*architect-director of Philadelphia's Planning Commission—Ed.*] knows that the city is not a chart but a plastic organism, a series of visual sensations produced by a succession of spaces and forms of different size and shape." Your sweeping generalization is not complimentary, either to the former architects and landscape architects who have become planners or to the growing numbers of professionally trained planners educated since the war who have, in most cases, been trained side by side with architects. You talk of "three-dimensional" planning without mention of the fact that planners (Bacon among them, I am sure) must consider as well the dimensions of time and motion and people, which make planning a multidimensional art.

Your statement about "same old city-planning engineers who thought of cities as flat planes without elevations at all" seems to be just rude. Come to Portland some time, and see a Planning Board in operation that does its work on three-dimensional-scale models, as well as in the dimensions of finances, population, and land use.

No single profession should delude itself into thinking that it alone can solve the problems of man's environment and relations with other men, or that its practitioners are the anointed ones who should lead all the teams. If it is our purpose to help other men, or to create beauty, then we cannot afford to be ungenerous with those who seek the same ends with different tools and skills, and whose contributions and knowledge we do not completely understand.

ROGER L. CREIGHTON, *planning director*
Portland, Me.

BUILDING ABROAD

Sirs:

I wish that you would pay a little more attention to what is going on in Europe and South America. You tend to present the American scene too much.

W. T. MARTIN, *architect*
Toronto, Canada

▶ Each month FORUM will present at least one outstanding building from outside the US. This month the subject is Mexico (p. 101).—ED.

(Continued on page 84)

FOR HARD-WORKING BUILDINGS MULTI-PURPOSE INTERIORS OF

Structural Facing Tile

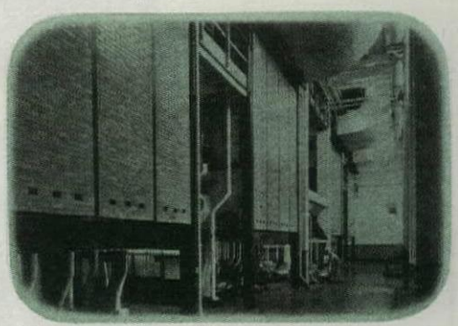
If you want to design interiors that will help a building to *work* better, at lower cost, specify walls of Structural Facing Tile—it gives you more for the dollar than any other single building material.

top choice for beautiful working space

in hospitals and laboratories

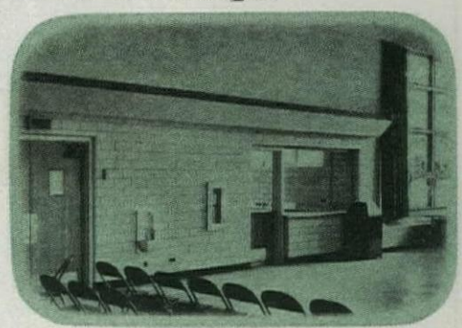
It's durable, easily maintained—Glazed or unglazed, Facing Tile's hard-burned surface stays beautiful under the hardest usage, will never scratch, mar or fade. There's no need to budget for refinishing, no need to shut down for painting.

in industrial plants



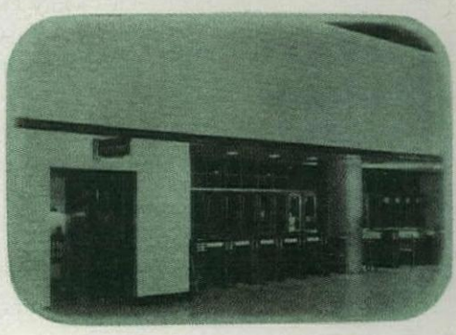
It aids cleanliness—Facing Tile stays test-tube bright with only an occasional washing or hosing down. Bacteria, dust, lint and other air-borne impurities find no foot-hold on this smooth finish. Paint fumes will never be a problem.

in schools and colleges



It speeds construction—Made in large-size modular units, Facing Tile goes up fast, reduces costly cutting and fitting. It provides a structural wall and a lasting finish in one economical step.

in public and commercial buildings



It's "color-engineered"—Facing Tile colors are scientifically developed to help you to make the walls fit the task. You can choose the *right* color to improve vision, aid lighting, increase production, and lift workers' morale.

FOR ALL THE FACTS ABOUT FACING TILE

glazed or unglazed, send for free booklet, "Catalog 52-C," "The Scientific Approach to Color Specification" and "Facing Tile Construction Details." Just address your request to any institute Member or Dept. AF-9 of our Washington or New York offices.

LOOK FOR THIS SEAL

QUALITY FACING TILE — FTI — Member of FACING TILE INSTITUTE

It is your assurance of highest quality Facing Tile. This seal is used only by members of the Facing Tile Institute. In the interest of better Facing Tile construction the following companies have contributed to the preparation of this advertisement.

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Columbus 16, Ohio
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HYDRAULIC PRESS BRICK CO.
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MAPLETON CLAY PRODUCTS CO.
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METROPOLITAN BRICK, INC.
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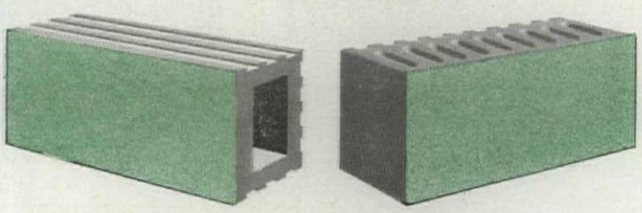
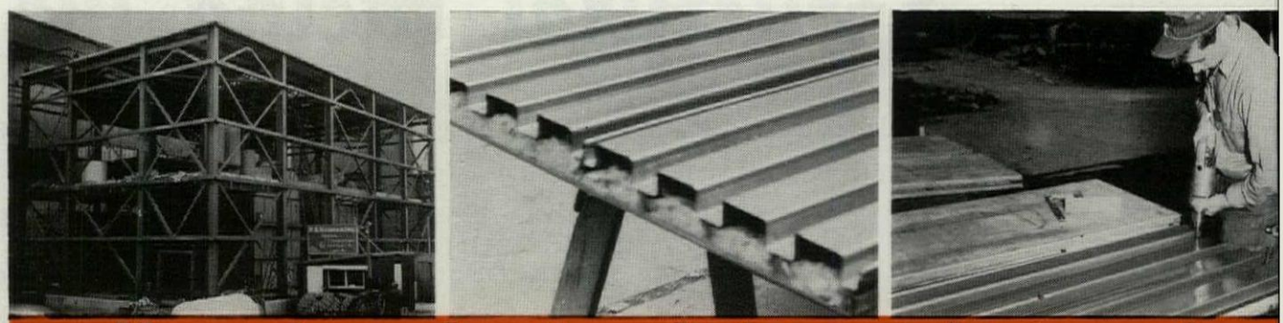
WEST VIRGINIA BRICK CO.
Charleston 24, West Virginia



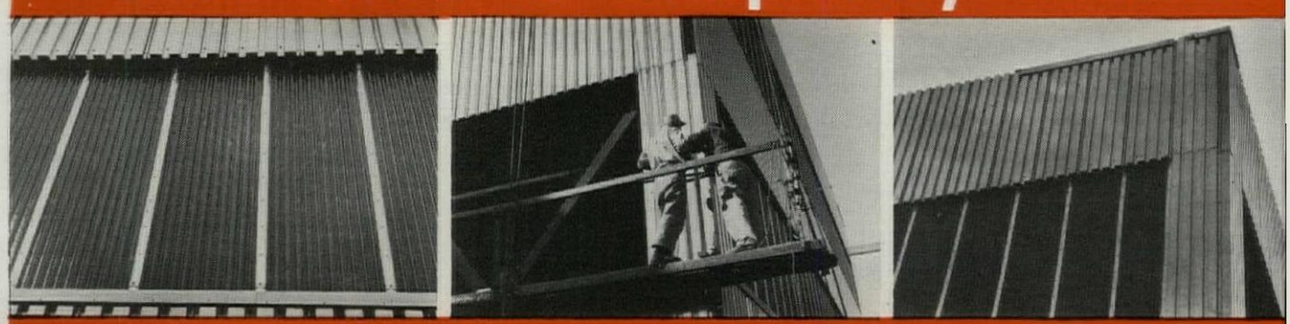
FACING TILE INSTITUTE

1520 18th Street, N. W., Washington 6, D. C.
1949 Grand Central Terminal, New York 17, N. Y.



How long-lasting lightweight panels

were used to completely enclose



plant in eleven working days

STEP by step, these photographs show how U·S·S 17 (AISI type 430) Stainless Steel insulated building panels were installed on this addition to existing steam generating facilities at Olmsted Air Force Base, Middletown, Pa.

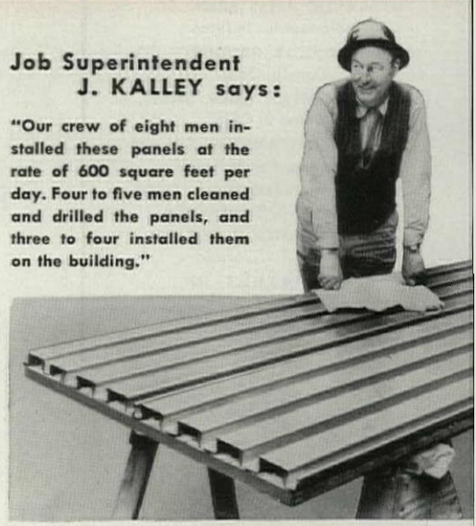
Only 11 working days were needed to bolt more than 7,000 square feet of panels to the structural framework. And that's only one of the advantages of this type of construction.

Panels of U·S·S 17 Stainless Steel give you a building with outstanding appearance, a minimum of maintenance and exceptionally long life. These benefits, plus the lightweight and low "U" value or heat transmission factor, make Stainless-paneled buildings the best answer to today's construction problems—especially since U·S·S 17 Stainless Steel is available without CMP tickets.

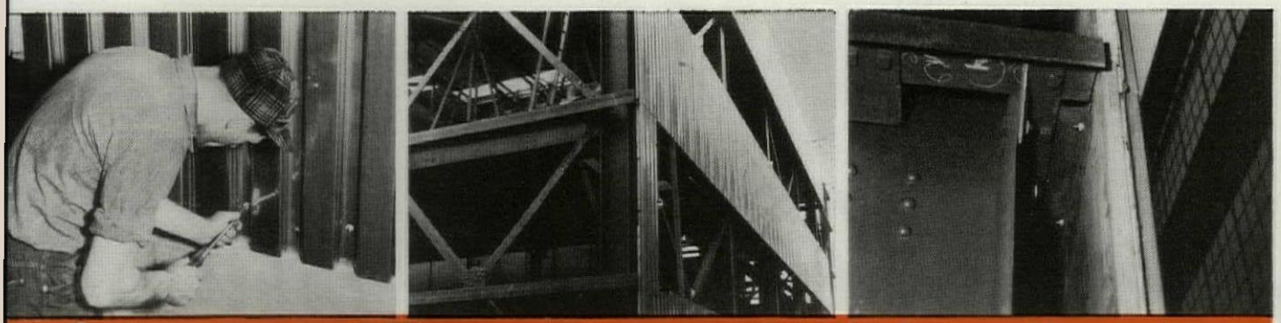
Get all the facts on this type of construction by mailing the coupon at the right.

Job Superintendent J. KALLEY says:

"Our crew of eight men installed these panels at the rate of 600 square feet per day. Four to five men cleaned and drilled the panels, and three to four installed them on the building."

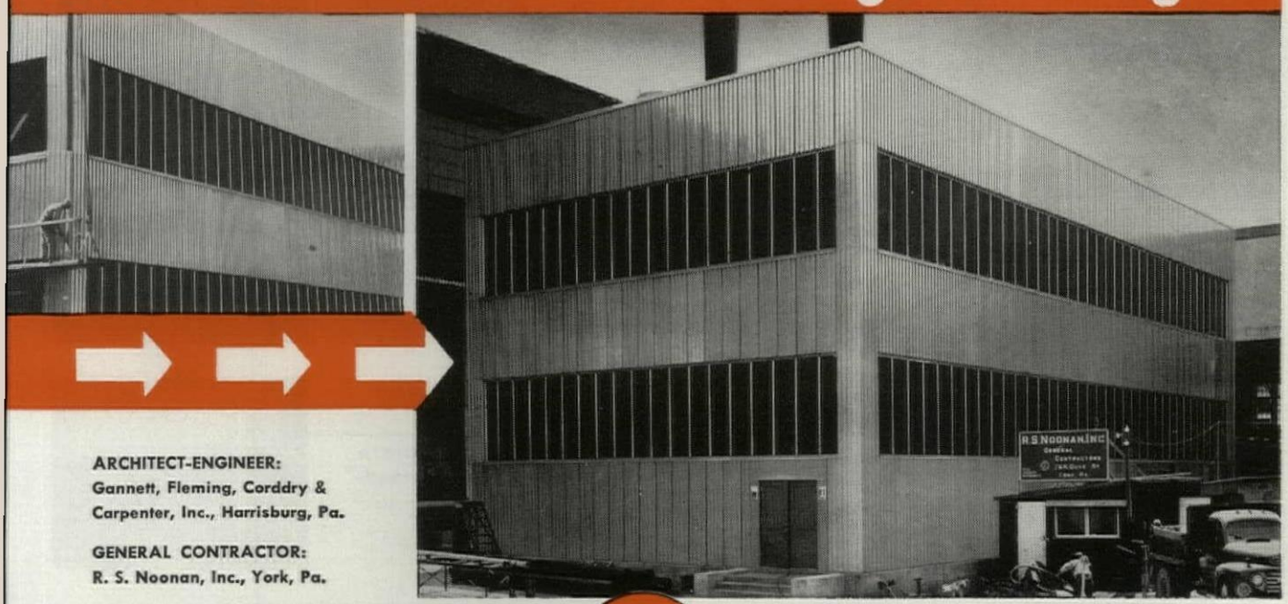


UNITED STATES STEEL



# of U·S·S 17 (type 430) Stainless Steel

this 86½′ x 46′ steam generating



ARCHITECT-ENGINEER:
Gannett, Fleming, Corddry & Carpenter, Inc., Harrisburg, Pa.

GENERAL CONTRACTOR:
R. S. Noonan, Inc., York, Pa.

WALLS are standard Stainless Steel panels fabricated and erected by H. H. Robertson Co., Pittsburgh, Pa.

USS TRADE MARK

UNITED STATES STEEL COMPANY, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

United States Steel Company
Room 2804Z, 525 William Penn Place
Pittsburgh 30, Pa.

☐ Please send me your booklet, "U·S·S 12, U·S·S 17 Stainless Steel Walls and Roofs for Industrial Buildings."

☐ Please arrange to have fabricators of Stainless Steel wall panels send me literature on their particular type of construction.

Name .....Title .....

Address .....

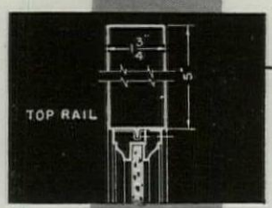
City .....State .....

UNITED STATES STEEL

RICHMOND MD DOORS

Molded Design

Now available with U.L. label

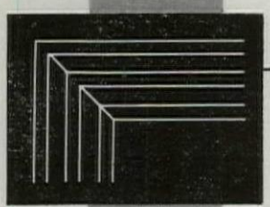


HEAVY DUTY CONSTRUCTION

Stiles and rails 16 gauge; butt and lock cutout reinforcing

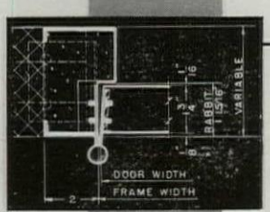
MOLDED DESIGN

A Richmond "first"; neat 20 gauge hollow metal molding around all glass and solid panels



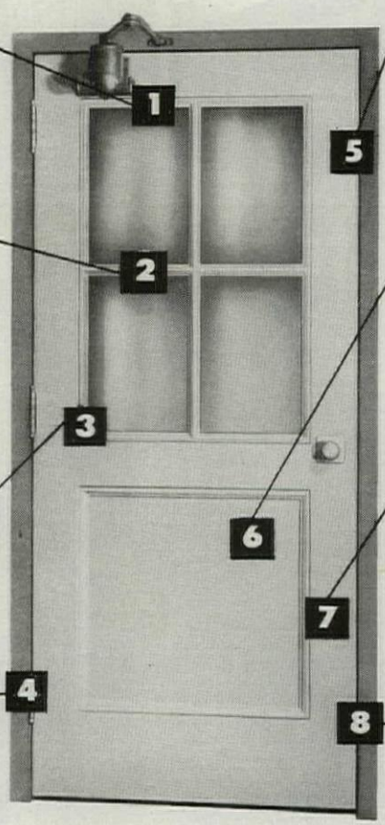
MITRED AND BRAZED CORNERS

Continuous sash ready for glazing; no open mitres



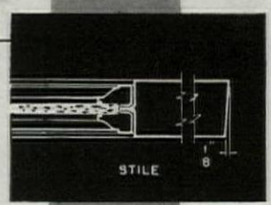
HINGE RECESSES

provided for neat fit; no cutting on job



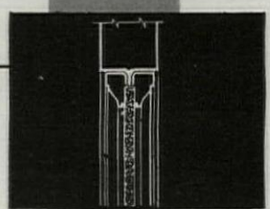
BEVELED EDGES

for snug fit in frame, and non-binding operation



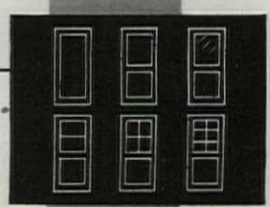
METAL COVERED PANELS

¼" sheet rock (asbestos for labeled doors) glued between 20 gauge steel sheets



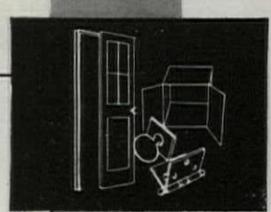
MANY SIZES AND STYLES AVAILABLE

Single and double swing in almost any size up to 4' 0" x 8' 0"



COMPLETE "PACKAGE"

Furnished complete with frame and standard hardware for savings on job



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FOR FULL DETAILS AND SPECIFICATIONS WRITE TO:

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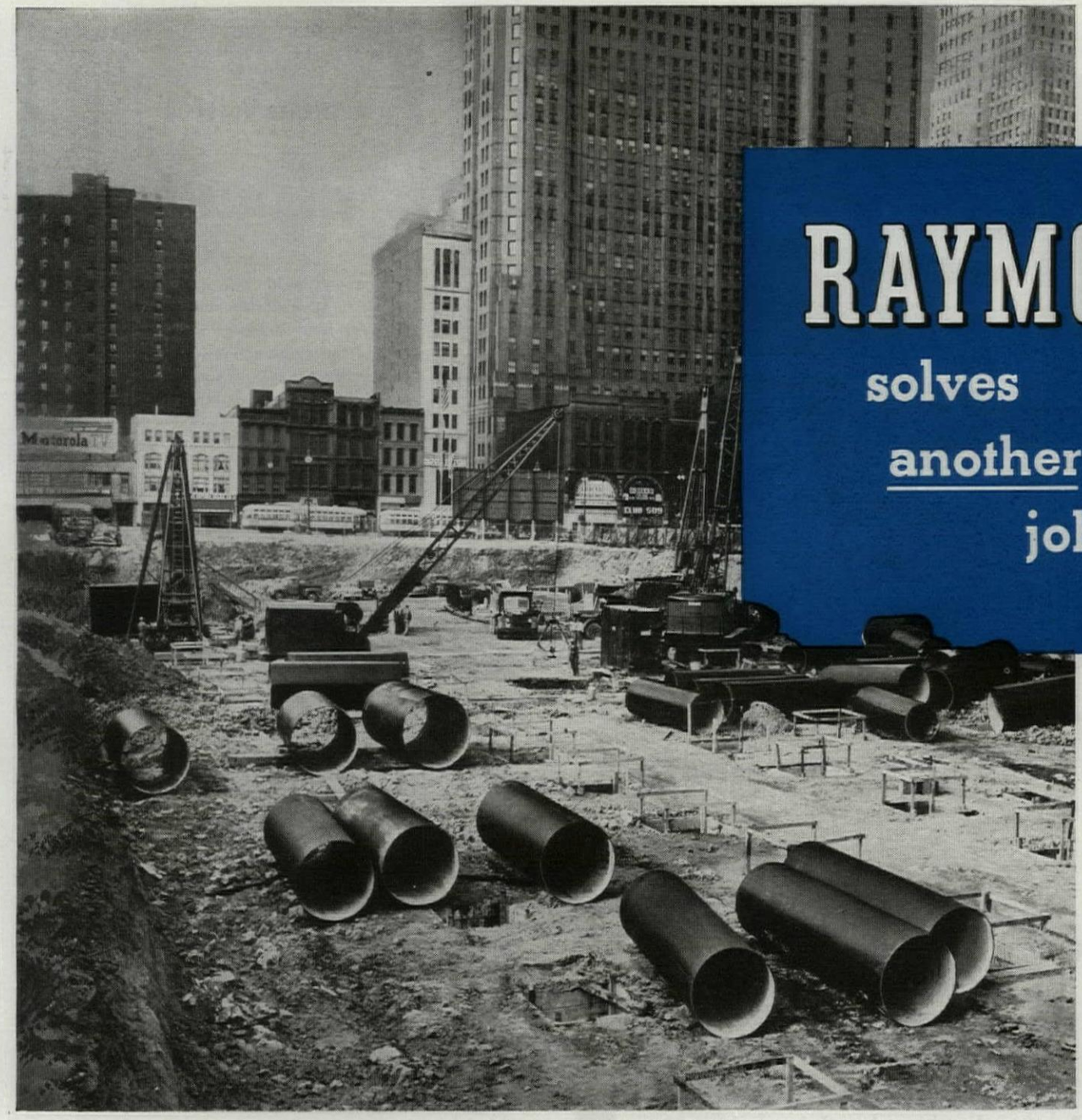


RAYMOND

solves another tough job!

at left
Sinking Gow caissons for Detroit's City-County Building

FOUNDATION CONTRACTOR:
O. W. Burke Co.

ARCHITECTS & ENGINEERS:
Harley, Ellington & Day, Inc.

CONSTRUCTED FOR:
Detroit-Wayne Joint Building Authority

...**To provide** the foundation for the City-County Building in Detroit's new Civic Center, Raymond placed 126 Gow caissons, with diameters of 48 to 74 inches, to depths exceeding 100 feet to hardpan. The caissons were belled out on the hardpan to varying diameters. Completion of this project ahead of schedule is another example of how Raymond engineers combine knowledge and experience with specially designed equipment to provide any type foundation anywhere. We would like to serve you on your next project.

RAYMOND **CONCRETE PILE CO.**

140 CEDAR STREET • NEW YORK 6, N. Y.

BRANCH OFFICES AROUND THE WORLD FOUNDED 1897 *IN THE PRINCIPAL CITIES OF UNITED STATES AND CENTRAL AND SOUTH AMERICA*

THE SCOPE OF RAYMOND'S ACTIVITIES

Foundation Construction . . . Harbor and Waterfront Improvements . . . Soil Investigations . . . In-Place Pipe Lining . . . Specialized Construction.

LETTERS

UNANSWERED QUESTION

Sirs:

The Gropius Challenge (AF, June '52, *et seq*), and the reactions were very interesting . . . but none of them answered to satisfaction a question on my mind. What is the role of the architect in the world today, and what will be his role in the future? I believe that there are other students like myself who would like to have this question answered.

In my opinion there is only one man who is really capable of answering this question, and inspiring the students of today to continue on to be the architects of tomorrow. That man is Frank Lloyd Wright.

DELTON D. LUDWIC
Gardena, N. D.

WHERE CREDIT IS DUE

Sirs:

We are sorry for an incorrect architectural credit line given in our Foamglas advertisement in your June issue. Although the ad, featuring the insulation of a new stockhouse, was submitted to the Miller Brewing Co. of Milwaukee for approval, the fact that it credited the wrong architect was not discovered until after publication.

It is our sincere desire to afford full recognition to those responsible for the design of any building where our products are used. Therefore, we take this opportunity to properly credit architect Gregory G. Lefebvre and professional engineer Donald C. Wiggins of Lefebvre & Wiggins, Milwaukee, for their important roles in the Miller project.

ROBERT F. QUINN, *advertising manager*
Pittsburgh Corning Corp.
Pittsburgh, Pa.

MT. SINAI'S INTERIOR

Sirs:

The article on Mt. Sinai Hospital in the July issue . . . gave proper credits to everyone concerned with the execution of this project excepting my firm as interior designers and consultants on this project. If anyone should have an understanding of the important role being played by the interior designers in projects of this kind it would be your publication.

MAURICE H. MOGULESCU, *president*
Designs for Business, Inc.
New York, N. Y.

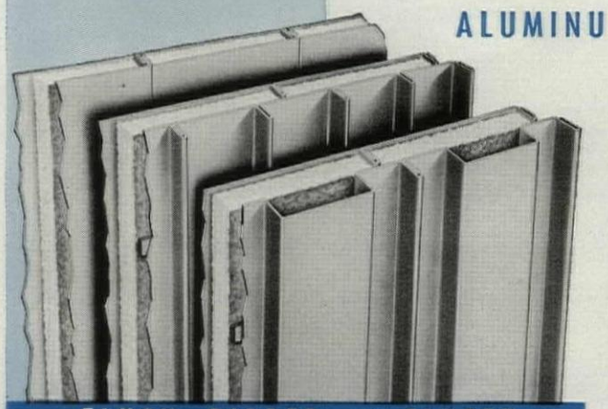
ERRATUM

▸ In FORUM's report on AIA's prize-winning buildings (AF, July '52, p. 158) it was erroneously stated that the Pontchartrain Beach bus-passenger shelter in New Orleans by architects Freret & Wolf had not previously been presented in the architectural press and would therefore be presented in a subsequent issue of FORUM. Actually, this bus shelter had been detailed in *Progressive Architecture* (May '49) and will not therefore appear again in FORUM.—Ed.

INSULATED METAL WALLS

for INDUSTRIAL and COMMERCIAL BUILDINGS

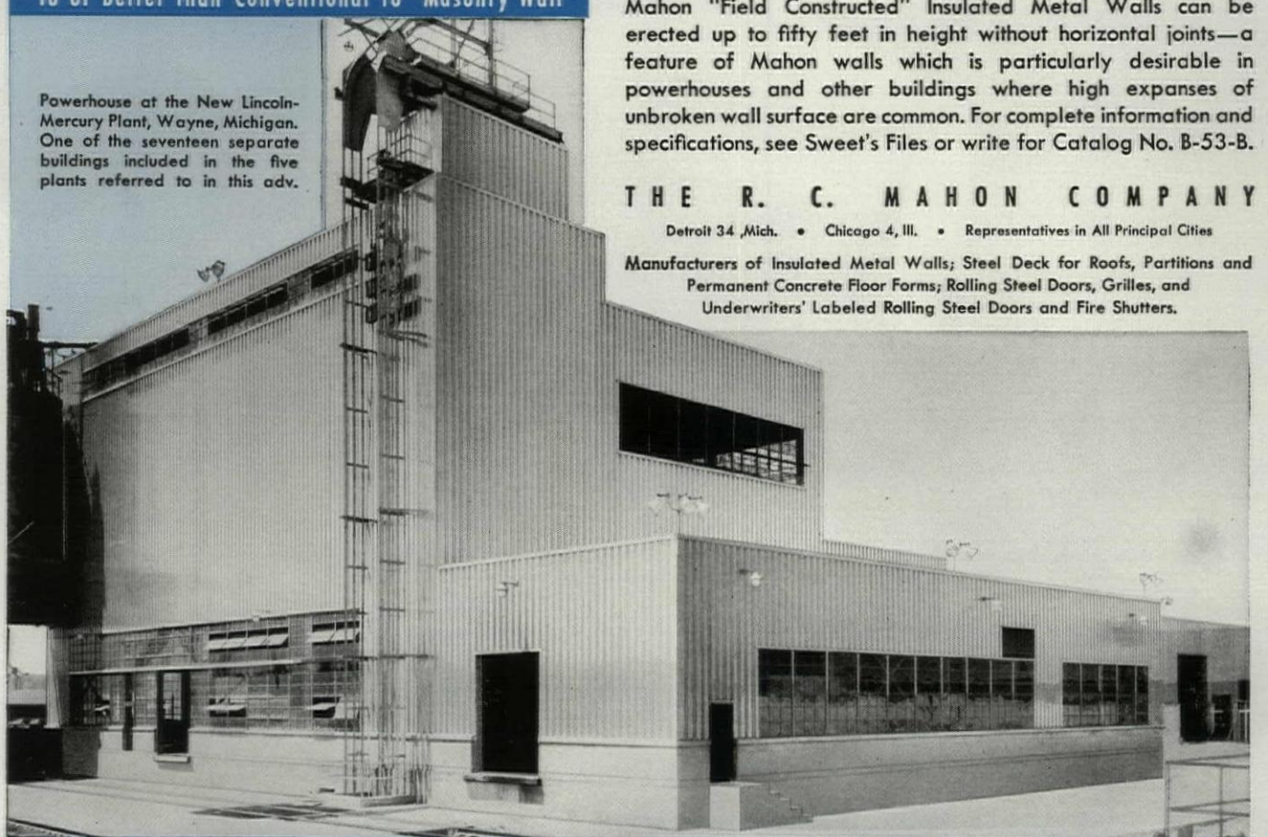
ALUMINUM, STAINLESS or GALVANIZED STEEL



FLUSH, RIBBED, or FLUTED
Over-all "U" Factor of Various Types is Equivalent to or Better than Conventional 16" Masonry Wall

As evidence of the trend to Insulated Metal Walls in modern construction, the following statements are presented: 520,000 sq. ft. of Mahon Insulated Metal Walls with aluminum exterior plates were employed in the construction of three complete new industrial plants built by one manufacturer in three widely separated localities. More than 66,000 sq. ft. of the same type of wall was employed in the construction of two complete new plants for another manufacturer. In the five new plants referred to, there were seventeen separate buildings of various industrial types. The fact that additional plants were subsequently built by both of these manufacturers, employing the same identical wall construction in each case, indicates the degree of enthusiasm among architects and owners for the striking appearance of the finished buildings, as well as the time and labor-saving advantages of this type of permanent, firesafe construction. Mahon "Field Constructed" Insulated Metal Walls can be erected up to fifty feet in height without horizontal joints—a feature of Mahon walls which is particularly desirable in powerhouses and other buildings where high expanses of unbroken wall surface are common. For complete information and specifications, see Sweet's Files or write for Catalog No. B-53-B.

Powerhouse at the New Lincoln-Mercury Plant, Wayne, Michigan. One of the seventeen separate buildings included in the five plants referred to in this adv.



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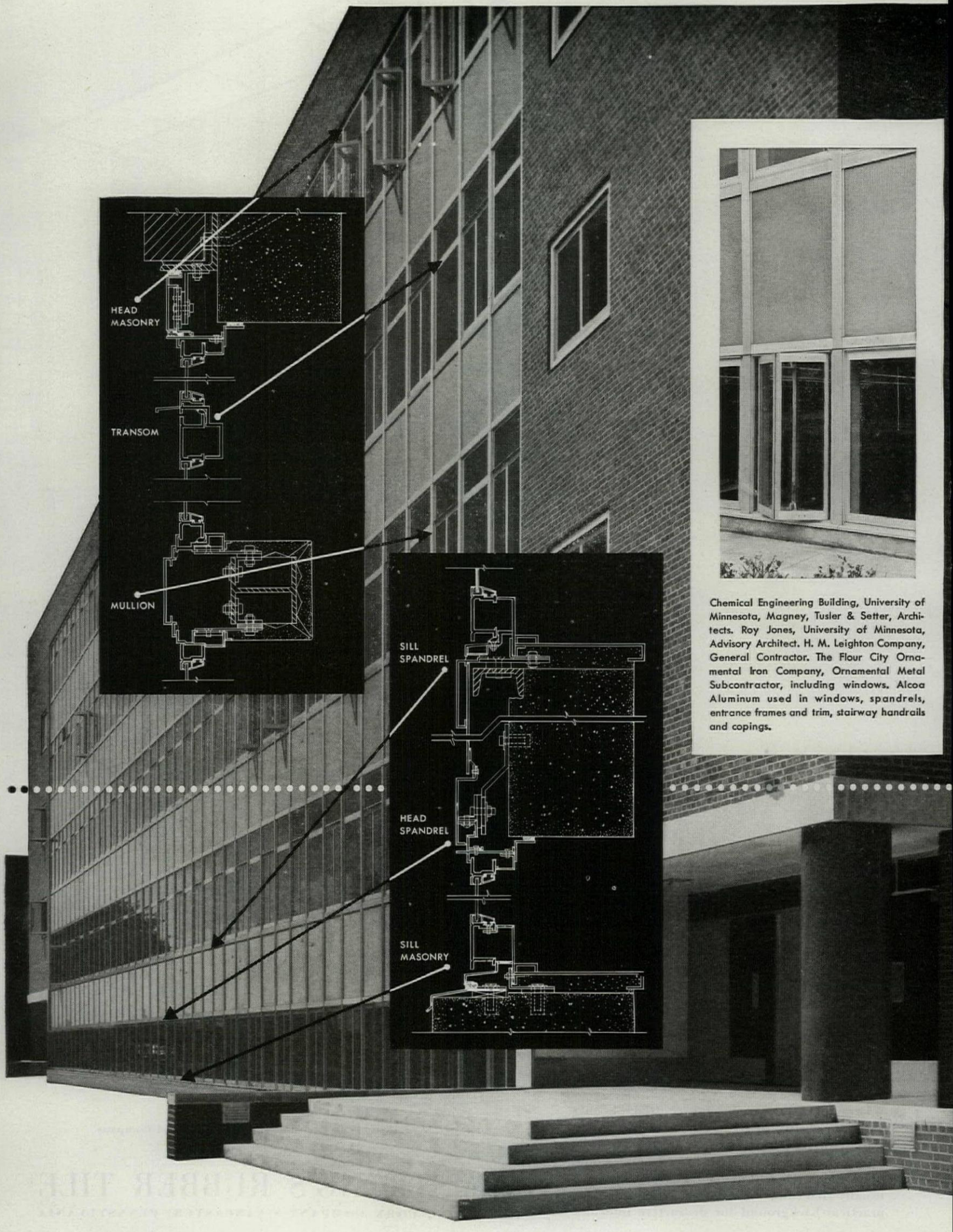
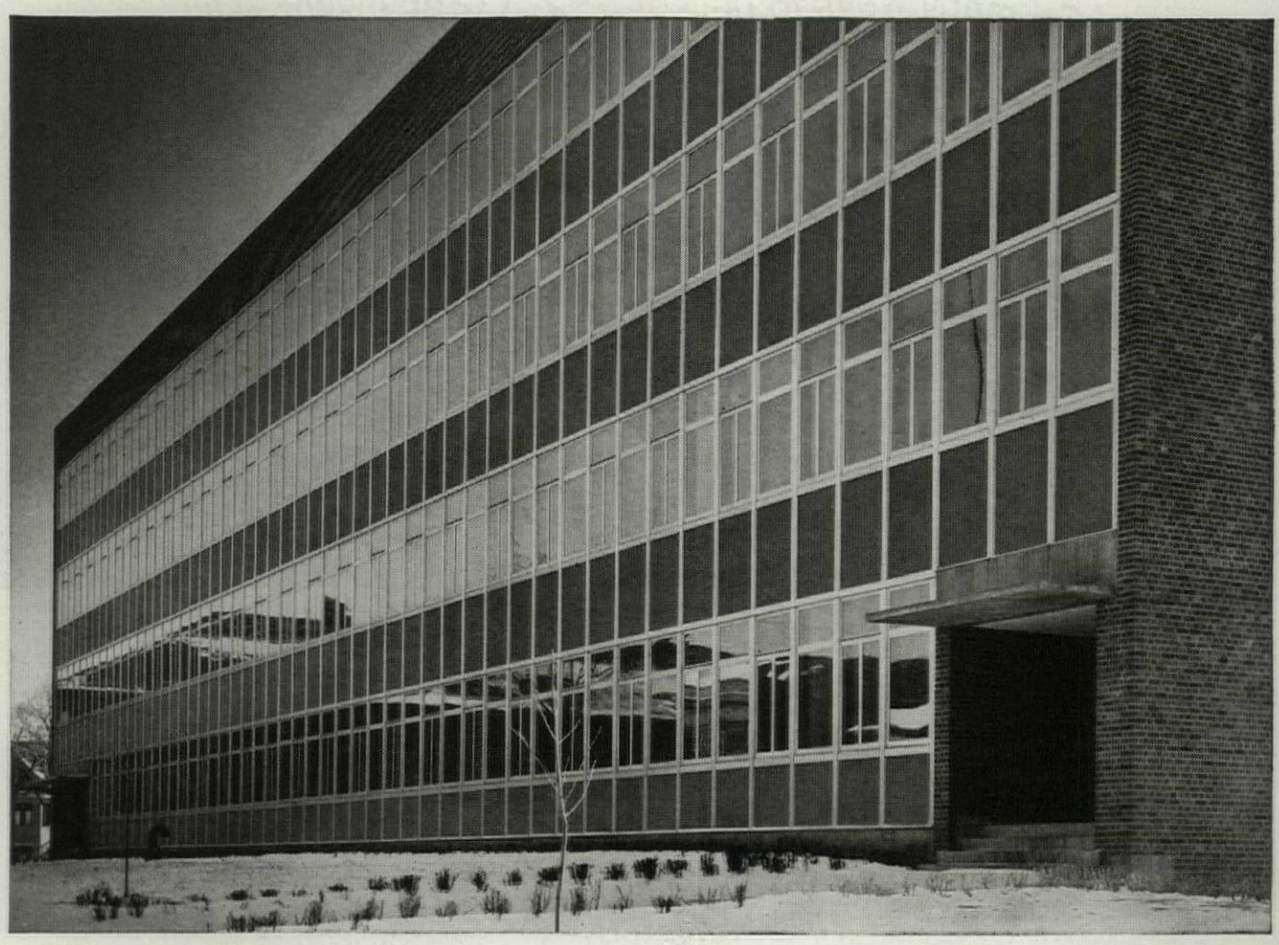


Chemical Engineering Building, University of Minnesota, Magney, Tusler & Setter, Architects. Roy Jones, University of Minnesota, Advisory Architect. H. M. Leighton Company, General Contractor. The Flour City Ornamental Iron Company, Ornamental Metal Subcontractor, including windows. Alcoa Aluminum used in windows, spandrels, entrance frames and trim, stairway handrails and copings.



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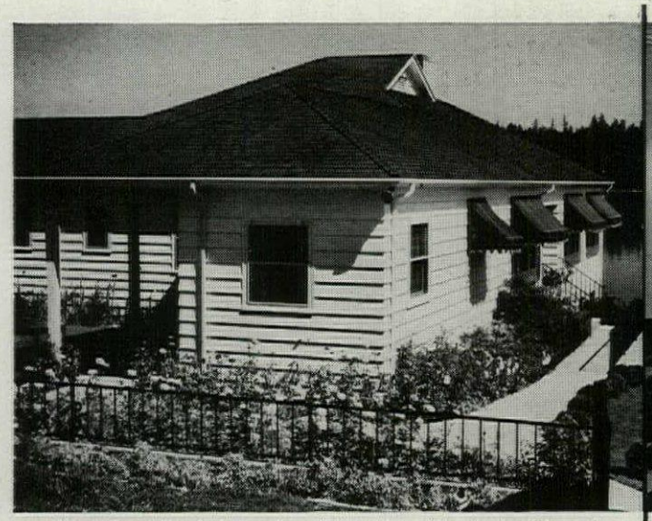

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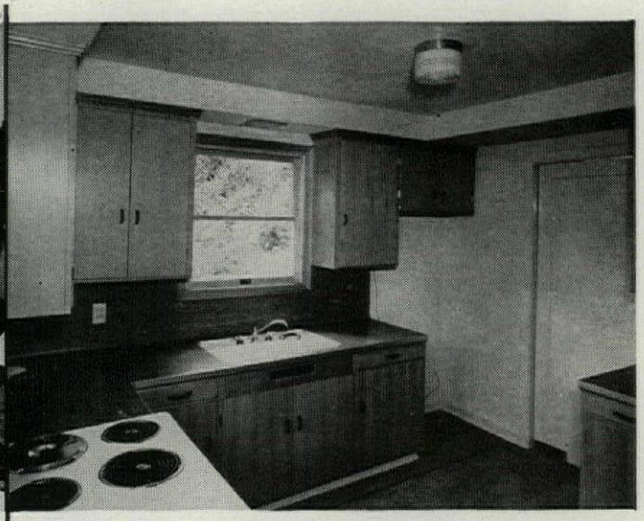

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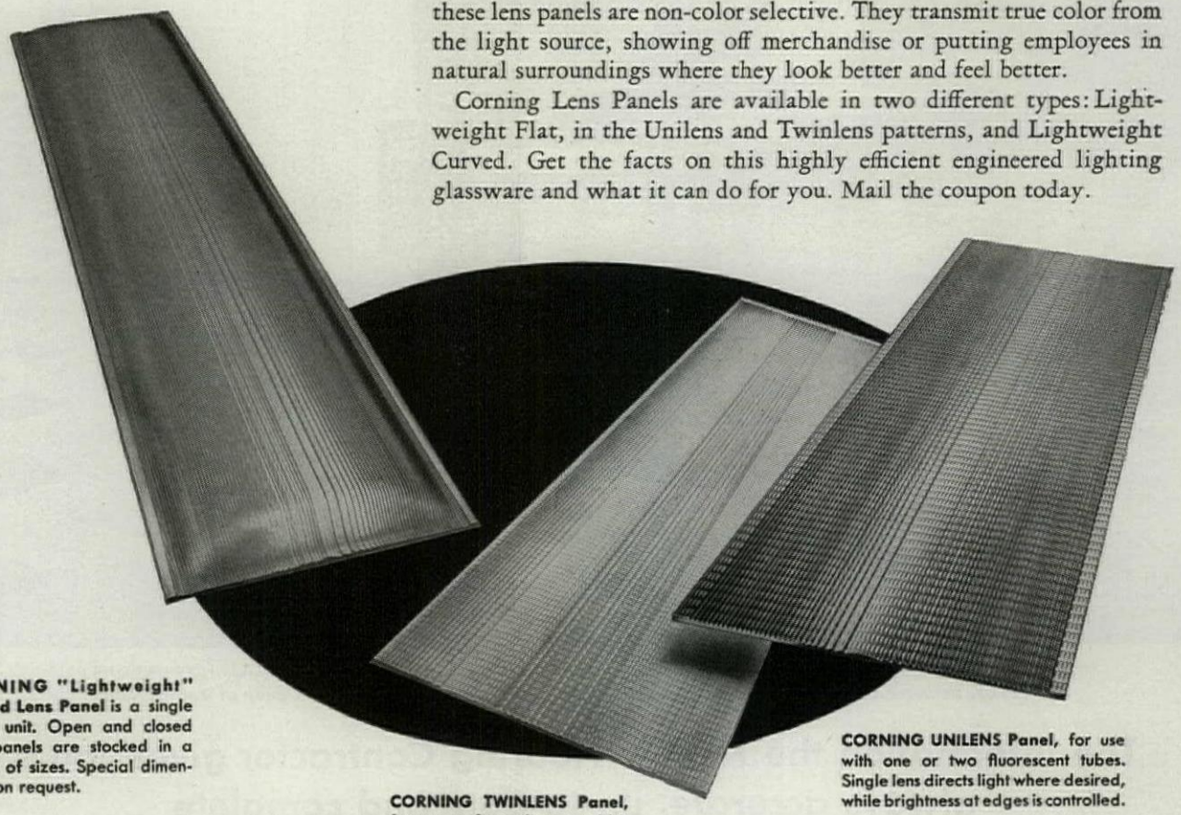

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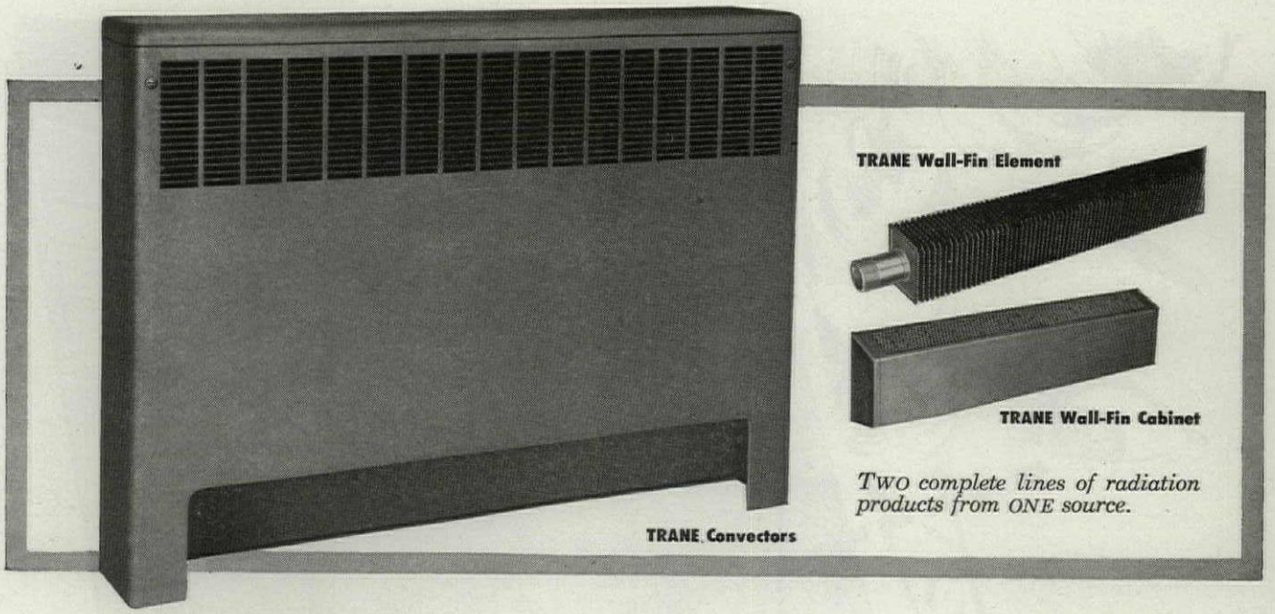

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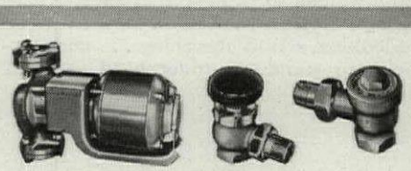

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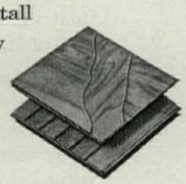

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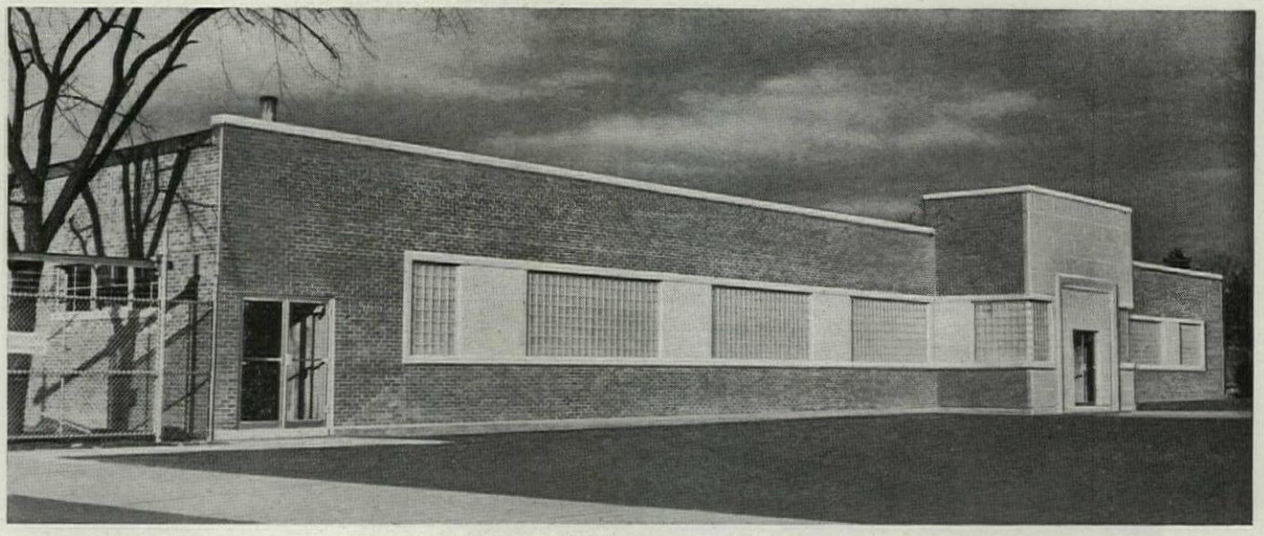

Marlin-Rockwell Corporation Building, Plainville, Conn., contains 17,000 feet of G-E Fiberduct to provide raceway coverage for present needs and for future electrical changes.

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Electrical Contractor: Joseph McNellis & Son, Waterbury, Conn.

General Contractor: Frank E. Downes Construction Company, New Britain, Conn.

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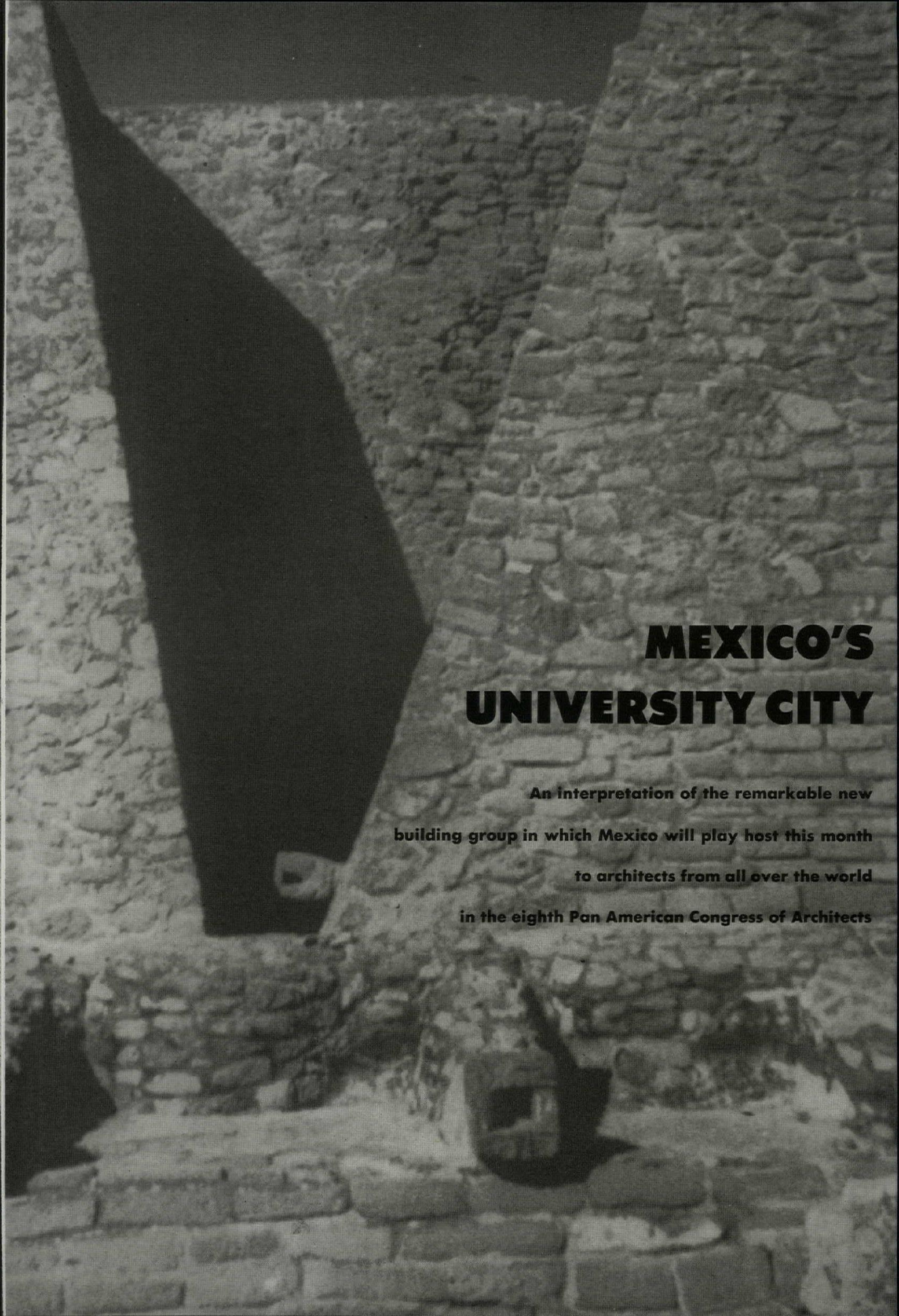


MEXICO'S UNIVERSITY CITY

An interpretation of the remarkable new building group in which Mexico will play host this month to architects from all over the world in the eighth Pan American Congress of Architects


MEXICO'S

ARCHITECTURE is ultramodern, yet it draws deeply from its own land and people, and from a history that blends two cultures

Mexico has time—mountains of it. In the rare air of her capital, a mile and a half above the sea, on the edge of the lava beds and within a fast hour's drive of the Pyramids of the Sun and Moon, she lets the visitor from the North choose what he wants to look at.

On the broad avenues he is in a booming pell-mell cosmopolis with more brand-new business buildings finished and underway than any city up North that he might have come from; the total effect is far more modern than that of New York or Chicago and any amount more zestful. Yet stepping around the corner into the dusty streets and colonnaded squares behind the Zocalo he stands four centuries from Main Street, incredulous that this should be America, not Europe.

Nonetheless by Mexican standards even European Mexico is very young.

Across from the cathedral there remains a ruined bastion of Tenochtitlan, that far older Indian city stormed and sacked by Cortez. And out on the plains are the pyramids. There are said to have been not dozens or hundreds of them but thousands—products of an energy we cannot understand. How ultramodern it all must have seemed then, how like the culmination of all history in its powerful golden splendor which so overwhelmed Cortez!

This pre-Columbian culmination could again look back, far back, at least as far as that small pyramid of Cuicuilco, recently unearthed close to the site of the new University City. Oldest known man-made structure in all the Americas, it belonged to a settlement said to have been 20,000 years old. One might reply that North America too has her prehistoric Indian mounds—but with the vast difference that the thread was broken. Mexico's secret is that the thread did not break across all the peaks and valleys of her tumultuous history. If the walls of her big new stadium, out at the university, made in three short years, are built just as the walls of the pyramid were, that is because thousands of the workmen who built the stadium were descended directly from the earlier builders.

The North American visitor who is an architect may long reflect on this continuity, this wealth of context; and it is possible that he will find nourishment in it for what is now his greatest hunger. For the day of heedless headlong modernism is past. Those who gave themselves to it have learned something invaluable and new: how to start converting the wonderful new resources of technology into new structures, new shapes and cunning ways with space; like Cortez some few among them have been valiant explorers. There is felt now the deep need to unite this unprecedented skill with more ageless wisdom: better context with the earth itself, better context with the artist's deeper sources of intuition, better context with what long ago was learned and seems to have been forgotten—lest, like Cortez, we destroy ageless values greater than ours.

It's not as if today's Mexican architects, the most thoughtful of them, were satisfied themselves with what they are doing, nor as if their work could be accepted as a revelation. Its faults are manifest but it has values in it that we might well study, perhaps less for what the Mexicans are doing at the moment than for what they are linked with.

As a study ground for North Americans, Mexico has strong advantages over Europe, even over Italy to which architectural pilgrimages are suddenly so fashionable. She is not Europe. She is not America. She is a marriage between the two, between Indian and Spaniard—native and explorer—two races that have battled one another into deep respect and lived side by side so each has learned from the other. We who have studied Europe perhaps too much and our own ground not enough can learn more here than from either force in isolation.

Mexico has the advantage over South America that she has preserved far more of her antiquity than any country except Peru.

Again, Mexico is on a great upsurge, which started with the liberation of her people, through the revolution of 1910, from colonial domination; and luckily for us some of her greatest leaders have been her artists. Passionately close to their people to the point of radicalism, they have had much to say; in saying it they have explored wonderful ways—as new as tomorrow and as old as time—of conjoining their art integrally with the great art of building.

In her latest phase, her modernist cosmopolitan one, Mexico has turned for architectural ideas almost wholly to the French leader Le Corbusier rather than to the American Wright or other leaders. In long perspective this is a detail, less important than the evident fact that today she faces another of her great dramatic struggles. Mexico, once beautifully Indian, first resisted then had to embrace the European invasion from Spain. Mexico, now beautifully Spanish and Indian, has just recently ceased to resist and started to embrace modern cosmopolitanism—modern business, modern industrialism, whose bounty she seeks to enjoy without letting its haste and thoughtlessness destroy her ancient heritage of art, her dignity in living.

Because one great building project displays this complex interplay most consciously and at its greatest concentration, FORUM will focus on Mexico's new University City.

Photos: Arnold Wasson Tucker, Molina, LIFE

CIUDAD UNIVERSITARIA DE MEXICO

America's oldest university visibly links a long past to a long future in a vast city of learning

It is a complete city indeed and one of the biggest, most comprehensive single building operations of modern times. President Miguel Aleman of Mexico, knowing well the crucial need of education for an upsurging people, chose to memorialize his administration with a complete plant for 26,000 students, plus a 110,000-seat stadium for Mexico City, all planned together from the ground up and built at a cost of some 200 million pesos (about $22 million US).

It is on an unprecedented "regional" site, a wild lava bed (*photos, r.*) whose sublime possibilities had only just been discovered since World War II by architect-genius Luis Barragan.

It was built at record speed—Mexico's first "deadline" job—from a competition in 1947 through the beginning of actual building operations in 1950 to approximately 80% completion now in 1952. For Director-General Carlo Lazo (appointed May, 1950)* this represented major problems of diplomacy and also of logistics which his organizing genius and drive brilliantly surmounted.

The initial 1947 competition had been criticized for giving too much leverage to the "inside" group of competitors comprising 40 teachers and advanced students in the University itself; but satisfaction was general with the adopted plan, and almost every able architect in Mexico City was ultimately given important work.

The ultimate design involved close teamwork in an unprecedented way by no fewer than 140 architects and uncounted engineers, each working independently out of his own office, but all correlated by Lazo and the two architects who were over-all site planners from the beginning, Mario Pani and Enrique del Moral.

The site plan reflects all major influences that make a twentieth-century plan different from a nineteenth-century plan. (*Site plan, p.* 104.) Two areas free of lava rock dictated placement of the stadium and main building group on an east-west *"Beaux-Arts" axis;* but visually this is now as full of off-center deviations as the Acropolis, and there are important innovations in long *cross-grain diagonal perspectives,* combined with a sort of *hooked branching deployment* of individual buildings to shorten distances. But the all-embracing new "principle of order" is found in the *long peripheral loops* of automobile traffic arteries separating the main elements into four major building groups.

Architecturally there is a sharp division into three types: The main group of buildings represents a stylistic importation of Le Corbusier—but his style has suffered by a big sea-change. The stadium and sports facilities derive consciously from Mexico's volcanoes and her Indian pyramids; part of the science group is functionalist. The fact that attention to indigenous traditions came in *later* than Le Corbusier's cosmopolitanism is significant.

Integration of painting and sculpture is wholly new in some of its techniques *and in its ultimate aim,* even though the art is wholly devoid of modernism's unrecognizable abstractions. Realistic historical themes and heraldic symbolism (the latter, especially, full of Indian symbols) create messages that explain themselves, or can be explained, to *all the people.* But the greatest significance of the effort lies in the breaking down of what might be called "craft unionism" in the arts—doing away with the usual fixed permanent separate jurisdictions for architecture, painting and sculpture. In its place there is a conscious effort (in some of the buildings) to *restore unity among all the visual arts,* so that sculpture invades architecture instead of being attached to it and vice versa, so also with painting and landscape architecture.

Salas Portugal

In landscape architecture, too, there is a new ideal—hitherto preached systematically in modern times only by Frank Lloyd Wright—making the buildings a part of the landscape the way the pyramids were, "of it" instead of "on it." This is the easier on the "Pedregal" site of the university because the site itself is the quarry. The quality of the purple gray lava rock is suggested in the photo on the cover, taken in Luis Barragan's initial Pedregal Gardens development right across the way. In the University City the new landscape ideal is seriously carried out only in the sports section *(see photo opp.)* but the important thing is that it has been stated so clearly in a large public group of buildings. Not by accident the university's most successful attempt borrows a great deal from the form language of the pyramids.

UNIVERSITY CITY OF MEXICO:

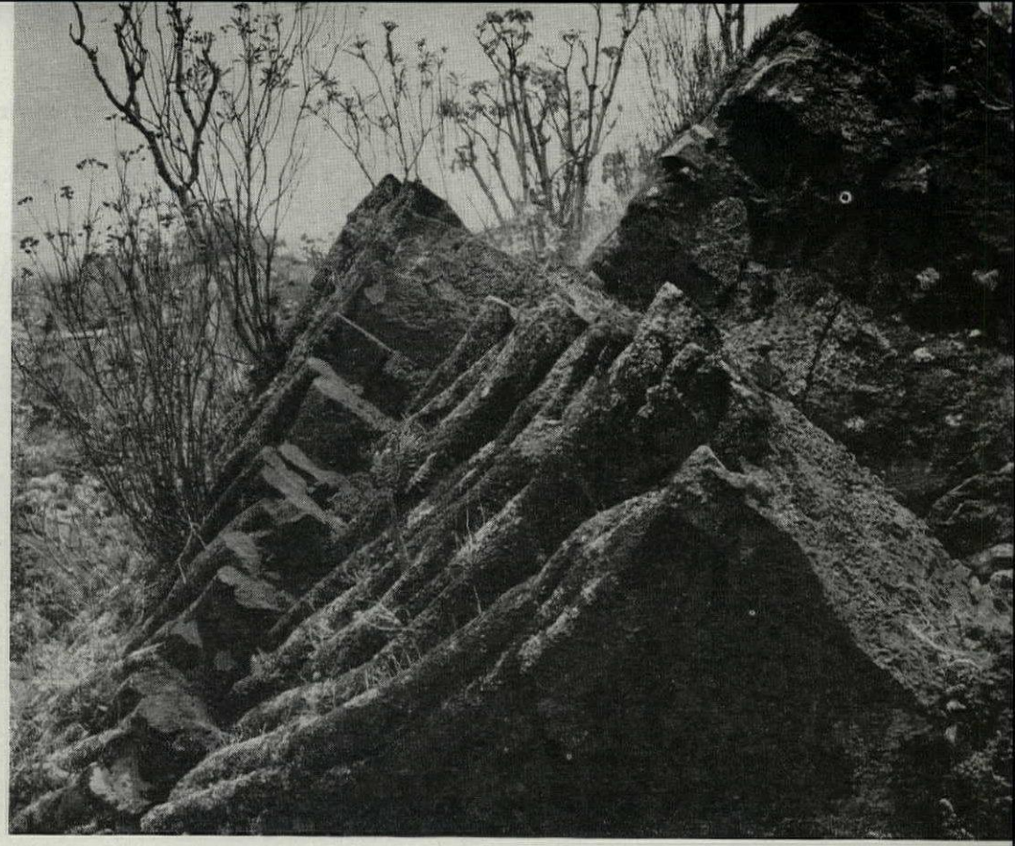
MIGUEL ALEMAN, president of the Republic
CARLOS NOVOA, president
CARLOS LAZO, director-general
ALNIRA DE MORATINOS, director of relations
GUSTAVO TRAVESI, director of plans and contracts
MARIO PANI, ENRIQUE DEL MORAL } directors for site planning
LUIS BRACAMONTES, director of works
WILFREDO CASTILLO, ROBERTO TREJO } directors of administration

* —and in 1952 given honorary membership in the AIA.

BEFORE

At left: the miles of lava waste, called "El Pedregal de San Angel," before building.

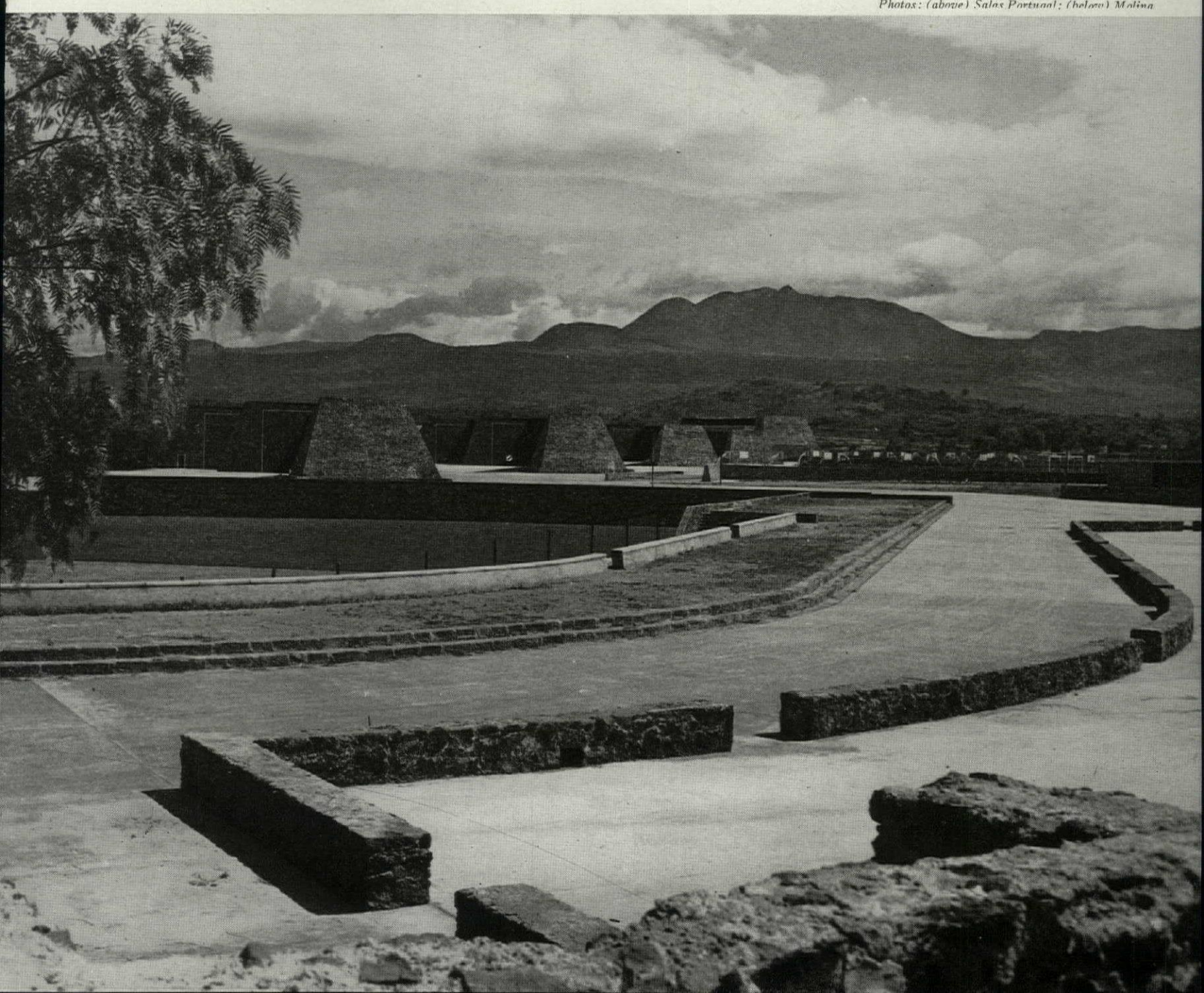
Right: beauty and wildness of the gray lava rock enhanced by exotic vegetation.



AFTER

Below: the rock is still there— in buildings and forms sympathetic to it.

Photos: (above) Salas Portugal; (below) Molina



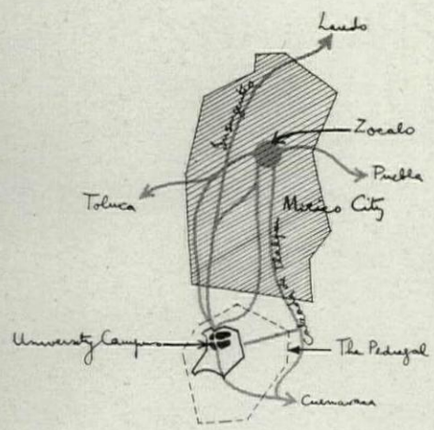
MAIN SITE PROBLEM: big distances and complex visual correlation

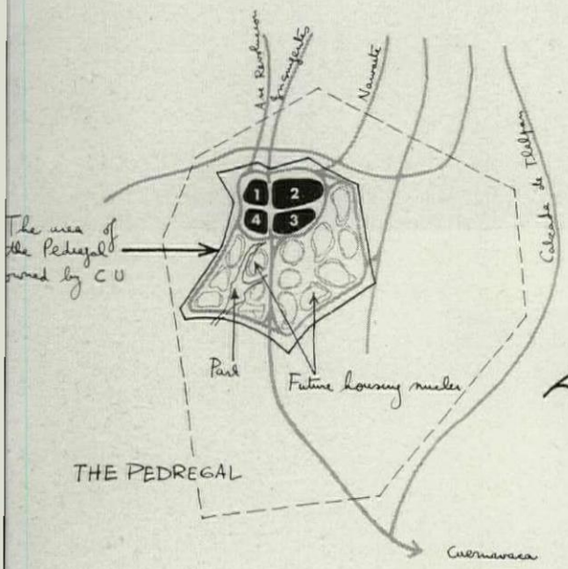
To begin with, the university had to be related to city traffic, is accessible by many main north-south arteries *(top sketch)*. Biggest is the avenue called Insurgentes, main highway from Laredo, Tex. to Acapulco. It's the big freeway cutting *between* stadium and campus in the air view, *across-page;* the Olympic stadium, used by the city, too, being deliberately given this isolation. The second sketch shows the university's Pedregal holdings as a whole, suggesting future housing dropped in like globules where land is not too rocky. The first unit, for faculty, has already been imaginatively developed by architect Wasson Tucker, is here shown (for the first time) along with its community center at *left bottom* (4) of main plan.

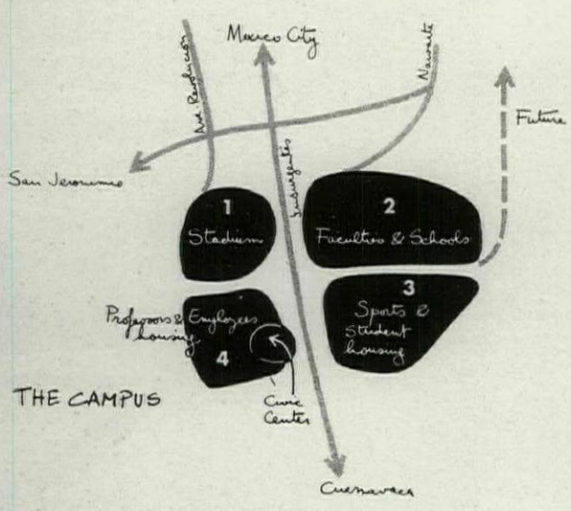
First units planned were campus and stadium, dropped into largest gaps in the lava cover on a plan of subtle parallel axes developed by architects Pani and del Moral. Problem was to keep open space big yet shorten walking distances (open campus is still 1,000′ long). Stroke of genius was full-length humanities building as great simple unifier (*toward right* in air view). Medical school in foreground was an inconvenient afterneed.

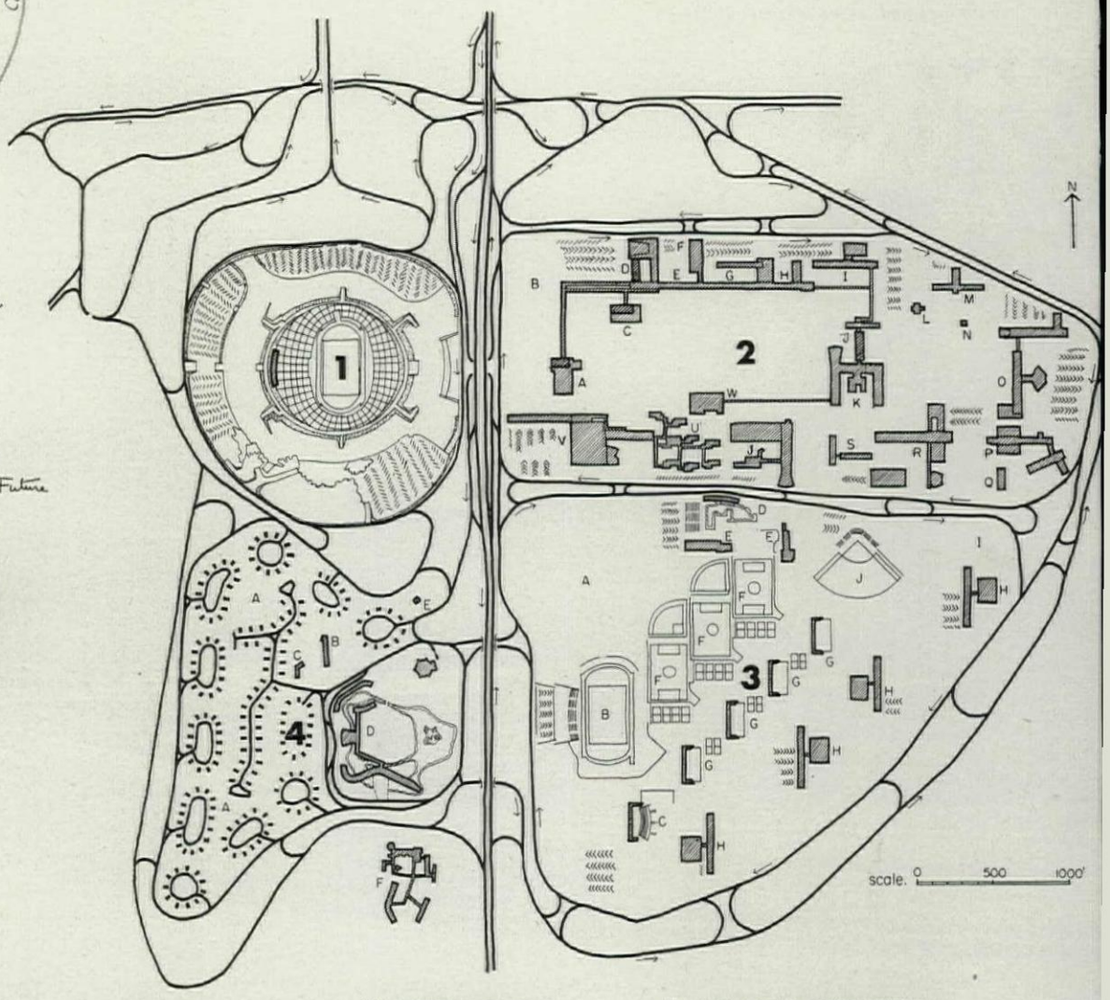
Ultimately the century asserted itself, made the dominant factor the long double-track, one-way peripheral roads (and parking lots) creating four major zones.

→ *Photo: Saul Molina*









1 OLYMPIC STADIUM

2 CAMPUS

- A Administration
- B Site for auditorium
- C Library
- D Humanities
- E Faculty of Philosophy
- F Social & Political Science
- G School of Law
- H School of Economy
- I School of Commerce
- J Institute of Mathematics
- K Faculty of Science
- L Nuclear Physics
- M School of Dentistry
- N Cosmic Rays
- O School of Medicine
- P School of Veterinary Service
- Q Institute of Biology
- R School of Chemistry
- S Institute of Geology
- T School of Engineering
- U School of Architecture
- V Art museum
- W Club

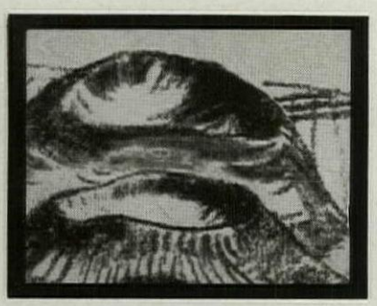
3 SPORTS ARENA & DORMITORIES

- A Site for women's dormitories
- B Stadium
- C Fronton court—closed
- D Swimming pool
- E Dressing rooms
- F Football or soccer fields
- G Fronton court—open
- H Men's domritories
- I Site for future dormitories
- J Baseball field

4 HOUSING & CIVIC CENTER

- A Professors' single houses
- B Apartment block
- C Kindergarten
- D Civic-center group
- E Filling station
- F Institute of Mental Health


4
1
3
2



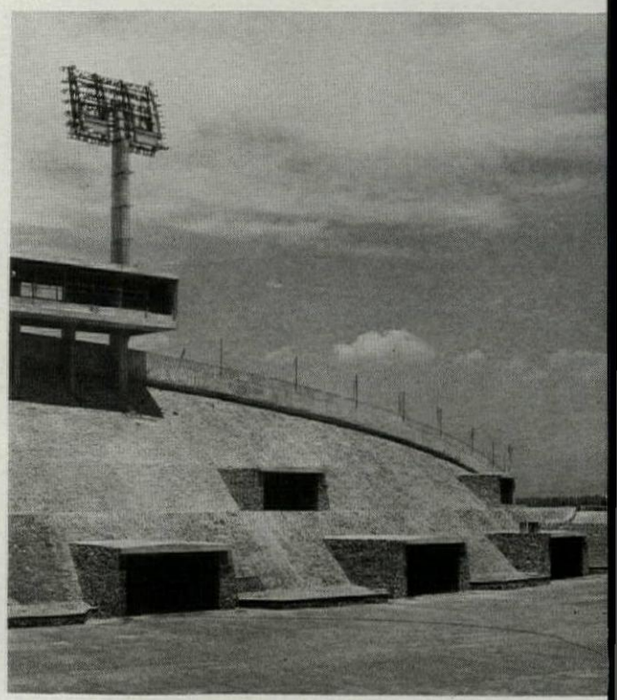
Volcano craters sketched by Dr. Atl

STADIUM OUT OF THE LAND

"We have built a volcano," said Lazo.* "The earth has a builder's mind. In Mexico it is natural for it to build volcanoes; we have followed its volcano-building habits. . . . This is a landscape form. The Mexican people see the volcano every day. They feel its form. So when our architects use this logical construction, it is the integration of *landscape culture*."

Technically, engineer Perez Palacios and his associates scooped out the *tepetate* (local rubble fill) into high embankments, compacted it, put seats on the inner slope and faced the outer with the local lava stone. Reinforced concrete was used only for access tunnels through the ramped embankment *(see photo, r.)*, for press stands and lighting standards. Under Mexican conditions this cut the cost to perhaps one fourth of US costs. Chief significance is in the strict, poetic adherence of the design to fundamentals. Said Lazo, "It was the earth that taught men how to build pyramids."

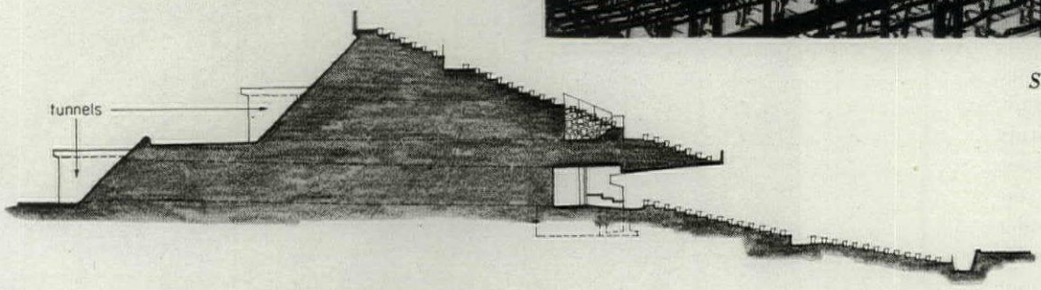
* *Arts & Architecture*, August 1952



Monumentally designed tunnels empty 110,000 spectators in 12 min

Photos: (top & opp.) Erwin G. Lang; (below) Foto Saul Molina

Architect-engineers for the stadium:
AUGUSTO PEREZ PALACIOS
RAUL SALINAS MORO
JORGE BRAVO JIMINEZ



Seats are simple metal frames painted bright yellow. Spectators bring or rent cushions.

Wide oval shape yields good equalized sight lines. Near side (with press box) is higher.

CU

Courtesy Espacios

The precedent: Rivera art form at Lerma

Entire embankment will be sculpted and colored

UNIQUE STADIUM EMBANKMENT

The picture *below* is neither a progress shot of rough construction nor a view of rock erosion on a mountain but the present state of famed muralist Diego Rivera's gigantic undertaking in a wholly fresh art medium.

It's a deep relief built up over the wall face with masonry used like three-dimensional mosaic, to be colored brilliantly with acid paint biting deep into the stone. A hint of the result is seen above in Rivera's previous experiment at the waterworks at Lerma (for a flat surface under water). At unprecedented scale (covering entire stadium) this will be neither "architecture" nor "sculpture" nor "painting" nor "landscape" but an amalgam not seen since Gothic.

First step: patterns painted on in white

Next step: three-dimensional mosaic built up

Photos: (top) Salas Portugal; (others) Saul Molina

OTHER SPORTS FACILITIES

A transitional form between the powerful earthbound forms of stadium and *frontons* on one hand and academic buildings on the other, the women's dressing-room building is typical of the auxiliary sports structures. It is faced with the local Pedregal lava stone, trimmed with the concrete fascia and metal rail of the roof-terrace restaurant, painted lemon yellow and orange. The other material is a special glazed brick made for the university and considered "studentproof." The pavement in front of the football stadium is again of the lava stone, represents another close link between building group and landscape.

Practice fields and courts form a vista of repeated diagonals

CU

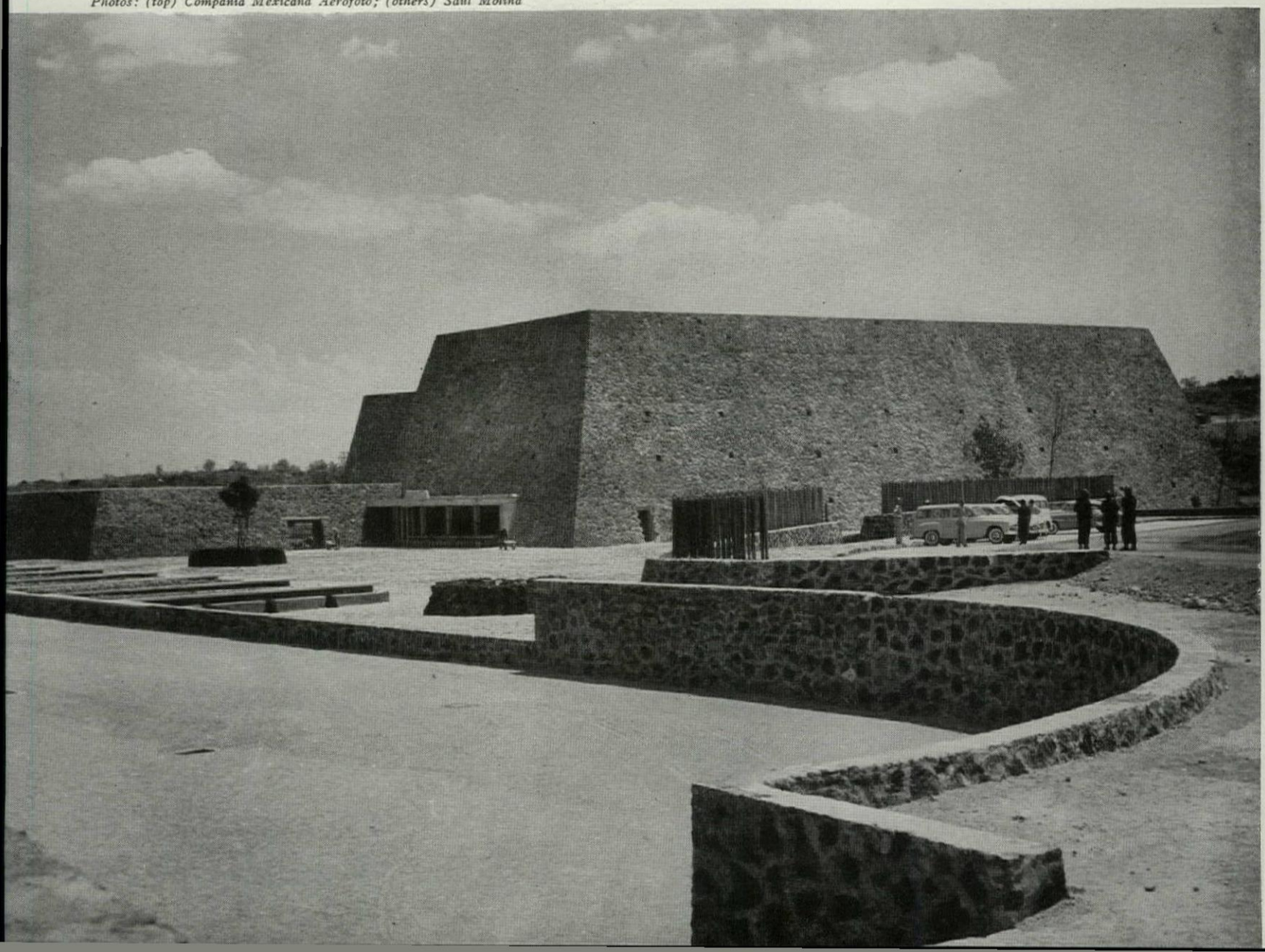
Recalled in the play courts of the university are the powerful horizontals and obliques of the Court of Teotihuacan, 30 mi. from the city.

FRONTONS echo the Pyramid. In these three-sided walled courts, set up in pairs, is played a ballgame similar to squash, product of two races and two cultures. In the design of the courts close-fisted functionalism has been forced to open its hand. Says writer Fernando Benitez, "Each fronton is a truncated pyramid, an aborted volcano. . . . The constructor of pyramids in the area of volcanoes has created, in the twentieth century, forms melodic and profoundly earthy, echoing the musical lines of the mountains of the Valley of Mexico and the horizontal esthetic of Teotihuacan. The walls surround a pavement of red delineated in white squares whose arrangement recalls a Chirico painting: they convey infinity. On this plane are united modern and archaic Mexico, conjoined in forming an everlasting landscape. The oblique walls and small entryways possess an eternal majesty in which time, subjected, appears to stand still."

The frontons were designed by an architect of Japanese and Mexican parentage, Alberto Arai

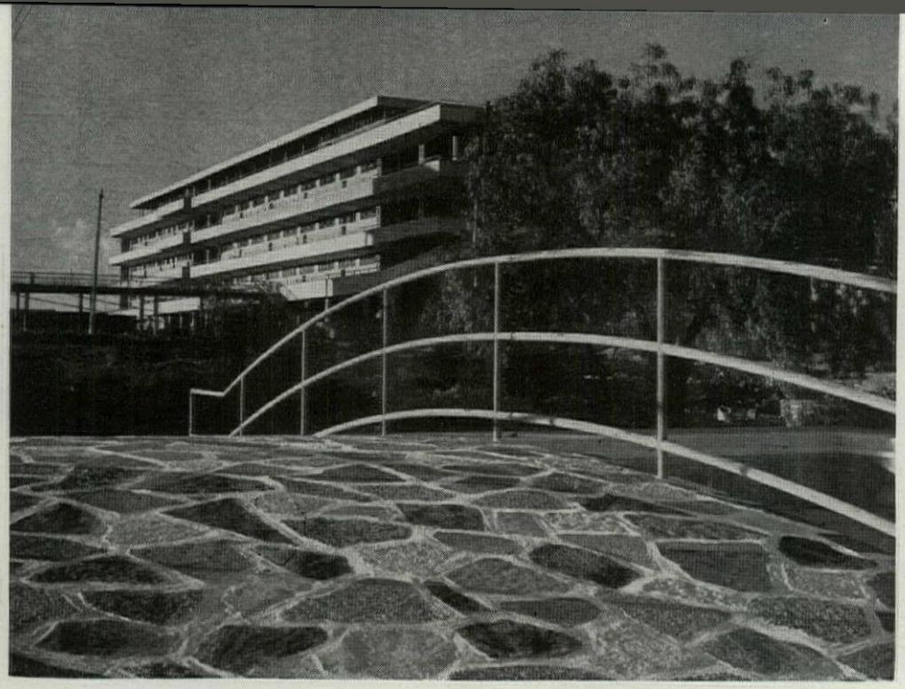
So closely followed is the "culture of landscape" that even the cactus screens concealing parking lots resemble fences of the villages.

Photos: (top) Compania Mexicana Aerofoto; (others) Saul Molina



Paired courts have vertical playing walls. Oblique outer face gives simplest stability.

In the foreground of this view is dual speedway separating academic buildings from sports area. Note overpasses. Student housing will be built behind frontons. *(See plan, p. 104.)*

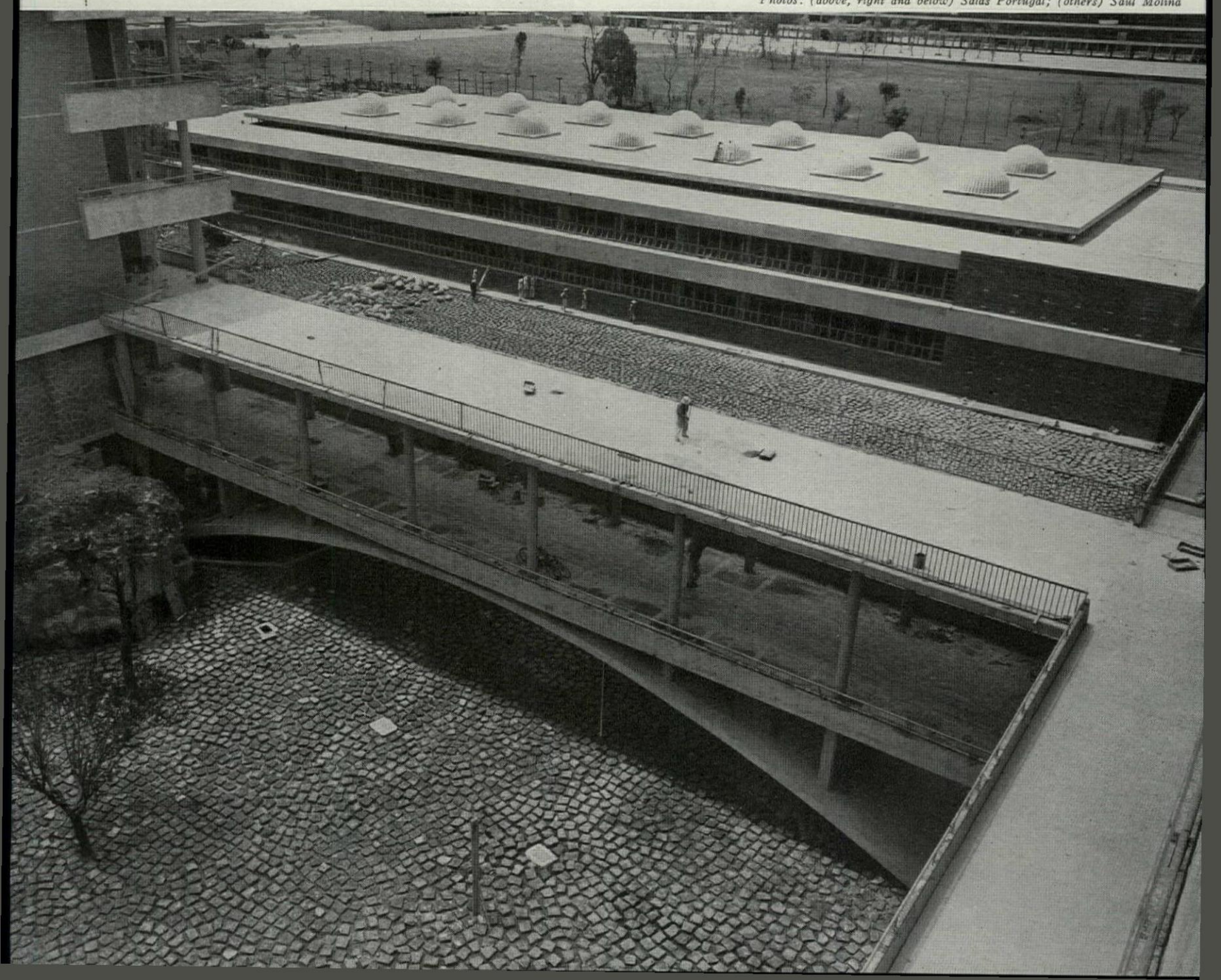


PLASTIC DETAILS

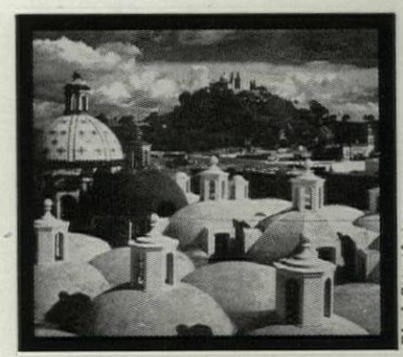
Irregular lava stone on footbridge is one of countless ways of texturing pavements.

Cobblestone pavement of Pedregal lava rock contrasts with elegant concrete bridge lines, delicate iron railing, glass window ranges over glazed brick parapet.

Photos: (above, right and below) Salas Portugal; (others) Saul Molina

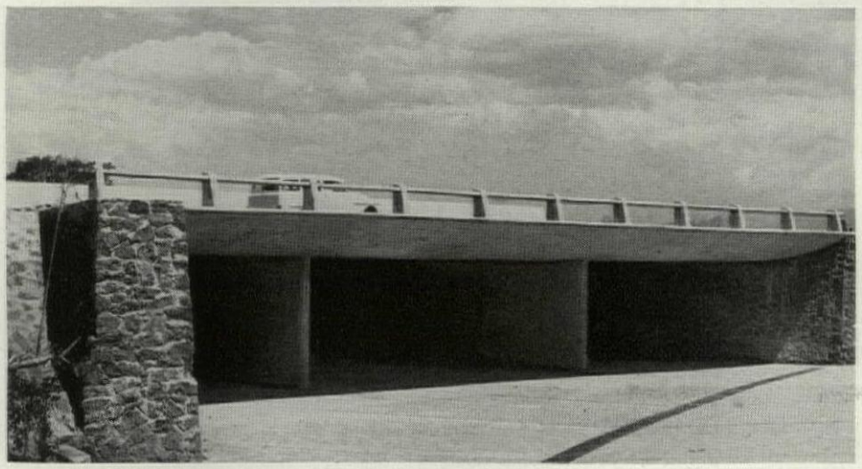


COLONIAL SPANISH EXUBERANCE, such as that of the "Church of 48 Domes" at Cholula *(right)* is continued in Mexico's modern virtuosity with concrete. Glass-studded domes *(above)* on truncated pyramids give diffused light to science laboratories while two-way reinforcing of slab permits wide span without intervening posts. The building *(seen across-page)* houses tall equipment; its central space is two stories high, surrounded by a mezzanine gallery. Its two emphatic horizontal window ranges are cantilevered for a run of 270′.

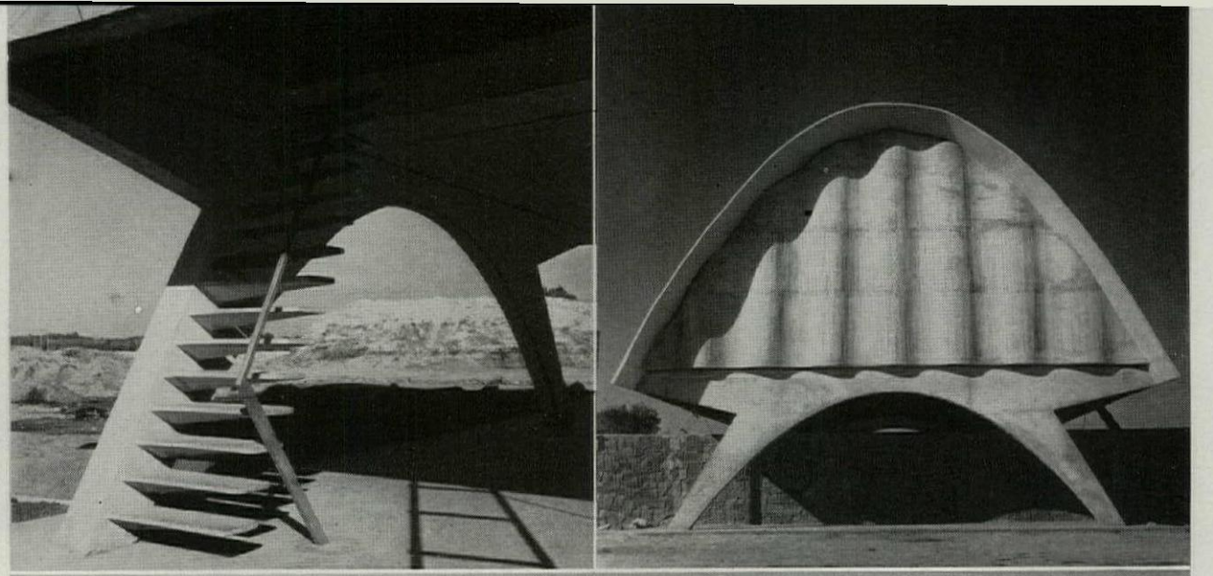


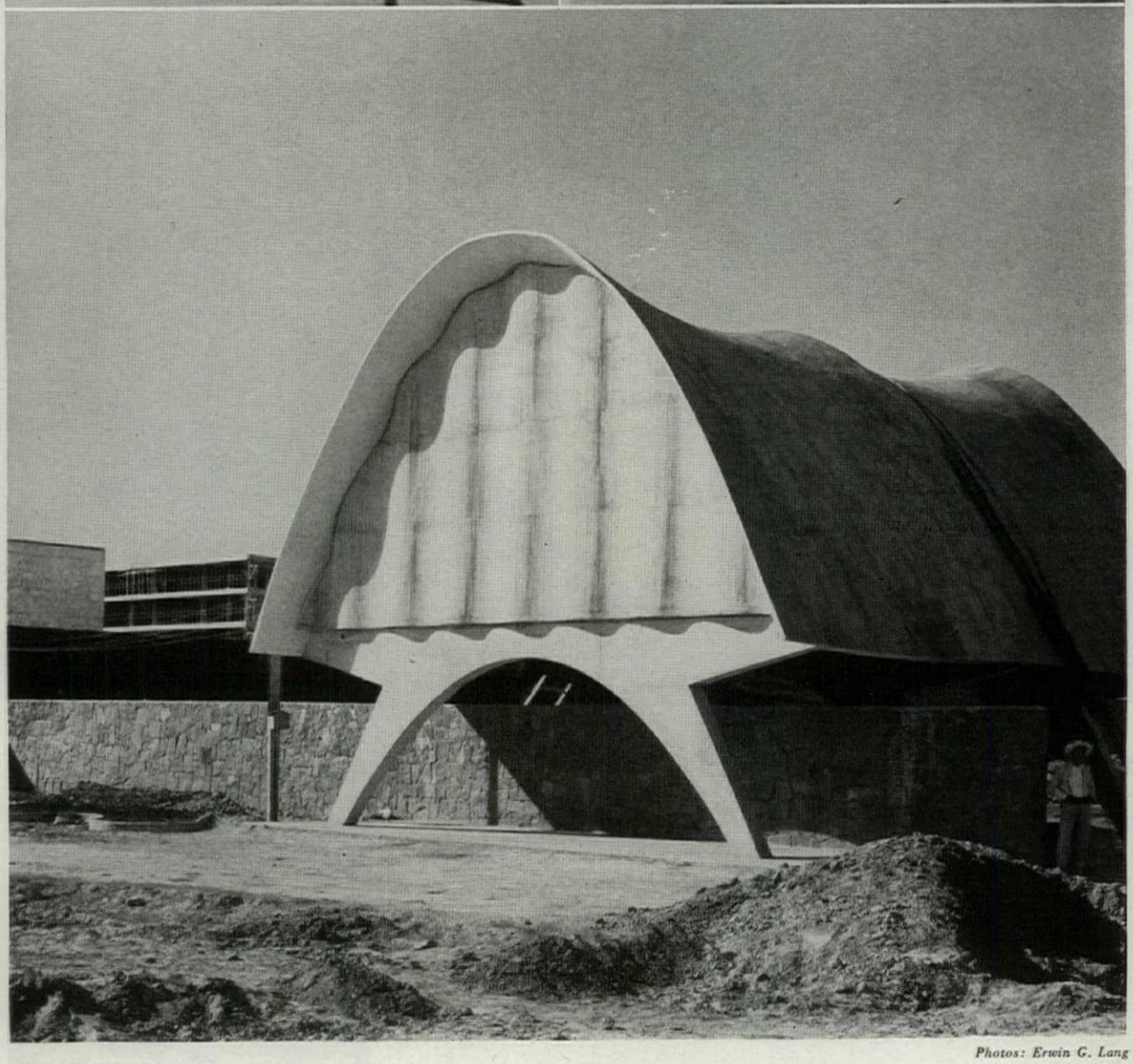
Black Star photo

An antecedent: the Royal Chapel at Cholula, with 48 domes.



Architect Santiago Greenham's overpass bridges are gracefully cambered like a boat.



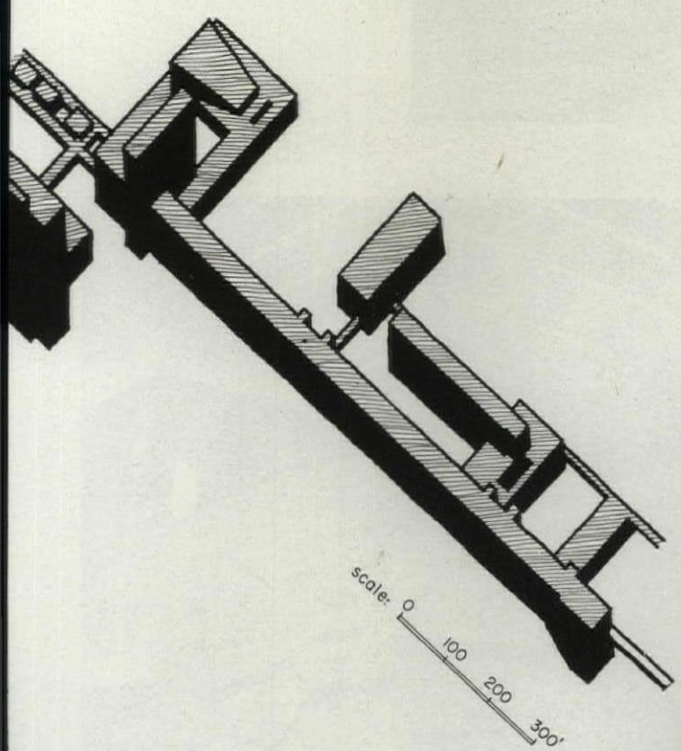


Photos: Erwin G. Lang

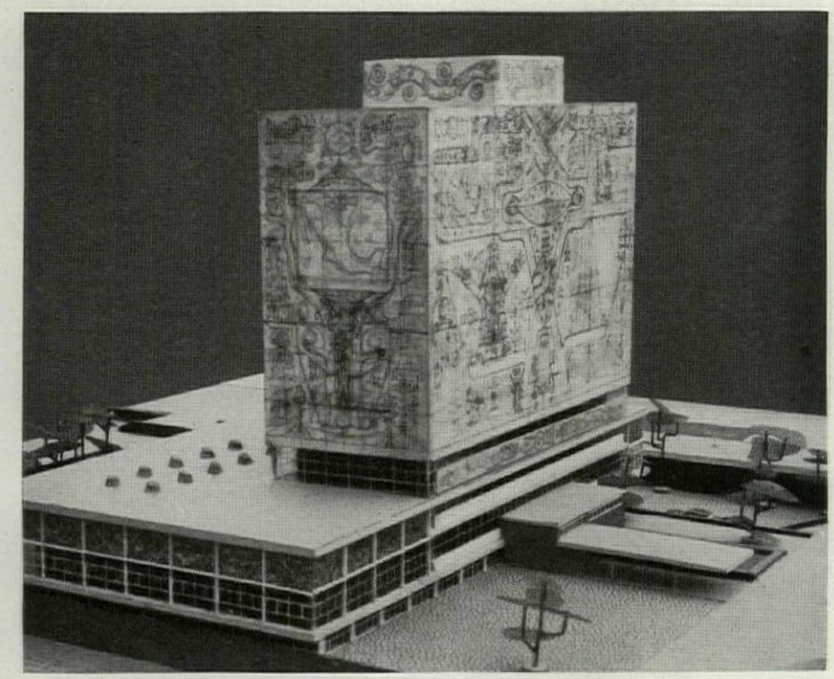
REFINED FUNCTIONALISM

"Thin as paper," the world's thinnest shell-concrete vault, in the beautifully graceful "covered wagon" of the cosmic-ray laboratory, is only 5/8" thick! Cosmic rays pass through it unobstructed. The handsome convolutions, both in the vault and the end walls, serve to stiffen the construction. Here is the opposite extreme from the mountainous stadium, in the university's vast vocabulary of forms, showing the range possible to today's architecture. Structural designer was the Spaniard Felix Candela; his architect associate was Jorge Gonzales Reyna. Determinations had to be largely empirical and bold.

COSMOPOLITAN IN STYLE, modeled on Le Corbusier, is this "mile-long" backbone building forming the north boundary of the campus. (Behind is a great long lava cut bounding the university against the city.) On stilts for its entire length, with only occasional glass-bounded areas at ground level, the building gains lightness that vanquishes its formidability, opens fascinating views through. Reason for the length was the desire to conjoin all schools of the humanities and their facilities and allow "come and go" in expansion or contraction. Plan shows how those schools which proved too big to fit on the main stem shot off branches.



Photos: Salas Portugal



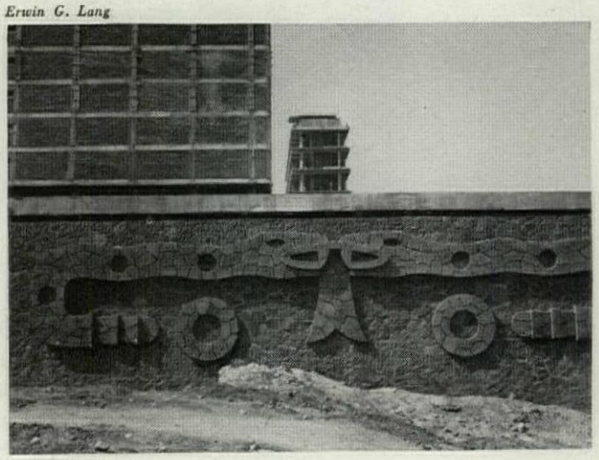
Antecedent: carving in relief at Xochicalco

BIGGEST OUTDOOR MURAL

—other than that on the stadium will give the library stack (116′ high, 190′ long, 45′ wide) gorgeous color: a mosaic of millions of small stones of roughly 2″ face, in ten hues of varied tone, from obsidian black to marble white through reds, yellows, green, gray—with pieces of glass cullet supplying the blue impossible in stone. The composition is heraldic and symbolic, representing Mexico's history culminating in today's outcome from "her historical past and as a result of the Indian and Spanish cultures." And at the base the terrace retaining wall of volcanic rock is carved with Indian themes, and the mosaic treatment continues in surrounding pavements.

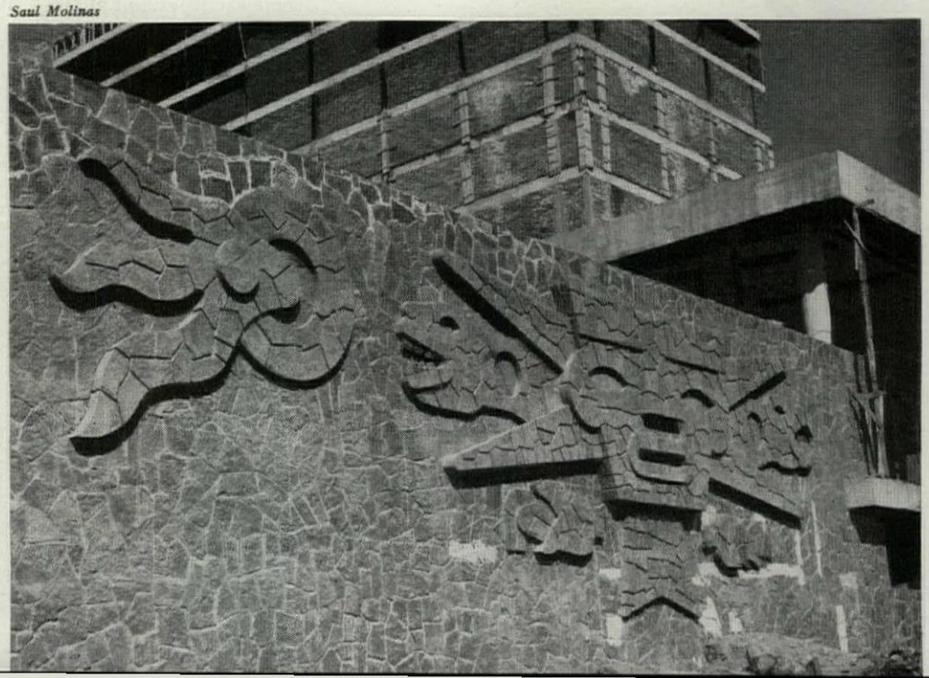
Juan O'Gorman, the architect-artist, an important figure in Mexican architectural thinking, confesses that he and his associates Saavedra and Martines de Velasco have let their library share in the general fault of "too much international style," then asks for plastic forms expressing what is "innate and latent in the unconscious of the people"; and for an amalgam of architecture-sculpture-painting-landscape restoring the fusion that always existed in historic Mexico and that was at its best, in European history, in the Gothic Cathedral.

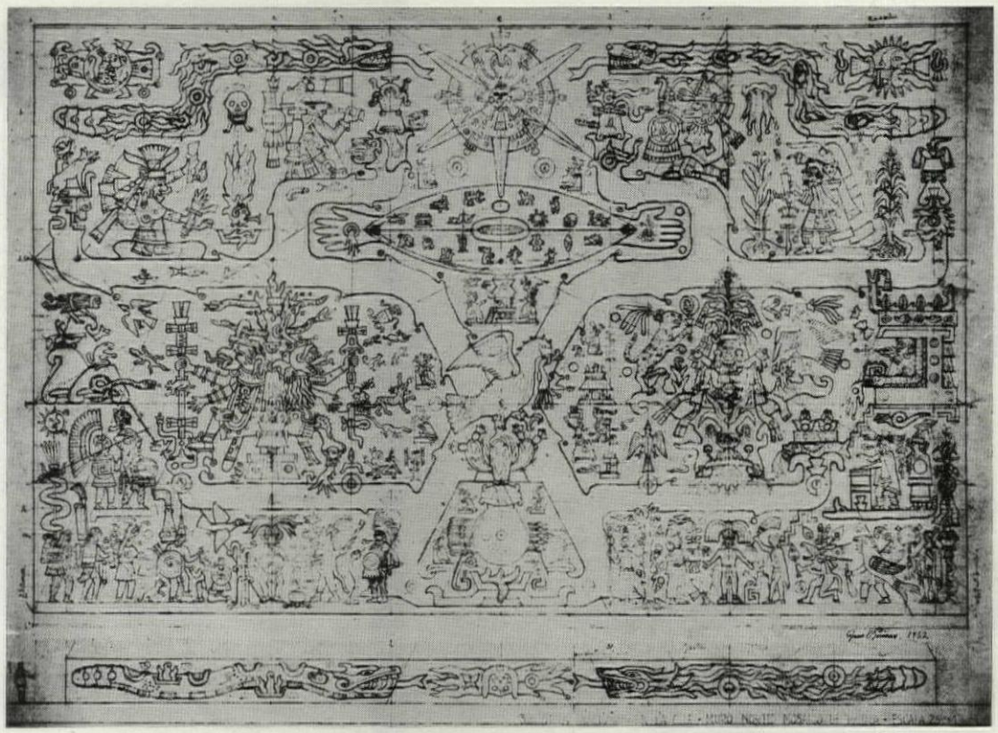
Erwin G. Lang

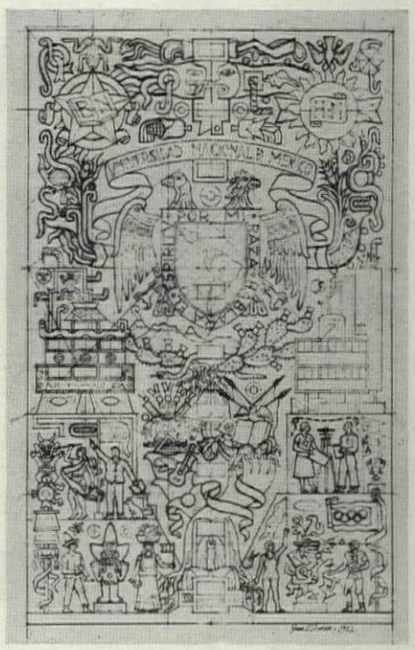


Carving in high relief on retaining wall of volcanic rock by Juan O'Gorman represents "the four suns of the Aztecs."

Saul Molinas



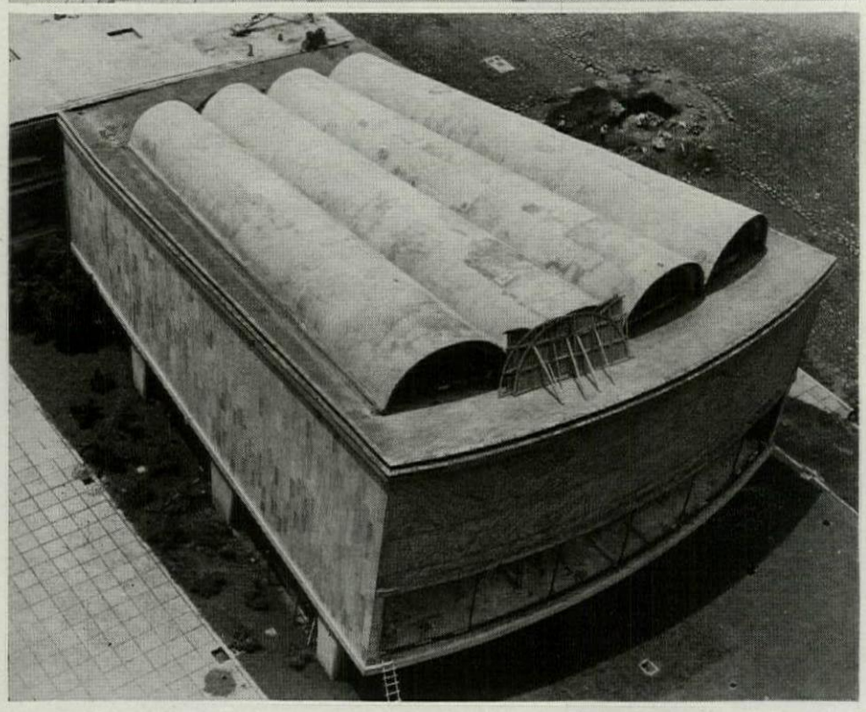




Cartoons for huge library mural show two historic phases: at left the pre-Columbian Indian age, at right Today, with crest of university. Library is seen below ready for mural. Note squares of translucent Tehali marble in upper part of the big reading-room window.

Administration building by Pani, del Moral and Ortega, directly below, is clad in half a dozen different kinds of stone, in rich textures and relief.

Solas Portugal



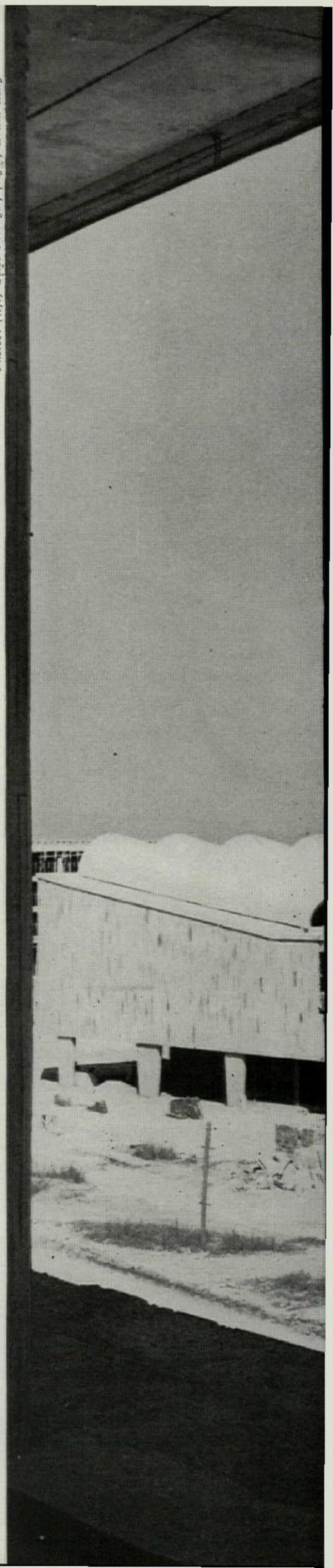
Landscaping, now barely begun, will use local trees. Auditorium roof looks sculpturesque seen from tower.

SCIENCE GROUP

The science tower is the first major structure on the campus to be finished. The horizontal structure in the foreground, to which the tower is connected by passages, owes its wavy floor lines to its classrooms, which are amphitheatrical in shape because they serve subjects where emphasis is on visual demonstrations. Above is seen the auditorium for 550 people, with its shell-concrete four-barreled roof that does away with interior columns and admits light through the roof ends. Building is travertine clad, is on stilts, has a Chavez Morado mural across its curved front face.

Necessarily the buildings and structures shown have been a short selection; and since each had a group of architects, individual credit could only rarely be given. Perhaps the biggest salute must be given to the Ciudad Universitaria's designers as a *multitude*; in bringing today's architecture to what may well be a new turning point they have served well in showing how, at its most vigorous, this architecture can be multiform yet harmonious.

Photos: (left) Salas Portugal; (right) Erwin Lang



Use of round columns for plastic effect is common in Mexico—see foreground building, right. In tower, columns are recessed about 2' behind all glass and metal wall. At partition lines columns are connected to mullion by a thin masonry fin.

FRANK LLOYD WRIGHT:

"About 15 years ago this spring, when Dr. Ludd M. Spivey, the presidential good-genius of Florida Southern College, flew north to Taliesin, he came with the express and avowed purpose of giving the US at least one example of a college wherein modern life was to have the advantages of modern science and art in actual building construction. He said he wanted me as much for my Philosophy as for my Architecture. I assured him they were inseparable.

"And ever since, owing to Dr. Spivey's unremitting efforts, this collection of college buildings has been in a continuous state of growth. Their outdoor-garden character is intended to be an expression of Florida at its floral best.

"Study these buildings from the inside out if you would know something about the kind of building we call Organic Architecture. You can't really know very much about anything America has in a native culture worth knowing unless you so study them. Knowing what is good or bad about a building is knowing what you must know about the life you live here in our country, how you live it and why. If only the upper middle third of our country would try to understand why these buildings are the way they are, there might be some reason to hope. Behind every front you see here there might be something to discover. If there is nothing, then—no matter what you like—it's probably bad. To see all there is to see in any good organic building takes study and more cultivation than the usual college education affords. Certainly more than can be sent back home on postcards by travelers.

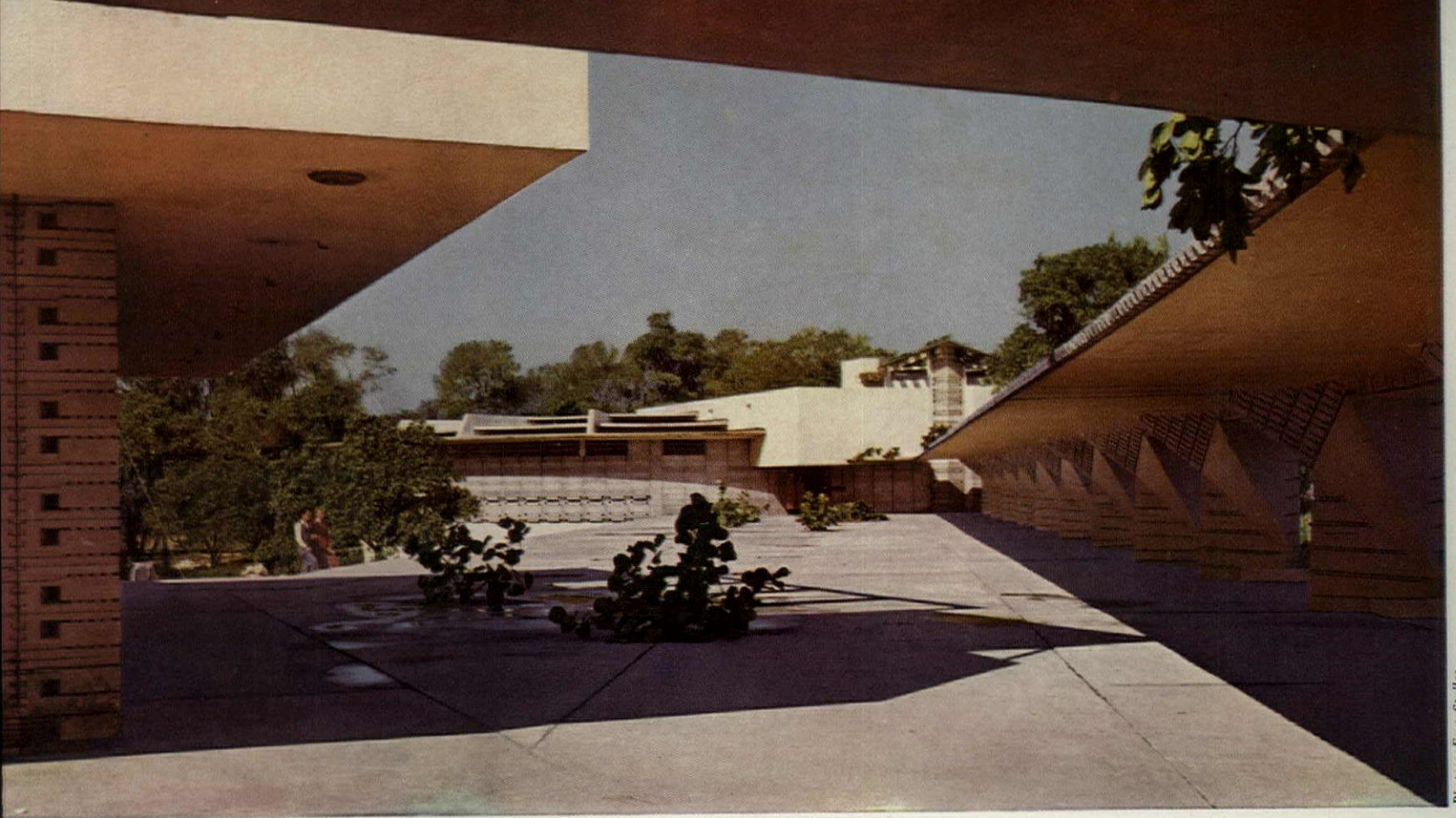
"Ask 'why' whenever you see Architecture you like or if you like what you see, and you would start along the path of a true culture. The path we call Organic Architecture is along the center-line of an indigenous culture for these states in which we live, because there can be no great life for our people without the integral culture of an Architecture of our own. I should say there is really no other kind of culture possible.

"Actual knowledge of the 'why' in Architecture—either old or new—is to be the true basis of our Culture now just as it has ever been and ever will be the basis of any Culture for any people. All we know about great civilizations is what we learn of them from what remains of their Architecture. Were our civilization suddenly destroyed what do you imagine subsequent civilizations would have to think of us as a civilization? They would look back upon our ruins and discover what we had done and were so busy doing. What then would they see? Nothing but the pottery of our plumbing from which they might conclude we belonged to 'the sanitary era'—authors of the sanitary slum.

"So, as for these buildings in which a true portion of America moves, studies, works and has its being, if you would honestly try to understand these Florida Southern College buildings and would really know what they are all about (whether you like them or not), something important to our country's future as a democratic nation will transpire. Because not only do buildings last long but in these buildings here and now you may see something of your own tomorrow that is yours today. Yes—and maybe, the day after the day after that.

"Because a preceptor in education like Dr. Ludd M. Spivey took thoughtful measure of his time and flew to Taliesin, you will see in these buildings now standing at Florida Southern College the sentiment of a true educational saga along the cultural lines of an indigenous Architecture for our own country."

FRANK LLOYD WRIGHT



Photos: Ezra Stoller

ABOVE, LIBRARY SEEN FROM ESPLANADE BESIDE CHAPEL; BELOW, ADMINISTRATION BUILDING ACROSS IDLE WATER DOME

GENERAL PLAN WAS MADE IN 1936, CONSTRUCTION BEGAN IN 1938. INTERRUPTED BY WAR, GROWTH IS NOW CONTINUOU

All this—and practical success too!

Presidents of most small private colleges today are worrying about: 1) fund raising, 2) enrollment, 3) intellectual apathy and conformity.

But Florida Southern's president, Dr. Ludd M. Spivey, thinks his spectacular campus is solving these problems for him.

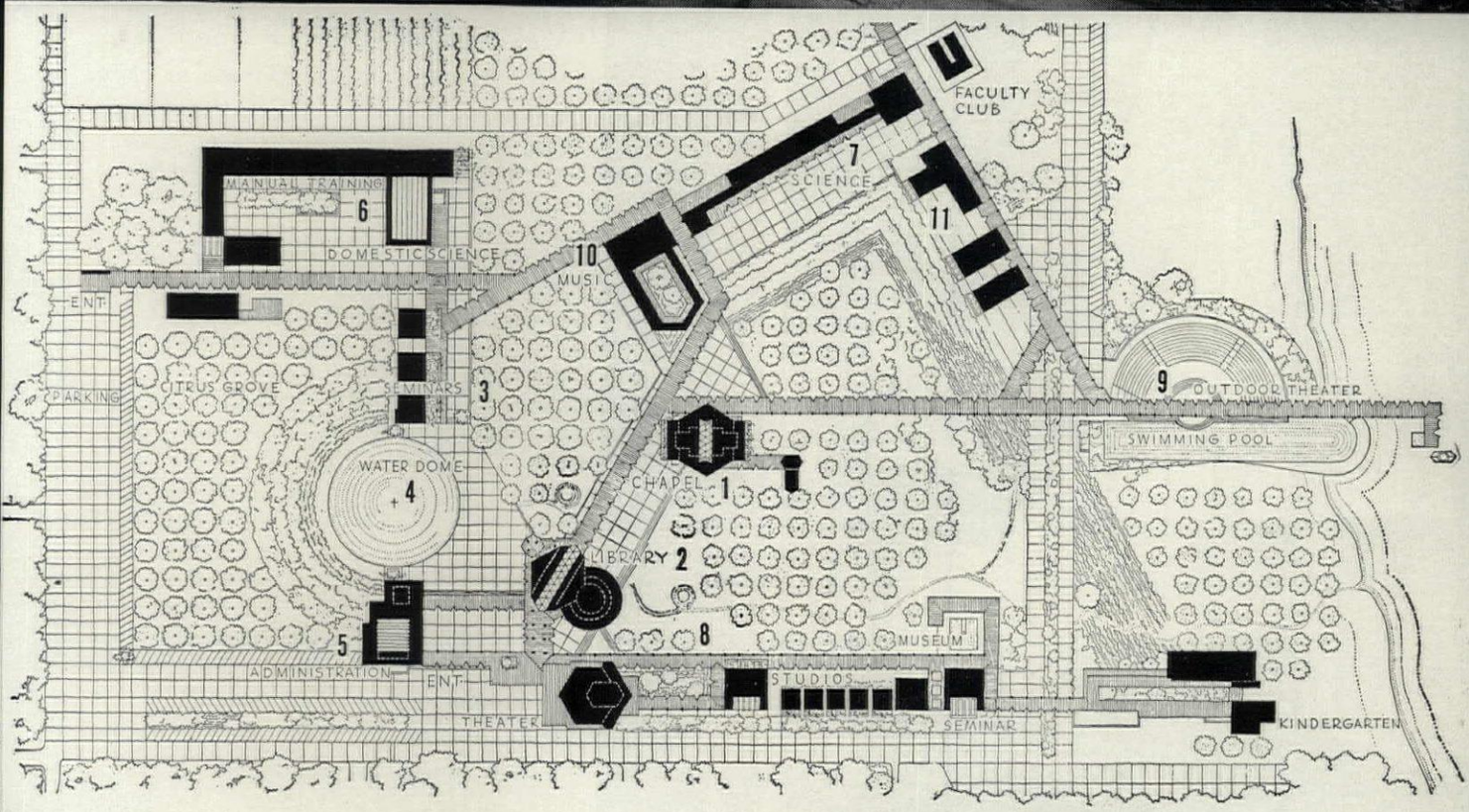
Student enrollment has increased fivefold since completion of Wright's first building, and student and faculty spirit has soared sky high (see Dr. Spivey's comments on page 125). As for fund raising, it seems that money for the first Wright buildings was hard and slow to come by. But as the campus has developed so has the eagerness of benefactors, confirming an old observation: whosoever hath, to him shall be given.

The way things are rolling, Dr. Spivey now believes the campus has a good chance of being completed by 1957, certainly by 1960. Estimated cost, complete, is $10 million.

Buildings on the plot plan (opposite page) are keyed to the order of their construction. The chapel was started in 1938, completed in 1941. Next came the library, completed in 1942; three seminars, 1943; water dome, 1948; administration building, 1949; industrial arts and home economics building, 1952. Ground was broken for the science building last spring, completion scheduled for 1954. Half of the 1½ miles of esplanade is finished. Art building, swimming pool and amphitheater, music building, gymnasium (not indicated on plan), and more seminars will follow in that order.

Photos: Ezra Stoller

LAN IS LIKE A NET BUOYED UP BY BUILDINGS WITH THE MESH OF THE ESPLANADE ROOFS FLOATING JUST ABOVE THE EYE



Lobby, where entering students register. Counter slants across it (not as shown in plan). Sidelights are notched directly into corners of diamond-shaped columns

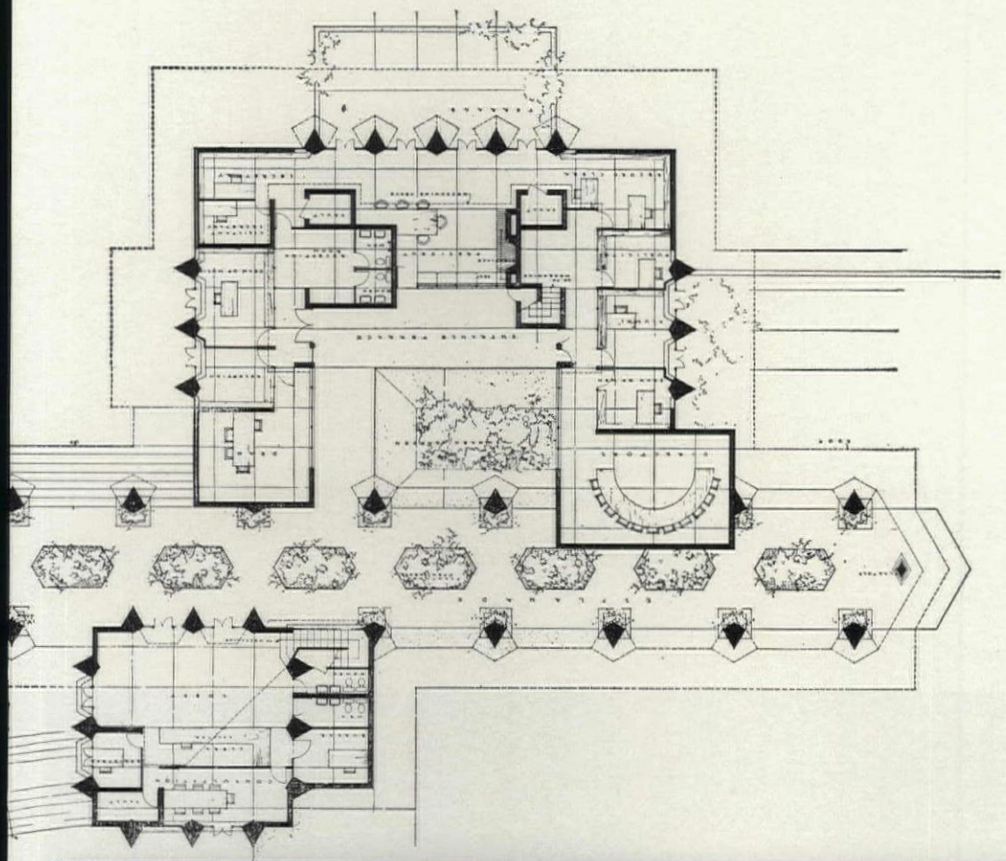
Photos: Ezra Stoller

View from directors' room with offices on right, court on left, a glimpse of office gallery high above door. Court with its reflecting pool is shown overleaf

→

Esplanade leads to library, ultimately also to projected theater. Retreating slant of stair risers has the psychological effect of pulling one forward and up

ND AS ALWAYS IN WRIGHT'S WORK EARTH IS MORE THAN A SETTING. GARDENS AND SHELTER ARE INEXTRICABLE



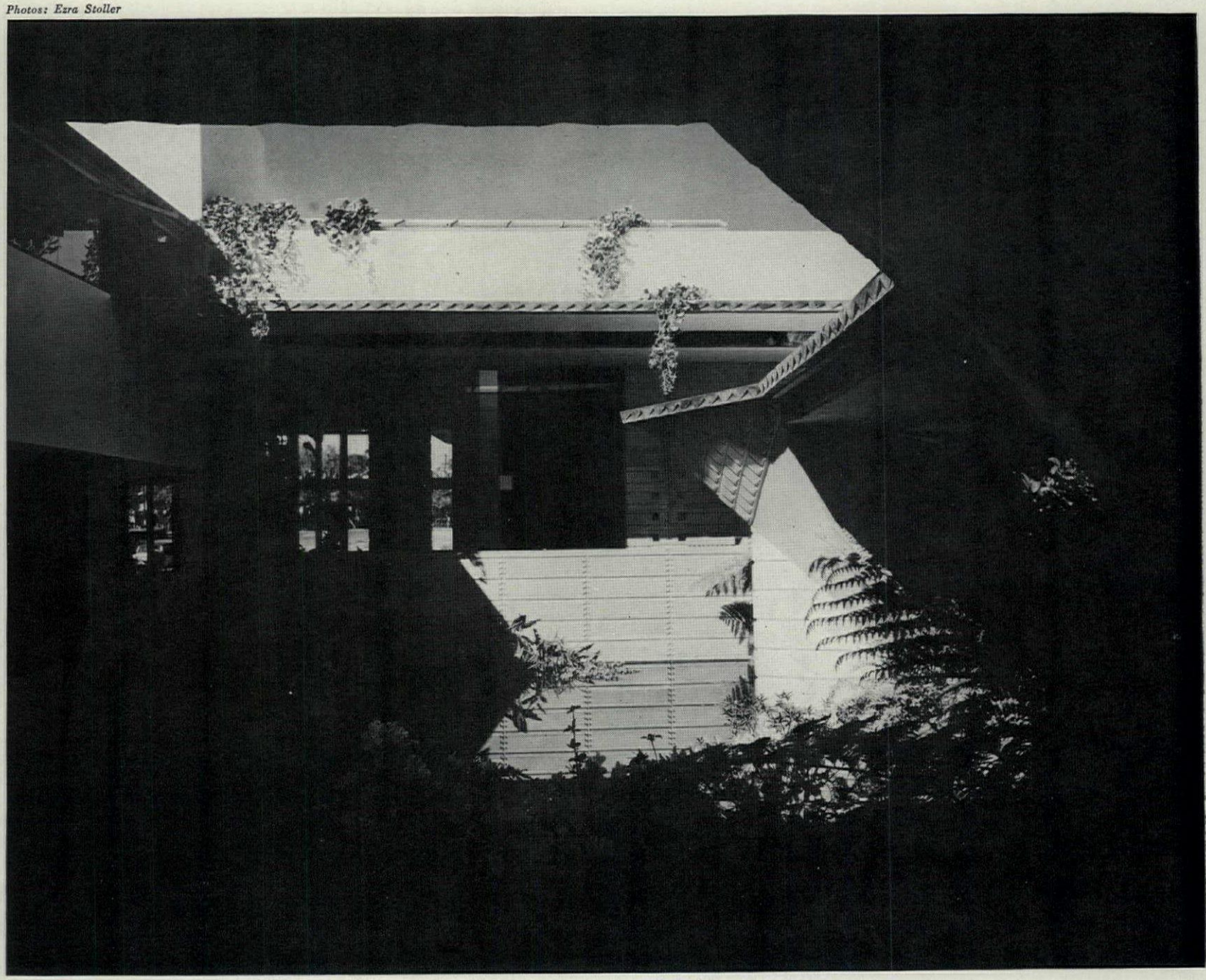
LUDD M. SPIVEY, F.S.C. president, says: "When the college decided to use Mr. Wright's architecture, it didn't realize it was to benefit from a by-product of his buildings—student enrollment. This has long been a major problem with small private colleges such as ours, but the Frank Lloyd Wright architecture has made this college known all over America and much of the world. It has largely solved our enrollment problems. In the last instructional year we had students from 42 states and 21 foreign countries.

"It is also interesting that college presidents from all over the country are coming to the campus in increasing numbers to see what the Frank Lloyd Wright buildings do to and for education.

"I have seen a new spirit and a new attitude in the student body and the faculty since the coming of the Frank Lloyd Wright architecture. It took a little time for the buildings to make an impact but they finally did, and one on the inside of the college finds a new stirring of minds all over our campus."

SCALE IS SMALL; ONE CAN TOUCH THE ROOF SLAB. HERE IS A SENSE OF HUGE, EXCITING SPACE MADE OUT OF MAMMOTH

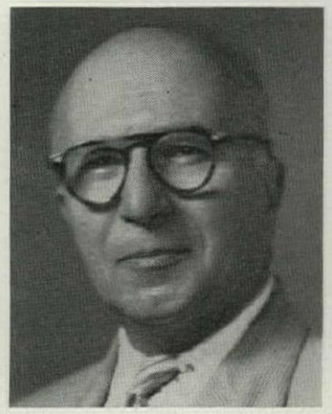
Photos: Ezra Stoller



LEMENTS SCALED DOWN TO HUMAN SIZE. HERE IN PERFORATIONS AND GROOVES IS DELIGHT TOO FOR THE SENSE OF TOUCH

ROSENFIELD AND HIS HOSPITALS

He approaches his jobs like a city planner



He likes horizontality *(p. 130)*

big nursing units *(p. 132)*

four-purpose windows *(p. 134)*

tailored modules *(p. 135)*

"I have no ambition to create the spherical hospital, the cylindrical, spiral or diagonal hospital," says Isadore Rosenfield. "The hospital architect's contribution is apt to be in new configurations of known forms rather than in the creation of new forms. The fact that the works of the great are usually small in magnitude and few in number and generally deal with well-known human problems such as the house, the hall, the workshop, shows how consuming creation is."

Within this realistic limitation there is certainly nothing humdrum about the 66 hospitals in which Rosenfield has had a hand as architect, consultant or executive principal. In almost every one of them you will find yourself brought up short by a piece of calmly logical, out-of-the-ordinary thinking. Like their articulate creator, Rosenfield's hospitals have plenty to say, often something new, always something to the point.

Rosenfield is an outstanding exponent of:

1. The 3- or 4-story hospital vs. the tower hospital;
2. Horizontal contiguity vs. vertical;
3. Horizontal expansion vs. vertical;
4. Big nursing units (up to 70 beds) vs. small;
5. Orientation primarily to the view vs. orientation primarily to the sun.

But Rosenfield's hospitals are all different one from another, and if you try to look at them all at once you risk missing the main point: in their differences they demonstrate best *the uses of an inquisitive and independent approach to social thinking.* Here are a few recent outcroppings of this rich Rosenfield vein of thought:

The big San Juan, P.R. medical center incorporates a complete small rural hospital and health center as a teaching unit for doctors and nurses who will go into the hinterland. ("If rural medicine is to be practiced successfully, it must be taught.") And its site was chosen with the idea of enabling student doctors and nurses to live on the University of Puerto Rico campus; their hospital and nonhospital lives are joined (and separated) by a little bridge into the medical-center grounds. ("Young people are entitled to a happy, normal social life.") *(P. 129.)*

Beth-El in Brooklyn* has a different relation of wards and nursing stations on each of three floors. ("There is a lot of talk about the most efficient arrangement but very little examination of the problem under controlled conditions.") *(P. 133.)*

Sidney Hillman Health Center† in Philadelphia shows an ingenious triple corridor outside examination rooms and doctors' offices. This was devised to eliminate herd waiting. ("We wanted the whole process to be dignified. We wanted the patients to feel they are really considered as individuals.") *(P. 135.)*

North Shore Hospital at Manhasset, L. I. includes group practice and community health offices and public meeting rooms. ("A hospital can be a very important cultural force.") *(p. 130.)*

The Children's Building of the Tuberculosis Hospital Center near San Juan includes a school with library, shop, art, science rooms. ("While children are recovering from a dreadful disease they must also have a chance for fruitful and enlightened living.")

Zachary Rosenfield *(M. Arch. MIT '50) doubles with his father on research, comprehensives.*

Conrad A. Johnson, Jr. *(M. Arch. Harvard '47) supervises detailed planning and design.*

Ichiro Kawasaki *(B. Arch. Michigan '29) is production coordinator and field supervisor.*

All these were Rosenfield suggestions, not contemplated in the client's program. The chance to make such suggestions and see them adopted is the biggest reason why Rosenfield decided to be an architect. He early discovered that most good ideas float around and eventually die in a sea of talk, but *an architect has the special advantage of being in there with his ideas precisely at the time action of some sort has to be taken.* This heady discovery switched him in his third year at Harvard from a social ethics major and settlement-house worker into the school of architecture.

Before Rosenfield graduated (M. Arch. '22) he realized that hospitals were his dish and he has concentrated on them ever since, first as apprentice to the big hospital architects of the twenties, later as chief architect of the New York Department of Hospitals and later of the New York Department of Public Works. He opened his own office in 1946, soon afterward completed the comprehensive book on hospital design that has made him known wherever American technical writing penetrates. This work still keeps his mailbox full of exotic stamps.

"The city planner gets a problem and he has to start from scratch. The architect usually asks for a program," Rosenfield observes. Working either as consultant or architect, Rosenfield uses the city-planner approach, does his own studies right down to digging out the facts on family income in the community. His facility with this kind of research comes out of his three years' training as a social scientist. He is suspicious of all rules-of-thumb and initial assumptions. To his clients, he explains himself as "a physician to hospitals," says he cannot base diagnosis and treatment simply on what the patient reports about his ache.

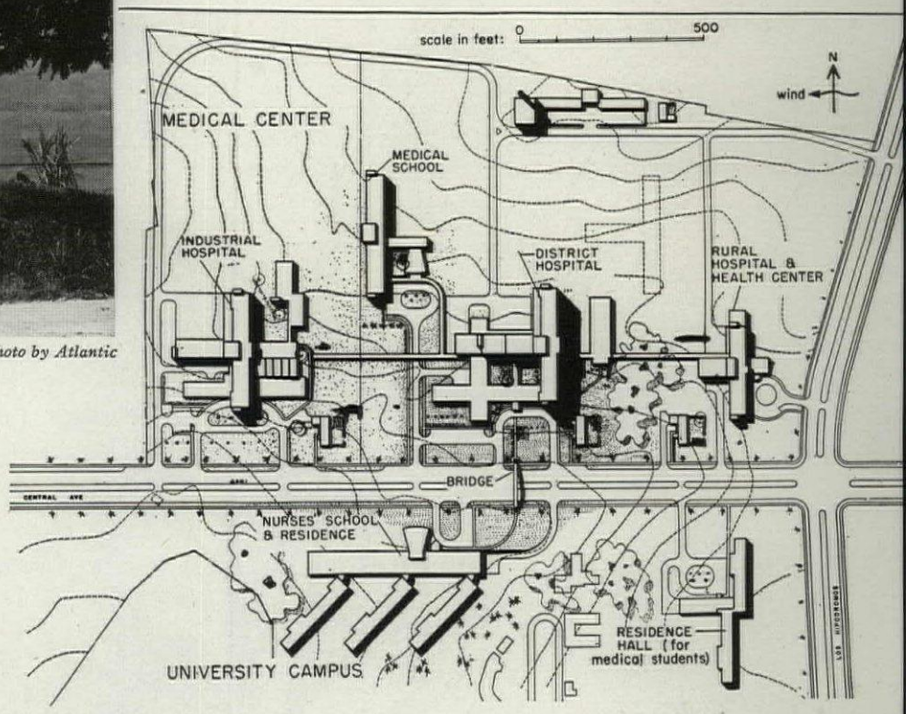
* William I. Hohauser, associated architect.

† Rosenfield, consultant; Magaziner & Polls, architects.

Photo by Atlantic

This 600-bed tuberculosis hospital at Rio Piedras, P. R. is one unit in Rosenfield's biggest work: a long-range program of integrated hospitals for all Puerto Rico. (For more on this tuberculosis hospital, see p. 134.)

Rosenfield works out his own programs; he convinced officials that San Juan Medical Center (plot plan below) should include industrial (similar to workmen's compensation) and rural units, be integrated with campus.



After the research, Rosenfield usually lays out a comprehensive program of rounded development that may take decades to complete. Most spectacular example is his Puerto Rican work, which began with an island-wide survey of all needed health facilities from medical schools to rural clinics. But even in a simple bed-addition job such as Beth-El he works out a rational scheme for the future first, fits the current project into it.

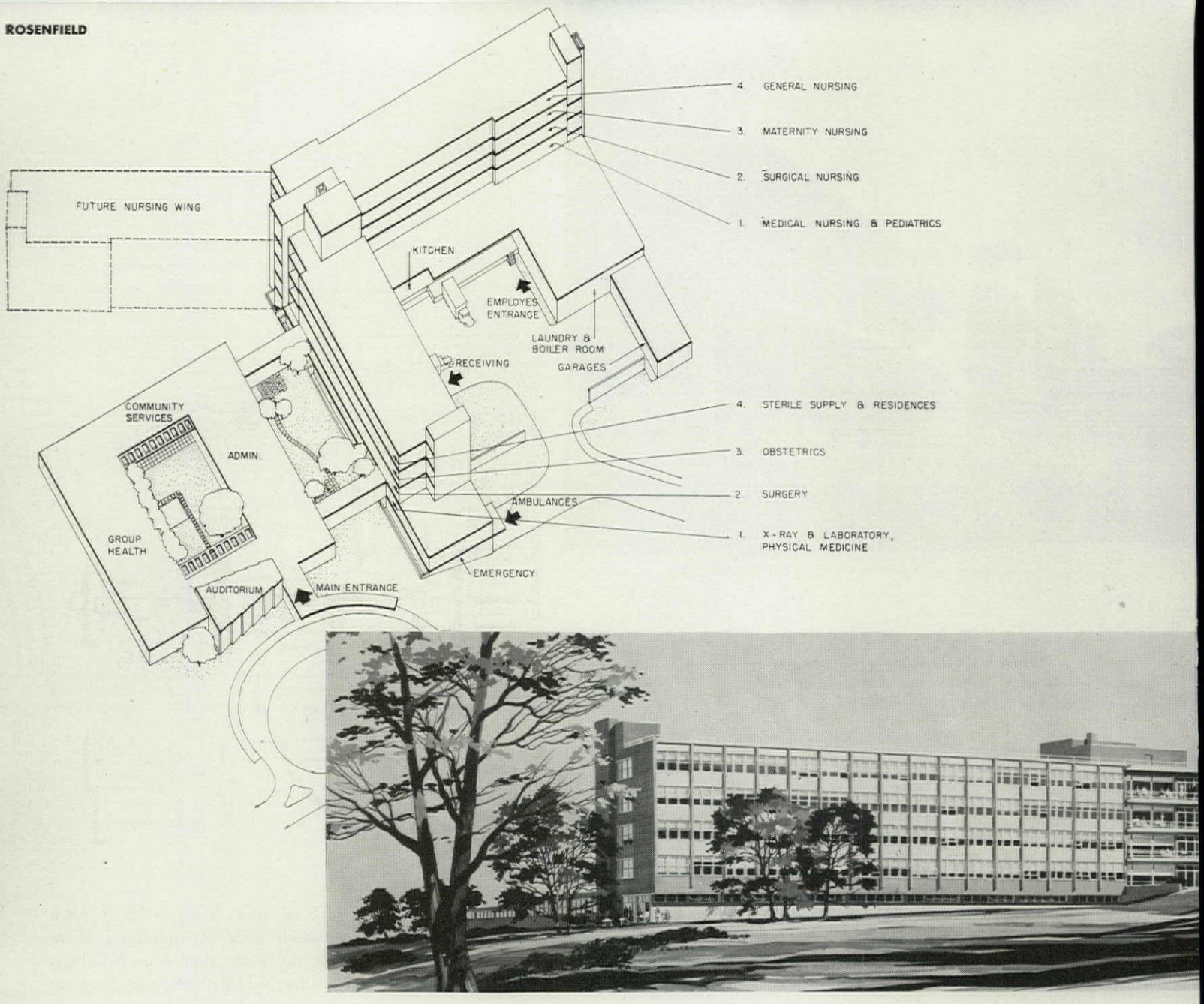
Sometimes Rosenfield tells clients their whole idea was wrong, sends them off to get ready for what he calls "the beautiful, significant operation." Instead of obliging with a new home for a small Philadelphia hospital, he advised the board to consolidate with two other small hospitals in the community, thereby amounting to something. This advice is being followed. His diagnosis of a small Boston hospital convinced its board that their site was a sow's ear, that they had better think in terms of future rebuilding instead of current addition. To make up for lost jobs similar to these, he counts on a percentage of the clients returning when they have a better grip on the future. Much of his current work involves some increment of a comprehensive he worked out some years ago.

Rosenfield's comprehensives (or presentation preliminaries) are like nothing taught in the schools of architecture. They straddle both sides of the usual first preliminaries. 1) They are prepreliminaries in the sense that they deal with decisions the architect usually, for better or for worse, takes on the client's say-so or leaves unexplored. 2) They are postpreliminaries in the sense that they leave absolutely no guessed-at spaces in the buildings to be tackled first.

Every unit, every floor has its interior space realistically allocated. If the building has new features or Rosenfield thinks it is time to reanalyze old ones—such as utility rooms—this is when he makes a detailed large-scale study with all equipment. If an old space grid does not work out, this is the time when he adopts a new one. Plans at this stage are freehand but the pencil lines are the only casual thing about them. Usual hospital experience is that the cube increases as the plans develop. Rosenfield's cubes show a consistent minor decrease from first to last. He has a horror of postpreliminary jolts on cost and cubage, which he seeks to avoid by this early detail method (plus regular reports to the client on the course of the building cost index); and he is convinced that in any case only realistic studies merit preliminary discussion with planning boards, medical advisors, administrators.

Rosenfield's entire presentation is unorthodox. Instead of submitting a luscious rendering ("too often a skin without bones") he stacks floor plans into a stripped isometric, bones without skin. His reason: first things first, discussion of function before form. While he has a very good idea as to how the building will look, he shows no elevation studies until everyone concerned has thoroughly picked over the bones, agreed on their shape, size and articulation. What makes this method workable is Rosenfield's elastic definition of function. In his lexicon it means not only the machinery but the emotional content of the hospital. The views from its windows, the look of the corridors, the effect on the entering patient are all deliberately built in.

In his own office, Rosenfield drops the analogy of physician, likes to think of himself as conducting an orchestra of composer-musicians. His draftsmen are all young fellows bent on hospital-design apprenticeship; he has a waiting list that sometimes runs two years. To get a line on the current directions of Rosenfield and his team, *turn the page.*



HORIZONTALITY

Rosenfield likes horizontality not for its own sake but because he believes it:

1. Cuts down vertical travel, thereby saves space and money in construction and time, money and aggravation in operation;
2. Makes for rational separation of elements instead of "stuffing";
3. Plays down monumentality and so avoids its pitfalls;
4. Allows easy expansion.

Rosenfield's revolt against the tower ("several stories of services topped by several stories of patient quarters, topped by still more stories of services with odds and ends stuffed here and there") dates back to 1943 when he hit on the principle of "horizontal contiguity."

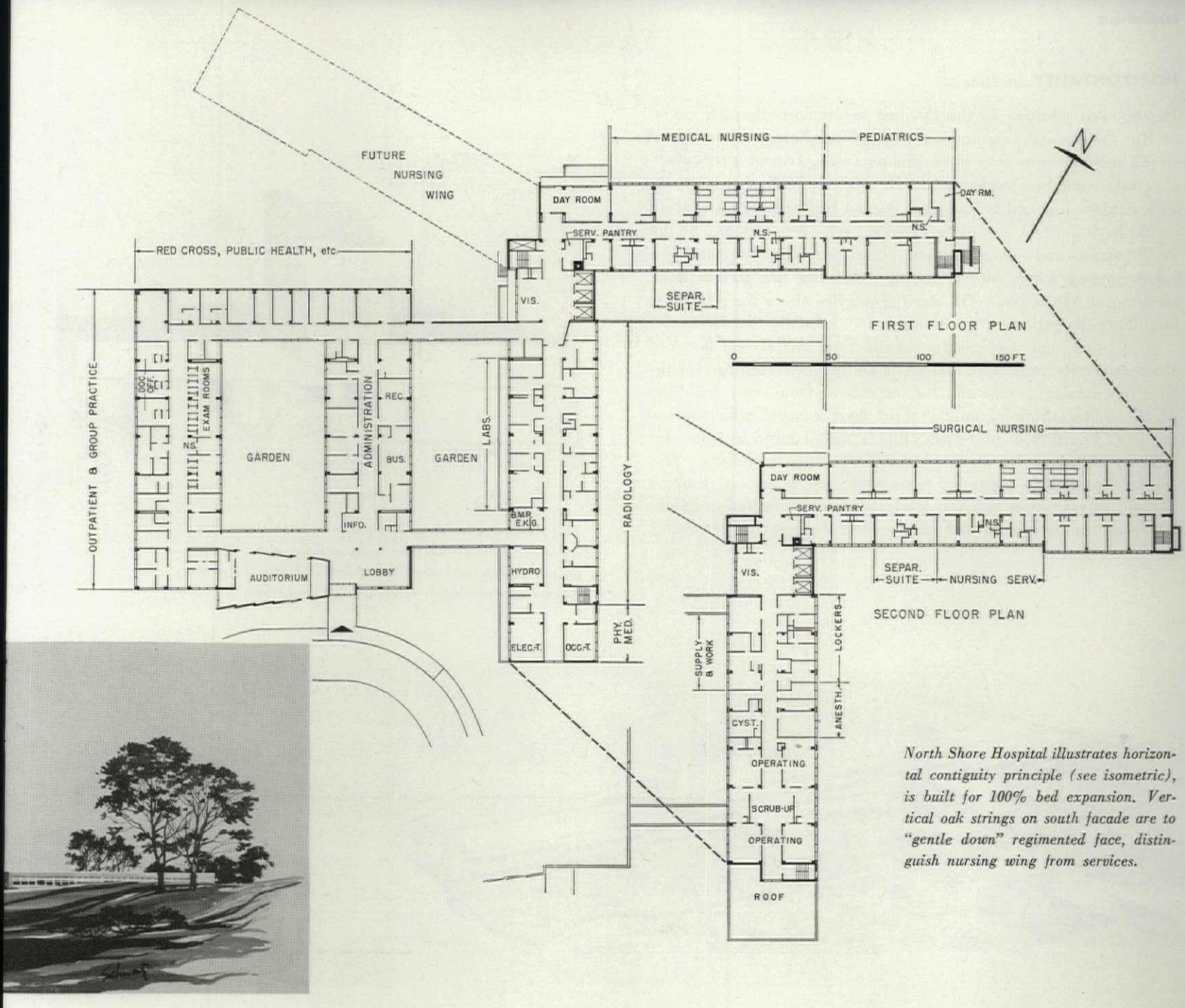
This is one of those simple ideas that seems obvious—*after* somebody thinks of it. Briefly, what he does is split the services and the nursing units into two independent wings, then relate them horizontally. He puts medical nursing units on the first floor to keep these beds on the same level as diagnostic services (which almost all hospitals put on the ground floor because of outpatients). He puts surgical nursing *and* surgery on the second floor, maternity nursing *and* delivery on the third. Where a fourth bed floor is needed he assigns it to general nursing for cases which will not need to make much use of any special services. This system minimizes elevator travel between services and nursing units, puts a quarter or third of the patients on the ground floor, another quarter or third one flight up, cuts elevator travel by visitors at least in half.

This contiguity principle is now fairly widely accepted in hospital planning (although plenty of modern exteriors on tall, new hospitals still belie it). Now Rosenfield is thinking it through to greater flexibility and adapting it to expansion needs and the spate of ever growing community services. His North Shore hospital *(above*—now under construction) shows most of his latest thinking.

Outstanding feature of North Shore is its horizontal expandability. When the second nursing wing is added *(see isometric)* capacity will double from 182 to 364 beds. Actually the project is so thoroughly planned for this expansion that it could more accurately be called a 364-bed hospital to be built in two stages.*

Floor pantries and day rooms are sized for the full load; kitchen, laundry and boiler plant have pipes and space for the extra equipment; another pair of operating rooms will bring the second floor of the service wing to first-floor length; additional delivery-

* *See News department* for picture of York & Sawyer's doubling hospital designed for the army.



North Shore Hospital illustrates horizontal contiguity principle (see isometric), is built for 100% bed expansion. Vertical oak strings on south facade are to "gentle down" regimented face, distinguish nursing wing from services.

suite space is already built into the third floor. For the nonce the hospital weighs in at 592 sq. ft. per bed; expanded it will have 465. The first figure is high, the second slightly under average.

Rosenfield and the planning committee had another choice: they could have saved $70,000 temporarily by building the first two stories of both nursing wings in stage I, adding the second two stories in stage II. But meanwhile patients would have been trundled up to the service wing's third floor, stage II construction would eventually eat up the savings on stage I, vertical addition would be more disturbing to the going hospital. North Shore's nursing slab is justified economically, Rosenfield thinks, *only* because it will be expanded horizontally. Otherwise he would not stack 182 beds into four stories.

Note that: 1) pediatrics shares the ground floor with medical nursing; 2) general nursing occupies the fourth floor. Thereby hangs another tale of the contiguity principle. The horizontally contiguous hospital will work out right only if its statistical base is right. Any bad miscalculation on the proportion of medical beds needed, for example, means shuffling cases out of their proper units and makes the system almost as amorphous as the old tower.

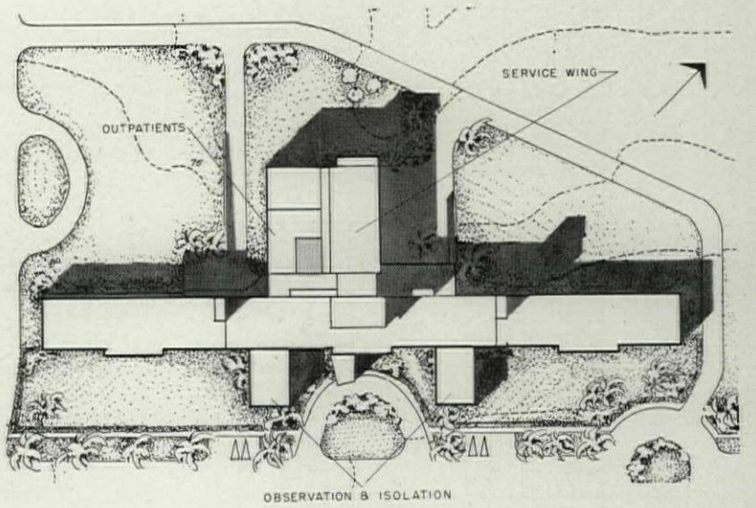
Once bed proportions are correctly figured, pediatrics offers a unit handy for juggling, because it is small and because there is really no "best" place for it. For instance, in hospitals where the maternity load will be light, Rosenfield puts pediatrics and maternity on one floor. Sometimes he puts pediatrics on the fourth floor. Studies for North Shore indicated that thorough-going medical nursing would take the lightest load, thereby fixing pediatrics on the first floor. The full general nursing unit at the top of the stack takes cases not intimately tied up with any services, provides a good hedge for flexibility. With one such variation or another, Rosenfield is convinced that in the US stacking for contiguity makes sense in any large or medium general hospital with adequate site space. In general hospitals of undeveloped countries it does not, because there the surgical load is far too heavy.

Now for the problem of the swollen first floor—which has begun to plague even hospitals whose patients are all aloft with administration and outpatient departments tucked beneath them. Hospital extras are growing: North Shore has the works, even to a community auditorium. Here (and in many of his Puerto Rican buildings) Rosenfield goes wholeheartedly horizontal with administration, outpatients and the extras, builds extensive one-story structures, welcomes the chance to drop patios into his hospitals.

HORIZONTALITY *(continued)*

His 600-bed addition to the 800-bed tuberculosis hospital center at Rio Piedras exhibits another trick. First Rosenfield combined its 12 nursing units into three groups (male, female, surgical-obstetrical) each two stories high. He placed the first two groups in a straight line end to end, then turned forward the ends which would have touched, making a two-floor gap. Into this gap he put public spaces and administration. He modified the two short forward nursing wings into admitting wards on the ground floor, isolation on the second. The third group lies above the other two, straddling the gap.

It all works out very neatly indeed. First and second floors of the rear service wing have diagnostic and medical facilities for the first two nursing groups and for outpatients from other buildings of the center. Surgery on the third floor matches with surgical nursing. Fourth-floor obstetrics (this is the island-wide center for delivery of tubercular mothers) matches maternity nursing. This special hospital is organized somewhat like a general hospital without extras, shows one way patients in a big institution can be kept close to the ground with only modest single-story burgeoning.



This 600-bed tuberculosis hospital for adult patients has ingenious plan for keeping nursing units close to the ground. Across oval plaza is 200-bed children's hospital (shown partially in left foreground of rendering).

BIG NURSING UNITS

Rosenfield, in a minority on this question, feels he is fighting against a sacred cow. He points out that different people and even whole nations adhere emotionally to the belief that a certain number of beds represents the apogee (in France 22, in the US 25-35, in Finland 37, etc). Rosenfield thinks some units as large as 70 beds are not only feasible but desirable. "I'm not stubborn about it," he says, "but I like to sell my ideas where I can."

The two chief arguments against big nursing units run like this: 1) the smaller the number of beds per unit, the better for the patient; 2) big units mean long corridors and tired nurses.

"Nonsense," says Rosenfield. To point No. 1 he replies that too many units spell poor supervision, which is not good for patients. Big nursing units, he points out, are assigned proportionately more nurses than small units; in themselves they do not save on numbers of nurses. But big units mean fewer units, hence fewer supervisors, chosen more selectively. Dividing a hypothetical 200-bed hospital into eight units averaging 25 beds requires eight supervisors on each shift and he believes a 200-bed hospital can hardly hope to fill *eight* supervisory jobs, day and night, without mediocrity. Supervisors would be better, he argues, if there were only four units, two of 70 beds each for medicine and surgery, and perhaps one at 26 for maternity and one at 34 for pediatrics.

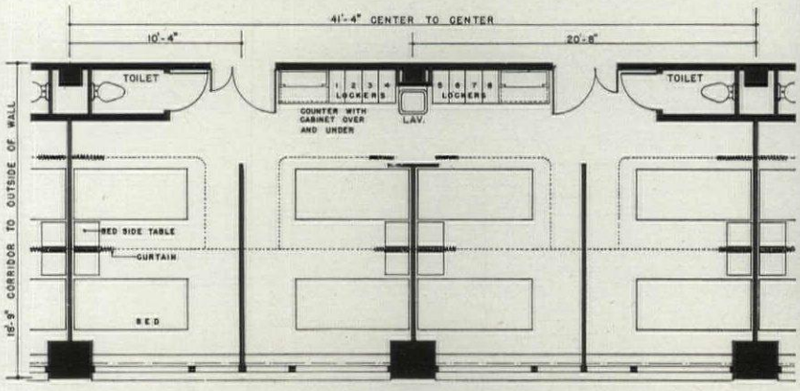
He adds that the 25-35 bed nursing unit—far from retaining the advantages of more personal nursing—has become a stronghold of assembly-line care. The patient sees a constant procession of strangers in white, one with a thermometer, the next with medicine, the third with an enema bag; because of changing shifts and days off, the patient is lucky to see the same nurse twice.

To point No. 2 he replies that just as the effective distance between New York and London has changed, so has the effective distance of the nursing corridor, owing partly to modern intercommunication systems between nurses' station and patients' rooms, partly to more inventive organization of the unit.

To shorten the corridor further, Rosenfield has lately devised a system of partitioned wards with nurses' substations *(see plan)*. Each ward includes nurses' cabinets and a counter for chartwork. Cabinets hold materials usually kept only at the nurses' station and utility room, toilets are equipped for bed-pan washing. All this makes trips to the main station few and far between. One nurse—usually with one or two practical nurses and an orderly under her supervision—takes full care of the patients in her ward, a system known as "team nursing." This partitioned ward with substation is valuable even for a hospital like Beth-El which has standard-sized (33-bed) nursing units. Its advantages:

Ben Schnall

Divided 8-bed ward at Beth-El is similar to plan below. Same scheme is sometimes used to break deeper 12-bed wards into 3-bed alcoves. Nurse's substation backs against corridor. Beth-El interiors by Designs for Business.



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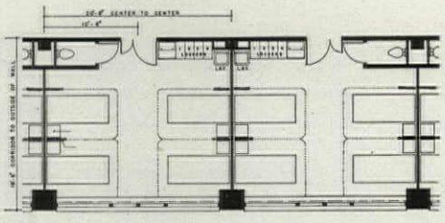

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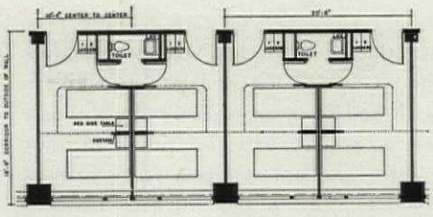

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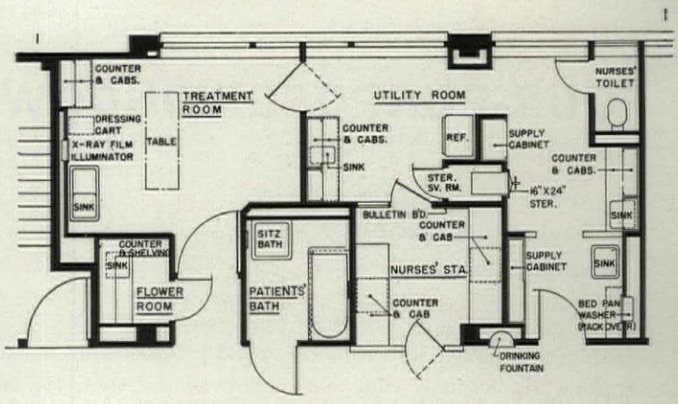
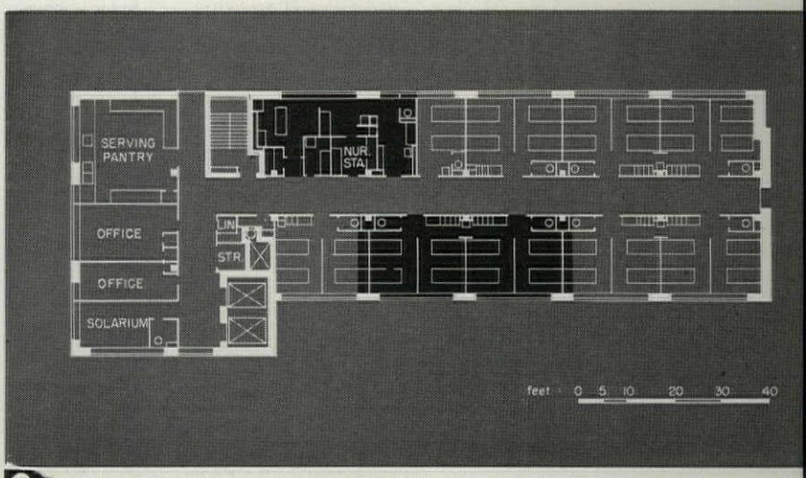


Nursing services as organized for Beth-El bed addition. Plan below shows their location.



Different floors of Beth-El bed addition have differing ward schemes for efficiency, comparison: second floor (above) has 8-bed groups with substations (see Plan No. 1); Plan 2 shows unpartitioned 4-bed wards with substations; Plan 3 has partitioned 4-bed wards, no substations.

1. Patients are rarely left unattended;
2. Old-fashioned personal nursing (now regarded as highly progressive in hospital circles) is made easier to handle;
3. Nursing itself includes more variety and less boredom than is the case in highly specialized, assembly-line systems;
4. Economy of the large ward is coupled with the greater flexibility and amenity of the semiprivate room;
5. Removing one bed from an alcove provides that long-sought paradox, "the cheap private room."

For the Beth-El addition, Rosenfield also reorganized the nursing services *(see plan)*. He sees no reason other than custom for the usual array of corridor-to-window rectangles, bases his reorganization on step-saving.

Note also the split doors into patients' rooms, a device which makes it unnecessary for a nurse to push a bed-width door every time she goes in and out. Instead of the usual 3′-6″ to 3′-10″ doorways, Rosenfield uses a 4′ opening, equipment with a 2½′ door for ordinary use and a 1½′ panel which is opened only when a bed must be pushed through. In effect, this is a neater, unclattery version of the swinging "barroom" doors in old hospitals.

Rosenfield's unorthodox views on the nursing unit go further than size. He is impatient with the concept of the hospital as a good hotel, believes that most of mankind is less concerned about recovering in luxury than it is about paying its bills, is convinced that a choice between fancy rooms and the best diagnostic and therapeutic facilities should always be resolved in favor of the facilities.

"It is far better to have a good hospital to go to in the hour of need, even if you have to rest in a large ward," he says, "than to sleep in a private room in a hospital that has an X-ray bottleneck or an unsafe nursery."

He believes that many hospital boards have unrealistic notions about the number of private beds their communities can support; he cites the case of a board which planned, by rule-of-thumb, to allot private rooms for one-third the beds in its new hospital; an economic survey showed that the town lacked enough well-to-do families to support *one* private bed. After a nursing unit has been allotted sufficient private beds for medical, emotional and economic needs, Rosenfield thinks that ideally the remaining beds should be in rooms three beds deep, or in six-bed wards. "This is the most economical arrangement," he says, "and the most difficult for people who believe in the hotel-hospital to accept.

"The very best hospital is the one that is not needed. Better to spend resources on prevention than on cures in luxury."

FOUR-PURPOSE WINDOWS

- for view
- for sunshine and breeze
- for agoraphilia
- for germicidal daylight

Before he begins his comprehensives, Rosenfield is already peopling his hospitals with appreciators of the view. He likes to imagine a tired surgeon at Rio Piedras tuberculosis hospital getting a lift from the breathtaking sight of San Juan and the distant sea beyond the surgery corridor, or a patient at North Shore drawing serenity from the green and rolling land. He orients patients' rooms first for view (plus breeze in the tropics), second for sunshine.

His preferences for sun orientation run (in order): southeast, south, east, northeast, southwest. For the sake of the best views and breeze he will accept any orientation except north or west on the major side of the nursing wing. He controls excessive sunshine by overhangs or—in the tropics—by filling the projecting sash of windows with cement-asbestos panels instead of glass *(see photo)*. He protects tropical balconies and terraces with column-to-column, floor-to-ceiling folding doors. (Normally such doors and opaque sash are merely adjusted for shade; they are closed only for hurricanes.) In tropical operating rooms he glazes inside the opaque sash or uses heat-absorbing double glazing with an overhang.

Whatever the latitude, Rosenfield does not favor windowless operating rooms. He cites instances of surgeons who fainted at operations during the first wartime blackouts, says many people suffer less overt manifestations of claustraphobia, believes most of us who are not claustraphobes are at least agoraphiles. In fact he does not favor windowless anything, will use a basement below grade for nothing but storage.

He stresses the germicidal value of daylight even for facilities facing north. (Direct sunshine is one of the swiftest germ killers in existence, but even light reflected from an overcast sky through double-glazed north windows is potent.) He is convinced that natural daylight is cheaper, safer and apt to reach more corners than germicidal lamps. He shudders at windowless kitchens, believes they hamper vermin control. He almost never ends a corridor with a blank wall, thinks large blocks of daylight (with sun-dappled view if possible) at corridor ends do wonders for a hospital's tangible and intangible atmosphere.

He prefers a minimum of masonry in his facades for: 1) unlimited (controlled) daylight; 2) freedom in internal planning; 3) economy. Costs on his jobs indicate that strip windows are cheaper than conventional masonry-plus-windows *provided about 50% of the windows are fixed glass.*

To increase windows, decrease masonry, he uses two devices:

1. He places the column inside the building face, leaving a space between the column's external face and the spandrel; then he runs pipes along the external face of the column rather than in masonry pockets at the sides. He protects the pipes with a thin sheet of masonry *(see detail)*. With this construction he is apt to use an upturned spandrel beam (above instead of below the ceiling). This carries windows full from sill to ceiling.

2. Or—with columns again placed inside the face—he carries pipes horizontally at each floor under the spandrel slab *(see photo and details)*, for the full length of a wing. The horizontal runs join vertical stacks only at the ends of the wing. This scheme does not require the thin sheet of masonry, permits continuous strip windows throughout a wing, has the added advantage of permitting exact duplicate modules.

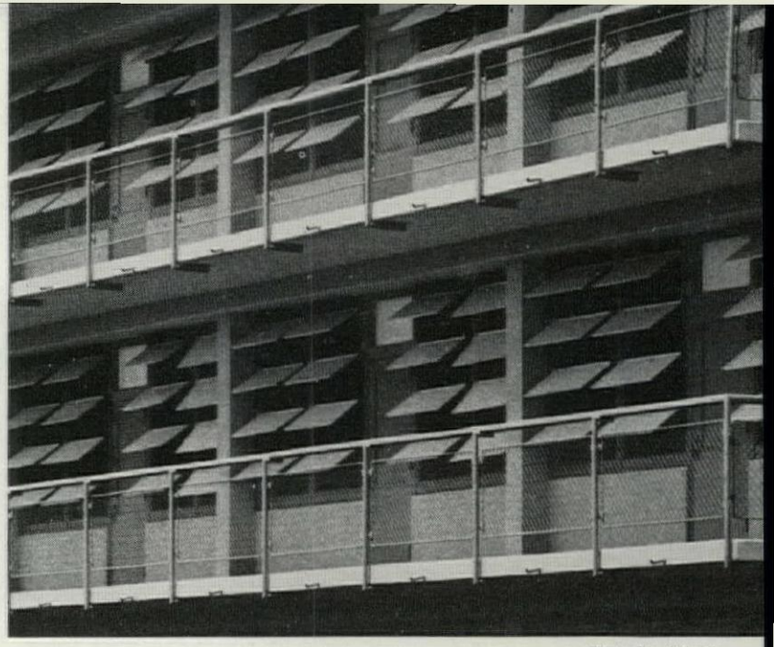
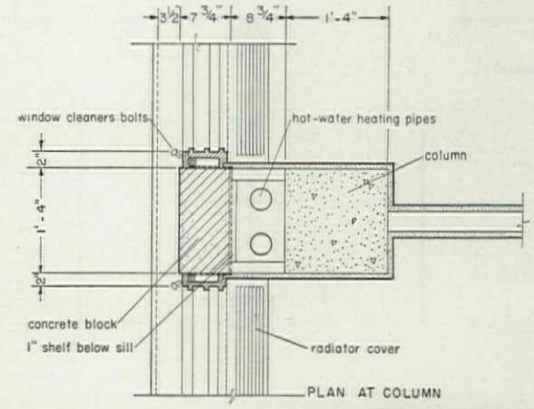
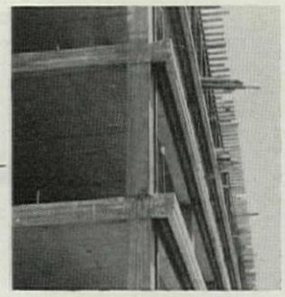


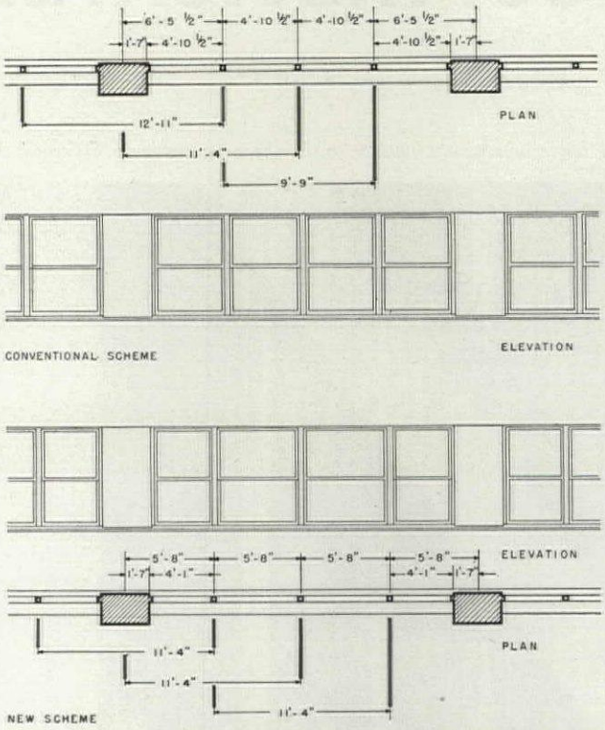
Photo by Atlantic

Facade of children's tuberculosis hospital at Rio Piedras shows opaque projected sash used for sun-control louvers, hurricane protection.

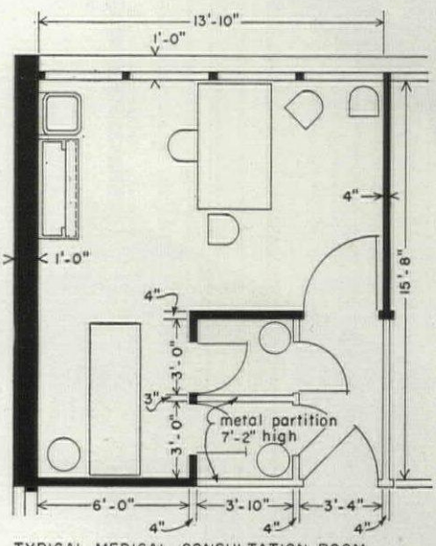


To add glass area: above, pipes at column face; below, pipes carried horizontally below spandrel slab. Photo shows horizontal runs at North Shore.



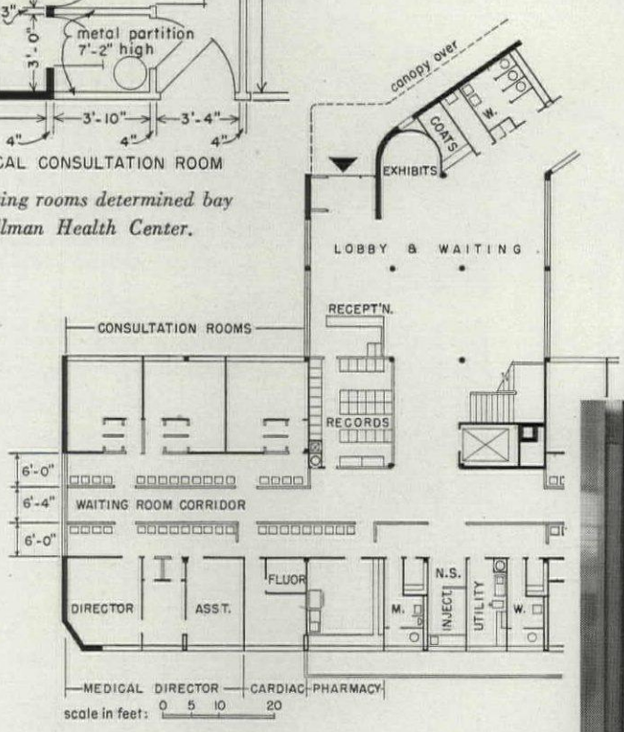


To give New York State Veterinary College identical-width modules, Rosenfield discarded conventional window spacing, divided bay into equal parts from column center to column center.



TYPICAL MEDICAL CONSULTATION ROOM

Size of consulting rooms determined bay at Sidney Hillman Health Center.



TAILORED MODULES

By now the economy of modular construction is commonplace. But not so much has been said about the economy of getting the right module.

Pulling services out from under and over the patients, as Rosenfield does, results in a nice by-product: the chance to discriminate between bay sizes for nursing wings and service wings. Generally Rosenfield uses a 22′ bay (to get minimum 10½′ rooms) for nursing wings, likes to fit kitchens and laundries into the downhill side of a slope beneath. But he finds this bay wasteful for laboratories, operating rooms and the like, saves almost 10% of length in service wings with 20′ column spacing. (He has also tried 19′ bays, finds them too tight.)

To restudy an old grid or determine a new one, Rosenfield begins with what he calls "a study of space for the horizontal patient and the vertical people and their tools around him." From an intimate-scale scrutiny of this sort he arrives at the larger scale dimensions of the room, then of the bay. For an example, *see* dimensioned plan of typical doctor's consultation room at Sidney Hillman Health Center. These were key rooms; each required space for consultation with a patient and his family, a curtained examination alcove, dressing rooms for incoming and outgoing patients. The resulting bay (1½ offices) was 21′.

Similar study of offices and laboratories for New York State Veterinary College (on which construction is to begin in the spring) reduced the client's selection of 12′ x 16′ room sizes to 11′ x 15′, saved 14% in floor space.

This Veterinary College boasts another refinement in modular construction: all offices and laboratories are in even multiples of 5′-8″, a degree of regimentation that was desirable in this case. To achieve this, Rosenfield narrowed the windows next to columns, so the distance from column center to mullion would preserve the 5′-8″ rhythm *(see diagram)*. Advantages: 1) standardization savings in flooring, built-in equipment, interchangeability, maintenance; 2) spared feelings for those academicians who would have got little (9′-9″) instead of big (12′-11″) offices.

Rosenfield is equally disposed toward steel or flat slab reinforced concrete construction, makes his choice on the basis of comparative costs. He avoids planning for vertical expansion ("all those people tramping around over the patient") which cancels out a principal advantage of steel. He abhors random column spacing which cancels out a principal advantage of concrete. Generally concrete gets the nod for economy.

"Our quest for uniformity, repetition and strict adherence to the module alarms some people," says Rosenfield. "They cry, 'A factory!' We do not flinch before this frightful accusation. We would be proud to design hospitals and medical teaching buildings that are as clean and beautiful as some modern factories."

Corridor waiting room at Sidney Hillman (plan at left)

Jacob Stelman

SOPHISTICATED

Grand Union's supermarket and office tower dominate a 100,000 sq. ft. shopping center in Elmwood, N. J.

Photos: (above) Target Photos; (below) J. Alex Langley

SUPERMARKET

borrows department-store technique to triple its customer capacity—a prototype

LOCATION: Elmwood, N. J.
KELLY & GRUZEN, architects and engineers
MAURICE MANTEL, associate in charge
BECK, SIMON & MANTEL, structural engineers
THE FERBER CO., general contractor

Here is the new look in supermarkets. Gone are the traditional long, high rows of shelves that block the view of the rest of the store. Gone is the assembly-line effect of formally aligned counters and shelves. Gone, too, are the knots of customers delayed on the assembly line at the meat and produce counters.

Instead, Grand Union has applied the best department-store design techniques to its newest and largest store—in an Elmwood, N. J. shopping center. Result: Except that it principally sells food, this 24,000 sq. ft. supermarket could actually *be* a department store.

- Sales islands are informally arranged on a loose wagon-wheel pattern.
- Impulse items—exotic foods, flowers and potted plants greet customers as they enter and leave the sales floor.
- Demand departments (meats, produce, essential canned goods and staples) are farthest from the entrances.
- Stocking the sales floor is unobtrusively done at three points with conveyors and a dumb-waiter from a lower stock area.
- Reserve stock on the sales floor is kept out of sight behind departments along the wall.
- Color defines and advertises each department. Adjacent departments have related colors so that the entire sales area has a running harmony of colors. In all, 19 colors were used in the store.
- High-intensity general lighting augments the colors. Slimline fluorescents throughout give a whopping 100 foot-candles at counter height.
- Display lighting accents special departments and special sales areas.

Successful experiment

This radical departure from accepted supermarket layout naturally raises the questions: How well does it work and does it pay off?

Grand Union believes it both works well and pays off handsomely and therefore plans to build certain future stores along the lines of this prototype. According to the owners' estimates, three times the normal number of customers can be handled with the department-store layout—and for three good reasons: 1) the plan disperses people throughout the entire area instead of bunching them in narrow constricting aisles; 2) it permits people to see and identify all departments from any part of the floor thus cutting down on the "wandering around" time lost in other stores; 3) it keeps stock carts and stock personnel off the sales floor as much as possible.

Unique slanted trays of adjustable width form racks for canned and packaged goods in a patented "Food-O-Mat" along the rear wall. Diminishing items are replaced by clerks out of sight behind the racks; all stock is pushed forward in the racks by gravity so that few empty racks ever appear. In addition the self-feeding rack system keeps all canned and packaged goods in neat alignment at all times.

Photos: Gottscho-Schleisner

Department-store techniques used in new supermarket place impulse items near entries, put fixtures in informal islands and bring high (100 fc) intensity general lighting to bear on merchandise.

1.

1. *Large signs for "Bake Shop" and "Home Center" characterize all major-department identification.*

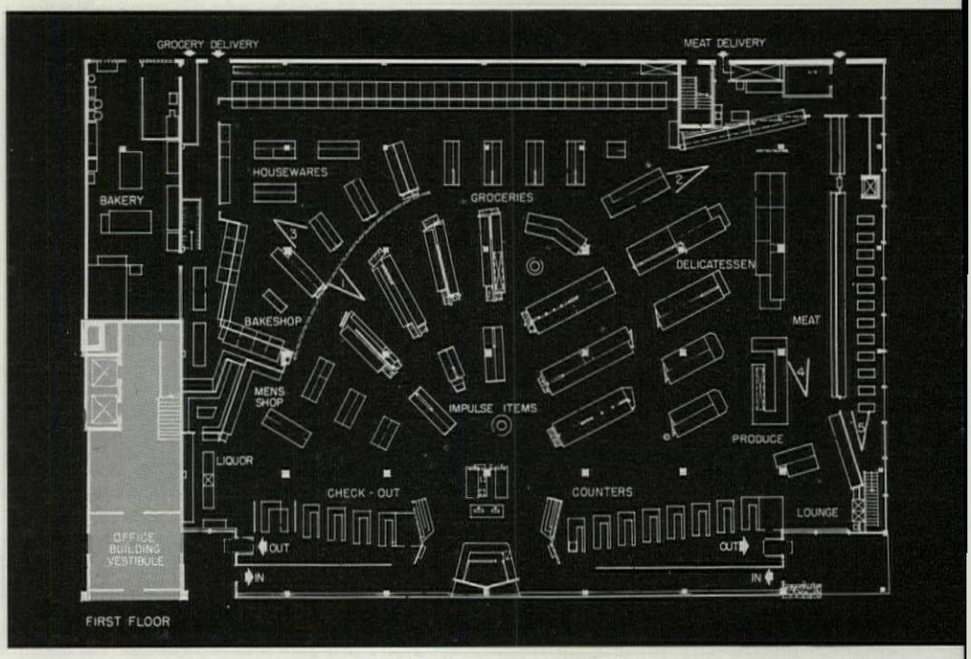
2. *Ends of informally arranged island fixtures in grocery section display items on special sale.*

3. *Houseware section contains items not generally found in grocery stores: pots, pans, kitchen stools, step ladders.*

4. *Meat counter with two-way wall mirror is serviced from rear. Wide aisle permits traffic around produce center as well.*

5. *At packaging stations behind meat counter, meat is received via conveyor, cut, weighed, priced and packaged.*

2.



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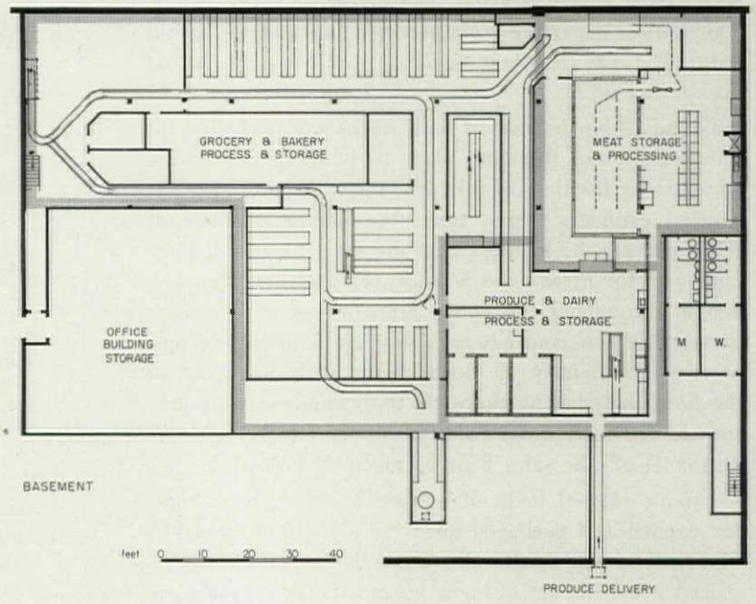
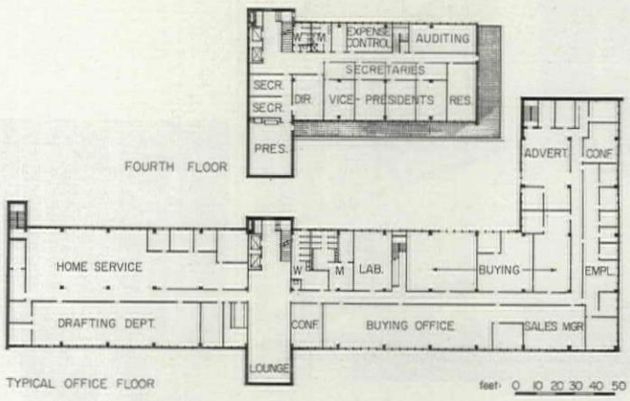


5.

Photos: (above) Gottscho-Schleisner; (bottom) J. Alex Langley

Basement level of supermarket has conveyor system to route processed produce, canned and packaged goods to floor above. Even an empty-bottle return under checkout counters was installed to keep sales floor clear at all times.

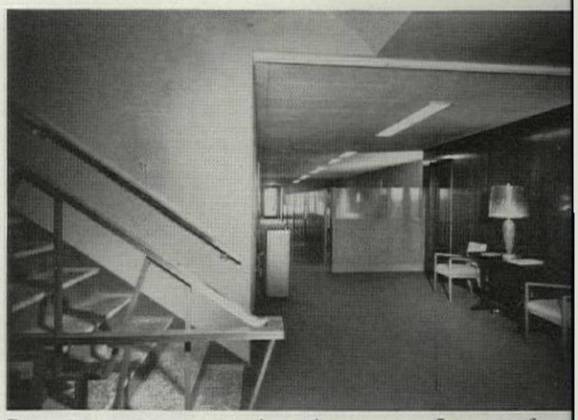


J. Alex Langley

Open front lobby to Grand Union offices is directly beneath tower

Lounges (above), reception rooms, lobbies occupy tower areas

Photos: Ben Schnall



Reception room to executive wing opens off tower floor

Office wings 56′ wide are broken by one line of columns

Prepackaged fresh meat cuts can be individually selected; the supply is replenished by clerks hidden behind a two-way mirror where they cannot interfere in any way with customers' activities.

A "hospitality bar" near the checkout counters offers exotic—and expensive—foods. It successfully tempts shoppers who would not otherwise look for caviar, rare foreign cheeses and the like.

A new approach to service

Canned and packaged goods enter the basement stock floor through one door at the rear of the building, meat is received at another rear entrance while produce is delivered at a third (ground floor) entrance at the front of the building. (This does not inhibit customer traffic since produce deliveries take place early in the morning before the store is open.) All goods are processed and marked then placed on the conveyor system and routed to the proper area of the sales floor above. Meats are raised to the sales floor in bulk by a dumb-waiter and there the cutting, weighing, pricing and packaging take place behind the sales counter out of sight of customers.

Suburban office headquarters

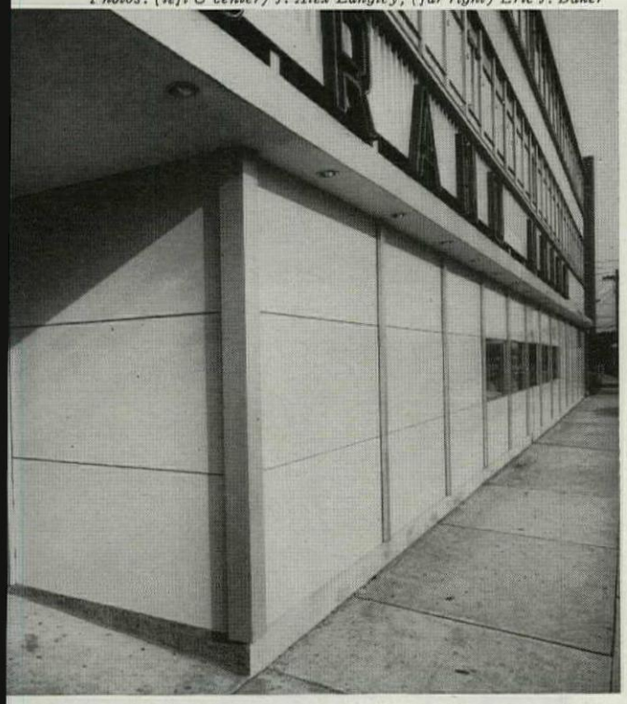
Grand Union's prototype supermarket lies under the watchful eye of high executives of the home office—located in spanking new, air-conditioned quarters above the store. Formerly located in crowded Manhattan, Grand Union was in the vanguard of those companies that have headed for the suburbs to achieve better employee relationships, reduce labor turnover and increase operational efficiency.

The dominant eight-story (24′ x 80′) tower *(see p. 136)* houses the office of the president, lounges, reception rooms and elevator lobbies with the top two floors being used for elevator and air-conditioning machine rooms. Its 24′ width is spanned without columns which gives great flexibility to tower floors.

Three hundred administrative employees and department executives are housed in three-level wings sprouting from both sides of the tower. These office areas were purposely kept long and narrow to insure plenty of natural light (though recessed fluorescents can produce 30 foot-candles at desk level without the aid of any natural light). Common width of the wings is 56′ with one row of columns splitting each wing down the center to produce 24′ x 28′ bays. What partitioning is used in the wings consists of low, freestanding panels with upper portions of glass. Lights in the strip windows are fixed with the exception of one light in each bay that opens to facilitate exterior window washing.

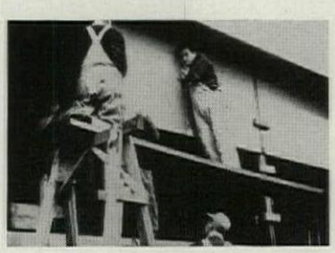
The entire structure (including other retail space in the shopping-center building) is designed so that another floor may be added in the future.

Photos: (left & center) J. Alex Langley; (far right) Eric J. Baker



Prefabricated fluted aluminum panels with 2¼" insulation cover spandrels and comprise the curtain wall for office floors. Only six weeks were required to enclose the entire office area. Speed of erection made curtain walls cheaper than conventional wall structure.

Insulated plywood panels with glazed yellow ceramic on steel form street-level wall of one side of the supermarket. These panels are only 2" thick from finish to finish.



Prefabricated curtain walls

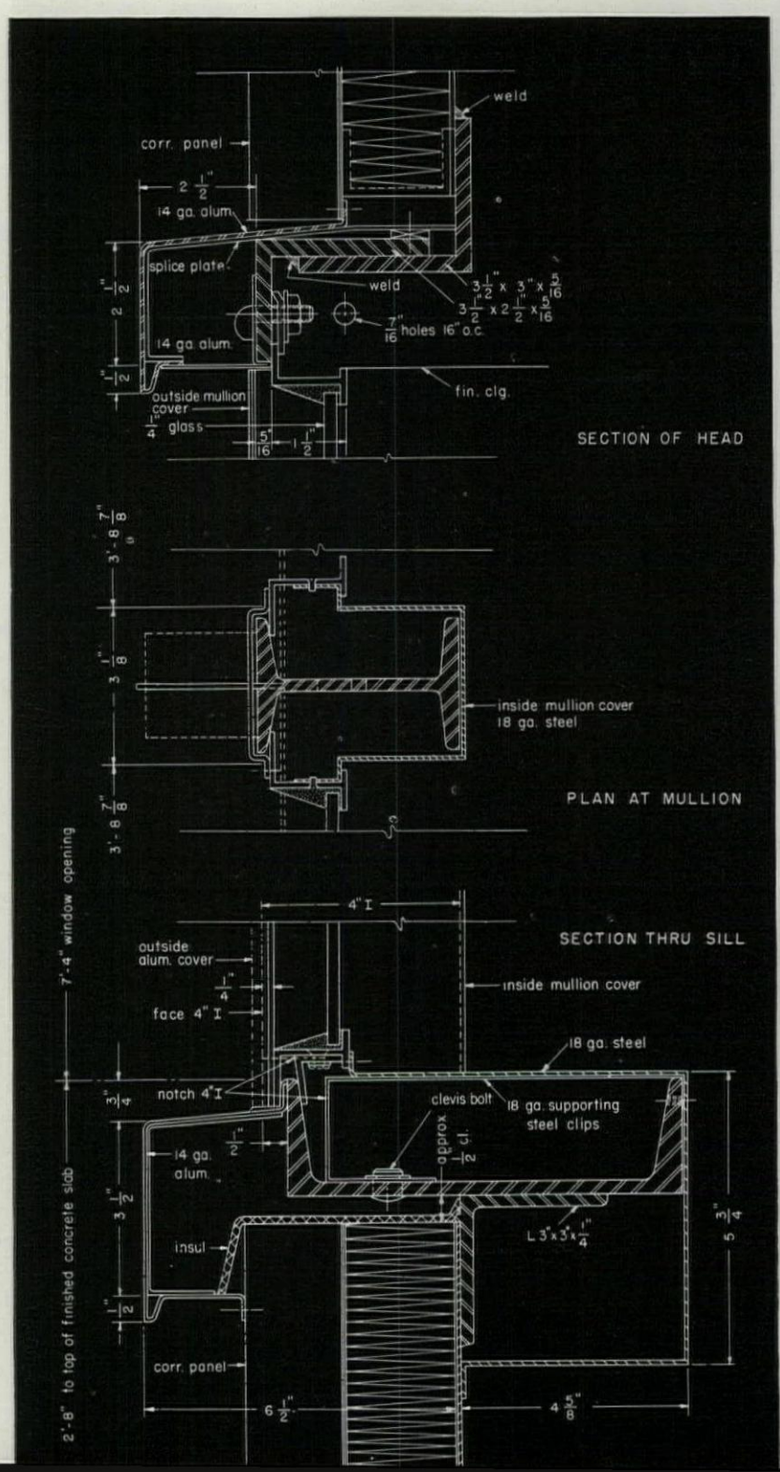
The one-building Elmwood shopping center strikes another blow for light, fire-protected wall construction as opposed to traditional heavy—and expensive—concrete backup construction. In the absence of restrictive codes prohibiting lightweight walls, architects Kelly & Gruzen used curtain walls of prefabricated fluted aluminum panels on all but the end and tower walls.

The prefabricated wall sections are 2′ wide and come in any specified length. Sill, mullion and head details were designed with aluminum exterior finishes to harmonize with the panels. The inside portion of the panel is a 2¼" thickness of spun glass insulation encased in light steel which is simply painted to provide the interior finish.

Delivered cost of the panels was $2.16 per sq. ft. Once the structural steel was in place, panels were speedily erected. Office areas, for example, were completely enclosed six weeks after steel was up.

In contrast to the metal curtain walls on front and rear elevations, end walls of the building and the tower walls are made of brick or precast stone with block backup. Floors are 2" thick concrete slabs poured on metal lath atop steel bar joints spaced 24" on center.

Insulated plywood panels 2" thick with a facing of glazed ceramic on light steel form one wall of the supermarket at street level. Inside face of the panel wall is painted. While delivered cost of these panels was high ($3.50 per sq. ft.) the architects felt it was justified for a decorative, facing material.



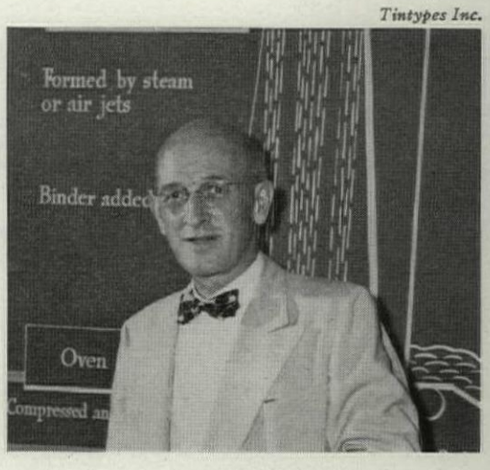
Education for an integrated building industry

If agricultural colleges teach every aspect of husbandry, why are there no construction colleges teaching every aspect of this still bigger industry, to train architects, engineers and builders side by side?

—by Tyler S. Rogers

Technical director of Owens-Corning Fiberglas Corp., past president of the Producers Council.

Tintypes Inc.



There are 178 colleges of agriculture, each teaching all the various branches of husbandry.

But the construction industry, now bigger than agriculture, still has not a single college teaching all its arts and sciences together. Instead we have architectural schools, engineering schools, even a school of homebuilding business.

But still there is a painful lack of appreciation, respect and understanding throughout the building industry between the design professions, the contractor-builder group and the manufacturers and suppliers of materials. It takes years of experience to break down almost instinctive barriers between these three interdependent factors.

Architects know architecture, builders know construction methods, manufacturers know their own and competitive materials. But very often architects do not know enough about building materials and methods to win the respect of these other groups, and very frequently builders and materials men do not understand the problems of the architect sufficiently to deserve the professional designers' trust.

All this division works against the integration of the industry and the best interests of everyone in it.

Divided schools: a divided industry

The cause of this narrowness of interest, I believe, is rooted in our present educational system.

At least there is a striking parallel between these industry schisms and the division of our schools. Each of the arts and sciences which, together with business and finance, must be brought together to create the towns and cities and the buildings we need, is now taught as a separate thing by itself. Each study is isolated from the others by a peculier vacuum of self-interest.

Architecture is taught by methods which tend strongly to create a sense of self-sufficiency. Executive director Edmund R. Purves, in a report to the AIA directors, once said, "The talent for criticism is so highly developed in every architect, and his conviction of personal justification is so ingrained, that he seldom concedes a solution as satisfactory that is not his own."

Engineering is taught by wholly different methods but each branch is, in itself, so complex and requires so much concentration that in the end one type of engineer rarely has adequate comprehension of the scope and significance of the others.

Business administration is taught as science in itself, but you can, if you wish, take courses in engineering administration, building contracting, building management, and hospital, hotel or institutional management, all of which necessarily embrace a general comprehension of the related construction arts and sciences. It is noteworthy that Trinity College's new course in the "Business of Home Building" has been inaugurated by its Department of Business Administration.

Ignorance: misunderstanding

Every architect, engineer, contractor and materials manufacturer knows that each is dependent for his success upon the success of the others, and that his growth depends on the growth of the construction industry. No one can operate alone in this field, and no group can profit largely unless the whole industry is prosperous.

And let us humbly remember that not one of us is really responsible for creating structures. Each project starts with a man who has a need, or an idea. He first gets the help of bankers, realtors and perhaps other businessmen and stockholders who decide that something should be constructed. Only then is an opportunity created for a designer to design, a builder to build, and materials men to produce and sell their wares.

Whatever people do not know or understand they usually fear or distrust.

If one man in the construction industry does not understand another with whom he must work, there is likely to develop a mistrust that automatically defeats effective cooperation.

So I feel that our basic educational approach, in which each of the arts, sciences and businesses essential to construction is taught as an isolated subject, is largely responsible for what our many critics call a backward, inefficient industry.

I don't agree that these critics are entirely right, because the construction industry, in spite of its lack of conscious integration, performed wonders during World War II and has continued to

(Continued from page 164)

LEONARDO: *painter (left) to aircraft engineer (above*

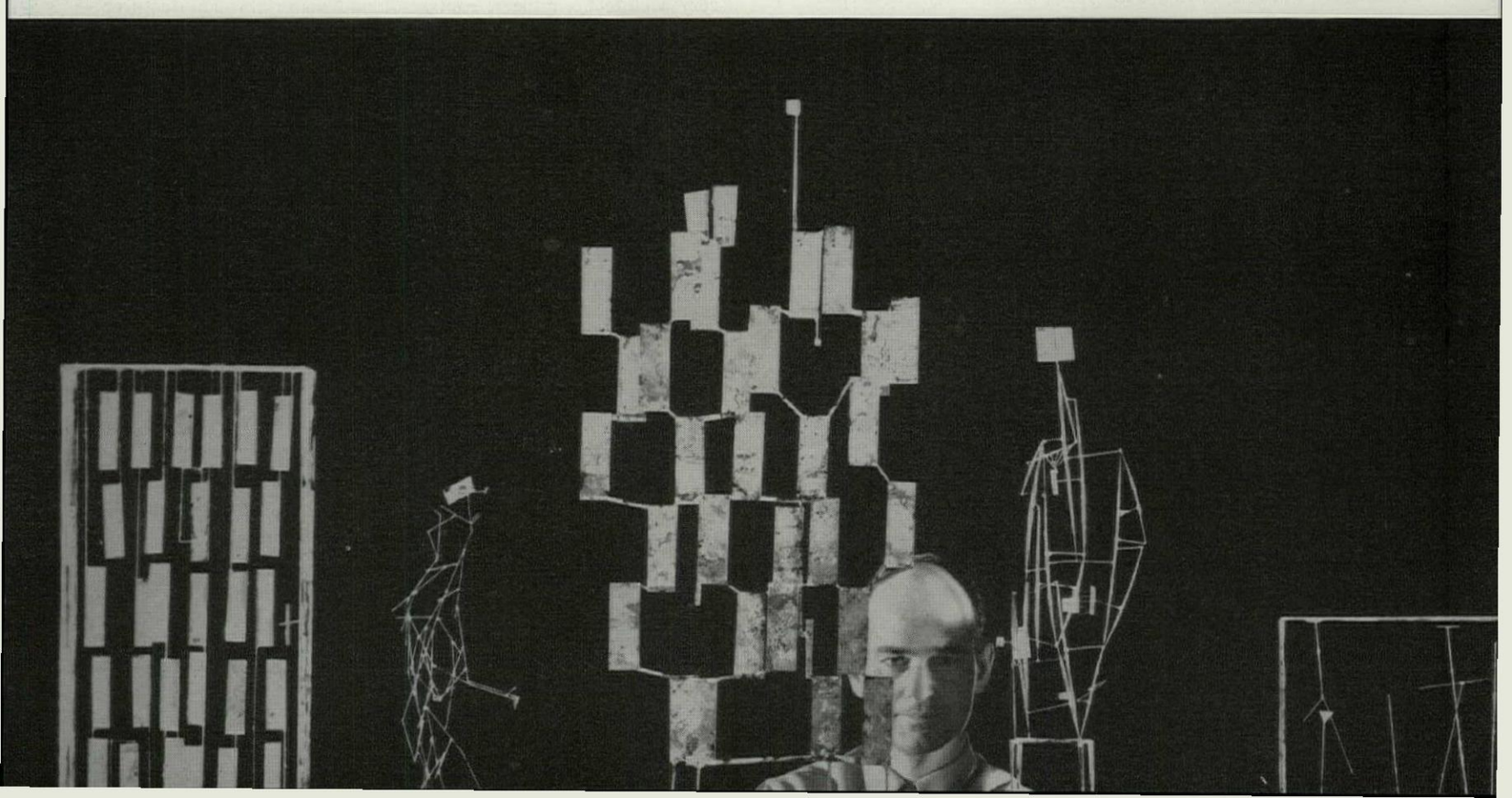
PURE DESIGN RESEARCH

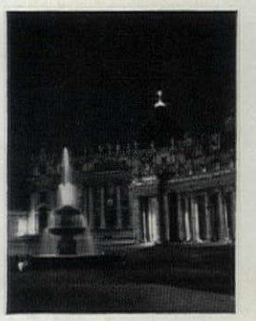
transforms abstract sculpture into new forms for architecture and furniture

The intense young man peering at you through a maze of strange metallic contraptions is a 37-year-old, Italian-born painter, sculptor, designer called Harry Bertoia, who spends most of his time fastening small glittering snippets of sheet metal to pieces of wire, and then fastening these pieces of wire to other pieces of wire. When he has fastened enough of these together, he gets something that looks at first glance either like a garlanded radio pylon, or like a yard full of laundry lines on washday, or finally like a magnificent fish net spangled with strange objects dragged up from the bottom of the sea.

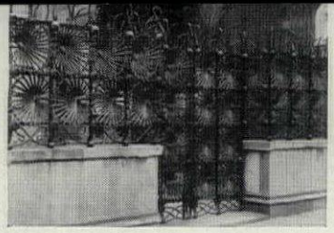
In actual fact—as many critics will testify—Harry Bertoia's work is among the finest in abstract sculpture produced in the US today.

This story, however, is not primarily about Harry Bertoia's sculpture. It is concerned with Harry Bertoia's research into the fundamental principles that unite all the visual arts—sculpture, painting, architecture, applied design. And the story is concerned, also, with the fact that this research for a *pure* art has produced many discoveries directly applicable to architecture and to furniture design.





MICHELANGELO: *sculptor, painter, architect (left and above).*



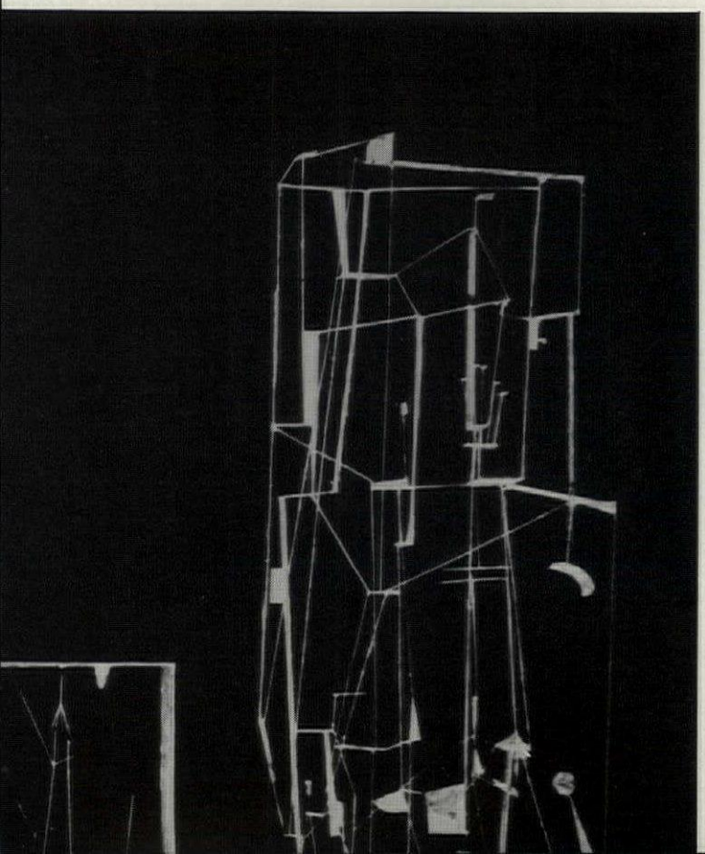
GAUDI: *metal grilles (above, left), wooden chairs (left), sculptured architecture (above).*

LE CORBUSIER: *painter, sculptor, poet, pamphleteer—and architect-planner.*

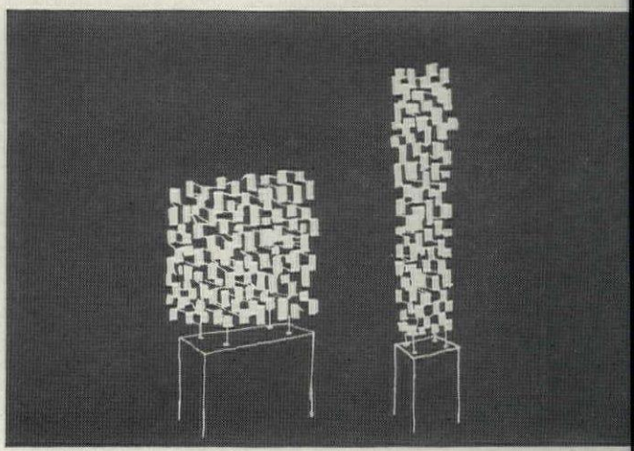
The principle is not exactly new: Michelangelo was known best as a sculptor, next as a painter, finally as a first-rate architect. Leonardo's work in all the so-called fine arts led him to an increasingly active interest in *all* forms and *all* structures—and helped to make him one of the greatest engineers of all times. More recently, the Spanish surrealist sculptor Gaudi produced architecture whose influence upon men like Le Corbusier has been important. And even today Le Corbusier himself spends more time on painting, sculpture and even poetry than he does on architecture itself—for the research into pure form, pure space, pure color, pure rhythm, proves to have a very distinct bearing upon the design of multi-story apartment structures.

But in recent US art history Bertoia is a rare phenomenon. His counterpart in the sciences has long been a familiar sight in big corporations such as DuPont—which employs scientists to engage solely in pure research at the company's expense, on the theory that the by-product of such pure research may well prove practically applicable.

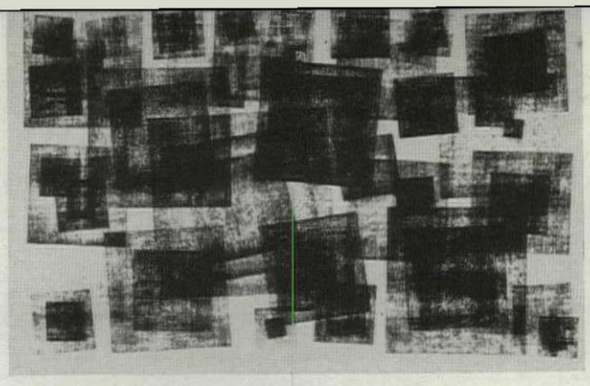
It now turns out that the by-product of pure art may be equally practical. Just as the Duke of Milan realized that a captive Leonardo, doing painting and sculpture, might also hit upon some wonderful new gadgets equally useful in peace or war, so American architects and producers of modern furniture have found that Harry Bertoia is no esthetic recluse, but a man who can give them something they badly need. Two years ago Hans Knoll, who produces the furniture designs of a whole series of artists, architects and designers, set up Bertoia in a barn and workshop in Pennsylvania. There Bertoia pursued experiments in pure art (especially metal sculpture) in the hope that the by-product might some day prove useful in architecture and interior design, and marketable. This month much of that hope was realized: Bertoia's wire chairs are in production, and his architectural screens and grilles have been specified for use—not as decoration *but as integral architectural elements*—in the staff restaurant of a giant US corporation, and in the cocktail lounge of architect Minoru Yamasaki's new St. Louis airport building.



Below: Bertoia's sketches suggest use of spangled screens as light-diffusers in modern chandeliers: pedestals contain light source; beam is directed upward to illuminate metal clusters, give them soft, emberlike glow.



Photos above: Acme Wide World; Pix; Arvix Mas; Nicholé Muller; Life-Nina Leen; Herbert Matter



Abstract lithograph shows how Bertoia plays with simple, related forms in space.

Similar lithograph technique produces patterns intended for use in printed fabrics.

The effect architecturally of Bertoia's screens, which will set up a scintillating kind of interior arbor around the activities which they enclose, hardly needs to be explained. But the new Bertoia chairs shown on these pages may at first seem to have very little in common with the abstract construction pictured next to them. FORUM consequently got Bertoia to talk about them, answer questions about them.

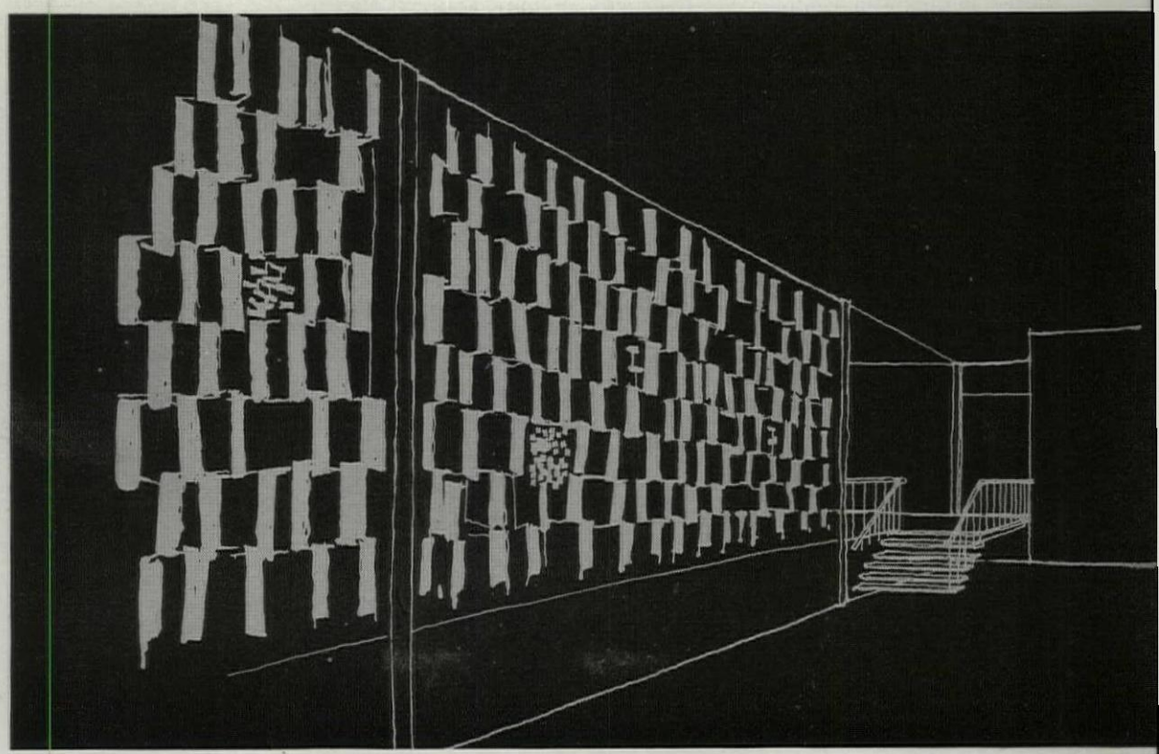
To Bertoia, as this conversation revealed, the chairs and the sculpture are just about the same thing. Said he, "In the sculpture I am concerned primarily with space, form and the characteristics of metal. In the chairs many functional problems have been satisfied first—while the sculptural element is quite nonfunctional. But when you get right down to it the chairs are studies in space, form and metal, too."

Question: Did Bertoia think the chairs ought to look like sculpture?

Bertoia: "Well, I am really in sympathy with the Japanese idea of interior design—that the best furniture is no furniture at all. But if you will look at these chairs you will find that they are mostly made of air, just like the sculpture. Space passes right through them." He made an expressive gesture suggesting space passing through a chair. "Besides, we don't have the Japanese tradition in the West. We need more comfort. The human form can't be redesigned, and chairs that really fit the human form are going to look a little sculptural."

Question: What was the relationship between his abstract sculpture and his furniture design—for example, the chair pictured to the left?

Bertoia: "You'll see that the sculpture is made up of a lot of little units—" pointing to a hexagonal wire frame decorated with pieces of sheet metal—"and these rectangles or triangles or hexagons are added together and produce one large rectangular (or hexagonal) sculpture. The same with the chairs. This chair has a lot of little diamond shapes in its wire cage and they all add up to one very large diamond shape, and this is the shape of the whole chair. It is a really organic principle, like a cellular structure."



Metal screen (right), similar in construction to abstraction in color plate (left), serves as space-divider between related, open areas in a modern building. Bertoia feels that natural light will bounce around within screen and right through it. Result: a screen that provides some visual privacy but does not shut out all light.

New Bertoia chair (left) is shown beside Bertoia sculpture. Chair seat has pivot with rubber "brake" designed to permit movement of an inch or two backward and forward.

Herbert Matter

Question: What about his principles of support?

Bertoia: "Everything should be separated according to function. In the sculpture you have one kind of metal rod, or nails welded and braised together, and that is the horizontal support. It is very clear, there is no confusion. The sheet metal pieces act only vertically—they are held in place by the rods.

"Now in the chairs we have done the same thing. In the chairs there is a strong supporting structure made of rods. Then there is the thing that is supported—a diamond-shaped form or something like it. There is a very clear direction. I like things to be very, very clear in that respect."

Question: Bertoia was known also as a painter. Had his painting influenced his chair design to any extent?

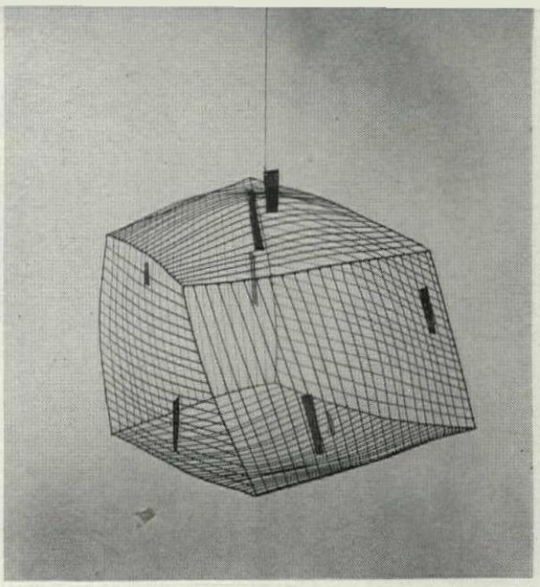
Bertoia: "Only indirectly. I used to make paintings on the most transparent paper I could find—paint just a shape here, leave a lot of space around it, and then another shape and another color there. Then I would stretch the paper on a frame and hang it up against the light. The colors would float in the air, some closer, some farther back. I started to get interested in all these space experiments long ago—at Cranbrook after I had been there a little while—and the floating-in-space idea is now in the chairs too."

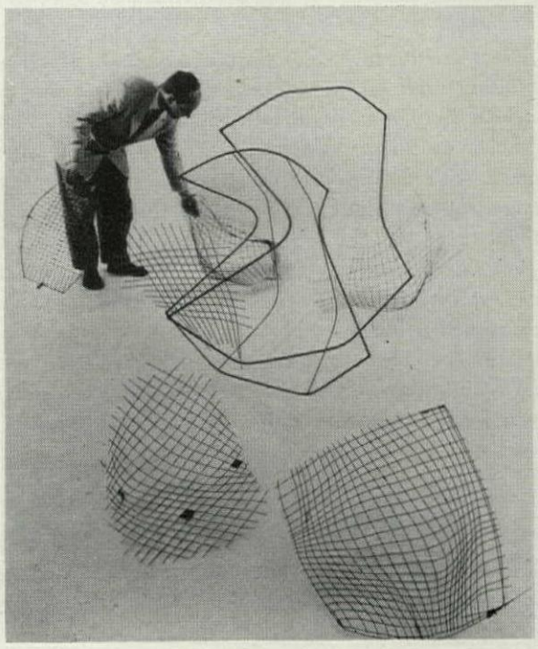
Question: Did Bertoia have more to say about the peculiar occupation of doing abstract sculpture on the one hand and very practical objects on the other?

Bertoia: "Everybody is a specialist now," said he. "I am trying to take in as much of the world as I can. There are many points of contact with other people. A week ago I met a man who did research in cosmic rays. After we talked for a while we found many things in common. This sculpture, especially—" he pointed to a metal frame filled with needlelike objects—"was something we found we both had in common. . . .

"The cosmic-ray specialist could explain it better than I," he smiled cryptically. "But anyway we understood one another perfectly. And at any rate I try to find out as much as possible about anything I do—and sometimes the thing I think has no purpose at all, like this sculpture, turns out to be actually very useful."

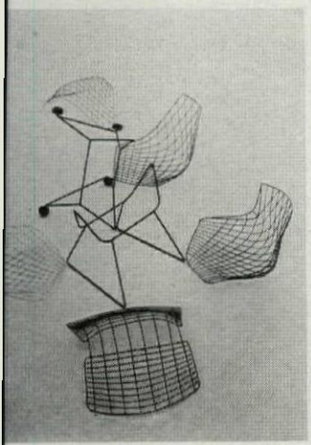
Bertoia is a very busy man. The Knoll workshop has several assistants and they are very hard at work solving practical details for architectural screens no less than furniture. At the same time, Harry Bertoia will continue his researches in pure abstract art for these have paid off handsomely and in design—as well as in the business world—nothing succeeds like success.

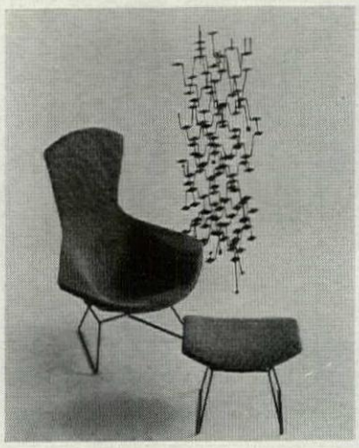


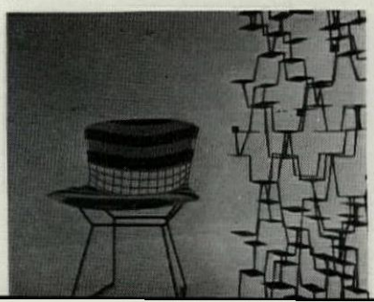


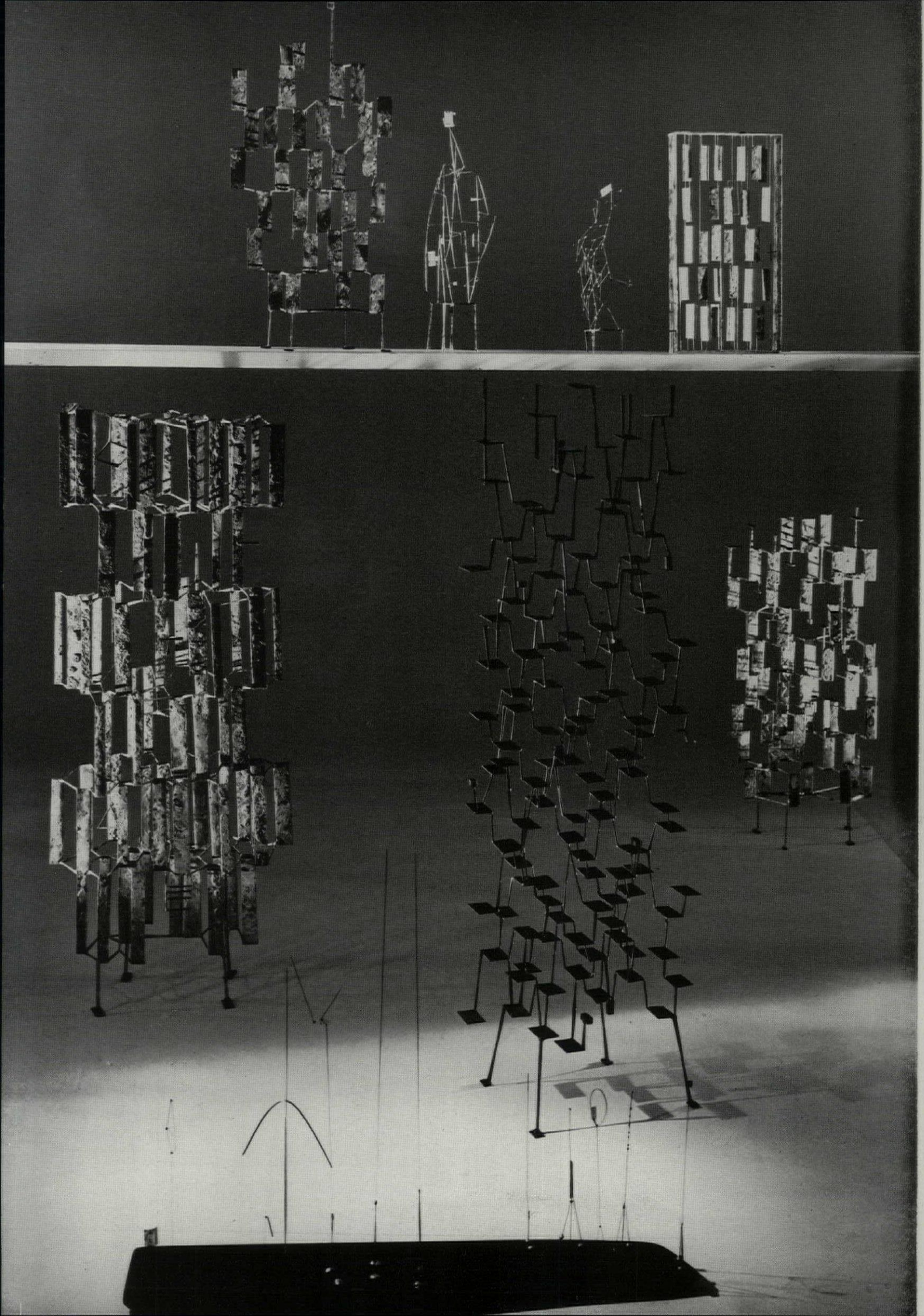
Photos: Herbert Matter Studio Associates Inc.

Pictures on this page show several variations on the basic line of Bertoia chairs. All are made of formed wire supported on a rod frame. Picture at top of page shows typical Bertoia "birdcage" sculpture, very close in spirit to wire chairs now being produced.







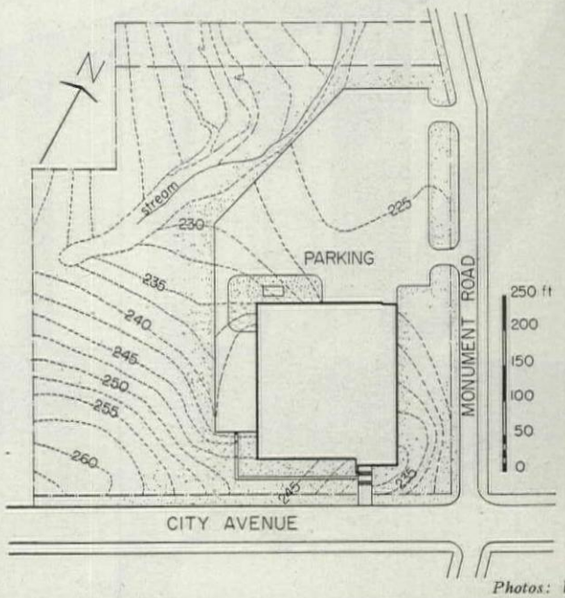


Main floor lobby of WCAU's new suburban station (below) is reached by ramp (above) from lower rear driveway entrance. High windows in these public spaces are only ones in the building.

Photos: William A. Rittase

TV-RADIO CENTER uses special truss to increase studio flexibility

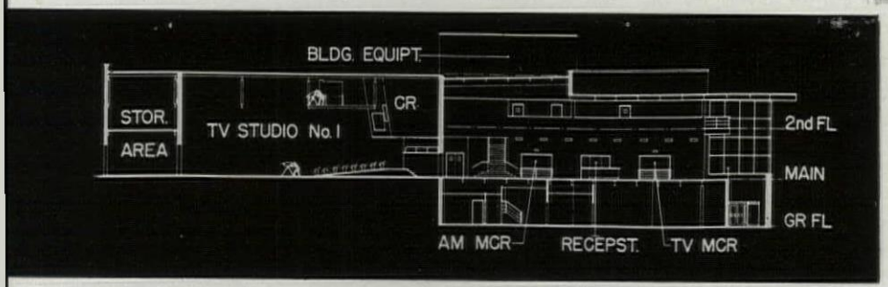
THE AUSTIN CO., designers,
engineers and builders
GEORGE HOWE and ROBERT MONTGOMERY BROWN,
consulting architects



Photos: William A. Rittase

This is the first large building completed that has been designed for large-scale radio-TV broadcasting. In its pioneering, WCAU's new TV-radio headquarters in Philadelphia has met and solved the major problems of this new building type.*

- It solves the problem of operational efficiency with a one-story production wing which eliminates the vertical movement of bulky sets and equipment.
- It solves the problem of limited operation early in the morning and late at night with a small operational block that can broadcast or televise when the rest of the building is closed.
- It solves the problem of flexible space with a specially designed "Tele-Truss." Not only do the 60′ spans clear the studio floor for maximum use, but, being free of diagonal members, the trusses can support platforms, permit free movement for lights and cameras high above the whole area.
- It solves the problem of sound control with studio floor slabs poured on grade to reduce vibration and with studios isolated from the rest of the building by corridors.
- It solves traffic problems with separate corridors for visitors and staff.
- It solves critical power and air-conditioning requirements with dual systems either of which can service the entire building in an emergency.



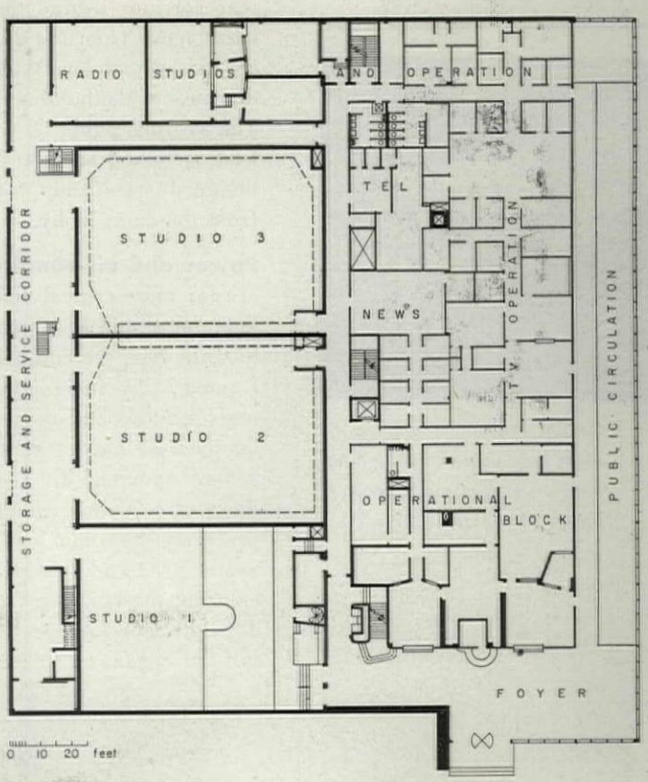
Rear of building (above) provides access to lobby ramp and service facilities on ground floor. Section (left) shows that balance of building consists of single-level studio section and two-level administrative section. In plan (below) note how corridors isolate studio section for sound control.

Operational efficiency primarily concerns the production space. Heart of this area is the trio of large studios isolated by corridors. A 20′ wide storage and service corridor connects the three studios along the side of the building. Thus, the horizontal movement of sets and equipment from one studio to another on the same level is done with the least possible effort. Large opposing doors on either side of the service corridor permit trucks to drive straight into the studios to load and unload.

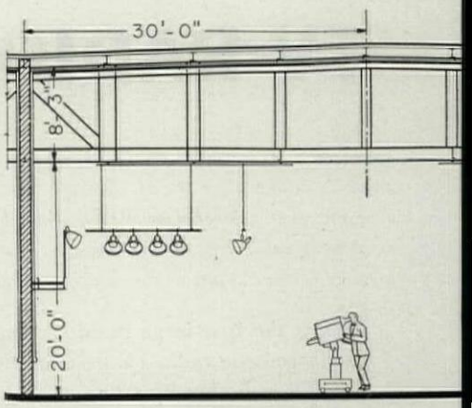
In addition to the three main studios there is a smaller, dual-purpose studio that can handle either TV or radio productions. Three regular radio studios occupy the end of the production wing and these too are separated from the TV studios by a corridor.

A small operational block on the studio level contains master control rooms, news room, news broadcast studio, TV film projection room and record library. This unique area can operate during early morning or late evening hours while the remainder of the building is closed down.

Flexibility attained with the special Tele-Truss (a variation on the familiar Vierendeel truss) is increased with the ability of the

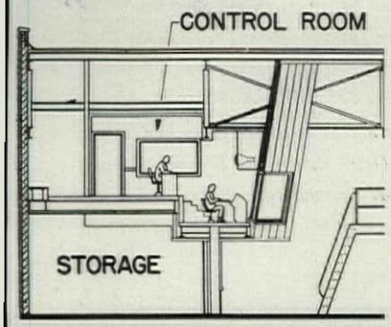


* For an account of CBS's solutions to much the same problems but on a bigger scale *see* the preview of its TV city now abuilding in Hollywood—AF, May '52, p. 101.



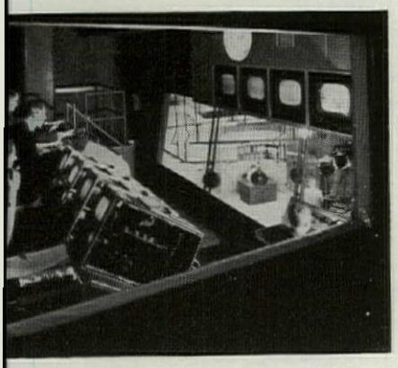
truss—and intermediate struts—to take a suspended load. Thus, battens, lights and even whole sets may be shifted to any part of the studio floor where as many as six productions may be simultaneously set up. Catwalks resting on the lower boom support additional lights and cameras to add even more flexibility to the space.

The concrete floor of the studio was carefully surfaced to eliminate all depressions. Result: Camera and sound equipment may move quickly to any part of the floor while operating. They may, in fact, move from one set to another during a normal station announcement.



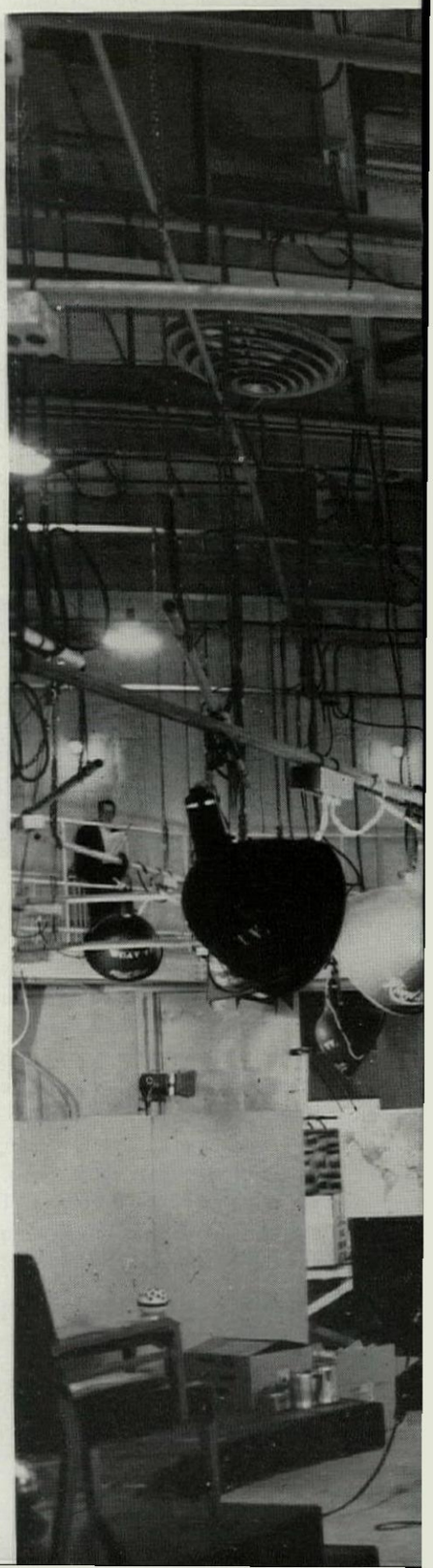
Expansion of production facilities will be simple. In effect the plan is to duplicate the main studio block on the side of the building beyond the service corridor. The added wing will have a service-storage corridor adjoining the existing one. These will be made into one 40′ wide corridor by removing the present side wall. Trucks will still have access from the end of the building.

Traffic control of production personnel was solved by the wide, rear corridor behind the studios. Administrative personnel and talent move from the administrative section (and dressing rooms on the ground level) along the corridor between the two main divisions of the building and so into front entrances to the studios. The visiting public is confined to the lobby and the long ramp leading to it from a rear ground-level entrance. The one studio designed specifically for audience participation opens directly from the main lobby.

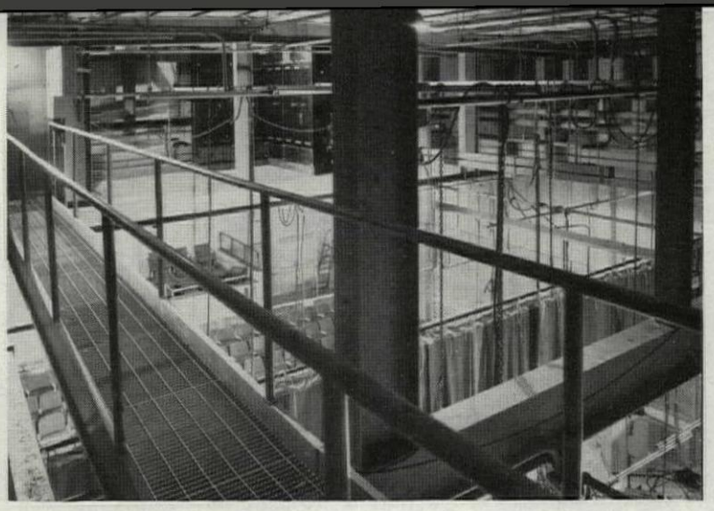


Control rooms above studio floors have slanted, light-inhibiting glass to eliminate glare from bright TV lights.

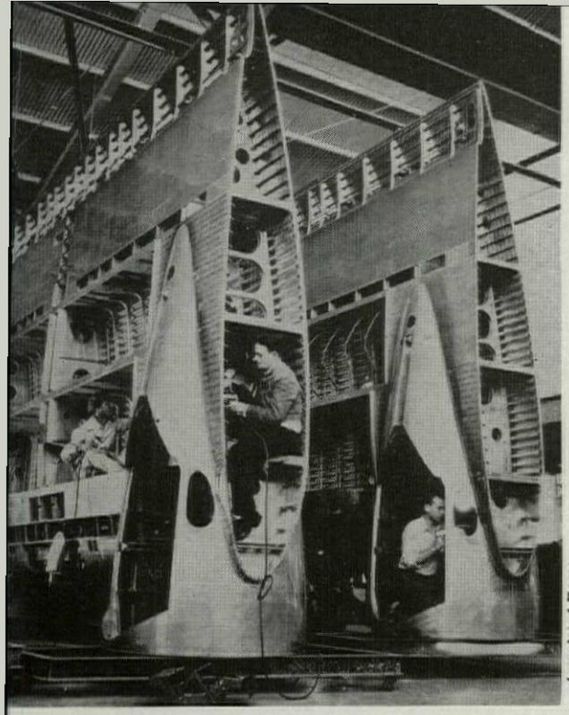
Power and air-conditioning requirements in a TV building are far more critical than in most ordinary buildings. Control of light for studio areas made a windowless building almost mandatory. In fact, the entire building, with the exception of the glass-fronted lobby and ramp space, is windowless. The building obviously must depend on air conditioning and studios with their bright lamps must have a continual supply of conditioned air or they cannot operate. To reduce the possibility of complete breakdown, two 200-ton compressors were installed either one of which can carry the studio load in an emergency. Critical power requirements produced a dual system with two 13,200-volt primaries entering the building from two separate mains and going to two 1,000 kva substations. Each carries half the load and if one should fail the remaining substation could supply the building.



TV-RADIO CENTER



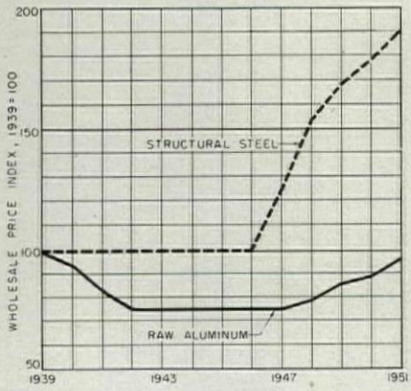
Tele-Truss: *A variation on the Vierendeel truss specially designed for WCAU spans 60' dimension of main studios, is free of diagonal members so equipment and lights range freely on platforms high above the studio floor. Trusses are so designed that they take a substantial suspended load. Lights, battens and even whole sets can be suspended from the lower booms. This flexibility permits six separate productions to be set up on each studio floor. Catwalks through the trusses provide additional vantage points for lights and cameras.*



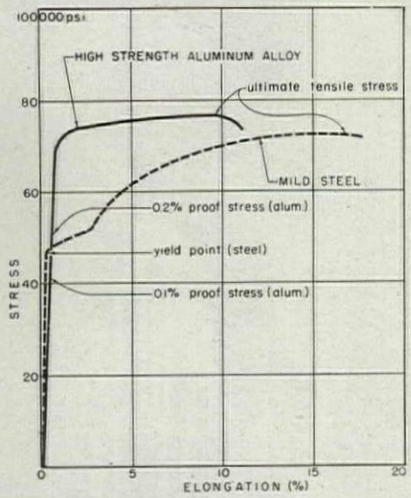
Associated Press

Aircraft design exploits high strength-to-deadload characteristic of aluminum, obtains rigidity through open-webbed joists, continuity and corrugated sections.

PRICE TRENDS *favor aluminum*



STRENGTH CURVES *compare yield points*



PHYSICAL PROPERTIES of mild aluminum and mild steel

	Mild aluminum	Mild steel
Specific gravity	2.7	7.85
Density (lbs. per cu. ft.)	169	490
Elastic limit	30,000-40,000 psi	33,000 psi
Modulus of elasticity	10.6×10^6 psi	29×10^6 psi
Melting range	935-1,215° F.	2,765° F.
Thermal conductivity (at 68° F.)	0.32-0.53 Btu	0.08 Btu
Coefficient of linear expansion	0.000012	0.000007

BUILDING ENGINEERING

ALUMINUM FOR BUILDING

Key metal of the twentieth century

promises to compete with steel as a basic structural material

A study of its many successful applications suggests that aluminum is now ready for employment as a standard structural material wherever its high strength/weight ratio, rapid erection and high resistance to most types of corrosion can be fully exploited. Its cost is still 2½ times as high as steel, but this gap is narrowing *(see chart)*.

In spite of the greater initial cost, engineers have found high-strength aluminum useful in reducing dead load by as much as 65%. They have also discovered that such savings are compounded into bonuses elsewhere—in a building, lighter foundations; in a moving structure, smaller power units. The light metal has proved particularly useful in several types of structures:

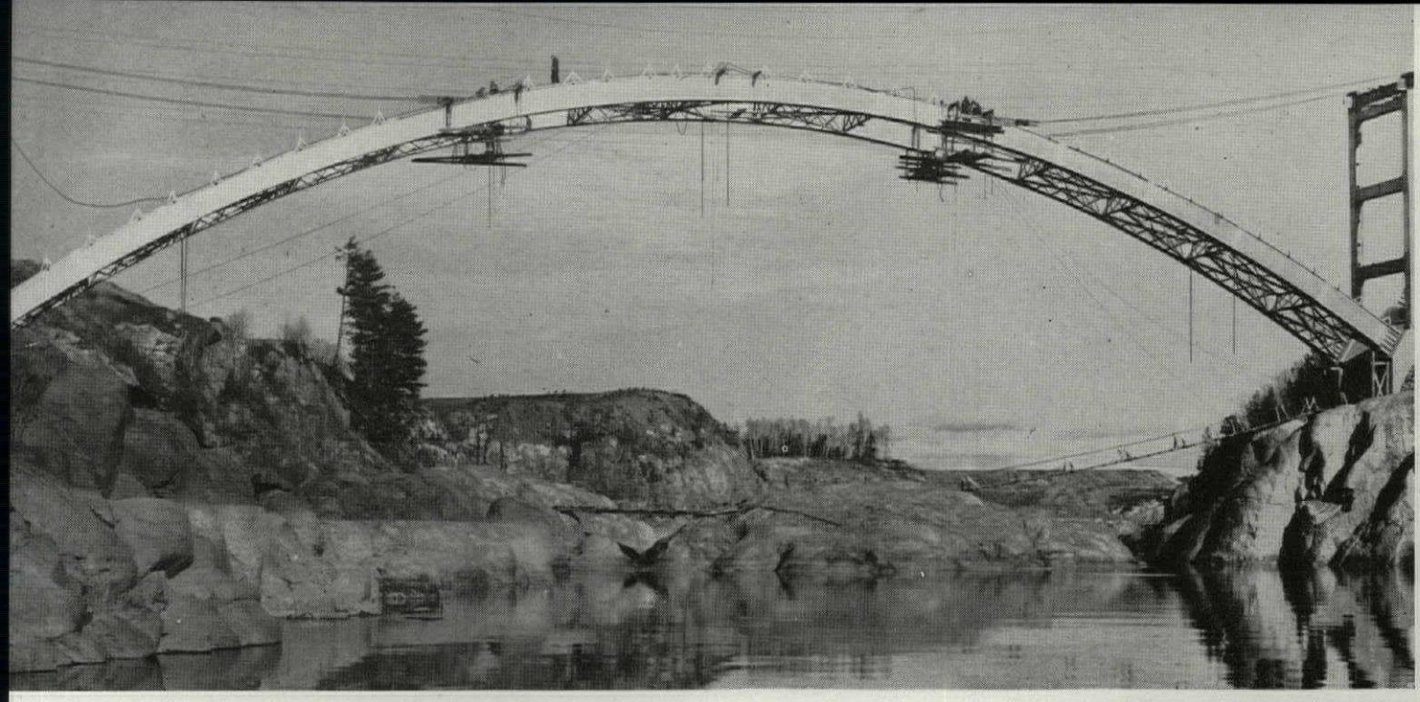
1. *For exposed framing in a corrosive atmosphere*—witness aluminum trusses of a St. Louis locomotive house where original steel trusses were eaten away by sulphurous smoke and had to be replaced every 12 years;
2. *For reducing dead load to permit corresponding increase in pay load*—witness 125 tons of aluminum used in fire escapes for Baltimore apartment houses; also over 2,000 tons of high-strength aluminum used in the liner *United States* to effect a saving of three times that weight in steel; also the Smithfield Street Bridge, Pittsburgh, Pa., where floor steel was replaced by aluminum in 1932 to reduce dead weight by about 1 ton per ft. run, and to give a new lease on life to this 70-year-old, 720′ long structure;
3. *For building additional stories atop existing buildings*—witness the fourth-story extension to Radcliffe Infirmary, Oxford, England; also the new penthouse atop the old Alcan plant at Etobicoke, Canada;
4. *For structures that have to be transported long distances before erection*—witness Vallot's climbers' refuge near the summit of Mt. Blanc, Switzerland; also over 700 prefabricated "permanent" all-aluminum houses, schools, hospitals and office-building units exported from a British aircraft factory to countries as far away as India and Australia where they were erected at prices competitive with comparable local buildings;
5. *For light nonfireproofed roof trusses in single-story industrial buildings using "pin-up" frames*—in such buildings one large erection bolt does the work of several smaller ones and trusses can be erected rapidly by hand assisted at most by light hoisting rigs — witness London airport hangars, England, where hinged portal frames spanning 125′ were assembled on the ground and winched into position.

Basic facts

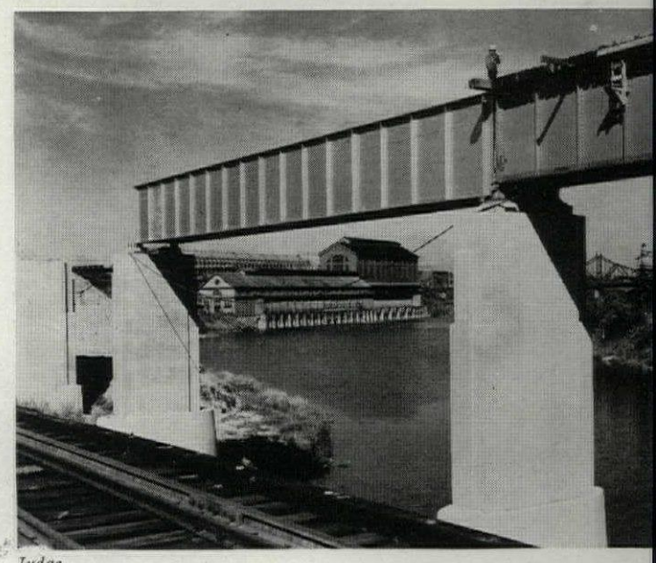
More than 8% of the earth's crust consists of aluminum but, although it is the most common metal known, only high-grade bauxite deposits are worth mining at present. US production was 759,000 tons in 1951 (42½% of world production) and is estimated to double during the next five years. Therefore the price of aluminum is likely to remain stable and might well go down, while availability of the metal will improve.

Pure aluminum is a soft, ductile metal with a strength of 11,000 psi. Medium strength or "mild" aluminum is made by adding traces of magnesium and silicon followed by heat treatment and quenching, which produces the same 40,000 psi strength of mild steel. This is the standard structural aluminum alloy and costs about 40¢ per lb. compared with 6¢ for mild steel. Its weight is only a third that of steel, but its modulus of elasticity is three times as great so that deflections must be carefully examined in designing an aluminum structure. High-strength alloys up to 85,000 psi are made by adding copper, manganese and zinc plus more complex heat treatment.

Aluminum alloys have exceptionally good resistance to corrosion in normal



Arvida bridge in Quebec is built with box girder arch ribs braced with lattice girders. Spanning 290′ with a 24′ roadway this design employed only 206 tons of "mild" aluminum whereas an equivalent steel structure would have required 490 tons of mild steel. Low maintenance cost of aluminum is expected to offset higher initial costs in relatively few years.



Grasse River bridge, Massena, N. Y., used one 100′ span of aluminum 10′ deep. It uses 26½ tons of structural aluminum vs. 64 tons for equivalent steel spans.

Judge

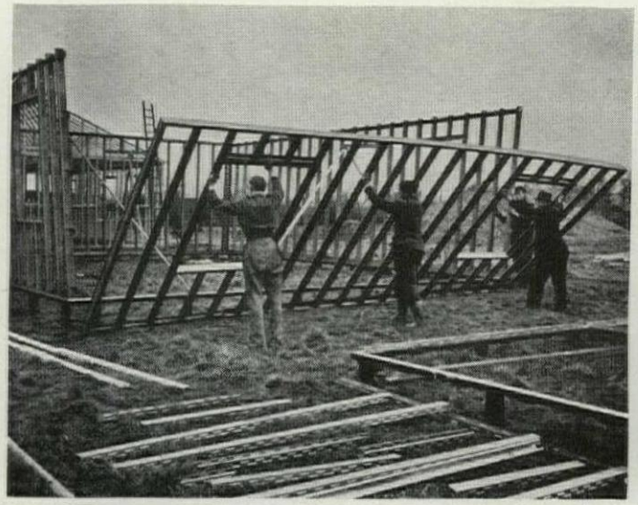
structural applications. Forty years ago aluminum was used to roof a gasworks in Germany; examination in 1946 showed accumulation of coal dust, ammonia condensates, sulphur acids, but no adverse effect on the metal. This is because surface corrosion of fresh aluminum forms a protective film of aluminum oxide which bonds closely to the parent metal and prevents any further oxidation. Galvanic corrosion occurs between aluminum and other metals (except zinc), therefore dissimilar metals should not be in contact, copper nails should not be used with aluminum and steel bolts should be galvanized. Alternatively, dissimilar metals can be insulated by using impregnated felt upon zinc chromate paint. Aluminum is also liable to attack from alkalis; if it is likely to be in contact with fresh mortar or concrete the metal should be coated with a bituminous solution.

Aluminum alloys vary in their resistance to corrosion. High-strength alloys containing copper, for instance, offer poor resistance to sea water. Designers should consult with manufacturers on the optimum alloy to employ under unusually corrosive conditions.

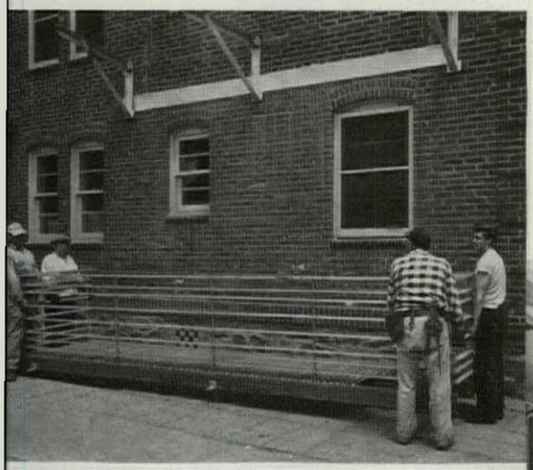
Experienced structural engineers believe aluminum is equal to steel in fire resistance despite the lower melting point of the light metal. A fully loaded steel structure can withstand 850° F. compared with 450° F. for an aluminum structure. At temperatures above these, the metal, while it does not melt, loses strength and buckles easily. However, since the heat conductivity of aluminum is five times that of steel it could take considerably longer to heat an aluminum frame to 450° F. than a corresponding steel frame to 850° F. because of the more rapid dissipation of heat. Fire underwriters both in England and the US recognize this fact and rate

Aluminum locomotive house trusses in east St. Louis, Ill. replace previous steel trusses that only lasted 12 years in highly sulphurous atmosphere.

Lightweight aluminum trusses frame fourth-story extension to Radcliffe Infirmary, Oxford, England. They are made of extruded sections, were erected quickly with light hoisting rigs.

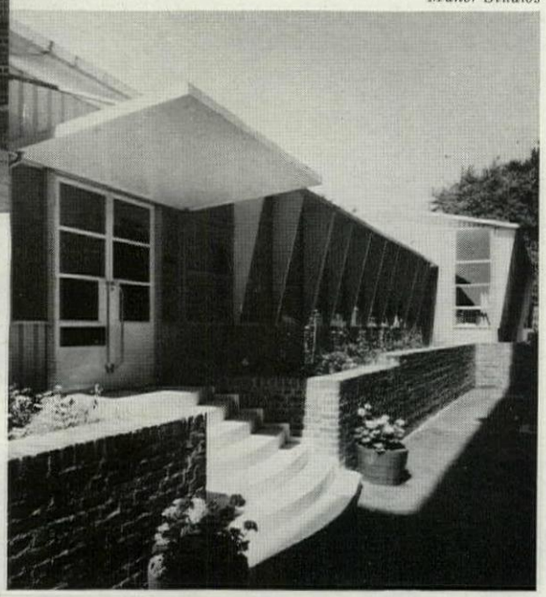


Lightweight aluminum house frames can be assembled on the ground and easily manhandled into position. To be economical aluminum designs must take full advantage of prefabrication.

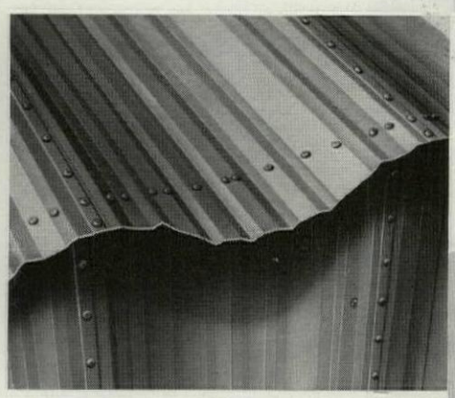


Aluminum fire escapes were approved for use in Baltimore, Md., apartment houses. A total of 125 tons of mild aluminum was employed.

Manor Studios



Prefabricated aluminum school was produced in Britain. Built in prefabricated modular sections, over 700 similar schools, hospitals and houses have been exported as far as India and Australia at prices competitive with local buildings.



Frameless aluminum utility buildings built in Nebraska exploit the rigidity of corrugated sections, corrugations being 4′ apart and 7½″ deep. Cost of a 52′ x 100′ x 15′ building is $8,710 f.o.b. in 18-gauge aluminum, comparing favorably with $7,141 f.o.b. cost of 18-gauge steel building in view of lower transportation and erection costs.

Bureau of Mines

aluminum structures the same as steel ones for single-story applications where no fireproofing is required.

Design of aluminum structures

When steel was first used as a structural material in building it was expensive to produce but cheap to fabricate as compared with other materials then in use. Structural aluminum is in a similar position today. To get the greatest value out of this expensive material, designs should employ as little of the metal as possible and make full use of today's highly developed extrusion and forming processes to produce framing members that can be easily handled, transported and erected.

To avoid nullifying the strengthening effects of heat treatment most aluminum alloys have to be shaped cold, a difficult and costly business to be avoided by choosing structural members that can be shaped at the mill where they can afterward receive heat treatment. As the builders of the liner *United States* learned, shaping of aluminum beams or plates at the job site will prove inefficient and costly. Extrusions are the most economical of aluminum members and can be produced up to 15″ in diameter and up to 40′ long. Many standard structural shapes are now available in mild aluminum and all the large aluminum manufacturers publish design handbooks giving the properties of each member.

Unlike steel, aluminum alloys do not exhibit any sudden yield point and the stress required to produce a permanent elongation of 0.2% (called 0.2% proof stress) is taken as the basis for permissible loading. The yield-point stress for steel is about half its ultimate tensile stress; the 0.2% proof stress for aluminum is about two thirds its ultimate tensile stress. Compressive stresses of aluminum alloys are at least as great as tensile stresses, while ultimate shear stresses are 60% of ultimate tensile stresses.

Modulus of elasticity of mild aluminum is only one third that of mild steel. Therefore a mild aluminum beam will deflect three times as much as an identical steel section for the same loading. Very often deflection is more important than stresses in the metal. To reduce the deflection of the aluminum beam to that of the steel beam, the depth of web must be 1.8 times as great. Alternatively thicker flanges may be employed or continuous design used in place of simple design (deflection of a simply supported aluminum beam is five times that of the same beam when the ends are fixed).

Proper design of an aluminum beam can save almost 50% in weight of material, giving no more deflection than an equivalent steel member. For tension members the weight saving of mild aluminum vs. steel is 66%; for struts 50%. Weight of an aluminum frame or truss is therefore between a third and a half that of an equivalent steel frame.

Weight of aluminum required can often be still further reduced by using the more efficient shapes and thinner sections permissible (there is no need to allow extra thickness for possible corrosion as is the practice in steel design).

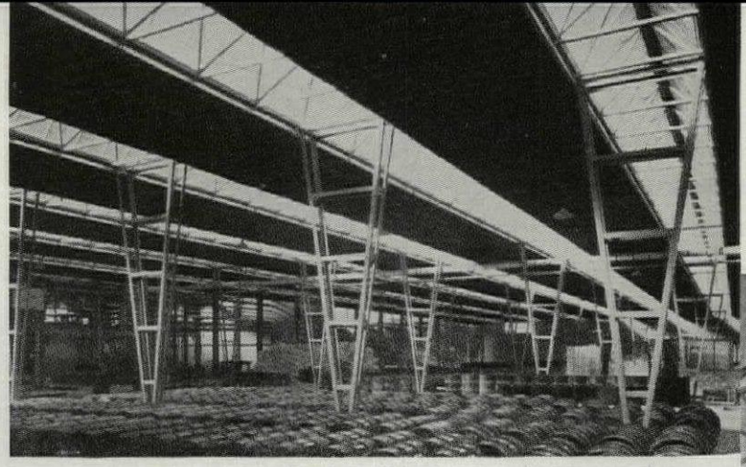
Expansion of aluminum is twice that of steel, which makes it difficult to marry the two metals within the same structure. This problem was encountered in building the liner *United States* (AF, July '52, p. 119); the solution was to lay aluminum deck plates during the sunny part of the day so they would be fully expanded.

Aluminum's best use

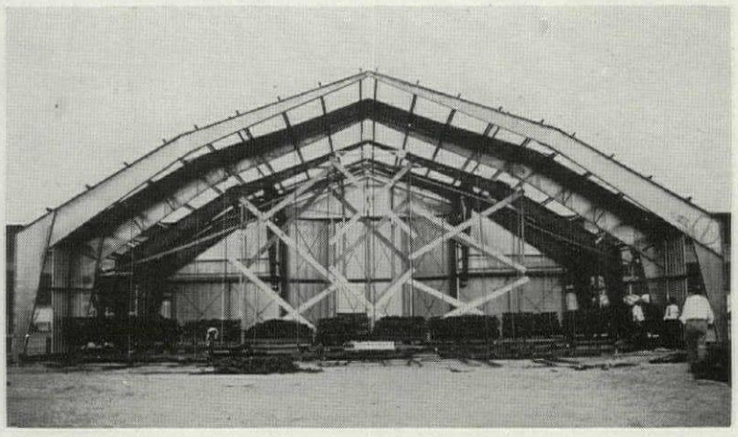
Optimum use of aluminum is achieved when both structural components and nonstructural ones can be integrated into a single space frame. This was done in frameless utility buildings manufactured in Nebraska where rigidity is provided by using corrugated aluminum sheet in the walls and sloping roofs, the corrugations being 4′ apart and 7½″ deep. Another interesting example is the clerestory roof trusses spanning 42′ in a factory at Cambridge, England.

Being more ductile and so much lighter than steel, mild aluminum can be cut and connection holes drilled much more quickly. Against this advantage must be set the fact that US fabricators are not experienced in handling this new material and their contract bids will be higher.

Welding or flame cutting of heat-treated alloys is not advisable because of possible loss in strength. Sheet aluminum can easily be cut with a wood saw. Holes are drilled twice as quickly as in steel and connections are made with aluminum bolts or cold-driven rivets up to ⅞″ diameter.

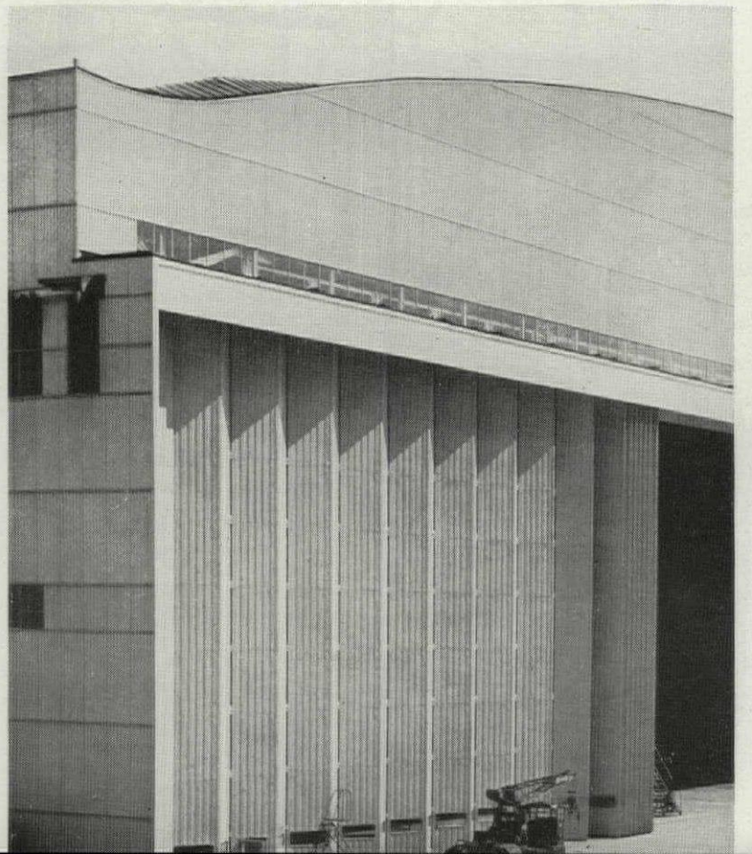


Aluminum space-frame clerestory trusses span 42′ in factory at Cambridge, England. V-shaped columns are of steel; upper surfaces of aluminum trusses are glazed, demonstrating integration of structural and nonstructural units.



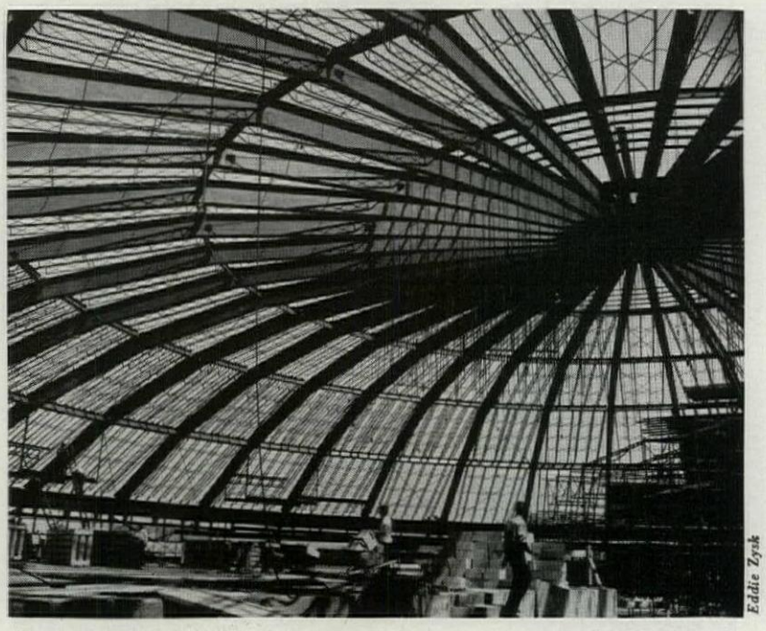
Aluminum alert hangars similar in design to steel hangars (AF, June '52) for USAF for air transportation to remote fields. Picture shows aluminum frame satisfactorily undergoing load tests of 90 psf.

World's largest moving door is that of Brabazon Assembly Hall at Bristol, England. It is 1,045′ long x 65′-9″ high and is comprised of 32 load-bearing folding leaves of aluminum sheet and extrusions. Weight is 200 tons.

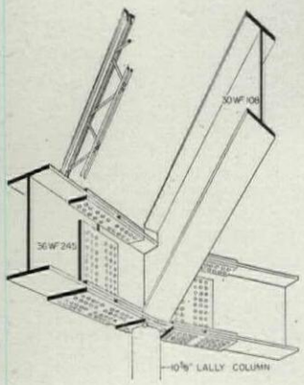


ECONOMIES IN DOME CONSTRUCTION

Two simple radial designs in US compared with complicated spherical design in Britain raise question: "Can you cut costs better in the office or on the site"?

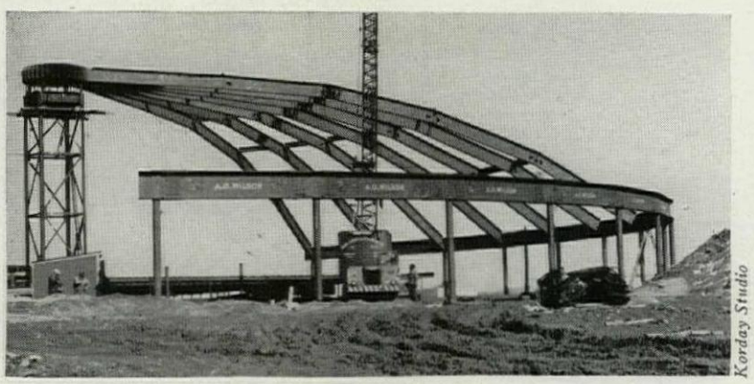


Eddie Zysk



Construction of 222′ diameter steel dome at Framingham, Mass. used ribs 30″ WF 108 lb. at 10° intervals with 36″ WF 245 lb. ring girder.

Heavy compression hub at center of dome facilitated erecting arch ribs.



Kordax Studio

Similar steel dome spanning 123′-10″ was built at Ford's new Research and Engineering Center, Dearborn, Mich. Arch ribs are spaced on 20° intervals. Total weight: 250 tons excluding concrete plank roofing. Erection two weeks.

Two steel domes newly completed in the US and the huge aluminum dome built for the Festival of Britain in 1950 permit a comparative analysis of structural efficiency versus speed and simplicity of construction.

Spanning 222′ and 123′-10″ respectively, the steel domes of the Framingham, Mass. shopping center and the Ford Research and Engineering Center at Dearborn, Mich. are both framed with radial arch ribs meeting at a compression hub at the center of the dome. This puts the heaviest weight of steel at the center where it is least desired but greatly simplifies design and erection.

In contrast the 342′ dome in Britain is composed of two-hinged arches intersecting in three main directions to form a series of equilateral spherical triangles, with 60′ sides, avoiding any concentration of metal in a manner similar to Buckminster Fuller's "geodesic" dome (AF, Aug. '51, p. 144).

The Framingham dome was erected in four weeks and employed 25 lbs. of steel per sq. ft. of area covered; Britain's dome was framed in 29 weeks and took 4.1 lbs. of aluminum and 2.3 lbs. of steel (in the ring girder)—a total 6.4 lbs. of structure per sq. ft. covered. Fuller claims a weatherproof geodesic dome spanning 411′ would use only 1 lb. of aluminum per sq. ft. The great variation between these figures reflects the controversy among structural designers about the most efficient way of encolsing space.

US design saves labor

Nothing can be simpler than the design and erection technique used in the Framingham and Ford steel domes. First the compression hub is positioned atop scaffolding. At Framingham it was 14′ in diameter and 58′ off the ground. Then the steel ring girder is erected on 30′ high lally columns and, once a large enough segment of the ring girder is up to make it structurally self-supporting, prefabricated rib arches are swung into position between ring girder and hub, to be tied with crossbeams and diagonally braced with ⅞″ tension wires.

At Framingham the ring girder, weighing 95 tons, is built of 36″ WF 245-lb. girders with 35 arch ribs spaced on 10° centers. These are 30″ WF 108 lb. girders with 12″ tie beams. The dome is designed for a combined live and dead load of 95 psf and took 440 tons of steel, excluding a 20-gauge steel deck weighing 50 tons.

Architects for the Framingham dome were Ketchum, Gina & Sharp; for the Ford

Fuller Research Foundation

Buckminster Fuller's geodesic dome with aluminum struts and plastic surfacing material cuts weight of structure to 1 lb. per sq. ft. of enclosed area.

dome Vorhees, Walker, Foley & Smith; Severud-Elstad-Krueger were the structural engineers for both.

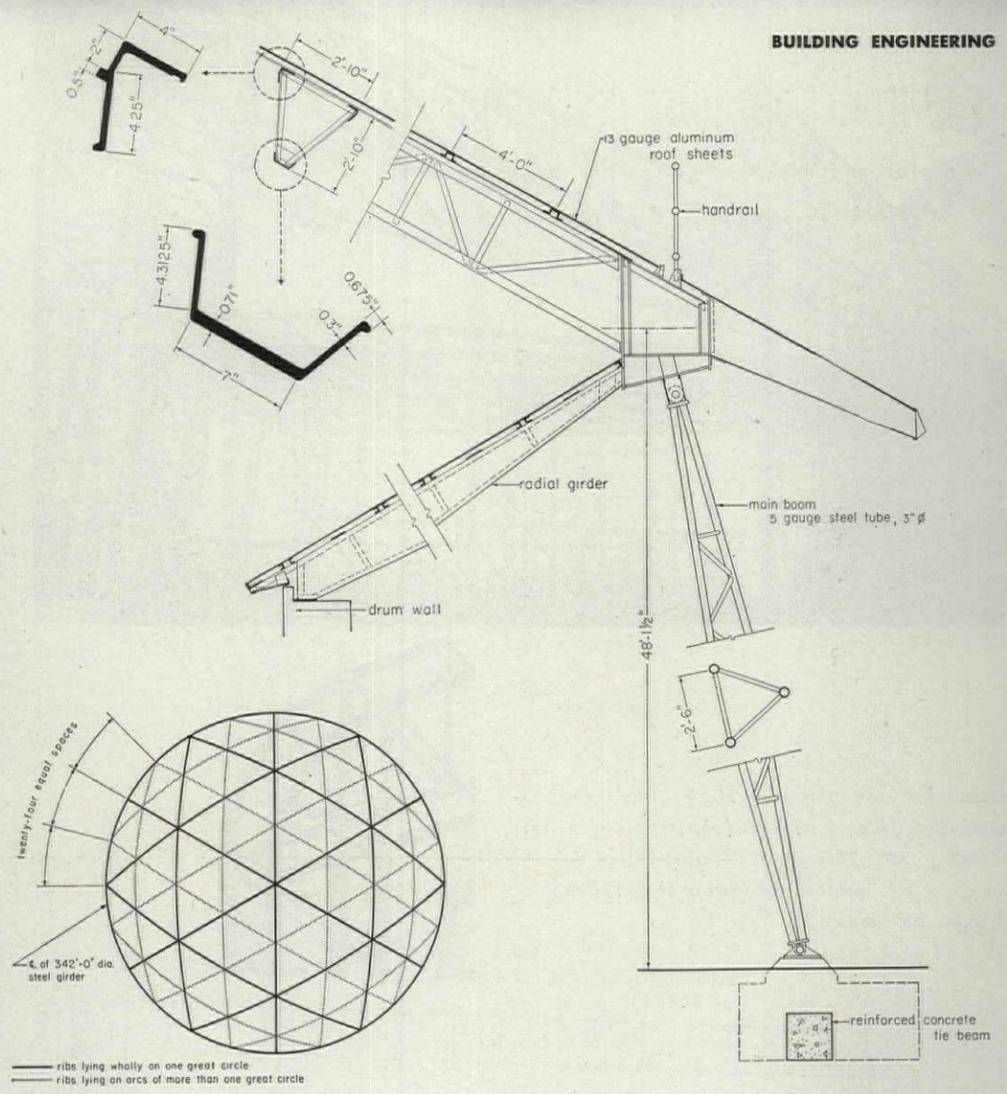
British design more efficient

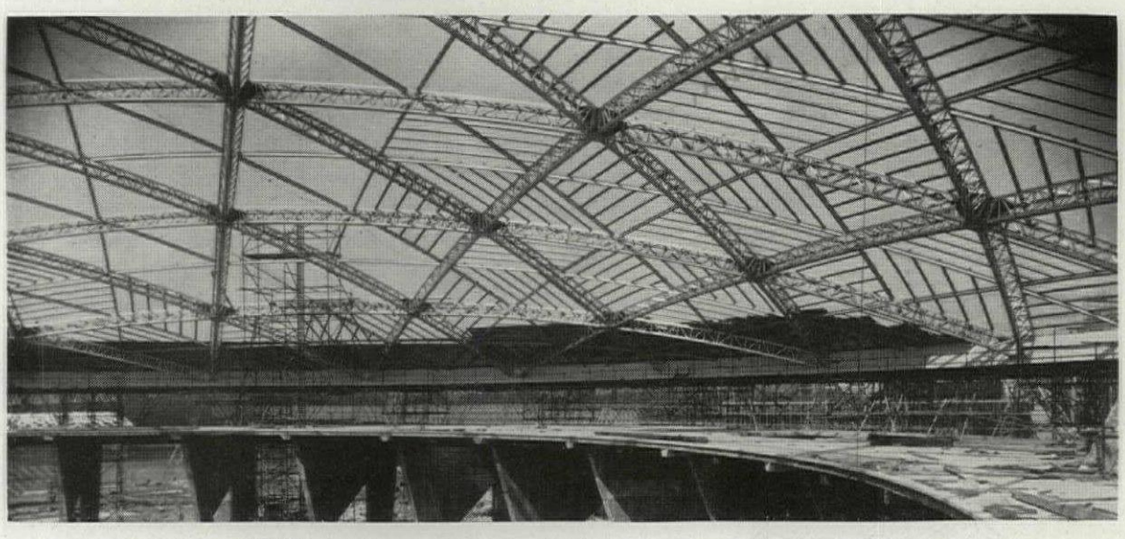
Though its span of 342′ makes it the largest dome ever built, Britain's Dome of Discovery weighs only 322 tons (aluminum framing ribs, 82 tons; aluminum roof rafters, purlins and 12-gauge sheeting, 128 tons; steel ring girder, 112 tons). In terms of pure structural efficiency, therefore, it is four times as efficient as the best US steel dome (6.4 vs. 25 lbs. per sq. ft. covered). On the other hand the design analysis of this statically indeterminate frame with its 300-odd degrees of redundancy* would frighten all but the most persistent of engineers, and since there are hardly any identical members this lack of repetition would drive contractors' bids up to prohibitive heights.

That such a design is built in Europe but not here illustrates the difference between the two building economies. In Europe building materials are scarce and extremely high priced; our materials are relatively plentiful but our labor is expensive. Therefore in the US fine, meticulous design calling for careful, laborious erection is costly. It is far cheaper to throw in a great many more tons of steel or a great many more bags of cement.

Once the British engineers had selected the system of intersecting arches, the problem was to find a way of reducing cost and erection of the vast number of different members (as Fuller points out, in this technique the relation of weight vs. span forms

(Continued on page 172)



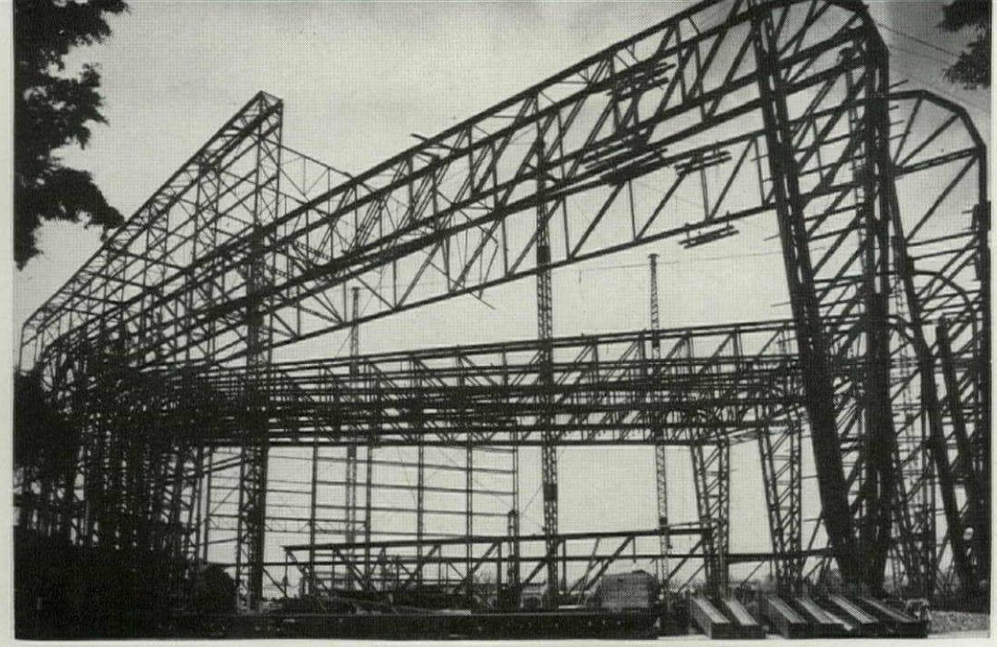


Main arch ribs of British dome (left) are constructed on great circle arcs to simplify fabrication and erection. Scaffolding was employed only for these arches, which then provided working platforms for rest of the 342′ span dome. Above, detail showing edge of dome.

This finely engineered dome employed only 180 tons of structural aluminum and 100 tons of steel (in the ring girder), only 6.4 lbs. per sq. ft. of enclosed area.

Weight of the roof structure is supported by cigar-shaped tubular steel struts, hinged at both ends to permit full expansion of the dome.

* Redundant structures possess more internal members than are essential for their stability; consequently their analysis involves study of deformations of the frame, usually an extremely complicated and lengthy procedure.



White Studio

WELDED FRAMES SPAN 328′

Mexico City's huge auditorium roof is supported by eight 260-ton two-hinged rigid frames whose tonnage was reduced 50% by welding

Built over Mexico City's swampy subsoil, this 18,500-seat auditorium had to be "as light as human ingenuity could make it." By spanning it with welded, open-web, bihinged rigid frames the engineers claim to have cut steel tonnage 50% under a conventional riveted design. In all, the structural frame and roof contains 2,600 tons of steel—45 lbs. per sq. ft. of floor covered. Total weight of the building is 4,750 tons.

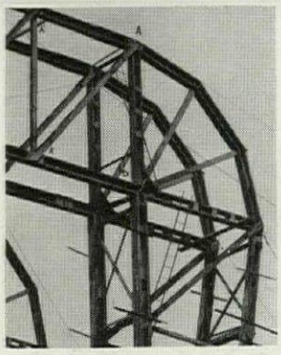
In plan this auditorium takes the shape of a 340′ sector radius. Roof, sidewalls and galleries are supported by eight bihinged welded steel frames radiating from behind the stage (where they are 11½′ apart) to the rear of the auditorium (where they are 51½′ apart). The largest two frames in the center span 328′, breaking by 3′ the previous record for welded arches set in 1941 by the 325′ span, two-hinged welded arches of a US navy blimp hangar. This 328′ span is still far short of the 377′ record for riveted frames set two generations ago by the three-hinged arches of the *Galerie de Machines* at the 1889 Paris International Exhibition.

Each welded frame is a box truss whose sides are held 8½′ apart by two types of wind bracing: 1) Upper and lower flanges are connected in the horizontal plane by members inclined alternately in opposite directions. 2) Vertical frames are braced by two diagonals at each stanchion. The trusses are supported by rigid knee joints leading down to tapering end columns where the latticed flange of the beams becomes the web of the box frame as it nears the base. Hinges are made of 9½″ nickel steel pins fitted into a welded clevis built of 2¾″ steel plate.

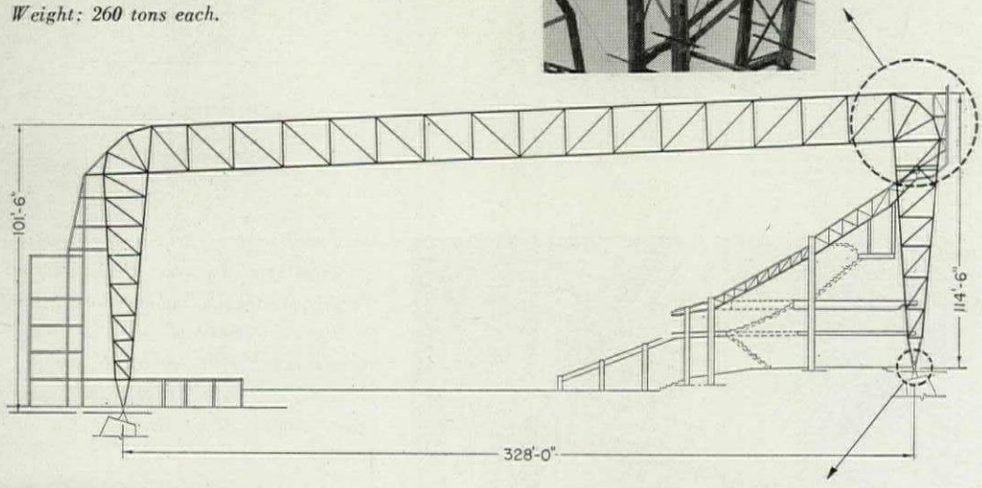
Opposite the stage are three tiers of balconies and behind them a gallery area, the framework of which is connected to the truss columns through hinges so that no movement is produced on the columns and yet reinforcement is provided to withstand seismic loads as required in Mexican building construction. Below this gallery are a second-floor foyer and a ground-floor restaurant.

Frames were erected in sections 79′ long weighing between 10 and 16½ tons. Columns including knee sections were erected first, then the horizontal beams were skip welded in position.

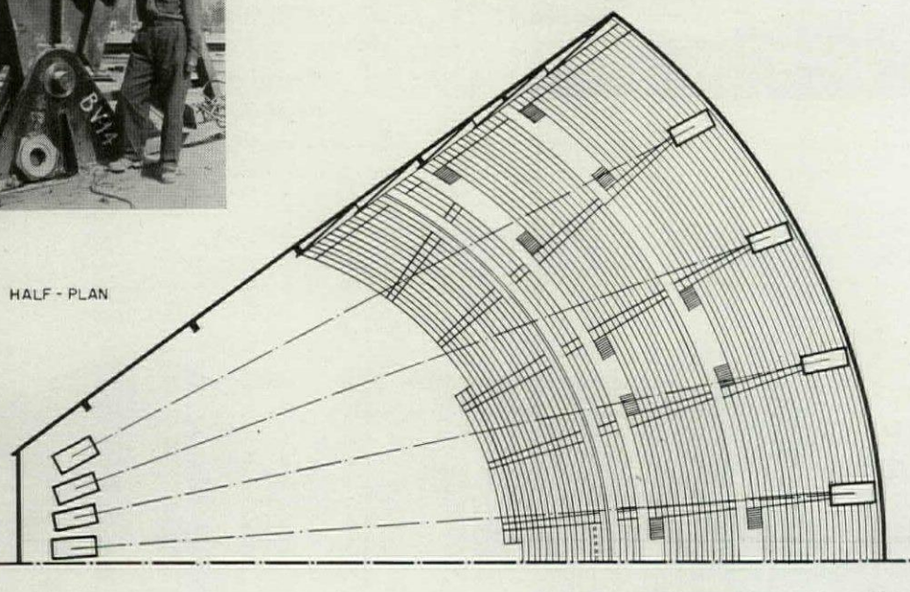
Design, fabrication and erection was by Macomber de Mexico, S. A. Total cost: $20 million Mexican ($2,300,000 US).



Skipwelded steel frames of Mexico City's new auditorium radiate from behind the stage in spans of 305′ to 328′. They are 11½′ apart behind the stage and 51½′ apart at the front of the building. Weight: 260 tons each.



Frames are hinged at each end, rigid knee joints taper down to a solid web as it nears the base. Total weight of this 108,000 sq. ft. structure is 4,750 tons. Steelwork used a total of 138 tons of weld metal.



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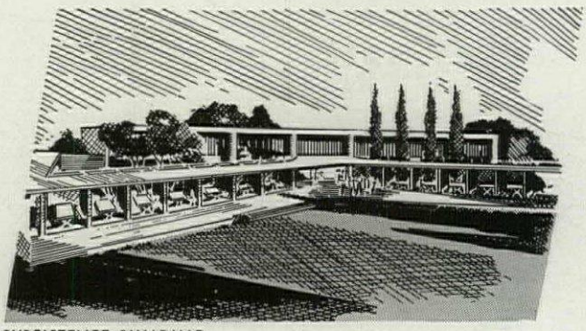
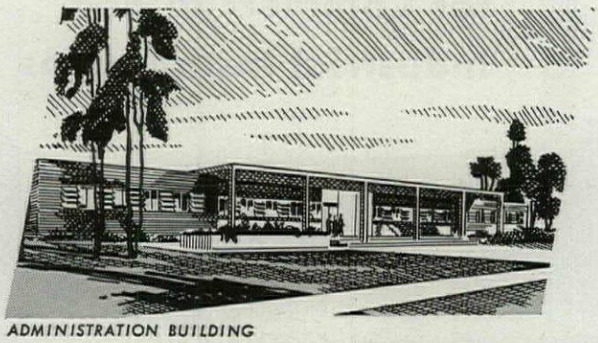


SUBSISTENCE BUILDING



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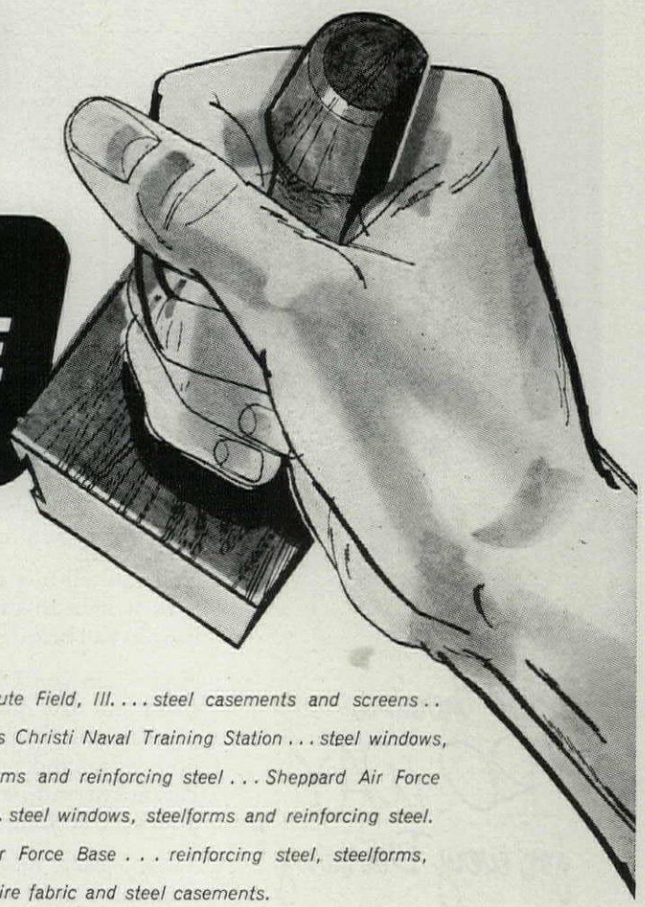
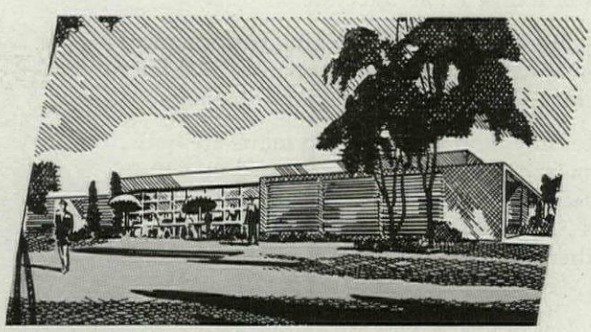
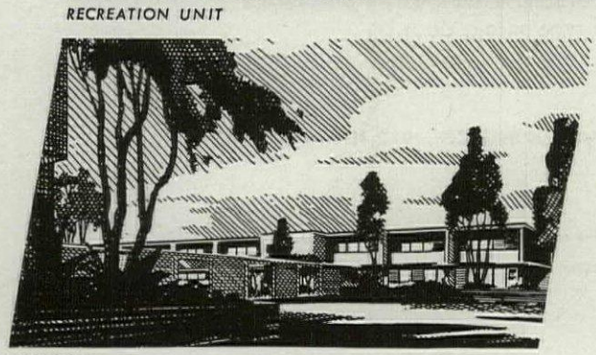




RECREATION UNIT



BARRACKS

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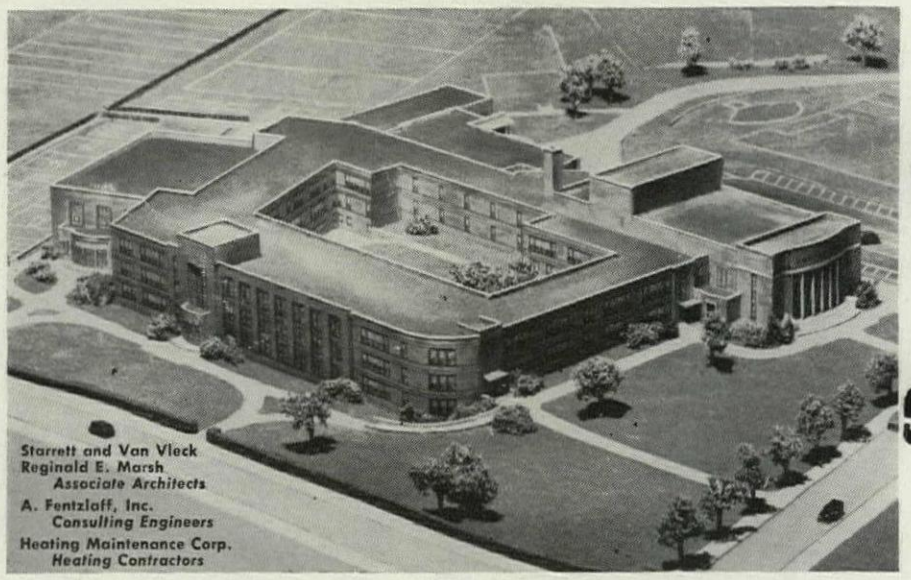

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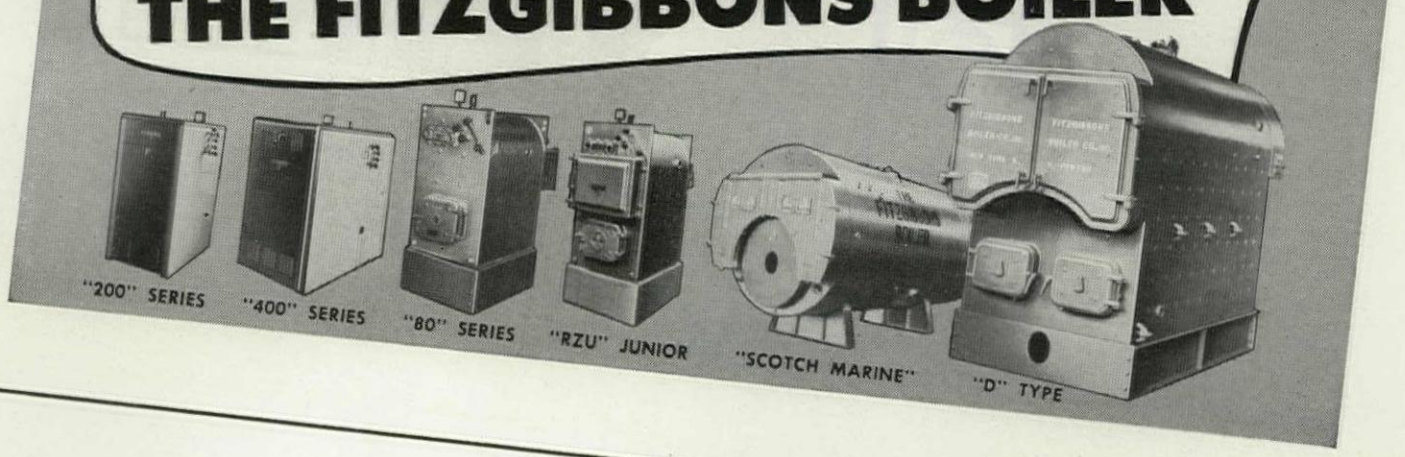
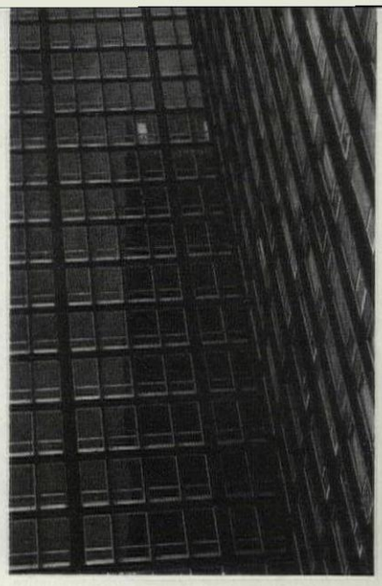


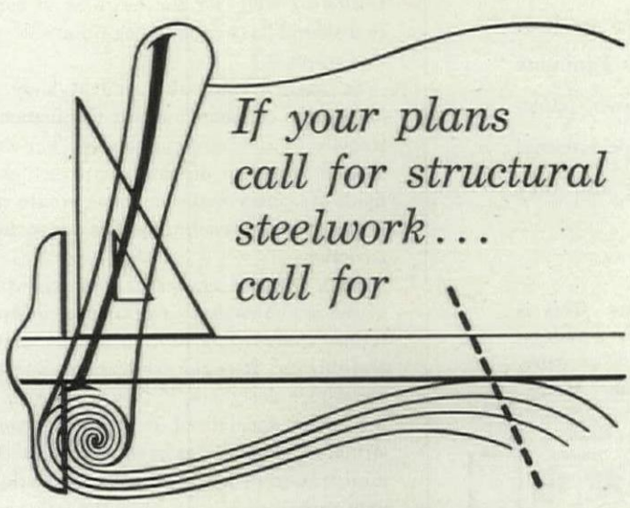


THE DRAMATIC UPSWEEP of glass and steel that distinguishes Chicago's latest skyscraper apartment building was made possible by the unique steel design and construction that holds the floor-to-ceiling glass walls in place. The steel face of the building consists of horizontal facia plates welded across the spandrel beams, with vertical I-beam mullions on 5-foot, 3-inch spacings running the height of the building.

3,600-Ton Steel Framework for Chicago's Unique Glass House

Owner: 860 Lake Shore Drive Trust.
Architects and Engineers: Mies Van Der Rohe, Pace Associates, and Holsman, Holsman, Klekamp & Taylor, Chicago.

fabricated and erected by AMERICAN BRIDGE



TWO 26-story towers of steel and glass connected at basement and ground floor comprise this ultra-modern 288-apartment structure. The unique design and construction of the vertical mullions and horizontal facia plates made possible the framing that holds the glass walls in place. There are no conventional masonry curtain walls. This imposing building occupies a block-long site along Lake Shore Drive and provides a beautiful view overlooking Lake Michigan on Chicago's swanky North Side within a short drive of the Loop. The 2,842 tons of structural steel and the 856 tons of plate steel for the face of the building were fabricated and erected by American Bridge.

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UNITED STATES STEEL

EDUCATION FOR BUILDING

(Continued from page 141)

out-smart its critics ever since. Nevertheless, if we could break down these barriers between the contributory arts, sciences and enterprises, and substitute a sense of interdependence and mutual understanding for the present self-dependence and mutual distrust, I am certain that the benefits would be colossal.

Integration: production and progress

Agriculture and construction are the two largest factors in US production. In some years agriculture leads, in others construction. Each is composed of many elements, widely distributed, independently owned and managed, using local resources and serving local needs, with relatively few components that operate on a national scale. But note this contrast:

For many years agriculture has been developing as a well-integrated complex of sciences and businesses.

Construction, on the contrary, has been developing through a sequence of independent advances, with only occasional periods—as during war emergencies—when it has shown the immense power and productivity it can develop through enforced integration and unity of objective.

The cause of this difference lies, I believe, in the divergent patterns of their educational approaches.

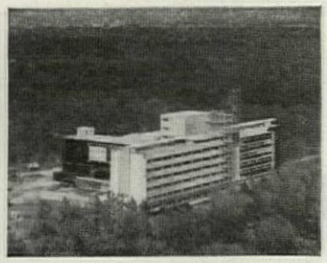
More than education: research

What I propose as a start toward improving these conditions is that some of our great universities should organize "Schools of the Construction Arts and Sciences." (A better title might be found to embrace business administration as well, for the business of construction should have equal recognition with its arts and sciences.)

In such schools the student body would have as a common interest the immense potentials of the whole industry. The faculty, though made up of men competent in many fields of science and economics, would see and respect the part each played in advancing construction.

Such a school graduates men skilled in any of the activities that make up the construction industry, according to each student's interests and talents. It could graduate architects who were pure designers, if they wished, or architects who specialized in materials and construction methods, or men skilled in the administration of large projects. It could graduate engineers who could be the indispensable associates of architects, or the equally indispensable managers of contracting firms, or the equally necessary independent consultants. It could graduate men trained to organize and finance great land developments and create or improve whole cities, and other men who could make needed building products and sell them soundly on their properties and appro-

(Continued on page 168)



New Texas Hospital Demonstrates Flexibility of Honeywell Customized Temperature Control

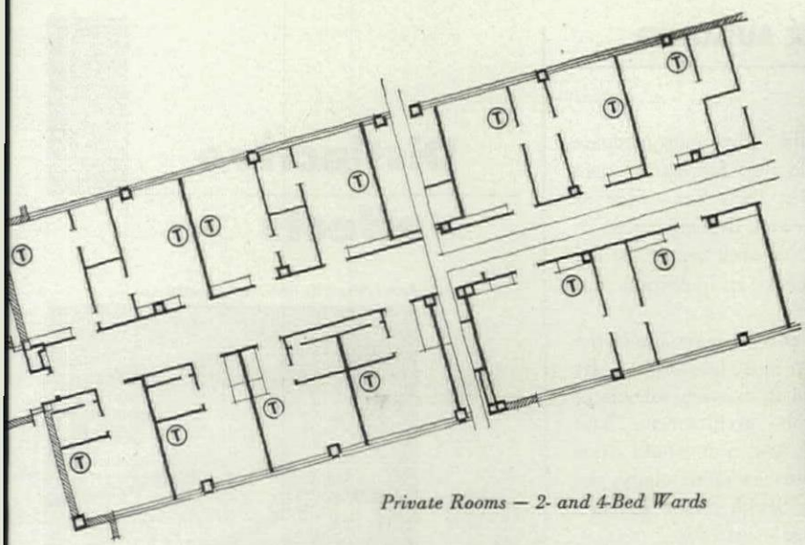
System will meet with wide range of temperature control needs

The University of Texas M. D. Anderson hospital for cancer research, now under construction in the Texas medical center at Houston, will be a truly outstanding addition to the country's medical facilities.

Carefully planned in every detail, this "cancer station" will contain such features as the first cobalt "bomb" in the United States for radiation treatment, color television for remote observation of operations and a betatron laboratory.

In this new building both heating and cooling will be controlled by Honeywell Customized Temperature Control. The installation includes *comfort* control for patients—an individual thermostat in every patient's room. It includes operating room controls for both temperature and humidity. It includes a new electronic temperature control system to maintain photographic bath water within a range of plus or minus one-tenth of one degree Fahrenheit. And it includes electronic fume hood controls to remove dangerous fumes from radio isotope laboratories.

Thus, Honeywell Customized Temperature Control will indeed meet a wide range of temperature needs.



Private Rooms — 2- and 4-Bed Wards

Notice on the floor plan that with Honeywell Customized Temperature Control each patient-room has its own individual thermostat. This means that *each* patient can be kept genuinely *comfortable* no matter what the weather outside. And it makes it possible for doctors to "prescribe" the exact temperature each patient needs to get well fast.

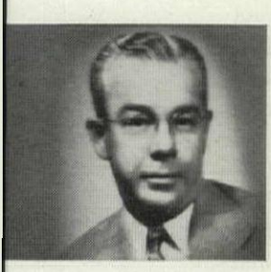
Plans for the Anderson hospital were developed by the following firms; MacKie & Kamrath, AIA, Architects, Houston; Schmidt, Garden & Erikson, Consulting Architects, Chicago; Lockwood & Andrews, Mechanical and Site Engineers, Houston; Walter P. Moore, Structural Engineer, Houston; Farnsworth & Chambers Co., General Contractors, Houston; Archer Plumbing Co., Mechanical Contractor, Houston.

For Comfortable, Even Temperature in New or Existing Buildings—of Any Size—Specify Honeywell Customized Temperature Control

Whether it's a hospital, apartment, office, store, factory, school—or any size building—new or existing, Honeywell Customized Temperature Control can help meet your clients' heating, ventilating and air conditioning problems.

Once equipped with Honeywell Customized Temperature Control, they'll have an ideal indoor "climate"—and save fuel besides.

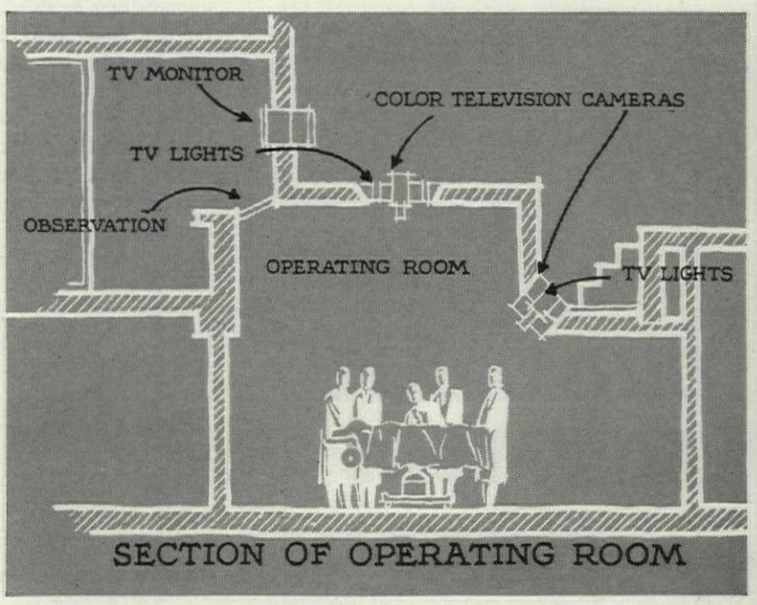
For full facts on Honeywell Customized Temperature Control, call your local Honeywell office. There are 96 across the nation. Or mail the coupon today.



W. M. Andrews of Lockwood & Andrews, Consulting Engineers, says:

"It's an extremely flexible method of control. And that means Honeywell Customized Temperature Control can be used to meet nearly any temperature problem—in any type of building."

Honeywell Customized Temperature Control will control these air conditioning units suspended above doorways. Heating of rooms will also be thermostatically controlled. When installed *at time of construction*, system duct work can easily be concealed, can be put in at lowest cost.



Color television, as shown on the operating room cross section above, will permit over 300 students to watch surgery. Extra heat from television lights will be compensated for by sensitive Honeywell thermostats. Operating rooms will also be equipped with humidity controllers, an important feature in the Honeywell Customized Temperature Control installation.

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EDUCATION FOR BUILDING

priate uses. It could offer postgraduate courses of an advanced type for mature men who wanted to broaden their knowledge or keep pace with the newest developments. It could become a great research center for the industry, using research as an important educational tool.

Such schools would effect a marriage of the related arts, sciences and businesses. Its faculty would be found in existing schools of business administration, architecture, land planning, engineering, law, and would draw upon such special fields as climatology, the social sciences, public health, labor management, advertising and salesmanship.

For old universities: new opportunities

I do not propose new institutions nor diminishing in any way the importance of the present basic courses in the arts and sciences and business enterprises. These must remain untouched for there will always be need for men fully and exclusively trained in each area of knowledge.

Rather, it is my proposal that these schools of construction arts and sciences be looked upon as new fields of educational opportunity for our great universities. While they could draw in many cases upon the great talents of the existing faculty, the new courses would broaden, rather than narrow, the areas taught by these men. In fact, in most cases the same courses would be taught as they are today, except for a broader concept of the relationship between them. Each study would be taught as the part of a whole, instead of as an end in itself.

The student body would feel the difference by having common interests and objectives and a common sense of dignity and importance clearly expressed by the very name of the school and the significance of its academic awards.

The barriers of educational isolationism would disappear.

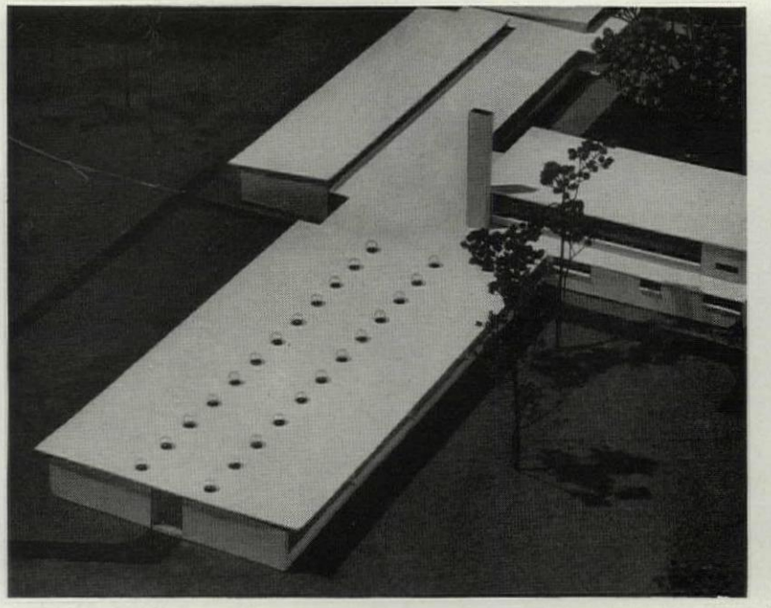
Result: benefits for all

All of you have a deep interest in the construction industry. Do you now feel that such schools are desirable? Wouldn't you like to employ their graduates? Wouldn't you like to send some of your outstanding young men back to such a school for advancement training, or go yourself? Wouldn't you feel that the component elements of the industry would give more than mere moral support to the establishment of such schools? Wouldn't the research possibilities of such institutions alone be of immense value?

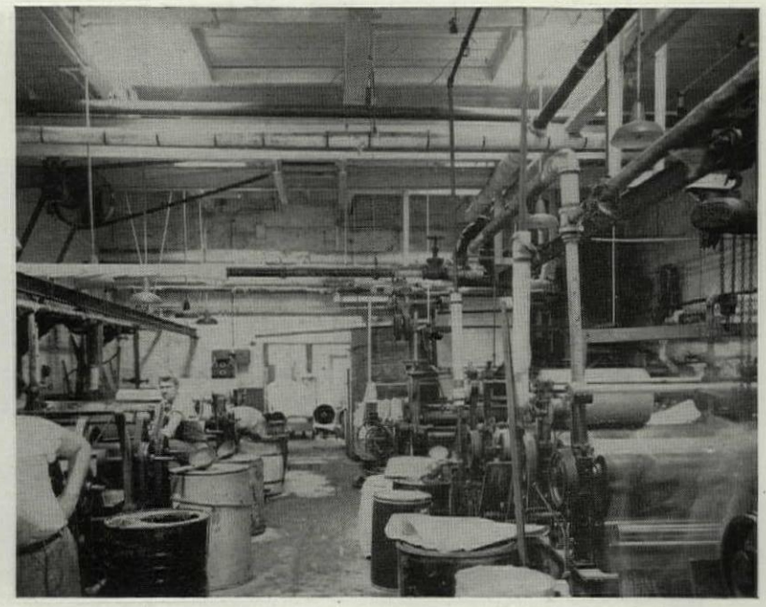
In fact, if you could start your careers all over, wouldn't you like to have the advantages that study in such schools would offer?

If you agree, then I suggest you discuss this idea, in your own way, with the educators you know, and particularly with the heads of your alma mater or your own nearby universities.

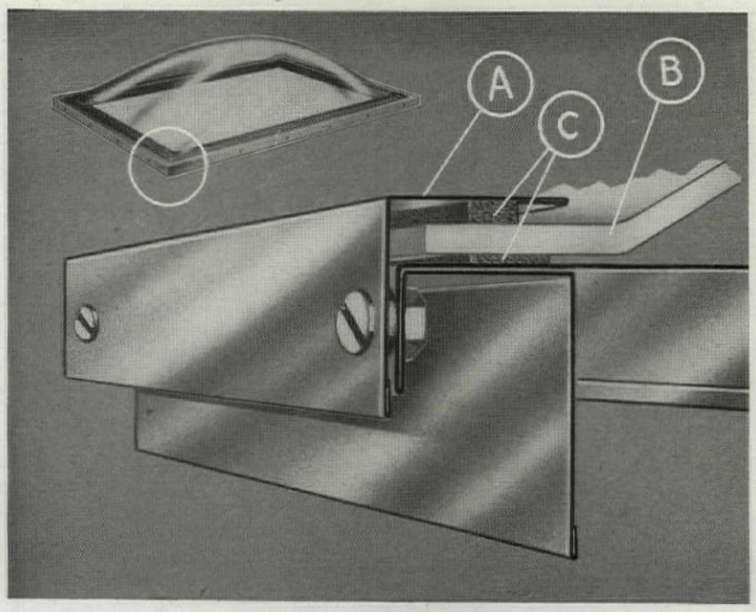
WHY specify Wascolite Skydomes for daylighting?



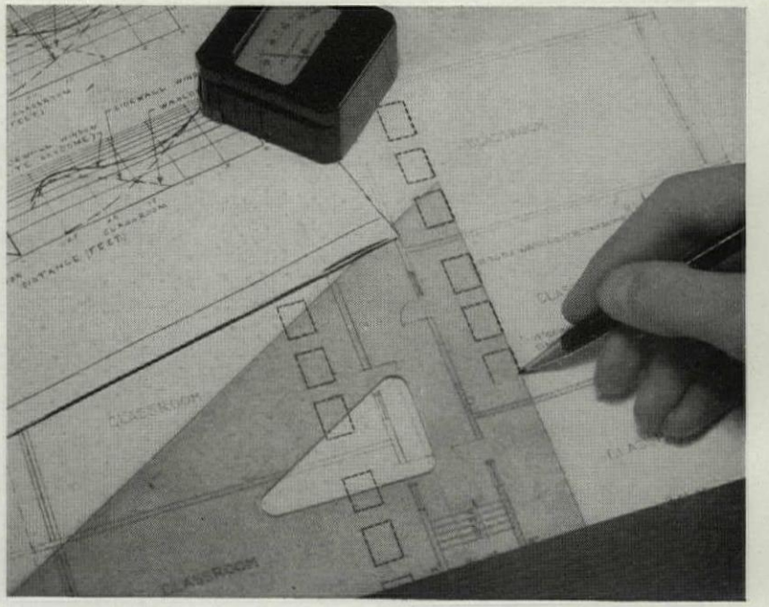
EXCELLENT LIGHTING PLUS BIG SAVINGS are reasons of The Architects Collaborative, Cambridge, Mass., for specifying Skydomes in Flagg St. Elementary School, Worcester, Mass. (model shown). They say: "Not only do Skydomes give very efficient lighting but, by making a flat roof and low ceiling possible, their use effects a reduction in cubage of the structure and consequently definite economies." TAC is associated with Albert J. Roy, Worcester, on this project.



WHEN PRODUCT QUALITY DEPENDS ON DAYLIGHT, Skydomes are indispensable to many manufacturing processes. Here, Skydomes replaced a wood-and-glass penthouse at the Cold Spring Bleachery, Yardley, Pa., because they assured abundant, glarefree natural light for the critical task of shade matching during textile dyeing.

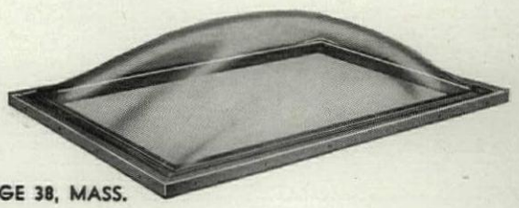


SUPERIOR ENGINEERING assures trouble-free performance from weather-proof, shatter-resistant Skydomes. Method of protecting otherwise exposed edge of acrylic plastic dome is typical: retaining frame (A) encloses plastic (B) yet allows plastic to "float" freely between neoprene gaskets (C) as it expands and contracts with temperature changes. Plastic must "float" to adapt unit for wide climatic range.



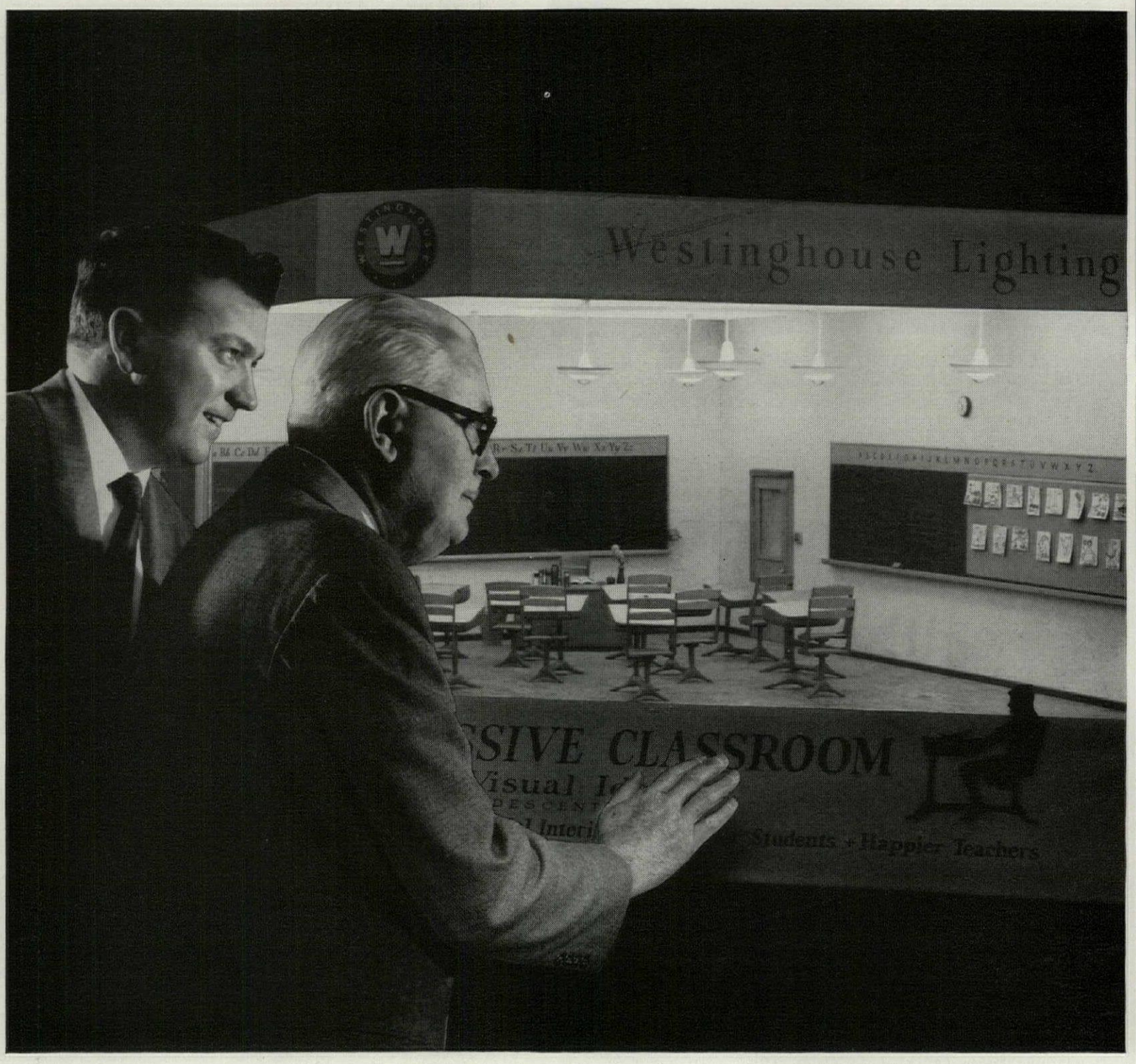
EASY FOR ARCHITECT to achieve correct daylighting with aid of Wasco Daylight Engineering Service. Just send floor plan of project and tell lighting requirements; Wasco recommends number, type, size and spacing of Skydomes to insure correct lighting for the specific task. Light distribution and illumination data included. No obligation.

WASCOLITE® PATENT PENDING **SKYDOMES**



WASCO FLASHING COMPANY 87 FAWCETT ST. CAMBRIDGE 38, MASS.

An analysis of lighting systems for today's classrooms . . .



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ceilings . . white to reflect maximum light
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layout . . . 3 units in 3 rows for best spacing, minimum wiring
system . . . indirect incandescent for comfort and initial economy
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Indirect-incandescent lighting

...if first cost is a prime factor

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In this way, a much improved level of illumination is practical. The absence of dirt-accumulating surfaces minimizes maintenance. Initial economies are realized with this type of lighting, and a quality lighting system results.

Westinghouse has a complete line of both fluorescent and incandescent luminaires which meet classroom lighting requirements. Practical methods of providing proper illumination levels are studied. For an analysis of these methods, write for B-4556, The ABC Plan for School Lighting, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

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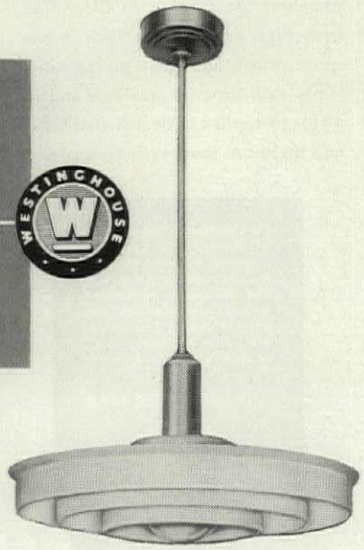


(Continued from page 158)

a straight-line curve so there is no point of diminishing returns as the span increases). Aluminum was chosen for structural members and roof to reduce dead load and facilitate handling ribs of maximum length. These long ribs would reduce the number of main joints and cut down chances of error in erection. They are 57′ long, 2′-10″ deep and weigh only 1,350 lbs.

General arrangement of the main ribs is based upon great circles so that their curvature could always be struck from the same radius, 365′. Prefabricated in eight sections per rib for assembly on the site, their great circle radius permitted adjoining sections to be butted together in the shop, and connection holes drilled and reamed using the same jig for each rib joint.

It is technically impracticable for all the ribs of a dome to be continuously of the same great circle radius, so subsidiary ribs were shaped to form smooth curves running generally with the main ribs. They were fabricated in single lengths of about 50′ and drilled and fitted at the site after the main ribs were in position. Scaffolding was required only to erect the ring girder and the main ribs, after which subsidiary ribs and roofing were erected from the main ribs.

In design the main ribs were treated as two-hinged arches, each one effectively supporting 16′ of roofing. Load-deflection tests on the completed dome and subsequent lengthy relaxation analysis proved this method of design to be conservative, since it neglects the effect of support from the interlocking rib system. Dead load is 4.41 psf; wind loads, determined by wind tunnel tests on a model, are a maximum 10 psf positive pressure and 16 psf negative in local areas over the roof; snow loads are 10 psf over the center of the dome. Load factor is 2¼, which gives a basic allowable tensile stress in the aluminum members of 15,000 psi (0.1 proof stress of structural aluminum alloy used, 38,000 psi). In future designs the engineers believe that a load factor of 2 would be sufficient.

Entire weight of the dome is carried upon tubular steel struts, each composed of three 3″ tubes, pin-jointed top and bottom so the dome can expand or contract and yet always be asymmetrically held against wind pressure.

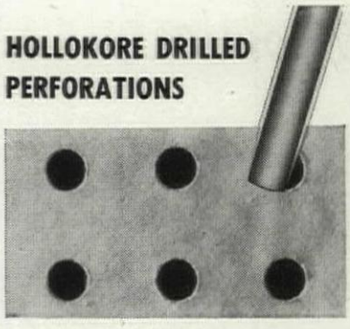
The ring girder is a mild steel box section weighing 207 lbs. per ft. run, fabricated in 24 segments about 45′ long buttwelded together on the site. Main and subsidiary ribs were fabricated of seven extruded aluminum sections, made into light-lattice triangular cross-sections 2′-10″ deep, which eliminated one plane of bracing as compared with a standard structural steel shape. Rafters, 7″ deep and about 25′ long, support purlins 2¾″ deep and 6¼″ wide placed on 3′-9″ centers. All aluminum structural members are connected with cold-driven ⅝″ rivets using special 28-ton single-blow pneumatic squeeze riveters. Lap-jointed 20-gauge roof sheeting is riveted to the purlins in such a way as to permit relative movement, allowing for a temperature difference between the sheeting and its supports of up to 40° F. This nonrigid connection facilitated the inclusion of insulating material beneath the sheeting, eliminated the need for stiffeners and decreased the possibility of buckling.

Architect was Ralph Tubbs, ARIBA; consulting engineers, Freeman, Fox & Partners.

Great American Reserve Insurance Building, Dallas, Texas.
Architect: George L. Dahl. Simpson Acoustical Tile
installation by Blue Diamond Company, Dallas.

We're keeping this QUIET

HOLLOKORE DRILLED PERFORATIONS



The Hollokore Drill (cross section sketch shown above) developed by Simpson Research and Engineering, is responsible for the clean round perforations of Simpson Acoustical Tile. In the enlarged unretouched photograph reproduced above, notice the clean-cut holes . . . no fuzzy edges . . . no loose fibers to encourage unsightly bridging when repainting.

SIMPSON ACOUSTICAL TILE is keeping 32,000 square feet of office space quiet in this 4-story building. This is typical of many hundreds of expert applications of every type throughout the country—offices and factories, hospitals and schools, stores and restaurants, churches and libraries, in fact—wherever noise is a problem.

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For more complete information, see Sweet's Architectural File. Contact the nearest Simpson Acoustical Contractor—he can help you with your sound-control problems.

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ACOUSTICAL TILE
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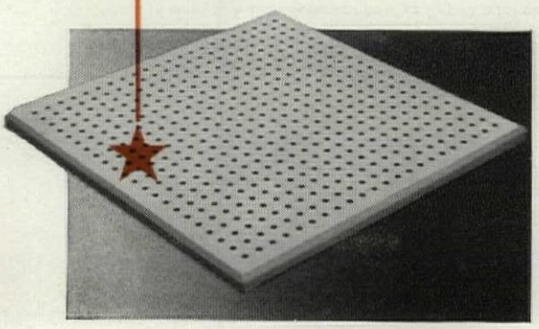

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COLORADO
Construction Specialties Co., Denver
CONNECTICUT
W. T. Roberts Construction Co., Hartford
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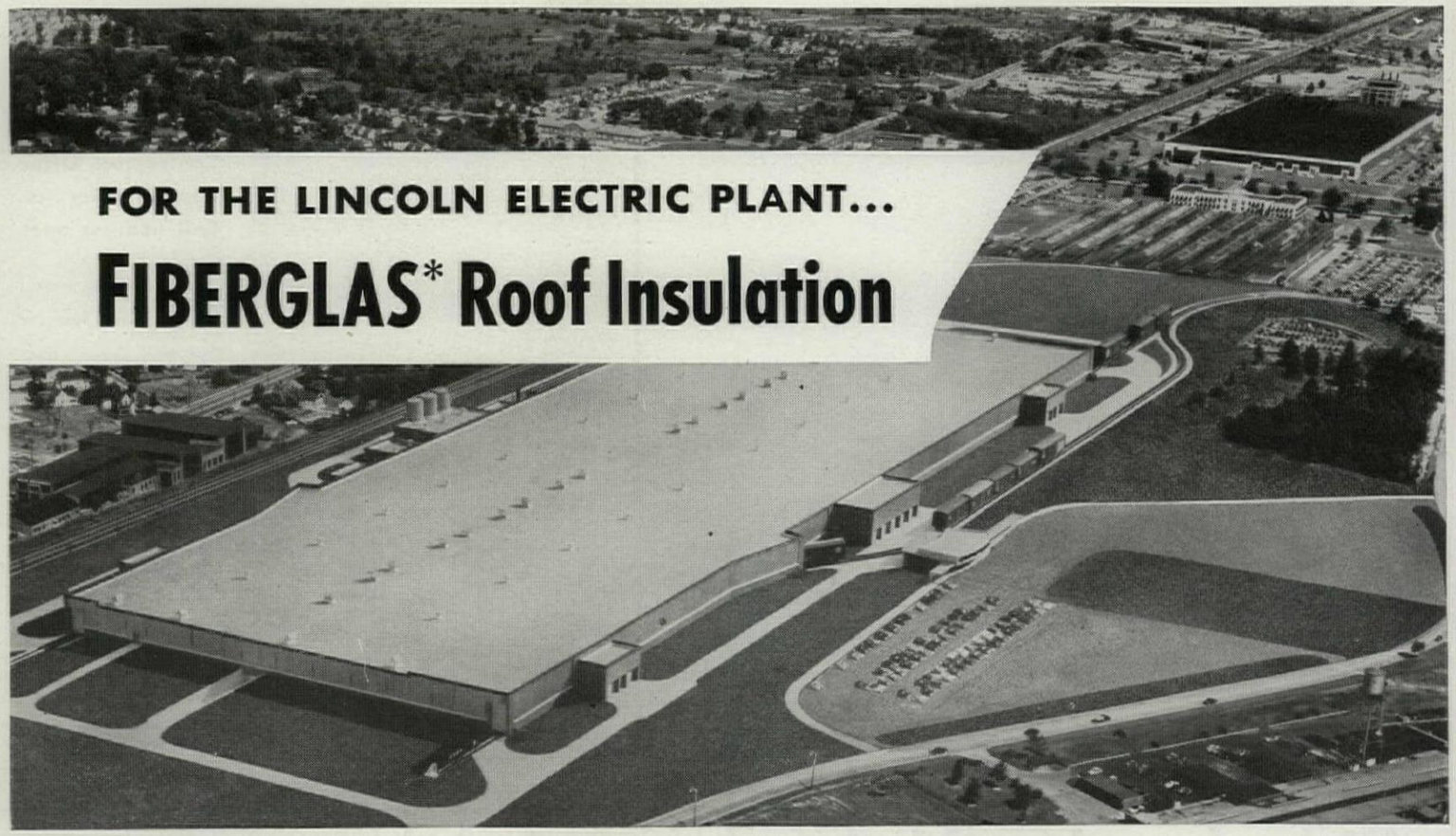

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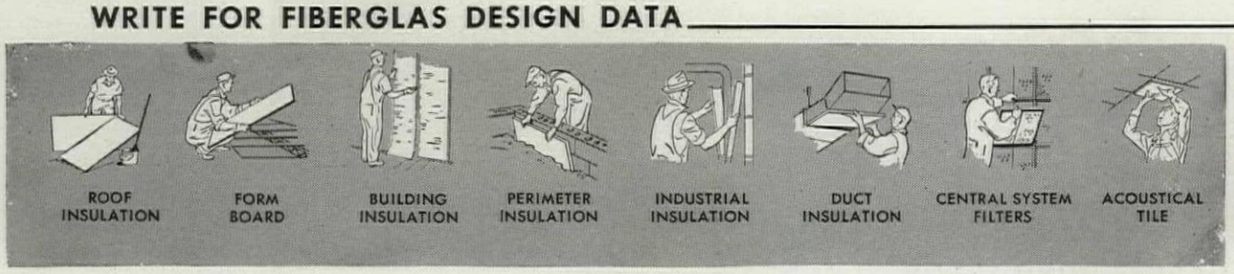

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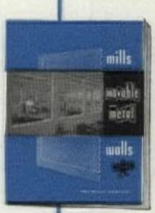

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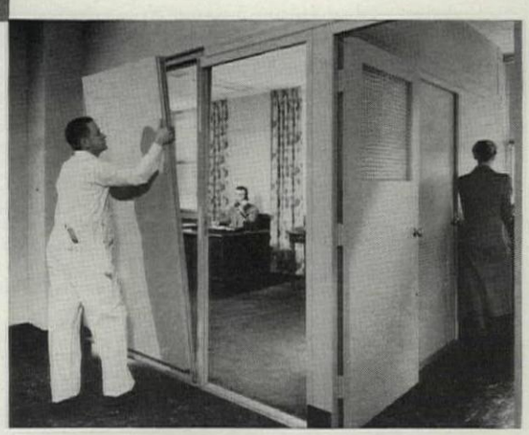

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RENT CONTROL —what has it done

Answers to these hot questions have been coolly documented for the first time by Leo Grebler in his brief but important book on rent control.* Grebler is no partisan ax grinder, he is research professor in Urban Land Use and Housing at Columbia University, and his study into the effects of rent control is not propaganda although it is likely to be used as such; it was made under the auspices of an institution whose high purpose is "to promote social justice in all the countries of the world," the International Labor Office. (Since organized labor has been perhaps the No. 1 sponsor of rent control, it is significant that Grebler's study for ILO has little good to say for rent control.)

Effect on the people. The "most serious effect of rent control and one that is economically and socially indefensible" is the way it divides the population into two groups bearing disproportionate shares of the burden of inflation: a) the "haves" who own prewar homes or rent prewar apartments and are thus protected by rent control, and b) the "have nots" (mainly new families with a veteran at the head) who must pay the high postwar cost of buying a house or renting a new (uncontrolled) apartment or must double up with another family.

Effect on their spending habits. Housing expenditures of those protected by rent control have declined substantially in relation to their incomes. The weight of rent in the consumer-price index fell from 18.1 in 1935-39 to 12.5 in 1947 —the last year when rent control was still fully effective. Meanwhile, food increased from 33.9 to 42.0 and clothing from 10.5 to 12.0. *Such a change in the pattern of consumer expenditures for a large number of families once established and firmly embedded in family spending habits, is hard to change.*

There is at least a presumption that the 1940-47 increase in food and clothing demand was based partly on income set free by rent control to buy other things. "To the extent that this was so," says Grebler, "repression of rent inflation led to more price inflation in other fields."

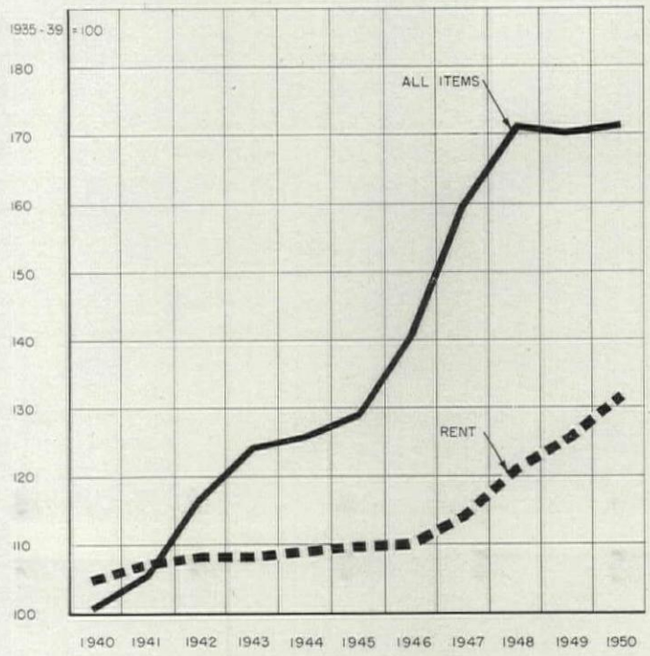
Effect on homebuilding. There is no evidence that rent control held postwar homebuilding below the top limit set by available resources. More homes could have been built only through additional cost and price increases—i.e., inflation—so if rent control did tend to dampen homebuilding activities it had an anti-inflationary influence in this respect.

Effect on building for rent. Rental housing construction has been unusually low despite its exemption from rent control. It dropped from 36% of total dwelling-unit production in 1920-24 to 17% in 1946-50. This substantial decline can at least partially be ascribed to rent control, which established an atmosphere unfavorable to investment in rental housing. (There was always the chance that rent control might some time later be extended to new units. That this fear was not groundless is shown by what happened in several communities where rents were re-recontrolled after Korea.)

---

* *Implications of Rent Control—Experience in the United States.* By Leo Grebler. Reprint from *International Labor Review*, Vol. LXV, No. 4; 1825 Jefferson Place, Washington 6, D. C. 24 pp. 6″ x 9″. Paper bound. 15¢

to the industry, the economy and the people?



Trend of rents, compared with trend of all items in the consumer price index for moderate-income families in large cities, has remained relatively steady—thanks to the limiting effect of rent control. Source: Bureau of Labor Statistics; revised series which, among other things, makes allowance for rents of newly constructed dwelling units for occupancy by moderate-income families.

Effect on prewar rental housing. The supply of existing rental housing has been reduced under rent control. Many owners, faced with the alternative of receiving a controlled rent or selling at an uncontrolled price, naturally preferred to sell. From 1940 to 1950 the number of single-family dwellings rented actually declined more than 1 million. Counting apartments too, the number of rented units increased only 4.6% while the numbers of owner-occupied units rose by 71%.

"It is indeed astonishing that the supply of rental housing was not reduced more sharply. In 1950 there were still more than 5 million detached single-family houses in the rental supply," according to Grebler.

Effect on waste of space. The percentage of changes indicating less intensive use of space are not so great or so uniform as one might expect. Comparative figures for 1940-50 showed that tenant-occupied units with 0.75 or less persons per room (i.e., low-intensity use) increased from 48.4% to 51.5%.

Effect of decontrol. Experience with complete rent decontrol in several cities indicates that average rent increases of only 1.5-2.0% per month may be expected during the first two years after decontrol. In these cities, the rent indices now are roughly 30 to 55% higher than in 1942. The upward movement of rents is, of course, continuing, but it appears that, after the initial impact of decontrol during the first six to 12 months, the rise in rents tends to slow down. Grebler further points out that there is no present indication that rents will double either in comparison with rents at the date of decontrol or with the prewar level of rents.

(Continued on page 184)

Ronald Chatham photo

Introducing smoke into the schoolroom model to make air flow visible.

VENTILATION GOES TO SCHOOL

Texas Engineering Experiment Station tests show what kinds of windows and window detailing provide the best warm-weather ventilation

If SCHOOLROOM—or plant—ventilation is a problem that concerns you, here's a report from the pages of "Architectural Forum" we know you'll want to read.

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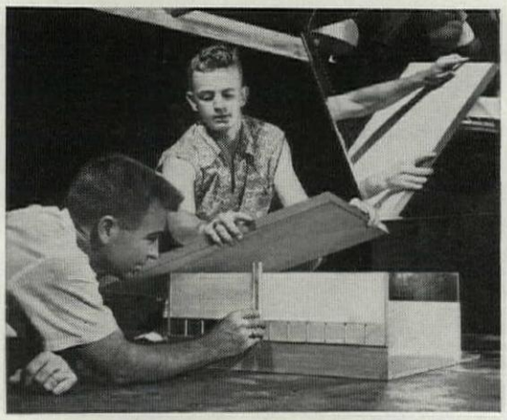

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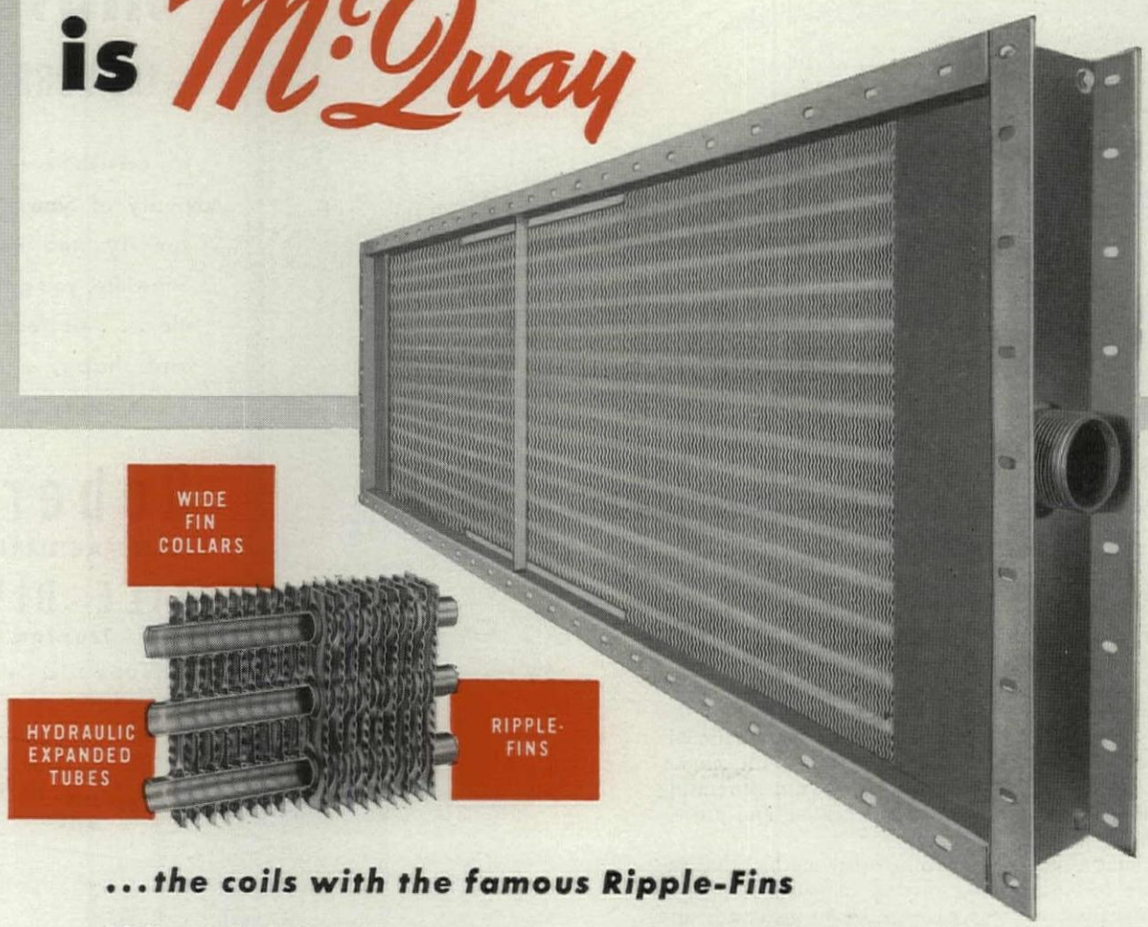

...the coils with the famous Ripple-Fins

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McQuay heating (blast) coils are available in a wide variety of styles and sizes. Hot water, cold water, brine, direct expansion, and refrigerant condensing coils are available for practically every type of application. Write McQuay Inc., 1609 Broadway St., N.E., Minneapolis 13, Minn. Representatives in principal cities.

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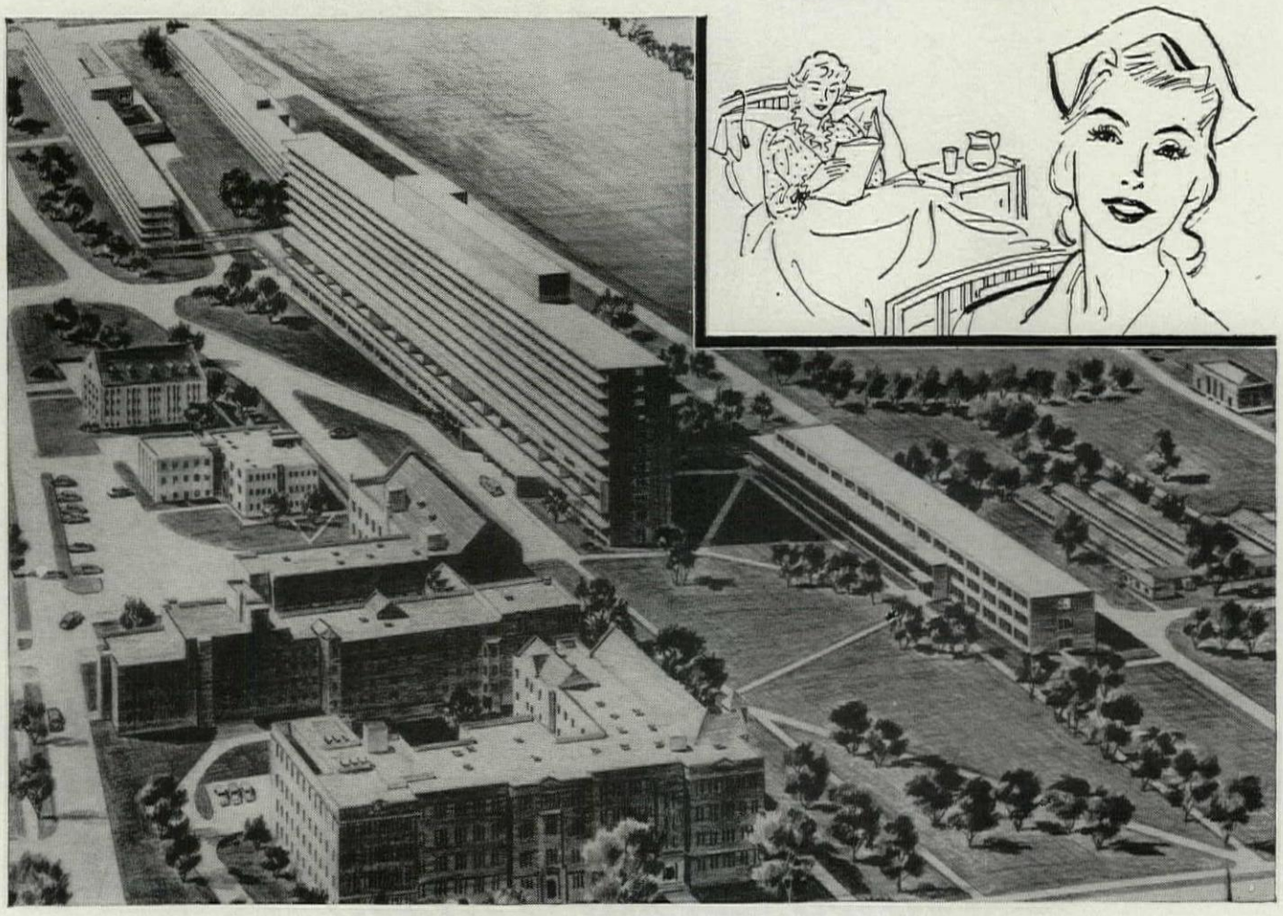

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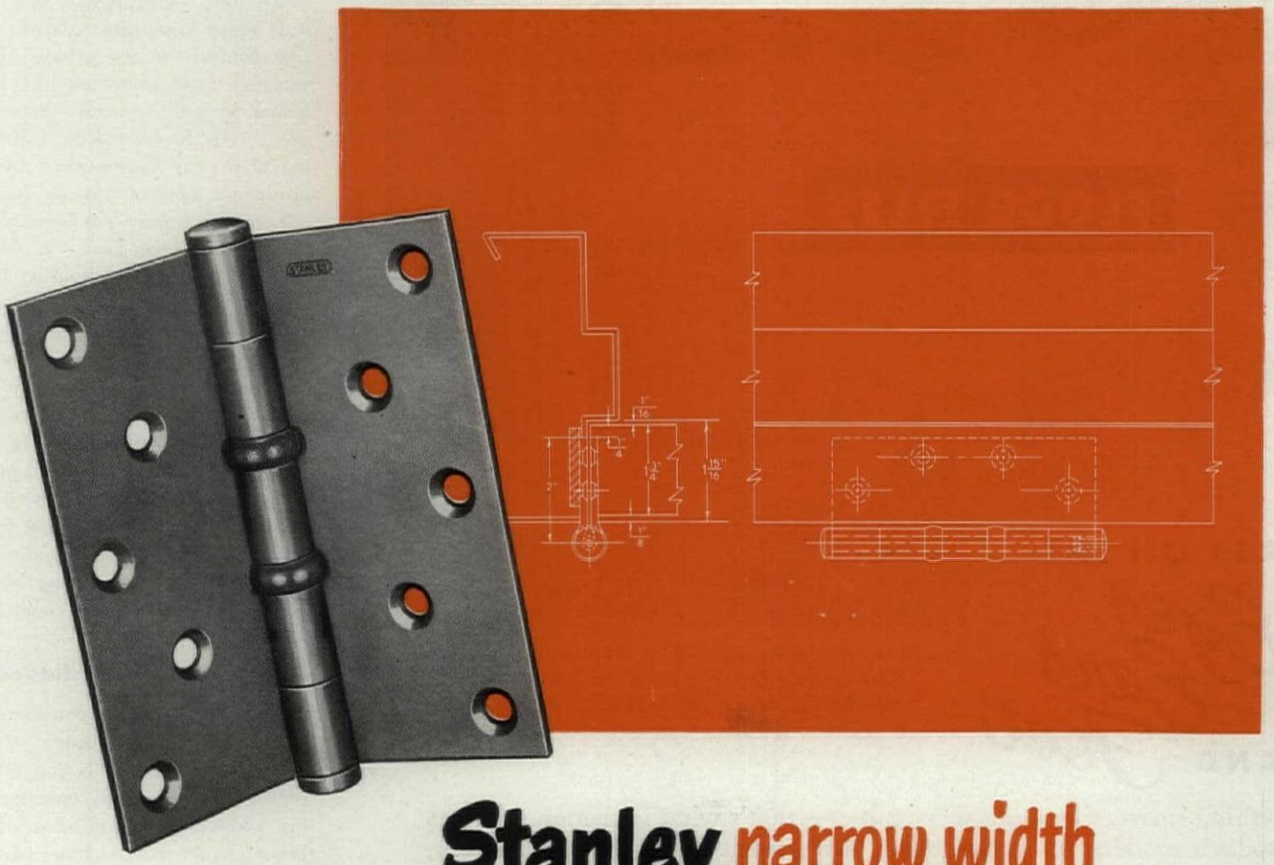

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The Stanley Works, New Britain, Conn.

The most famous doors in the world swing on Stanley Hinges

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

RENT CONTROL

(Continued from page 177)

Its most serious effect is unequal loading of the inflation burden*

There has been an unfortunate preoccupation in the rent control controversy with the relative gains and losses of tenants and landlords. But for economic and social analysis it is more important to study the effects of rent control on two groups of housing consumers—those protected and those not protected by rent control—"haves" and "have nots." (In the case of the US, the large number of prewar homeowners constitute a third group not affected directly by rent control.)

Economists have not been oblivious to this approach. Thus, James E. Meade analyzes the British postwar situation like this:

"The present position is grossly inequitable and grossly inefficient. Those lucky occupiers who are protected by rent restriction obtain accommodation exceptionally cheaply and have no incentive to economize dwelling space by living in a smaller dwelling, leasing excess rooms to lodgers, etc. Those unlucky persons (often ex-servicemen and women attempting to set up home) who are not in this charmed circle cannot find accommodation, largely because the protected 'sitting birds' have little or no incentive to make room for them."

Rent control and inflation

Rent control may be considered a means of redistributing the burden of inflation, not only between landlords and tenants, but also between the protected tenants and other housing consumers. This view of rent control becomes increasingly important when restrictions extend over long periods during which population grows and the proportion of those enjoying the benefits of rent control declines.

The question is whether, through rent control, the "have nots" are made to bear a disproportionate share of the burden of housing inflation and whether this distribution is warranted.

It is clear that the "have nots" are prevented from bidding for rent-controlled space on equal terms with the "haves." Only those rent-controlled units released by the "haves" are available to the "have nots." Because, however rent regulation weakens the incentive of "haves" to give up rent-controlled dwelling units, the chances for the "have nots" of obtaining such units are greatly reduced, and these chances are determined in large measure by luck, favoritism and "side-payments." For the majority, or "have nots," the means of obtaining housing are purchases at uncontrolled prices, high-rental tenancy in new, high-cost projects or prolonged "doubling-up" and makeshift arrangements. To the extent that they are able to

(Continued on page 188)

* A condensation of the most important chapter in Grebler's book.

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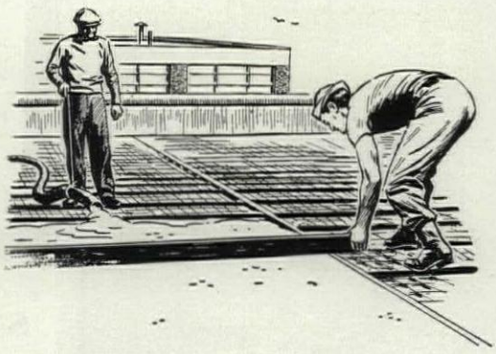

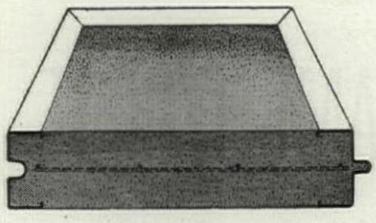

CERTAIN-TEED GYPSTEEL PLANK

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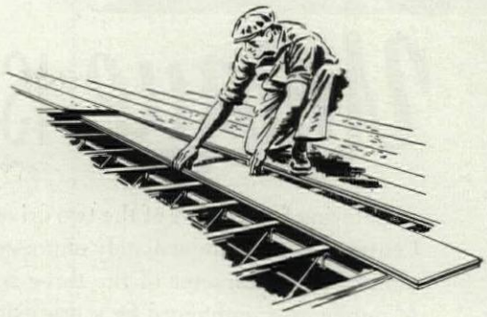

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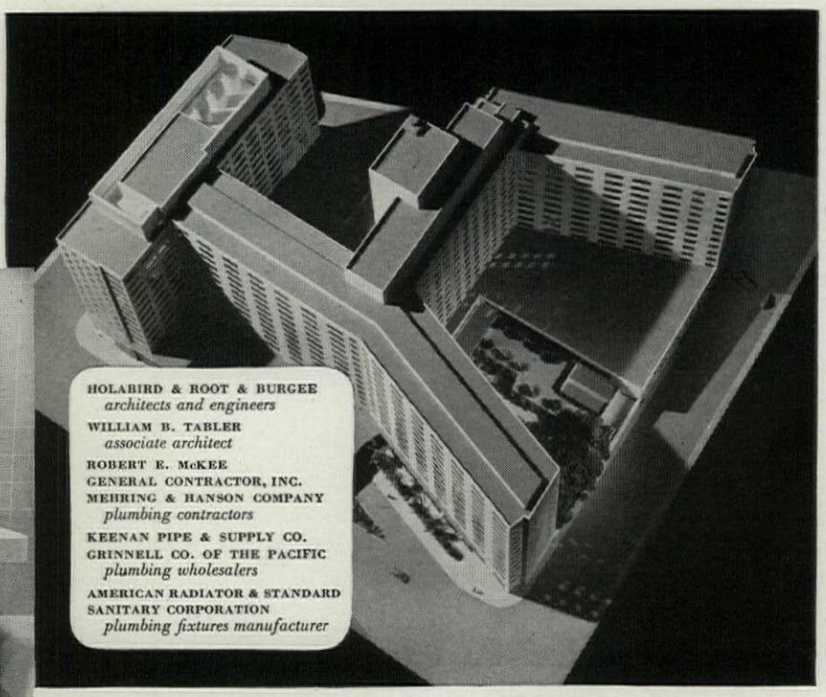

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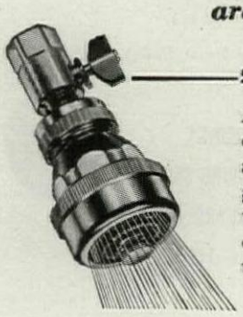

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Another achievement in efficiency, endurance and economy is the SLOAN *Act-O-Matic* SHOWER HEAD, which is automatically self-cleaning each time it is used! No clogging. No dripping. When turned on it delivers cone-within-cone spray of maximum efficiency. When turned off it drains instantly. It gives greatest bathing satisfaction, and saves water, fuel and maintenance service costs.

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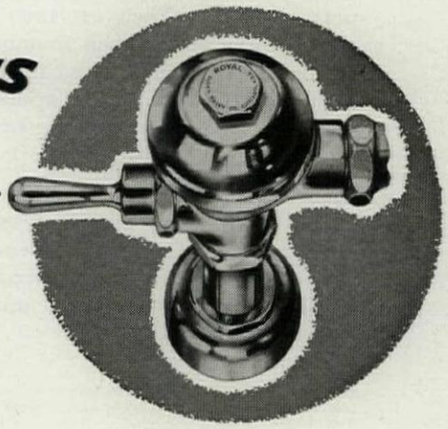

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▶ **LOW MATERIAL COST**—yet meets the strict requirements for radiant heating. GM Steel Tubing is *all steel*—no secondary bonding alloys to encourage electrolytic corrosion.

▶ **LOW HANDLING COST.** 120′ to 1000′ continuous coils *eliminate fittings and joints* in plaster and under grade—reduce labor costs and, at the same time, lessen chance of leakage.

▶ **HIGH QUALITY, STRENGTH and UNIFORMITY.** Every foot of GM Steel Tubing is hydrostatically tested at 2000 pounds per square inch. In addition, a section of each coil is subjected to "destructive" tests such as flaring, twisting, flattening, etc. Such tests assure you of quality and uniformity.

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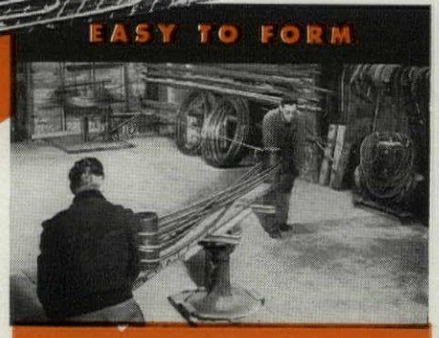

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(Continued from page 184)

obtain separate dwelling units they are made to pay the full economic cost of housing, whereas the "haves" pay less.

In the US where home ownership and renting are about evenly divided, the inflationary forces are permitted to operate fully in half the housing supply—in the uncontrolled market for owner-occupied houses. These forces are practically shut off from the other half—the rent-controlled units. Obviously, the price pressures on half the supply are much greater than if they had been distributed over the entire supply. Yet it is this uncontrolled half (together with new and converted dwelling units) that has been available to meet the demand of most of the "have nots." In other words, the "have nots" are forced to bear the full burden of inflation in the price structure of housing, or at least a disproportionate share of it.

How many "have-nots"?

Statistics are lacking for an adequate analysis of the numbers and characteristics of the "haves" and "have nots"; but certain impressions may be obtained from population and other data. More than ten million marriages have been registered since the end of the war; in addition, several million couples married in wartime did not establish separate households. In the majority of cases, the young married couples were "have nots." During the years 1946-51, about 14 million new and existing houses were purchased for owner-occupancy at uncontrolled prices. About 800,000 new rental units exempt from rent control were built and occupied. Conversion of existing dwellings, also exempt from control, must have accounted for at least 500,000 units. In other words, there are now about 15 million dwelling units whose occupants pay the full economic costs of housing on the basis of 1946-51 price levels. After various deductions the figure would be about ten million "have nots"—making the number of "have nots" paying the full postwar costs of housing equal to the number of tenants protected by rent control.

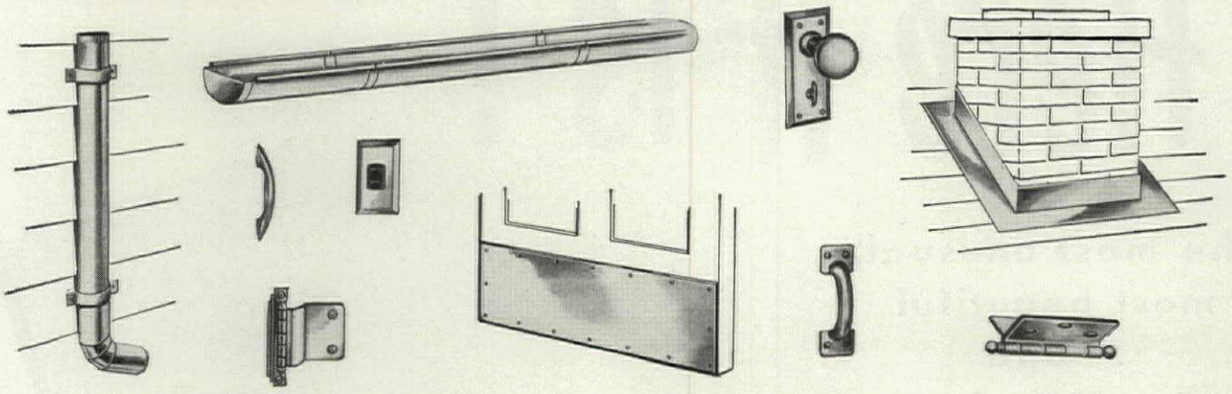
With the pressure of the "have nots" concentrated on the market for owner-occupied houses, the number of these houses increased from 11.4 million (or 41%) of all occupied nonfarm dwelling units) in 1940, to 19.5 million (53%) in 1950. This phenomenal change reflects both the effects of rent control and the historical preference of US families for the purchase of single-family houses when incomes are high.

Who are they?

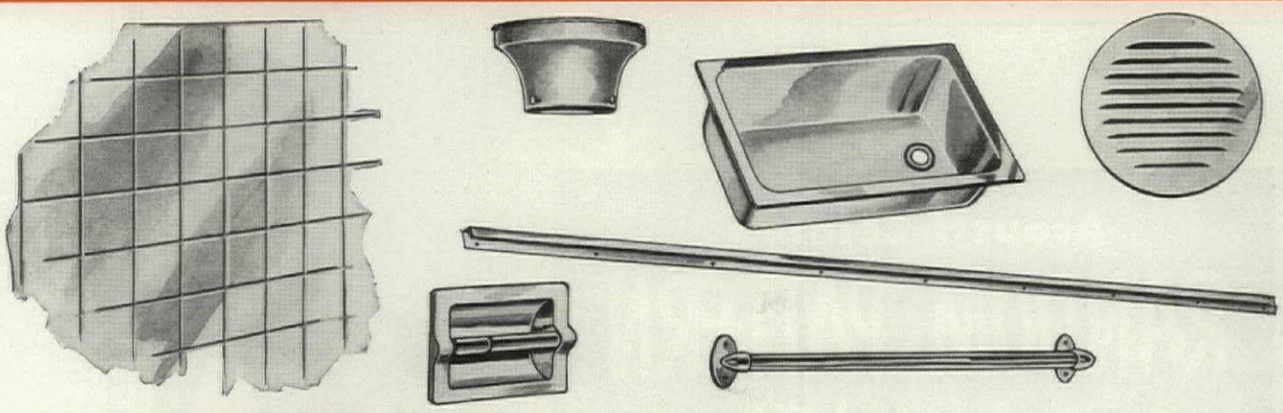
Who were the "have nots"? Are they perhaps more capable of paying the full economic costs than the others? All indications point to the opposite conclusion. Most of them are young families with income earners who, because of their age, have not yet reached the peak of their earning capacity. Most of the "have nots" are growing families with increasing responsibilities. A large proportion of them are veterans' families. From the point of view of equity and welfare, there is real question whether these groups should be penalized in favor of older, established households by differentiation in housing costs that is tantamount to taxing them more heavily than the "haves."

(Continued on page 192)

If you are a manufacturer of building products



and are caught in the critical material squeeze



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- **. . . sharply profiled perforations of varying sizes, arranged in random fashion**
- **. . . rich, linen-like surface that gives better light diffusion**
- **. . . a pattern that minimizes joint lines, for beautiful over-all effects**

. . . these are the new, exclusive features of Acousti-Celotex RANDOM PATTERN Perforated Tile that enable you to create striking, dramatic decorative effects impossible with any other Sound Conditioning material!

But beauty is only part of the story. Like all Acousti-Celotex Sound Conditioning Products, RANDOM PATTERN Perforated Tile has high sound-absorbing value. And it also has a remarkably durable *new washable finish* that keeps its smart, soft-white beauty after many washings.

ASK YOUR DISTRIBUTOR of Acousti-Celotex products to show you a sample of new Acousti-Celotex RANDOM PATTERN Perforated Tile. If you don't know where to reach him, write to The Celotex Corporation, Dept. A-92, 120 S. LaSalle St., Chicago 3, Ill. In Canada, Dominion Sound Equipments, Ltd., Montreal, Quebec.

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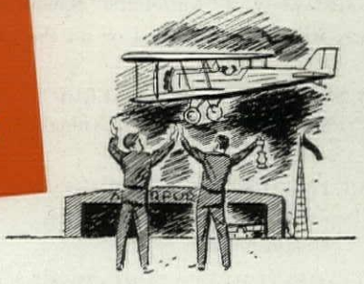

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EVERYTHING IN WIRING POINTS TO

PLANTS IN AMBRIDGE, PA.
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(Continued from page 188)

The amount of this "taxation" can be illustrated by differences in rentals and in carrying charges on owner-occupied houses. According to a 1949 survey, the average monthly rent in newly constructed rental projects was about twice the average monthly rent in existing rental housing. Monthly FHA mortgage payments for single-family houses bought in recent years were $55-60, as against less than $30 for the years immediately preceding World War II—in spite of easier credit supported by the government. Thus, housing expenditures as a percentage of income would show substantial variations within each income group for "haves" and "have nots."

The unity of the price system prevailing in a market operation is broken by rent control, and broken in such a way as to create sharp and unjustifiable inequities between different groups of consumers of about equal capacity to pay.

Can it cure market faults?

The operation of the price system in housing may produce neither a completely efficient nor a socially desirable allocation of space—the operation of the housing market is imperfect in many ways. But rent control can hardly be advocated as a cure of the basic imperfections of the market, since it superimposes its own inefficiencies in the allocation and equitable distribution of space on those of the market operation.

The merits and implications of perpetuated rent control could be evaluated more clearly if the searchlight was directed on this phase of the subject rather than on the opposition between landlords and tenants.

If the results of this approach argue for speedier decontrol, the question of profits to owners of prewar housing can perhaps be solved in more practical fashion by taxation.

* * *

NEED FOR COMPREHENSIVE RENT CONTROL STUDIES

"It is astounding that the quantity and quality of analytical materials on rent control are wholly incommensurate with the social and economic importance of the problem. Here is a burning public issue which has been kept alive over a generation in several important countries, and which has been almost a worldwide issue for ten years or more. There is an abundance of factual, empirical materials which may serve to test the validity of various assertions on the effects of rent control; yet few attempts have been made to subject these materials to scientific, dispassionate analysis. Discussion of rent control is dominated by dogmatic statements, reflecting the tenants' or landlords' point of view and by description of the maze of administrative detail. Efforts at analytic treatment are scattered and often lack comprehensiveness. The contribution of the International Labor Office to comparative analysis of rent control after the first World War are still among the best in the field but neither the ILO nor any other agency of the UN has undertaken any research similar in scope to analyze the experience during and after World War II. Such a research project is badly needed, and it is to be hoped that it will soon be forthcoming."—Leo Grebler

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Answer:

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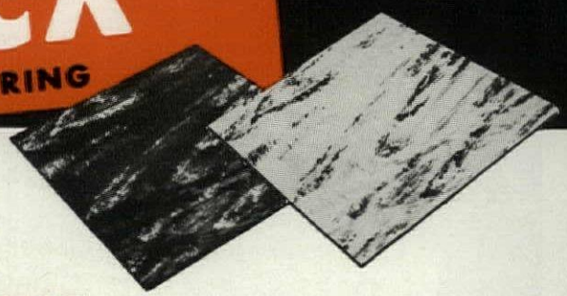
THE ARISTOCRAT OF RESILIENT FLOORING



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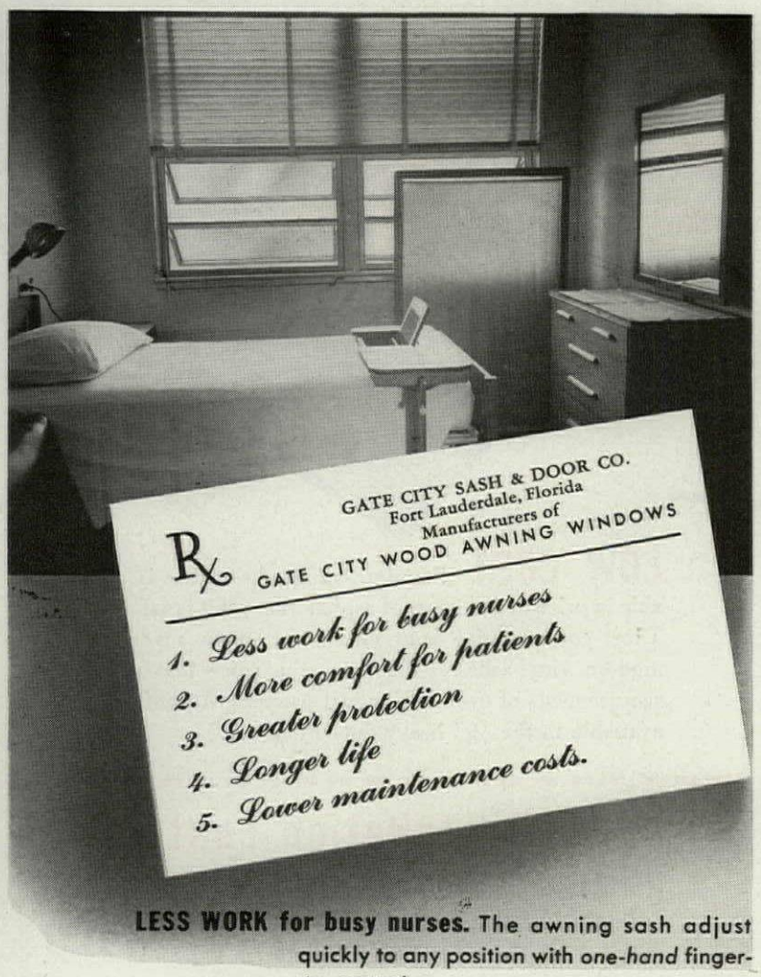

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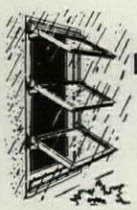

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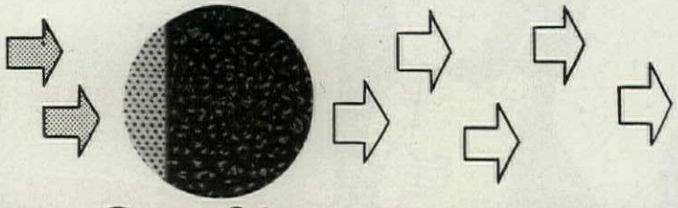

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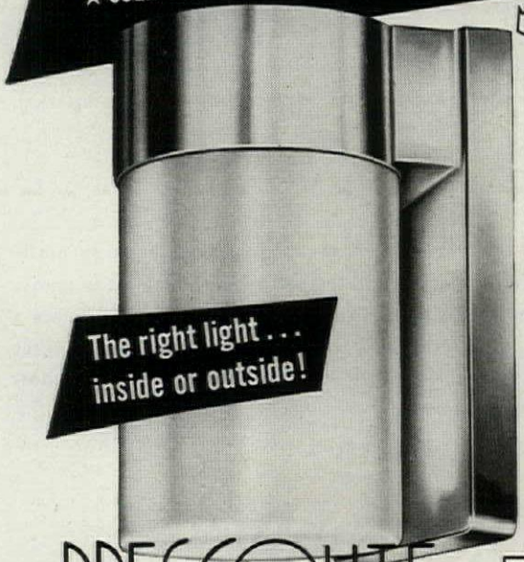

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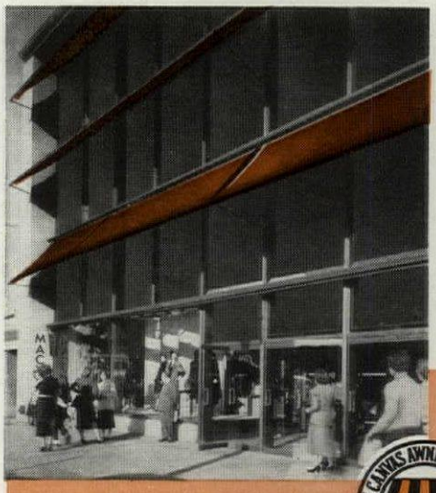
S-2 Swivel
A-1 Architectural

PRESSTEEL COMPANY • 800 BANCROFT WAY • BERKELEY 2, CALIFORNIA

Macy's Flatbush Store
Brooklyn, New York

Architects and Engineers:
Voorhees Walker Foley & Smith



modern design and Canvas

Among the materials which help contemporary architecture combine function and beauty, none can match CANVAS in providing maximum design flexibility. Awning fabrics lend color and texture, permit greater freedom in the use of glass by economically solving problems of solar heat control.

Voorhees Walker Foley & Smith chose Canvas as a colorful companion to glass . . . for transparency tempered with shade. These materials, gracefully blended, have played important roles in meeting Macy's specifications for an outstanding modern store design.

FREE: Write today for our new brochure on Canvas applications. Contains original and practical ideas, plus helpful instructions for specifying Canvas.

THE CANVAS AWNING INSTITUTE INC.

CANVAS AWNING INSTITUTE
and NATIONAL COTTON COUNCIL
P. O. BOX 18 MEMPHIS, TENN.

ENGINEERS AND IVORY TOWERS. By Hardy Cross. Edited and arranged by Robert C. Goodpasture. McGraw-Hill Book Co. Inc., New York 36, N. Y. 141 pp. 5¾" x 8¼". $3.00

Technical education is receiving a great deal of attention among architects and engineers today *(see p. 149)*. Some architects are worried that they are required to know considerably more about building engineering on the one hand and town-planning techniques on the other and they feel that architecture as an art is likely to suffer thereby. Engineers have their problems too. Demand for engineers is still so much greater than supply that designs are often prepared using the simplest column and beam structure that can be laid out quickly with the aid of design tables. Structural engineering is thus reduced to an automatic process that could be carried on by an electronic brain, and all too many engineering schools are teaching rules rather than training judgment.

Technical training vs. education

This series of essays by Professor Cross makes a plea for creative engineers instead of glorified slide rules. His theme is that technical training and education are not synonymous, that young men should first be taught a sense of scale—an ability to distinguish whether a proposition is true or false. He points out that everybody wants general rules to avoid thinking things out; the creative engineer will question rules and facile solutions since no two problems are identical. In particular, architects and engineers should be less restricted to two-dimensional design and there is a need for considerable research into the properties and durability of building materials.

Reflecting the current integration of engineers and architects, there is an excellent chapter on bridge architecture demonstrating that like any work of art a beautiful bridge is one that has sound proportions, produces the greatest effect with the least effort and is durable, lasting.

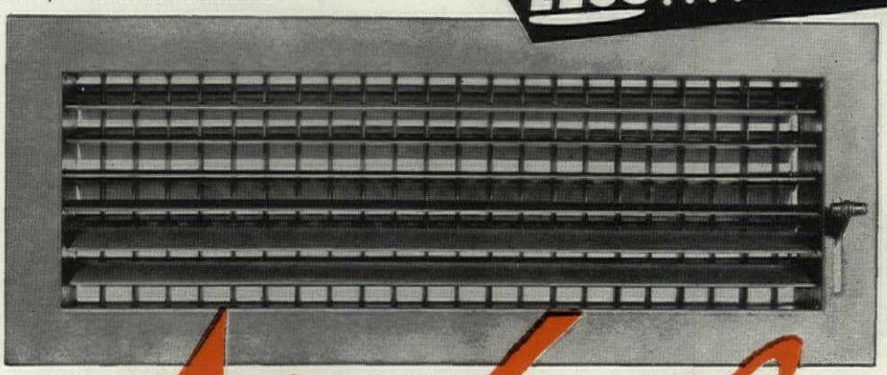
Professor Cross, head of the department of civil engineering at Yale University, has a long record of outstanding achievement in both structural analysis and in education. He is convinced that more development of natural resources will take place during the next 20 years than took place in the last half century. Lights in his ivory tower are liberal, individual thinking and tolerance: "Alumnae are much inclined to have their educators carefully prepare some part of this long road that young men are to follow and wish to have attention concentrated on the particular part of the road that they themselves are following at the time. Thus a young graduate of 30 often thinks that he should have had more technical details in his courses. At 40 there is often the complaint that not enough attention was given to law and management, at 50 the alumnus wishes that he had studied more English or that he had read more of classical literature, at 60 he is usually grown up enough to recognize that colleges are dealing with young men of 20 and not old men of 60 and to realize that it is best to harmonize and give due attention to all stages of his career."

This stimulating, thought-provoking book will be of special interest to university lecturers and students who are having to cram more and more specialist knowledge into an already overcrowded curriculum.

MAKES ANY AIR CONDITIONING SYSTEM A BETTER AIR CONDITIONING SYSTEM

Yet it COSTS LESS.....

● *Illustrated below—*
#276 4-way multi-shutter register . . . features front louvers and rear damper blades parallel to long dimension . . . second row louvers parallel to short dimension.



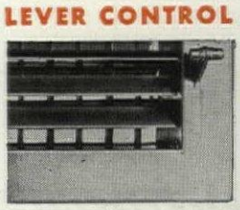
AirFoil

4-WAY MULTI-SHUTTER REGISTER

SOLID-SECTION AIRFOIL LOUVER

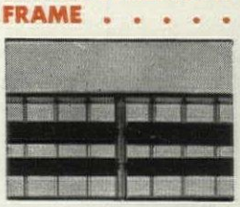
● Louver knifes air in wind tunnel tests. Turbulence has been almost eliminated giving noiseless control of air.

LEVER CONTROL



● Inconspicuous lever in face of frame controls dampers for complete shut-off.

EXTRA-STRENGTH FRAME . . . . .



● New, exclusive Titus *concealed support* eliminates unsightly mullions and butted construction.

The smartly designed #276 combines *4-way #270 grille* with the *multi-shutter damper* to assure maximum directional control with positive volume control and shut-off. Damper blades interlock for complete shut-off.

The two front sets of louvers are individually adjustable with blades on ¾ inch centers.

Dampers are controlled from face of grille by inconspicuous lever. Removable lever furnished at no extra cost.

EXTRA STRENGTH—LONGER LIFE

Sound, inspired know-how engineering gives the #276 superb simplicity of design with no unnecessary parts—no clumsy bulk. A special patented, *concealed support* eliminates unsightly mullions and butted construction permitting superior strength with no added weight.

EASY TO INSTALL

#276 grilles are light in weight—easy to carry—easy to fit—easy to put in place. *Save much costly time and labor.*

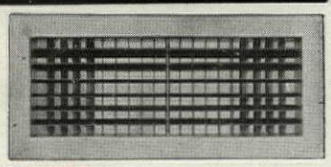
EXTRA VALUE AT LOWER COST

AIRFOIL grilles are priced down to give you more value—more performance—more efficiency—at less cost.

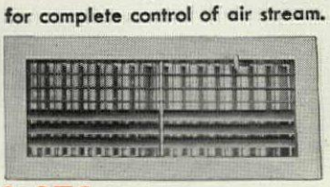
NOTE THESE OUTSTANDING AIRFOIL FEATURES . . .

- Smooth-as-glass AIRFOIL louvers.
- Extra-heavy frames.
- Airtight rubber gasket.
- Positive shut-off.
- Individual louver adjustment.
- Removable lever.

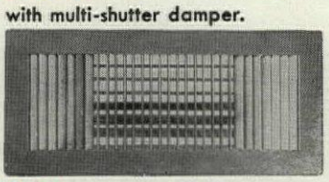
LOOK TO AIRFOIL FOR THE FINEST



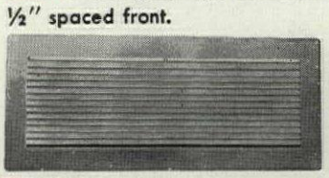
L-270 4-way directional grille for complete control of air stream.



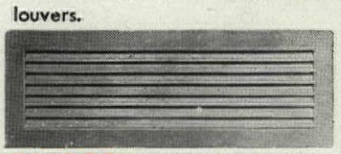
L-274 Double directional grille with multi-shutter damper.



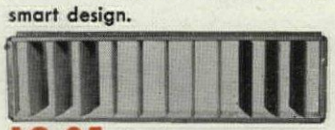
S-8 4-way grille with louvers on ½" spaced front.



RL-21 Return air grille of fixed deflection type with closely spaced louvers.



RL-230 Return air grille incorporates rugged construction and smart design.



AG-25 Volume controller designed to fit behind grille.

CHECK TYPE OF GRILLE ON WHICH INFORMATION IS DESIRED

- ☐ Air conditioning outlets
- ☐ Return air grilles and registers
- ☐ Volume controllers
- ☐ Perforated metal and ornamental grilles
- ☐ Door ventilators
- ☐ Special made-to-order grilles

TITUS MANUFACTURING CORP., WATERLOO, IOWA

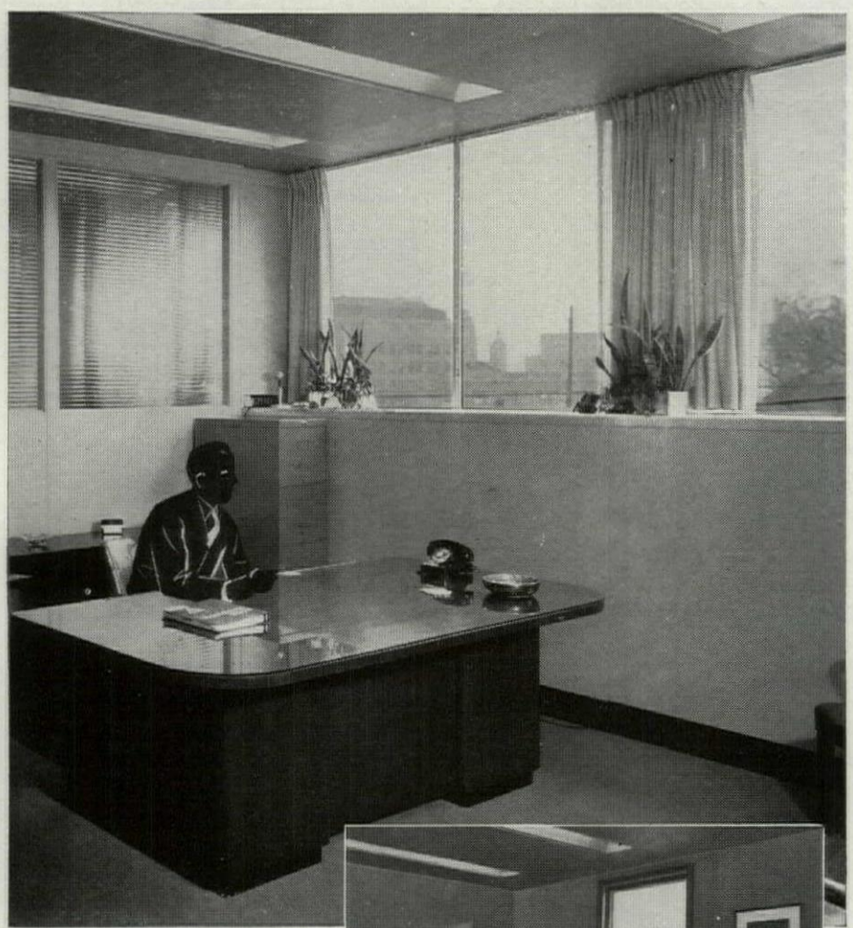
____Rush Information on 276.
____Send complete catalog.
____Send literature on above checked items.

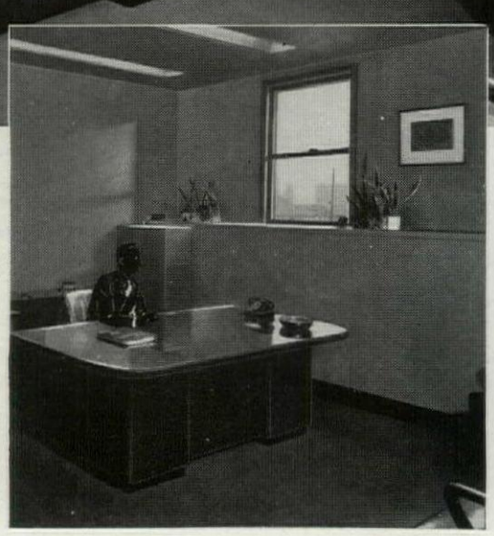
NAME_____
ADDRESS_____
CITY_____ STATE_____

WHY DESIGN A HOLE IN THE WALL

. . . *when you can design a whole wall* that

insulates against heat and sound but also provides maximum natural daylight, soul-lifting sunshine and a view to chase away any cooped-up feeling?





PHOTOGRAPHS SHOW OFFICE in the Line Material Company, Milwaukee, as designed by Maynard W. Meyer & Assoc., with a *Thermopane* Daylight Wall, and as it would have looked with "hole-in-the-wall" windows.

*Thermopane** insulating glass with ½" of dehydrated air hermetically sealed between the two panes has a .58 U value. When made with ¼" air space, it has a heat transmission coefficient of .65 for average winter conditions. It saves 44% of the heat that would be lost through single-pane windows. In summer, this same insulating quality makes *Thermopane* economical in air-conditioned buildings. The size of the equipment and cost of its operation are greatly reduced by the insulating effect of *Thermopane*. Maximum economy is achieved when *Thermopane* is made with Heat Absorbing Plate Glass. In this form, it excludes 41.9% of total solar radiation, compared to 22.7% for standard *Thermopane*.

Thermopane insulating glass with a ½" air space also eliminates 44% more noise transference than single glass, thus making buildings on busy streets quieter to work in.

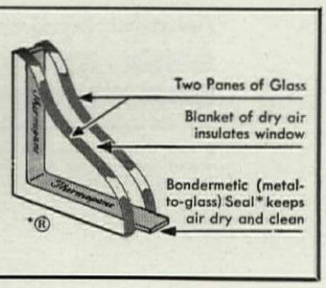
When you design a Daylight Wall with *Thermopane*, using the clear glass all the way to the ceiling and from wall to wall, you can take advantage of relatively lightweight construction to effect structural savings. Compare the cost of a *Thermopane* Daylight Wall with an opaque wall of comparable thermal quality, finished and decorated inside, taking into account erection costs. *Thermopane* compares well!

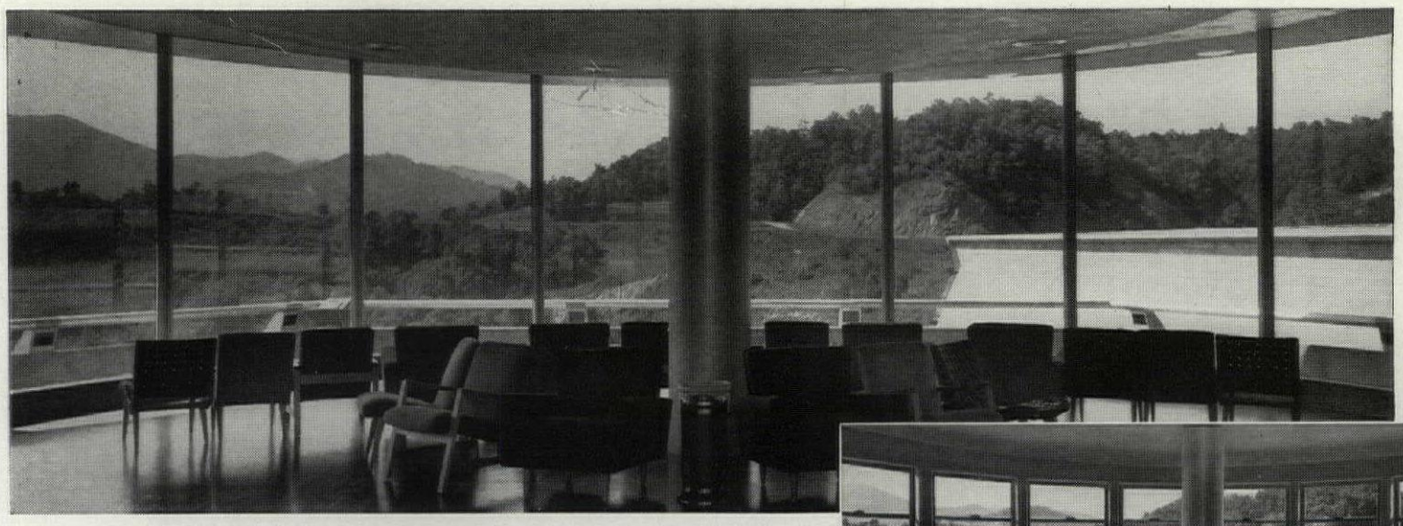
Have you the latest *Thermopane* literature in your file? Send the coupon. *®

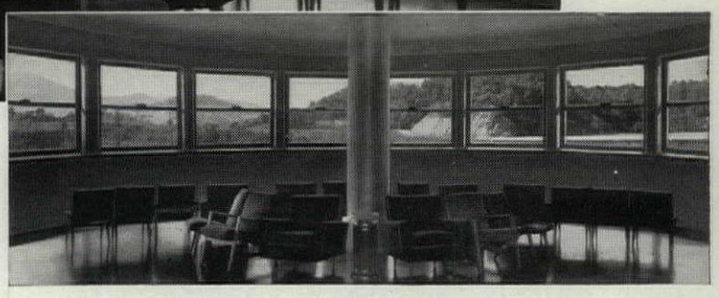
Thermopane
INSULATING GLASS

LOOK FOR THE NAME ON THE SEAL BETWEEN THE PANES

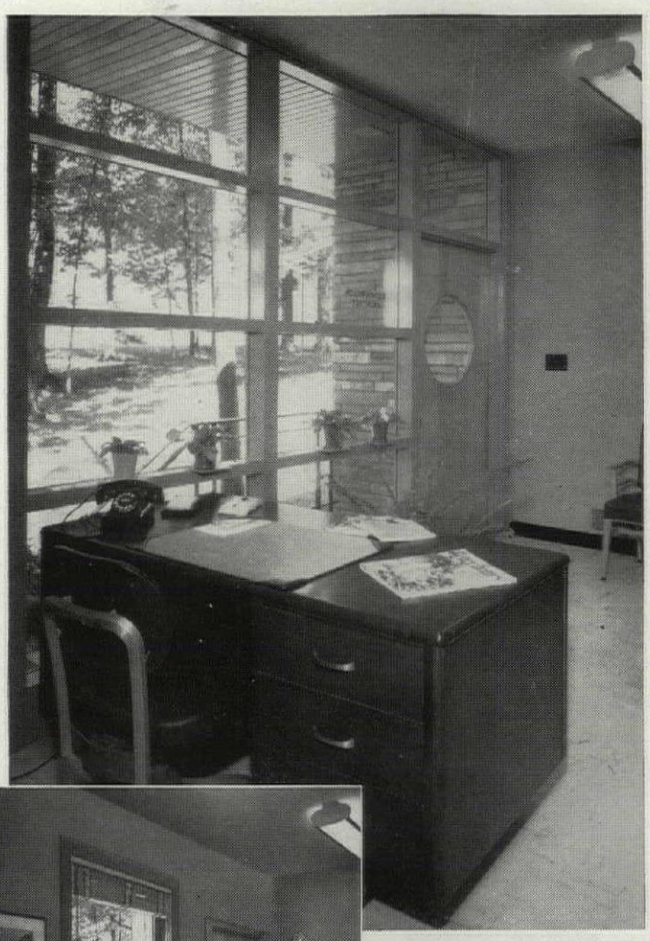
LOF GLASS PLASKON FIBER-GLASS

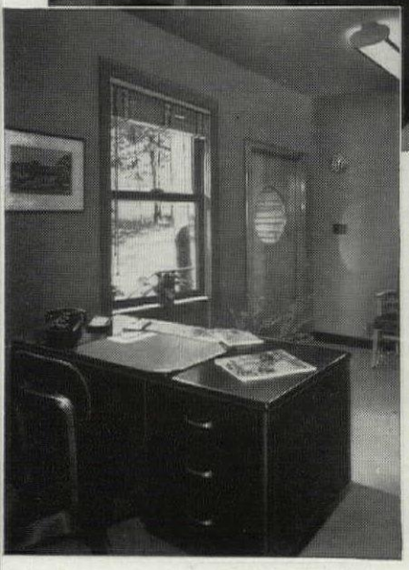






THIS IS HOW TVA ARCHITECTS designed a wall of *Thermopane* insulating glass at Fontana Dam. The feeling of unbroken spaciousness is achieved by running clear glass all the way to the ceiling. Any nontransparent material between the top of the glass and the ceiling would have created a visual barrier, which would have given the room a feeling of smallness, of enclosure.



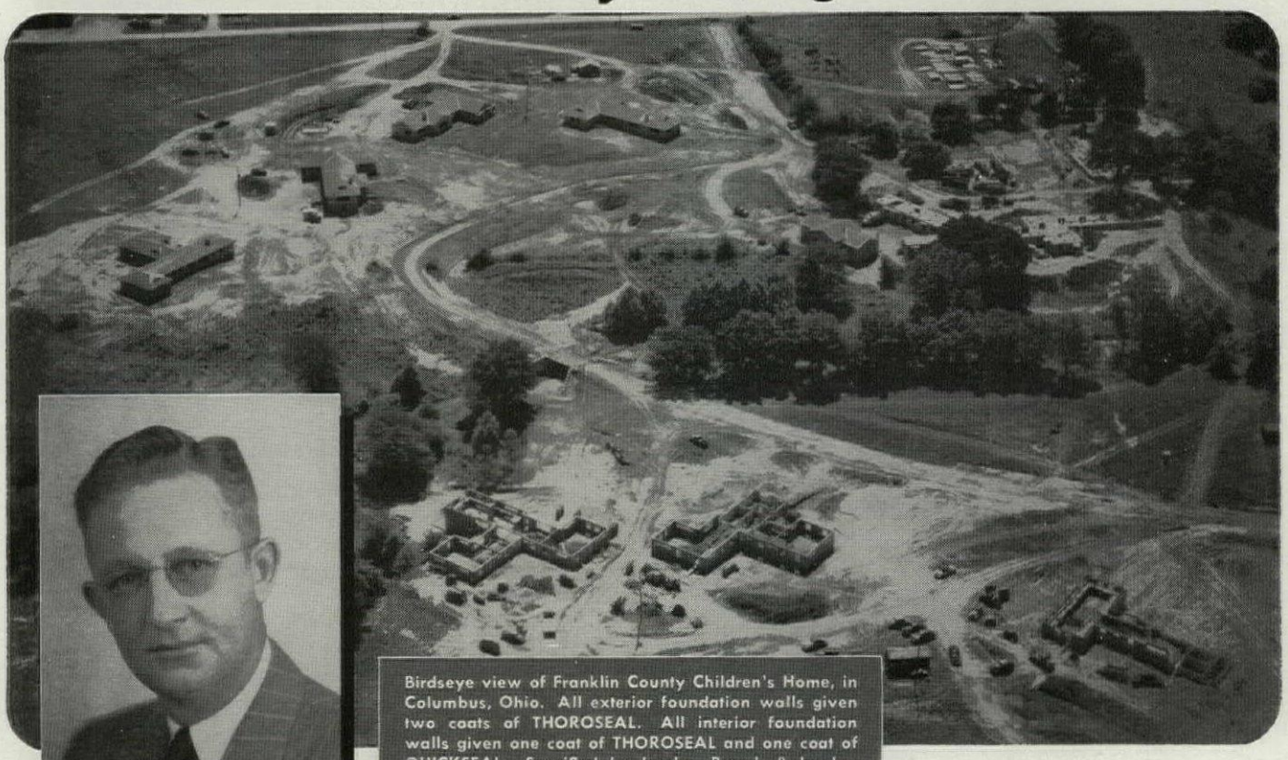


ARCHITECT R. EDWIN WILSON in his small office building, in the outskirts of Charlotte, N.C., creates a feeling of spaciousness by the same device used at Fontana Dam on a grand scale. He used *Thermopane* insulating glass all the way up.

✓ ✓

What a difference, if he had designed a "hole in the wall" instead of a whole wall of glass! When you wall heat in, why wall out light, sunshine and view? *Thermopane* provides an insulated wall you can see through.

TONS of THORO System Materials used by George Sheaf & Co.



Birdseye view of Franklin County Children's Home, in Columbus, Ohio. All exterior foundation walls given two coats of THOROSEAL. All interior foundation walls given one coat of THOROSEAL and one coat of QUICKSEAL. Specified by Inscho, Brand, & Inscho, Columbus, Ohio.

Phones— Main 2321 Main 2322

GEORGE SHEAF & CO.
General Contractors
440 NELSTON STREET
COLUMBUS 3, OHIO

September 6th, 1951

Mr. Robert C. Saunders
Standard Dry Wall Products, Inc.
Box X
New Eagle, Pennsylvania

Dear Mr. Saunders:

For several years now, we have been using your THORO SYSTEM Products, WATERPLUG, THOROSEAL, and QUICKSEAL, and thought you would be interested in the results we have obtained with them.

We have used THOROSEAL, applied in two brush coats as per your specifications, as an exterior foundation coating and have found this method of waterproofing foundations not only to be highly effective but economical aswell as easy to apply.

We have used THOROSEAL and QUICKSEAL, above grade on masonry walls, both exterior and interior, and are very well satisfied with the results, having obtained completely sealed walls as well as decorative finishes that have proven as durable as your literature maintains.

We have also enjoyed excellent relations with your distributor in Columbus, The Columbus Builders Supply Company, and found Mr. Kern of that company very cooperative and helpful whenever we have had reason to call on him.

In the past we have used many tons of THOROSEAL and QUICKSEAL under most every condition and found your claims for their permanence and effectiveness to be entirely justified. Please be assured we would not hesitate to recommend their use where a good waterproofing and beautifying job is required.

Sincerely,

GEO. SHEAF & COMPANY

Geo. Sheaf

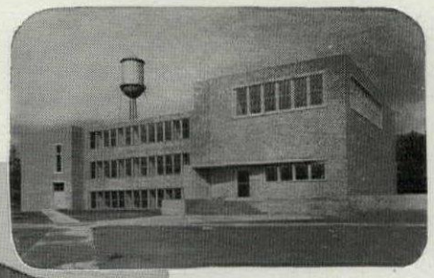
Geo. Sheaf
Owner

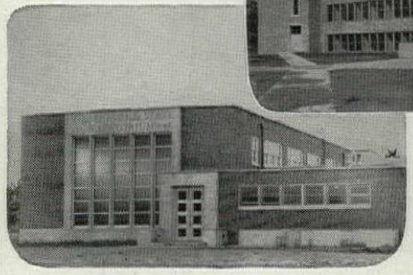
GS/ac

40 Years of service

This year marks our 40th year in the manufacturing of high quality masonry materials. Today, from coast to coast, the name "THORO System products" is high on the list of specified materials by leading architects, engineers and contractors who, themselves, have achieved fame by recognition of good products.

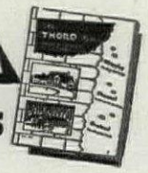
Wilberforce State College, Wilberforce, Ohio. All interior exposed block walls and ceilings received one coat of THOROSEAL (Base Coat).





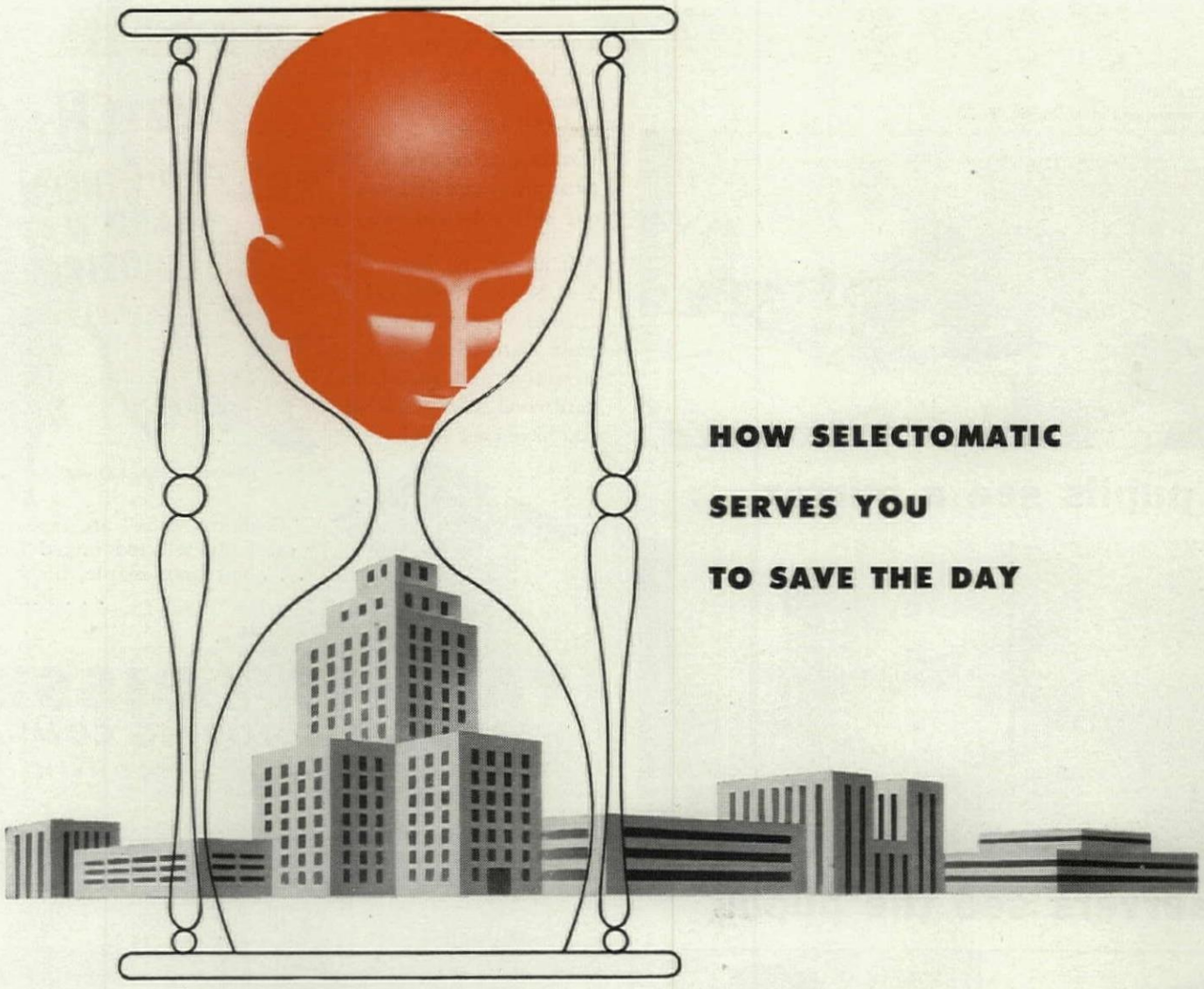
QUICKSEAL (Finish Coat) was used to provide final protection and beauty, with the wide variety of colors meeting all decorative requirements.

Get our 20 page brochure pictorially described in detail, "How to Do it."



Standard Dry Wall Products

NEW EAGLE, PENNSYLVANIA



HOW SELECTOMATIC SERVES YOU TO SAVE THE DAY

You know as well as anyone how much wasted time can cost in today's race against the clock. Long waits for inefficient elevator service, for instance, can waste a lot of time . . . can mean aggravating delays when promptness is so important.

But unique Westinghouse Selectomatic elevators cut your waiting time to a minimum. This fabulous elevator control system responds and dispatches cars in accordance with all traffic conditions.

And for extra time-saving speed, Selectomatic installations now include Westinghouse Synchro-Glide Landing Control. It makes accurate landings extra-smooth, cushion-soft.

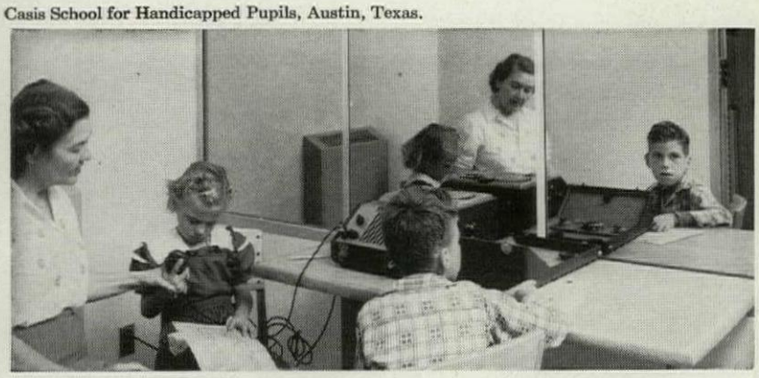
If you have a part in elevator planning or buying, test-ride the new Selectomatic with Synchro-Glide Landing before making any decisions. See how smooth-riding and time-saving an elevator can be. For names of Selectomatic installations in your locality, contact the nearest Westinghouse Elevator office, or write Westinghouse Electric Corporation, Elevator Division, Dept. F1, Jersey City, N. J.

For years, Westinghouse engineering developments have stimulated the vertical transportation industry to strive for ever-higher standards of quality and efficiency. In every phase of vertical transportation—equipment, maintenance and service—Westinghouse has been the vanguard for progress. So, whatever your traffic problems may be—there's a Westinghouse Integrated Vertical Transportation System to solve them completely. Look ahead with the leader . . .

YOU CAN BE SURE... IF IT'S **Westinghouse**

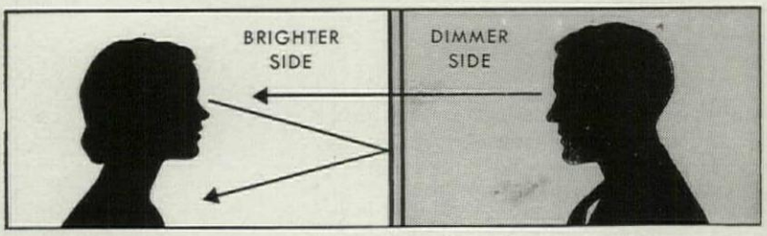
J-98624

Casis School for Handicapped Pupils, Austin, Texas.



The pupils see a mirror ...

observers see the pupils



... with MIRROPANE the 2-way mirror

DOCTOR? LAWYER? MERCHANT? Whatever your business, *Mirropane**, the two-way mirror, probably can help you! In a doctor's waiting room, for example, patients on the brightly lighted reception room side see only a decorative mirror; the doctor and his nurse from their side can see how many patients are waiting. Or supermarket stock clerks can spot the shelves that need replenishing. Hotels, restaurants, banks are taking advantage of *Mirropane's* unique, one-way transparency . . . to see without *being* seen.

MIRROPANE can be installed by your local L·O·F Distributor or Dealer. Look for him under "Glass" in your classified telephone directory.

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L·O·F GLASS

MIRROPANE

TRANSPARENT MIRROR

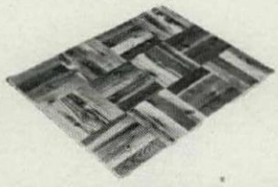
PRODUCT OF LIBERTY MIRROR DIVISION
LIBBEY • OWENS • FORD GLASS COMPANY. LM-192 NICHOLAS BLDG., TOLEDO 3, OHIO

Your requirements for block and strip hardwood flooring (Northern Maple, Oak and Birch) can be met most satisfactorily from our well-balanced inventory.

Ask about the new Y-B Mixed Hardwood "Economy Blox" . . . the most distinctive, attractive and economical hardwood block flooring you have ever seen!

YAWKEY BISSELL
NORTHERN HARD MAPLE FLOORING
from the Heart of the Hardwood Country

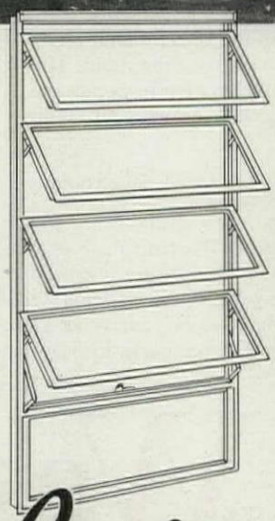
Member MFMA, NOFMA



"Economy Blox" are made up from carefully selected mixed hardwoods . . . northern maple, birch and oak . . . in all grades.

YAWKEY BISSELL
HARDWOOD FLOORING COMPANY
WHITE LAKE • WISCONSIN

Office Building - Chubb & Son, Millburn, N. J.
Walter Kidde Constructors, Inc. - Engineers & Contractors



LEMCO Series 62
MONUMENTAL ALUMINUM
AWNING WINDOWS

Many of the finest new buildings throughout the country are using LEMCO Series 62 Aluminum Awning Windows, chosen for their smart modern appearance, smooth operation and minimum maintenance. The office building of Chubb & Son is an outstanding example of the adaptability of LEMCO Series 62 windows to special structural requirements.

WRITE FOR DESCRIPTIVE LITERATURE

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AMERICA'S OLDEST CASEMENT WINDOW MANUFACTURER
16 MARKET STREET • JAMESTOWN, N.Y.

Knoll Furniture

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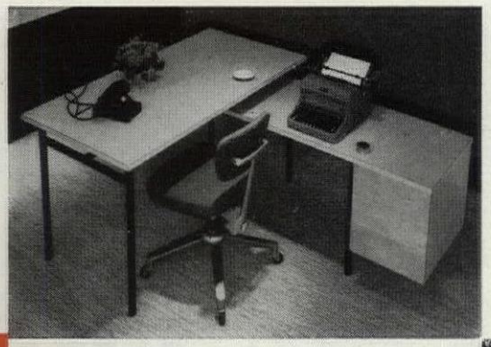
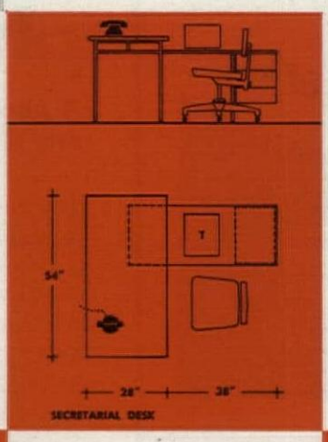
KNOLL



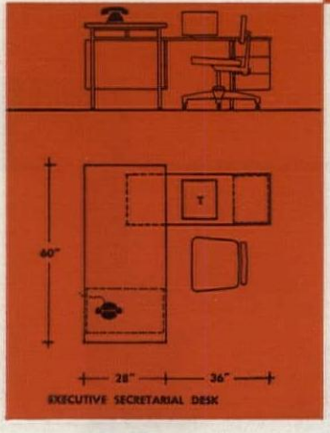
KNOLL ASSOCIATES, INC., 575 MADISON AVENUE, NEW YORK 22, N.Y.

SECRETARIAL DESKS from the Knoll Office Planned Furniture Group. The new L-shape design provides maximum work area per square foot of space and brings wider flexibility to the planning of contemporary offices. Structural base of black metal supports a burn and stain-proof, high pressure laminate top of linen or birch, with stepped-down typewriter extension left or right. Grouped in multiples of two or more, these desks form working units of great efficiency in compact space. Knoll Office Planned Furniture is available in integrated groups of desks, tables, cabinets and chairs for executives and secretaries. Information on request.

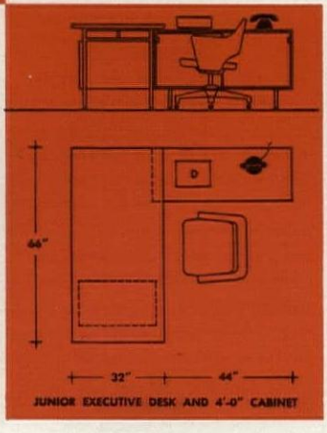


SECRETARIAL DESK

T=TYPEWRITER
D=DICTAPHONE



EXECUTIVE SECRETARIAL DESK



JUNIOR EXECUTIVE DESK AND 4'-0" CABINET

Stressteel for prestressing

New bar tensioning units make prestressing practical for all types of structures

The Stressteel Corporation offers to the U.S. construction industry STRESSTEEL tensioning units, which now make prestressed concrete more economical than reinforced concrete or structural steel in a wide variety of linear structures.

The principal obstacle to wider use of prestressed concrete by American engineers and architects in such structures as bridges and building frames has been the high labor costs required to place, stress and anchor high carbon wire. Until now this wire has been the only steel capable of the sustained high stresses necessary to prestress concrete. These costs have often offset the tremendous savings in materials offered by prestressed construction.

The STRESSTEEL bar is the American equivalent of the Macalloy bar, developed in England specifically to reduce prestressing labor costs, and widely used there under the Lee-McCall method. This bar has a guaranteed ultimate strength of 145,000 psi and a yield strength of 130,000 psi at 0.7% elongation. One STRESSTEEL bar 1⅛" in diameter does the work of 22 wires of .192" diameter. STRESSTEEL bars are available in diameters of ½" to 1⅛" and in lengths up to 80'. High efficiency couplers increase the bars to any desired length.

STRESSTEEL bars and anchorage assemblies can be placed, stressed and anchored with only 25 to 45 man hours per ton, as against 130 to 150 man hours per ton of high carbon wire.

For your copy of the STRESSTEEL Manual, which contains complete information about this important new product, write today to

Stressteel Corporation
Box 13, 207 East 37th Street
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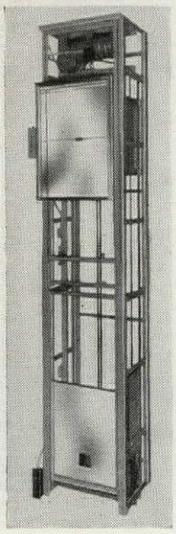
Stressteel



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Parts and small unit movements expedited with MATOT dumb waiters!

MATOT dumb waiters are easy to install in old or new construction. Light weight. Capable of surprising load capacity. Manual or automatic.

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MATOT dumb waiters have many industrial applications, particularly with parts, hardware and small appliance manufacturers.

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LOOK HOW MUCH you can do with the new 35-mm. PRAKTICA FX single-lens reflex camera: Sell custom services and equipment by sample photos, in color or black and white. Show merchandise too bulky to carry. Photograph every field installation. Record construction progress. "Before and After" photos. Train personnel, etc. Easy to carry. Practically foolproof. An excellent camera for the home photographer, too. From $99.50 to $199.50 (Tax incl.). The Praktica Co., Inc., 48 West 29th Street, New York 1, N. Y.

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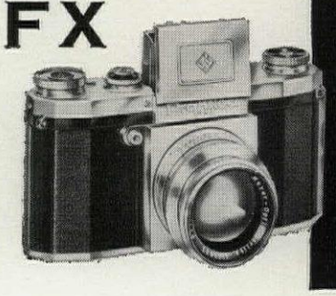

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Lay down *Beautiful Flooring* that doesn't get laid up!

Flooring that can take the 24-hour daily hospital routine *without* requiring periodic doctoring *is a must!*

Follow the lead of leading hospitals and install Flexachrome* Plastic-Asbestos Tile from offices to operating rooms...from kitchens to clinic.

With Flexachrome, you have your choice of 25 bright, clear colors...colors that *go all the way through.*

Some colors are *contagiously cheerful.* Some are subdued and restful. *All of them* are made to help you accomplish a definite purpose...to fit a certain mood.

And *all* Flexachrome tiles are made to give you long, long service life...with minimum maintenance costs.

Flexachrome tiles are *tough* as well as resilient. The stream of patients, doctors, nurses, orderlies, wheel chairs, operating tables and food wagons goes on its way *without damage* to Flexachrome...without disturbing sounds.

Another important thing...Flexachrome takes the problem out of keeping floors clean and sanitary. Daily sweeping...occasional washing...is all that's needed.

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You'll find him listed in the classified pages of your local telephone directory. Or write:

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FLOORS AND WALLS

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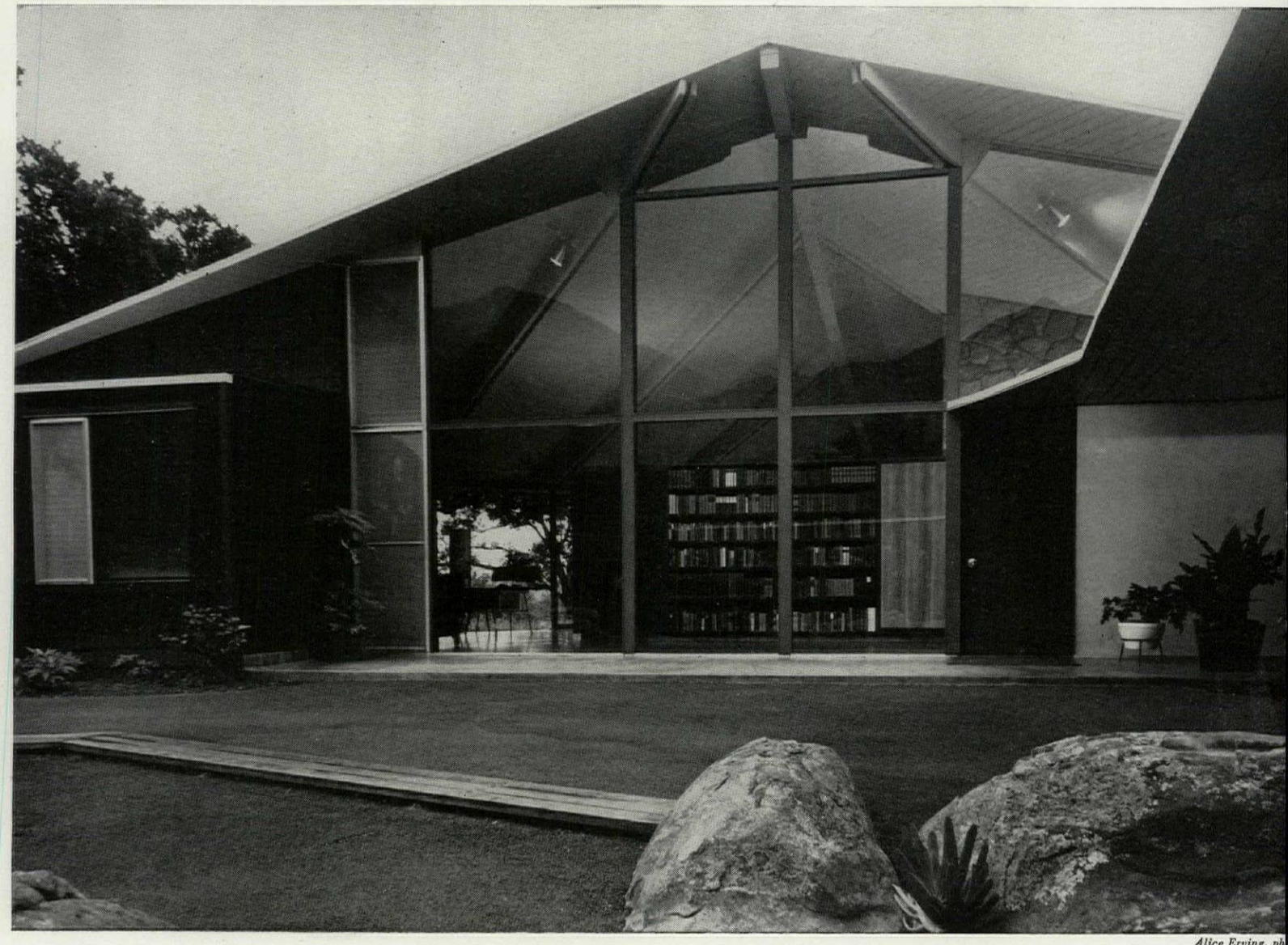

Alice Erving, ph

Triangular "glass tent" in Santa Barbara, California, by architects Leutah Riggs and Arvin Shaw III.

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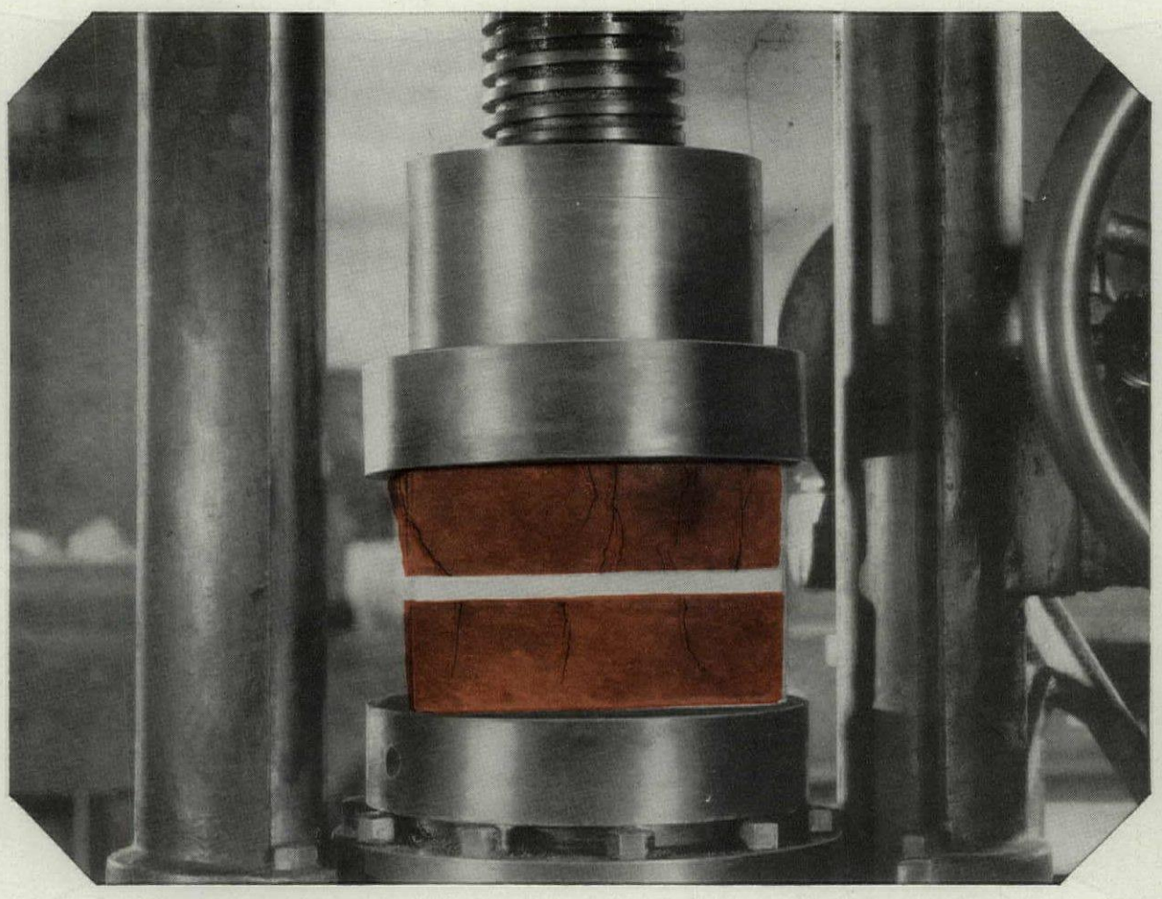

WHERE STRENGTH IS ESSENTIAL

The strength of a brick wall depends on three important factors: The strength of the brick, the strength of the mortar in the joint, and the strength of the *bond* between the two.

When Brixment mortar is tested in compression between two brick, at 28 days or later periods, the brick almost always fail before the mortar.

Brixment mortar assures a strong, durable bond because: (1) it hardens slowly enough to permit deeper penetration and more thorough keying into the pores of the brick; (2) because it has high water-retaining capacity. . . This prevents the brick from sucking the water out of the mortar too fast and keeps the mortar from losing its fine plasticity when spread out on the wall. This permits a more complete bedding of the brick, and an increased area of contact between the brick and mortar. It assures a good bond above as well as below the mortar joint.

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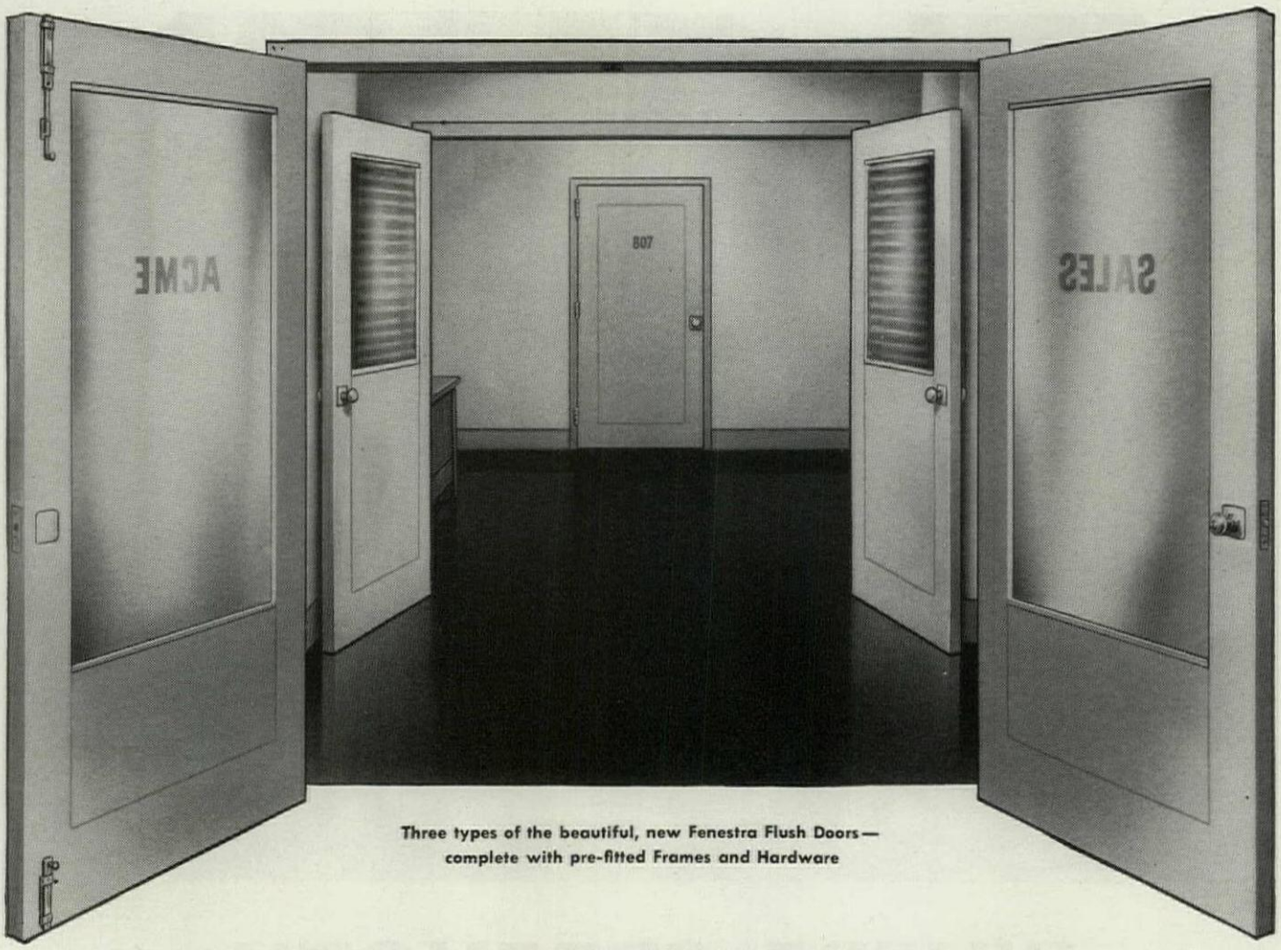

Three types of the beautiful, new Fenestra Flush Doors—
complete with pre-fitted Frames and Hardware

How much entrance fee do you pay?

It adds up. And keeps adding up.

Count the doors in your building—the entrance doors, the hall doors, the office doors—and then remember these door savings when you build again:

The *installed* cost (which is the *real* cost of any door) is amazingly low for a Fenestra* Hollow Metal Door-Frame-Hardware Unit because so much time and labor is saved—everything goes together without any cutting or fitting or fooling around.

Maintenance cost is low because these doors can't warp, stick or splinter. They always open smoothly, easily. And when they close, they're quiet—between the panel is double insulation. The clean modern lines and velvety finish of these Fenestra Hollow Metal Doors—and the durability of their beauty—help to give you a building you can *always* be proud of.

Above, you see Fenestra Flush Entrance Doors, then Fenestra Flush Interior Doors with glass panels and finally the sleek Flush Interior Door with full metal panel. Find out more about all three. They are made by one of the most experienced metal fabricators in America—The Detroit Steel Products Company. Call your Fenestra Representative (he's listed in the yellow pages of your phone book) or mail the coupon. *®

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Please send me full information on Fenestra Door-Frame-Hardware Units.

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Fenestra **Hollow Metal Door • Frame • Hardware Units**

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Don't miss our exhibit in Booth 150 at the American Hospital Association Convention . . . Convention Hall, Philadelphia, Sept. 15-18.

Fenestra Intermediate Steel Windows in Veterans' Hospital, Altoona, Pa. *Architects:* Marlier, Wolfe, Johnstone & Associates, Pittsburgh. *Contractors:* Mellon-Stuart Company, Pittsburgh.

These Windows Give You Ventilation Control!

Fresh air to sweep the staleness out—even when it's raining. Fresh air in the amount you want—where you want it—without drafts. That's what your windows ought to give you.

The swing-out vents of a Fenestra* Intermediate Steel Window catch passing air and guide it in. The tilt-in sill vent keeps out the rain and tames the breeze. Always easy to operate—with one hand—Fenestra Windows never stick.

You get more glass area, light, and more view, too, with Fenestra Steel Windows, because their frames are designed to be strong and rigid without being *bulky*. And those graceful lines add immeasurably to the trim, clean beauty of your building.

FENESTRA GALVANIZING SAVES YOU MONEY

No maintenance-painting is necessary with Fenestra Super Hot-Dip Galvanized Steel Windows. The combination of the strength of steel and the protection of Fenestra's special galvanizing makes Fenestra Windows the most *permanent* windows made.

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Send for your free book on how Fenestra Super Hot-Dip Galvanizing makes Fenestra Steel Windows *stay* new.

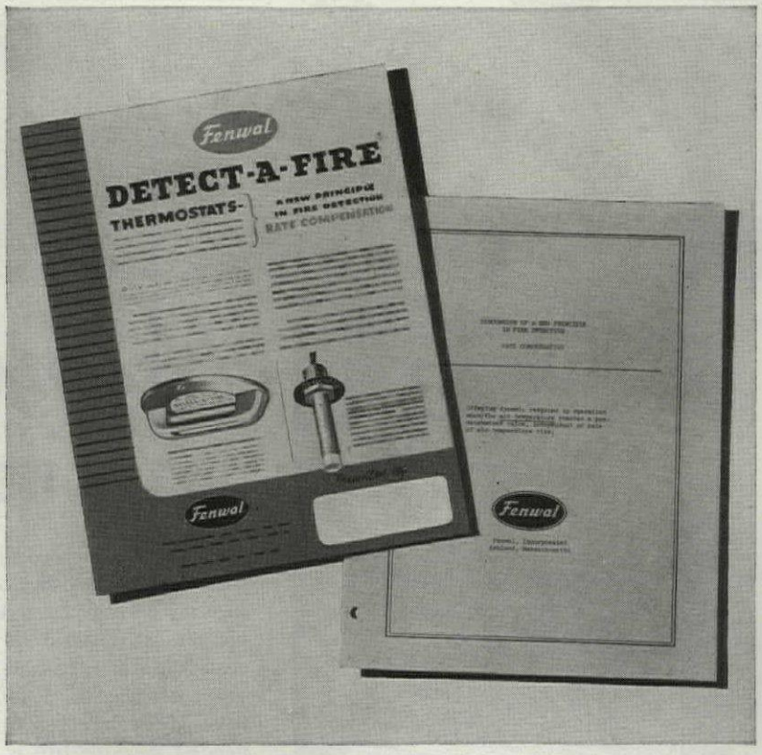
Windows that make the most of Daylight and Fresh Air *Fenestra*

Which will happen to YOU?

A $200,000 LOSS, as in this paint and varnish factory, can happen only where *full* fire protection is lacking. To more and more men responsible for protecting life and property, *full* fire protection means a carefully engineered alarm or release system incorporating Fenwal DETECT-A-FIRE® thermostats.

SPEEDY ACTION when fire starts helps keep losses low. Fenwal Rate-Compensated DETECT-A-FIRE thermostats activate alarm or release fire protection systems the instant the temperature of the surrounding air reaches the danger point. No hazardous delays! No troublesome false alarms! No other fire detection units are so positive.

YOU GET EXTRA VALUE, TOO, when your fire protection system includes Fenwal DETECT-A-FIRE thermostats. Their long life, corrosion resistance and repeatability give you *long-term economy*. They're approved by FM . . . listed by UL. Investigate the *extra* value of Fenwal DETECT-A-FIRE thermostats.



THESE FREE BULLETINS give you the complete facts about Fenwal DETECT-A-FIRE thermostats . . . the only units which give you the benefits of the new Rate-Compensation principle of fire detection. Fenwal engineers will be glad to work with you and your system installer so that you, too, can enjoy all the benefits of *full* fire protection. Write Fenwal, Incorporated, Temperature Control Engineers, 259 Pleasant St., Ashland, Mass.

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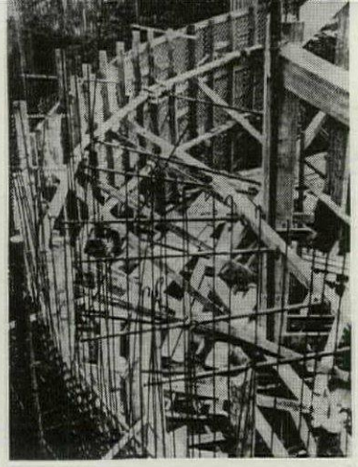
DETECT-A-FIRE®

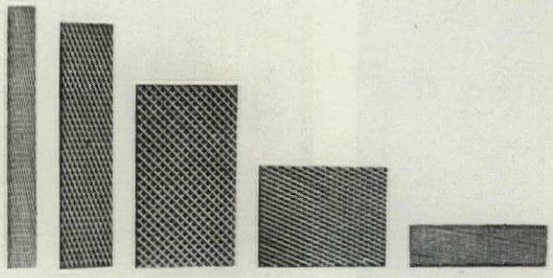
Thermostats

DYNAMIC, RATE-COMPENSATED ACTUATED FIRE DETECTION

PRODUCT NEWS



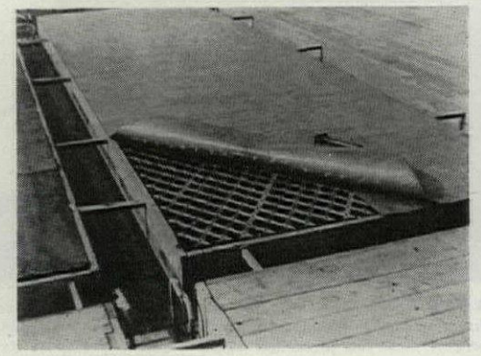
Flexible and lightweight, the wood mesh forms are suitable for curved as well as straight concrete work.



EXPANDABLE FORM FOR CONCRETE. Wood lattice accordions to varying panel sizes

Crisscross wood struts make up the core of the lightweight *Rubora* form for poured concrete. After several years of successful use in Europe, the Holland-made form is being introduced to the US building industry. Although premium priced at about $1 per sq. ft., the scissorlike section may be reused 100 times, bringing the cost per job down to about 1¢ per sq. ft. The *Rubora* boasts several practical features:

▸ Hinged at intersecting points, the wood struts may be pushed and pulled easily to



different heights and widths. Type A, for instance, is 8 sq. ft. folded but can be expanded to cover a maximum area of 30 sq. ft. and adjusted to any combination of dimensions between 5′-8″ x 1′-4″ and 10′-4″ x 9″. Weighing only 50 lbs., the form is easily carried by one man.

▸ Unique lattice construction gives the forms a greater carrying capacity than plain board and thereby cuts shoring costs. (Supports for a 4″ thick concrete floor can be spaced as far as 28″ apart.)

▸ *Rubora* units have an 8″ to 9″ rise in a 6′ to 7′ arc, and so make inexpensive curved forms for circular walls on silos, bridge piers, factories, etc. For rough-finished work, a kraft paper liner is tacked over the core; where a smooth surface is needed, ⅛″ or 1/10″ hardboard (reusable about 10 times) is nailed along the edge and easily stripped after use.

Although the form itself does not contact the concrete directly, it is chemically impregnated against dampness. Compressed to ¼ their expanded sizes, *Rubora* panels stack in neat bundles for easy storage and transportation to the site.

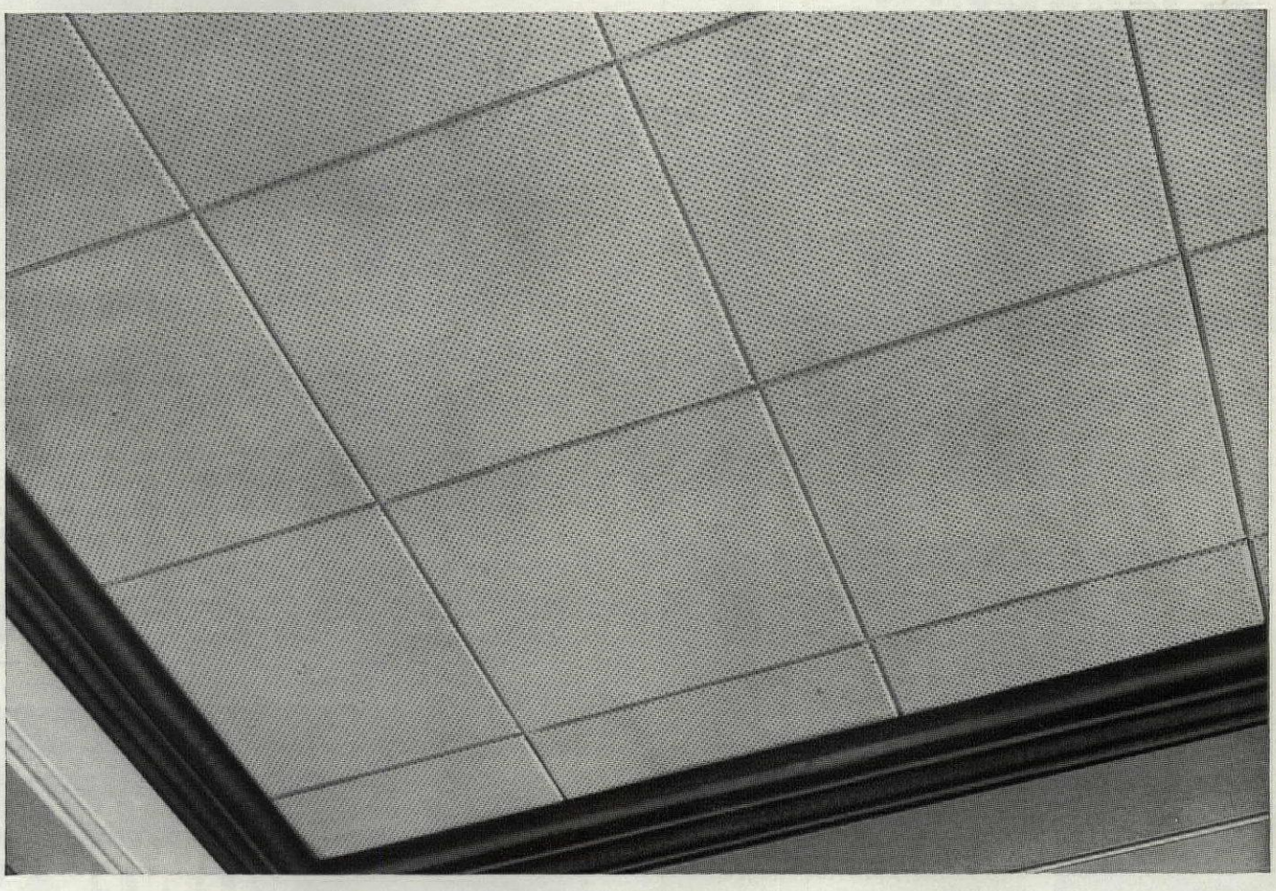
Distributor: Kurt Orban Co., Inc., 205 E. 42 St., New York 17, N. Y.

DEMOUNTABLE STEEL FRAMING made of chanels and spring bolts

Mult-A-Frame is the latest man-sized erector set to join the growing ranks of quick-assembly framing. Comprised of three basic units—channel, bolt, and lock fitting—the system has wide industrial possibilities and perhaps still greater building potential. The new framing requires no nailing, drilling or

(Continued on page 214)

Johns-Manville Sanacoustic* ... a perforated metal acoustical unit.



J-M Sanacoustic Units are noncombustible, demountable, easy to clean.

J-M Sanacoustic Units are noncombustible, easy to clean. Wherever installed they provide the highest acoustical efficiency plus safety, economy and attractive appearance.

In addition to high sound-absorption qualities, J-M Sanacoustic Panels combine all the important advantages that are desirable for all-round acoustical ceiling efficiency. They are fireproof, easy and economical to clean, removable, and have high light reflection.

As a result, millions of square feet of Sanacoustic have been installed in institutions, offices, schools, hospitals, hotels, and other places of public assembly where quiet is important.

Consisting of perforated metal panels backed up with a fireproof sound-absorbing element, Sanacoustic Ceilings will not burn, rot, or disintegrate. They may be applied over new or existing construction; and can be painted, if desired, without affecting acoustical efficiency.

An exclusive J-M patented construction system permits interchangeability of flush-type fluorescent lighting and acoustical ceiling units.

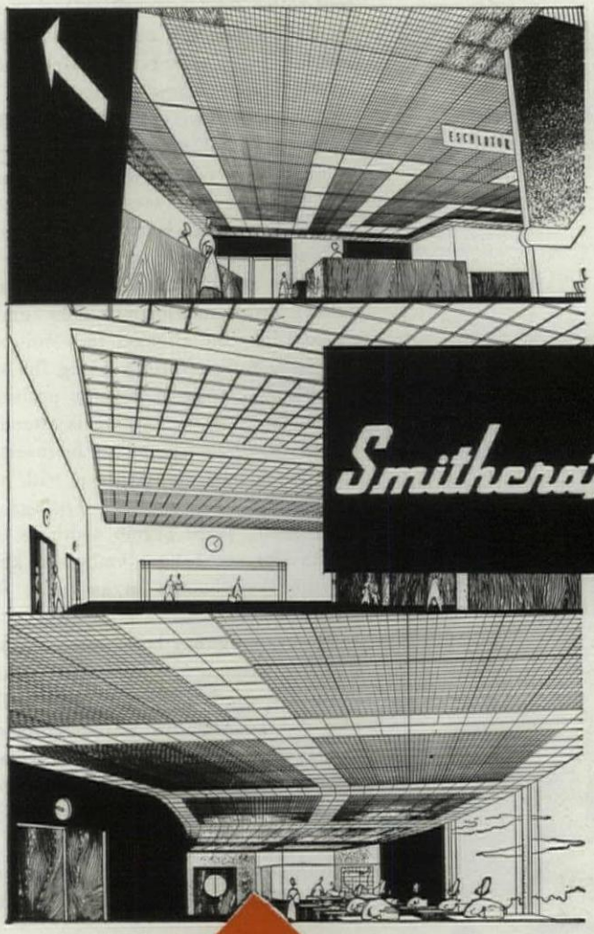
Other Johns-Manville acoustical ceilings include *Fibretone**, a drilled fibreboard; *Transite**, made of perforated fireproof asbestos; and *Permacoustic**, a textured, noncombustible tile with architectural appeal.

Send for the free Johns-Manville brochure, "Sound Control" that tells about these acoustical ceilings. Write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

*Reg. U.S. Pat. Off.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville**

J-M Acoustical Materials include Sanacoustic Units, Transite* Acoustical Panels, and drilled Fibretone*



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A COMPLETELY NEW APPROACH TO OVERALL LIGHTING . . .

Smithcraft area illumination

NOW . . . **advanced design** fulfills all the possibilities and benefits promised by overall lighting! **Smithcraft Area Illumination** is a complete fluorescent lighting system free from all the limitations and mechanical difficulties of previous attempts, yet it is not "custom built" to each installation. Skillfully engineered with unbelievable simplicity, **Smithcraft Area Illumination** when installed becomes a lighting "fixture" of limitless dimensions, shapes and patterns with unrestricted selection of shielding media and varied intensities within the system. For those who plan, recommend and install, here is an important new tool and business-producer; for the user, **Smithcraft Area Illumination** opens up exciting new possibilities for effect combined with illumination of unequalled quality.

architects

To the architect, **Smithcraft Area Illumination** presents a new opportunity for freedom of expression in the integrating of lighting interiors within interior design. Here is freedom of choice with no restrictions as to **size, pattern, intensity, shielding,** and **periphery.**

engineers

Engineers can now specify **and get** any required level of intensity. Or **different** intensities for different sections of an installation may be recommended to permit optimum usage of store or office areas. Alternating light, rows of lighting, or banks of lighting are possible because of flexibility of switching and a specially designed wiring system.

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Ease and economy of installation are truly amazing! **Smithcraft Area Illumination** is actually installed in far less time than any combination of ceiling and illumination currently available. No careful dimensioning is required and no special tools, rules, or gadgets. From the time the hangers are in position on the ceiling to the finished installation, only a water level and small screwdriver are required.

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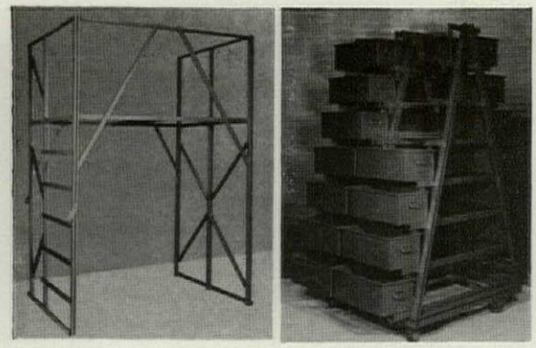
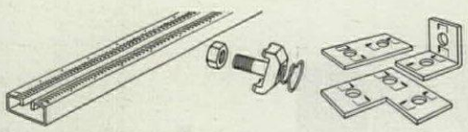
For those who own buildings and businesses of many kinds, **Smithcraft Area Illumination** is a **profitable** and practical investment. Versatile and adaptable, here is highest quality illumination combined with appearance and effect that **sells** and **produces.** Its ease of maintenance and adaptability to future plans and developments are factors that interest any businessman. Yet, its initial cost is comparable to that of a suspended ceiling and troffer system.

America's finest fluorescent fixtures **Smithcraft**
LIGHTING DIVISION
CHELSEA 50 MASSACHUSETTS

Send now for further information on Smithcraft Area Illumination.





Spring bolts, fittings, and cold rolled steel channels make up this adaptable framing system for demountable structures and storage racks.

welding. Purchased in standard lengths, its cold rolled steel (noncritical) channel can be cut with a saw and assembled rapidly with a common wrench, and dismantled just as easily for moving or a new application. It comes in two sizes and weights—1-5/8" x 13/16", 17 gauge and 1-5/8" x 1-5/8", 13 gauge— and may be ordered in factory-welded combinations of two, three or four sections for use as structural columns and beams. Both the single and multiple members may be bolted to other members at any angle. For convenience in cutting and measuring, dots and dashes pressed into the channel face indicate inches and feet, and serrations along the slot edges provide 1/8" adjustments for positioning the spring bolts. A coil spring is attached to the one-piece T-bolt which may be inserted in the channel, moved or taken out with a twist of the fingers. *Safe-Locking Fittings*, stamped from 3/16" plate (same width as the frame on its slot side) have embossed keys which fit into the channel to assure a rigid construction.

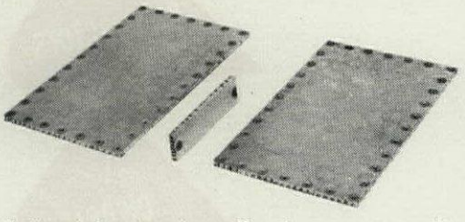
The framing may be adapted as hangers for lighting fixtures and bus bars; and as supports for conduit, heaters or ventilators. It also can be used for wall, ceiling and floor inserts as well as scaffolding, worktables and storage racks. The smaller-size channel sells for about 28¢ per lin. ft. and the larger for 55¢.

Manufacturer: Ainsworth Manufacturing Corp., 2200 Franklin St., Detroit 7, Mich.

ALUMINUM BOLT SPACER prevents crushing of delicate sandwiches

The *Fasco Spacer* is a practical device for securing structural materials such as balsa and other soft woods and sandwich-type panels

with thin-gauge metal faces. The strong aluminum-alloy bolt fastener limits the take-up of nut and bolt to a specified grip length, preventing damage to fragile building materials. Providing a means of attaching structural members, conduits and equipment to



lightweight curtain walls, the spacer can be installed either by hand or with a squeezer die and index pin. Available in various anodized colors, it is made in No. 8, No. 10, and 1/4" screw sizes with grip lengths from 3/16" to 1". It costs about 12¢ to 20¢, depending on quantity purchased.

Manufacturer: Delron Co., Inc., South Gate, Calif.

(Continued on page 218)

For your personal reference write for a copy of "Doors for American Industry" —its pages bring to you ideas obtained through many years of varied experience

DOORWAYS TO *Profit*

However unusual your industrial door problem or requirements, you can depend on International Steel to come up with the one best answer. That's a broad statement but no broader than International's specialized experience—and consistently successful record—in solving tough entrance problems for business and industry.

A long list of satisfied customers is your assurance of our ability to meet difficult specifications—and tight budgets!

Slide doors, vertical lift doors, turnover doors, canopy doors—of whatever size—special doors for test chambers, stormproof doors for huge hangars . . . these are all in the day's work to the industrial door specialists at International Steel. Put us to the test! For further facts, write, wire or phone . . .

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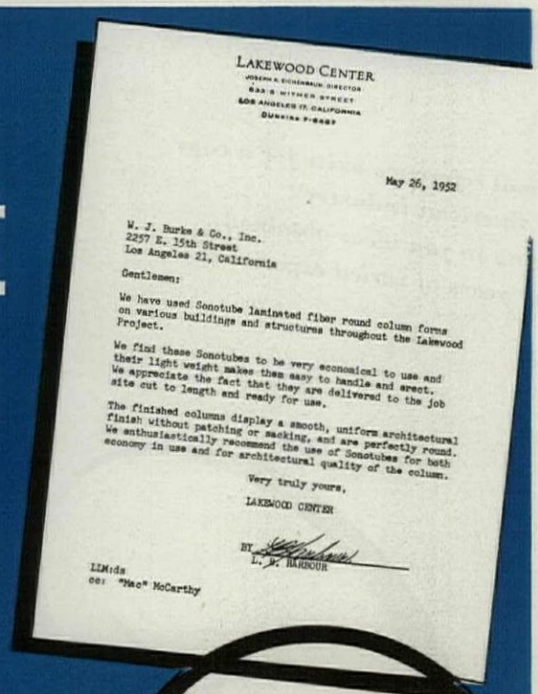
The one-time use FIBRE FORMS

ROUND COLUMNS of CONCRETE



LAKEWOOD CENTER
JOSEPH A. SCHENKMAN, DIRECTOR
633 S. WITMER STREET
LOS ANGELES 17, CALIFORNIA
DUNKIRK 7-6587

May 26, 1952

W. J. Burke & Co., Inc.
2257 E. 15th Street
Los Angeles 21, California

Gentlemen:

We have used Sonotube laminated fiber round column forms on various buildings and structures throughout the Lakewood Project.

We find these Sonotubes to be very economical to use and their light weight makes them easy to handle and erect. We appreciate the fact that they are delivered to the job site cut to length and ready for use.

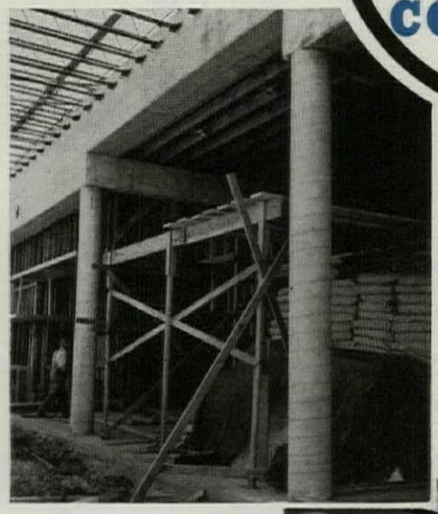
The finished columns display a smooth, uniform architectural finish without patching or macking, and are perfectly round. We enthusiastically recommend the use of Sonotubes for both economy in use and for architectural quality of the column.

Very truly yours,

LAKEWOOD CENTER

BY L. W. HARBOUR

LLM:ds
cc: "Mac" McCarthy



Thank you, Mr. Harbour! With each day, Sonotubes are being used in an ever widening range of projects involving concrete columns, piers, piles, underpinning, etc. Their low initial cost and ease of handling result in considerable savings in time, labor and money. Sonotubes are available in sizes 3" to 24" I.D., up to 24' long. Saws like wood.

Lakewood Shopping Center, covering 154 acres, Los Angeles County, Calif., is the nation's largest suburban shopping development.

Architects include Armet & Davis; I. Herman Kanner; Albert C. Martin & Associates; all of Los Angeles. Lakewood Reservoir, Hedden & Shelley, Engineers, Long Beach, Calif.

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with AIRFLOW channel

a new idea in factory lighting as different as white from black

white inside and OUTSIDE
the white upside helps lift ceiling gloom, reduces strong shadows and improves brightness-contrast ratios

surface 300° Permalux or Porcelain Enamel
Airflow Channel circulates air for longer ballast life
easy to clean, easy to install

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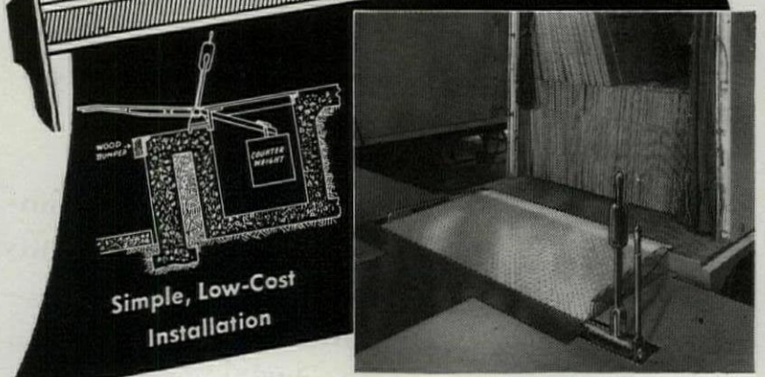
You get top efficiency with . . .

RITE-HITE ADJUSTABLE LOADING DOCKS



Simple, Low-Cost Installation

Include RITE-HITE Adjustable Loading Docks in your design. You'll get . . .

- Ease of Installation
- Trouble Free Maintenance
- Modern and Efficient Performance
- Speedy Cross-Dock Operation

No piping ✓
No compressors ✓
No pumps ✓
No motors ✓
No lubrication ✓
No machinery ✓
No operation expense ✓
Counter-balanced ✓
Easy to operate ✓

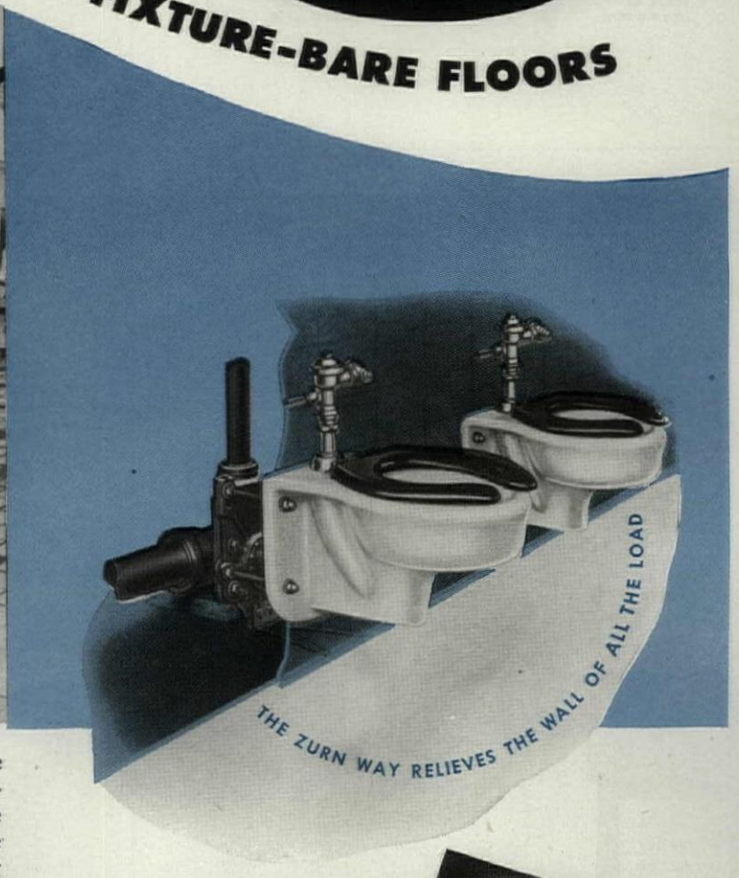
For complete details, sizes, and specifications write to: Dept. A

LOOMIS MACHINE CO. • CLARE, MICHIGAN
RITE-HITE DIVISION

ZURN TYPE REST ROOMS HAVE FIXTURE-BARE FLOORS

ZURN

A FIXTURE-BARE FLOOR IS, AS IT IS, ALWAYS!



Immaculately clean! Cleanliness is no problem in toilet rooms where plumbing fixtures are off the floor, because there is nothing to interrupt the sweep of the broom and the swish of the mop. Fixture-bare floors reduce the day by day dollar cost of maintenance to an all-time low while lifting sanitation to a new high. A New Way of building utilizes wall type plumbing fixtures throughout, installed the Zurn Way—the simple, fast, safe way of installing wall type closets, lavatories, sinks and other fixtures. This New Way reduces the use of building material; eliminates need of suspended ceiling constructions; requires less space for walls; saves time and labor and protects rest rooms from premature obsolescence. Specify wall type plumbing fixtures installed with Zurn Wall Closet Fittings and Carriers. Write for booklet entitled, "You Can Build It (Cubic Foot of Building Space) For Less The New Way".

Write for this booklet. It tells how "You Can Build It (Cubic Foot of Building Space) For Less A New Way".

J. A. ZURN MFG. CO. ERIE, PA. U.S.A.

PLUMBING DIVISION

Sales Offices in All Principal Cities

Pre-eminent Manufacturer of Sanitary Products for the Protection of Human Health and Modern Structures

ZURN

J. A. ZURN MANUFACTURING CO. • PLUMBING DIVISION • ERIE, PA., U.S.A.

Please send me the new Zurn Booklet, "You Can Build It (Cubic Foot of Building Space) For Less A New Way."

Name and Title .....

Company .....

Street .....

City and State .....

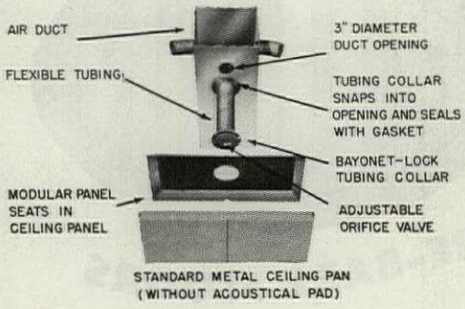
Please attach coupon to your business letterhead. Dept. AF

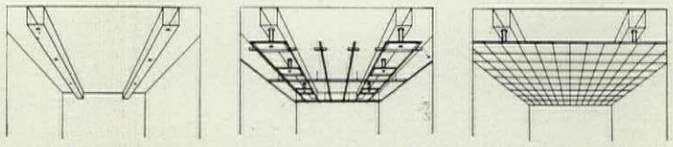
Rest Rooms with Fixture-Bare Floors in These Buildings and Hundreds of Others:

OFFICE BUILDINGS: Farmers Mutual Insurance Company, *Madison*, Wis. • New Hampshire Fire Insurance Building, *Manchester*, New Hampshire • Southwestern Bell Telephone Co., Toll Building, *Houston*, Texas • International Business Machines, *Endicott*, N. Y. • General Food Building, *Newark*, N. J. • The Texas Company, *Minneapolis*, Minn. • Humble Oil Company, *New Orleans*, La. • **EDUCATIONAL BUILDINGS:** Fisher Memorial Dormitory, University of Notre Dame, *Notre Dame*, Ind. • Maple Heights High School, *Maple Heights*, O. • Dilworth School, *Salt Lake City*, Utah • New Engineering Laboratory, Virginia Polytechnic Institute, *Blacksburg*, Va. • Medical Research Building, University of Michigan, *Ann Arbor*, Mich. • **INDUSTRIAL BUILDINGS:** DeLaval Separator Company, *Poughkeepsie*, N. Y. • Houston Lighting and Power Company, *Houston*, Texas • Berkshire Knitting Mill, *Andrews*, N. C. • Minneapolis Honeywell Regulator Co., *Minneapolis*, Minn. • Chrysler Corporation, *Trenton*, Mich. • Dan River Mills, *Philadelphia*, Pa. • Court House and City Hall Building, *Minneapolis*, Minn. • Oregon State Penitentiary, *Salem*, Oregon • **HOSPITAL BUILDINGS:** Cuyahoga County Chronic Hospital, *Warrensville*, O. • National Jewish Hospital, *Denver*, Colo. • Terrell State Hospital, *Terrell*, Texas • Memorial Hospital, *Algoma*, Wis. • Central State Hospital, *Petersburg*, Va. • Oakwood Hospital, *Dearborn*, Mich. • **TERMINAL BUILDINGS:** New Norfolk and Western R. R. Warehouse, *Roanoke*, Va. • Holland American Line Terminal, *Hoboken*, N. Y. • New Greyhound Terminal, *Phoenix*, Ariz. • **MERCANTILE BUILDINGS:** Emporium, *Oakland*, Cal. • Sugarland Shopping Center, *Sugarland*, Texas • Federal Stores, *Cleveland*, O. • Macy's Kansas City Store, *Kansas City*, Kan. • Rexall Drug Company, National Headquarters Building, *Los Angeles*, Cal. •

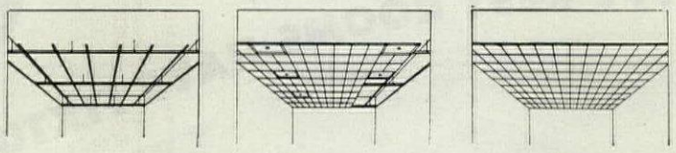
Patented and Pat. Pending. *Copyright 1952*

PRODUCT NEWS





The rectangular diffuser panel is engineered to fit right into a standard acoustical pan ceiling. It is available with a tube connection for application in a duct system *(above)* or without, for a plenum *(below)*. Perforations in the pans emit conditioned air at low velocity.



OUT-OF-SIGHT AIR DIFFUSER works with ceiling plenum or duct systems.

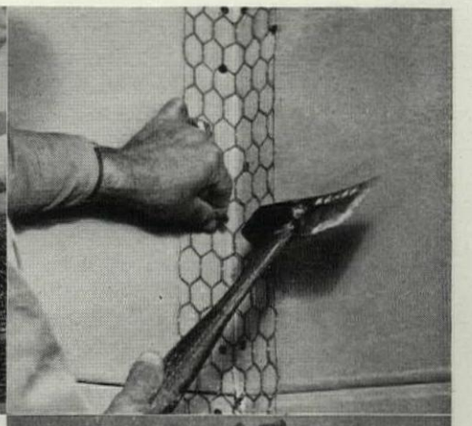
Designed to fit into a standard metal acoustical pan, *Multi-Vent's Modular* air diffuser simplifies the appearance and installation of a working ceiling. Nesting behind a 1′ x 2′ perforated pan (with its sound-absorbent pad removed) the new unit presents the same front as the rest of the ceiling. Like the firm's other *Draftless Air Diffusers*, the ceiling-conformist model is engineered for low-velocity distribution, functioning by gradual pressure displacement rather than forceful air stream. No air movement more than 6″ from the panel excedes the comfort zone requirements set up by the American Society of Heating & Ventilating Engineers, the manufacturer states. Thus the diffusers may be situated wherever they best suit cooling, heating or ventilating needs; partition placement will not affect, nor will draft-sensitive personnel be affected by, the air pattern.

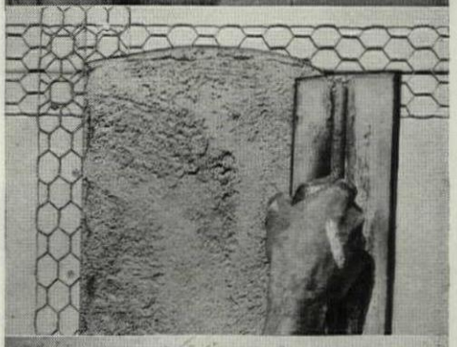
For use in duct systems, the panels are equipped with 3″ wide tube connections made of glass-fiber reinforced neoprene. Flexible and compressible, the tubing allows a comfortable margin for juggling to keep the ceiling panels aligned—even where the ductwork above wanders from the straight and level. To keep installation simple, holes can be cut in the ducts—bottom or sides—during fabrication. Gasket sealed collars on the tubing snap into the openings; no calking is necessary.

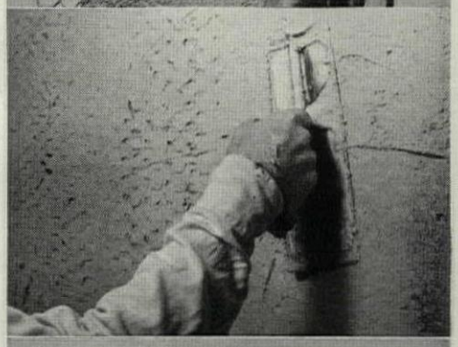
For plenum applications, the panels are furnished with a perimeter gasket and orifice valve, minus the tubing. They are installed on suspended tee runners with the regular acoustical pans, substituting panel assemblies for insulating pads. Modular diffusers for duct-air systems cost about $12; plenum type are $9. In both kinds of discharge systems (and especially in a plenum type where the acoustical blanket is hung above the air supply) the metal pans quickly take on the temperature of the conditioned air and thereby provide radiant heating and/or cooling as well as air distribution. About 50 to 75 units are needed for a room measuring 1,000 sq. ft. Because the installation is accomplished with a minimum of fitting fuss, application costs are claimed to be lower than for any other type diffuser.

Manufacturer: The Pyle National Co., Multi-Vent Div., 1334 N. Kostner Ave., Chicago 51, Ill.

(Technical Publications page 222)







FOR WALL AND CEILING CORNERS AND JOINTS WHEREVER PLASTER IS APPLIED...

Keymesh-NARROW

NEW...ECONOMICAL SOLUTION TO AN OLD PROBLEM!

Pre-formed for Corners...lies flat, too... while Keymesh-NARROW is purposely supplied pre-formed for corners, it still lies flat in the roll and when applied on flat surfaces. It forms easily for corners by merely flexing the cut piece . . . holds its shape or can be re-shaped if desired. Its narrow width and low cost permit a fast, economical reinforcing job on any location where interior plaster is used . . . and helps prevent future crack troubles!

SAFE HANDLING . . . IMPROVES BOND AND REINFORCEMENT

Keymesh-NARROW will not injure the hands, because the smooth selvage edges eliminate this hazard. It's galvanized against rust, too. And, the open mesh permits the brown coat to flow through and around the mesh giving a generous bond of plaster to rock lath, insulation lath, etc., imbedding the steel wires . . . thus making a strong, reinforced section where needed . . . with an even base for the second coat . . . and a firm, smooth finish!

SIZED RIGHT . . . FOR EVERY PLASTER REINFORCING JOB

Keymesh-NARROW is manufactured in 150 foot rolls in several widths. For corners and joints it is made in 4″, 5″ and 6″ widths, 1″ mesh, 18 gauge . . . 4½″ and 6″ widths, 17 gauge. For joints, also in 6″ by 1″ mesh, 20 gauge. For reinforcing above large windows and openings, 12″ with 1″ mesh, 20 gauge is recommended. Keymesh is also available in 3 and 4 foot widths for easy overall lathing reinforcement practice.

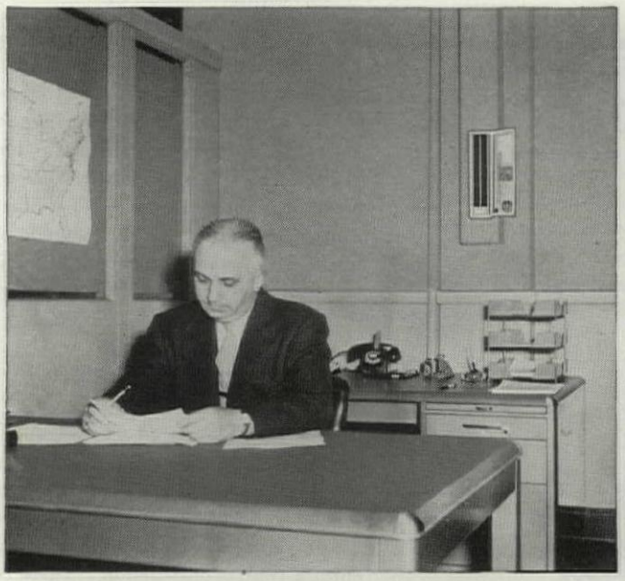
NARROW WIDTH CORNER AND JOINT REINFORCEMENT

KEYSTONE STEEL AND WIRE COMPANY

Building Materials Division *Peoria 7, Illinois*

KEYMESH • KEYMESH-NARROW • TIE WIRE • WELDED FABRIC • NAILS
KEYSTONE NON-CLIMBABLE FENCE • KEYSTONE ORNAMENTAL FENCE

WRITE FOR PRICES AND OTHER INFORMATION ON Keymesh PRODUCTS



NPB Electri-Centers blend into surroundings naturally, don't have that "electrical look." Wireway extensions replace exposed conduit pipes on wall leading from ceiling to panel cabinet. Column may be extended to floor if desired.

Slim dimensions make it easy to install NPB panels where wall space is limited or not available. They slip easily inside a standard 8" H-beam, fit snugly because of rounded corners. Front overlaps back for deep recessing.

LIGHTING PANELS CAN BE ATTRACTIVE

No maze of conduit pipes or cables leads into *these* compact lighting panels! Architects who specify NPB's can be sure that they will have top-notch appearance when installed, will cut installation costs for clients.

Specify NPB Electri-Centers for *any* commercial or industrial surface-mounted lighting-panel installation up to 32 circuits. They get rid of "open-plumbing look" in offices, hallways, factories and shops. They may be mounted against walls, on columns, or in H-beams. Streamlined for appearance and safety; no sharp corners to snag, scrape or bump. No jutting cabinet or columns to hamper traffic of personnel or mobile mechanical equipment. Beautiful gray enamel finish.

BullDog NPB Electri-Center lighting panels let your clients eliminate the high expense of bending pipes to fit panel knockouts, and of pulling wires down through conduit pipes. All wires, from ceiling to panels, are contained in wireway extensions. Neutral wires are attached to neutral bar in Pull Box at ceiling (or in false ceiling), eliminating individual neutral wires down to cabinet. Wiring can be inspected any time by simply removing front. Pushmatic® Circuit Breakers, interchangeable from 15- to 50-amps., make NPB Electri-Centers compact, versatile.

Investigate NPB Pushmatic Electri-Centers now! Write for NPB Bulletin, or request call from a BullDog field engineer.

BullDog Narrow Column (NPB) Pushmatic Electri-Centers make attractive lighting panels; give easier, lower-cost installation; eliminate unsightly conduit pipes and cables.

NPB FEATURES ARE YOUR ADVANTAGES!

- NPB's are only 6¾" wide, 6⅝" deep. Come in 16-, 24-, and 32-circuit capacities. Listed by Underwriters' for 1 ph., 3 wire, s.n., 120/240V AC or 3 ph., 4 wire, s.n., 120/208V A.C.
- Wireway extensions reach to ceiling or false ceiling regardless of height, or to wiring in truss-constructed buildings.
- Lightweight, easy to handle; no loose parts to misplace.
- "Open-plumbing look" eliminated with wireway extensions.
- Numbered wire retainers are attached to back of box for circuit identification. All wiring, including main lugs, can be done before interior is installed.
- Attractive, interchangeable BullDog Pushmatic Circuit Breakers make NPB Electri-Centers compact, versatile.
- All copper current-carrying parts silvered for greater conductivity.
- Sell for price of ordinary panels; much cheaper to install.

BULLDOG

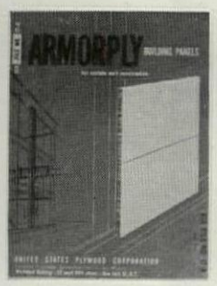
BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

PIONEERS IN FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS

1902-1952 . . . SERVING INDUSTRY FOR 50 YEARS WITH FINER ELECTRICAL PRODUCTS



CONCRETE. Manual of Standard Practice for Detailing Reinforced Concrete Structures. American Concrete Institute, 18263 W. Nichols Rd., Detroit 19, Mich. 55 pp. 8½" x 11". $3

Draftsmen and engineers can save countless hours at the board by using the concrete construction detailing methods illustrated in this new edition of the manual. Revised to include data on A-305 deformed reinforcing bars, which are permitted higher bond values by the 1951 ACI Building Code, and other changes, the book also has been re-edited for greater clarity. It is not intended as a design handbook but as a detailing manual of improved methods and standards for preparing drawings for the fabrication and placement of reinforcing steel. To illustrate the use of the standards and methods advocated by ACI, the manual presents 21 typical engineering and placing drawings for various types of structures.

CURTAIN WALLS. Armorply Building Panels. United States Plywood Corp., 55 W. 44 St., New York 36, N. Y. 12 pp. 8½" x 11"

Prepared especially for architects concerned with commercial and industrial buildings, this new booklet contains suggested design details and specifications for *Armorply* in curtain wall construction. These sandwich panels, which consist basically of a lightweight insulating core and two metal faces, are described as providing maintenance-free interiors and exteriors. Quickly erected, they are reported to lower costs for foundations and framing because they put less dead weight on the structure than the more conventional masonry wall materials.

PLUMBING FIXTURES. You Can Build It and Maintain It for Less. J. A. Zurn Mfg. Co., Plumbing Div., Erie, Pa. 32 pp. 8½" x 11"

This practical planning aid explains how different types of plumbing fixtures affect building and maintenance costs. It points out that time and material savings often can be realized by selecting types of sanitary facilities before the final structural details are approved. Most of the ideas presented in the booklet came to Zurn from men in the field—engineers, architects and contractors—who, obviously, have felt the need for coordination early in the design of any structure. Many photos and line drawings show details which should facilitate installation of fixtures.

AIR DIFFUSION. Kno-Draft High Pressure Air Diffusion. Bulletin K-29. W. B. Connor Engineering Corp., 500 Fifth Ave., New York, N. Y. 4 pp. 8½" x 11"

High-pressure diffusers made to handle duct velocities up to 3,000 fpm are pictured and described in this bulletin. The publication maintains that, unlike conventional low-pressure systems where a slight variation in duct pressure can alter the air pattern considerably, high-pressure systems can be balanced even when wide variations in delivery are present. Air volumes are regulated from full open to completely closed positions by the diffusers' calibrated damper. High-pressure systems utilize smaller and simpler ductwork with long runs of diffusers supplied by uniform conduits (without the customary reduction for each take-off) and therefore afford sizeable space and installation savings.

(Continued on page 226)

Which is the most important room in the home?

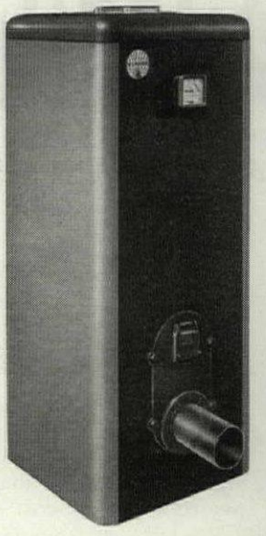
Kitchen . . . Utility Room . . . Bathroom . . . or is it the room where the boiler is?

Nothing adds more to the comfort and value of homes than plenty of healthy heat...so the room *where heat is made* is vitally important.

And for the heat-making system there can be no healthier heart than the Kewanee Steel Boiler.

KEWANEE

STEEL BOILERS FOR HOMES



Kewanee Cottage Boiler

A vertical tube jacketed steel boiler for hot water heat in smaller homes. For 510 SqFt water radiation with oil or gas or 77,000 Btu hourly.

Kewanee Round "R"

Unjacketed or Jacketed Boiler burns oil-gas or coal, hand or stoker fired. Rated 79-216 thousand Btu or 330-900 SqFt steam radiation 530 to 1440 SqFt water.

351

There is a Kewanee steel boiler just right for homes of every size . . . from 4, 5 or 6 room cottages to the largest mansions. And that is true regardless of the fuel used or the method employed to distribute the heat.

Although priced to meet modest budgets, *Kewanee Boilers for Homes* are built of the same staunch steel plate and in the same faultless manner as those larger sizes which for over 80 years have heated America's most important buildings.

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Division of American Radiator & Standard Sanitary Corporation

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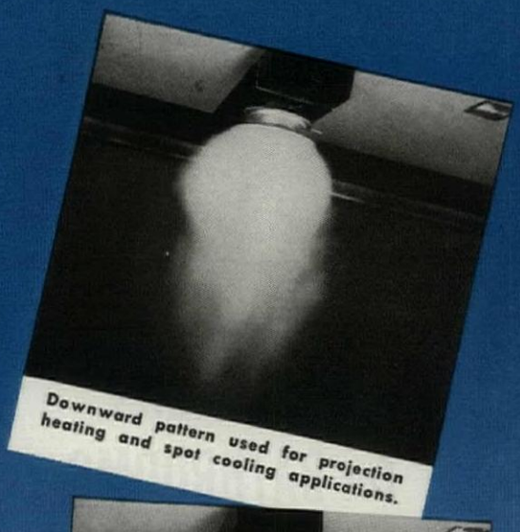
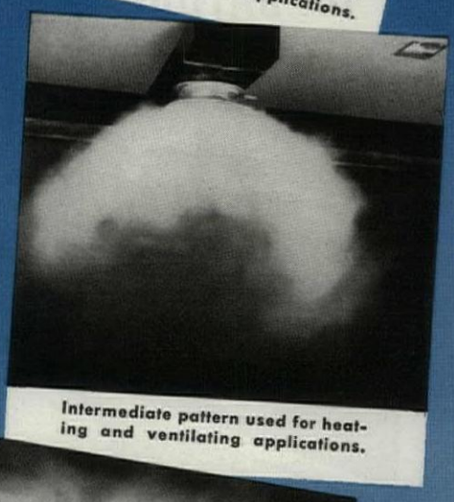
Anemostat Type C-1
ADJUSTABLE *Air Diffuser*

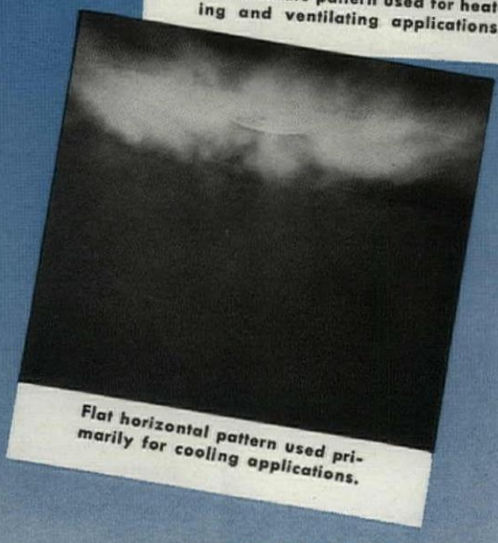
Just "Turna-kone" for the air pattern you want!



Downward pattern used for projection heating and spot cooling applications.



Intermediate pattern used for heating and ventilating applications.



Flat horizontal pattern used primarily for cooling applications.

Anemostat's Type C-1 air diffuser is *easy to adjust*—simply "Turna-kone" to vary the air pattern from horizontal to vertical discharge. No tools, no screws, no fussing, no fiddling. Changing pattern does not affect balance of system.

The Type C-1 Anemostat air diffuser is *easy to install* on exposed duct or flush to ceiling. The snap-in assembly cuts installation time two-thirds. It has clean, handsome, concentric lines that add to ceiling beauty, blend into your design motifs. It provides true *draftless air diffusion*, eliminates stale air pockets, equalizes temperature and humidity.

ANEMOSTAT®

DRAFTLESS *Aspirating* **AIR DIFFUSERS**

ANEMOSTAT CORPORATION OF AMERICA

10 EAST 39th STREET, NEW YORK 16, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

SELECTION MANUAL 40

gives full story on new Anemostat Type C-1, the *ultimate in adjustable air diffusers.*

Send for your copy.

"No Air Conditioning System Is Better Than Its Air Distribution"

AC-1290

TECHNICAL PUBLICATIONS

STORE FIXTURES. Store Planning Kit for Spacemaster Equipment. Reflector-Hardware Corp., Western Ave., Chicago 8, Ill. 120 pp. 9½" x 13". $1.50

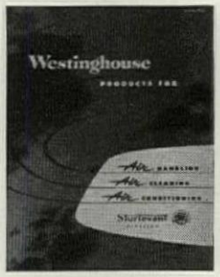
"Make the fixtures fit the merchandise," advises the manufacturer in introducing this aid to store planning. Complete details on the *Spacemaster* metal-display framing and hardware are covered in two catalogues contained in the kit, and an illustrated instruction booklet explains how to use the merchandising equipment templates and layout sheet to plan a coordinated store interior.

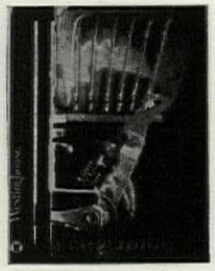
CEMENTS. Corrosion Proof Cements, Bulletin No. 5-2. Atlas Mineral Products Co., 55 Walnut St., Mertztown, Pa. 12 pp. 8½" x 11"

The resistance of four types of corrosion-proof cements to each of 176 different common chemicals is charted in this technical bulletin which also lists temperature ranges for the four mineral products. Estimating tables are given for three kinds of acidproof brick and cement constructions, illustrated by three-color line drawings.

AIR CONDITIONING. Westinghouse Products for Air Handling, Air Cleaning, Air Conditioning, Catalogue No. 600. Westinghouse Electric Co., Sturtevant Div., Box 2278, Pittsburgh 30, Pa. 60 pp. 8½" x 11"

A clever color-tab contents page and cross-indexing system makes it easy for the catalogue's user to find quickly the kind of air-handling equipment he is looking for. The book is divided into three main sections. The first one, *Equipment*, contains good illustrative material and specifications. The second, *Application*, tells how and where to use the machinery to best advantage. Of special interest to engineers is the *Data* chapter which rounds out the handbook.



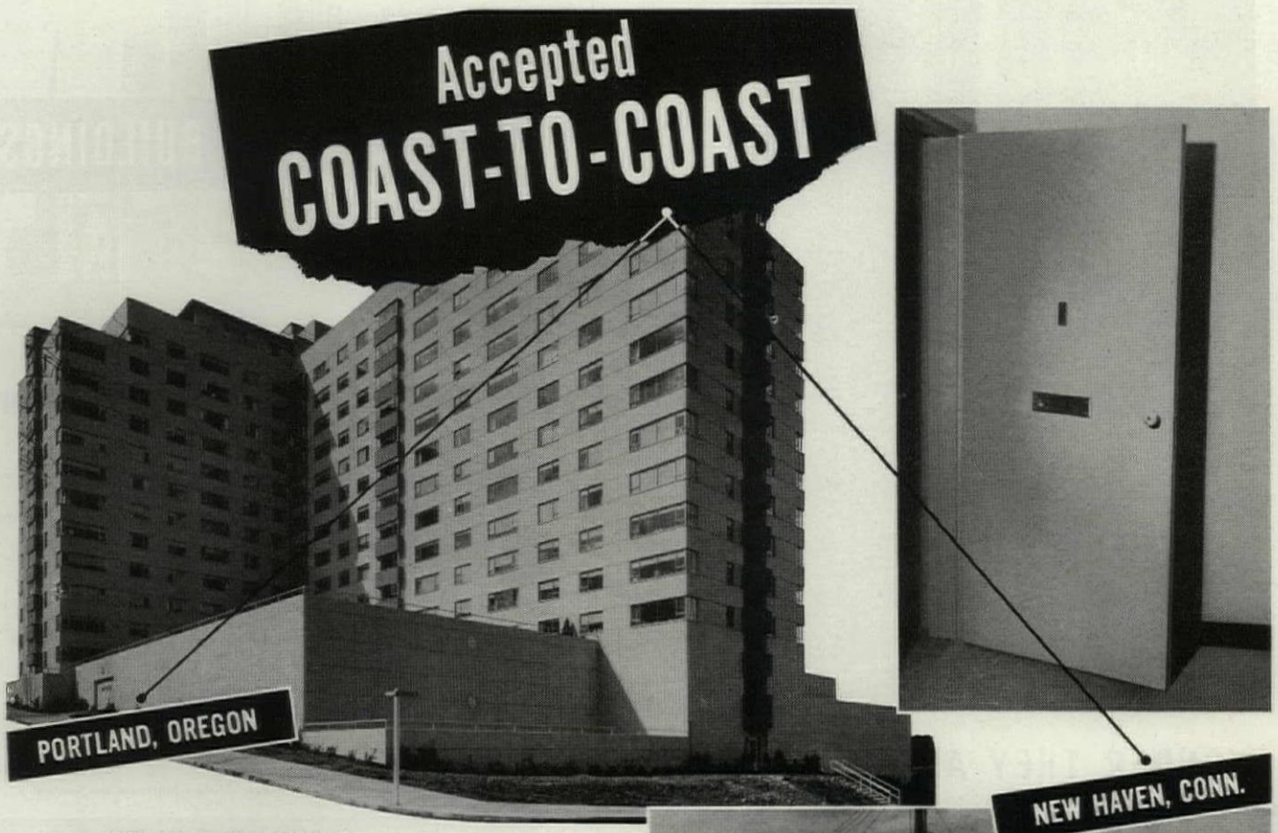


WIRING. Type AB Circuit Breakers. Booklet B-5407. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa., 35 pp. 8½" x 11"

Three photographs, all taken in 1/20th of a second, record the actual arc-quenching action of the firm's AB circuit breaker as it confines, divides and extinguishes a hot arc. Construction details, ratings and dimensions, and application information are given for each of eight types of AB breakers. A short history of the development of these breakers is included, and their operating principles are explained.

LIGHTING. Lighting for Industry. Holophane Co., Inc., 342 Madison Ave., New York 17, N. Y. 96 pp. 5" x 8"

Indoor and outdoor industrial illumination problems are analyzed in this engineering handbook which tells how to utilize the manufacturer's lighting equipment to its best advantage. Each phase of factory lighting is illustrated with technical diagrams, charts and photographs of actual installations.



VISTA ST. CLAIR APARTMENTS
Constructed by: Smith-Phillips Company
Architect: Victor Jones & Associates

BROOKSIDE HOUSING PROJECT
Constructed by: Fusco Amatruda Company
Architect: Associates of Douglas Orr

USF "WOOSTER"

HOLLOW STEEL

Doors and Frames

From coast to coast, USF Hollow Steel Doors and Frames are fast becoming the leading choice for the "blue ribbon" residential developments of every size and type. Architects, builders and owners prefer the USF "Wooster" Door because it offers clean design, labor-saving installation, and the lowest of maintenance. It's the *only* line of hollow steel doors available in matching design for corridor entrances, interior doors and sliding closet doors.

Want complete details? Write today for descriptive literature.

United Steel Fabricators, INC.

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Manufacturers of: **Hollow Metal Doors and Frames • Prefabricated Metal Buildings • Corrugated Metal Window Wells • Highway Guard Rail • Structural Plate Bridge Flooring • Corrugated Metal Pipe**

USF
Reg. U. S. Pat. Off.

New $5 Million Warehouse gets *lasting* protection —A KOPPERS ROOF!

New Warehouse at Pittsburgh, Pa., Protected by a Koppers Built-Up Roof, Bonded for 20 Years.

Architects and Engineers: Hunting, Larsen & Dunnells, Pittsburgh, Pa.
General Contractor: Trimble Company, Pittsburgh, Pa.
Roofing Contractor: Warren-Ehret, Pittsburgh, Pa.

● Shown here is a giant warehouse, that was recently constructed at Pittsburgh, Pa. It is well over a quarter-mile long. It is functional, yet is modern and attractive in appearance. Not only is the building itself fire-proof, but it also employs the latest devices in order to protect merchandise against fire, damage and theft.

With a Koppers Roof "on guard," warehouse contents get the best possible protection against the elements, too. This protection will last for many, many years; no exaggeration, this, for Koppers has guaranteed the performance of its roofing materials for 20 years.

Koppers Roofs are built-up with Koppers Coal Tar Pitch and Approved Tarred Felt. These roofs give long, care-free service. They "heal" themselves if cracks are caused by weathering. They resist water — proved by the fact there are many Koppers Water-Cooled Roofs in use.

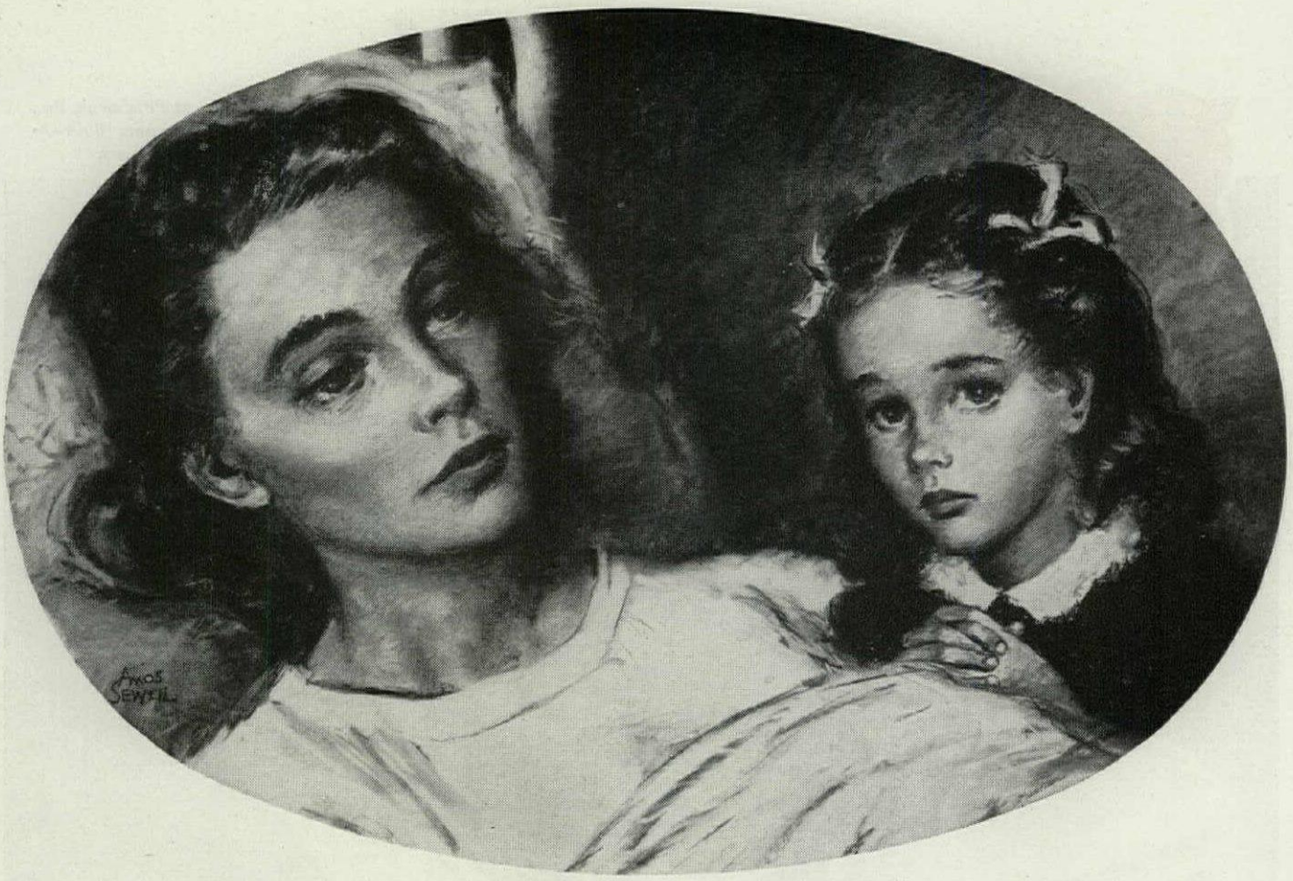
Koppers Roofing Materials are available from coast-to-coast. Specify these materials and your projects will have the best in built-up roofing. Get in touch with us for full information, including specifications.

KOPPERS

KOPPERS COMPANY, INC., Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALABAMA

• SPECIFY KOPPERS FOR LONG-LIFE ROOFING •



"THANK YOU FOR THE CHANCE

to watch my daughter grow up"

I don't think I would have known how to say good-bye to my little girl. Thank you for the chance to watch her grow up . . . The doctors tell me that now all the disease in me has been destroyed. I'm going to live.

I'm one of the lucky ones—one of the 70,000 saved each year from cancer. *There should be more of us . . .*

When I was helping raise funds last April for the Cancer Crusade I never thought I was really working for myself—never dreamed cancer would strike me.

The dollars you give to the American Cancer Society mean so much to those of us who face cancer. Those dollars paid for the leaflet that sent me to my doctor . . . He told me yesterday they paid for his training on an American Cancer Society fellowship.

Yes, I am one of the lucky ones. With your help there will be many more . . . thousands more. Won't you show you care with a generous gift? Thank you, thank you very much.

CANCER STRIKES ONE IN FIVE!

Strike back—give to conquer cancer

MAIL THIS COUPON TO "CANCER" C/O YOUR LOCAL POST OFFICE

AMERICAN CANCER SOCIETY

GENTLEMEN:

☐ PLEASE SEND ME FREE LITERATURE ABOUT CANCER.

☐ ENCLOSED IS MY CONTRIBUTION OF $.....TO THE CANCER CRUSADE.

Name.....

Address.....

City.....State.....

The tenants think it's wonderful

Self-service elevators for busy office buildings have been in successful operation for more than two years. These Otis AUTOTRONIC® elevators—*without attendants*—are now installed or on order in twenty cities from Boston to San Francisco.

AUTOTRONIC—*without attendant*—elevators may be operated either by passengers or by regular attendants in the cars, but passenger-operation has been more than satisfactory wherever it has been used. The tenants think it's wonderful.

Building management finds real advantages, too. Savings for each non-attended elevator average $5,500 every year.

Why not look at an actual installation in a new or modernized building? Talk with the tenants and management. Ask any of our 266 offices for details. **Otis Elevator Company, 260 11th Avenue, New York 1, N. Y.**

Better elevatoring is the business of

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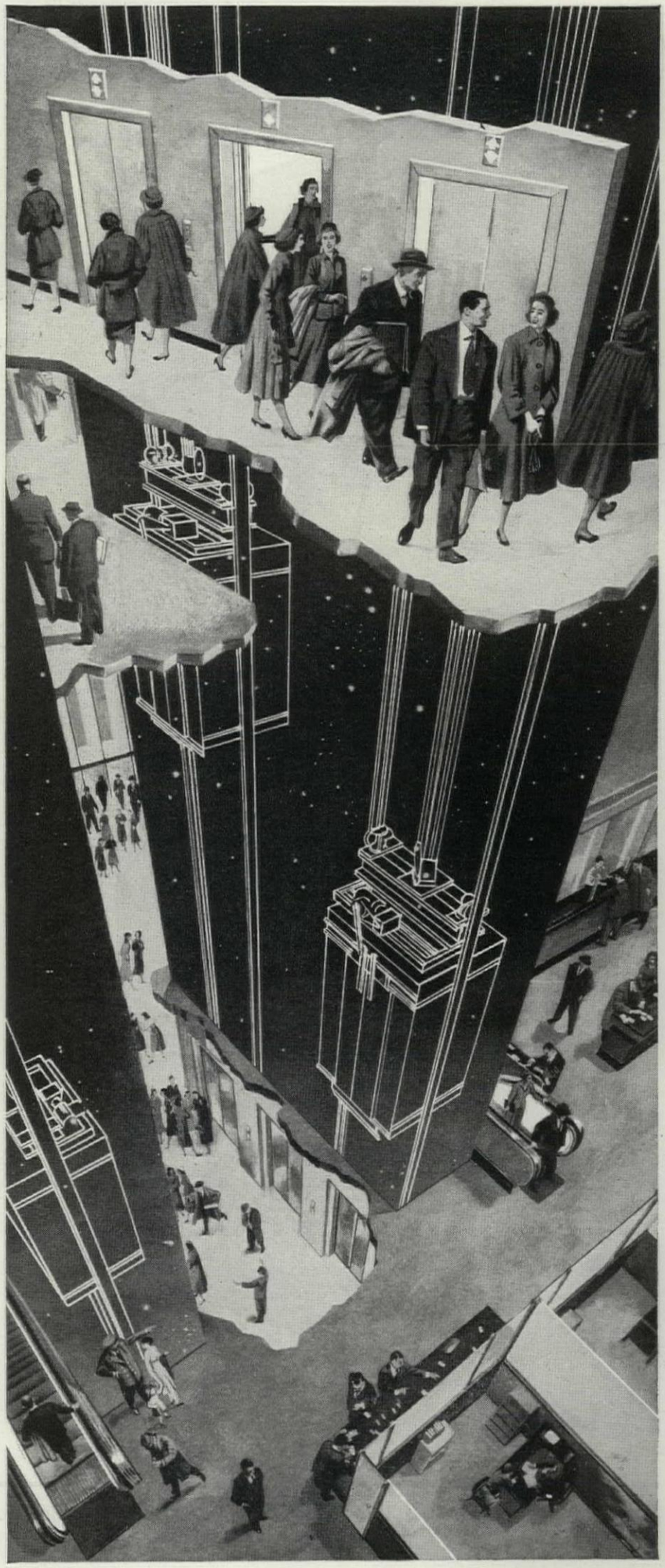
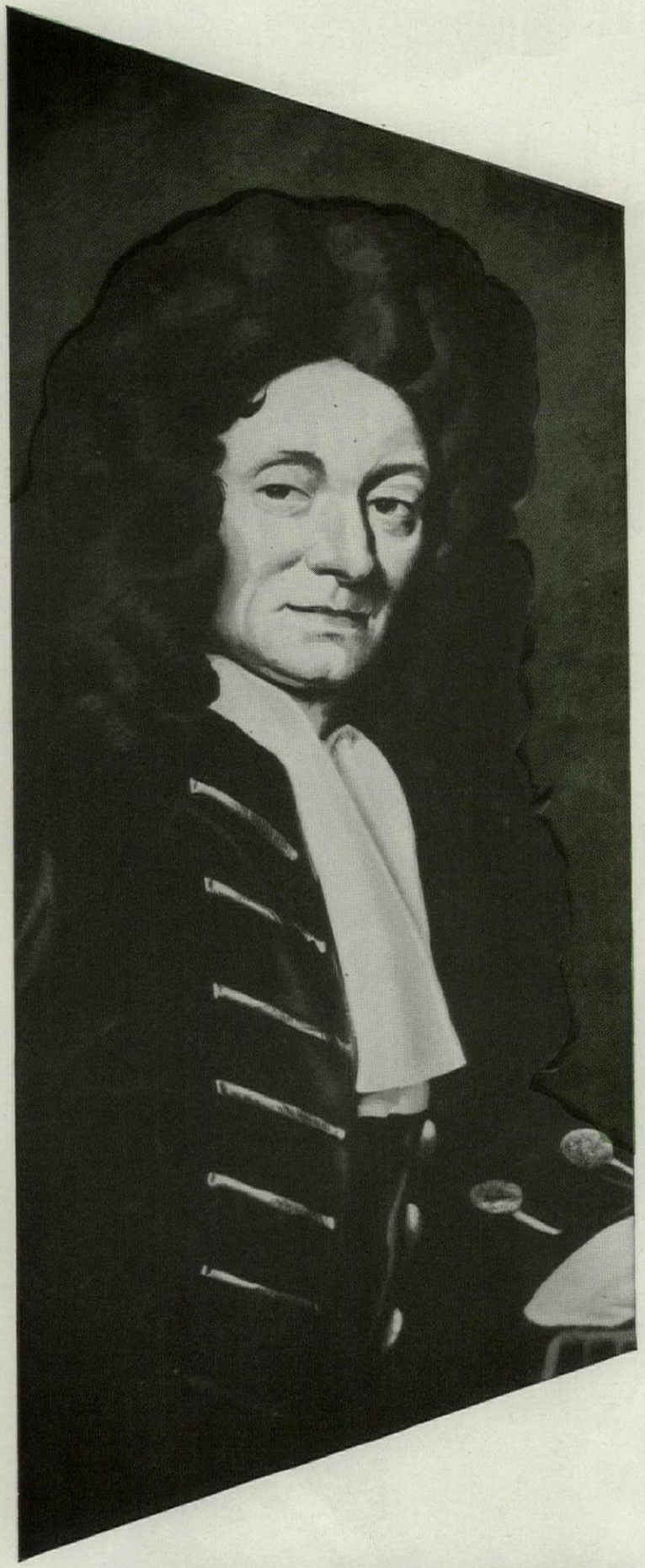
Passenger Elevators • Escalators
Freight Elevators • Electric Dumbwaiters
Modernization • Maintenance



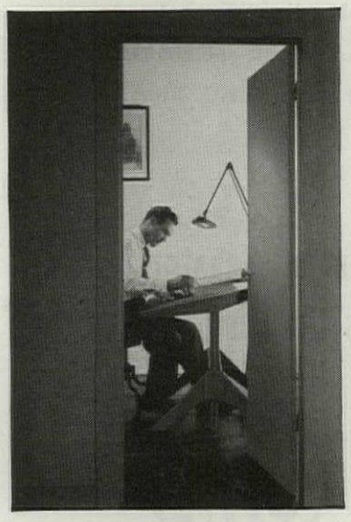


250 years ago Sir Christopher Wren wrote:

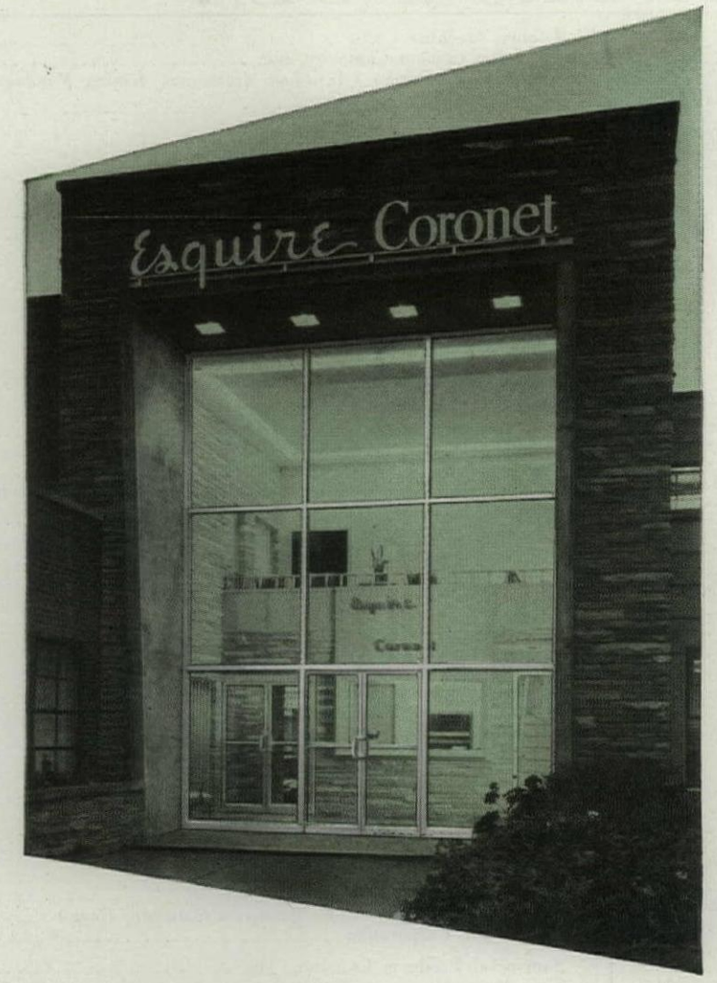
"We architects are scrupulous

in small things . . .

AND ARCHITECTS TODAY HEARTILY AGREE WITH THE GREAT ENGLISHMAN. . .

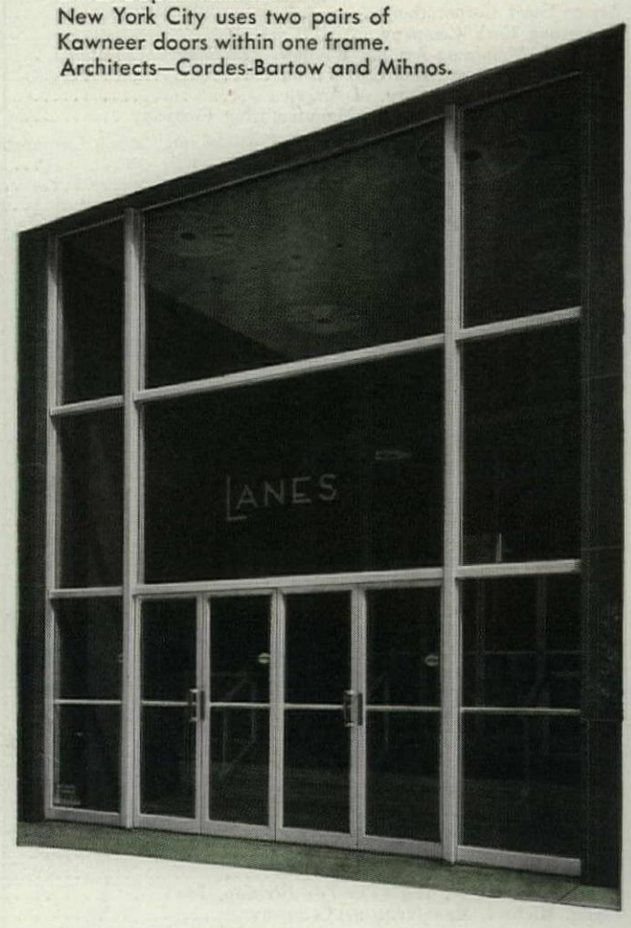


STORE FRONT METALS · ALUMINUM FACING MATERIALS · TRIM · AWNING BOXES AND HOODS · ALUMINUM ROLL TYPE AWNINGS

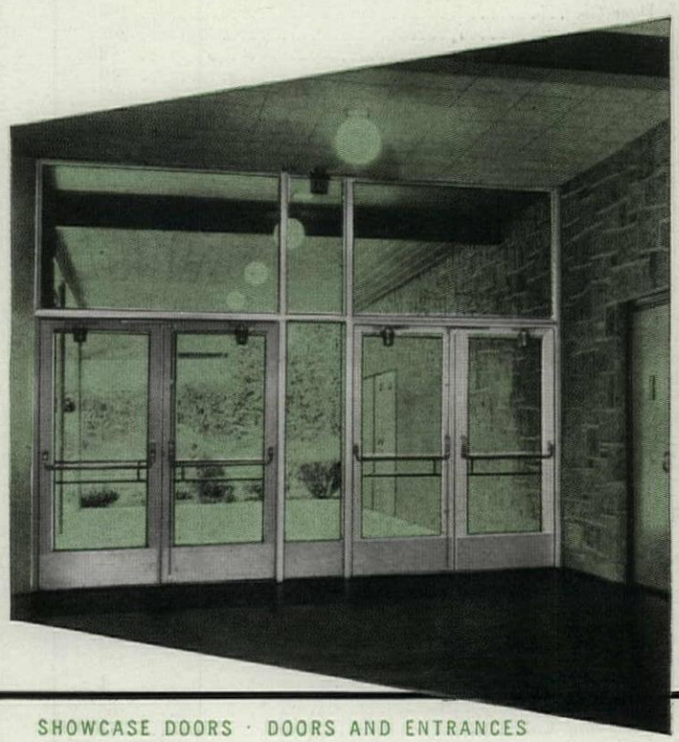


Esquire Coronet publications building in Boulder, Colorado. A striking treatment of an entrance unit featuring Kawneer doors and mullion construction. Architect—Ralph Stoetzel.

Lanes Department Store in New York City uses two pairs of Kawneer doors within one frame. Architects—Cordes-Bartow and Mihnos.



PAINSTAKING ATTENTION TO DETAIL HAS ALWAYS BEEN THE ARCHITECT'S TRADEMARK. To meet high contemporary standards, Kawneer Entrances are cleanly and handsomely styled to reflect the utmost simplicity in line and form. They are precision-engineered for maximum strength, smooth operation, and weather protection.



Transfiguration School in Tarrytown, New York, shows an excellent solution to an entrance problem that required panic exit devices. Architect—Robert A. Green.

Kawneer

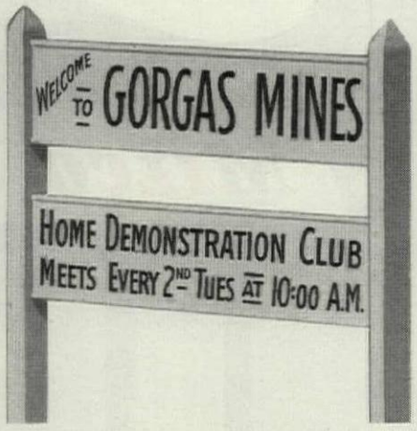
ARCHITECTURAL METAL PRODUCTS

SHOWCASE DOORS · DOORS AND ENTRANCES

CONSULT KAWNEER DETAIL PORTFOLIO, SWEET'S CATALOGS OR WRITE DEPT. AF-101, 1105 NORTH FRONT STREET, NILES, MICH., OR 930 DWIGHT WAY, BERKELEY, CAL.

ADVERTISERS INDEX

Monsanto Penta protects housing project



Gorgas, Alabama, is the location of one of the largest electric generating plants and coal mines in the Southeast. In the community surrounding these developments, Alabama Power Company owns about 300 houses and additional houses are constructed as the operation expands. Lumber going into the construction is protected against termites and decay by a formulation of Monsanto Penta.

Alabama Power Company first used penta in this area eight years ago. In its construction and maintenance program, penta protects all outside lumber as well as joists, subflooring and floors. Much of the timber required is cut from the company's forests; then sawed, seasoned and treated with penta before use.

When untreated lumber was used, replacement of some parts was necessary in one to three years. With penta protection, the company already has proved that service life of the wood is substantially increased. If only ten years of life is obtained with treatment, the company estimates it will earn 200% on its treating investment.

Monsanto Penta (pentachlorophenol) is a stable chemical manufactured for wood preservation. It protects against termites and other wood-boring insects. It prevents decay. Penta does not leach . . . does not wash away in rain or ground water. Properly formulated penta gives a clean treatment so that paint or other finishes can be applied.

For information on the use of Monsanto Penta to preserve wood, for names of suppliers of penta-treated lumber or for names of branded wood preservatives formulated with Monsanto Penta, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

AVENUE OF HOMES in the Gorgas housing project of Alabama Power Company

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle, Twin Cities. In Canada, Monsanto Canada Limited, Montreal.

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MONSANTO CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MILCOR* No. 605 Plastered-in Metal Base

with friction-fit fittings for faster installation

Flush-type plastered-in design — Base (4" and 6" heights, standard 10' lengths) is punched for nailing to wall. Has slotted plaster flange for easy grouting. Sections of base joined by flat aligning plate, requiring no punching, no screws.

Fittings require no punching, no screws — Cast outside and inside corner fittings (square or ¾" radius) and left-and right-hand end-stops are friction-fit.

Sanitary, fire-safe, durable — Ideal for hospitals, schools, hotels, apartments, office and industrial buildings, etc. — with linoleum or any other type floors.

Write for complete information.

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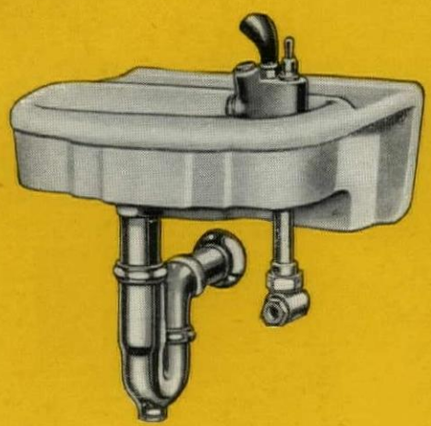
✓ check ELJER



✓ check FEATURES

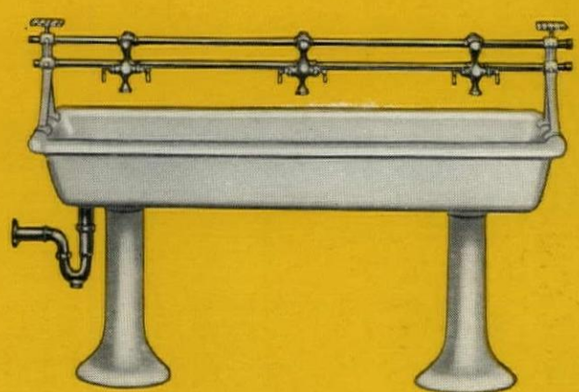
Many Eljer Fixtures have an *extra* feature that makes them an *extra* value . . . in lower maintenance costs, longer life, more beauty or greater convenience.

ILLUSTRATED: E-5910-V Sanus, vitreous china, syphon-jet closet, with elongated rim. 1½" top inlet for flush valve, as specified. (Also available with round front.)

✓ check QUALITY

The *finest quality* is Eljer's first consideration . . . in vitreous china, enameled cast iron and brass goods. User satisfaction is our prime objective.

ILLUSTRATED: E-4995-C Crystal Fountain, vitreous china, with chrome-plated fittings. Size: 11" x 11½". Non-squirting bubbler, automatic volume control, self-closing handle.



✓ check SERVICEABILITY

In almost half a century, Eljer has manufactured more than fifteen million plumbing fixtures, to meet virtually every requirement. Eljer users are Eljer's best boosters.

ILLUSTRATED: E-8200-V Pedestal-type vitreous china urinal with flush valve, as specified. Width: 14". Projection: 23½". Height, floor to top of lip: 19½".

✓ check ADAPTABILITY

The engineering features of Eljer Fixtures provide maximum adaptability. Engineering and design service is geared to meet special fixture requirements.

ILLUSTRATED: E-1810-E Double Wash Sink, enameled cast iron, with painted pedestals and double pipe supports. Fittings shown. Length: 4', 5', 6', 8'. Width: 30".

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