E MAGAZINE OF BUILDING

architectural **forum**

October 1953 **SCHOOL ISSUE**

WHAT A BEAUTIFUL WAY TO BE DIFFERENT!

Securit Door in the office of Architect John B. Danna, Dallas, Texas.

. . . a door of translucent patterned glass

This door decorates with light—and does a grand job of it. Everyone who sees the Blue Ridge *Securit** Interior Glass Door remarks on its contribution to the appeal of the room. They ask questions, of course, such as:

"*Is it rugged?*". . . The glass is heat tempered, so it can stand hard usage.

"*Is it as expensive as it looks?*". . . Not by a long shot—its cost compares favorably with high-quality doors of common materials.

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See your L·O·F Glass Distributor or Dealer about this newest thing in doors. He's listed in the yellow pages of phone books in many principal cities. Or mail the coupon. *®

BRIEF DATA

Glass—3/8" thick. Muralex pattern on both surfaces.

Tempered—3 to 5 times stronger than untempered glass of same thickness.

Reversible—can be used right or left hand.

Standard Sizes—2'6" x 6'8" 3'0" x 6'8"
2'8" x 6'8" 3'0" x 7'0"

—also 4 sizes for openings of these dimensions with proper allowance for clearances.

Libbey·Owens·Ford Glass Company
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That's the story. Doesn't it suggest an idea to you? *Name on Request

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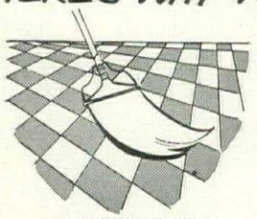

1. ECONOMY OF MAINTENANCE

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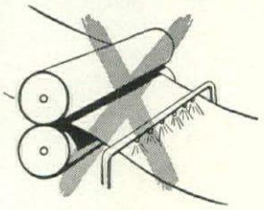

2. NO ARTIFICIAL FINISH

—no artificial finish applied to its natural surface; the cured-plate finish lasts for life!

3. TOUGH SURFACE

—in elevators and other severe service applications, Goodyear Rubber Flooring excels in wearing quality and color fastness!

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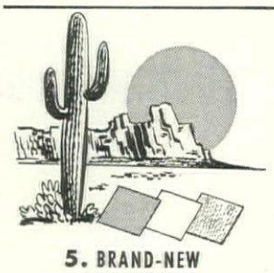

5. BRAND-NEW DESERT TONES

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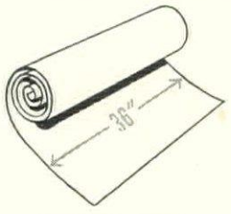
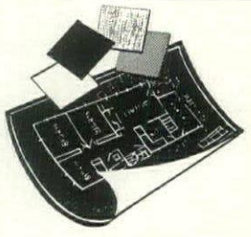


6. AVAILABLE IN FULL 36" WIDE ROLLS

— as well as in tiles — a big Goodyear advantage; makes it possible to create virtually any desired pattern!



7. FIRST CHOICE

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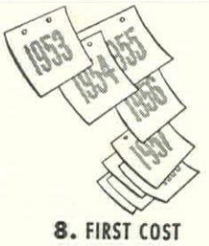

8. FIRST COST IS LAST COST

— its durability, low upkeep, beauty and comfort all add up to greater luxury for no greater long-run cost!

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THE MAGAZINE OF BUILDING

architectural **forum**

OCTOBER 1953

Published by TIME Incorporated

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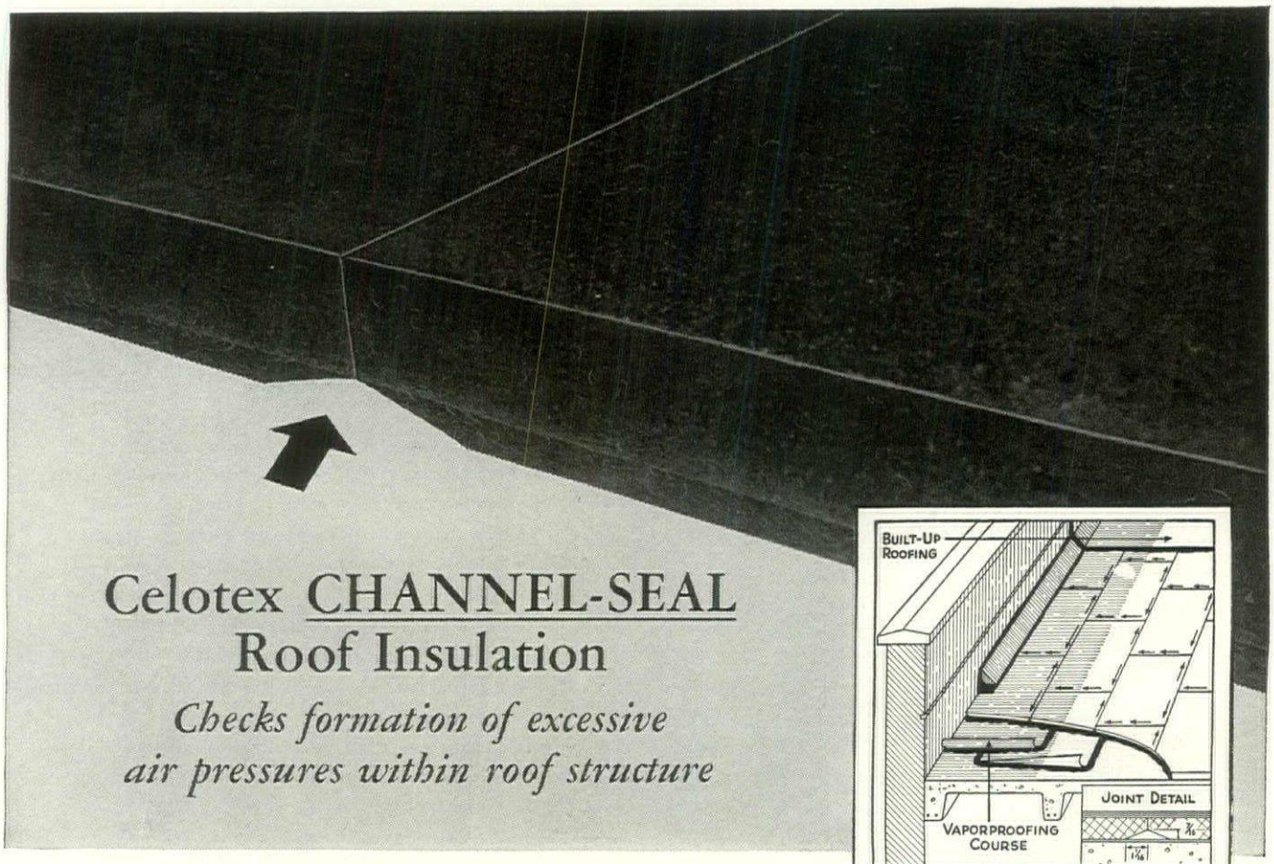
VOLUME 99, NUMBER 4

Cover design by Ray Komai.

Exclusive channeling guards against blistering and separation of felt and insulation



Here you see why high-pressure air pockets won't build up with Celotex Channel-Seal Roof Insulation. Pressures due to temperature differences are equalized by movement of air through the channels. This channeling principle of roof protection has been proved effective by many years of actual use on jobs of every type and size.

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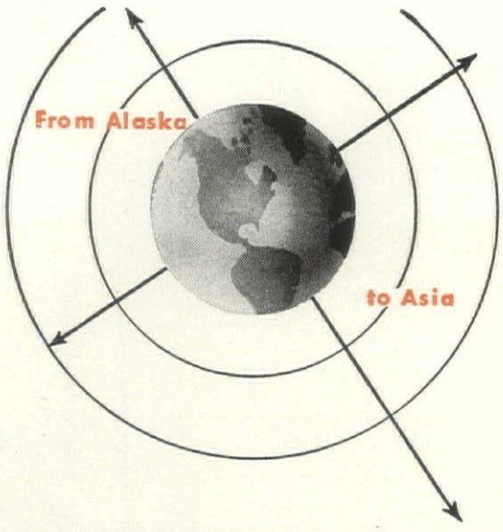

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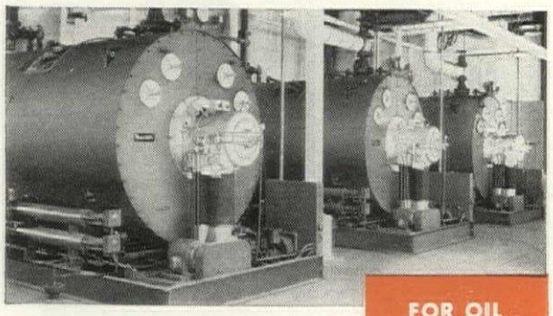

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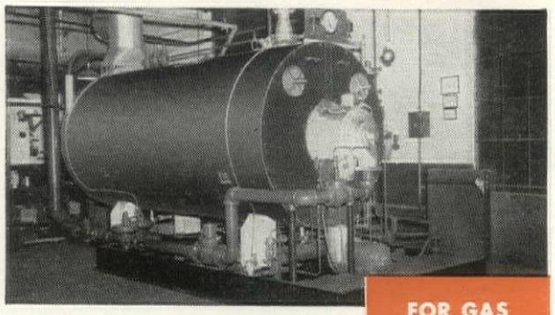
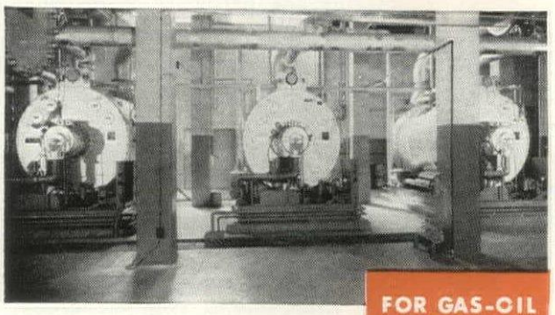


FOR GAS FIRING



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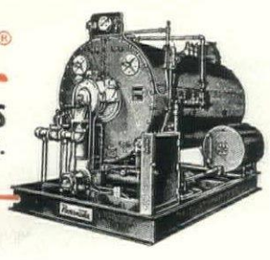

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These free-standing J-M Movable Walls permit maximum use of space. They create efficient offices that can quickly and easily be rearranged to suit the needs of changing space requirements.

For the offices you need in the space you have

Johns-Manville Asbestos Movable Walls provide offices when and where you want them

YOU can rearrange your present space or have new space partitioned off quickly and economically with Johns-Manville Asbestos Movable Walls. Made of asbestos, they resist fire, rot and wear.

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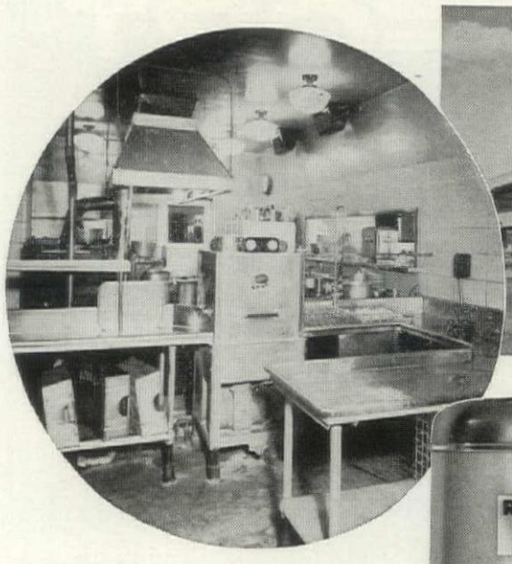

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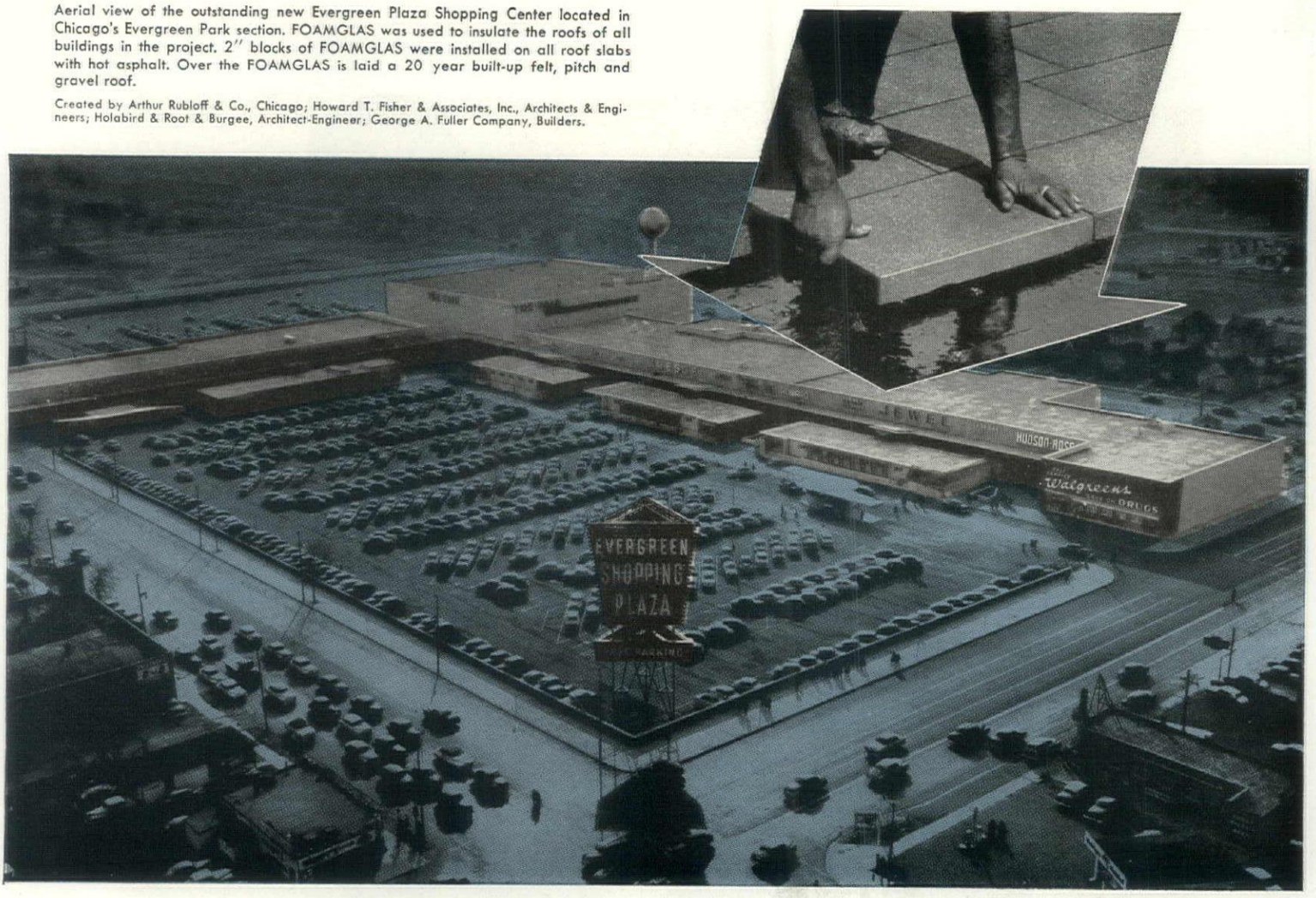
Aerial view of the outstanding new Evergreen Plaza Shopping Center located in Chicago's Evergreen Park section. FOAMGLAS was used to insulate the roofs of all buildings in the project. 2" blocks of FOAMGLAS were installed on all roof slabs with hot asphalt. Over the FOAMGLAS is laid a 20 year built-up felt, pitch and gravel roof.

Created by Arthur Rubloff & Co., Chicago; Howard T. Fisher & Associates, Inc., Architects & Engineers; Holabird & Root & Burgee, Architect-Engineer; George A. Fuller Company, Builders.



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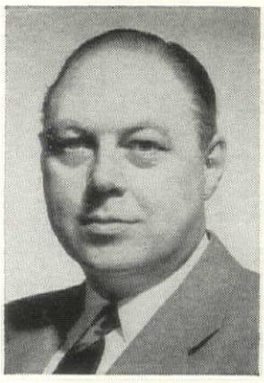

Willard A. Brown
Managing Director
Evergreen Plaza Shopping Center

". . . to help keep our heating and cooling costs lower year after year,"

reports Willard A. Brown, Managing Director of Chicago's new Evergreen Plaza Shopping Center. He explains: "Placing insulation on the roofs of our center was imperative to keep down our heating and air conditioning costs. We chose FOAMGLAS for our roof insulation because it assures us constantly high insulating efficiency *year after year*."

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Let us tell you how FOAMGLAS can best be applied as an insulant for roofs, walls, floors, piping and equipment . . . for normal temperature or low temperature buildings. For complete information and a sample of this remarkable insulation, write Department D-103 . . .

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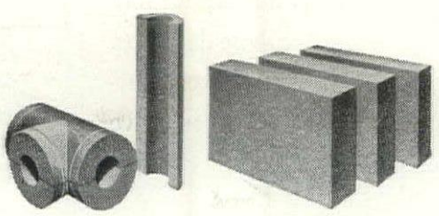

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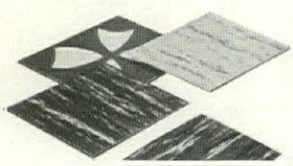

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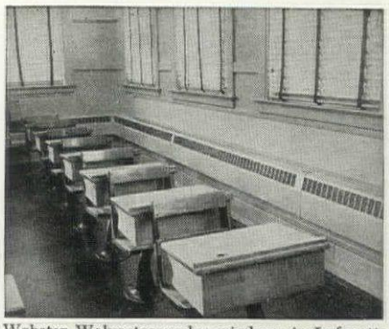


Webster Walvector under windows in Lafayette School classroom. Wall-to-wall warmth.

COLD MEETS ITS WATERLOO

In Waterloo, N.Y.

New York Community Modernizes its school system with new schools and Tru-Perimeter Heating.

When Waterloo, N.Y., decided its educational shoe was pinching they called on Carl C. Ade, prominent Rochester architect and engineer, to help remedy the situation.

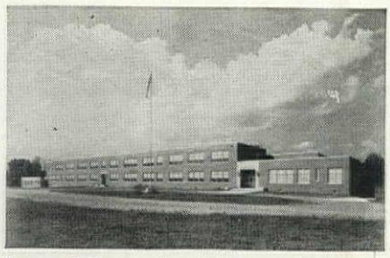
Result—the handsome new Lafayette Elementary School illustrated here and the even larger Skoi-Yase (Indian for "bubbling water") Elementary School. With these new schools, and its existing buildings, Waterloo has solved its educational space problems for many years.

Lafayette Elementary School, Waterloo, N.Y. Completed 1951 at a cost of $550,000. Architect and Engineer: Carl C. Ade. Heating Contractor: A. Burgart, Inc.

For efficient heating, both these new schools use Webster Walvector, as do many of the schools designed by Carl C. Ade's office.

Here is Tru-Perimeter Heating. The cold perimeter walls of the buildings are heated gently and evenly.

Webster Walvector in perimeter heating simplifies piping, uses fewer risers. Buildings can be heated just before occupancy, heat reduced immediately after the need is gone.

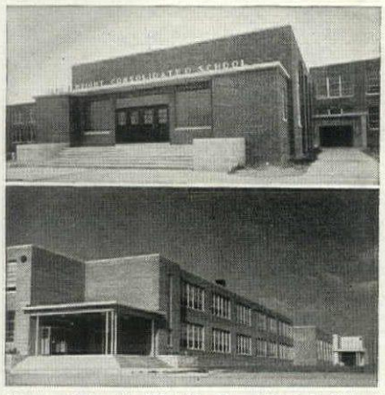


James Solomon Russell School, Brunswick County, Va. Cost—$524,870. Heating Contractors: W. J. Bloomfield & Son, Inc., Farmville, Va.

Nature Controls the Heat in these Schools

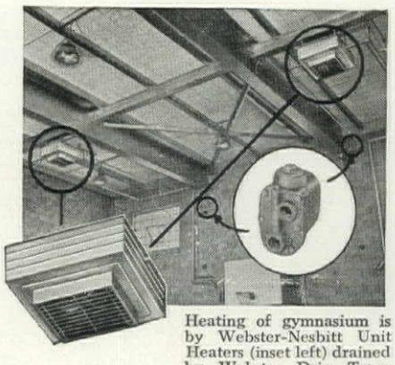
Dixon & Norman, Virginia architectural firm specializing in schools, specify Webster Moderator Systems for efficient heat in open-plan buildings fed by long steam lines.

"Nature makes the weather, let her operate the controls"—so say Dixon & Norman, Richmond architects and engineers. "Many of our schools are used for community activities. Classrooms are large, with auditoriums, gymnasiums and shop areas often in separate wings. Despite long steam lines there is balanced heat distribution. The Moderator System delivers heat evenly and rapidly to every section of a building."



Above: John J. Wright Consolidated School, Spotsylvania County, Va. Cost — $635,000. Heating Contractors: W. J. Bloomfield & Son, Inc., Farmville, Va.

Below: Montevideo High School, Montevideo, Va. Cost — $622,740. Heating Contractors: J. H. Cothran Co., Inc., Altavista, Va.



Heating of gymnasium is by Webster-Nesbitt Unit Heaters (inset left) drained by Webster Drip Traps (circle).

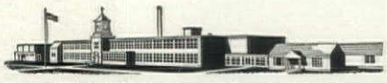
HIGH SCHOOL FOR 1000 STUDENTS

When first put in service in September 1951 the new Ewing High School had 665 pupils from grades 7 to 10 using 24 of the 32 classrooms. Full capacity will be used by fall 1953.

Ewing High School is steam heated. Webster Heating Equipment used includes:

Webster-Nesbitt Down-Blow Unit Heaters in gymnasium — up in the air, out of the way as illustrated.

Webster-Nesbitt Propeller Fan Unit Heaters in locker rooms, manual training rooms and cafeteria kitchen.



Ewing High School, Mercer County, New Jersey. Architects: Micklewright and Mountford, Trenton, N. J. Consulting Engineers: Runyon and Carey, Newark. Heating Contractor: Walter E. Bittner, Trenton.

Webster Convectors in home economics room, auditorium, corridors, stair landings.

Webster Radiator Valves, Thermostatic Traps and Float and Thermostatic Traps throughout to assure steam circulation.

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Webster's nationwide field organization serves architects, engineers and heating contractors, working with operating personnel to achieve maximum efficiency from top quality Webster Systems.

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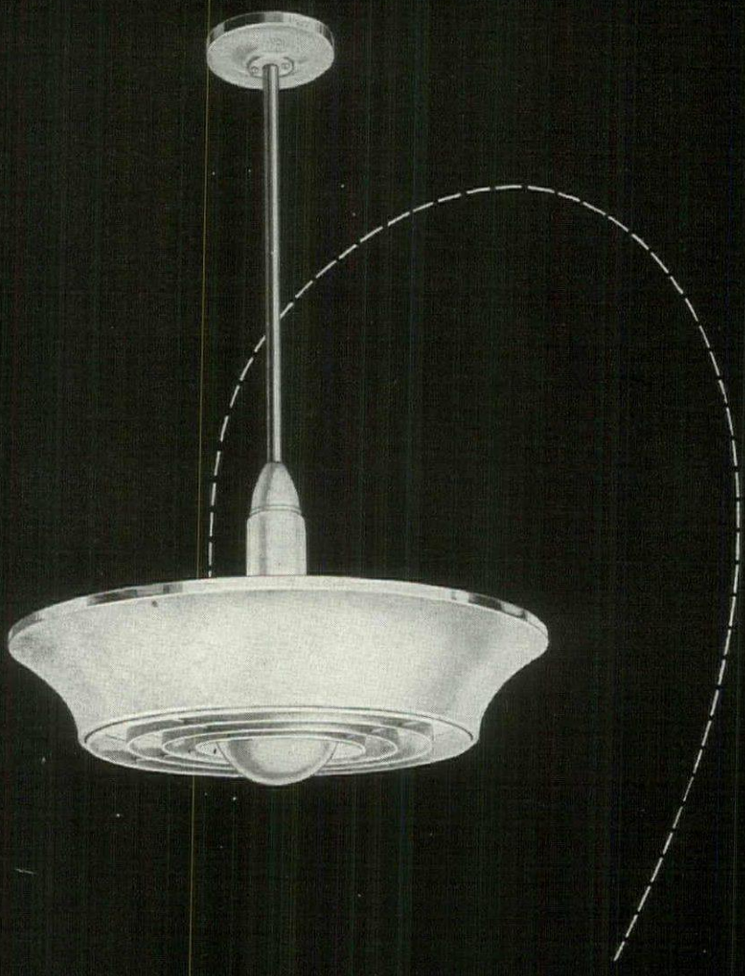
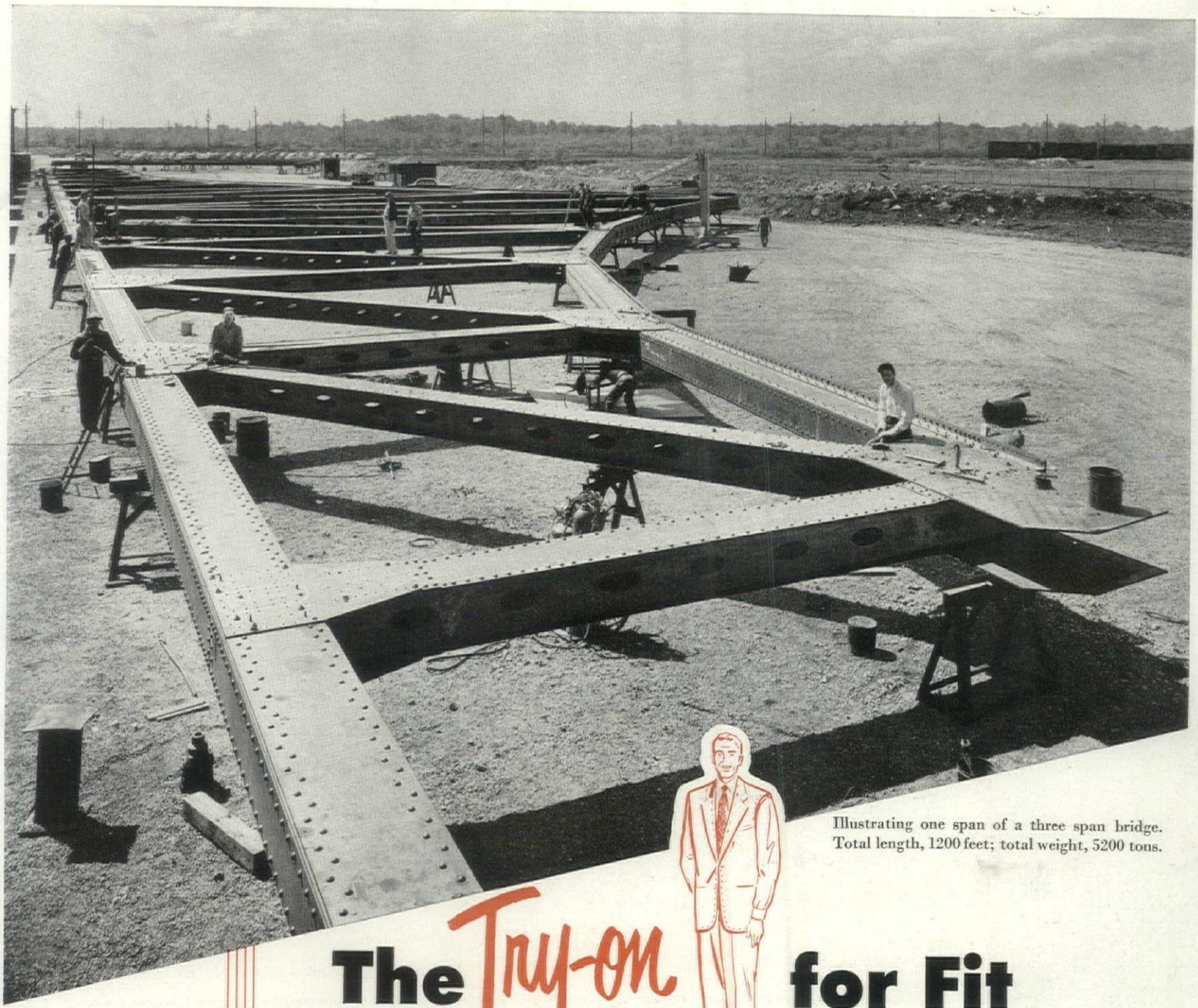


* This unit represents the unique and fresh approach to indirect incandescent lighting by ART METAL. Available in pendent or close-to-ceiling mountings and from 150 to 750 watts. • It is one of many unusual designs found in Catalog 153. Write for a copy.

THE **ART METAL** COMPANY
CLEVELAND 3, OHIO

*Patent Pending

Manufacturers of Engineered Incandescent Lighting



Illustrating one span of a three span bridge. Total length, 1200 feet; total weight, 5200 tons.

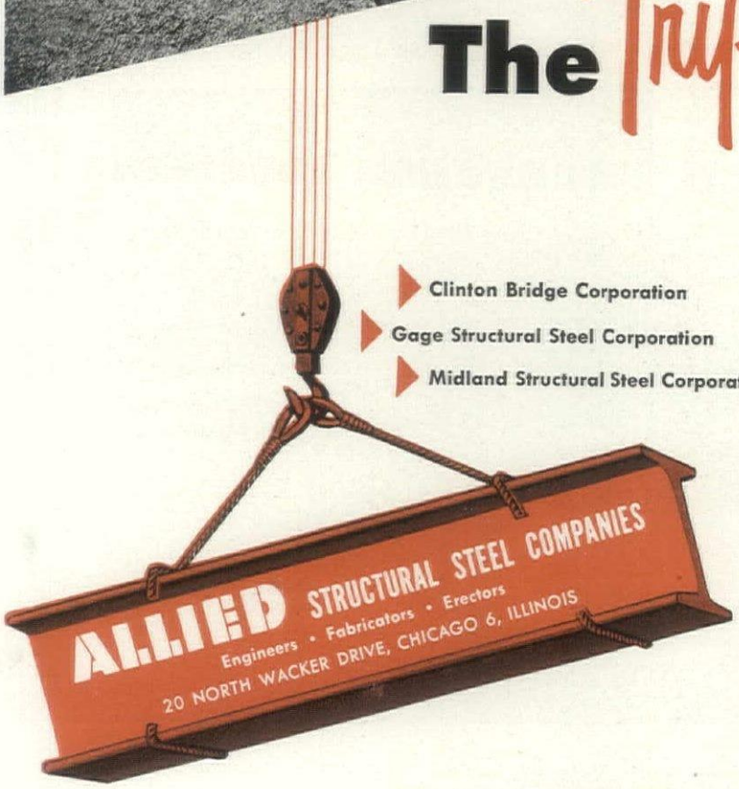
The Try-on for Fit

Bridges, like custom-made clothes, have their "Try-on for fit." They are pre-assembled to make dead certain that every rivet hole is exactly in place. This procedure means that, when the sections arrive on location, they fall into perfect position for the erecting crews. Much erecting time is saved. It also serves as a check on our templet makers who are perfectionists in their own right.

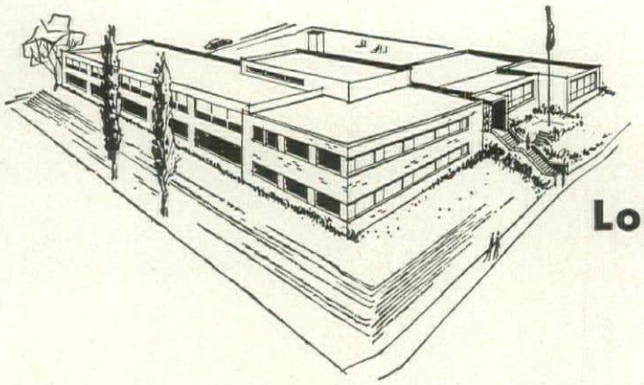
The Midland shop is so large that most bridge spans can be pre-erected inside the plant. This span is an unusually large and heavy one so the try-on was accomplished in the shop yard outdoors.

If you have any structure . . . large, medium, or small . . . on your drafting boards that calls for fabrication and erection of structural steel, send your plans and specifications to us to be estimated.

- Clinton Bridge Corporation
- Gage Structural Steel Corporation
- Midland Structural Steel Corporation



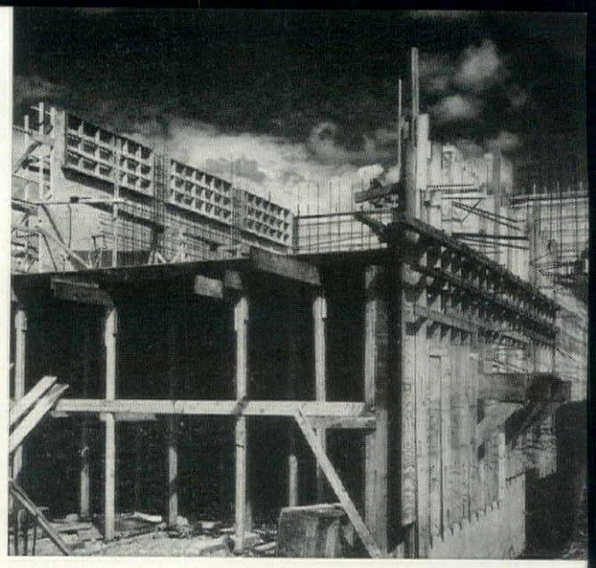
Fabricators and erectors of structural steel for highway and railroad bridges; industrial, office, school, and government buildings; airport structures; harbor facilities.



Low construction costs demonstrate

Fir plywood concrete forms helped set a new standard in low construction cost on 46,891 sq. ft. Lowell Elementary School, Tacoma, Washington

THREE KEY ADVANTAGES OF FIR PLYWOOD FORMS



Construction view shows forms in place for floor slab and walls. 5/8" plywood panels were placed across 2x6 joists on 16" centers. This was backed up by 2x10 stringers supported by 4x4 and 4x6 posts. The 8" thick walls were also cast against 5/8" Exterior-type plywood panels.

1. TIME AND LABOR SAVINGS

Use of fir plywood forms for the striking architectural concrete of this school helped establish a new record for low school construction costs in Washington state. Allowing only half area* for the lower floor play area and maintenance rooms, Tacoma school officials give $9.91 per square foot as the complete construction cost, including taxes and fees. Architect Irvin E. Muri credits fir plywood forms with playing an important role in helping hold costs to this low figure—some 20 per cent below the average cost for schools in the state.

2. SMOOTH, FIN-FREE CONCRETE

Flat, monolithic plywood-formed surfaces, both inside and outside the building, were merely sack-rubbed and then painted—a major factor in the low cost. In addition to forming both interior and exterior walls, fir plywood was used to form ceiling slabs and retaining walls.

3. ECONOMY THROUGH RE-USE

Up to 6 re-uses of the plywood forms were reported by the contractor. In addition, many of the panels were later re-used on other jobs. C. E. Bonnell, President of the Bonnell Construction Company, job contractors, reports that the plywood forms were satisfactory in every respect and that they helped speed work and cut costs all along the line.

View shows stripping off ceiling forms. Smooth fir plywood panels permitted structure and finish surface to be cast simultaneously. Exposed concrete surfaces, both inside and out, were painted direct after a minimum of rubbing, eliminating expensive plastering on ceilings.

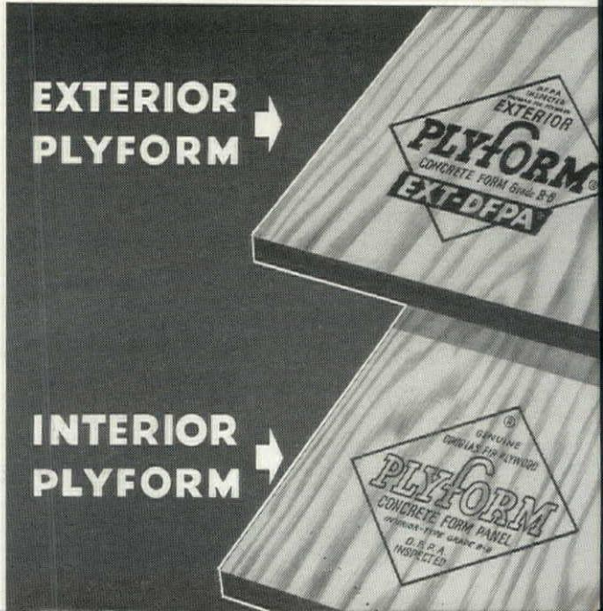
**Allowing full area for the lower floor the complete per square foot construction cost comes to $7.85.*

SPECIFY DFPA-INSPECTED FIR PLYWOOD

These registered industry trademarks are your guide, guard and assurance of DFPA quality-tested fir plywood manufactured especially for concrete form work. INTERIOR PLYFORM (highly moisture resistant glue) gives multiple re-use; up to 12-15 are not unusual. For maximum re-use, specify EXTERIOR PLYFORM (100% waterproof glue). For special architectural concrete use fir plywood with "A" face veneer or one of the new plastic-surfaced or hardboard faced fir plywoods identified by this star and link industry hallmark of quality.

DFPA INSPECTED — A Product of the Plywood Industry

For further information write Douglas Fir Plywood Association, Tacoma 2, Washington.



LOWELL ELEMENTARY SCHOOL
LOCATION: Tacoma, Washington
ARCHITECTS: Lance, Muri & McGuire, Tacoma
CONTRACTORS: Bonnell Construction Co., Tacoma

SURCO
Floors are best

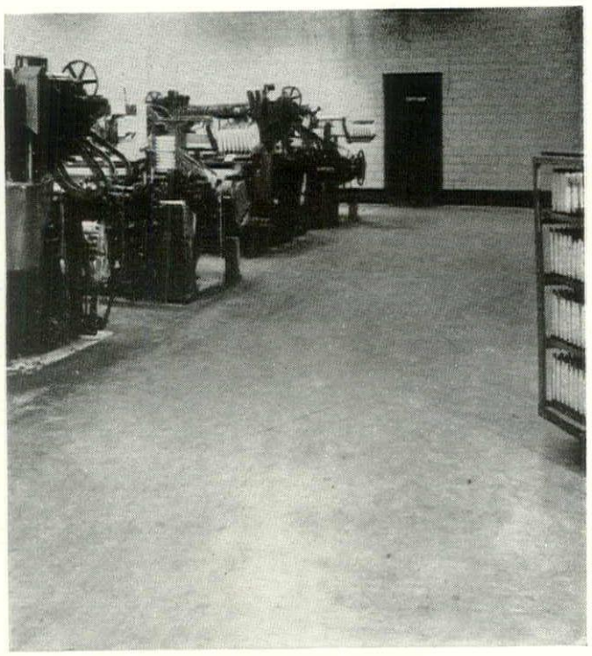
For durability . . . for comfort . . . for beauty

New industrial floors made with SURCO have the durability of concrete fortified with the best hardener . . . plus resilience of quality hardwood flooring. Discomfort and fatigue often caused from walking or standing for long periods on ordinary concrete floors are drastically reduced when SURCO floors are installed.

For restoration of old, pitted mill or warehouse floors SURCO has no equal. Such floors can be made like new by applying SURCO only ¼ inch thick right over the old concrete.

Terrazzo floors for executive offices, reception rooms, department stores, lobbies, and washrooms are not only durable, resilient, and attractive, but are easy to apply. For new construction SURCO terrazzo can be applied without final finishing of the concrete, thus saving time and money.

In resurfacing old terrazzo or concrete floors, SURCO'S setting time often reduces expensive losses incurred from closing off areas during application. The light weight of SURCO terrazzo floors, resulting from ¼-⅜ inch application compared to the usual greater thickness, means that structural changes on or about the floor are unnecessary.



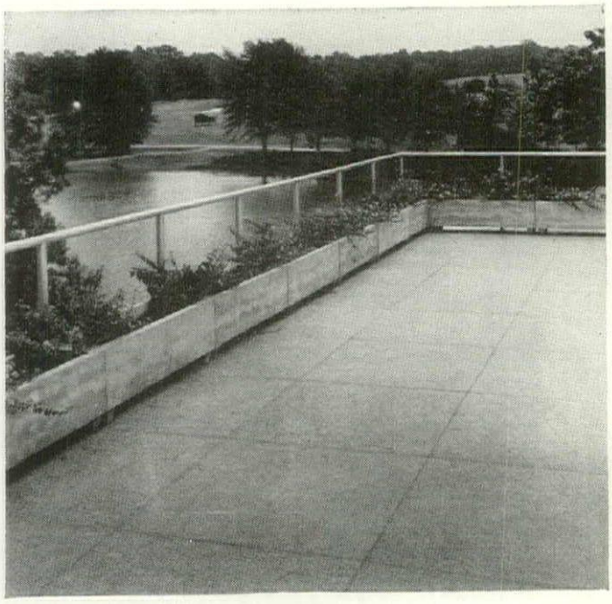
Textile Mill Spinning Room

Prior to resurfacing with SURCO this floor was badly pitted. Although fortified with hardener the concrete had failed less than two years after it was poured. Application of SURCO over the old concrete has completely restored surface. There are no noticeable signs of wear after many months of constant, heavy traffic. Most important, machinery and bins did not have to be moved during application.

Executive Office

This beautiful, resilient terrazzo floor was applied over an old concrete floor completely transforming the room. Since SURCO terrazzo was applied ¼ inch in depth, no structural changes were necessary. Department stores and commercial establishments have found that, in many cases, SURCO terrazzo can be applied without moving sales counters and show cases. Also aisles are open to traffic again much sooner than before.

SURCO



Country Club

The SURCO terrazzo shown here was put down over an old terrazzo floor which leaked, allowing moisture to seep into the room beneath. SURCO terrazzo was applied ¼ to ⅜ inch thick providing a beautiful floor and at the same time completely eliminating all water seepage.

SURFACE COATINGS, INC. ***110 Pear Street, S.E., Atlanta, Georgia***

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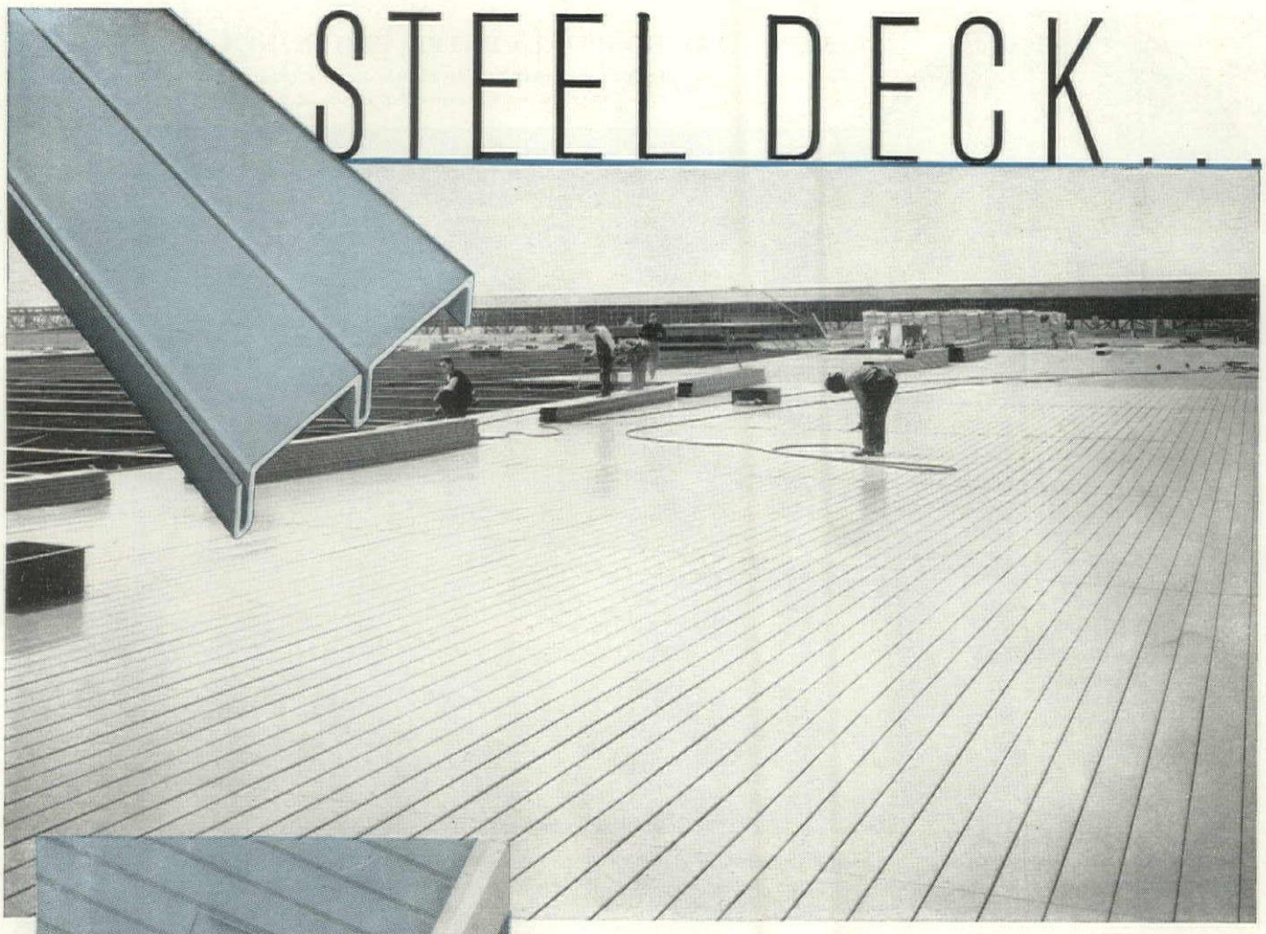
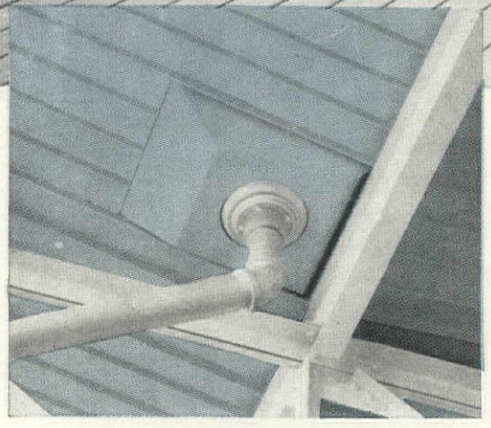
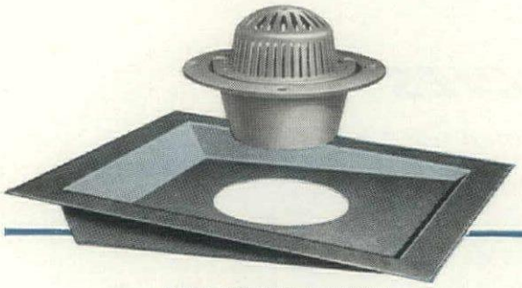




BUILT-UP SADDLES ELIMINATED

Built-up saddles are eliminated in Steel Deck Roofs. Purlins can be set to create valleys at sump locations in the drainage area. Steel Deck can be warped to conform. No additional deck plates are required—no cutting, fitting or bending necessary.



SUMP RECESSES and SUMPS

Mahon Roof Sump Recesses for use with Mahon Steel Deck can be furnished to fit any roof pitch. Mahon Cast Iron Sumps can also be furnished for 4", 5", and 6" conductors.

for the Most Economical, Permanent Firesafe ROOF CONSTRUCTION!

Steel Deck is still the most economical, permanent roof material available today. No other type of roof construction can match the inherent advantages of Steel Deck . . . its light weight permits appreciable savings in the supporting structure . . . it can be quickly erected in any kind of weather, and, the fact that it can be insulated to any degree, to produce thermal properties for any temperature range, reduces total roof cost per sq. ft. to an absolute minimum in any given locality. Mahon Steel Deck is available in Galvanized Steel, Galvanized Enamel Coated Steel, or Enamel Coated Cold Rolled Steel. Stiffening ribs are vertical—no angular or horizontal surfaces where troublesome dust may accumulate. In the enamel coating process, the metal is chemically cleaned, phosphated, and treated with a chromic acid solution to provide paint bond, and the protective coating of synthetic enamel is baked on at 350° F. prior to roll-forming. These extra value Mahon features warrant your consideration. See Sweet's Files for complete information, or write for Catalog No. B-54-A.

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Manufacturers of Steel Deck for Roofs, Partitions, and Permanent Concrete Floor Forms; Insulated Metal Walls of Aluminum, Stainless or Galvanized Steel; Insulated Metal Wall Panels; Rolling Steel Doors, Grilles, and Underwriters' Labeled Rolling Steel Doors and Fire Shutters.

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BUILT BY DEPARTMENT OF PUBLIC WORKS, CITY OF NEW YORK
FREDERICK H. ZURMUHLEN, P. E., R. A., COMMISSIONER

GENERAL HOSPITAL, Staff Quarters and Superintendents' Houses, *upper half of illustration*

TUBERCULOSIS HOSPITAL, (Service Buildings not shown) *lower half of illustration*

POMERANCE & BREINES, *architects* • GUY B. PANERO, *mechanical engineer* • GERACE & CASTAGNA, *general contractor* • JOSEPH F. EGAN, *plumbing contractor, Tuberculosis Hospital* • ASTROVE PLUMBING & HEATING CORP., *plumbing contractor, General Hospital* • CRANE CO., *plumbing wholesaler*

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more **SLOAN** *Flush* **VALVES**

are sold than all other makes combined

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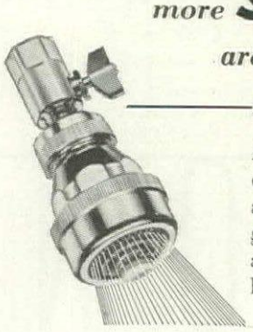

Another achievement in efficiency, endurance and economy is the SLOAN *Act-O-Matic* SHOWER HEAD, which is automatically self-cleaning each time it is used! No clogging. No dripping. Architects specify, and Wholesalers and Master Plumbers recommend the *Act-O-Matic*—the better shower head for better bathing.

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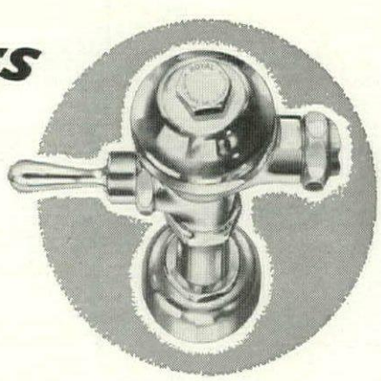
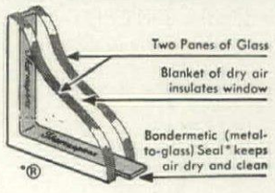


"*Thermopane* resulted in savings on both initial cost and operational cost of heating and air conditioning."



Thermopane cuts air-conditioning as well as heating costs

People want economical heating and air conditioning. They also want the *big window areas* they've become accustomed to. Insulation without isolation.

You can give it to them with the help of *Thermopane** insulating glass.

Architect Everett V. Welch of Dallas, Texas, used *Thermopane* in an air-conditioned house in Dallas (shown above). He says:" This resulted in savings on both heating and air conditioning, first from the standpoint of initial cost and second, in operational cost."

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Here's what the National Warm Air Heating & Air Conditioning Association says: "Insulation and double glazing are desirable". It goes on to say that this "may allow the use of the next smaller horsepower cooling unit with its corresponding saving in equipment and operating cost".

TO RECAP: *Thermopane* insulating glass reduces heat *loss* in winter, heat *gain* in summer. It is *permanent* insulation, just as the other insulation in the building is permanent. Nothing to put up and take down. No extra maintenance or washing. *Thermopane* is made to order for modern heating and air conditioning. And it is available in virtually any type, style or size of window. *®

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Please send immediately my free copy of "Glazing the Air-Conditioned Home". Also send complete information on types and sizes of *Thermopane* and the kinds of sash in which it is available.

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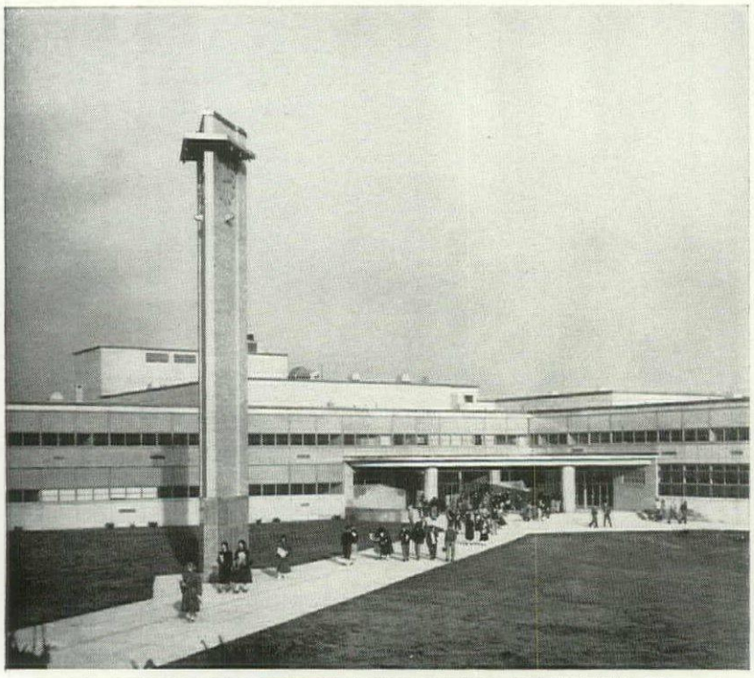
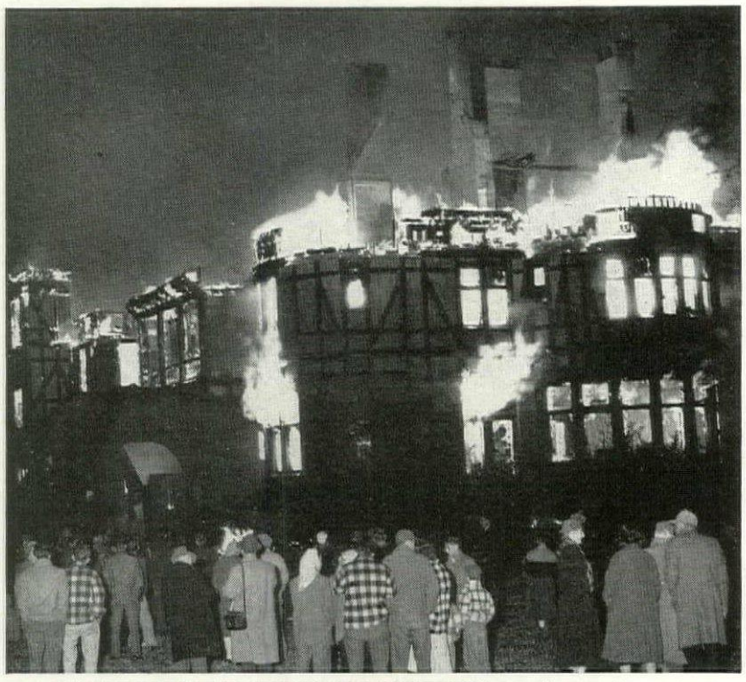
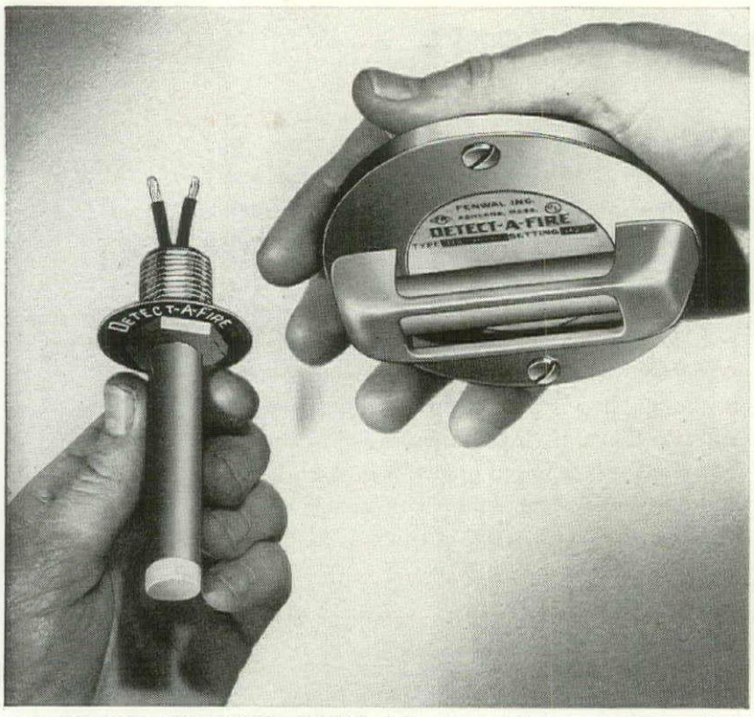


1. NO SCHOOL FIRE TRAGEDY CAN OCCUR HERE! With Fenwal DETECT-A-FIRE® thermostats on the job an alarm is practically instantaneous. No chances will be taken — DETECT-A-FIRE has been specified throughout this new high school. Fire detection and fire alarms will be in perfect, non-failing coordination.



2. WHAT THE COST IN HUMAN LIFE MIGHT BE is much more important than the slight difference in cost between the very best in fire detection and something less dependable. DETECT-A-FIRE offers the best intrinsic value — is in use by all of the leading manufacturers of alarm and release systems.



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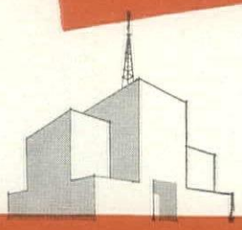

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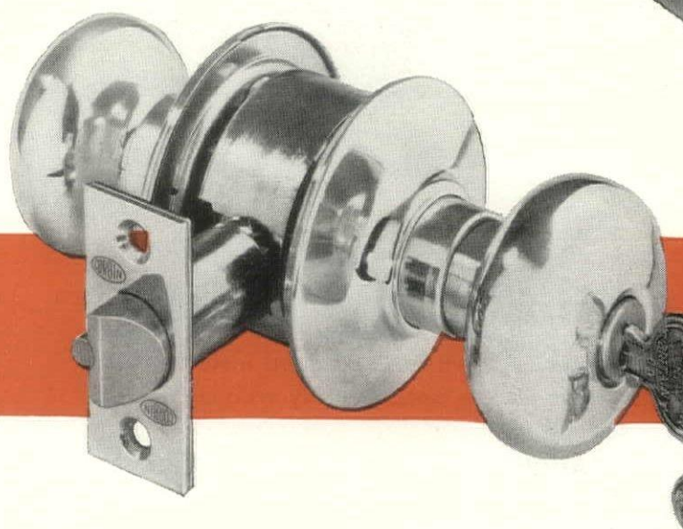

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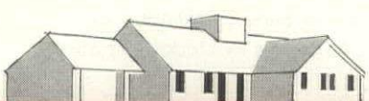
For any building where economy must be combined with security



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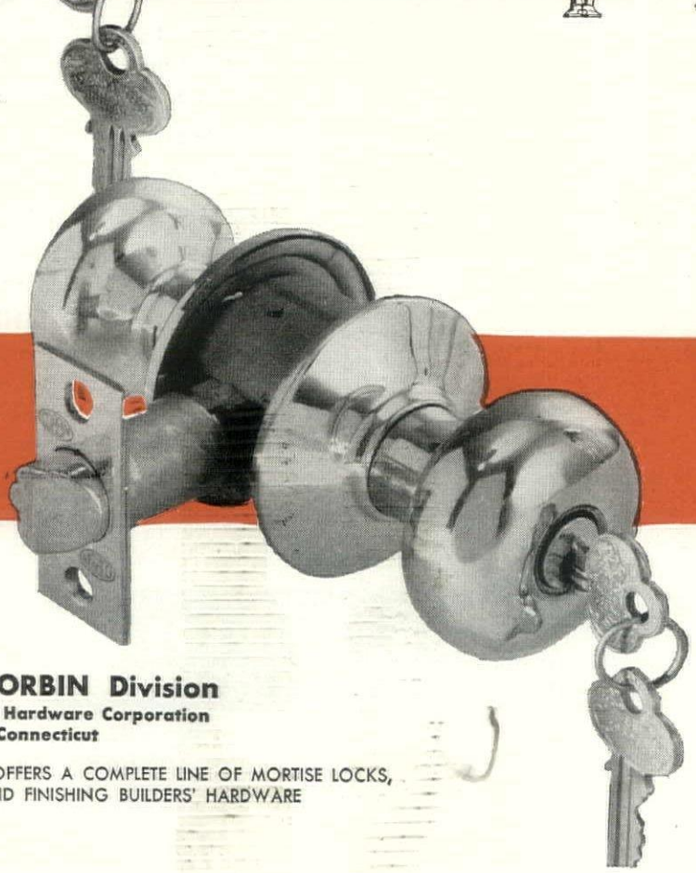

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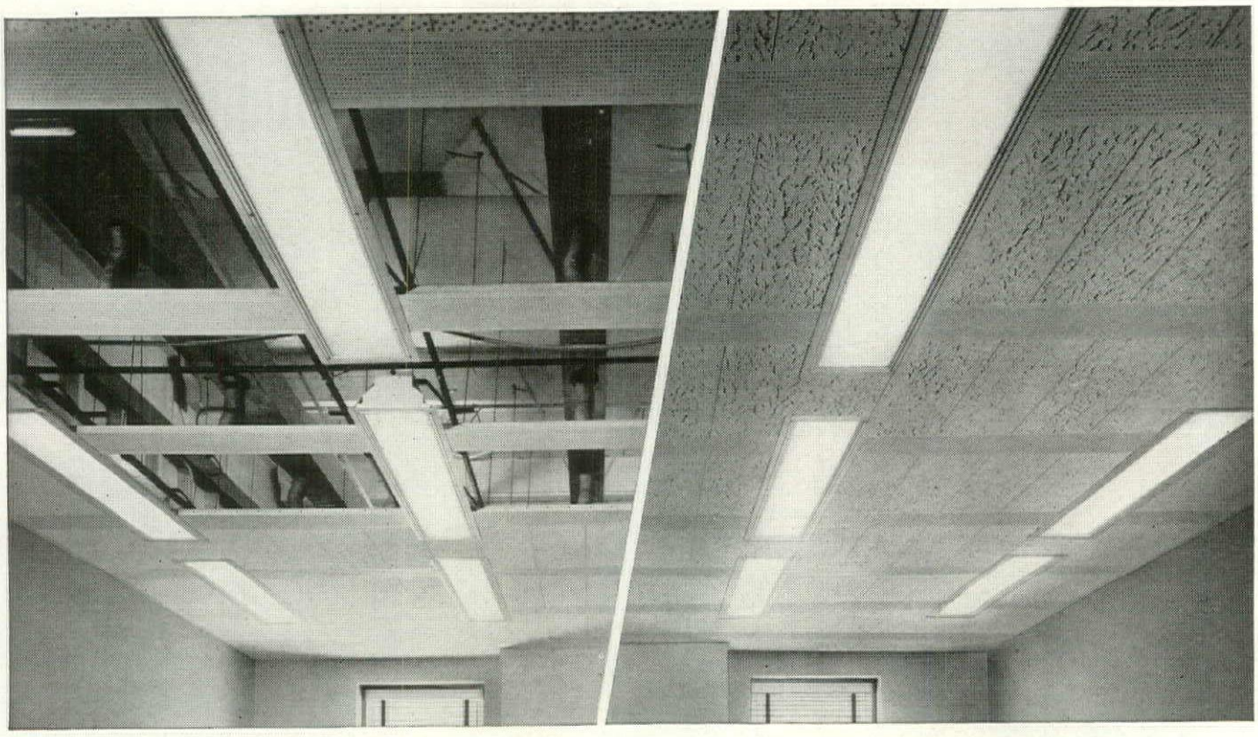
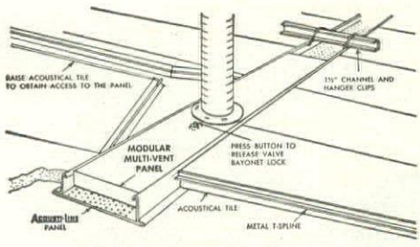


new! *Out-of-sight* AIR DIFFUSERS for acoustical block ceilings!

Now Pyle-National Multi-Vent® air diffusing panels, adapted for concealed installation in Celotex Acousti-Line ceilings, provide advantages heretofore possible only with metal pan.



The perforated face of Acousti-Line metal suspension panels act as diffusing plates for Multi-Vent units. No special supports are needed. Flexible connection minimizes need for accurate alignment between duct opening and Acousti-Line panels.

Note ready access to Multi-Vent unit for cleaning or valve adjustment.

NEW SMUDGE-FREE OPERATION—Multi-Vent's low velocity air delivery eliminates the dirtying or discoloration of adjacent acoustical blocks, a costly maintenance problem with high velocity diffusion.

NEW BEAUTY—Out-of-sight installation eliminates all protruding outlets and unsightly grilles. Permits complete freedom of interior design and decoration.

NEW LOWER INSTALLATION COST—Multi-Vent units can be assembled, connected to the duct, and seated in the metal suspension panels in just a few seconds. No tools are required . . . no cutting of blocks necessary.

AND, MOST IMPORTANT OF ALL—Air distribution by Multi-Vent's gentle pressure displacement assures perfectly even air motion and exceptional uniformity and control of room temperatures. The total absence of strong air streams or blow eliminates all usual sources of draft complaints and permits complete freedom in relocating partitions.

For complete information about Multi-Vent installations for all types of ceilings consult the Pyle-National Sales Engineer in your vicinity, or write direct.

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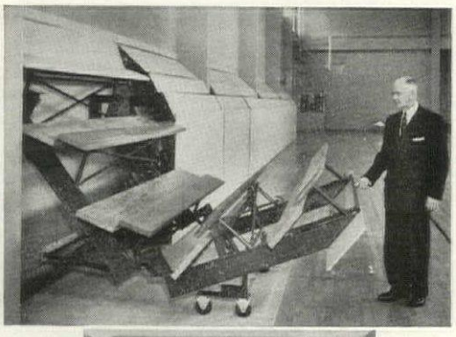
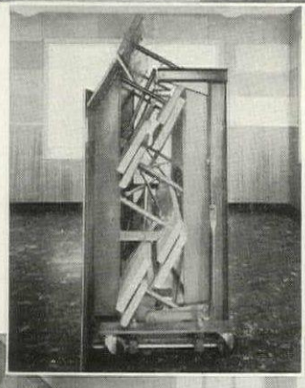
FOR DOUBLE–DUTY GYMS

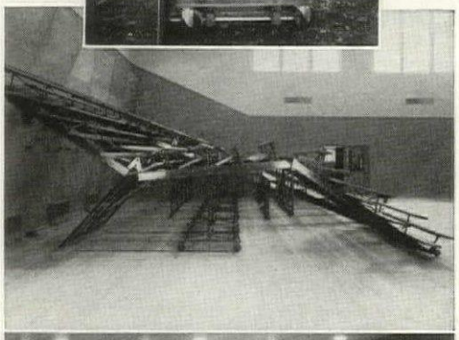
Takes only finger-tip control to raise or lower. Note neat appearance of bleachers folded against wall.

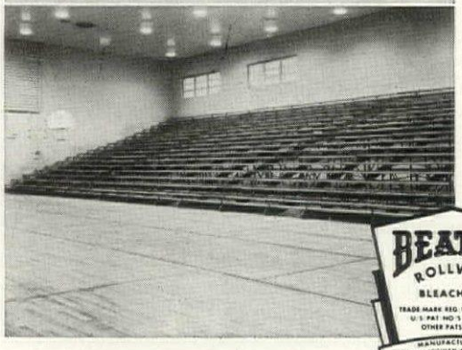


Completely portable, identical free rolling units for greater variety of uses.



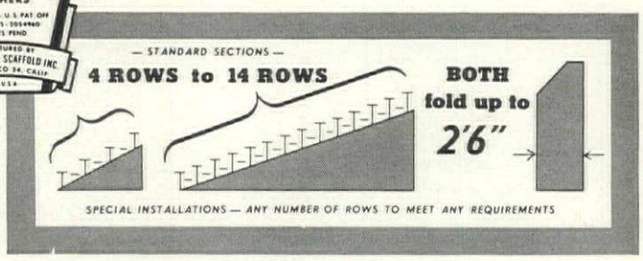
Double fold units for mass seating available up to 24 rows in depth. Occupy only 4' 6" when folded.





Check these advantages of BEATTY R-O-L-L-W-A-Y BLEACHERS

- **EXTRA COMFORT**—The only folding bleacher with 24-inch back-to-back spacing...offers 25% more seating capacity.
- **LESS FLOOR SPACE NEEDED**—Only 2'6" storage space required. Allows extra room for other uses.
- **EXTRA FLOOR PROTECTION**—Total weight evenly distributed. Casters roll on plyboard panel to prevent marring of floors. Easy access for under-the-stand cleaning.
- **STURDIER CONSTRUCTION**—Heavy duty I beams plus 2-inch structural douglas fir lumber mean greater strength.
- **SMOOTHER OPERATION**—Perfectly counter balanced so that one person can raise or lower bleacher. Minimum of moving parts. No hazards to catch fingers. Can be locked in open or closed position.
- **UTMOST SAFETY**—Every Beatty Rollway Bleacher rigidly inspected. Carries unqualified approval of state safety authorities and insurance underwriters.



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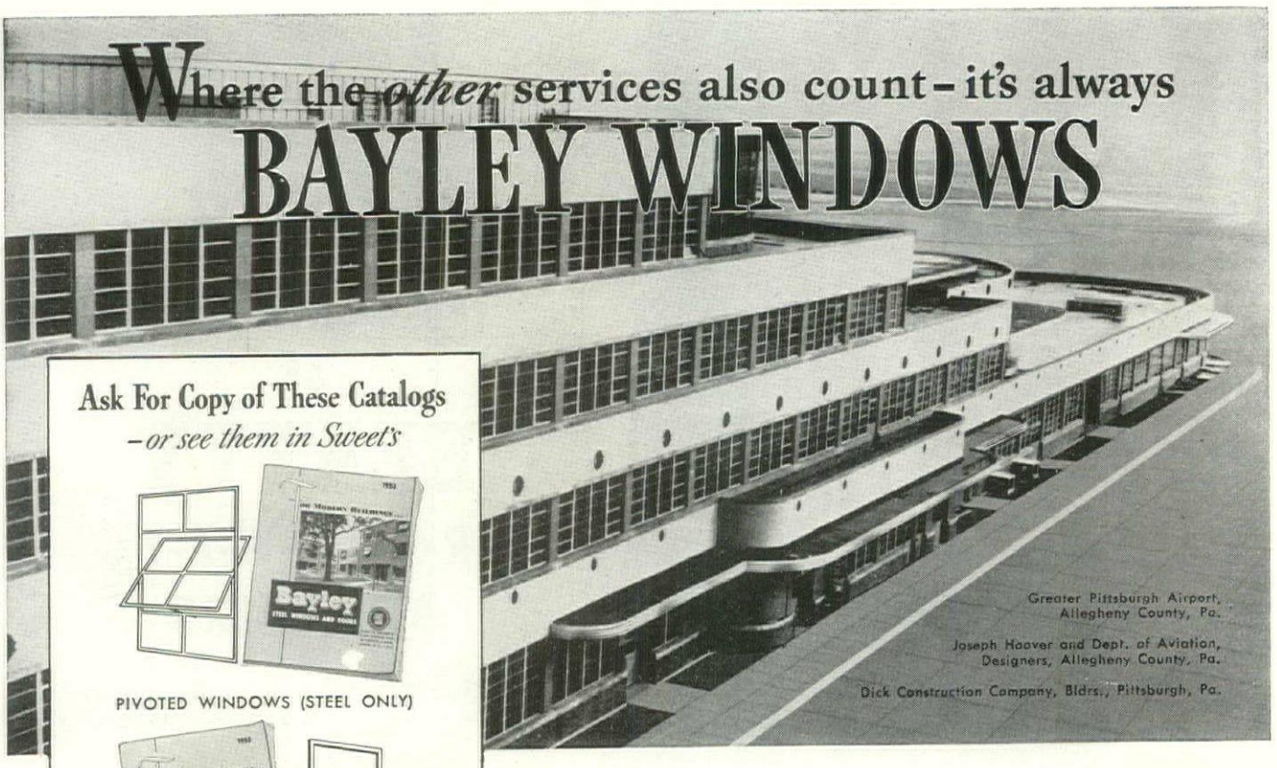
SNYDER TANK CORPORATION
3373 Lake Shore Rd., P.O. Box 14, Buffalo 5, N. Y.

SNYDER TANK CORPORATION
95 West St., P.O. Box 51, Galeton, Pennsylvania

FOLDING ROLLWAY BLEACHERS & STAGES

OUTDOOR PORTABLE GRANDSTANDS

Where the *other* services also count – it's always BAYLEY WINDOWS



Greater Pittsburgh Airport, Allegheny County, Pa.

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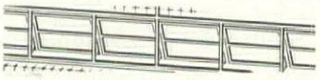
Ask For Copy of These Catalogs

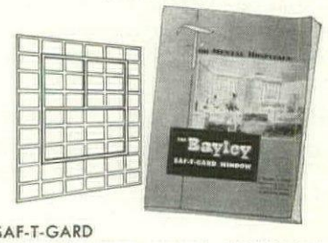
– or see them in Sweet's

PIVOTED WINDOWS (STEEL ONLY)

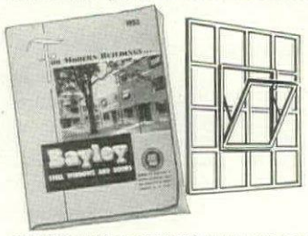
PROJECTED WINDOWS (ALUMINUM OR STEEL)



PROJECTED RIBBON WINDOWS (ALUMINUM)



SAF-T-GARD WINDOWS (FOR MENTAL HOSPITALS)



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For Factory and Power Plants

- Office Buildings • Commercial Buildings
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Steel or Aluminum Windows of

Time-tested Design for Modern or Traditional Buildings of all Types

Through 73 years of serving the construction industry Bayley has never been satisfied to build for quality *alone*. They also recognized the need for a fully cooperative relationship from the time of a building's inception to its occupancy. With that sense of responsibility, they pioneered during those years many of the most worthwhile developments in the design of metal windows.

The objectives of Bayley Window design have always been to improve natural daylighting, vision and ventilation with an enduring window, and to constantly develop products in harmony with advancing architectural trends.

The efficiency, quality and all-around economy of Bayley Windows — in either steel or aluminum — is evidenced by their use in outstanding buildings throughout the world. The nationwide Bayley Organization — through District Offices and local representatives — places on ready call a trained Window Engineer to work with you on any window requirement, from inception to completion of a project. Write or phone.

See Bayley in Sweet's. Complete catalogs on aluminum windows, 17 a/BA; steel windows, 17 b/BAL; Saf-T-Gard Hospital Detention Window, 17b/BAY.

The William **BAYLEY** *Company*

Springfield, Ohio

District Sales Offices: Springfield, Chicago 2, New York 17, Washington 16

73 *Years of* **RELIABILITY**

Architects and Engineers agree it's tops in its class.

NORMAN SCHOOLROOM HEATER

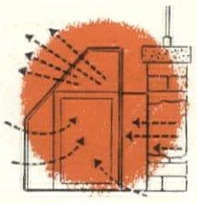
Before you decide . . . here's a new low-cost way of heating you should know about.

There's just nothing to match it! Yes, the Norman Schoolroom Heater provides you with a far superior heating system at a cost . . . lower than ever before.

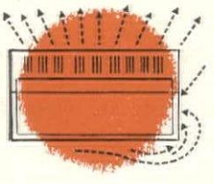
Here's the answer to real heating comfort in any schoolroom . . . not stale dry heat, but clean comfortable gas heat that introduces refreshing warm air into your schoolroom.

But that's not all! The Norman Schoolroom Heater brings you all the advantages of a central heating and ventilating system . . . with Norman's exclusive, compact, space-saving design that really cuts installation costs.

And what a pleasure to work with . . . so healthy and relaxing for students and children that you'll agree . . . it all adds up to better attendance . . . less absenteeism on cold winter days.



Preheated outside air mixes with room air as it passes through the Norman Schoolroom Heater. Flow of air can be adjusted with a damper, so that no expensive ventilation system is needed . . . and piping is completely eliminated.

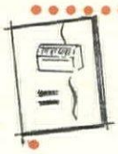


Circulation of Warm Air eliminates "cold spots" in front of windows and prevents excessive drafts along floors. Room air is later drawn back through heater to mix with fresh outside air for continuous circulation of refreshing warm breezes.

Take a lesson . . . from the Norman School Heater. Send for illustrated literature and get the complete facts on low-cost gas heating with the Norman Schoolroom Heater. Or write direct to your Norman Dealer for your copy.

Norman® products company

Manufacturers of a Complete Line of Gas Heating and Air Conditioning Equipment



Norman Products Company
1150 Chesapeake Avenue, Columbus 12, Ohio

Architects and Engineers: We invite your inquiries. Please send folder, "Norman Schoolroom Heater"

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Title_____

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Announcing new additions to the money-saving family of Fenestra Building Panels!

Here's a whole new line of modern architectural "tools"—the latest advancement in the field of light-gage steel construction.

Each one of these new Fenestra* Metal Building Panels is a multi-purpose package—structural and finish material. Each is long-span, steel-strong and lightweight, saving time, money, labor and materials.

Fenestra Engineers are ready to give you thoroughly tested data on all of these products. Please call your local Fenestra Representative or write direct to the Detroit Steel Products Company, Dept. AF5-, 2296 East Grand Blvd., Detroit 11, Michigan.

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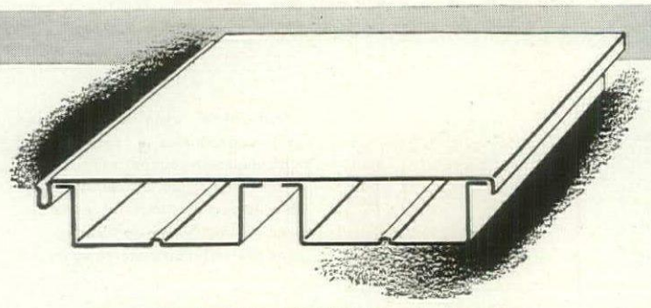
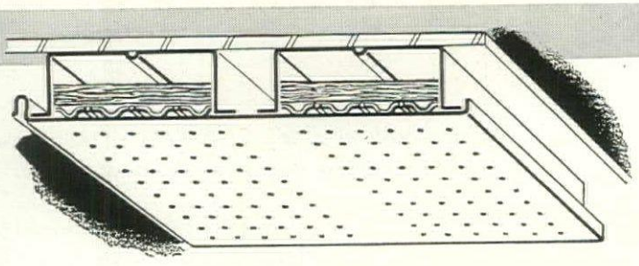


Fenestra's New "D" Panels for Floor, Ceiling, Roof

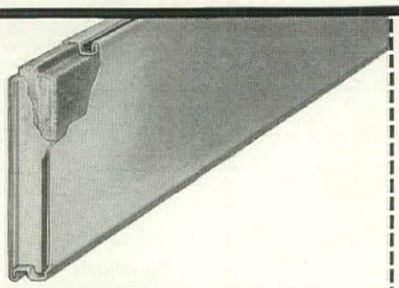
These rugged, rigid, long-span metal panels interlock quickly and easily to form subfloor, or combination ceiling and roof. They are easily arc welded to supporting structural steel. Wires, etc., can be run conveniently through the box beams. Pipes and ducts can go between cells. Panels are 24 inches wide, 1½, 3, 4½, 6, 7½ inches deep, up to 31 feet long.



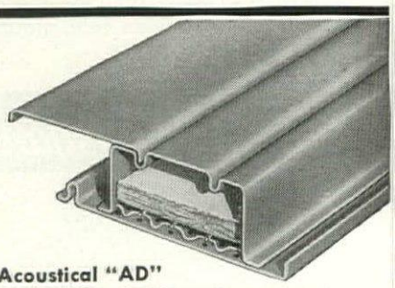
Fenestra's New "D" Panel Acoustical Ceiling

These panels are available with the flat, smooth side of the box beams perforated and with sound insulation material inside the box beam. Placed flat side down, the panels interlock to give you a beautiful finished ceiling. It's structural material and finished ceiling *in one* compact package. Fire-safe, maintenance-free. Same dimensions as "D" Panels for floors.

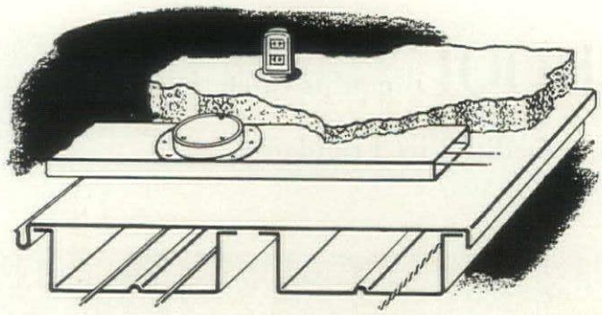
Add the new panel products, shown above, to this old, established family. Here is real latitude for architectural design.



"C" Insulated Wall Panels. Width 16". Depth is 3". Installed horizontally, or vertically.

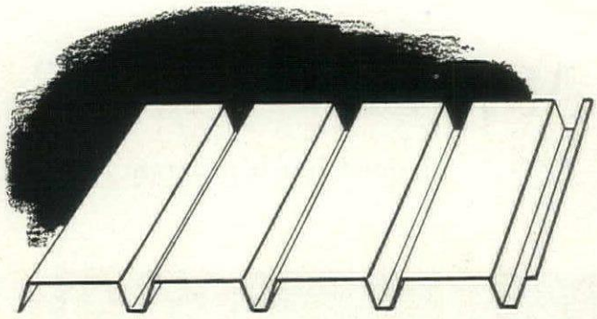


Acoustical "AD" Panels for ceiling-silencer-roof. Width 16". Depths to 7½".



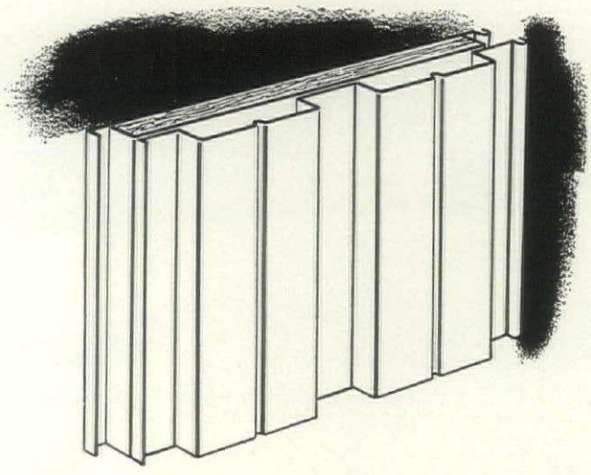
New Fenestra-Nepco "D" Panel Electrifloor

Here is almost unlimited electrical availability for the life of a building. Panel cells are 12″ on center, a 27 sq. inch duct area for the 3″-deep panel. This is adequate for all cables, including coaxial. And for a two-duct system, outlets can be spaced 6″ apart.



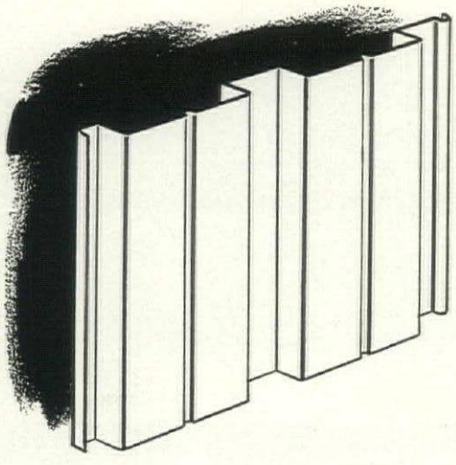
New Fenestra Econorib for Roofs

Here is 18 and 20 gage, 1½″ deep roof deck with a full ½″ rib base for purlin contact when you weld the deck down. 24 inches wide for economy of handling and for increased strength. This balanced design combines economy and strength to the "nth" degree.



Fenestra's New Fluted Wall Panels

These 24″-wide insulated wall panels are available in galvanized steel, painted steel, aluminum or stainless steel—in lengths required by job conditions. The double 1½″-deep hat sections have stiffening ribs for great strength and good architectural effect. Interlocking, telescoping ends eliminate intermediate flashings. Insulated with 1½″-thick glass fiber, for a better U value than a 16″-thick brick wall! Quickly installed inside-outside finished wall in one package.



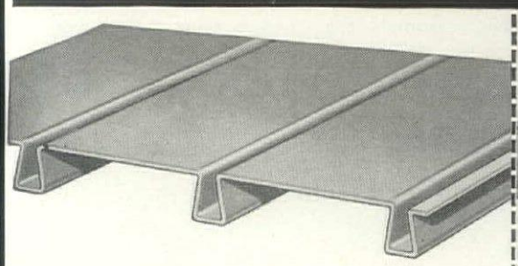
Fenestra's New Uninsulated Siding

An architecturally attractive, economical siding for use where high insulating value is not necessary. Available in 18 gage steel or 16 gage B&S aluminum. Quickly and easily installed. Fire-safe. 24 inches wide with 1½″-deep hat sections.

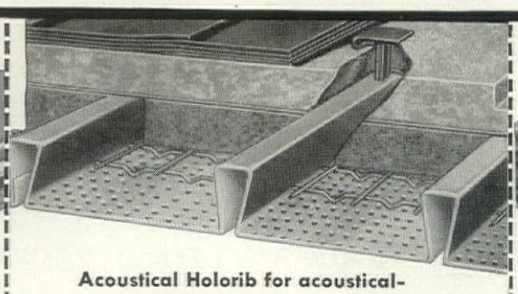
Be sure to see the Fenestra exhibit at the A.I.A. Convention in Seattle, June 16-19

Fenestra

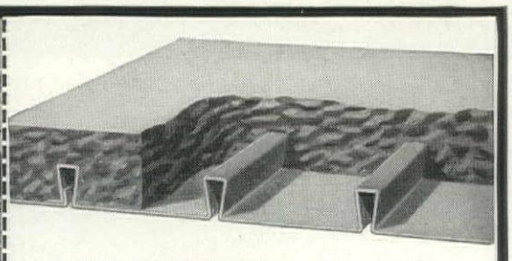
METAL BUILDING PANELS



Holorib Roof Deck. 18″ wide—depth 1½″—lengths up to 24′.



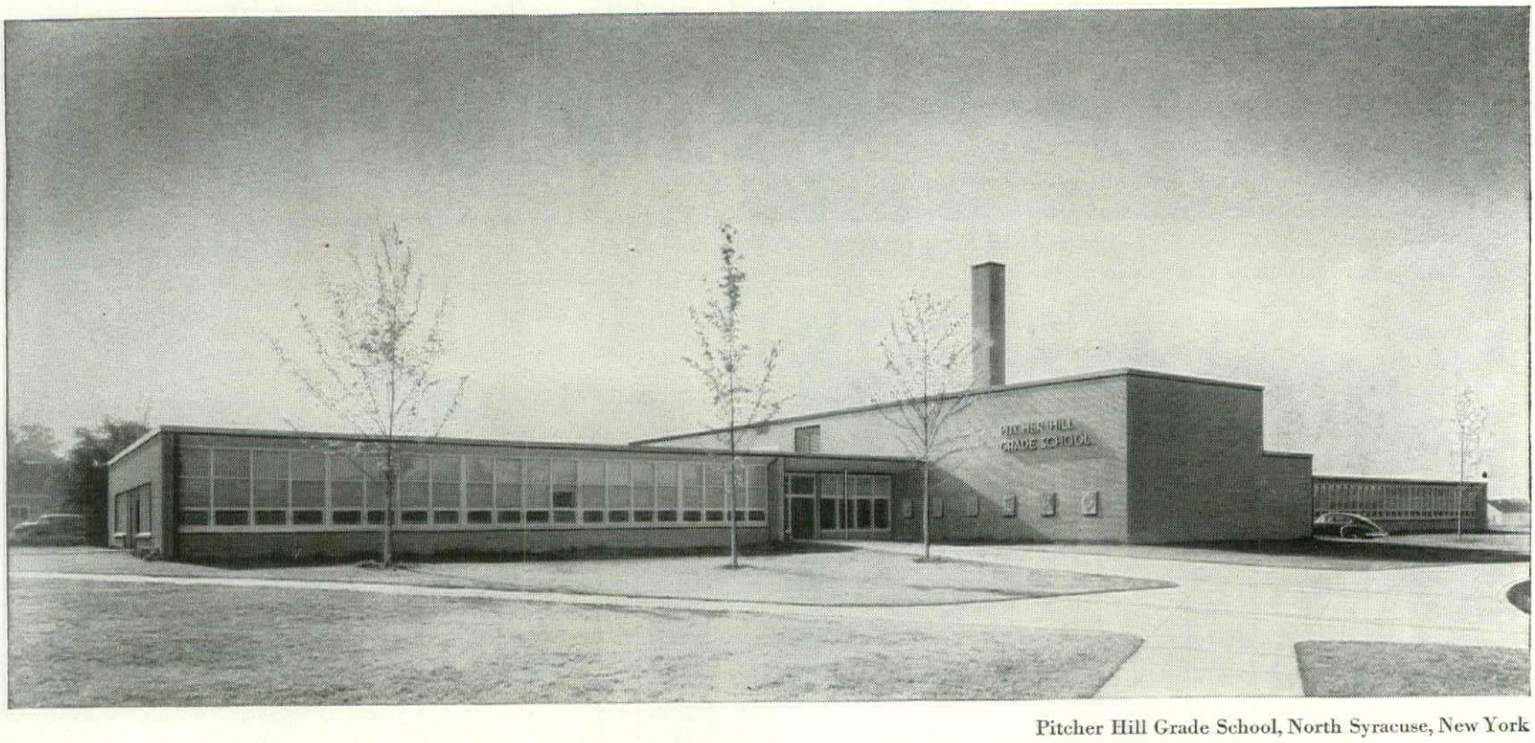
Acoustical Holorib for acoustical-structural roof. Width 18″. Depth 1½″.



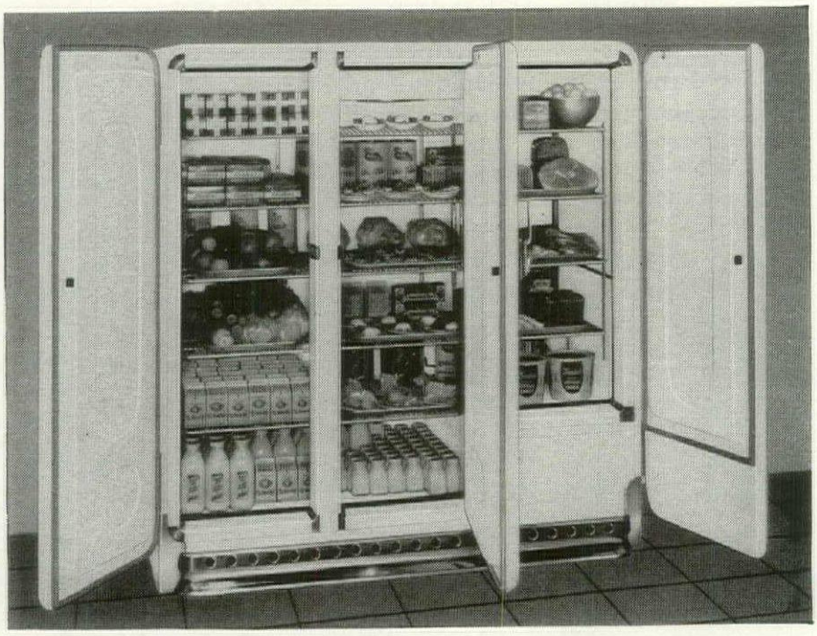
Holorib Reinforcing Floor Forms. 18″ wide—lengths up to 24′. Upturned pyramidal ribs reinforce concrete slab.

MODERN GRADE SCHOOL equips cafeteria for

planned lunch program . . . food-keeping facilities by Frigidaire



Pitcher Hill Grade School, North Syracuse, New York



Frigidaire 44 cu. ft. Reach-In Refrigerator, 3-door model RIL-44

An outstanding example of functional grade school design is the recently completed Pitcher Hill Grade School, ideally situated amid spacious, rolling lawns in North Syracuse, New York. Modern to the last detail, the school provides up-to-the-minute facilities throughout for its student body and faculty.

As a case in point, the school's cafeteria is equipped with a roomy 44 cubic foot Frigidaire Reach-In Refrigerator that maintains the top nutritional value of the food it keeps, while helping to make possible the smooth, fast service a school lunchroom demands.

Frigidaire Reach-Ins, models from 17 to 62 cu. ft., provide large, accessible food storage capacity in minimum floor space. Flowing Cold refrigeration gives uniform food protection. Long life, dependability and economy are assured by all-steel construction, sealed Meter-Miser mechanism and all-porcelain interior.

For further information on Frigidaire equipment suitable for schools, hospitals or institutions, call the Frigidaire Dealer, Distributor or Factory Branch that serves your area. See Frigidaire catalogs in Sweet's Files, or write Frigidaire Division of General Motors, Dayton 1, O. In Canada, Toronto 13, Ont.

FRIGIDAIRE Refrigeration and Air Conditioning Products

BUILT AND BACKED BY GENERAL MOTORS

Reach-In Refrigerators • Display Cases • Air Conditioners
Ice Cube Makers • Ice Cream Cabinets • Water Coolers
Compressors • Beverage Coolers • Home Appliances

Waterproofed BRIXMENT HELPS PREVENT EFFLORESCENCE

Efflorescence is caused by soluble salts which are present in almost all masonry materials. When reached by water, these salts dissolve and may be drawn, by evaporation, to the surface of the wall.

Brixment is permanently waterproofed, during manufacture, with the most effective air-entraining waterproofing agent known.

Waterproofed Brixment mortar checks the passage of water and keeps it from percolating down through the wall, dissolving salts which may be in the masonry materials, and carrying them to the surface.

* * * * * * * *

In addition to reducing the possibility of efflorescence, Brixment mortar gives you two other practical benefits:

1 HELPS PREVENT LEAKY WALLS

Even under pressure, water cannot readily pass through Brixment mortar. Therefore, if the face brick are backplastered with Brixment mortar, an effective barrier is set up against the passage of water to the inside of the wall.

2 GREATLY INCREASES DURABILITY

Water cannot readily penetrate Brixment mortar. This prevents the mortar from becoming saturated — therefore helps protect it from destructive action of freezing and thawing to which it is subjected many times each winter.

Both these advantages of waterproofed Brixment mortar are fully described in other recent advertisements. Write for reprints.

Louisville Cement Co., Louisville 2, Ky.

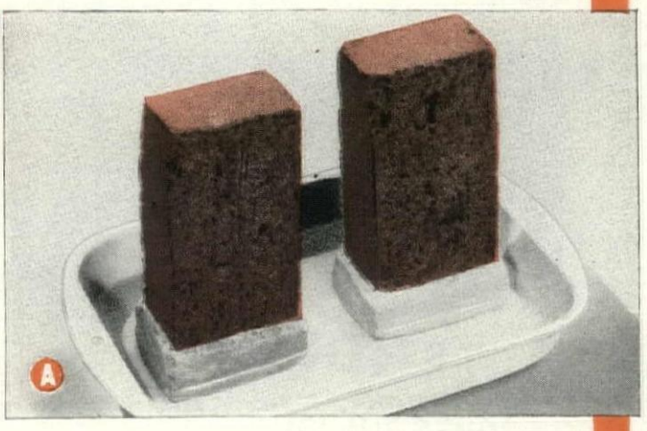


FIGURE 1

A To test Brixment and any other mortar for resistance to efflorescence, "cap" two brick heavily with the mortars, and let harden.

B Keep both brick for a few weeks in a shallow pan of water, as shown. See the difference with waterproofed Brixment mortar!

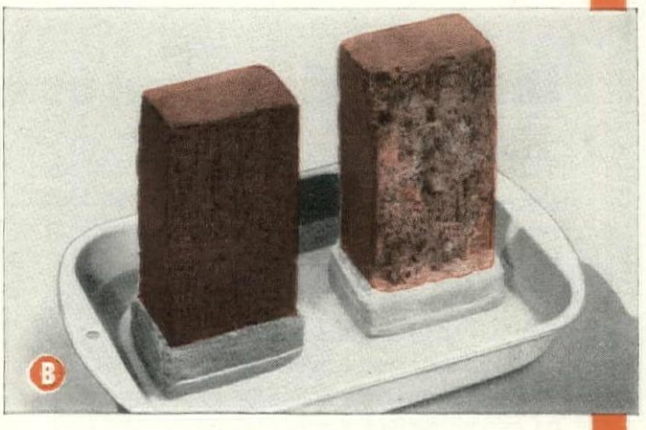
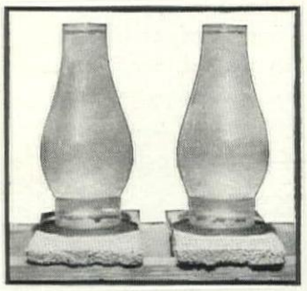
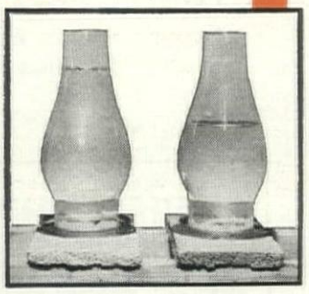


FIGURE 2



Prepare two slabs of mortar, one with Brixment and one with ordinary cement-and-lime mortar. After mortars have hardened, seal a lamp chimney to each of the mortar slabs, using wax or candle grease, and fill with water.



After 24 hours, note how much water has gone into and through the non-waterproofed mortar, and how little water has gone into or through the Brixment mortar.

Looks inviting when new...stays inviting for life

This entrance says "come-in" today. It will say the same thing years from today . . . and look just as handsome . . . because it's made of Republic ENDURO Stainless Steel.

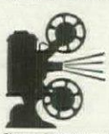
Built-in beauty is one of the reasons why ENDURO stays so good looking . . . so long. It's solid stainless steel . . . all the way through . . . with a distinctive permanent lustre that lasts. Its smooth surface is easy to clean . . . and keep clean. And that's something clients like to know . . . in advance.

ENDURO actually makes open designs like this possible. It allows you to use thinner, lighter sections without sacrificing strength or durability. It's easy to fabricate, too. And it's so versatile that you can combine it with many other materials to obtain striking effects.

Does ENDURO Stainless give you an idea? File it with your future plans now. Sweet's will give you the details on this remarkable metal. For special help in developing your own ideas, write Republic.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • *Massillon, Ohio*
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

See *and* Hear
"THE STORY OF STAINLESS"



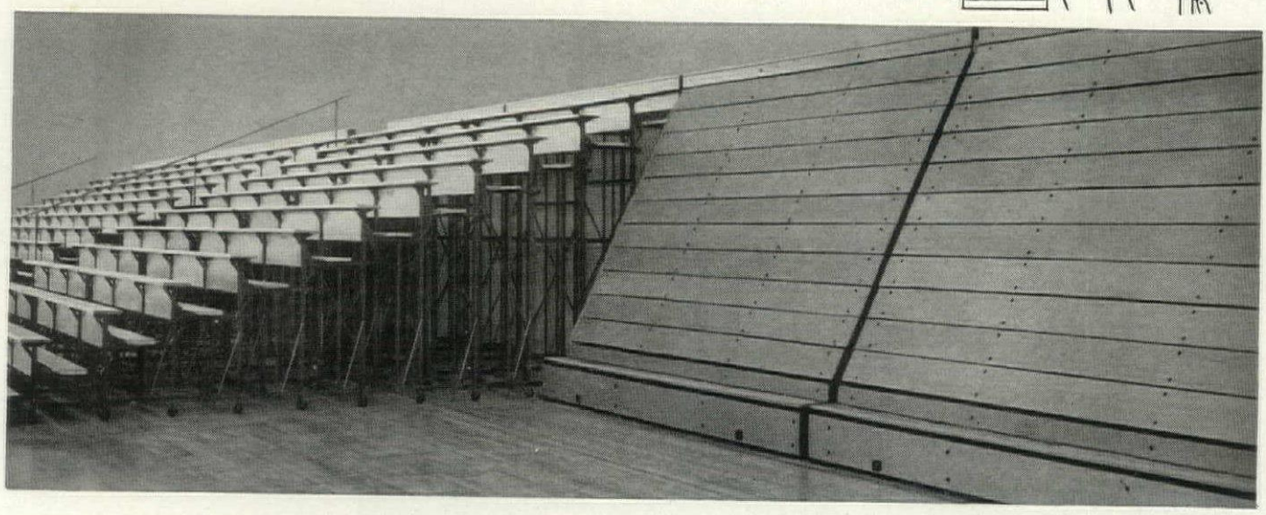
Full-color, 16 mm sound film —27 minutes running time. Dramatic . . . historic . . . interesting. Available to qualified groups without charge. Requires 16 mm sound projector. Send name of organization, type of projector, requested date to Ideal Pictures Corp., Dept. T-4, 65 E. So. Water St., Chicago 1, Ill., or write Republic Steel, Dept. K, Cleveland 1, O.

Republic
REPUBLIC STEEL
ENDURO® STAINLESS STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

Think of Spectators' *Comfort*

When Selecting Your Gymnasium Stands



Universal Roll-A-Ways Provide More Leg Room Than Any Other Leading Stands

When selecting or specifying gymnasium stands, it is quite natural for you to favor those which provide maximum seating in minimum space. But what about the spectators? Are you considering their comfort? Cramped seating facilities don't encourage big turn-outs for basketball games or other events.

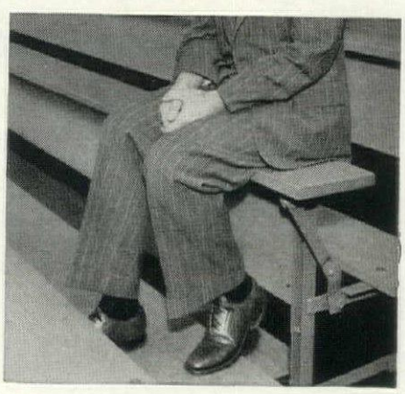
However, this need not be a problem. With *Universal* Roll-A-Way Stands you can meet all demands . . . for comfort as well as maximum seating in minimum space.

Thanks to improved design and construction, Roll-A-Ways provide more leg room than any other leading stands. The extra distance from seat board to foot board (18½") and the centered position of vertical filler board beneath the seat permit every spectator to keep his feet and legs in normal position (illustrated at right). Continual comfort is assured.

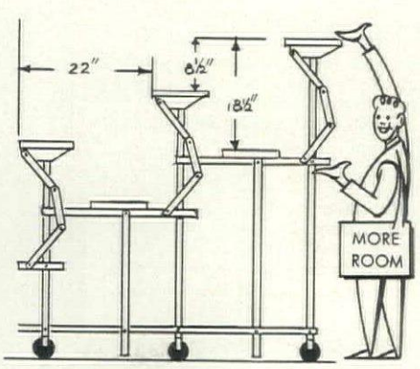
Universal Roll-A-Way Stands are engineered to individual specifications, fit any space, and afford perfect visibility. When not in use, they may be rolled back to the wall, opening approximately 70% more floor space for regular gymnasium activities. They are ideal for large capacity or small; neat and attractive; exceptionally strong and safe.

Investigate *Universal* Roll-A-Way Stands today. Write for catalog and list of installations. No obligation.

ANOTHER PROMINENT UNIVERSITY SELECTS *UNIVERSAL!* Roll-A-Way Stands have just been installed in the large new gymnasium at Vanderbilt University, Nashville, Tenn. Another proof of preference!



Notice the natural, comfortable position of this man while seated on Universal *Roll-A-Way Stands. The extra distance from seat board to foot board and the centered vertical filler board mean maximum space per spectator. See detail drawing below.*



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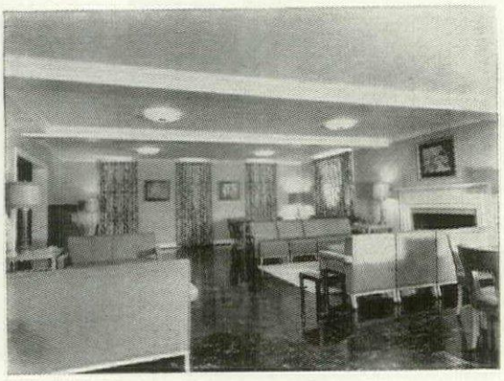
CLIFTON CLUB, Lakewood, Ohio

Members eat in comfort and quiet under the ceiling of Travertone in the Club's Dining Room. Travertone not only absorbs the clattering noise of dishes and utensils, but adds distinctive beauty to the room as well.

Architect:
Charles Bacon Rowley and Associates, Inc.

General Contractor:
Cleveland Construction Company

Acoustical Contractor:
Airway Insulation Company

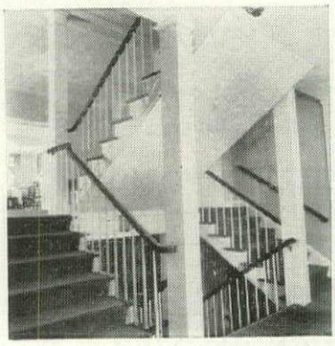


High acoustical efficiency rather than dignified appearance was the requirement for the sound conditioning in the Informal Lounge. Here, low-cost Armstrong's Cushiontone, a perforated wood fiber tile, was chosen to do the job.

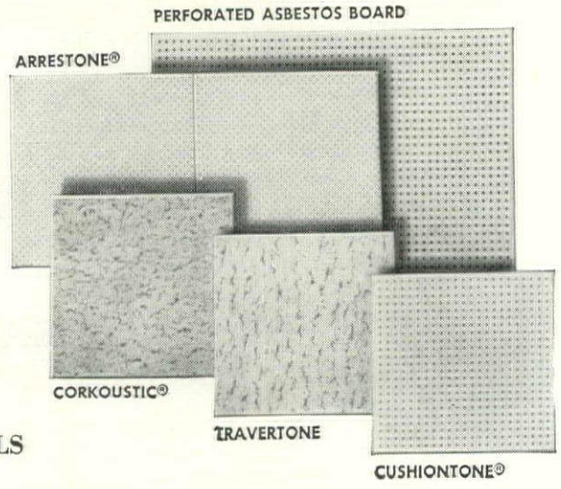
Quiet dignity dominates the decorating scheme in the distinguished Clifton Club. Furniture, carpets, draperies, and even the acoustical ceilings blend tastefully to provide attractive, restful surroundings for the members. The beautiful ceilings of Armstrong's Travertone contribute to this atmosphere by absorbing disturbing noise, promoting comfortable quiet at all times.

Selected for its handsome, dignified appearance, Travertone is a highly efficient, completely incombustible mineral wool tile. It is easily, economically maintained. Travertone's fissured surface can be repainted when necessary. Installation is by cementing or mechanical suspension.

There are many different acoustical materials in the Armstrong Line, and they offer a wide variety of product features to meet any sound-conditioning need. For full details and a free estimate, call in your local Armstrong Acoustical Contractor. For your personal copy of the booklet, "How to Select an Acoustical Material," write Armstrong Cork Company, 4210 Rooney Street, Lancaster, Pennsylvania.



Armstrong's Travertone overhead helps to isolate disturbing noise, keeps it from travelling through the large open stairwell into other parts of the building.



ARMSTRONG'S ACOUSTICAL MATERIALS

More experts ponder '54 outlook

▸ BLS Construction Chief Riley predicts construction volume near $34 billion next year but sees no drop in costs

▸ AGC survey finds 49% of members expect drop in building volume in next six months as competition grows

This time a year ago, and for many months this year, 1953 was billed widely as the year for caution because business would probably experience a trying slide and readjustment.

This month, when the President's Council of Economic Advisors reported on business activity through the third quarter of the year, it found that incomes, and just about every other yardstick but government spending (down $2 billion), had soared higher than ever. At the end of 1952, the gross national product rate was $361 billion a year. It rose to $362 billion the first quarter of this year, jumped to $372 billion in the second quarter, and eased off to $371 billion in the third quarter. Even so, GNP stood $25 billion ahead of '52's third-quarter rate. And construction got its full share from the cornucopia: expenditures through September were 4.7% ahead of last year's rate (p. 43) and would hit an all-time peak for the full year.

More of the same. This month the tenor of 1954 predictions was reminiscent of predictions a year ago. But construction sources usually agreed with FORUM's forecast last month: there will be a descent from this year's pinnacle, but only a small one; 1954 construction outlays will probably be the second biggest in history.

Addressing the Producers' Council annual convention in Pittsburgh last month, H. E. Riley, chief of the BLS construction statistics division, offered his personal opinion that 1954 construction would be "slightly under $34 billion," compared with FORUM's $33.3 billion prediction. Riley saw no particular decline coming in construction costs. (The annual BLS–Commerce Department estimate for next year will not be made until next month, but the joint [revised] estimate for this year's total volume is $34.6 billion.)

Reduced optimism. The AGC last month surveyed its members' market opinions for the coming six months. Heading into the winter season, their replies were not as overwhelmingly optimistic as in a similar survey last April. The contrast was greatest in the outlook for building. Contractors' expectations for different types of construction:

	(% of replies)	
BUILDING CONSTRUCTION	*April*	*Sept.*
Expect greater volume	54	21
Expect same volume	24	30
Expect less volume	22	49
HEAVY CONSTRUCTION		
Expect greater volume	41	24
Expect same volume	24	33
Expect less volume	35	33
HIGHWAY CONSTRUCTION		
Expect greater volume	62	43
Expect same volume	24	33
Expect less volume	14	24

Fiercer competition. In the AGC survey, 94% of the replies reported more intense competition, 5% no change, 1% less competition. On bidding 82% said bid prices would go lower, 14% said they would remain stable, 4% said they would go higher. In the South, said the AGC report, competition has become "murderous."

Two public housing contracts illustrated the competition among contractors: in Los Angeles last month 13 bids (one each from Houston and New Orleans) came in on one project, seven on another. Low offers, $1,417 and $1,370 per room, were 8 to 12% below the $1,553 average in 3,195 units now under construction. In Norfolk, Va. 15 bids came in for two sections of a project at low figures of $1,496 and $1,514 a room, also down about 12 to 16% from low bids of $1,732 in March, $1,689 in 1950 and $1,819 in 1951.

Stay out of debt. Realty Analyst Roy Wenzlick, father of the celebrated multicolored Wenzlick real estate charts, ventured a ten-year forecast on housing, construction and real estate this month for the Illinois State Chamber of Commerce. He still saw the day approaching when a prospective home owner can "buy an existing building for considerably less than the cost of constructing a new one." New home building is apt to shrink considerably at that point, he observed.

A cutback in construction of larger buildings, particularly office structures, would not occur so soon, he added, "as it is a peculiar fact that this type of building is generally built in larger quantities at the tail end of a boom or even after the boom is practically over."

His advice to realty investors: sell off poorer properties and use the proceeds to pay off the mortgages on better properties; avoid going ino a deflationary period with large outstanding mortgage debt obligations.

Defense Dept. junks sq. ft. limits; Adm. Jelley to head construction

Military construction policies under Defense Dept. reorganization took firmer shape. After two months of sizing things up in his new job as assistant secretary for properties and installations, Franklin G. Floete created three new divisions in his office, named men to run two of them.

1. To head a construction division he appointed the Navy's ranking construction expert, Rear Adm. Joseph F. Jelley, chief of the Bureau of Yards & Docks since Dec. '49. Floete and Jelley promptly agreed to discard the most important work of Floete's predecessor, Frank Creedon: square foot or per man cost limitations on barracks and other repetitive service structures. They explained such curbs sometimes might hamper economy. If they must be bound by such cost formulae by Congressional mandate they would seek adjustments for different weather and building cost zones.

2. To head a realty management division Floete appointed Ira D. Beynon, Lincoln, Neb. attorney. His work will include functions formerly handled by the defunct Armed Services Housing Agency. He will supervise renting and purchasing policies.

3. Floete said he was shocked to discover that none of the service agencies could produce figures on the cost of maintaining their $165 billion plant. Maintenance, particularly on temporary buildings, can soar to fantastic rates. A maintenance and building operations division will be created to tackle this problem as soon as a director is picked.

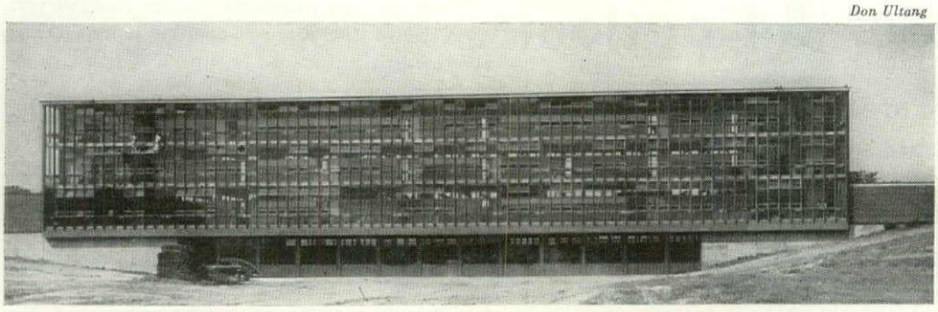
Reni

DIVISION CHIEFS Ira D. Beynon (l) and Rear Adm. Joseph F. Jelley (c) confer with Defense Dept. building boss Franklin G. Floete.

The biggest job for Jelley's construction division, it appeared, will be launching the new naval and air base program in Spain. Supervision of this $200 million project was assigned to the Navy's Yards & Docks, where Rear Adm. John R. Perry, now in charge of Y&D's Pacific and Alaskan division, would succeed Jelley. Y&D apparently got the nod because most of the work will be naval bases. Some observers interpreted Navy direction as a slap at the Army Engineers because of the fumbling at Moroccan bases.

Architectural and engineering contract for the Spanish program was awarded jointly to: Pereira & Luckman, Los Angeles; Shaw-Metz & Dolio, Chicago; F. R. Harris Co., New York; and Metcalf & Eddy, Boston. The primary construction contract is not expected to be awarded before January, and efforts will be made to subcontract as much work as possible to local Spanish firms.

Don Ultang



KEOKUK GOES MODERN: Senior high school and community college students at Keokuk, Iowa went back to classes last month in an extraordinarily handsome new $1.5 million plant designed by Architects Perkins & Will of Chicago. The four-story main building, shown here, has side gallery corridors reminiscent of a steamboat. Corridors are cantilevered from the central skeleton of reinforced concrete. Cost was about $14 per sq. ft.

Could homebuilders trim costs in school building?

Biggest problem facing school building, as educators see it, is how to erect $10.7 billion worth of schools for only $5.8 billion. The higher figure, says the U.S. Office of Education, is what it would cost to bring the nation's schools up to par. About half of it would relieve today's overcrowding; half would replace obsolete classrooms. The lower figure is what communities could raise by stretching their resources to the limit. Moreover, enrollments are still zooming. The National Education Association now thinks the peak elementary school load will not arrive until 1959-60. The all-time high in college attendance is expected in 1964-70.

In the resulting push to cut school building costs, a few schoolmen were turning to an unexpected source: homebuilders. One Washington economist, Donald J. O'Connor, made headlines this month with a suggestion that elimination of structural steel beams, use of mass-produced homebuilding materials and single-story construction would cut the average cost of a school room from $40,000 to about $10,000. "We don't want to chisel on our kids," said O'Connor in advocating one-story, house-type structures for teaching, "but we shouldn't be taken for a ride on costs. A $40,000 classroom is a ride."

In booming Bucks County, Pa. when the Bristol Township school board found it could not afford $2 million to build the schools it had planned to serve the new Levittown, Builder William J. Levitt offered to form a nonprofit corporation, build two 20-classroom schools for $800,000 each and lease them to the board for 20 years at $40,000 annually. After that, the schools would revert to the township. Local officials accepted Levitt's idea enthusiastically. And near month's end Dr. Francis B. Haas, state superintendent of public instruction, added his preliminary approval to the lease idea. Under Pennsylvania law, the state department of public instruction must approve all school plans to qualify local communities for 50% reimbursement of the cost. Levitt hoped to find a mortgage investor for the schools; if not, he told schoolmen he would put up the construction money himself.

Chicago school costs hit; private architect named

Chicago public schools, said the *Sun-Times* in a critical series of articles in August, not only are viewed as "stodgy from the design standpoint" by private architects, but also cost more than comparable parochial schools in Chicago or public schools in the suburbs and in St. Louis and Milwaukee. Average cubic-foot cost of Chicago public schools this year: $1.39 (range: $1.28 to $1.53). Parochial schools cost 75¢ to $1.28 per cu. ft. Suggested remedy: let private architects design schools instead of the board of education's staff.

This month, the board of education heeded the advice, prepared to hire Perkins & Will to design a $3 million elementary and high school. Moreover, the private architects will let bids and supervise construction — jobs formerly done by the board's staffers.

British school to be built with 2″ plastic wall panels

Lumber-shy Britain usually builds with brick or concrete. This month, an Edinburgh court approved construction of a $280,000 school with load-bearing walls of a plastic made from compressed, resin-impregnated paper. Architects George L. Walls and George P. Duncan expected speedier erection and reduced maintenance to offset the initial high cost of the material. It comes in 4′ x 8′ panels 2″ thick, with doors and window frames factory-installed. The panels are fastened together with aluminum alloy stanchions. Glass or wood will provide insulation between inner and outer panels, which the architects called nonflammable and impervious to water and vermin.

Said Walls: "It is not possible to say at present whether there is any saving over conventional methods of construction, apart from time, because we do not know yet how long the building will take."

SIDELIGHTS

Foreign buildings shake-up

State Dept.'s Foreign Buildings Office is due for a shake-up. Its able boss, Leland W. King, now on a European inspection trip, will be kicked upstairs into an advisory job. State Dept. brass say King and his predecessor, Frederick Larkin, ran the office as a "one-man show." They would have more committee meetings, procedures, analyses before building, and perhaps would offer US plans to local officialdom abroad for approval before construction—all procedures which architects know tend to produce mediocrity instead of good design. Masterminding the shake-up is Edward T. Wailes, deputy undersecretary of state, a 24-year veteran with the department. Advising him is New York Builder Nelson Kenworthy. While they study, State Dept. foreign building not already under contract is being held up—for more study, says Wailes. AIA may be asked to form a panel to advise on the program. Some topflight design men intimately connected with the foreign buildings program privately call King's ouster a "dirty trick." Ironically, an exhibit of the work King did was attracting favorable attention this month at Manhattan's Museum of Modern Art, along with expressions of surprise that such cleanly styled architecture could be for the government.

Tax aid for bomb shelters

The Office of Defense Mobilization awarded its first 100% rapid tax write-off certificate for protective construction. A $550,000 allowance was given the Cincinnati Milling Machine Corp. in Cincinnati to cover building two bomb shelters at its home plant.

Another code barrier falls

The tortuous renovation of US building codes gained another inch: Minneapolis junked its archaic building code requirement of 8″ masonry walls—whether load bearing or not—on all structures over one story except houses. A code amendment adopted Oct. 16 permits noncombustible panels separated by 1½″ of fireproof insulation.

BRAB to scan Navy tempos

To learn from past mistakes, the Navy Bureau of Yards & Docks has asked Building Research Advisory Board to review its World War II temporary construction program. Navy wants to know whether cost and time saved by makeshift building is offset by costlier maintenance.

Atomic power: a new horizon

The Atomic Energy Commission's announcement that it will build a reactor to produce more than 60,000 kw of electric energy opened a new horizon for construction this month. Westinghouse Electric Corp. was picked to build what will become the first civilian atomic power plant. Although General Electric's proposal to put up a dual-purpose reactor for both plutonium and power was thus sidetracked for the moment, AEC Commissioner Thomas E. Murray indicated more atomic power plant jobs are in the offing.

Photos: Genack Studio

NAHO-HHFA CHIEFTAINS: Oliver C. Winston (l), new president of NAHO, greets HHFAdministrator Albert M. Cole. Architect Winston, 48, is executive director of Baltimore's housing authority.

DEPUTY CHIEFS for NAHO and two of HHFA's main sub-agencies were principal speakers at a NAHO lunch: (l to r) FHA Commissioner Charles E. Slusser; Luncheon Chairman Ramsey Findlater; James W. Follin, HHFA's redevelopment director.

NAHO'S AWARD for distinguished achievement and community service among cities over 500,000 population went to Philadelphia's HA. The Liddonfield row house project (above) exemplifies "imaginative design" cited in award. Architects: Newcomb Montgomery & Robert Bishop; Matthew Ehrlich & Ezekiel Levinson; John W. Wright, Robert Gilfillan, Allen Berkowitz.

HHFA chiefs woo public housers

▸ At NAHO meeting, Cole says he wants to make Housing Act of 1949 "work"; most cities need US subsidy

▸ Commissioner Slusser says he will "fight" for program, would like it to provide single-family houses

Was hate turning into love? At the annual convention of the National Association of Housing Officials in Milwaukee this month HHFAdministrator Albert M. Cole and PHA Commissioner Charles E. Slusser gave public housing a bold embrace on behalf of the Republican administration. Said Cole, wooing the New Deal's beguiling housing widow:

▸ "There is no intention on our part of curtailing federal help under the authorities given us. . . . I did not oppose the public housing section of the 1949 Act because I object in principle to any kind of program of federal assistance for decent housing for low-income families. I think we should have an effective program in this particular area of housing need.

▸ "I thought [the public housing section] was defective. . . . I think it should be restudied and changed to whatever degree is needed to remove [the] defects, and . . . make it work.

▸ "Decent homes have to be provided for slum dwellers. If those families cannot afford such homes on the private market, then a program is necessary that will enable them to be housed decently. . . . I do not see how in most cities housing for such families can be provided in sufficient quantity without some subsidy aid from the government."

At a press conference, Cole gave as his own the public housers' definition of "low-income families": "families unable to obtain good housing by reason of their low income." He confirmed that administration policy makers are studying what job-making role public housing could play during recession.

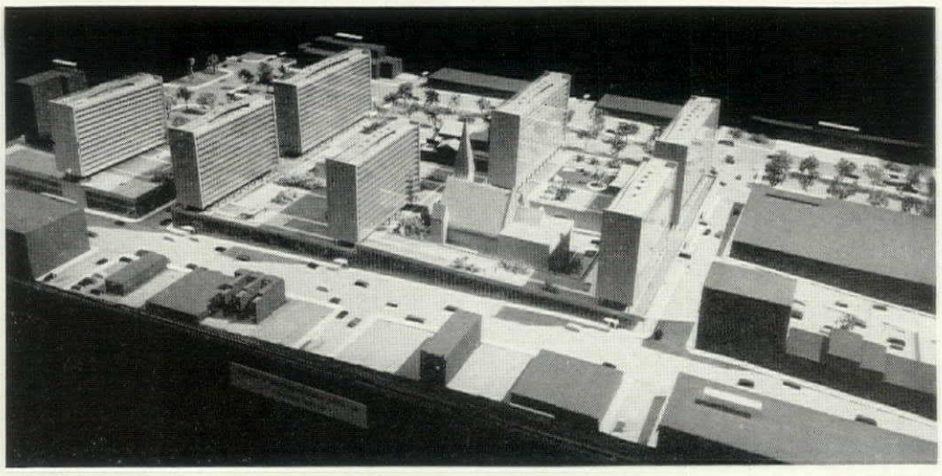
No liquidation. Commissioner Slusser was just as ardent. Said he: "I am dedicated to the original concept of the 1949 Act . . . 'of using the funds and credit of the United States . . . to remedy the unsafe and unsanitary housing conditions injurious to . . . the citizens of the Nation'. . . . I would like to get one message over to you. . . . The late Bob Taft did not recommend me for this job and President Eisenhower did not appoint me for the purpose of liquidating the low-rent public housing program.

"I am going to fight for it—not for its mistakes, not for its apologists, but for the great good that it has done—the great good that it will do—and for the people who so greatly need it."

At a press conference, Slusser elaborated his view of public housing mistakes. The worst: overprogramming that has caused vacancies in some localities (which he refused to identify), high-handed action by some local housing authorities in jammed-through programs without adequate regard for the views of other local interests (i.e., politicking).

Detached houses? Former real estate man Slusser said he discounted NAREB and NAHB attacks on public housing as "propa-

Paget—St. Louis



St. Louis election revives $20 million redevelopment plan

Last March, a $1.5 million bond issue that would pave the way for a $20 million urban redevelopment project (model above) failed to win the needed two-thirds vote at a special election in St. Louis. Last month, after an intensive nonpartisan drive that enlisted AFL and CIO support, the bond issue carried at a second election.

The money will buy and clear three downtown slum blocks for a park and parkway development (background). With assurance that these blocks will be rebuilt, the city's Land Clearance Authority revived plans for a federally assisted Title I redevelopment project for the adjoining five and one-half blighted blocks (foreground). This would provide 1,350 apartments in seven privately built, 12-story buildings designed by Hellmuth, Yamasaki & Leinweber, and Harris Armstrong, associated architects.

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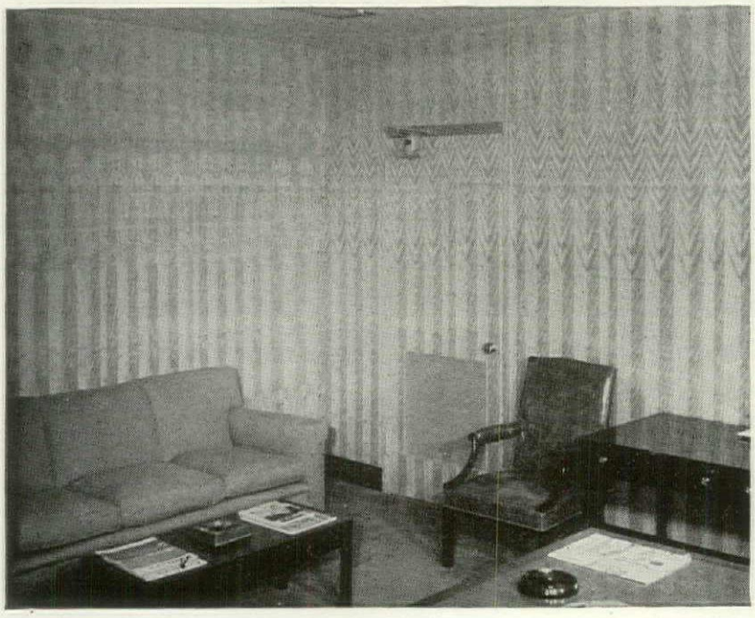

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ganda," but he added that public housers also are guilty of "overemphasis."

One experiment Slusser is "thinking strongly" about: to bring the architects and builders of some locality together to see if they could design and erect single-family public housing homes that would blend perfectly into the rest of the community. He said he was inspired to attempt this after seeing some good two-bedroom houses costing $7,000 to $7,500.

'Clear but mistakable.' Public housers were uncertain how to accept Cole's and Slusser's advances, or what Chicago's *Sun-Times* last month called Cole's "conversion" to public housing.

President Ira S. Robbins of the National Housing Conference, public housing's chief lobby group, gave NAHO his estimate the next day. Cole, said Robbins, had spoken "in clear, but mistakable terms." Robbins insisted there must be some hidden "gimmick" behind Cole's surface affection. Cole demanded greater "local" approval and support for public housing, Robbins noted, and perhaps the "gimmick" would emerge as mandatory local referenda or dollar-for-dollar federal subsidy matching by each locality for any further projects—both likely to block or cripple prospective programs. Said Robbins: "Now that [Cole's] 'shirt-sleeve conferences' [to seek ideas on federal housing policies] are over, it's time to get into our 'shorts and gloves' and really start fighting."

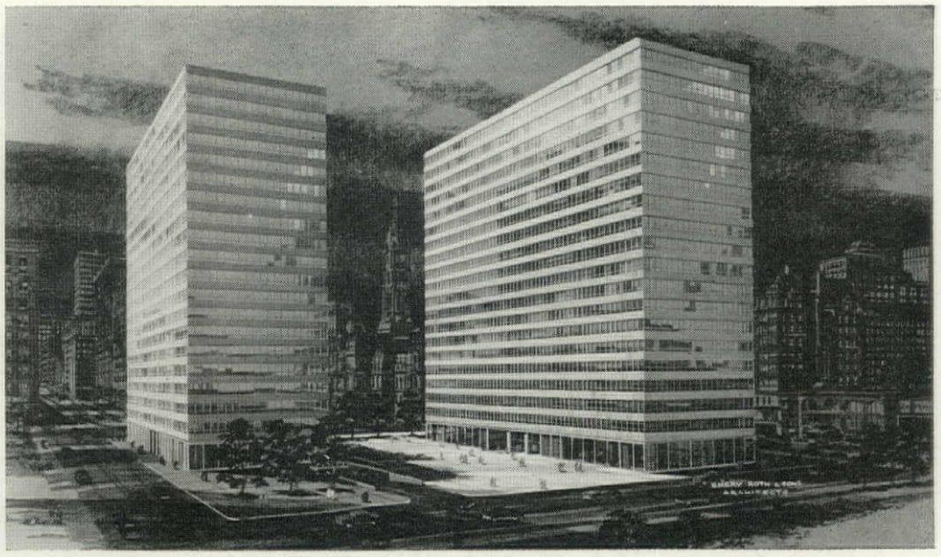
Incoming NAHO President Oliver C. Winston of Baltimore typified those more inclined to accept Cole at face value. Reasoning: there is no point in fighting the administration before it discloses its housing recommendations to Congress; if the administration is going to urge more public housing than Congress is likely to vote for, public housers would only defeat their own aims by fighting the administration.

Title I changes? Cole told newsmen he favored an "expanded, aggressive" Title I urban redevelopment program, with its greatest emphasis remaining for the present on housing, rather than nonresidential improvements. But at a NAHO luncheon, James W. Follin, HHFA's new slum clearance and urban redevelopment director, said he hoped "that without any lessening of our concern about housing" the program eventually can be freed of its pervasive link to housing.

Norfolk Builder Ralph E. Bush gave an urban redevelopment session one pointed reason why homebuilders should support the Title I program: half the residents in the Area B Washington, D.C. site for which he was awarded a redevelopment contract have incomes above public housing limits, and will thus become new home or apartment prospects as soon as they have to move.

The convention approved changing NAHO's name to the National Association of Housing and Redevelopment Officials. It will become NAHRO as soon as the formality of a mail ballot vote is completed.

Adolph Studly



URIS BROTHERS' PENN CENTER BLOCK UNDER EARLY PLAN FOR TWIN OFFICE BUILDINGS

Citizen advisors criticize slab design for Penn Center

New York's Uris Bros. were elevated to angelic status in Philadelphia last May, when they leased a block in the Penn Center redevelopment project, announced they would erect two buildings, the first a 20-story office structure (AF, Sept. '53, News). This month their halo was knocked askew when a preliminary sketch showing the structure (above right) was displayed. Members of the Penn Center citizens advisory committee called it "dull and unimaginative."

Said Committee Chairman Arthur C. Kaufmann, executive head of Gimbel's: "If this is just going to be an ordinary development, I don't want to be connected with it. It's just another office building. I feel considerably let down." Another member, Architect Louis I. Kahn, was heard to say that an architectural student presenting such a plan could expect to be marked "zero."

Realtor Robert W. Dowling, the Pennsylvania Railroad's consultant for Penn Center, admitted the building as sketched by Emery Roth & Sons (ground breaking scheduled Nov. 23) drew only "pretty faint praise." But he said the plans were not final. "We can still change the over-all profile," he said. Architect George M. Howe, chairman of the design board for the development, suggested that some way might be found to integrate the "lower part of the inner wall with the esplanade to keep it from looking like a cliff." In New York, the Urises agreed that ground-floor features of the office building and the concourse treatment for the entire block were only tentative.

Further complicating the scene was the fact that the Sheraton Corp. has announced that its staff architects headed by Mrs. Mary Kennedy will design a 30-story hotel to occupy the site of the office building illustrated on the left.

For Reyburn Plaza, a small park adjoining both Penn Center and City Hall, a skyscraper municipal building was proposed this month. Philadelphia Realtor Frank G. Binswanger said unidentified Philadelphia and New York interests were ready to pay the city $6 million for the park, erect a $25 to $30 million building and large underground garage on a lease-purchase arrangement so the property would revert to the city in 25 to 30 years.

Binswanger suggested the city could use the $6 million cash it would receive for Reyburn Plaza for repairing and rehabilitating the present City Hall.

Smog is blamed for a death and LA goes into a flap

Is smoke more than just another form of urban blight? Los Angeles doctors have long been convinced that their city's tear-jerking smogs actually shorten the lives of patients suffering from heart or lung ailments. But not until this month did one of them say so on a death certificate. Dr. John V. Barrow, a former president of the county medical association, recorded that Mrs. Gertrude Call, 69, died of a heart attack "due to heat and smog." A patient suffering, as she was, from damage to the heart muscle, needs lots of fresh air, said Dr. Barrow, but "in this case it would have made the condition worse to open the window."

Barrow was deliberately trying to raise a fuss in the hope it would speed Los Angeles' fumbling efforts to do something about smog. He got the rumpus he wanted. Mayor Norris Poulson asked the state to take over smog fighting from the county, which spends $500,000 a year on the program but, in the opinion of the League of California Cities' local division, has been "ineffective" in combating smog and has "no satisfactory program" to eliminate it soon. Chief cause of Los Angeles' smogs, say air-pollution detectives, is gasoline. Some 900 tons a day of unburned fuel are spewed in the air by Los Angeles' 2 million autos. Another 500 tons of vapor come from oil refineries, 120 tons more from bulk storage tanks and 120 tons from evaporation as gasoline is pumped into service station and automobile tanks.

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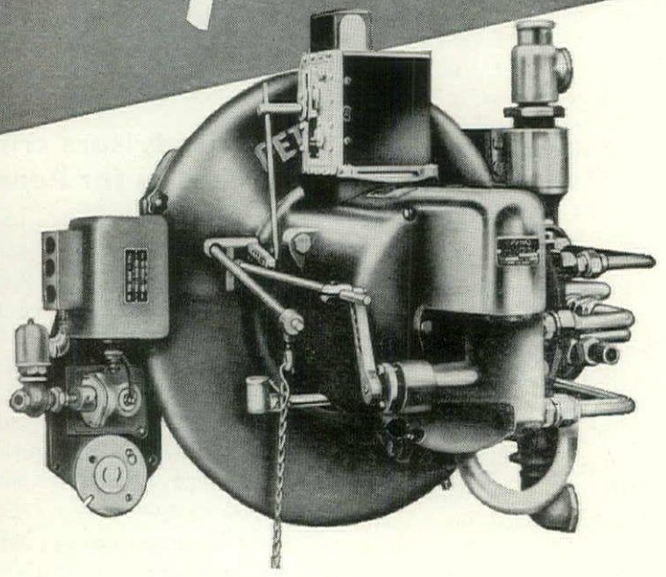

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Does the attack on urban blight get at its causes?

- **Economist Miles Colean, in a new book, underscores the danger that only symptoms will be treated**
- **Roots of city decay lie in bad government, unfair taxing methods, traffic and slum profits, he says**

In the nation's growing attack on urban blight, thinks Economist-Architect Miles L. Colean, there is a serious danger that action will be aimed at symptoms instead of causes. This month, in a book written for the Twentieth Century Fund (*Renewing Our Cities*, 181 pp., $2.50), Colean points out the all-important difference between the two with scholarly insight. He also offers a sweeping analysis of how to cope with the entire problem of saving the urban centers which represent more than a quarter of the Nation's $830 billion assets.

Warns Colean: "Decay and stagnation are evidences of deep-seated maladjustments in urban organization and development. They are not the maladjustments themselves. Efforts simply to repair or to tear down deteriorated structures and build new ones without seeking out and mastering the underlying troubles are likely to be both costly and fruitless."

The overriding need, thinks Colean, is for agreement on "what our cities should be." Today's confusion over objectives (new towns vs. urban sprawl, low buildings vs. skyscrapers, suburban centers vs. downtown shopping) tugs cities hither and thither instead of in any one direction. Moreover, mobile Americans, like the Indians they supplanted, find it easier to abandon a befouled camp than to clean it up. "A good physical cleanup," says Colean, is one of the best ways to "awaken a community's faith in itself" for rebuilding. Redevelopment in Pittsburgh and St. Louis, for instance, "appears to date from the beginning of effective smoke control."

Two problems, not one. But though slum cleaning (i.e., rehabilitation) can trigger renewal of cities, slum cleaning and renewal are two problems, not one, as Colean sees it. Says he: "We are not likely to make real progress with either . . . if the present confusion exists." A city area is ripe for renewal, Colean holds, if there is no demand for it as is and conversion would be uneconomic, or if it has grown so obsolete or deteriorated that it is uneconomic to repair it to today's standards. A slum, on the other hand, involves structures "so overcrowded and so carelessly kept that [they] menace health and safety." Moreover, warns Colean, while renewing cities hinges chiefly on economic questions, slums are "basically a problem of attitudes and behavior of people and of indifference of the community to neglect and victimization of the underprivileged."

Slum cleaning (such as the Baltimore Plan) is a vital part of any serious effort to end slums, Colean points out. Reason: it helps destroy one cause of slums—their vast profitability. For the poverty-stricken slum owner-occupant, Colean advocates philanthropic aid to finance needed repairs (like Baltimore's Fight Blight fund). For the nonresident owner, he has no sympathy: "The plea, frequently heard, that tenants are unable to pay sufficient to warrant safe and sanitary maintenance, is without merit. In the first place, it is unreasonable to expect to recoup in a short period the cost of long years of neglect. Second, if tenants are not forthcoming to pay rents reasonably required to maintain the property decently, then either the property is not worth an economic return (and should be taken off the market), or prospective tenants are too poor to pay an economic rent—a situation that calls for family relief and should be treated as such and not made the excuse for further neglect."

Walter Bennett

COLEAN

Demolishing roadblocks. Coping with the far broader, more complex problem of renewing cities is largely a matter of removing the roadblocks inhibiting rebuilding, says Colean. These cover the gamut of bad municipal housekeeping, preoccupation of state legislatures with farm problems, and federal legislation (Title I) which props up land values that depend on illegal or antisocial uses.

Colean calls traffic the No. 1 problem. He recommends it as a place to start renewing cities because solving traffic problems leads to total city planning and even beyond to recognition of "the need for some method of integrating the physical structure and political functions of the metropolitan area." He warns: "Citizens of parasite suburbs should be convinced that their efforts to establish self-protected residential refuges cannot succeed indefinitely; sooner or later the cost of providing alone the services they want will exceed the resources of even the richest of them. . . . The problems of crime and poverty in one place must be seen as a problem to all, as are the problems of smoke, slums, traffic and highways, water supply and sewerage, health and education, race and segregation."

One of the unfortunate aspects of the nation's still-fumbling efforts to renew its cities, thinks Colean, is that Title I redevelopment focuses on specific clearance projects instead of addressing itself to the "over-all aspects" of the problem. One result is that land prices are too high, because most redevelopment projects lie on land where 1) landlords have packed in tenants and 2) cities have not acted to make such crowding "expensive by rigorous law enforcement." Warns Colean: "The granting of subsidies does nothing to bring these unsocial values down. On the contrary, the very offering of subsidies tends to encourage hold-outs against the redeveloper." For 15 projects where calculations could be made a year ago, reports Colean, the average federal subsidy was running close to $80,000 an acre, on the basis of resale to redevelopers at 50 to 85% of the purchase price. Says he: "When land is worth so much less than the price that has been paid for it, there is, economically speaking, something wrong with the transaction. . . . The answer would be to end the indulgence and immunities granted to owners of neglected and deteriorated property and to blast the hope that holding out can be advantageous." In no other undertaking, notes Colean, "is it necessary to subsidize the offender in order to eliminate the offense."

Aid to investment. If private capital is ever to finance renewing US cities (and Colean plainly does not think any government can afford to do it), equity investment in downtown rental housing will have to be made far more attractive than it is today. Colean notes that an insurance company can invest in utility bonds in 45 min., but that putting an equal sum into real estate takes about two years, largely because of government red tape. Moreover, the political threats of rent control and discriminatory taxation discourage investment. Colean suggests: 1) changes in federal tax laws to give equity investors a better break, 2) changes in local tax structures to ease the load borne by real estate, 3) regional land-planning which prevents undue competition inside a single metropolitan area for the same uses, 4) building code overhauls, 5) making cleared areas available on a lease basis (with option to buy later), and 6) faster methods to assemble land in blighted areas for redevelopers.

Colean's study touches only briefly on the trickiest part of urban renewal: redevelopment often disperses racial ghettos, hence is covertly opposed because of racial prejudice. Colean lists ending racial ghettos among his fundamentals of a "consistent, long-range, continuous drive for urban renewal."

For renewing cities, says Colean, there are "no ready-made formulas that will assure a spontaneous process." Subsidy will not solve the problem alone, although some may be needed. His formula: "unremitting action along many fronts—municipal housekeeping, physical and financial planning, political reorganization, public improvements."

Industry's adviser. Unremitting action along many fronts is a familiar formula for Miles Lanier Colean. In a sense, it has been the story of his career. His contributions to

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building (mostly housing) have been so many and so varied that only unremitting self-propulsion can explain them.

Peoria-born "Mike" Colean, now a spare and graying 55, began professional life as a Manhattan architect (he is now a fellow of AIA) after graduating from Columbia University in 1922. From 1925 to '29, he was associated with the famed Chicago firm of Holabird & Root (now Holabird, Root & Burgee), and for five depression years after that was a principal in his own architectural office in Chicago. When New Dealers were concocting a formula to breathe life into the moribund housing industry, a Harry Hopkins aide asked Colean to contribute technical advice. Colean thought it would take only a few weeks. But when he finished helping set up FHA—notably its property standards and land planning section—he moved in as its first technical director. That was 1934. He has lived in Washington ever since. After three years as assistant FHA administrator (1937-40), Colean left for more lucrative private enterprise. From 1940 to '42, he directed the Twentieth Century Fund's housing survey. For the next three years he was a vice president of Starrett Bros. & Eken, the big Manhattan contractors.

Since 1945, he has been a Washington economist and consultant on construction and mortgages—a role in which he is in such demand that some people call Colean a "consultant to everybody." That is perhaps only a way of saying that quick-smiling Mike Colean, now the author of seven books, is one of the building industry's most influential figures.

Congressional economy thwarts clearing temporary offices from Washington's Mall

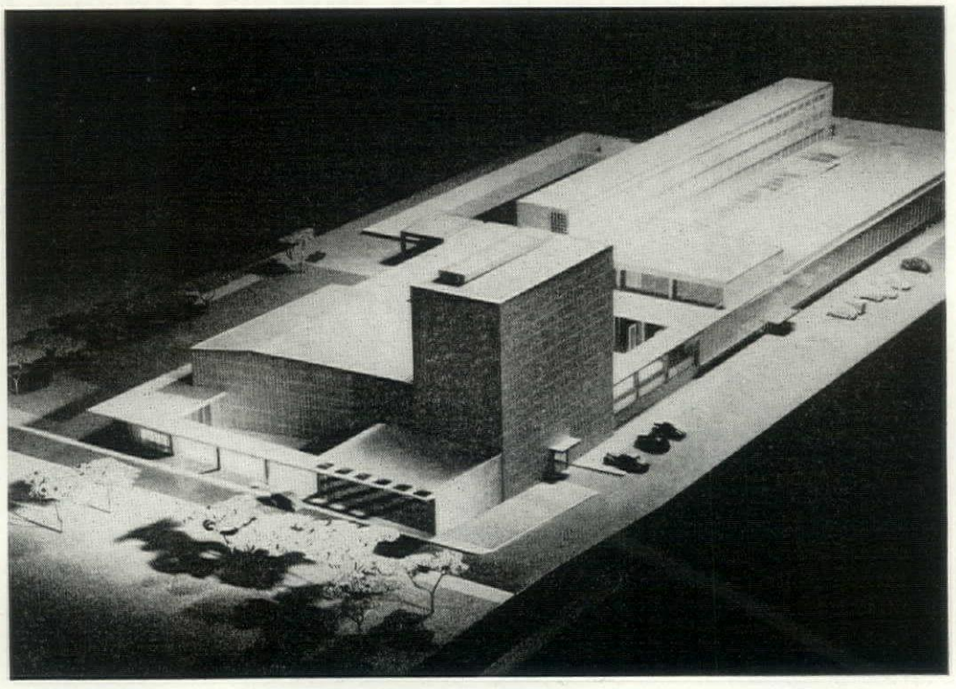
For years, the expanding federal government has been a star boarder in office buildings in Washington and elsewhere across the nation. This fall, office landlords will find things different. The reason: a little-noticed gimmick in the Independent Offices Appropriations Act ordering the government to trim its leased space more than one-third (from 21,973,000 sq. ft. to 13,435,000 sq. ft.) by next June 30. By the end of December, the lawmakers demanded a cutback of leased office space to 17,787,000 sq. ft. To make sure the General Services Administration carries out the mandate, Congress cut rental funds from $59.8 million last fiscal year to $50 million this year.

Reprieve for tempos. Large-scale reductions in the federal bureaucracy will ease the resulting squeeze on space, but will by no means solve it. One result, GSA chiefs disclosed this month, will be that chances for tearing down Washington's ugly crop of temporary federal offices have gone by the boards again. In fact, the much deplored tempos will have to fill the gap.

If the prospect was one to make architects and civic-minded groups unhappy (see below), it made them no unhappier than it did W. E. Reynolds, commissioner of GSA's public buildings service. Reynolds repeatedly has reminded Congress that temporary buildings cost an average of 74¢ per sq. ft. a year to maintain, compared to 67¢ for the average permanent building and 53¢ for an efficient block-type structure like the mammoth new General Accounting Office (AF, July '51, News). As soon as he can, Reynolds vowed this month, he would start at the Lincoln Memorial reflecting pool (which is surrounded on three sides by eyesore tempos), and "roll up the temporaries like a blanket." Said GSA Chief Edward F. Mansure: "We are as anxious as anyone to get rid of the temporaries, but we are faced with the practical proposition of utilizing every bit of available government space since Congress has reduced our appropriations." Reynolds figured it would cost about $200 million to build ten structures to rehouse the 46,000 federal workers now in the capital's 54 temporaries.

Lease-purchase solution? One long-range solution that would avoid big outlays for new construction and also keep the government from becoming a perpetual tenant is the lease-purchase bill approved by the House last session. Chairman Edward Martin (R, Pa.) of the Senate public works committee favors the measure, intends to prod it toward enactment in the upper chamber. The bill would let the government buy office buildings out of rentals on a 10- to 25-year installment plan.

Washington Star



THE AIA this month stepped up its efforts to persuade the government to tear down the tawdry temporary buildings that blight the Washington Mall, which was intended by its planners as a grand central park surrounded by monumental public buildings. At Washington headquarters, the AIA exhibited past and present plans for the Mall, along with a model of the proposed $20 million Smithsonian Institution museum to house contemporary art (pictured at right). The museum was the winning design by Saarinen, Swanson & Saarinen in a 1939 competition. It would wipe out three and perhaps four unsightly temporaries—Tempo D, built in World War II, and the old Fisheries Building dating from before World War I, plus (pictured above) Tempo E of World War I and Tempo S.

Four bills pending in Congress would advance the project, but as Rep. Charles R. Howell (D, N.J.), author of two of them, noted recently: "Congress has done little in developing a national policy on fine arts mainly because cultural leaders have made little effort to formulate constructive proposals for consideration by Congress." To help muster support for such a policy, AIA hoped to send the exhibit on tour.

Plaster fights for its lost market

- **Two AFL unions join plaster contractor group in pledge to end labor gouging, excess profits**
- **With unions footing part of the bill, they start bureau to promote plaster-work, watch its quality**

In the building boom of the 20s, 90% of America's new homes were built with plaster walls. Today only about 50% are erected with fully plastered interiors. Nonresidential construction also has cut its use of plaster.

For plastering contractors and unions, the handwriting on the dry wall was clear: "You are being driven out of business by cheaper, speedier innovations." Complete dry-wall cities like the two Levittowns were rising around the country. At Park Forest, Ill., American Community Builders, Inc., started with plaster but in this year's homes and apartments switched to substitutes.

This month in Chicago, a National Bureau for Lathing and Plastering was created to start a drive to recapture, if possible, the plastering market in new construction. The bureau represented a unique example of labor-management cooperation. The Contracting Plasterers International Assn. and two AFL unions—the Wood, Wire & Metal Lathers International and the Operating Plasterers & Cement Masons Assn.—will split costs of the new bureau. And they agreed on a program designed to eliminate practices and feather-bedding that were pricing them both out of jobs.

Promotion and reform. The drive will involve newspaper, magazine, radio-TV and trade publication advertising for more use of plaster, starting in January. Outlays may run as high as $500,000 a year. Ads will be financed by a 3¢ an hour deduction from workers' wages (½¢ for bureau headquarters in Washington, 2½¢ for bureau offices promoting plaster locally).

The program also involved a revolutionary pledge by both contractor and union groups to squeeze extra costs out of plastering. They adopted a Standards of Performance (i.e., code of ethics) with these main points:

- All materials and workmanship shall comply with nationally recognized quality and performance standards. (Conforming contractors may display bureau certificates. Nonconforming contractors will not have this privilege, and union locals may refuse to work for them.)
- Contractors will charge only a reasonable profit. Craftsmen will work a full day for a full day's pay, without bonus payments and unreasonable travel time and expense. Contractors and mechanics agree to employment on a straight hourly basis. Limitation of the daily production will be eliminated.
- Contractors and labor will agree on reasonable time schedules for completion of work. Contractors will man jobs only with qualified foremen. Unions will supply sufficient competent mechanics and apprentices. Apprentice training programs will be increased.
- To regain the favor of architects and builders, schedules and completed work of other trades must be respected, and material and equipment handled to assure normal project progress. Completed areas will be cleared of scaffold and other equipment and made ready expeditiously for the next craft.
- Lathing and plastering must be kept attuned to new designs, methods, techniques and materials developed in construction. Members must cooperate by using them without restraint when their value has been established and approved by the bureau.

Operation cooperation. Brainfather and president of the bureau was Edmond Venzie, head of the contractors' group, which employs about 90% of the nation's union lathers and plasterers. Venzie, 47, who employs as many as 1,500 plasterers at a time, is one of the US's largest plastering contractors, with offices in Philadelphia and Dayton, Ohio. To get trade and labor support for his idea, he spent three years of missionary work, finally persuaded the employer association and the two unions to contribute $5,000 each for initial financing of the bureau. Supplementary, but separate, support for the program (with their own advertising) has been promised by the Gypsum Assn., Lime Assn. and the Lath Manufacturers Assn.

President John F. Rooney said his AFL plasterers would put 16 vice presidents on the road to spread the job salvation gospel. He wrote his locals that their participation was "imperative."

President William J. McSorley said the AFL lathers were adding six new vice presidents to stimulate local union participation; after Jan. 1, 12 would be assigned to this work. McSorley asserted productivity already has increased 7 or 8%, although he agreed it was too early to foresee what final cost reductions might emerge from the drive.

Contractor Venzie said his firm already has dropped bonuses of $2 to $5 a day and double-pay overtime in Philadelphia. Said he: "In the last two months, five major housing projects in the state have gone to plastering from previously scheduled dry wall because our contractors quoted competitive prices."

At the Chicago press conference announcing the new bureau, Venzie admitted contractors must do some "house cleaning." Said he: "There were places where one contractor had a monopoly on skilled labor and could bid up jobs to get the last dollar. Now, we're sending competitive contractors into such areas to bid on every job, assured by the unions that they'll be able to get men to do the work."

Labormen Rooney and McSorley indicated that some of their union members had been guilty of make-work practices in the past—such as insisting on three coats of plaster, or limiting a day's production by a lather. But they said these were banned by union decrees two years ago.

AFL convention orders council to draft plan for curbing reckless jurisdictional disputes

Last month's St. Louis conventions of the AFL and its building and construction trades department produced the strongest evidence yet that labor leaders are genuinely worried that whopping pay demands and jurisdictional disputes are costing them the broad public support that helped unions grow strong in the 30s and 40s.

For a labor chief, President James Brownlow of the metal trades department was remarkably critical of labor at the building trades meeting. Once a picket line used to be the sign of an honest labor dispute or inability to get together with an employer, said Brownlow. But today, he charged, there are too many instances where a business agent "proves inept or unable" in negotiating with an employer and recklessly "resorts to the picket line" without telling his membership "everything that went on" and without any consideration for "the people who are concerned, not only the members of his own organization, but members of other organizations who may be denied their right to work."

"Some of these picket lines," said Brownlow, "are established for reasons so ridiculous that they would make anybody who gives them some thought wonder whether they were there for subversive reasons; then again, whether there was some particular interest of either the employer or the business agent. If we are going to hold the picket line as something worth defending in a legislative way before the courts of our land, and publicly, then we should not abuse this privilege . . . [but] retain it only to protect the interests of the people who work."

The full AFL convention, warned by its building department that today's "crazy-quilt jurisdictional pattern" threatens "open warfare" between unions, moved to snuff out interunion strife. It ratified a two-year no-raiding agreement with the CIO to go into effect Jan. 1. It instructed its executive council to develop within six months a plan to halt AFL jurisdictional rows.

BUILDING STATISTICS: plywood prices skid, rebound; building costs flatten

West Coast mill prices for plywood fell to a postwar low of $68.59 per M sq. ft. this month, putting many producers in the red. The new price was $21.41 (23.8%) below the $90 that leading mills charged from February through late August, when BLS recorded prices for ¼" AD index grade as averaging $85.56 (see chart). Behind the price slashing lay shrinking late summer orders, while production climbed to an average of 63 million sq. ft. a week for the year so far, compared with 53 million in the same period last year.

By month's end, however, prices rebounded to around $72.20 net after jobbers' discounts ($76 list). Reasons: 1) as prices tumbled they attracted larger orders, which rose from 59 million sq. ft. the week ending Oct. 3 to 76 and 72 million ft. the next two weeks; 2) new production lagged, because many marginal mills could not operate at the low prices.

Equally important, although not so sharp as plywood's plunge, was the long and steady decline in Douglas fir 2" x 4" mill prices (see chart). From last year's (May) high of $75.80 per M bd. ft., the BLS average for fir 2" x 4"'s fell steadily to $61.50 last month—an 18.8% slide. Prices for larger Douglas fir dimension have been firmer, as have prices for southern pine lumber.

Labor also took note of the economic facts of life in plywood and lumber. At its Vancouver convention this month, the CIO International Woodworkers of America, representing most Pacific Coast loggers and many sawmill and plywood workers, decided not to ask for more pay next year "unless lumber prices improve."

Metal prices also were slipping. Steel producers held to list quotations, but began to absorb freight charges to give customers "savings." Copper prices remained firm as strikes and slowdowns hampered ore output at US and Canadian mines, but the trend was down and copper tubing was one of the items for which BLS recorded a decline in wholesale prices last month. On Nov. 1 the Business and Defense Services Administration will decontrol nickel, the last major metal under defense restrictions. This will end controls that prohibited nickel stainless steel in many incidental hardware and plumbing items.

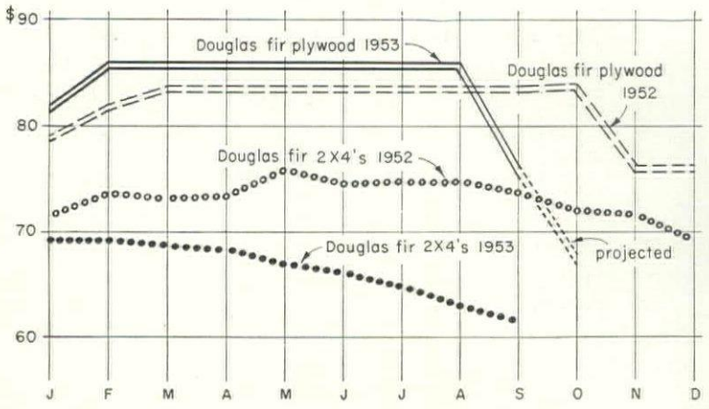
NEW CONSTRUCTION ACTIVITY

(expenditures in millions of dollars)

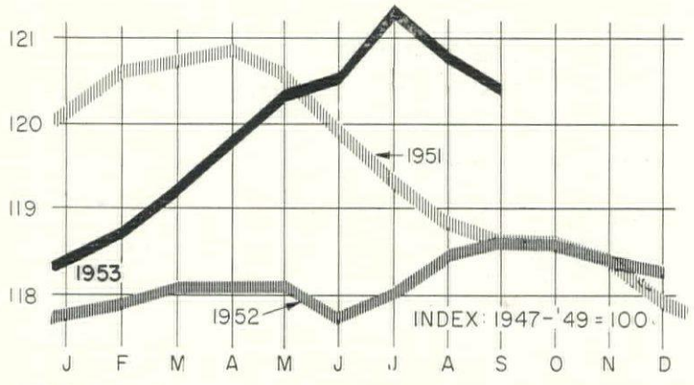
	September			1st nine months		
Type	'52	'53	% change	'52	'53	% change
PRIVATE						
Residential (nonfarm)	1,045	1,087	+4.0	8,083	8,803	+8.9
New dwelling units	930	950	+2.2	7,170	7,765	+8.3
Additions & alterations	97	111	+14.4	782	842	+7.7
Nonhousekeeping	18	26	+44.4	131	196	+49.6
Industrial	190	180	—5.3	1,740	1,712	—1.6
Commercial	101	183	+81.2	807	1,249	+54.8
Other nonresidential	143	153	+7.0	1,150	1,200	+4.3
Religious	38	45	+18.4	285	337	+18.2
Educational	32	39	+21.9	252	303	+20.2
Hospital	34	26	—23.5	303	236	—22.1
Public utilities	381	428	+12.3	2,967	3,266	+10.1
*TOTAL	2,029	2,185	+7.7	16,076	17,490	+8.8
PUBLIC						
Residential	54	47	—13.0	505	426	—15.6
Industrial	177	150	—15.3	1,205	1,354	+12.4
Educational	139	152	+9.4	1,212	1,266	+4.5
Hospital	41	25	—39.0	359	278	—22.6
Military	134	120	—10.4	1,028	1,036	+0.8
*TOTAL	1,131	1,125	—0.5	8,060	8,448	+4.8
GRAND TOTAL	3,160	3,310	+4.7	24,136	25,938	+7.5

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

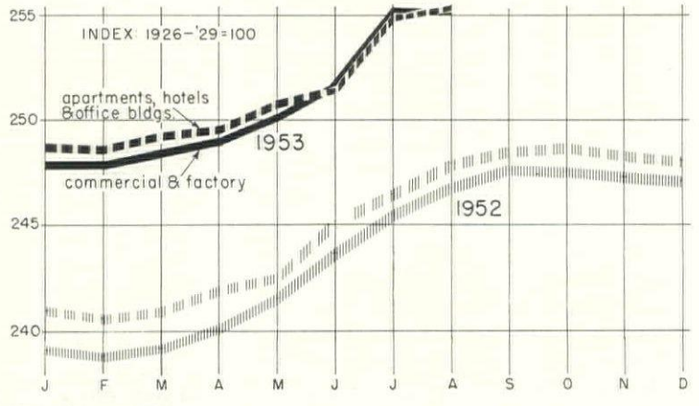
CONSTRUCTION EXPENDITURES began their seasonal decline in September. Total outlays of $3,310 million, however, were only 0.4% below August's all-time monthly record of $3,323 million and were almost 5% ahead of Sept. '52 expenditures. Commercial building outlays rose 6% from August to September. They were a whopping 81% greater than Sept. '52, for the first nine months of the year, 55% ahead of the same '52 period.



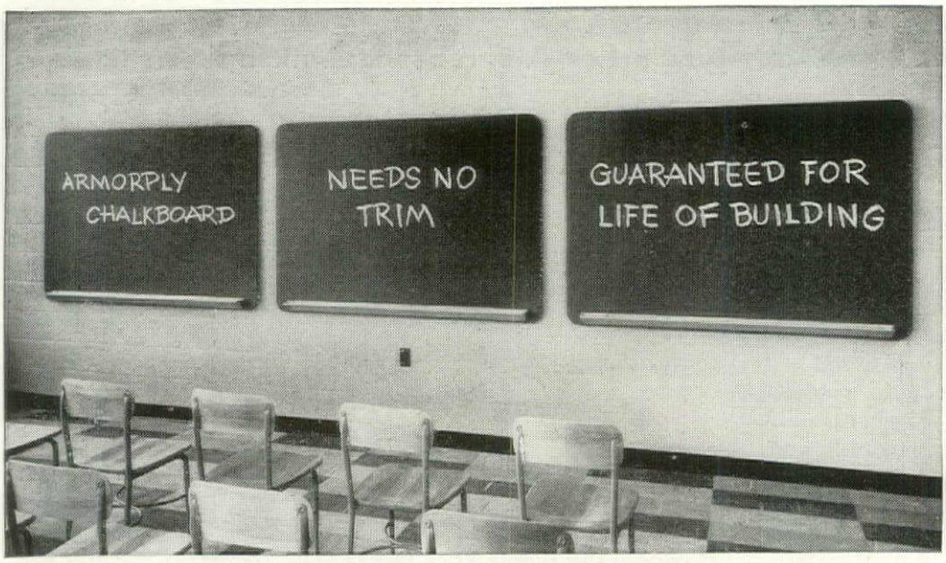
PLYWOOD AND LUMBER PRICE TRENDS since Jan. '52, are reflected by BLS estimates of average F.O.B. mill charges per M sq. ft. for interior AD ¼" x 48" x 96" Douglas fir plywood, and per M bd. ft. for #1 green random-length Douglas fir 2 x 4s. The chart's October plywood price ($67.76) was projected by FORUM. It puts plywood $17.80 below the BLS average of $85.56 that prevailed from February to August. It is based on sales at $72.20 (after jobbers' discounts) late this month by leading producers—$17.80 below their $90 quotations throughout the summer, when the BLS average was charted at $85.56. Before stabilizing around $72.20, net prices after discounts dropped as low as $68.59.



MATERIALS PRICES charted by the Bureau of Labor Statistics fell for the second successive month in September (to 120.4, from 121.3 in July and 120.8 in August). Plunging plywood and sliding lumber prices (see separate chart and story) more than offset slight increases for steel pipe, paints, structural clay products, concrete ingredients and asphalt shingles.



BUILDING COSTS for commercial and factory structures and apartment, hotel and office buildings, as compiled by E. H. Boeckh & Associates, rose almost imperceptibly from July to August. The commercial-factory index figure rose from 255.2 in July to 255.3; the apartment-hotel-office figure rose from 255.1 to 255.5. Among the other construction cost indexes, Smith, Hinchman & Grylls' was down 0.7% for October. AGC's average construction costs rose a shade, from 416 to 417 (1913=100), from August to September. The contractors' construction wages index rose from 581 to 584, while its materials cost index remained at 306.



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PEOPLE: Zeckendorf buys Chrysler Building in $52 million deal; AGC picks MacLeod and Koss for top posts

It was harder and harder to pick up a newspaper without tripping over a report on another project involving ubiquitous **William Zeckendorf,** president of Webb & Knapp, Inc. Five of the larger operations by Zeckendorf last month and this:

▸ With $8 million cash, and $40 million in financing (see cut), Webb & Knapp acquired three hefty midtown New York office buildings: the Graybar, the Chrysler and the new Chrysler Building East. The deal involved $52 million, topping the previous biggest New York real estate deal (the Empire State sale in 1951) by $500,000.

▸ For an undisclosed sum, Webb & Knapp bought the James McCreery department store building at 5th Ave. and 34th St. in Manhattan from Associated Dry Goods Corp., which will close 116-year-old McCreery's in January.

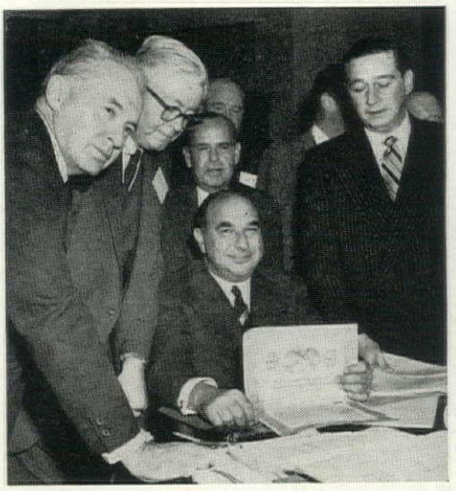
▸ Still embryonic, but subject of much Manhattan talk, were plans for a service post office, loft and merchandise mart that would have the biggest floor area of any building in the world—6 to 7 million sq. ft. Zeckendorf had negotiated air rights for a two-block structure over Pennsylvania Railroad tracks behind the city's main post office. Still needed to make the deal click: a long-term post office lease for one-third of the space.

▸ A contract for Webb & Knapp to build approximately 100 retail buildings for lease to Safeway Stores Inc. Total cost: $30 to $35 million. After construction, Webb & Knapp would retain some, sell others to investors.

▸ Purchase of Charlie Chaplin's old Hollywood studio and lot for $650,000 cash. The studio will be rented to TV and film producers. The vacant land will be developed with a large shopping center and parking lot.

NAMED: **Brig. Gen. Emerson C. Itschner,** North Pacific Division Engineer since Apr., '52, as the Army's Assistant Chief of Engineers for Civil Works, succeeding **Brig. Gen. Claude H. Chorpening; Col. Raleigh M. Edgar,** 55, chief of the construction division, as the VA's assistant administrator for construction, succeeding **Col. Frank H. Dryden,** who supervised $700 million of hospital design, construction and conversions during the past seven years and who now will establish a private consultation service; California, Hawaii and South Carolina businessman **Charles F. Honeywell,** as head of the Business and Defense Services Administration, which is in charge of the residual NPA controls; **John A. Kervick,** New York field office director for PHA since 1949, as vice president

United Press



BIG DEAL for William Zeckendorf to buy the Graybar and two Chrysler buildings in New York was financed with mortgage bonds for $40 million issued by Equitable Life. At closing Zeckendorf (holding bonds) was flanked by Equitable's Glen McHugh and Walter Harvey Jr. (l) and Walter P. Chrysler (r).

of **Paul Tishman Co., Inc.,** which has erected more than 6,000 private and public housing apartment units in New York.

Unopposed nominees for 1954 officers were announced by the Associated General Contractors: for president, **John MacLeod,** 59, of Paramount, Calif.; for vice president,

Frank Lloyd Wright exhibits 60 years' work

Eighty-four-year-old Frank Lloyd Wright celebrated the completion of his first New York buildings this month: a temporary pavilion housing an exhibit of his 60 years' architectural work and an adjoining Usonian House embodying his contributions to house design. The house and pavilion lay on the site of Wright's projected new Guggenheim Museum, which is still stalled by provisions of New York's building code. The pavilion (which went up under the code's gospel tent section) was delayed, though not stalled, by the city's code-enforcing Department of Buildings. It insisted on testing the pipe structure by loading it for two weeks with twice the load it was designed to carry. Meanwhile, work had to halt.

The pavilion was roofed with alternate bands of sandblasted wire-glass and gray asbestos cement panels. Delighted photographers found it provided a setting literally as light as day for the 16 models of FLLW buildings plus scores of 8′ square photographs, floor plans and drawings representing his work from the Charnley House of 1891 to such recent projects as the Guggenheim Museum, Price Tower in Bartlesville, Okla. and Johnson Wax building in Racine. As he proudly showed his first guests through the prairie-type house, which first appeared in 1900, Wright paused in the dramatic living room (sunken fireplace, a glass wall facing a landscaped terrace, 12½′ ceiling), waved his cane and said: "I think this has the old colonial on the run."

AT PREVIEW showing for his friends, Wright in familiar tan porkpie hat chatted with MIT Dean of Architecture Pietro Belluschi (r) and George Biddle of the National Fine Arts Commission.

Photos: LIFE—*Richard Meek*

OVER-ALL VIEW of exhibit, titled "Sixty Years of Living Architecture," shows Price Tower in center, and portion of Broadacre City modeled in 1932 as a Taliesin Fellowship project in foreground.

George C. Koss, 48, of Des Moines.

MacLeod, who will advance from the vice presidency, would succeed **C. P. Street,** of Charlotte, N.C. He heads the Macco Construction Co., in Los Angeles County, which he organized in 1929. During World War II his firm handled $350 million in military contracts for airfields, bases and docks (AF, Oct. '52, News). Koss, born in Des Moines and schooled at Phillips Exeter and Harvard, is president of the Koss Construction Co., of which his father **George W. Koss,** is board chairman. Its principal work: paving

KOSS

MACLEOD

and airports. The nominee was AGC Iowa chapter president in 1940, and has been a national AGC director since 1947. He directed the Des Moines United Campaign drive last year and for this and many other civic activities received last year's Des Moines *Tribune* "most public-spirited citizen" award. Dog-lover Koss is partial to English setters. (From 1945-52 he headed the Animal Rescue League.)

Gilbert E. Morris, superintendent of Los Angeles' department of building and safety and a leader in the city's rehabilitation drive, was elected president of the Pacific Coast Building Officials Conference at its annual convention in Pasadena this month.

CONGRATULATIONS: To New York City Public Works Commissioner **Frederick H. Zurmuhlen** for receiving the National Sculpture Society medal of honor this month for "vision and achievements in reintegrating sculpture and mural painting with civic architecture" (preserving the Appellate Division Court parapet sculpture in Manhattan and arranging for entrance sculpture for the new Domestic Relations Court in Brooklyn); drug manufacturer **George W. Merck,** chosen to receive the industrialist-of-the-year award of the Society of Industrial Realtors at the annual NAREB convention in Los Angeles next month; **Robert H. Hose,** architect-engineer partner of **Henry Dreyfuss,** elected president of the Society of Industrial Designers; **John W. Brown,** dealer sales vice president of National Gypsum Co., elected president of the National Mineral Wool Assn.; Brooklyn's **Adolph Goldberg,** elected president of the NY State Assn. of Architects; **John W. Hargrave,** of Mont-

ZURMUHLEN

NEWS

gomery, and **C. Melvin Frank,** of Columbus, elected president and first vice president of the Architects Society of Ohio.

Federal figures show state and local public works totaled $6 billion in 1952; except during war and depression years they usually far exceed federal construction outlays. But BLS and Commerce Department officials, suspect a more accurate survey would reveal state and local works bulk even larger. Accordingly, BLS asked the Budget Bureau to let it spend $90,000 to improve its checking methods in this field, the same $90,000 it was granted this year to update housing starts survey methods. Commerce also will ask for funds to rebuild its anemic construction division statistics staff from eight to about 20 people to produce better construction market reports. This project, say insiders, will be championed by **Lothair Teetor,** who was appointed an assistant secretary of commerce this month, subject to Senate confirmation. Teetor is sold on the value of government statistical reports that business finds useful, and one of his responsibilities will be supervision of the construction division. He was board chairman of the Perfect Circle piston ring manufacturing company in Hagerstown, Ind., and formerly was president of the Indiana State Chamber of Commerce and a director and regional vice president of NAM. Though Eisenhower has given up the Presidential yacht, Teetor planned to keep *his* yacht in commission and in Washington.

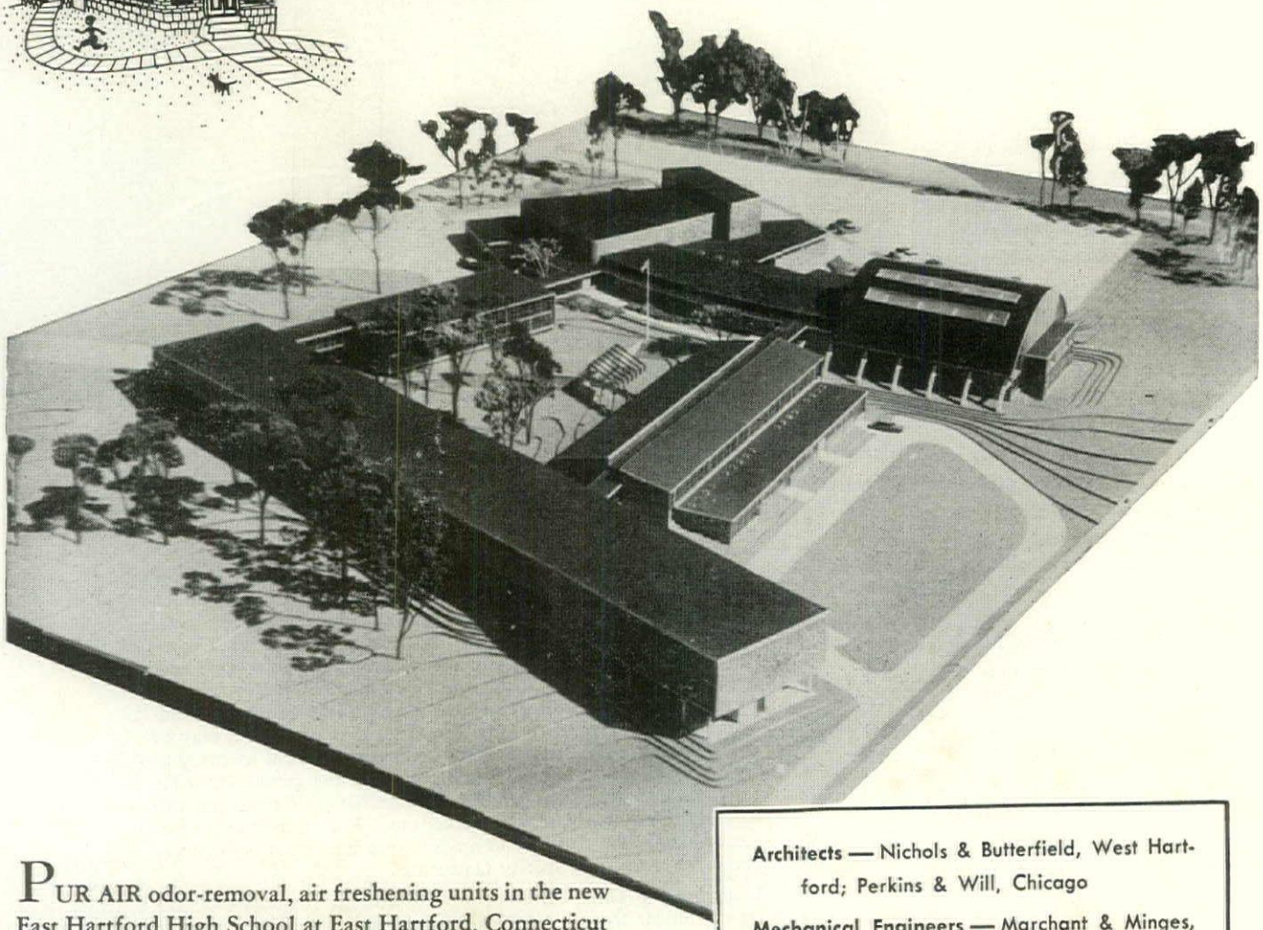
DIED: **Rosario Candela,** 63, architect for luxury apartments and New York City public housing projects, for schools and health centers, and, in collaboration with John Russell Pope, designer of the upper-story apartment section of the US Embassy in London, Oct. 5 in Mt. Vernon, N.Y.; **Dr. Jacob J. Golub,** 62, member of the hospital planning council of the American Hospital Assn. and planning consultant for the Rothschild-Hadassah Hospital in Jerusalem and many US hospitals, Sept. 22 in New York; **Dr. John M. Gries,** 76, head of the division of building and housing, Bureau of Standards (1921-28), former chief of the Commerce Department construction division, Sept. 23 at Piqua, Ohio; Artist **John Marin,** 80, who abandoned an effort to become an architect in his youth, but in 1948 received the AIA's Fine Arts Medal, Oct. 1 in Addison, Me.; **Herman Wick,** 81, architect for more than 200 hospitals, including Doctors and French in New York and Creole in Maracaibo, Venezuela, Oct. 4 in East Orange, N. J.; **David Fettes,** 88, former chief construction superintendent and charter associate of the Albert Kahn architectural and engineering organization, Oct. 8 in Detroit.

CANDELA

(NEWS continued on p. 54)

The Little Red School House was Never Like This!

"PROGRESSIVE EDUCATION" IN PURIFYING AND RE-USING AIR SAVES $5,000 YEARLY ON HEATING



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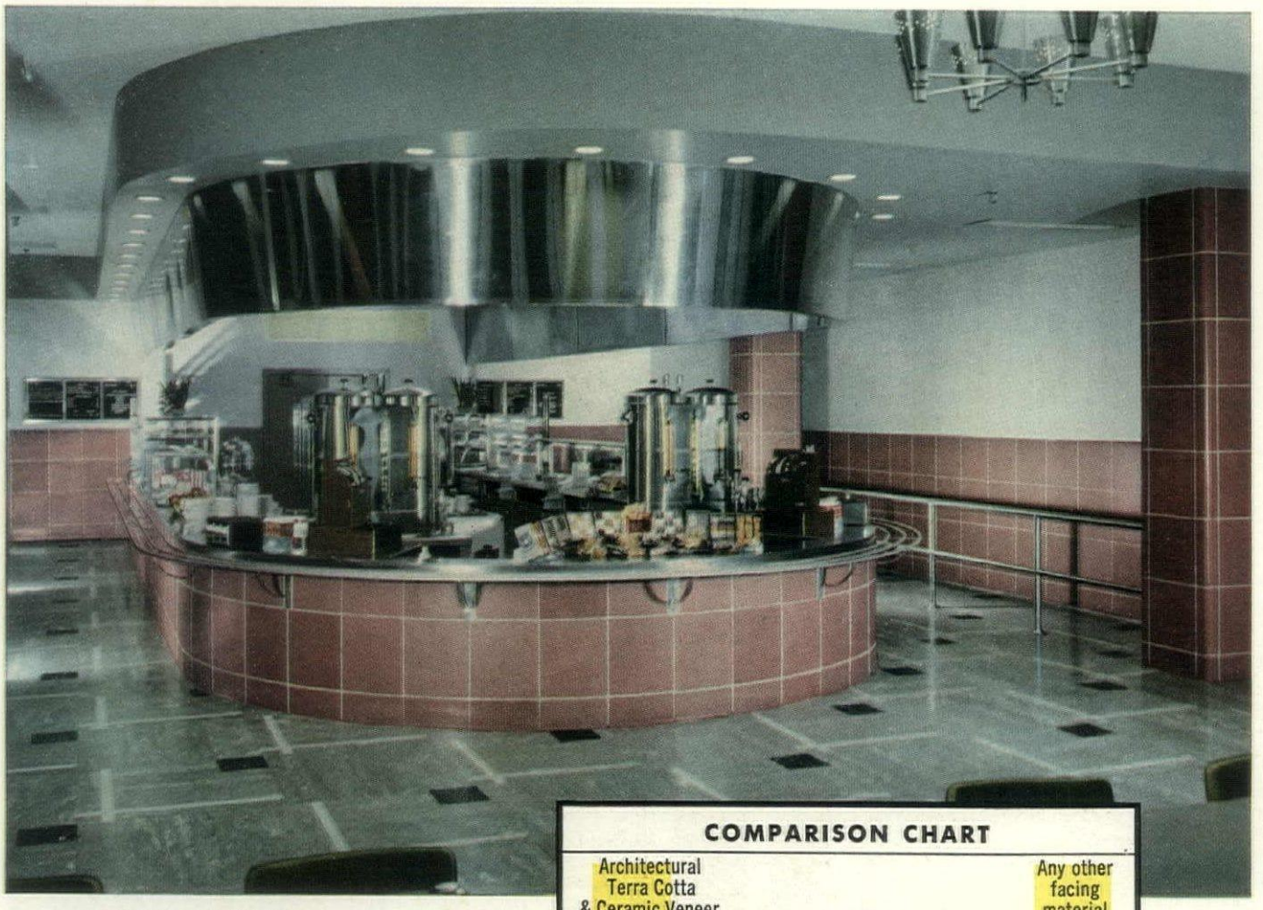

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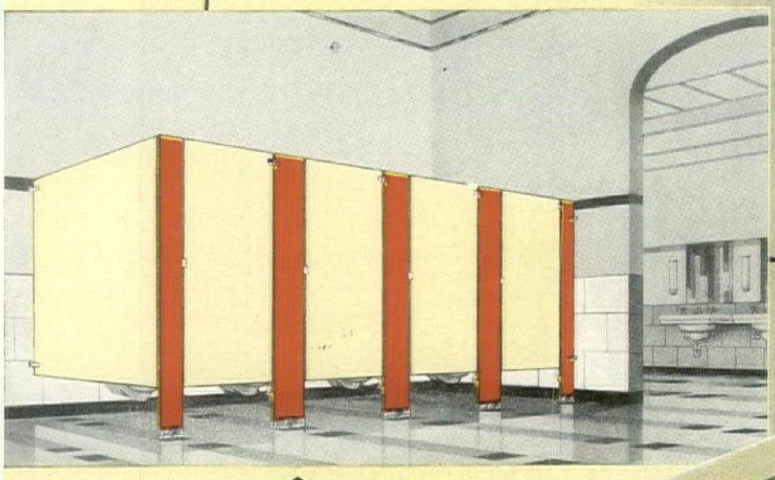
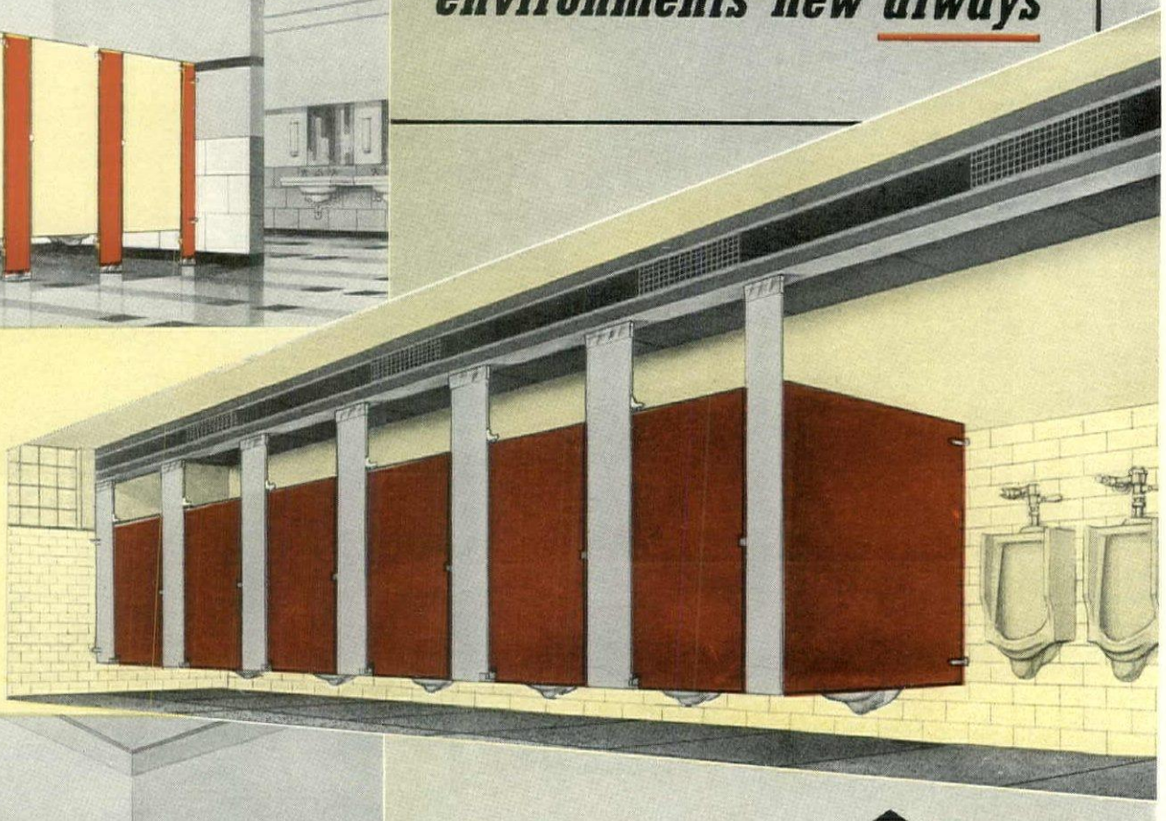
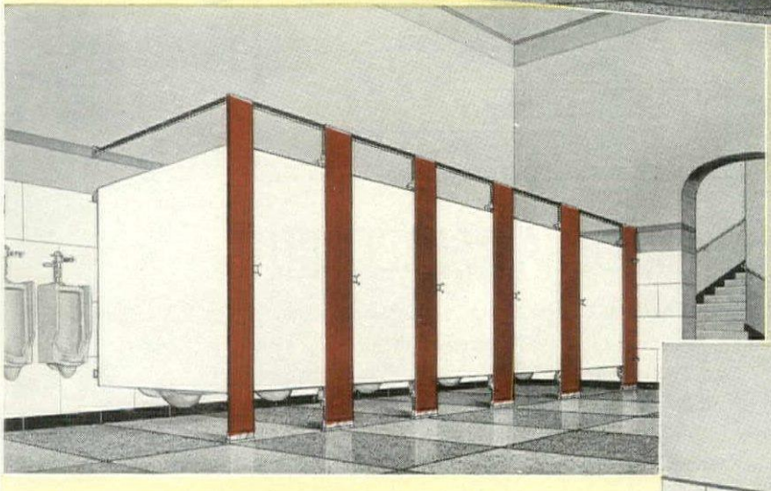


Sanymetal NORMANDIE Type Toilet Compartments endow a toilet room environment with dignity and good taste





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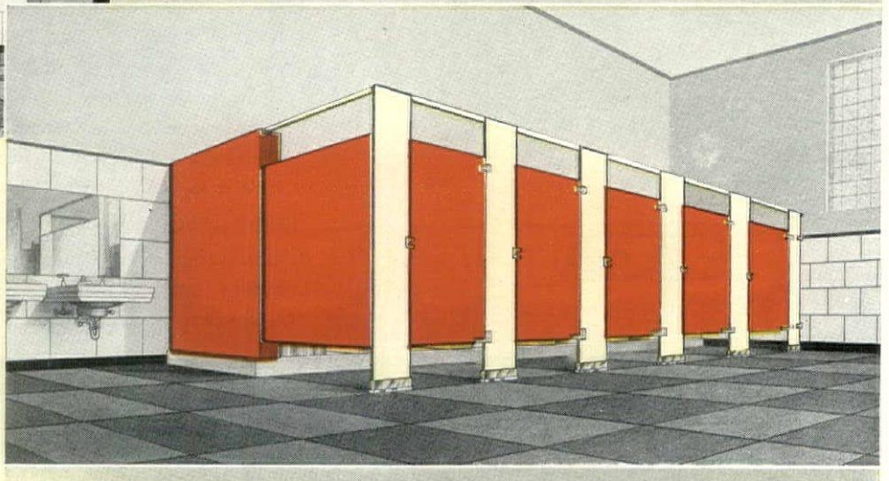

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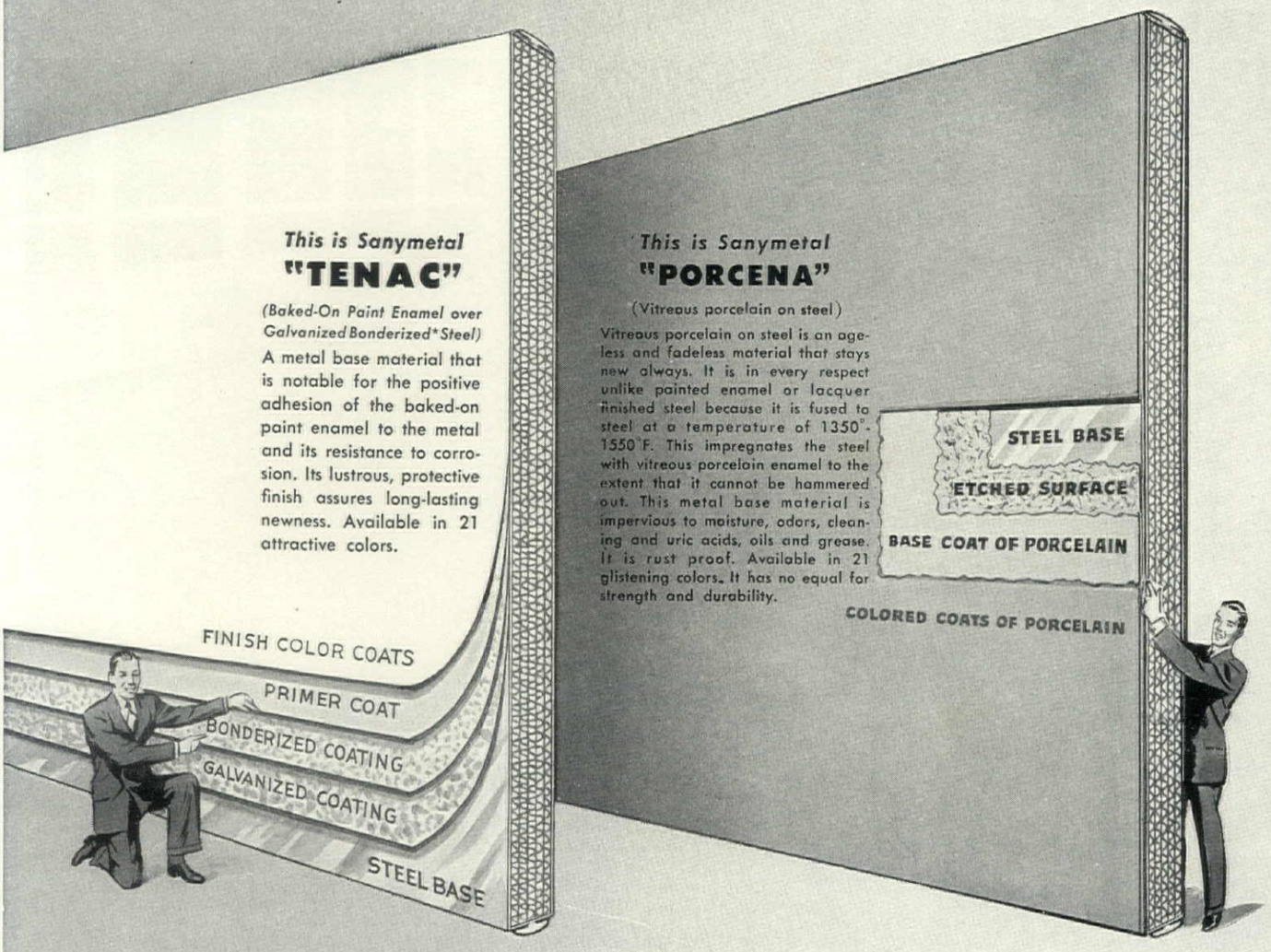

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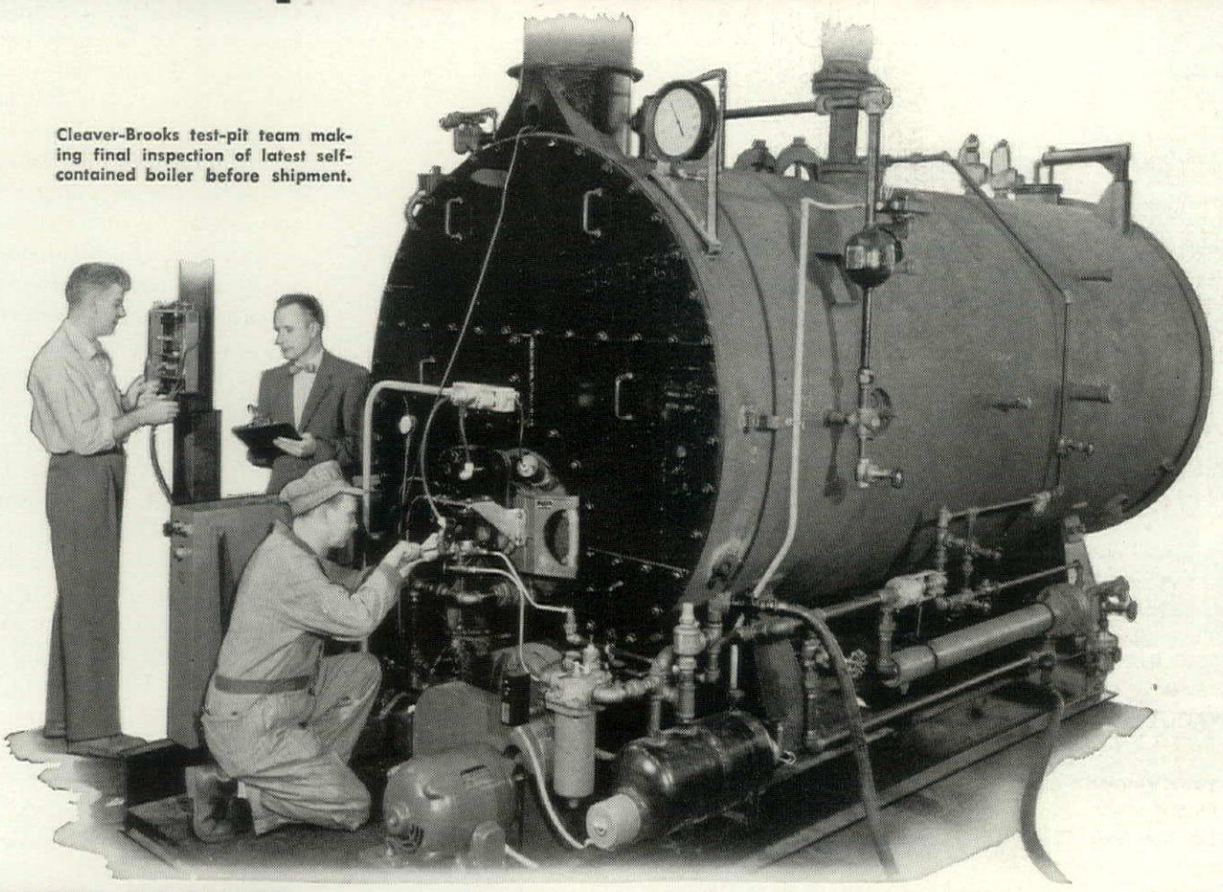

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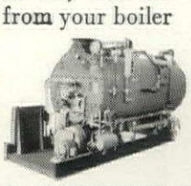

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Architect groups meet at Biloxi, Lake Placid

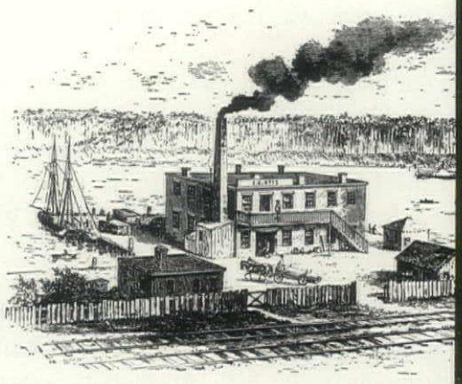
One hundred and ninety architects of the Gulf States Region pulled into **Biloxi, Miss.** for a conference held in honor of second AIA Vice President Howard Eichenbaum, "the man who conceived the idea of regionalism within the AIA and made it work." The group enjoyed itself in sea and surf, visited Louis Sullivan's Ocean Grove cottage, pulled in a formidable panel of experts to try to comb out the complex threads of regionalism in architecture. In the end threads were still tangled, but interesting remarks had been made. By Hodding Carter, editor-publisher of the *Delta Democrat Times*, Pulitzer Prize winner, and well-known author on the South: "The time of Southern isolationism is past, but regionalism remains strong. It rests on a homogeneous population and tradition, not just on climate, and the Southern citizen of the US is more often of solid yeoman ancestry than cavalier."

Said Richard J. Neutra, visiting California architect: "Does not regionalism depend rather on a fixed society and is not the new industrialism bringing flux?" Neutra's theory: people living in southern climes develop more *savoir vivre*, a greater love of all the arts. They have the mission of transmitting culture to more northern neighbors as did Greece to Macedonia, as did Rome to Northern Europe. Said Architect Paul Rudolph of Sarasota, Fla.: "The Harvard house, the same in Australia as it is in Boston, is no real answer for the South. Our materials and equipment may be national but our forms are best local."

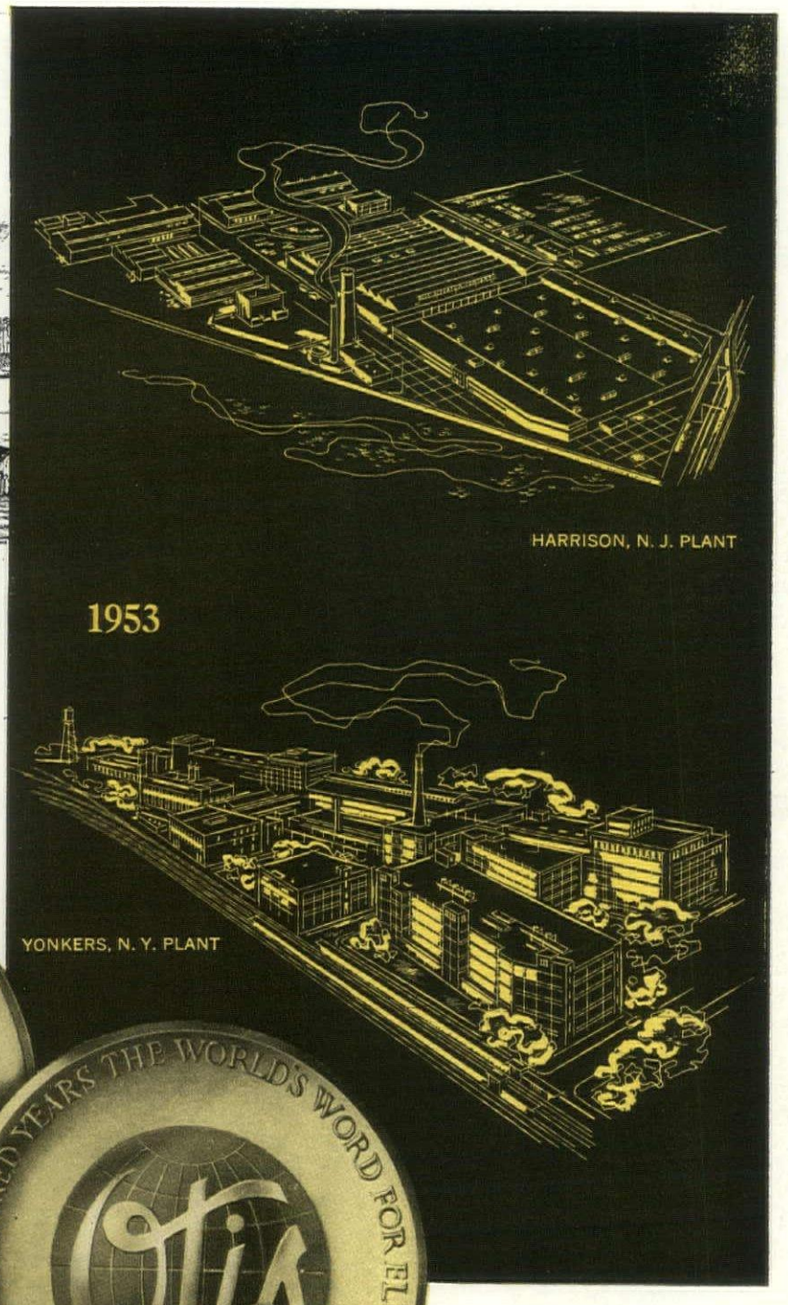
The jury found itself giving awards in pairs to three firms: To Sherlock, Smith & Adams for their "cow coliseum" and a tractor plant at Montgomery, Ala.; to Architects Curtis & Davis for their proposed Thomy Lafon School and for their development houses for Builder Fred Laucks in New Orleans; to A. L. Aydelott & Associates for their office at Memphis and for their L. T. Hord house.

Over 400 architects of the Empire State registered at the New York Association of Architects meeting at **Lake Placid,** creating a regional meeting all by themselves. So bright was the weather, it was a good session when more than 50 heads could be counted. Architect Dan Schwartzman was, meanwhile, reported to have painted golf balls red for use in snow. Intensely businesslike, the New York architects concentrated on such subjects as the progress of the statewide building code, the question of requiring a loyalty oath for architects seeking registration (it was referred back

continued on p. 60



First elevator shop, Yonkers, New York 1853



OTIS SETS A GOAL
for a second century of progress

100th Anniversary statement to the employees and stockholders of the Otis Elevator Company by the President, LeRoy A. Petersen.

The year 1953 is for Otis both an end and a beginning. It is the end of a century during which the name, Otis, became synonymous with the word, elevator; it is the beginning of a second century of continued Otis leadership and development in the field of vertical transportation.

During the past hundred years, the men and women of Otis have, by hard work, trial and error, and occasional flashes of genius, built a company and a product of which we today have just reason to be proud and, in the doing, they have contributed greatly to the building of their country.

(continued on next page)

the Otis heritage

During this first century, there evolved an Otis organization whose character reflects the composite character, judgment and ideals of those leaders of the past who, generation after generation, selected and trained and inspired this organization. It is an organization whose roots go deep into the past, and which has a tradition of loyalty to the Company not easily understood by those who are not a part of it.

Similarly, the organization of the future will, to a considerable degree, reflect the judgment, character and ideals of those who now have a voice in the selection and training of those who will follow us. Clearly, it is our obligation to pass on to our successors an organization no less qualified for their task than the organization which we inherited and with which we have had the privilege of working.

During the past century, Otis established and maintained a reputation for designing, manufacturing and installing the best elevators available. At the same time, we built a reputation for trustworthy performance and fair dealing, which resulted in our becoming not only the world's largest producer of elevators but also a producer whose product commands a premium price.

That this position is not the result of chance, but rather is the result of a deliberate policy and of a conscious goal, is evident from the objectives outlined by Charles Otis in 1877:

"It should be our aim", he said, "to make our work satisfactory to our customers, not alone until we get our pay for each particular job, but until we get paid for every job we ever intend or expect to do for anyone, to the end of time; to get every customer we can and to keep every one we get — both for his work and for his influence.

"We must keep in mind", he said, "that the great objects of doing business are (1) to give occupation, (2) to achieve success, and (3) to make money, and that we shall not accomplish very much of the first two of these objects if we fail in the last."

SOME OTIS "Firsts" OF THE FIRST HUNDRED YEARS

1853—Elisha Graves Otis invented the first safe elevator. It was equipped with a safety device to prevent the elevator from falling if the ropes should break, which was a frequent occurrence in those days. Until a safe elevator became available, buildings and cities had grown vertically only as high as people were willing to climb stairs.

1878—The first high speed hydraulic elevator, introduced by Otis Brothers and Company made the first "skyscrapers" economically possible. These elevators were capable of higher speeds than the then existing methods of control made it practicable to use, and car speed was, therefore, limited to 700 feet per minute.

1889—The first Otis electric drum elevator was installed in New York City. The application of electricity to elevators made possible many new types of control, and the use of electric door interlocks added greatly to elevator safety.

1892—The first elevator to be controlled by variable voltage supplied by a separate motor generator was installed by Otis Brothers and Company in New York City under license from Ward Leonard. This type of control, which is now used on all high speed Otis elevators, provides smooth and rapid acceleration and retardation and contributes immeasurably to the quality of operation.

1900—The first Escalator was exhibited by Otis Elevator Company at the Paris Exposition and was awarded a grand prize. Until 1950 the word "Escalator" remained an Otis trademarked name, but is now in common use as a part of the English language.

1903—The first electric gearless traction machine was developed and installed by Otis. Gearless traction machines can be used for any desirable speed and rise and are extremely durable. To our knowledge, no Otis gearless machine has ever worn out.

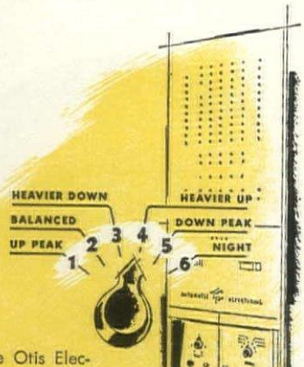
1915—The first self leveling, or Micro-Drive, elevators were developed by Otis engineers and enable passenger and freight elevators to be brought to an accurate stop at floor landings and to maintain this level automatically. This development saves time, eliminates the stumbling hazard and permits trucks to run smoothly on and off an elevator platform.

1953—The first traffic duplicating equipment was designed by Otis engineers to facilitate research and to demonstrate elevator performance. This electronic device is used to impose upon a group of model elevators in any desirable order all of the traffic conditions that, under any circumstances, could be created by the passengers in an intensive service office building. It then demonstrates by actual performance how such traffic is handled by Otis Autotronic—Without Attendant—Elevators with a fully automatic electronic group supervisory system.

This ingenious electronic device is effective, not only in demonstrating the performance of existing equipment, but, by providing Otis engineers with a laboratory which furnishes a prompt and accurate reading on the utility of new developments under actual operating conditions, it gives added assurance that the Otis leadership which has been so outstanding in the past will be continued in the years to come.

1950—The first group supervised intensive service elevators, designed to operate without attendants in the cars and equipped with electronically protected car and hatchway doors, were installed by Otis Elevator Company in the Atlantic Refining Company Building in Dallas, Texas. Such Autotronic—Without Attendant—Elevators have demonstrated their ability to render excellent service and to save up to $7,000 in operating costs per elevator per year.

1948—The first automatic and electronic supervisory system (Autotronic®) was developed by Otis to secure maximum quantity and quality of performance from a group of intensive service elevators and to vary the plan of operation to suit the changing requirements of the traffic.



At this time, also, the Otis Electronic Touch Button was made available which, at the lightest touch of a fingertip, is brightly illuminated and simply and dependably stops the elevator automatically at the desired floor.

1925—The first full Collective Control elevators were developed by Otis, primarily for use in apartment houses and hospitals. These elevators are passenger operated but furnish service substantially equivalent to that secured with an attendant operated elevator.

1924—The first Signal Control elevators, developed and installed by Otis, enable elevators to operate with speeds in excess of 700 feet per minute and to stop accurately and automatically in response to the pressure of hall or car buttons.

our goal for the future

At the beginning of our second century of operation under the name of Otis, it is appropriate to consider what we *now* regard as our purpose and objective and what we *now* believe to be the justification for our continued existence.

Without attempting to be epigrammatical, it seems to me that our objective should be:

To build the best products in our field; to continually improve these products in design and in method of production and installation so that they can continue to be sold at a profit sufficient to

(a) permit payment to investors of a return on their investment which will furnish an adequate incentive to save and invest in this or other useful competitive enterprises,

(b) permit stable employment of a carefully selected and trained organization,

(c) make possible such wages, salaries and working conditions as will result in the maximum incentive and capacity for production for the ultimate good of the greatest number.

This objective is based on the belief that the greatest good for the greatest number can result only from maximum production of useful goods equitably distributed. It is also based on the belief that maximum production is obtainable only through competitive enterprise, with such incentives as are necessary to prompt capital to provide the required tools and to stimulate all types of labor to the greatest possible productive effort consistent with their spiritual and physical well being.

It will be noted that, in common with Mr. Charles Otis, it is recognized that, first and foremost, the purpose of a business must be to satisfy its customers to the end that they will continue to buy the product at a profitable price. Failing in this, all other objectives must be abandoned—including the fundamental objective of continued operation.

Obviously—a successful business must provide for its own future existence, if it is to accomplish anything else. However, mere existence is the *minimum* requirement. The real justification for a company's survival must be measured by the contribution which it makes to the general welfare.

In common also with Mr. Otis, we recognize the importance of providing employment—but only when employment results in, or contributes to, useful production or gratification of human needs. Employment which merely wastes time is a criminal waste of human lives and human energy and is grossly inconsistent with the objectives of a legitimate business.

our personal obligation

The ideal for which we should strive is a company which provides every person in its organization with frequent opportunity to test his maximum capacity and which provides a constant incentive to increase that capacity and to devote it to useful ends.

There is so much in this world that requires doing and the doing of it requires so much human energy and intelli-

(continued on next page)

gence that we cannot tolerate that which wastes this energy and intelligence and which stultifies the ambition which is necessary to make it do useful work. We must measure our own individual success not primarily by the position we attain but by the extent to which we are utilizing to the utmost the talents and capacity with which we are individually endowed and also by the extent to which we make it possible for others to do the same thing.

the role of competitive enterprise

The United States has reached a position of world leadership primarily, I believe, because, throughout the greater part of its history, emphasis has been laid upon the importance of the individual and upon the importance of maintaining individual opportunity and powerful incentives for individual effort and accomplishment. The resulting competitive enterprise has produced a standard of living and a capacity for production the like of which the world has never seen.

Nevertheless, there has arisen a contrary philosophy, backed by the ruthless power of a foreign dictator state, and the American system of living and producing is on trial before the world.

the challenge to American business

Now, at long last, the American people have once more called upon American business men to restore the faith of the country in the basic principles upon which our nation was established and to stage such a demonstration of the advantages of democratic competitive enterprise that the fallacy and folly of socialism and communism will be self evident to all the people of the world who are free to learn—and, ultimately, even to those behind the iron curtain.

It is a crisis greater than any previously faced by the American people and a challenge to the business men of the country which they must accept or fail miserably in the defense of the principles in which they have professed a profound belief.

our share of the job

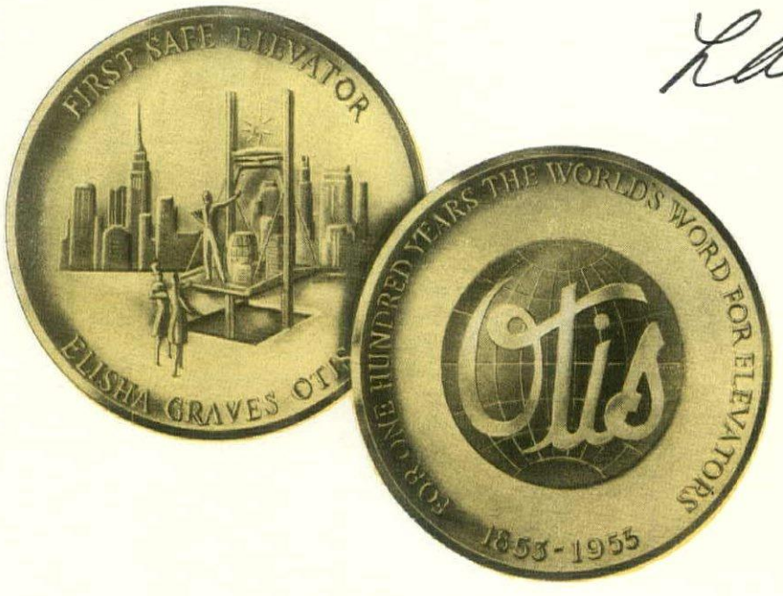
As a part of the business world, we share in the obligation to demonstrate the superiority of our system of democratic competitive enterprise in providing for the general welfare.

Our share in this demonstration is to so work and so manage the affairs of our Company as to help raise the level of accomplishment of the business community. Then confidently, aggressively, persistently and intelligently we must acquaint, first of all the people of our own country and then the other people of the world, with what business is, has done and can do and the vital part which business has played and must continue to play in building up and maintaining the standard of living, way of life and defense of our country.

The Otis Elevator Company is to thousands of employees, stockholders and customers a representative of business and an example of the operation of the competitive enterprise system. It should be our purpose to make that example a good one.

R. A. Peterson

President



OTIS HAS PLANTS ALL OVER THE WORLD

United States—Yonkers, N. Y. • Harrison, N. J.

Canada Hamilton

England London

France Bezons

Italy Milan, Naples

Germany Berlin-Borsigwalde

Australia Sydney

Mexico Mexico City

Japan Tokyo

Argentina Buenos Aires

Brazil Rio de Janeiro, Sao Paulo

Uruguay Montevideo

Union of South Africa Wadeville

OTIS ELEVATOR COMPANY

Offices in principal cities all over the world

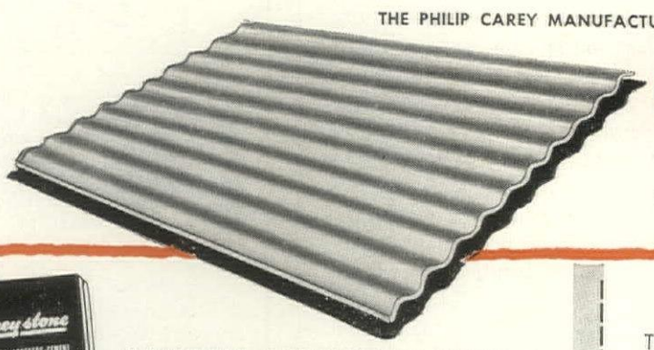
executive offices:
260 11th AVENUE, NEW YORK 1, N. Y.

again...Careystone Corrugated cuts construction time and costs...

New Superior Foundry Co. Building with Sidewalls of Careystone ... BUILT IN ONLY 6 WEEKS!

"Raze our old frame building and erect a new building with 60,000 square feet of floor space on the site. Do it *fast* to hold our production 'time out' at a bone-bare minimum! And do it within our budget!" That's the job engineers Christian, Schwarzenberg and Gaede and general contractor Sam W. Emerson were asked to tackle by Superior Foundry Company, Cleveland, Ohio. And – they did it! In record time! In a mere six weeks a new steel, brick and Careystone building was humming with production. A perfect example of the miracles American ingenuity can accomplish. And an eye-opening demonstration of Careystone's many virtues. Careystone – made of asbestos and Portland cement – posed no "availability" problems. Corrugated for great structural strength, it is quick, easy and inexpensive to apply . . . comes in big sheets that cover fast, can be applied over wood or steel framing. It won't burn, rust, rot, corrode, nor can termites or rodents damage it. Exposure to weather actually strengthens it! Thus Careystone loaned these many virtues to the need for speed . . . will provide fire-safety and protection for the life of the building, without one cent for maintenance!

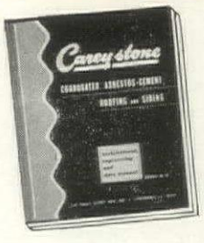
If there's a new plant in your plans – or additions to facilities you own – give serious consideration to the advantages only Careystone can deliver. Ask your Carey Industrial Sales Engineer for our new fact-filled manual. Or, if you wish, fill in and mail the coupon for your copy today!



THE PHILIP CAREY MANUFACTURING COMPANY, LOCKLAND, CINCINNATI 15, OHIO

Carey

In Canada: The Philip Carey Co., Ltd., Montreal 3, P. Q.



VALUABLE CAREYSTONE MANUAL . . . YOURS FREE ON REQUEST!

84 fact-crammed pages listing uses for Careystone Corrugated, erection details, estimating procedures. Hundreds of "how to" diagrams. Send for your FREE copy right away.

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FROM THE HOUSE OF CAREY • SERVING INDUSTRY SINCE 1873

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Department AF-10
Lockland, Cincinnati 15, Ohio

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to the chapters), and public relations.

Said George Bain Cummings on public relations: "An architect can promise to meet the cost equation if, and only if, he is given control of one of three terms that enter the equation: quantity, quality and cost. For example, given a quantity of building to be achieved at a price, he can raise or lower quality to match; given a quality and quantity of building, he must be free on cost; given a quality and cost, he can determine how much can be built."

AIA approval for ads asked again in Michigan

At AIA's Seattle convention in June, the resolutions committee headed by Paul Gerhardt of Chicago was criticized for pigeonholing several proposals, one of them a Michigan recommendation to ease the institute's prohibition against paid advertising.

Last month at its annual conference in Detroit, the persevering AIA Great Lakes regional council blueprinted another attempt to modernize this institute rule. It adopted a resolution to go to the AIA board of directors urging approval for limited advertising under the following substitute rule:

"One may enter into paid advertising in a publication issued on behalf of the owner of a project on which he was architect, provided that copy is devoted entirely to promotion of the interests of the profession as a whole, is of such a nature as to inform the public of the beneficial services architects can render to society, and that no mention is made of the individual architect or firm, except for the signature."

For background the resolution stated that a similar proposal "was dealt with rather summarily at the Houston convention (1949) despite the fact that opinion, to say the least, was divided." It also declared "the institute should take a more realistic view of this phase of advertising, as it has done with respect to advertising in publications sponsored by it and its components."

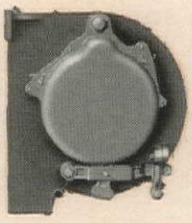
In many instances, said the resolution, the present rule creates a condition that "tends to give the impression the institute is not realistic, progressive or businesslike." Example: an architect designed a newspaper plant addition, but when the owner asked the architect if he would take space in a special edition featuring the building, the architect had to reply that he was forbidden to do so. The resolution said the limitation to publications "by or for the owner" should still protect the architect "against solicitation from other publications of a purely commercial nature."

Last May the AIA *Journal* printed a short, "opinions are solely those of the author" article by Architect Herman Charles Light of Los Angeles: "Is Our Code of Ethics 'Contemporary'?" Wrote Light: "Paid advertising is a real headache. Have you ever really studied this rule? Can the paid public relations counsels of many large offices qualify?

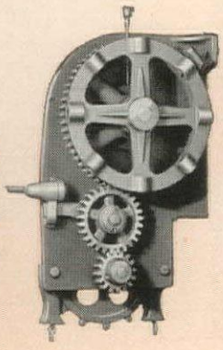
continued on p. 62

Rolling Steel Doors

Standard or Automatic Underwriters' Labeled Types!



Mahon Release Device and Governor on the Automatic Closing Mechanism of a Mahon Underwriters' Labeled Rolling Steel Fire Door. In case of fire, Fusible Links release the closing mechanism and the door closes automatically.



Mahon Release Device on the Chain-Gear Operator of a Mahon Mechanically Operated, Underwriters' Labeled, Automatic Rolling Steel Fire Door. Fusing of the Fusible Link, which releases the Automatic Closing Mechanism, simultaneously disengages the Chain-Gear Operator.

Manually, Mechanically, or Power Operated

Below you see three Mahon Automatic Underwriters' Labeled Rolling Steel Doors installed on fire-wall openings of an enclosed shipping dock. These doors normally remain open, but are equipped with mechanical chain-gear operators which permit closing or opening at will. If a fire should occur while they are in the open position, they automatically close and prevent the spread of fire through the openings. This is one use for one type of rolling steel door. Many types are produced by Mahon to meet virtually any door requirement. Mahon quick-opening, quick-closing power operated rolling steel doors offer more desirable features than any other type of door . . . the vertical roll-up action utilizes no usable space either inside or outside the door opening. There are no overhead tracks or other obstructions to interfere with crane operations. No other type of door offers these advantages of space economy and compactness in operation. In addition, rolling steel doors are permanent—their all-metal construction assures a lifetime of trouble-free service and maximum protection. When you select a rolling steel door, check specifications carefully . . . you will find many extra-value features in Mahon doors. See Sweet's Files for complete information including Specifications, or write for Catalog G-54.

THE R. C. MAHON COMPANY

Detroit 34, Michigan • Chicago 4, Illinois • Representatives in all Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Fire Doors and Shutters; Insulated Metal Walls and Wall Panels; Steel Deck for Roofs, Partitions ,and Permanent Concrete Floor Forms.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Three Mahon Underwriters' Labeled, Automatic Rolling Steel Fire Doors installed on openings to an enclosed truck loading dock in a new plant for Towne-Robinson Nut Co., Detroit, Mich. Austin Engineers, Inc., Designers. The Austin Company, Cleveland, Ohio, Gen. Contrs.

MAHON

Or do some of the form letters, mailing pieces, etc., meet the spirit of this rule? Is paid advertising a matter of degree for those who can afford a 'huckster'? . . . Let's make our code consistent with architecture as practised. What good is a public relations program if the public encounters practices contrary to stated rules or in opposition to the needs and requirements of present-day good business?"

AIA polls its chapters on social security coverage

For years the AIA has opposed extension of social security coverage to architects. But now it realizes its members are of two minds and is polling its chapters to learn the majority viewpoint. Armed with this information it will testify for or against a new Administration proposal to bring under the act more than 10 million self-employed persons, including architects and engineers.

Results of the poll have come in slowly and AIA cautions that the first 20 chapters to reply are too small a percentage of the membership to be conclusive. Among these, however, 12 are in favor of coverage for architects, eight opposed.

Architect opposition frequently stems from the provision that rules out the payment of monthly retirement benefits to a 65-75-year-old person as long as he continues to earn more than $75 a month; after his 75th birthday, however, he can earn any amount and still be eligible for benefits.

Says one spokesman for the opposition: "Many of us reach our maximum earning power at 60 to 65 and many, if not the majority, can continue a useful practice for some years after 65, in which case we would receive no retirement benefits.

"Most important, an architect may be able to obtain social security coverage through employment before 65 with some other business, which even under present law, would permit him to draw social security benefits and still practice architecture after 65.

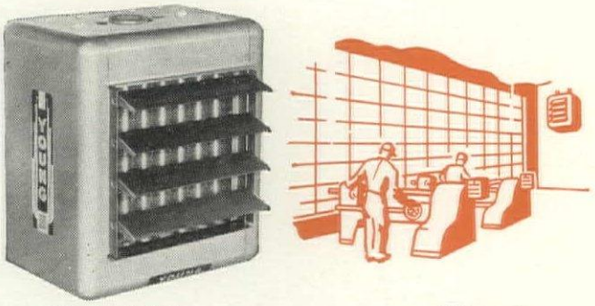
"Social security benefits are not large—a maximum of $1,500 a year for a married man whose wife is over 65—but they are tax exempt, which makes them equivalent to $1,800 to $3,000 of income from other sources."

Greatest advantage of social security for many persons, particularly for younger people, is its survivorship payments. These can become effective after paying taxes for only 18 months and can give a widow and dependent children under 18 up to $1,900 a year. If she has not remarried, a widow over 65 or upon reaching 65 can also draw about $750 a year, even though she may have received widow and dependent children payments many years earlier.

Full information about the program and formulas for determining retirement or survivorship payments are available at local social security field offices or the social security board in Washington.

continued on p. 66

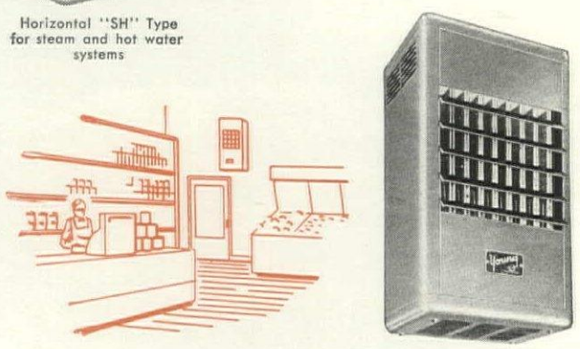
These Young Unit Heaters are Heating "Specialists"!



Horizontal "SH" Type for steam and hot water systems

FOR GENERAL PURPOSE REQUIREMENTS

Here's an all-purpose unit for most general heating requirements . . . Young "SH" Type horizontal Unit Heater, available in fourteen models, for use with steam and hot water systems. Heavy-duty casings are made of braced and welded furniture steel with rounded corners, durable baked-on gray enamel finish, and individually adjustable louvers. Features include quiet, rubber-mounted motor, spring-suspended mechanically bonded tube-and-fin heating element, plus 15 other design advantages.

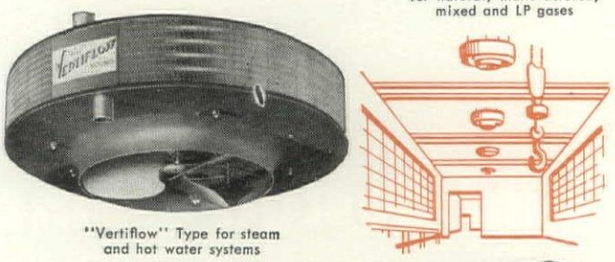


Horizontal Gas-Fired Type for natural, manufactured, mixed and LP gases

Young Gas-Fired Units, with horizontal delivery, are especially suited for installations not requiring a boiler. Available in eight physical sizes these units feature aluminized steel construction. Molten aluminum is permanently bonded to steel base metal in both combustion chambers and heat exchanger, to withstand the corrosive effects of gases and high temperatures. Approved by the AGA for use with either natural, manufactured, mixed and LP gases.

FOR DELIVERING HEAT FROM HIGH CEILINGS

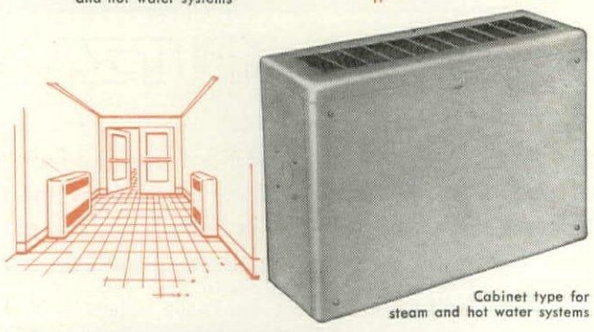
Where direct, downward distribution of heated air is desired . . . above craneways and other high-ceiling installations . . . Young "Vertiflow" Unit Heaters should be specified. Seven models, for use with steam and hot water, may be equipped with several types of adjustable diffusers and Anemostats for various heating patterns. Exclusive ventilating stack surrounds motor with cooler room air, prevents failure due to overheating. Features quiet operation, mechanically bonded tube-and-fin heating element, etc.



"Vertiflow" Type for steam and hot water systems

FOR WARMING COLD SPOTS WHERE APPEARANCE IS IMPORTANT

Lobbies, vestibules and similar installations require unit heater performance, plus an attractive appearance. For these Young offers Cabinet Units with three sizes in each of three cabinet styles for use with steam and hot water systems. With accessories, these units may be wall-hung, inverted wall-hung, ceiling mounted, free-standing, with ducts, inlet grilles, etc. Features quiet operating blower assembly with entire unit designed for ease of installation.



Cabinet type for steam and hot water systems

For further information, including ratings, dimensions, construction features, etc., see your nearest Young Representative or write for free catalogs.

YOUNG RADIATOR COMPANY
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Plants at Racine, Wisconsin and Mattoon, Illinois
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YOUNG

Heating, Cooling, Air Conditioning Products for Home and Industry

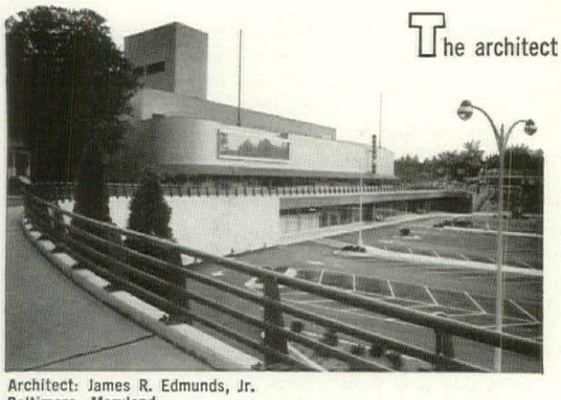
Heat Transfer Products for Automotive, Agricultural, Industrial, Gas and Diesel Engine Applications

Leaders in Heat Transfer Engineering for more than 25 years

THE PEELLE MOTORSTAIR

EZRA STOLLER

AT HUTZLER'S



Architect: James R. Edmunds, Jr.
Baltimore, Maryland
Contractor: Consolidated Engineering Co., Inc.
Baltimore, Maryland

The architect for this fine, new Hutzler Brothers Store in Baltimore, Maryland, employed Peelle Motorstairs both functionally and decoratively. Off-the-street parking with entrance at the basement level was made possible by Peelle Motorstairs, and these handsome stairs were also used effectively as a design element.

In well-planned buildings everywhere, the Peelle Motorstair is furnishing smooth, safe, economical floor-to-floor transportation. It is based on an advanced engineering design which results in many years of smooth operation with a minimum of maintenance. The new Type "C" Motorstair illustrated can be furnished in twelve color combinations. The exclusive Peelle all-metal safety handrail adds a striking two color accent to the beauty of the entire stairway. Write for details.

see our catalog in
ARCHITECTURAL FILE
or write for copy

PEELLE MOTORSTAIR DIVISION
THE PEELLE COMPANY
47 STEWART AVENUE, BROOKLYN 37, NEW YORK — OFFICES IN PRINCIPAL CITIES

"We've used them before"

Offices and warehouse of Peirce-Phelps, Inc., Philadelphia, Pa., distributors of heating equipment and appliances. Construction: Robert E. Lamb & Son, Inc., Philadelphia, Pa. Windows: Lupton Steel Architectural Projected, Pivoted and Fixed.

Time after time, research into why a new building has Lupton Metal Windows reveals that the architects have "used them before . . . liked Lupton Windows . . . liked Lupton service . . . and liked Lupton prices".

Such was the case with the new Peirce-Phelps buildings in Philadelphia, with their 329 Architectural Projected Windows in the offices and the 378 Pivoted and Fixed Windows in the warehouse.

In the air-conditioned office section, costs were reduced by using a modified Standard Projected Window. Standard Lupton Projected Windows have two ventilators — a larger one opening out in the upper section and a smaller open-in ventilator below. By keeping only the lower ventilator and using a solid sheet of glass in the rest of the window, savings were made in window construction costs.

Helping you save costs in planning your window layouts is a Lupton service . . . through using standard units in unique ways.

You know what a reputation means . . . Lupton's has been growing for over forty years. It's built on quality and service. See the full line of Lupton Metal Windows in Sweet's. There's a standard unit ready, or adaptable, to any building you design . . . and Lupton Window Design Engineers are at your service.

MICHAEL FLYNN MANUFACTURING COMPANY
700 East Godfrey Avenue, Philadelphia 24, Pa.
Member of the Steel Window Institute and Aluminum Window Manufacturers' Assoc.

LUPTON
METAL WINDOWS

Industrial realtors foresee sustained factory building

Theme that emerged from an Eastern States Regional Conference of the Society of Industrial Realtors in New York this month: construction of large modern industrial plants should continue in very great volume through the next decade despite any dip this year or next from the peaks of the huge tax-assisted expansion that started in 1950.

Some indications of the outlook:

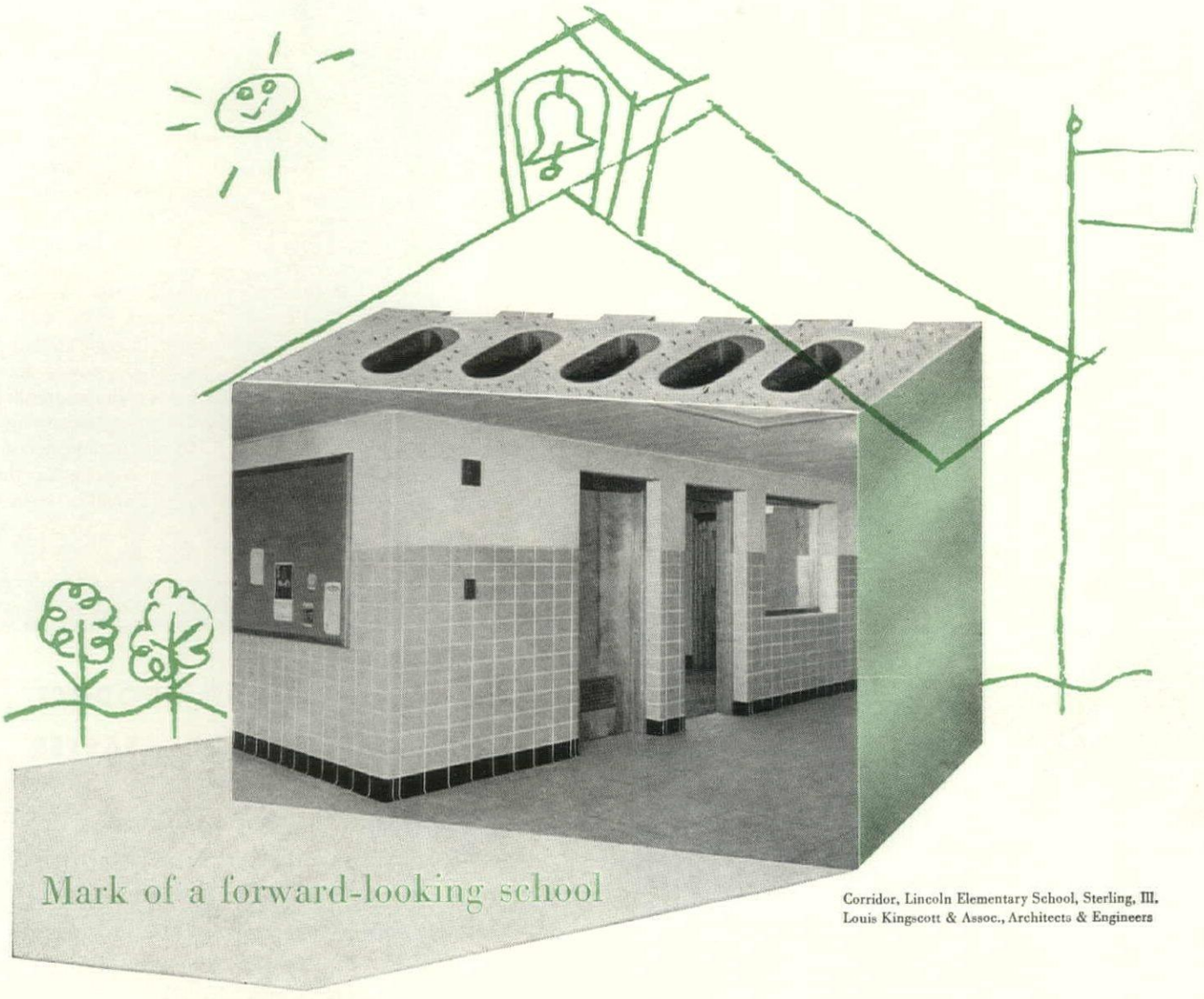
▸ Former national SIR President Aime V. Carkhuff of Newark, N.J. cited a client who was operating in 13 separate buildings in one location with its own power and water supply. Continued operation in this old plant, however, would be a staggering 41% more expensive than in a new one-story modern plant now being erected for the company. (Future of the old plant? It obviously would be no use to any other single-occupancy producer. It could only be sold to a speculator who would sell or lease single buildings or single floors to concerns requiring very small quarters.)

▸ Frederick B. ("Puff") Martin of St. Louis, current national SIR president, estimated that two-thirds of the nation's industrial plants are obsolete and subject to replacement within ten years. The trend to large regional plants will continue to give the South, as well as the Southwest and West Coast, a progressively greater share of the nation's industrial capacity, he added.

▸ New York's "package deal" plant specialist, James H. Burns, looked at the intensified competition industry faces in the next few years. His conclusion: if labor, material and other costs are very rigid, "a more efficient plant may be the only place where major economies can be achieved." In other words, many producers will not be able to survive unless they buy or build new, efficient modern plants and achieve the kind of savings outlined by Realtor Carkhuff.

Samuel R. Walker, vice president of Robert W. Dowling's City Investing Co., predicted that the pattern of future industrial location will be inland locations equally accessible to a number of large metropolitan markets by fast overnight or 24-hour transportation. He cited the creation of the tremendous, strategic military supply depot at Horseheads, near Elmira, N.Y., during World War II. This facilitated virtually overnight shipment to any port or city from Boston to Norfolk as convoy loading needs dictated. Recently he started to make an industrial survey in the West, said Walker, and he quickly came to the conclusion that the best place for many plants (except for local needs) would not be Los Angeles, San Francisco or Portland, but Salt Lake City, quickly accessible to all of them without being engulfed by any of them.

continued on p. 70



Corridor, Lincoln Elementary School, Sterling, Ill.
Louis Kingscott & Assoc., Architects & Engineers

STARK GLAZED FACING TILE

✳ lowers maintenance ✳ lasts for life

When you specify Stark Glazed Facing Tile for school interiors, you can rest assured that your original design concept will retain its freshness for years to come.

A color scheme built into the walls with Stark Glazed Facing Tile will stay bright as new—this glass-hard surface will never fade, crack or craze under rough school usage. And Stark's colors are "engineered" to fit a wide variety of school needs —ranging from glare-reduction to high light-reflection for a brighter environment.

Stark Glazed Facing Tile pays for itself many times over in maintenance savings, too. It washes sparkling clean with plain soap and water, completely eliminates the inconvenience and expense of refinishing big wall areas. It's a multiple-duty material—provides a fireproof wall and a decorative finish in one cost-cutting operation.

Our new brochure on Modular Masonry contains full specification data. To obtain one, just write us on your letterhead. Our reference in Sweet's Catalog is 4f-St.

STARK *Ceramics, Inc., Canton 1, Ohio*

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QUALITY FACING TILE FTI Member of FACING TILE INSTITUTE

PG's

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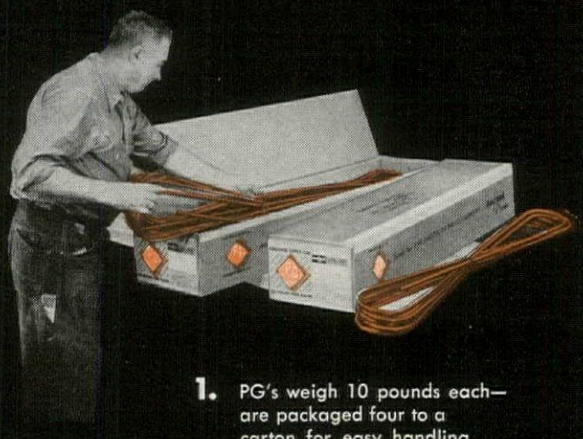


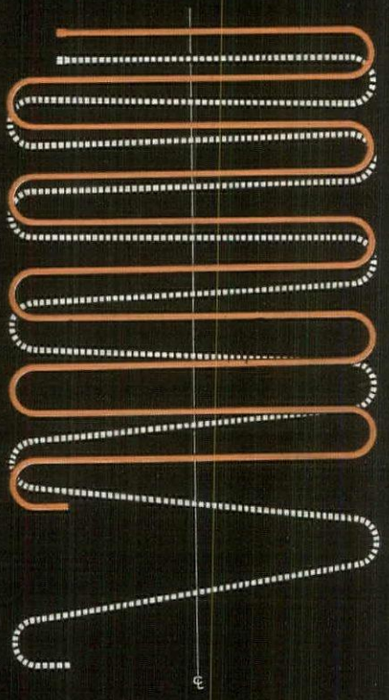
1. PG's weigh 10 pounds each—are packaged four to a carton for easy handling.

CUT COST IN

A NEW ANACONDA PRODUCT MAKES A BETTER JOB — FASTER

Now — something new in radiant panel piping. It's ANACONDA Panel Grids* (PG's). These action pictures show how easily PG's install. No more awkward "stringing up" of coiled tubing. The job is done easier and quicker with PG's. These handy and adaptable panel grids are conveniently packaged ready for installation. The machine-made prefabricated grids eliminate on-the-job bending and the expense of special panel-forming aids.

PG's are supplied in one standard size, consisting of 50 linear feet of ⅜ in. Type L copper tube. At normal 6 in. spacings, PG's are rated at 1800 Btu/hr. This simplifies estimating and layout. PG's may be extended or contracted by *hand* to serve panel surface areas from 22½ to 60 square feet. *Pat. applied for



The flexibility of PG's meets all design requirements. Center line spacing ranges from 4½ in. to 12 in. At normal 6 in. spacing the over-all dimension of a PG is 56 in. x 60 in.

For full details we'll be glad to send you an informative booklet that will answer almost any question you have about this new Anaconda product. Use coupon, or write for Anaconda Publication C-6 to *The American Brass Company, Waterbury 20, Connecticut.* 5373A

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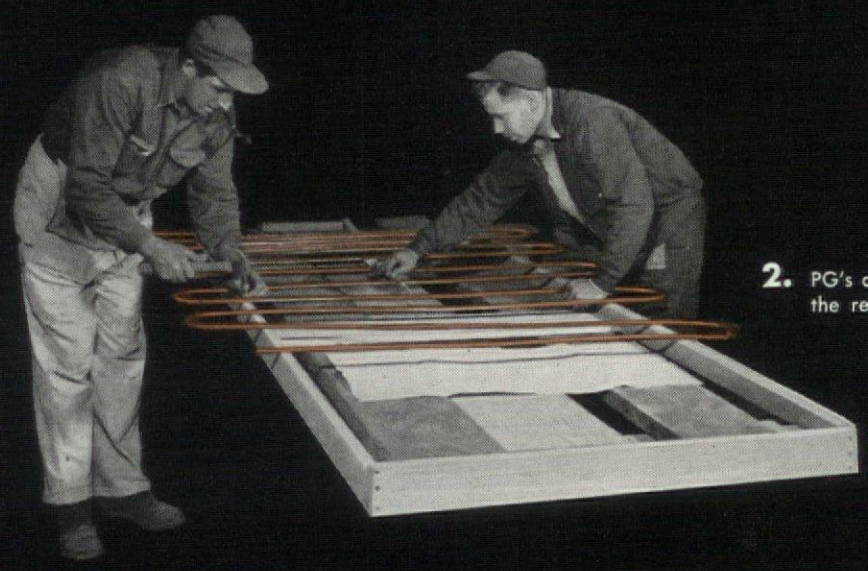
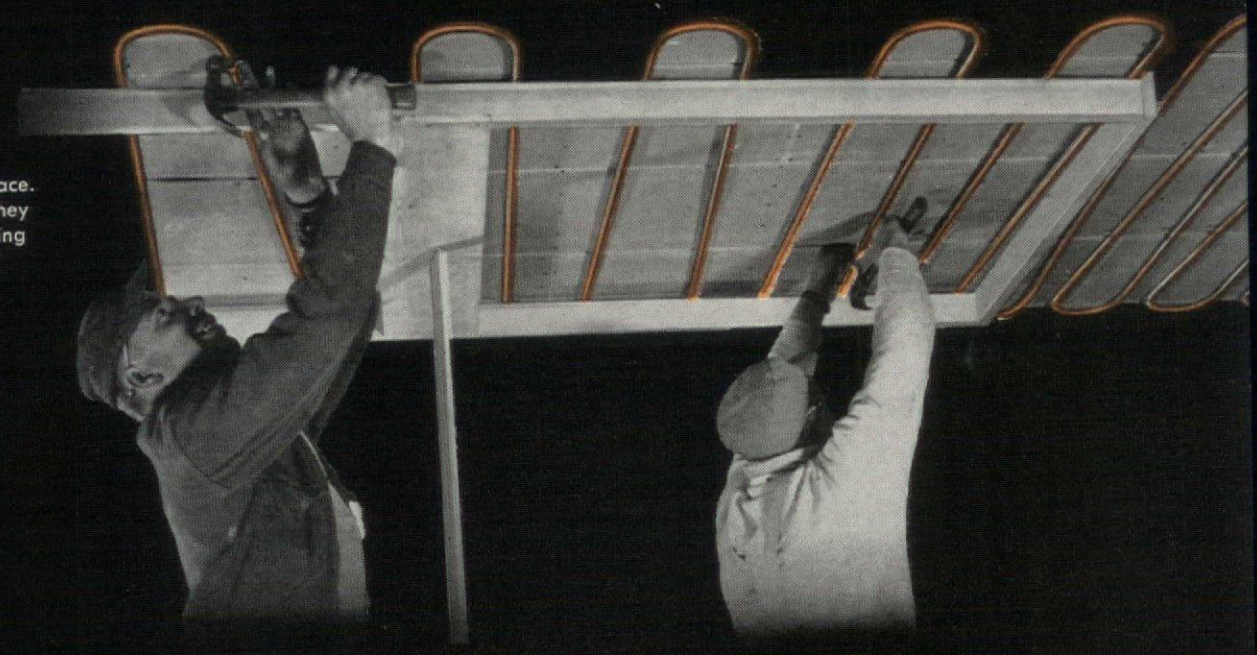
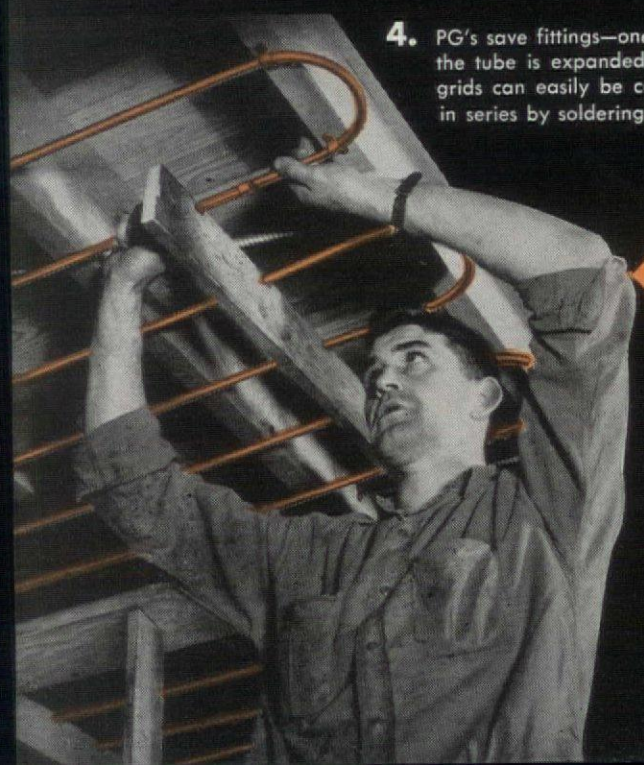


2. PG's are readily laid out to the required spacing.

RADIANT HEATING



3. PG's are easily put in place. Trim, straight and true, they fasten tightly to the ceiling and require only *normal* plaster thickness.



4. PG's save fittings—one end of the tube is expanded so that grids can easily be connected in series by soldering or brazing.

PG's

The American Brass Company
Waterbury 20, Connecticut

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Please send me Anaconda Publication C-6, describing PG's:

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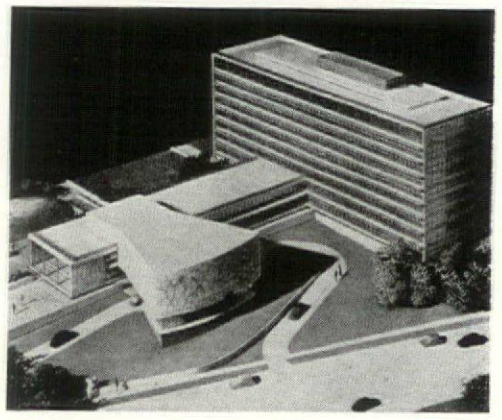
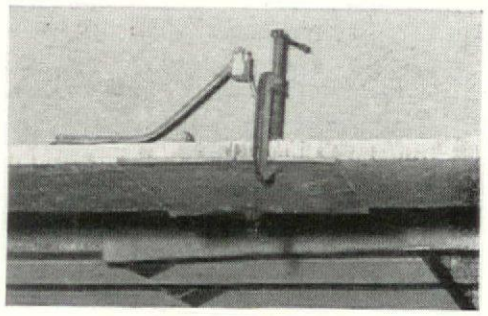
CITY .....ZONE.....STATE.....



New medical college will have novel teaching rooms

Ground was broken this month for the first three buildings (above) of the $25 million Albert Einstein College of Medicine of Yeshiva University, the first new medical school established in New York City since 1898. These will be a modern gray brick and glass ten-story teaching and research center, a fan-shaped auditorium, and a connecting three-story administration and library unit. An innovation in the central building, according to B. Sumner Gruzen, head of Kelly & Gruzen, architects, will be large multipurpose home-room laboratory-classrooms so faculty, rather than students, will move from one lecture room to another.

Additional buildings to be erected later will house schools of dentistry, nursing, public health, a graduate school and a professional building for the college's 300 full-time and 400 part-time instructors. The faculty will be large because the college made an agreement with the city to staff completely two hospitals in the adjoining $40 million, 1,400-bed Bronx Municipal Hospital Center now nearing completion.



Radioactive cobalt used to X-ray huge steel beam

Radioactive cobalt 60 from the Oak Ridge, Tenn. AEC plant was put to work X-raying welded joints in a huge steel beam. Instead of heavy X-ray equipment all that was required in probing through a 1½" section of steel (above) was a small capsule of cobalt 60 weighing less than a gram, and an X-ray film on the underside of the metal. Supervising Architect E. L. Stouffer of the University of Illinois used this method to check the safety of a 60' square underground room to accommodate 260 persons in a campus building, and at one point discovered a welded joint cavity that required correction. Professor George L. Clark of the University's chemical department has been advocating extensive safety X-raying of this type on all steel construction. X-ray Inc. of Detroit made the actual tests.

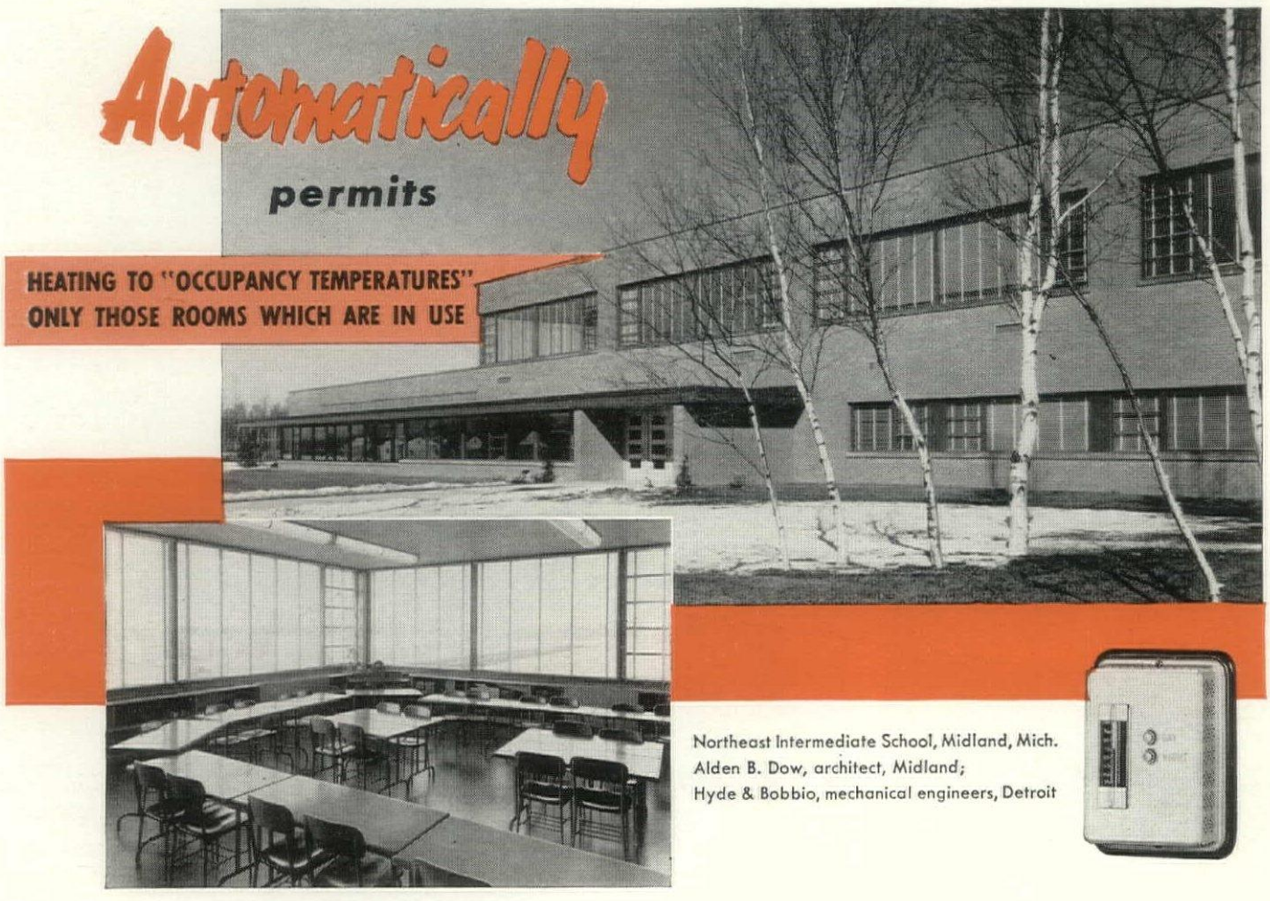
continued on p. 74

day or night...

JOHNSON *Dual* Temperature CONTROL

Automatically permits

HEATING TO "OCCUPANCY TEMPERATURES" ONLY THOSE ROOMS WHICH ARE IN USE



Northeast Intermediate School, Midland, Mich.
Alden B. Dow, architect, Midland;
Hyde & Bobbio, mechanical engineers, Detroit

• Educational opportunity in America today is founded upon adequate buildings, properly equipped and staffed. The tremendous responsibility of providing these fundamentals rests with school boards, school administrators and their architects.

The activities in today's modern school buildings are many. The buildings are truly neighborhood and community centers. Wise planning and thrifty management are necessary in order to receive the greatest return from every budget dollar.

That is why the well-planned Northeast Intermediate School at Midland, Michigan, is equipped throughout with a planned-for-the-purpose, installed-for-the-purpose Johnson *Dual* Temperature Control System. Here, 62 *Dual* room thermostats control unit ventilators, convectors and central fan ventilating systems to provide comfortable occupancy temperatures in rooms that are in use, while reduced economy temperatures are maintained in unoccupied spaces.

Here again, as in thousands of other schools, Johnson engineers have worked hand in hand with thrifty planners, in order to provide the best in automatic temperature control for greatest possible fuel saving. They know full well that the completed structure will stand as evidence of how well the planners did their job.

If you are planning a new building or modernizing an old one, have your architect consult a Johnson engineer about *your* temperature control problems. There is no obligation. JOHNSON SERVICE COMPANY, Milwaukee 2, Wisconsin. Direct Branch Offices in Principal Cities.

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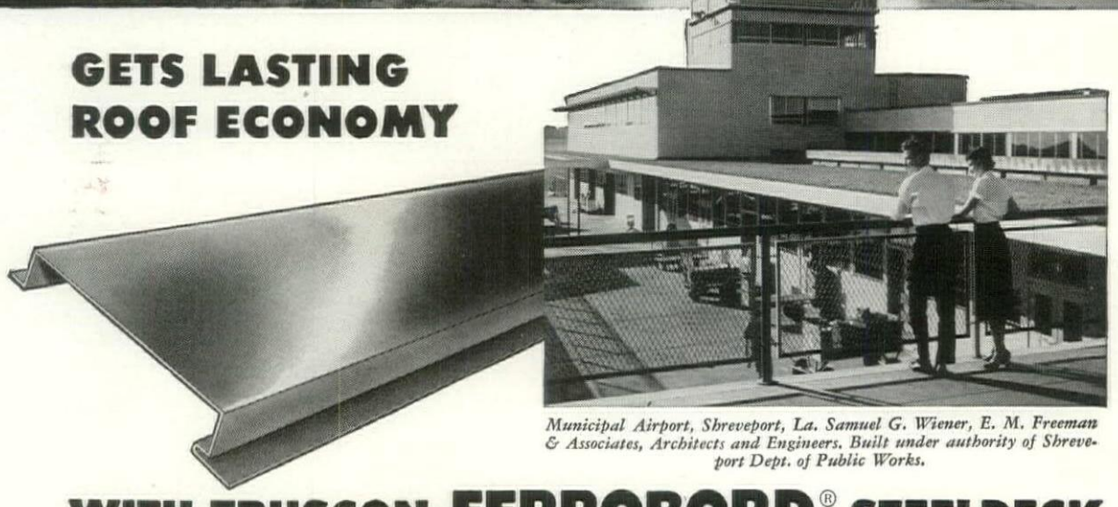
NEW SHREVEPORT MUNICIPAL AIRPORT

GETS LASTING ROOF ECONOMY



Municipal Airport, Shreveport, La. Samuel G. Wiener, E. M. Freeman & Associates, Architects and Engineers. Built under authority of Shreveport Dept. of Public Works.

WITH TRUSCON FERROBORD® STEELDECK

This lightweight steel decking comes in units long enough to span three or more purlin spacings. Members are designed for full-length interlocking—a principle which increases carrying capacity as much as 25%. Long spans and full-length interlocking mean important first-cost savings in trusses and structural framing.

Lightweight Ferrobord is easy to handle, easy to place. Welding contacts are flat. Work is done from above. No need for scaffolding or movable stages during erection. More first-cost economies.

When laid, Ferrobord is a smooth unbroken surface, ready for insulation and built-up waterproofing. Its life expectancy is long. We'll arrange a worthwhile demonstration that takes about two square feet of Ferrobord and twenty minutes of your time. Just write:

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TRUSCON® a name you can build on

men and **methods**

make the difference

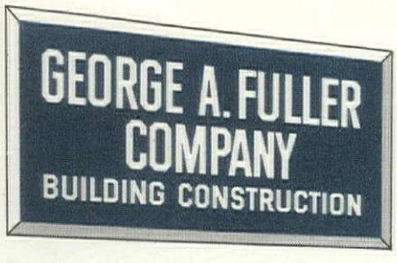
When you choose a builder, it's important to consider his capacity for teamwork.

He must be able to work smoothly and effectively with the other members of the building team – architects, engineers and owners. His organization must be skilled in the close teamwork needed to build soundly, on schedule and within the budget. His men and methods make the difference between waste and economy, between time lost and time gained in completing the job.

The George A. Fuller Company's belief in the importance of good teamwork is reflected in its record: 72 years of excellent relations with architects and owners, thousands of varied construction projects satisfactorily completed throughout the U. S. and in many foreign countries.

Many architects have profited by Fuller's ability to provide estimates, studies and "know how" to help the building team produce the best structure for the money. These services are available from the first stages of planning – and throughout construction in the field.

INDUSTRIAL PLANTS • HOSPITALS • LABORATORIES • OFFICE BUILDINGS • SCHOOL AND COLLEGE BUILDINGS • CHURCHES • HOTELS • BANKS • ARENAS • HOUSING • THEATERS • TERMINALS STORES AND SHOPPING CENTERS • BROADCASTING STUDIOS • MONUMENTAL BUILDINGS



Sign of Leadership in Building Construction

GEORGE A. FULLER COMPANY

NEW YORK · BOSTON · CHICAGO · PITTSBURGH
WASHINGTON · ATLANTA · LOS ANGELES

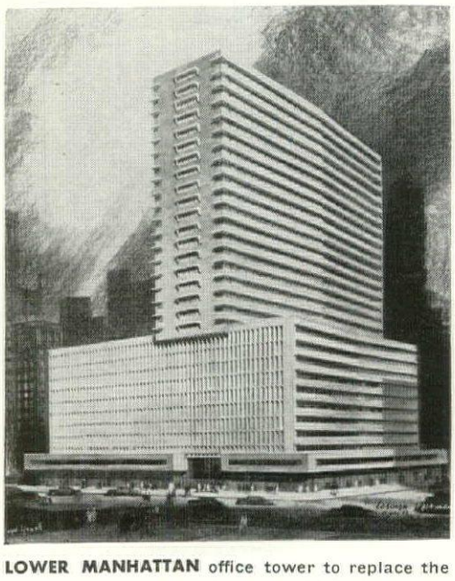
Wall St. area cheered by plans for new skyscraper

Lower Manhattan has had no major rental office construction for the last two decades. Concentration of new, modern space in the midtown Grand Central–Rockefeller Center area has made it difficult for owners in the aging downtown district to rebut reports that the area was doomed to succumb soon to galloping obsolescence.

This month the shipping-financial-commercial district got its best news in years. Real estate's famous cross-continent partners, short, dynamic Jack D. Weiler of New York, and San Francisco Hotelman Benjamin H. Swig, had leased the lower Broadway Produce Exchange blockfront facing Bowling Green. In place of this 69-year-old structure that still has rope-pull elevators they will erect a $25 million 30-story air-conditioned rental building with 1 million sq. ft. of floor space from plans by Architect William Lescaze. Other features: a 300-car garage; moving stairs from lobby to second floor; 50,000 sq. ft. floors from the 3rd to 11th stories; tower floors of about 18,000 sq. ft.

While downtown owners rejoiced at the realty investment significance of this long-awaited construction, not everyone was happy. Mourned Talbot Hamlin, FAIA: "One of the unforgettable pictures on Manhattan . . . [includes] the rich red brick front of the Produce Exchange, with the powerful rhythms of its marching arches. . . . Designed by George B. Post . . . for nearly three-quarters of a century [it has] been one of the distinguished landmarks of our crowded island.

"There seems thus something peculiarly unfortunate in the proposed unnecessary destruction of this building, so striking in its color, so powerful in its design, so expressive of its time. Historically, too, it is important, for its court wall is the earliest example of metal-framed construction in New York and one of the earliest in the country. Is the city and are its inhabitants such slaves to economic pressures that they can have no say in what they see, no power to preserve what they love?"



LOWER MANHATTAN office tower to replace the ancient Produce Exchange at 2 Broadway.

SERVICE REYNOLDS ALUMINUM to Architects

At Your Call Across the Nation

Reynolds Architect Service Representatives will work with you on your aluminum design problems without cost or obligation. This special service is Reynolds way of keeping pace with architects who are employing the unique characteristics of aluminum in varying ways for countless applications.

When your plans also call for standard aluminum products, Reynolds distributors throughout the country offer complete stocks of architectural aluminum mill products. Their assistance, too, is readily available to you. Names of aluminum building products manufacturers will be furnished on request.

Write to Reynolds Metals Company, 2528 South Third Street, Louisville 1, Kentucky.

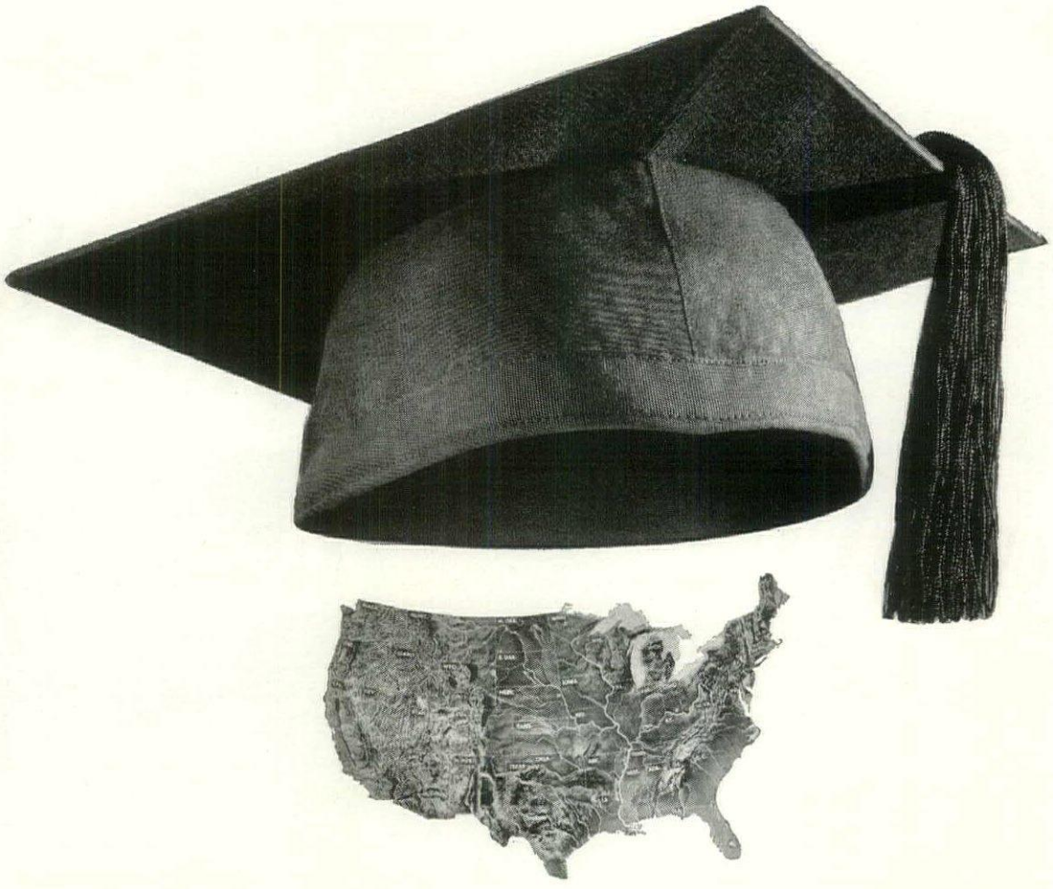
design folio

A completely new manual on architectural aluminum with drawings for direct tracing. Please request on business letterhead.

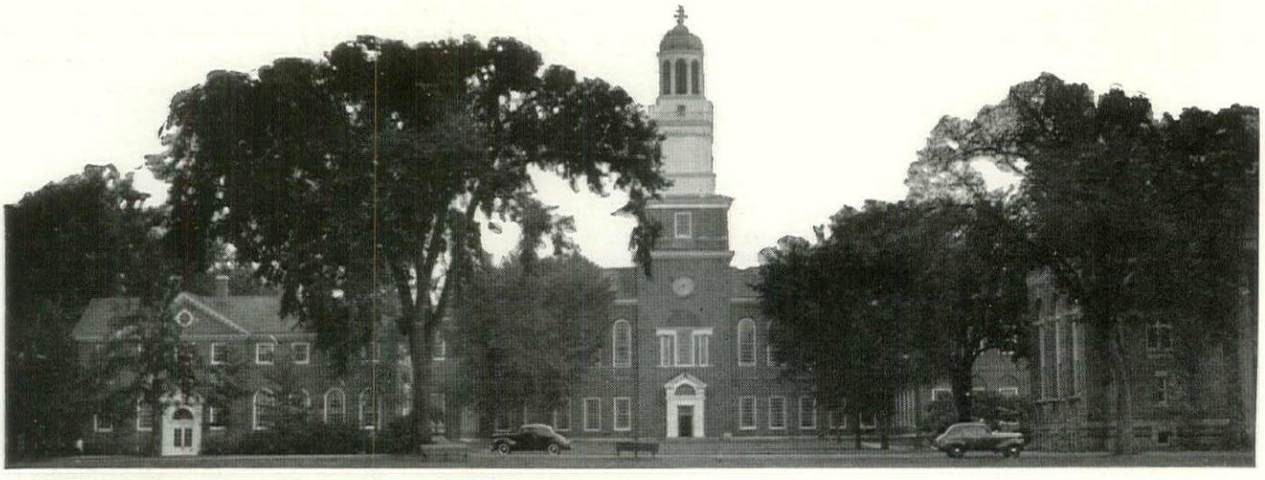
For quick reference see catalog 5a/Re in Sweet's File

See "Mister Peepers" Sundays on NBC-TV. Consult local listing for time and station.

MODERN DESIGN HAS ALUMINUM IN MIND



America goes to college...under Barrett roofs



Some of America's most beautiful buildings are to be found on the campuses of her colleges and universities. Fittingly enough, many of these institutions elect to preserve the traditional beauty of their buildings with the long-lasting protection of Barrett Roofs, including the renowned Barrett Specification* Roof.

Leading architects and engineers have long specified Barrett in the knowledge that Barrett materials, specifications and application procedures result in the strongest, most durable built-up roof ever devised . . . a roof that regularly outlives its guaranty bond by many years and gives matchless service under all weather conditions. Specify Barrett — and be sure.

Barrett Specification Roofs*

*Reg. U. S. Pat. Off.

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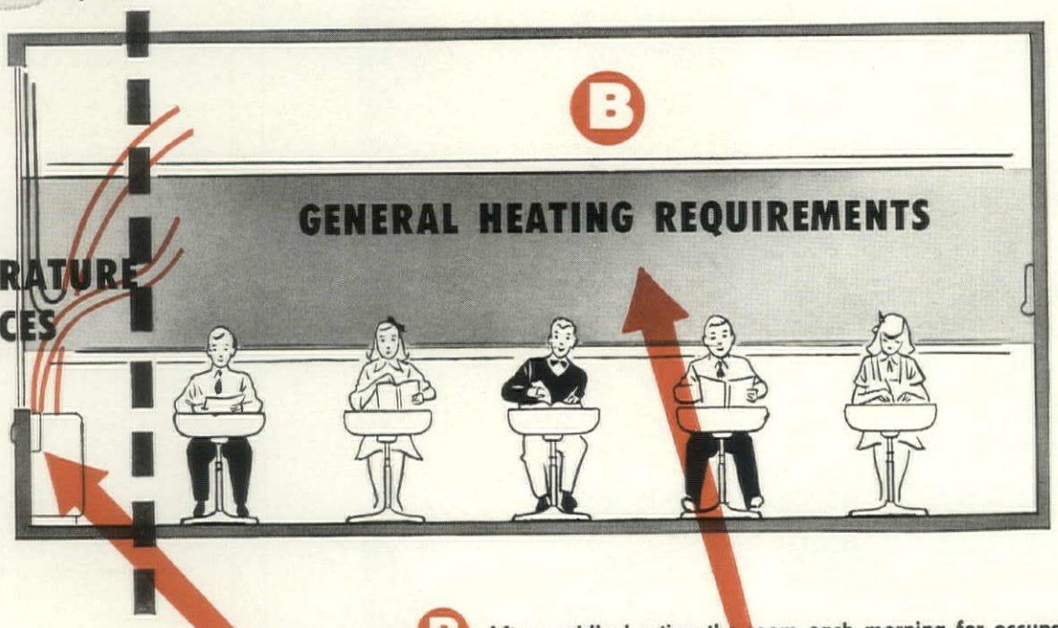
Cold surfaces rob body heat

Only NESBITT treats BOTH problems separately

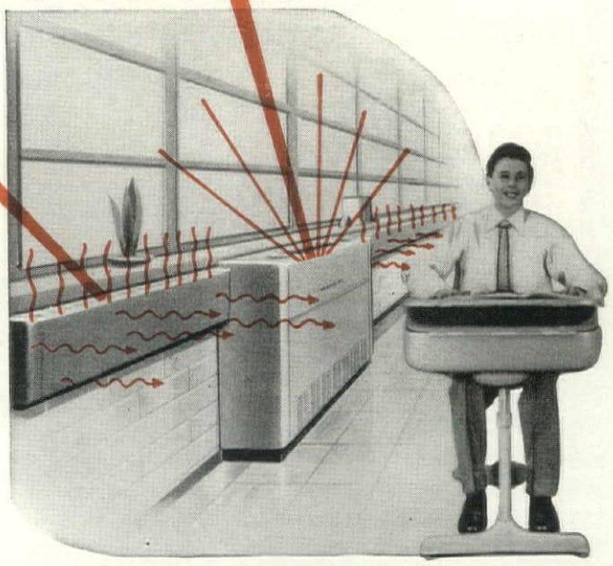
–setting a NEW STANDARD OF CLASSROOM COMFORT



B After rapidly heating the room each morning for occupancy, the Syncretizer *ventilates*—brings in at least the desired minimum quantity of outdoor air; mixes it with room air (adding heat only when more than Wind-o-line heat is needed); circulates the healthful stream continuously (without drafts or overheating); maintains the desired comfort all day long . . . for unmatched performance and economy.

A The Nesbitt Syncretizer and Wind-o-line System provides the desired thermal environment in schoolrooms by recognizing and dealing adequately with two separate and distinct thermal demands in modern classrooms. The problem of large "wall-of-ice" windows and their chilling downdraft is handled first—by the Wind-o-line Radiation that extends both ways from the ventilating unit for the full length of the sill. Heated convected air from the Wind-o-line grille (the positive answer to a heat loss) diverts the cold downdraft upward and above the room occupants. Radiation stops the loss of body heat to the cold surface. Wind-o-line comes on first; and stays on even after the ventilating unit has stopped heating and is supplying cooler air to maintain the classroom comfort. It goes off only when the unit needs more than the minimum quantity of outdoor air.

Send for Publications



NESBITT *Syncretizer* WITH WIND·O·LINE

MADE AND SOLD BY JOHN J. NESBITT, INC., PHILADELPHIA 36, PA., SOLD ALSO BY AMERICAN BLOWER CORPORATION

EVENTS

Pacific Coast Building Officials Conference's annual meeting, **Oct. 20-23,** Huntington Hotel, Pasadena.

State Dept. Architecture—exhibition of models and photographs of nine postwar buildings designed by leading American architects under US State Dept.'s Foreign Buildings Operations Program; on view **through Nov. 22,** Museum of Modern Art, New York.

Radiant Heating—series of six conferences on radiant heating, at Pratt Institute, **Oct. 13, 20, 27; Nov. 10, 17.** For information address Dept. of Architecture, Pratt Institute, 215 Ryerson St., Brooklyn 5, N.Y.

Texas Lecture Series—University of Houston Student Chapter, AIA, announces the following speakers: **Oct. 20,** Henry Hitchcock; **Nov. 17,** Philip Johnson; **Jan. 7,** Mies van der Rohe; **Feb. 11,** Buckminster Fuller; **Apr. 1,** Alfred Roth; **May 6,** Eero Saarinen.

Urban Planning and Redevelopment Middle Atlantic Regional Conference, **Oct. 21-23,** Hotel Statler, Washington, D.C.

Architectural League—series of five evening conferences on "The Impact of Science and Materialism on Art Today" to be held at monthly intervals on second Thursdays from **October through April.** For Program address Architectural League of New York, 115 E. 40 St., New York.

Public School Planning—short course for architects in "Programming and Planning the Public School Building," **Oct. 27-29,** University of Illinois. For information address R. K. Newton, Division of University Extension, 205 Arcade, Champaign-Urbana, Ill.

National Savings & Loan League's fall conference, **Nov. 8-11,** Casablanca Hotel, Miami Beach.

National Association of Real Estate Boards' annual convention, **Nov. 8-14,** Statler and Biltmore Hotels, Los Angeles.

Refrigeration and air conditioning's eighth all-industry exposition, Public Auditorium, Cleveland, **Nov. 9-12.** Hotel reservations may be made through Cleveland Convention Bureau.

Building Research Advisory Board's conference on uses of porcelain enamel as a large-scale structural materials, **Nov. 12-13,** National Academy of Sciences, Washington, D.C.

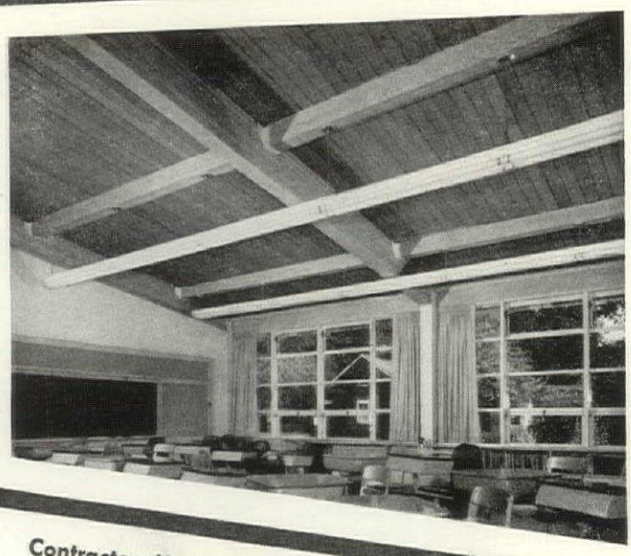
National Building Materials Distributors Association national meeting, **Nov. 12-13,** La Salle Hotel, Chicago.

Mortgage Bankers Association of America's annual convention, **Nov. 13-19,** Miami Beach.

The American Institute of Steel Construction's thirty-first annual convention, **Nov. 30—Dec. 4,** Boca Raton Hotel and Club, Boca Raton, Fla.

Competition to encourage design and manufacture of new kinds of children's playground equipment of a sculptural nature. Prizes total $2,000 plus royalties. Entries, consisting of models and drawings must be postmarked not later than **Jan. 15, '54.** For entry blanks and program address Miss Daniel, Museum of Modern Art, 11 W. 53 St., New York.

ARCHITECTS: SMITH & VOORHEES, DES MOINES, IOWA

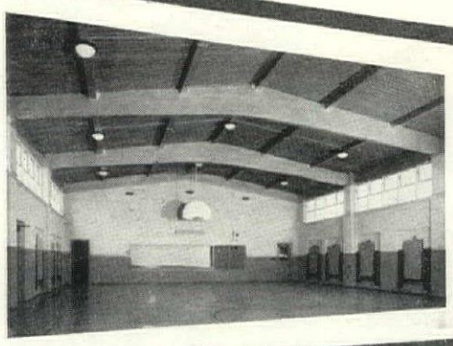


Contractor: Hurley Construction Co., St. Paul, Minn.

MODERN SCHOOL DESIGN SAVES $500 PER ROOM

Smith and Voorhees specified glued laminated wood structural members for the Webster Grade School at Pella, Iowa and the West Side Grade School at Eagle Grove, Iowa. Cost comparison showed a savings of $500 per schoolroom over other types of construction materials.

Contractors find they can give lower bids when Rilco glued laminated wood is specified. Gene Hurley, contractor of both jobs says, "Rilco really cut erection costs. The beams arrived on the job ready for erection. No specialized crews were necessary; the carpenters did all the erection easily with the connectors furnished by Rilco. There was no furring, we just nailed the Rilco decking to the top of the beams and purlins."



The natural beauty of Rilco glued laminated wood gives an attractive interior; the ease of erection and elimination of interior finishing cuts construction costs—yet Rilco structural members offer the architect freedom of design with simple yet effective construction in a fire-resistant material.

For the modern school design that calls for economical construction and beauty, the architect who specifies Rilco achieves an attractive and structurally sound building at lowest cost. Rilco's service engineers will be pleased to consult with you about your requirements. Write for information or see our catalog (2B/Ri) in Sweets.

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RILCO LAMINATED PRODUCTS, INC.

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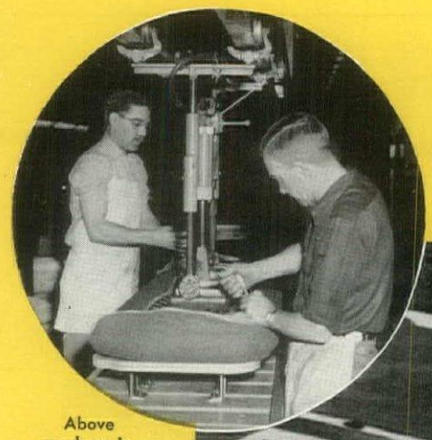
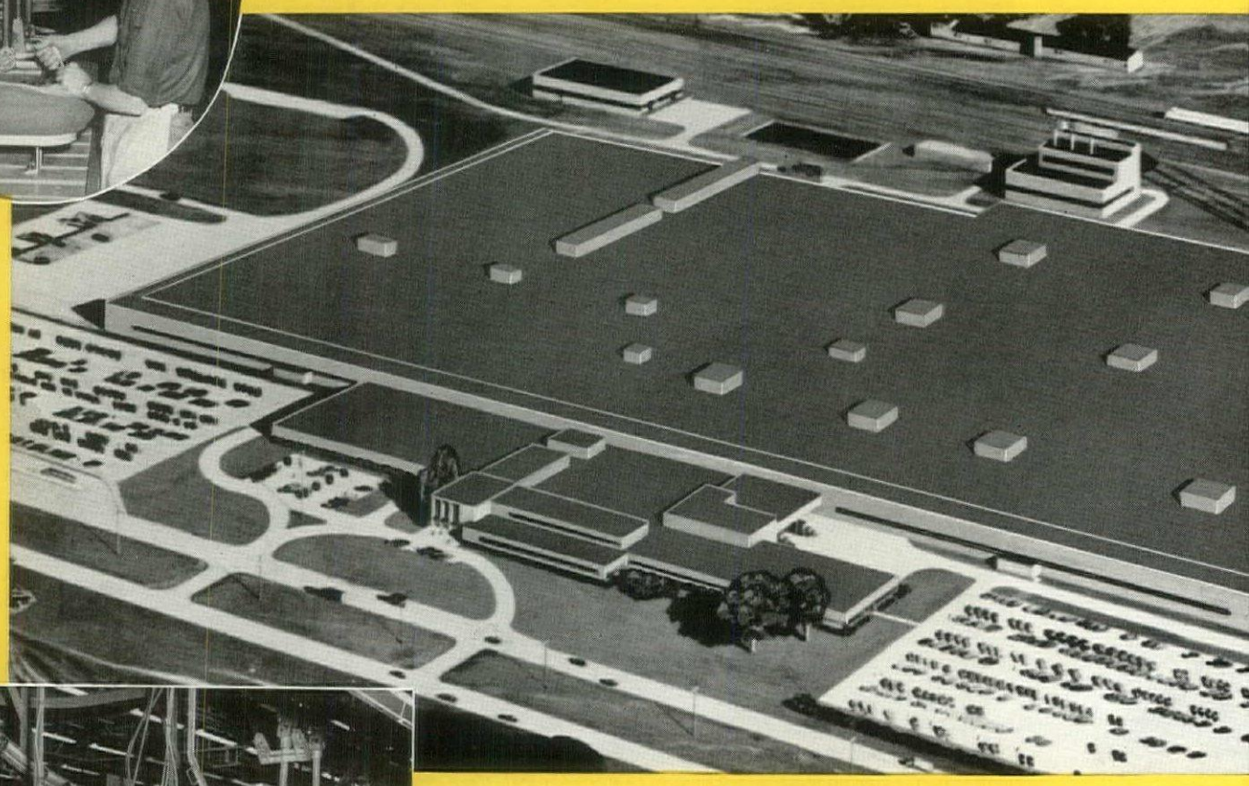
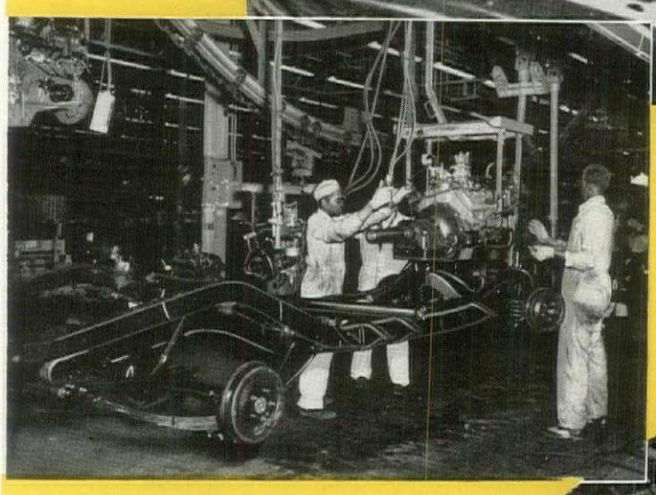
FORD'S *Most Modern*



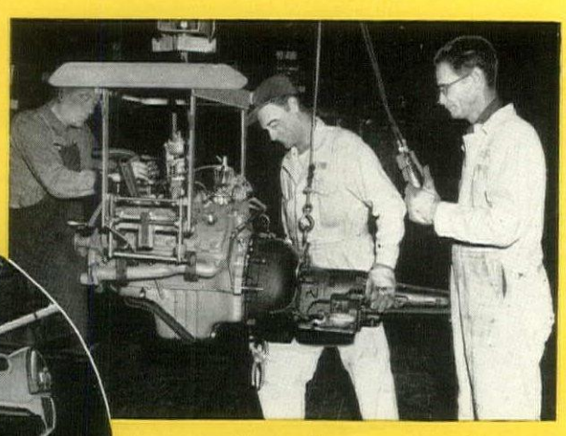
Above workers in **Cushion Department**



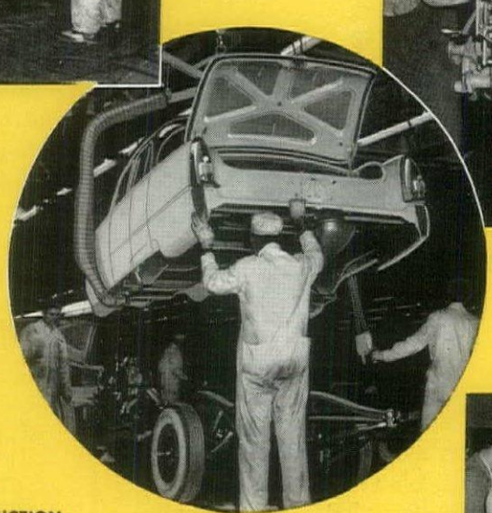
Length of Plant is 1500 feet. Width is 900 feet.



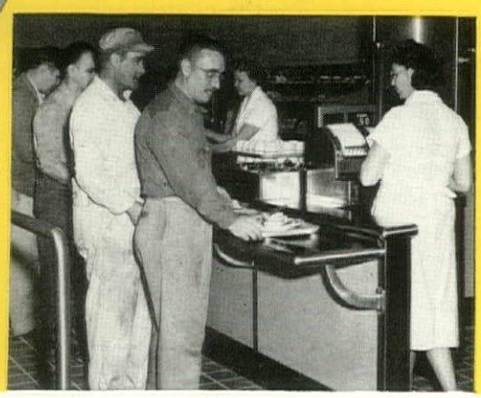
Chassis Line or sometimes called the "Build-up" is the portion of the Assembly Line where the completed engine, brakes, springs and many other items are assembled to the frame.



Motor Line is an example of team work in action. Shown above are three men working on the same engine. One is installing the wiring while the other two are attaching an automatic transmission.



Body Drop (right) is where two assembly lines meet. A trimmed body is lowered on a chassis and becomes the Final Line.



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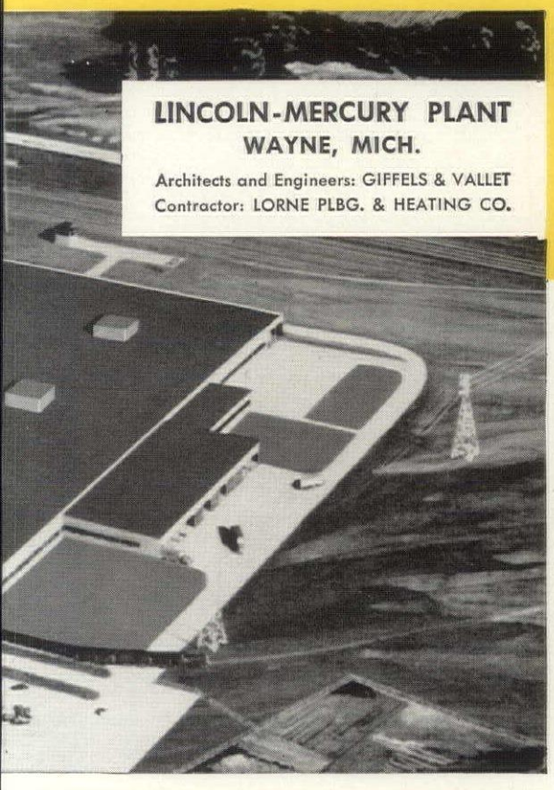

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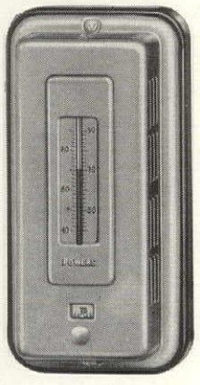

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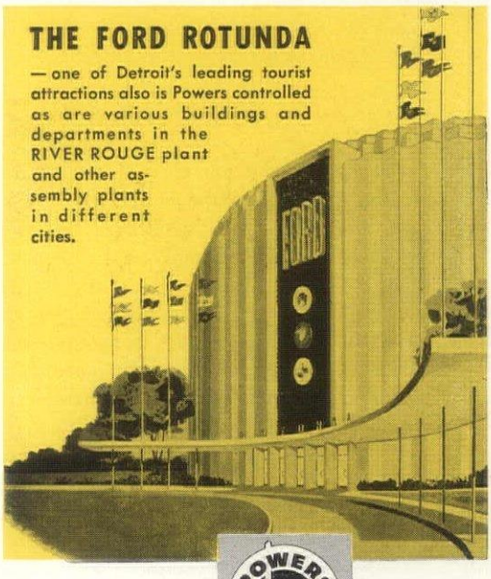

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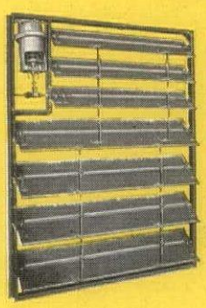

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LETTERS

MENDELSOHN'S EULOGY

Forum:

The last services were held for Eric Mendelsohn on Sept. 17. I was honored, and the School of Architecture was honored, that Mr. Mendelsohn in his will requested that I speak the *eulogy*.

It seems appropriate that I send you a copy of the eulogy as a memorial to his memory.

WILLIAM WILSON WURSTER, *dean*
School of Architecture
University of California
Berkeley, Calif.

"Eric Mendelsohn 1887-1953"

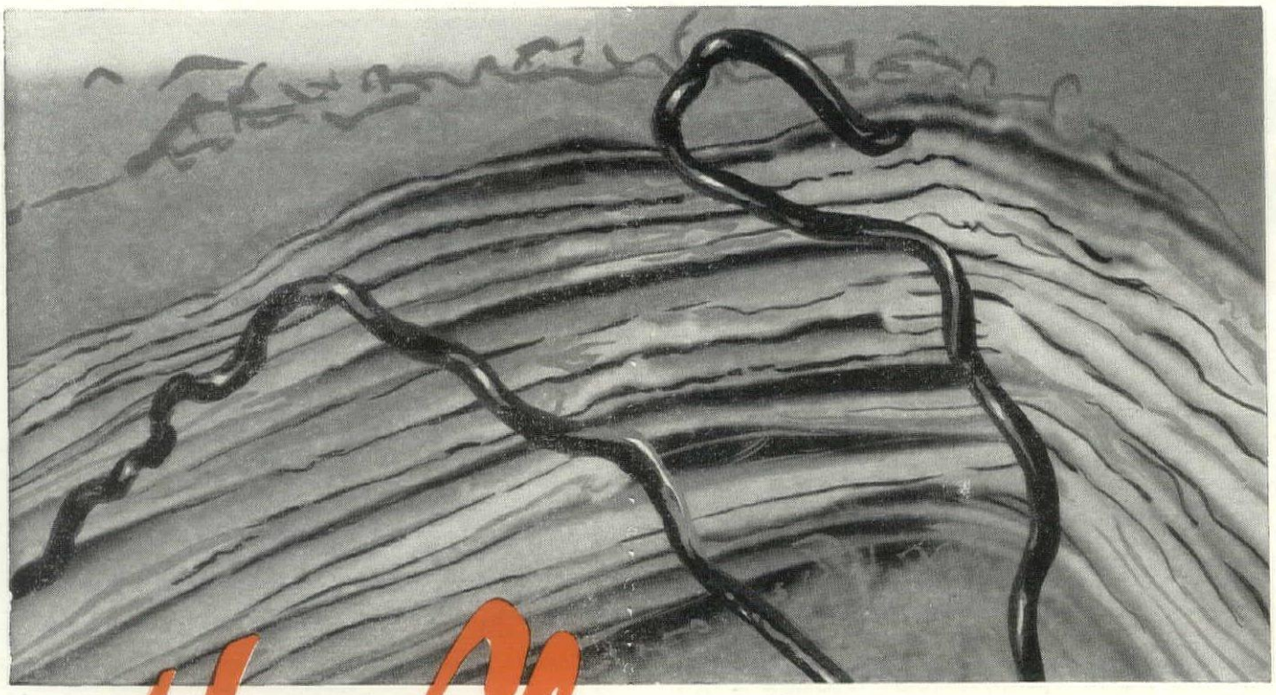
"We . . . honor a great spirit. This spirit ever turned to youth, and I speak for his students at the University of California, in fact, for all the students who have been inspired and freed by his genius.

"I think of his vitality, which swept aside all the usual material and psychological props, not with disdain for he knew and used their value, but he also knew the greater needs of the spirit of man. He was ever ready to rebuild his life and this has been necessary, for the framework of his existance has been constantly changing — the reasons for the move from Germany in 1933 would have embittered most of us. But Eric Mendelsohn has always had a deep faith in the dignity of man which could not be weakened or corroded by exterior forces.

"I think of a meeting in 1942 when a young group of Bay Area planners and architects asked him to speak to them. This was the Telesis group, who were busy seeking knowledge for the planning of our environment. I was amongst the guests. Many, many times when I've been discouraged this meeting comes to mind. There stood a man who had been surrounded by all the success possible in our professional world—but a man forced to make a new start in another continent—yet he never once mentioned times past; he only spoke of the wonderful future for him and for all those young people. Instead of impressing us with the authority and importance of his own world-wide experience and great contributions to architecture, as he well might have done, he opened up fresh horizons for all architecture. I believe this gives the clue to his character and nis buildings. He always tried for the creative thought which did not set limits. He would not accept the things we call practical facts if in his opinion the greater good was served by ignoring them. The so-called practical world sometimes chided him for this, but the young people were apt to see through to the hope and aspiration of all he stood for.

"In a day when narrow proprietary dogmas threaten to stifle and dehumanize the modern movement in architecture even before it has come to its maturity, Eric Mendelsohn stood for freedom, imagination and creative indi-

continued on p. 86



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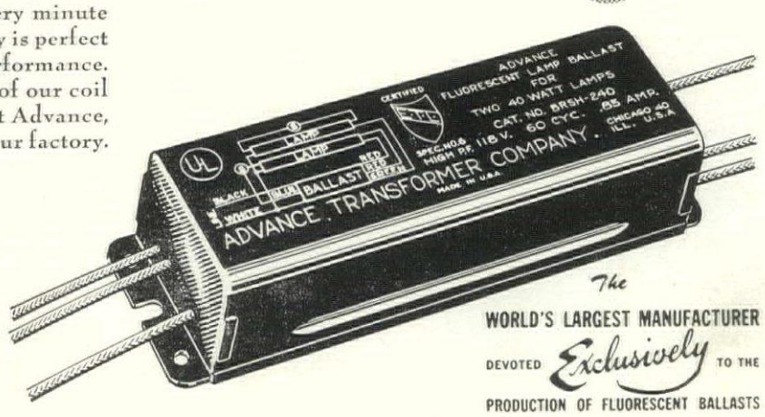

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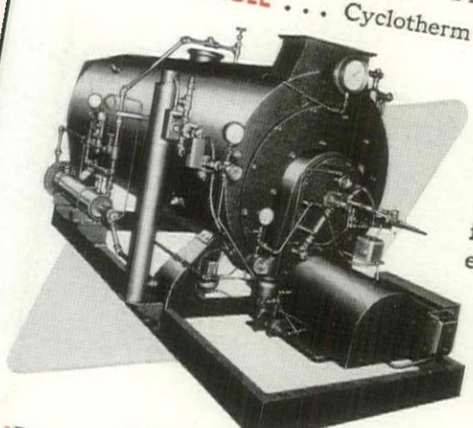

*Reg. trade name

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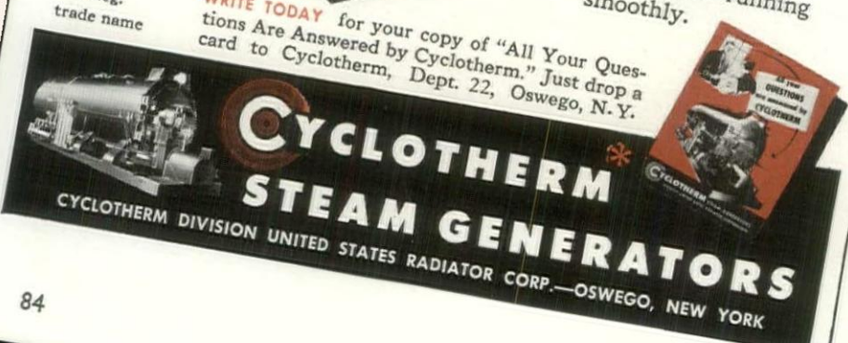

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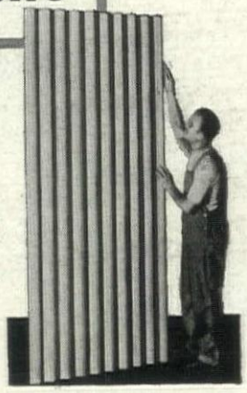

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LETTERS *continued*

vidual leadership. As an artist he always sought to make his life richer. He had a large-scale vitality and exuberant optimism which made him, perhaps more than any other architect, akin to the great personalities of the baroque cities.

"As a teacher he stretched the students' imaginations and ever conveyed the deep importance and excitement of being an architect. Students and staff are happy that he worked with us. We will miss him in the School of Architecture at the University of California."

WHAT CAUSES SLUMS?

Forum:

The News story, "Rat-Bite Decision," in the July FORUM shows how unfortunate it is that in so many cases a tragedy must occur before proper action is taken. That the Chicago *Daily News* has undertaken an investigation of the appalling conditions in slum areas is most encouraging. That the greed and selfishness of some property owners contribute in a great way to these conditions cannot be denied. That slums are actually caused by people and not buildings, however, is a most obvious point which apparently has been completely overlooked. . . .

While it is entirely probable that many property owners may not make necessary repairs to prevent their buildings from deteriorating; and while it is certain that many slum dwellers do not contribute to these conditions in any way, but are the innocent victims of their neighbors' way of life; it would appear, nevertheless, that the *Daily News* should report the whole story instead of just finding a few scapegoats, even though this phase of research may not "produce the flashy sensation of a crime exposé."

While this is not intended to mitigate the evils of the property owners who may be involved nor to lessen their responsibility, we have reason to believe that some people could make a slum out of the White House if they were permitted to live there. While substandard housing may contribute to slums, it does not effect this condition without a certain amount of help from the tenants. The Lincoln family was not wealthy to begin with, but no one could say of Abraham Lincoln's log cabin that it fell into the slum category, even though there was no 20th Century plumbing installed.

While the *Daily News* exposé may be very helpful in placing a large portion of the blame where it belongs, wouldn't it be in order if some newspaper reporter would advise the tenants just once that they have some responsibilities also?

JOSEPH WILLARD WELLS, *architect*
Norfolk, Va.

● The *Daily News* series did not focus on the contribution that slovenly tenants make to the deterioration of property, except for printing several interviews with slum landlords who gave that story. The fact that tenants help make slums is certainly

continued on p. 90

REMOTAIRE

ROOM CONDITIONER

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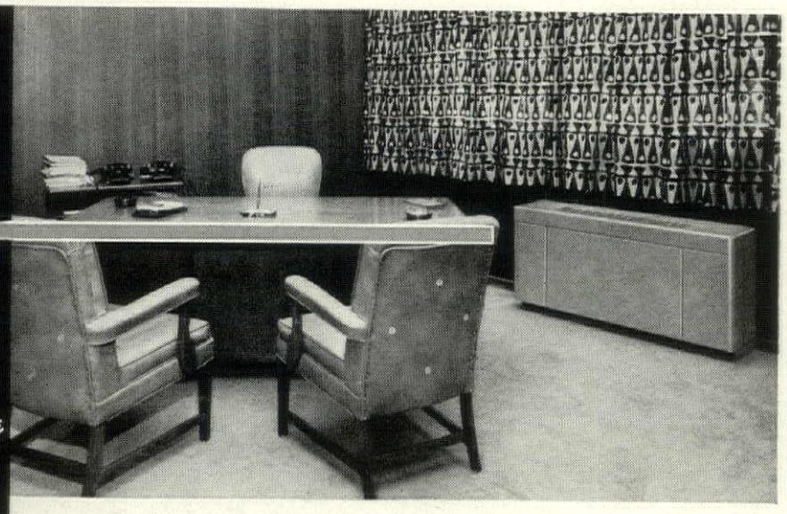

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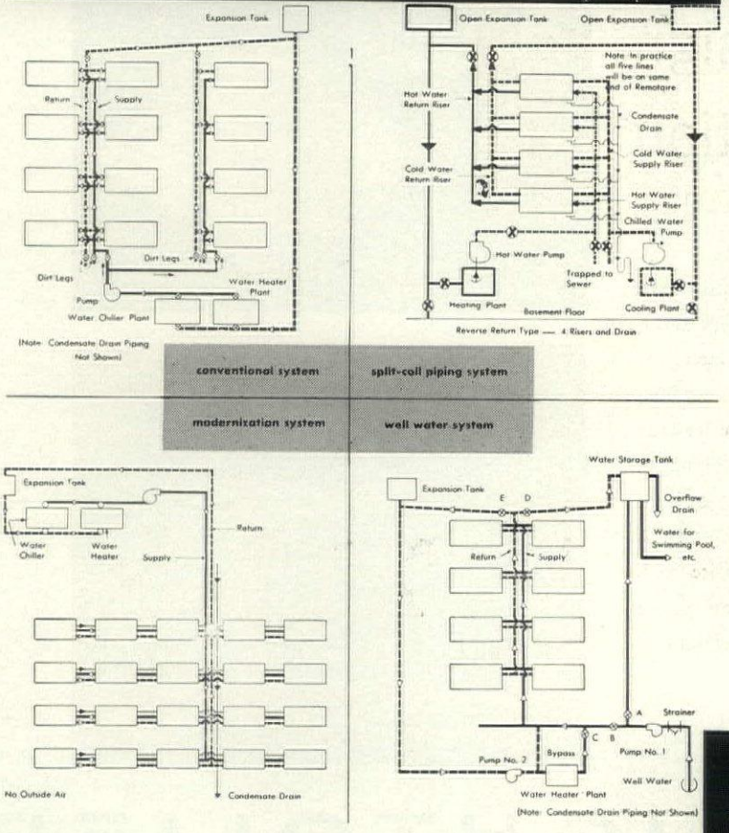

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For details on the various Remotaire systems, or for suggestions on which system to use in your building, contact your nearest American-Standard sales office or send for descriptive literature.

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For further information on the Remotaire see Sweet's Architectural File.

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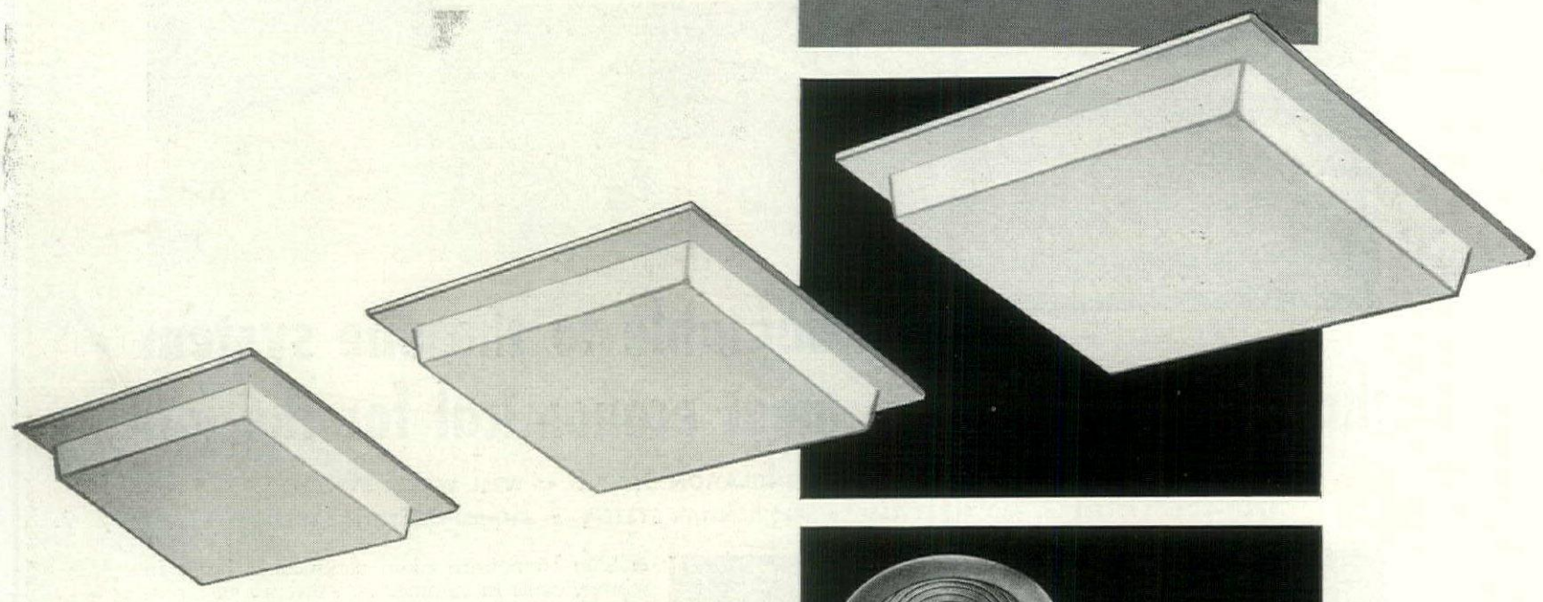
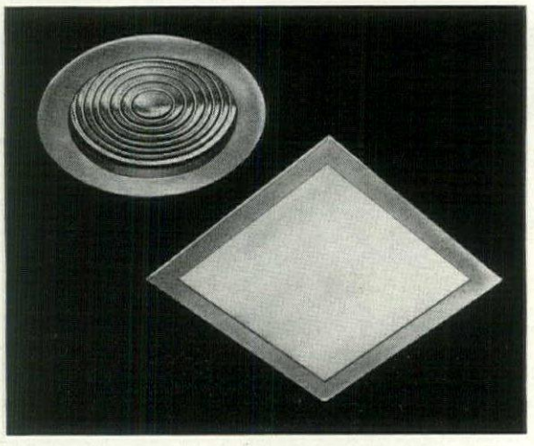


crisp design
engineered construction



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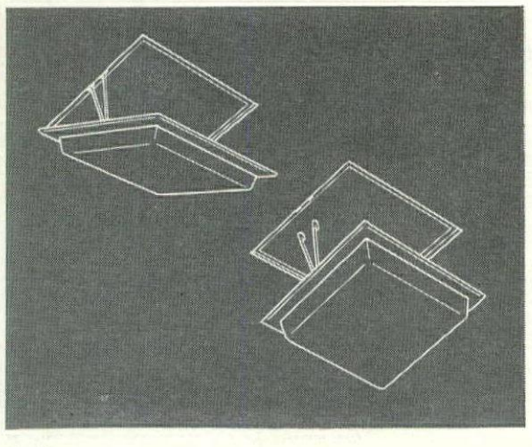

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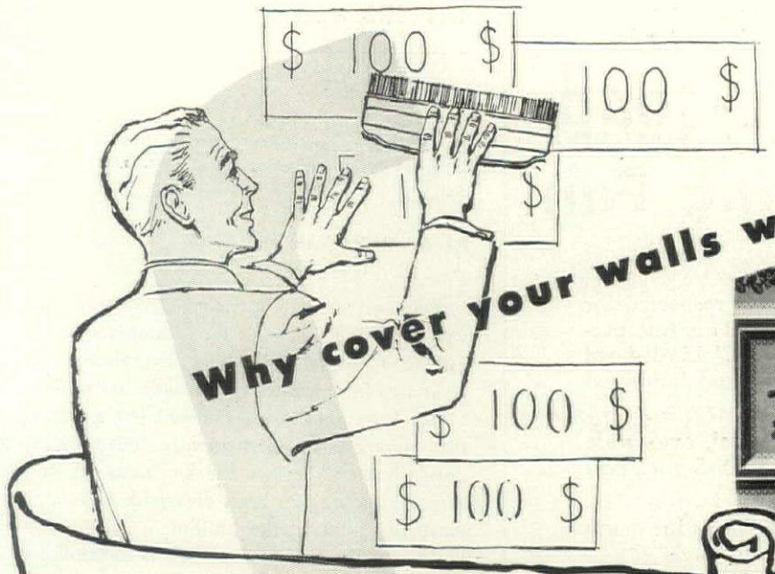

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LETTERS *continued*

not news. But it *is* news when a newspaper catches the building department of the nation's second biggest city in neglect of one of its primary duties. —Ed.

HARA-KIRI BY VAN DER ROHE

Forum:

Your pictures and commentary on "Mies van der Rohe's Theater for Mannheim" (AF, July '53) desolate me. I feel as naked as an Arkansas farmer after the tornado has passed.

But I am glad to see someone has achieved the nirvana—has permanently locked Pandora's box and thrown the key away. A universal building has been designed, and since "instead of fitting the building's skin to the building function as a glove fits a hand, he would create a vast and simple space—something like a big airplane hangar—and then place all his functional elements into that protected space," it would surely follow that size shall be the only variable.

The container Mies has designed is not influenced by function (even as airplane hangars are); consequently, the services of any other architect, and for that matter, Mies himself, are no longer necessary. Mies has committed hara-kiri and carried the rest of us with him. All a would-be client needs to do is decide how much money he has available and how much space he needs, and then the various engineers will inherit all the headaches.

W. Jeter Eason
Eason, Anthony, McKinnie & Cox, architects
Memphis, Tenn.

Forum:

Several parts of Mies van der Rohe's Mannheim Theater (AF, July '53) leave me in doubt about it:

Functional. The public rooms do not appear to be in proportion to the auditorium; the paint shop is somewhat small to be used for making scenery as big as the large stage would require.

Financial. The capacity of the auditoriums is small for a covered space of 266′ x 533′. The expense of enclosing it would be great.

Esthetics. There is no doubt concerning the form, for it is simple and unified—good characteristics of all the works of this great master.

Is there not a precedent in the traditional theater for surrounding the fan-shaped form by a different form of enclosure?

Rubens Meister
Curitiba, Brazil

CHURCHILL ON PUBLIC HOUSING

Forum:

I respect Henry S. Churchill and his views on "What Changes Must Be Made in Public Housing" (AF, July '53). I believe, however, that he has not yet related cause and effect. In this regard he has plenty of company.

He says that the core of the trouble is that "there has been no new thinking, no accept-

continued on p. 94

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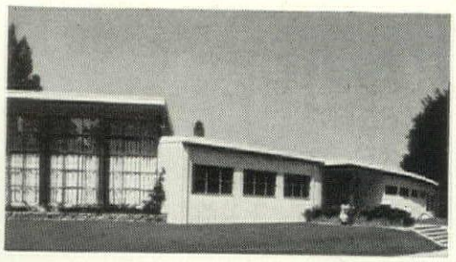
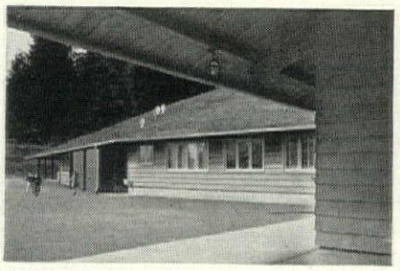
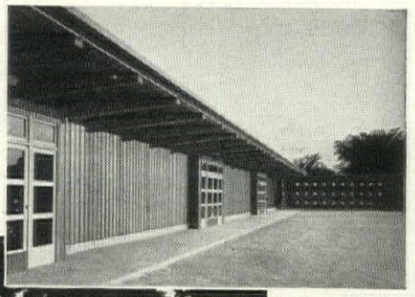


John T. Jacobsen, Victor N. Jones & Associates, *Architects*



Pietro Belluschi, *Architect*



Saarine & Perkins, Wheeler & Will, *Architects*

Donald W. Edmundson, *Architect*, and Daniel Riggs Huntington, *Associate*

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A few years ago, engineers in the heating and ventilating industry were faced with the problem of engineering, designing and then building a system of unit ventilation capable of trapping and controlling the downdrafts of cold air pouring off the much larger window areas used in modern classroom designs.

THE INVESTIGATION

Backed by many years successful experience building unit ventilators—Herman Nelson engineers tackled the task presented by the new, and still "modern" classroom designs.

During the period of investigation—many ideas were discussed and discarded. A few reached the planning stage. Still fewer were tried out. The search narrowed to three major ideas. From these three, one system, DRAFT|STOP, was selected.

The engineering department made its report in March, 1950. *This was before* any of today's systems for controlling downdrafts were on the market!

IDEA "A"—THE CONVECTION SYSTEM. This idea proposed the use of strip convectors, of limited capacity, placed in back of the cabinet, releasing heated air along the window at the sill.

The system worked, to the extent that it worked at all, only when the classroom as a whole needed heating. It failed to maintain control of the window draft—when *cooling* was required! This idea also increased installation costs without providing justifiable improvements in performance.

It was discarded by Herman Nelson engineers.

IDEA "B"—AIR DISCHARGED INTO PLENUM CONDUIT. This idea was a unit ventilation system that relied on the unit ventilator to discharge air into a plenum duct. Again *heating* was its prime function and it had the same weaknesses as the Convection System plus an increase in power requirements and in costs.

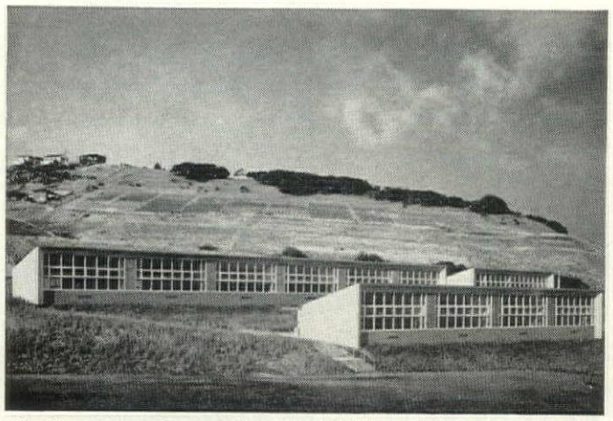
This idea was also discarded by Herman Nelson engineers.

THE SOLUTION

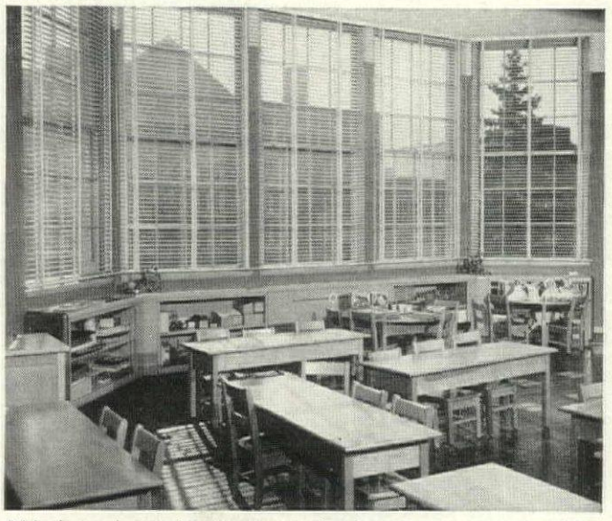
IDEA "C"—THE DRAFT|STOP SYSTEM. Here the fundamental weaknesses of the first two systems, were overcome. This system differs from all other types of schoolroom ventilation by intercepting the air cooled by the window *before* it has a chance to spill out into the classroom and cause drafts! Once captured, the cold air stream is never permitted to flow back into the room. And since the DRAFT|STOP system does not attempt to fight the cold downdraft problem by adding heat, *except when such heat is actually needed*—it works equally well under all conditions and at all times: permanently blanking out the downdraft from the window as a source of classroom discomfort.

DRAFT|STOP is the one system that offers a "perfect classroom climate" without drafts in any season—or in any part of the country. This system was introduced to the American market in September, 1950. Architects and engineers, the country over, have since put the "Mark of Leadership" on DRAFT|STOP by specifying and installing it in thousands of classrooms.

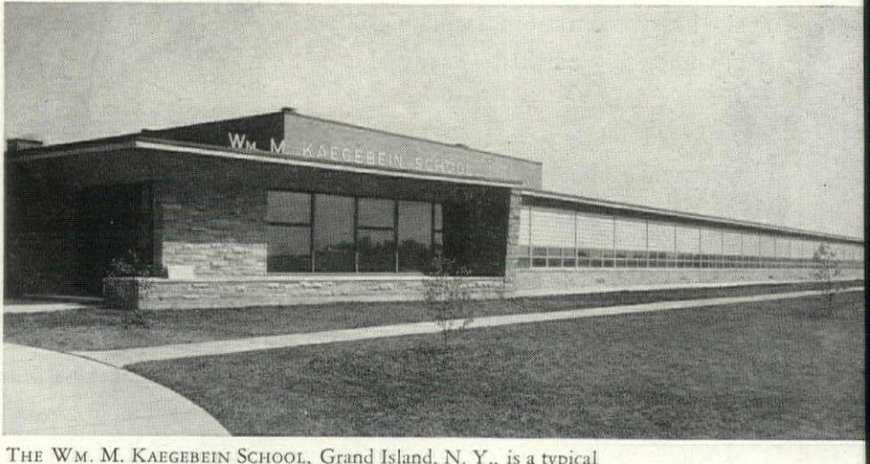
Write for complete information and Experience Reports to: Dept. AF10, Heating and Ventilating Products, AMERICAN AIR FILTER CO., INC., Louisville 8, Ky.



The SAN MATEO KNOLLS SCHOOL, San Mateo, California, sits snugly against the rolling California hillside which seems to emphasize the smooth modern lines of this new school. Architectural features include fixed vision-strip windows with a middle opening sash providing an open, picture window effect. All classrooms are North lighted. The DRAFT|STOP installation is in the popular Sahara-tan finish, *Architects,* FALK AND BOOTH, *Consulting Engineers,* DEANE AND HILL.



This is an interesting treatment of a bay-window utilizing filler sections and DRAFT|STOP end panels in the HENRY WADSWORTH LONGFELLOW SCHOOL, in Portland, Maine. *Superintendent of Schools,* HARRISON LYSETH; *Architects,* MILLER AND BEAL, INC.; *Consulting Engineer,* FELS COMPANY, INC.



THE WM. M. KAEGEBEIN SCHOOL, Grand Island, N. Y., is a typical example of good modern one-story school architecture featuring glass block with vision strip windows and an interesting use of native stone which adds warmth and beauty to the building. *School Principal,* MISS VERONICA CONNOR; *Architects,* ROSWELL E. PFOHL; *Consulting Engineers,* BEMAN AND CANDEE; *Mechanical Contractors,* JOHN W. DANFORTH COMPANY.

DRAFT STOP TRADE MARK

HERMAN NELSON

SYSTEM OF CLASSROOM HEATING AND VENTILATING

LETTERS *continued*

ance of new ideas. . . ." There is no point in my arguing about whether or not new thinking will help. To argue that point would be to agree to the possibility that public housing, as a policy, is correct. I have no doubts on that issue.

Mr. Churchill referred only indirectly to charges of socialism in housing by saying ". . . and you never hear any kicks about FHA subsidies or complaints that FHA is socialistic or subversive to private enterprise. . . ." I will make such a complaint a matter of record, herewith.

My chief complaint, however, is the failure of architects generally to note their inconsistency in supporting public housing while declaiming government plan bureaus. They are remarkably astute in their assaying of the faults and shortcomings of government architectural service. At the same time many architects take the view that it is perfectly agreeable for government to own and operate houses and hospitals *provided* that private enterprise architects plan them. There is no difference in private home owners and hospital administrators saying it would be entirely satisfactory for government architects and construction bureaus to plan and build their buildings provided they (private enterprise) can own and operate them in the end.

What we have to face up to is the fact that a thing which is wrong in principle is wrong however it may be applied. And it will fail when so based no matter how nice people we are, no matter how good are our intentions and regardless of the excuses we make for it when it fails.

Public housing, it is rumored, has been dealt its death blow. I doubt it. However, if by some miracle it should die, it still will be some 20 years late.

E. W. DYKES
Lawrence and Dykes, architects
Canton, Ohio

• For Author Churchill's reply, see below.—Ed.

Forum:

Public housing is a necessity in our economy because:

1. Private enterprise historically has never been able to supply sufficient housing for all needs, and consequently some public agency had to step in, just as public subsidies had to help schools, railroads, highways, shipping, religious institutions, farmers, exporters, veterans and so on. What you say is true, of course: one thing leads to another and it's a shame Horace Mann ever got away with starting public schools in the early 19th Century. However, housing subsidies are essential, both PHA and FHA varieties, because a high level of construction activity is vital to our economy.

2. Housing of any kind is not a matter of "supply and demand" in the old Smithian sense any more, but a matter of supply and

continued on p. 98

Would you spend $50 to protect this home against *moisture menace?*

That amount or less makes the masonry in this home Watertight when you use MEDUSA WATERPROOFINGS!

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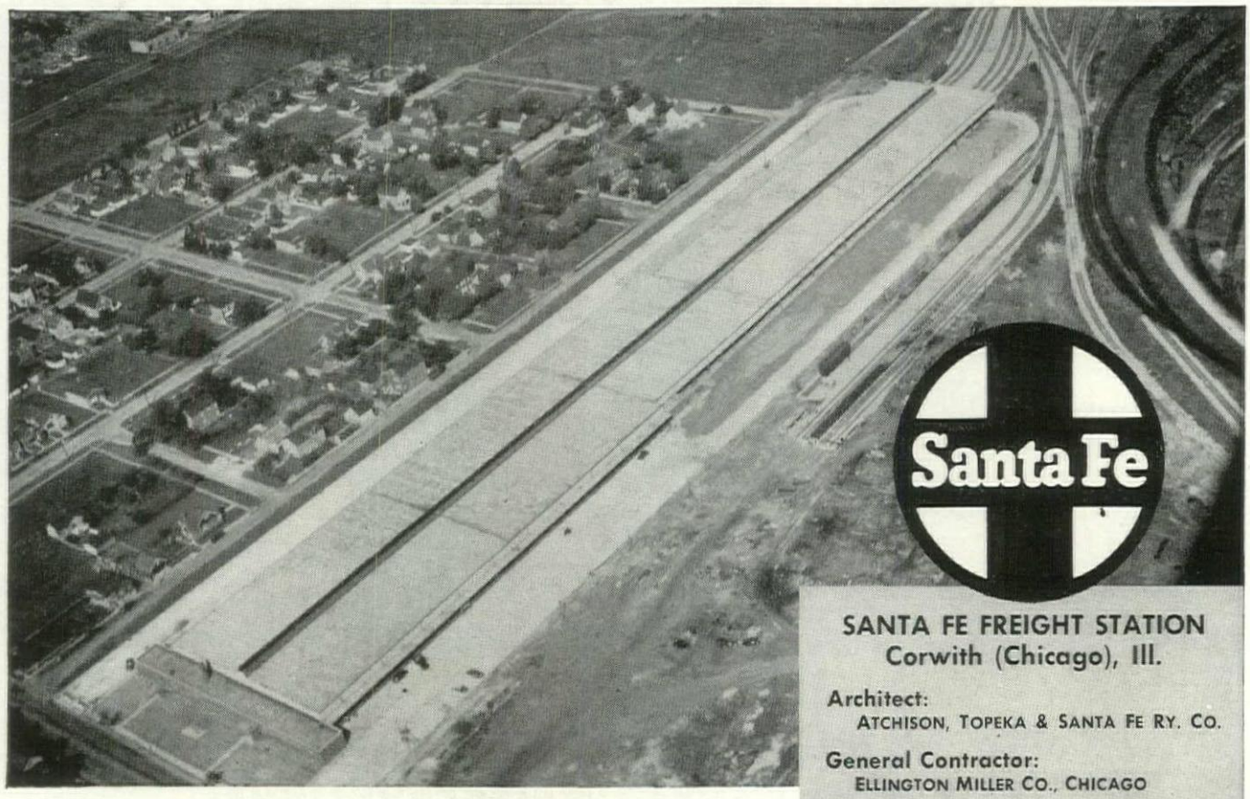

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Six football fields could be tucked under the broad expanse of Ruberoid roofing at the Santa Fe Railroad's new Chicago freight station. That's a lot of roofing but that's what it takes to protect the heavy traffic at the eastern terminus of the Santa Fe system. From six tracks, 156 freight cars can unload their goods simultaneously at this modern depot.

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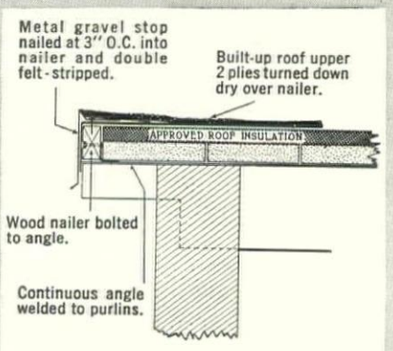

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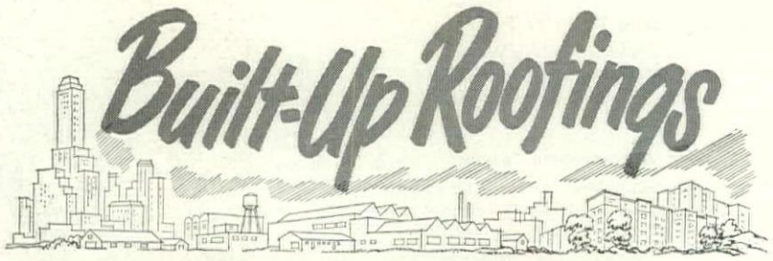

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SPECIAL SCHOOL WINDOWS

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only give performance like this!

And what performance! Ludman Auto-Lok windows give you complete all-weather window ventilation control! They open widest . . . close tightest. They seal shut ten times tighter than generally accepted standards. Each vent *locks* automatically at *all four* corners when closed. They help air-conditioning and heating equipment to operate more efficiently. And equipped with the exclusive Ludman Control-Bar, Ludman windows are the simplest, safest, easiest of all school windows to operate! They are made to withstand the severest kind of classroom abuse and give a life-time of trouble-free performance!

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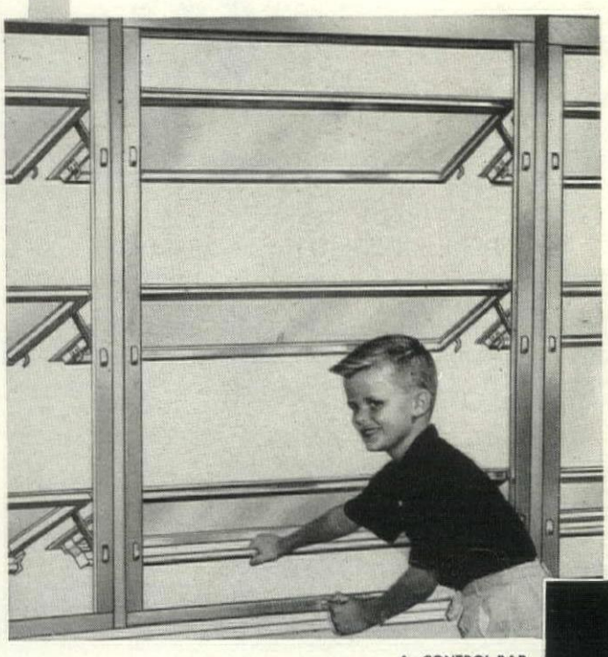
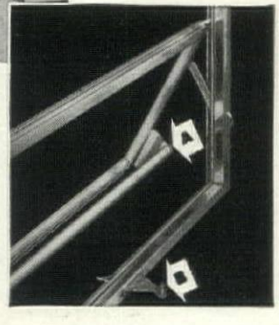
High Point, N. C.
Yonkers Junior-Senior High
Yonkers, N. Y.
University of California (Physical Education Bldg.)
Riverside, Calif.
Evansdale Elementary
Evansdale, Iowa
Wilson & Enslen Schools
Modesto, Calif.
Morrisonville School Addition
Morrisonville, Ill.
Ojus Elementary School Addition
Dade County, Fla.
Forsyth Grade School
Forsyth, Ill.
Consolidated High, District 4
Knappa, Ore.
Nashua School Addition
Nashua, Iowa
St. Mary's School & Convent
Rhinelander, Wisc.
Pleasant Valley Township
Bettendorf, Iowa
Herbert Hoover School
Mason City, Iowa
Glenwood Elementary
Ada, Okla.
Franklin Sherman School
McLean, Iowa
Dorsey Junior High
Miami, Fla.



Over the years it's the least expensive window to use. No maintenance required. Reduces heating costs Write for descriptive catalog.



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LUDMAN LEADS THE WORLD IN WINDOW ENGINEERING

LETTERS *continued*

demand of the mortgage money market, a very different thing.

3. The money market is government-controlled (which is also "socialism," but a fact nevertheless) and therefore every activity which depends either actually or psychologically on that market must, sooner or later, in some measure come under government auspices.

You and I may not like this, but the forces of the last 40 years (World War I) cannot be turned back. My point therefore is to make every effort to make things work within the framework that we have, and not to let the winter of our discontent fail in germination of new thought.

HENRY S. CHURCHILL, *architect*
New York, N. Y.

Forum:

Henry Churchill's timely "shot" at public housing in your July issue has the ring of hope of its survival, subject to certain reapproaches. That public housing needs such is not questioned, but his one-track architectural approach avoids the main point, e.g., that public housing is a social (welfare) medium with a live social purpose. It is the recognition of that fact that will revive it. That issue has been straddled too long.

The whole trouble with the program has been that it became a project-building operation and its architectural opportunities crowded out the original reason for its being. That many of the architects "missed the boat" cannot be charged entirely to the bureaucrats but to the fact that some of them, at least didn't have either sufficient courage or vision to stand up for their ideas—possibly risking canceled commissions.

Since some, including Henry Churchill, feel that public housing done as it should be is good business (AF probably won't agree), then let's begin over by recognizing its primary purpose. Public housing as a social factor should help to meet the challenge of bad environments in cities and towns, admittedly one of the causes of the problems with which the social agencies have to contend and for which we generously (?) provide Community Chest funds—without recognizing that the slum areas get most of them.

Public housing didn't begin as Henry Churchill suggests from "the smell of rich and redolent pork" but as a means of helping relieve the then serious unemployment situation. Fortunately, there was currently the dream on the part of certain of the early housers, at least, that getting rid of some of the bad slum housing (with which all were familiar and had decried but had done nothing about) was possible to be realized.

The need now is to get back to first principles, namely, that since bad home and neighborhood environments are contributing factors (not sole causes) of many acute social

continued on p. 102

We Built A Dallas Skyscraper in 188 Days

says Contractor J. W. Bateson of Dallas

It happened recently in Dallas, Texas. J. W. Bateson Company, Inc. began erection of the sleek, new Corrigan Tower Building (right) on July 1, 1951, and completed the job exactly 10 months later, on May 1, 1952.

How did they do it? By using Cofar corrugated steel forms, which also serve as reinforcement, J. W. Bateson Company completely eliminated the costliest, most time-consuming element of concrete floor and roof construction—wood forms. Cofar sheets arrived at the site cut to fit the building frame. In one quick easy operation, 30 square feet of form and reinforcing steel was placed and immediately *provided the required reinforcement per square foot and a working platform for plumbing, electrical, and other trades.* Concrete was then placed. Result: A safe high-strength floor.

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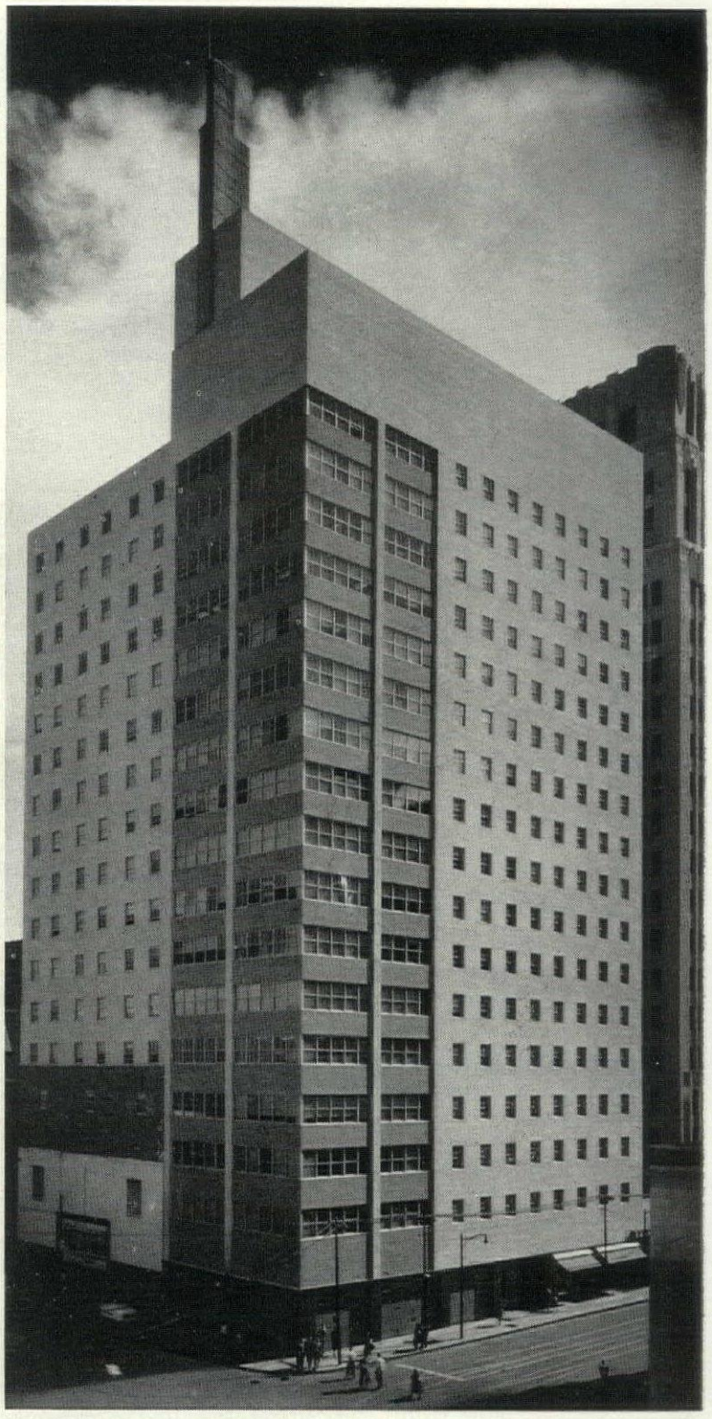

Corrigan Tower
Owner: *Corrigan Properties, Inc.*
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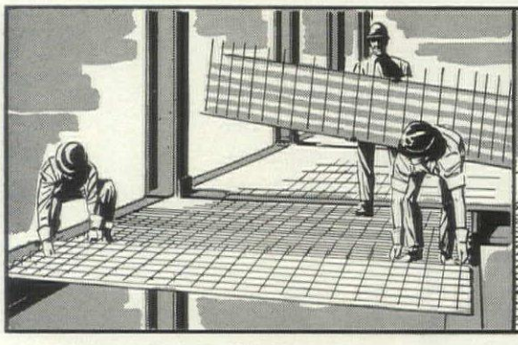
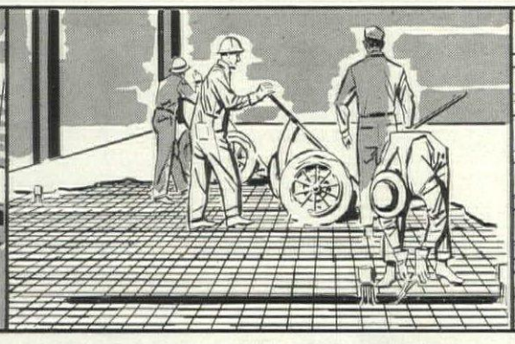


Workmen placing steel and form in one fast operation.



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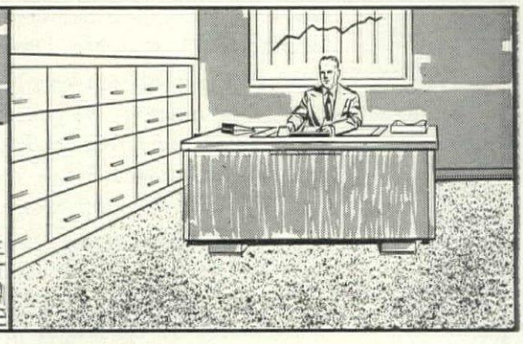

A safe high-strength concrete floor.

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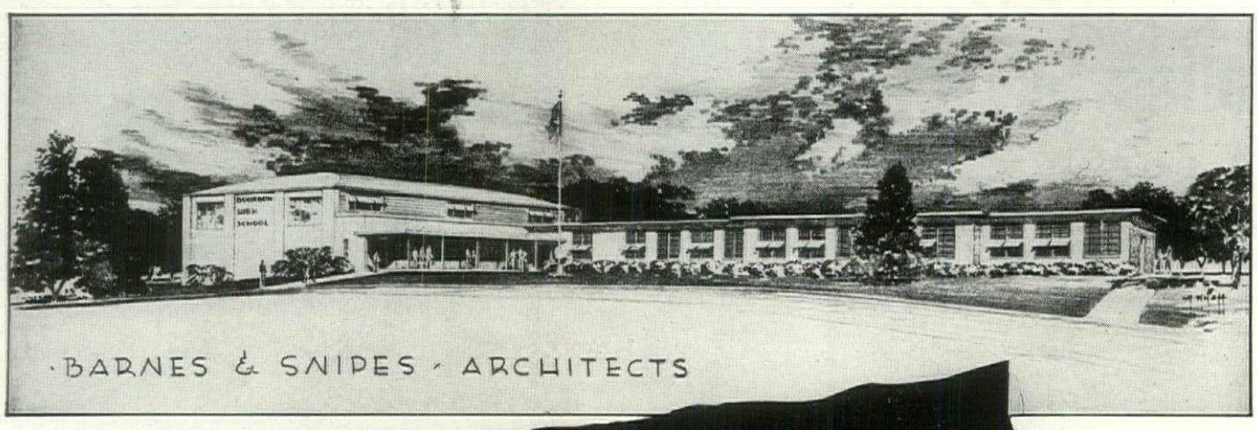
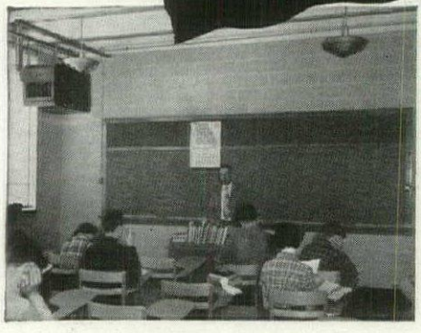
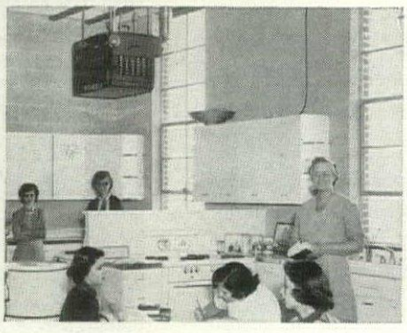


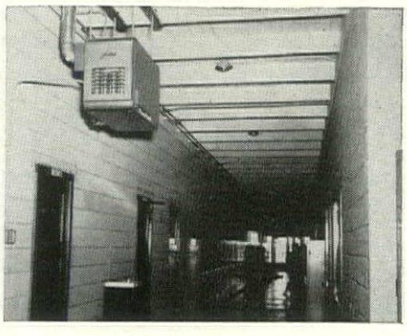
"Janitrol gas unit heaters helped us build within our budget"

Heating Installation by Hausgas, Inc. Washington, Mo.

. . . Statement by Mr. James Dawson, Supt. of Schools, Crawford County, Bourbon, Missouri.







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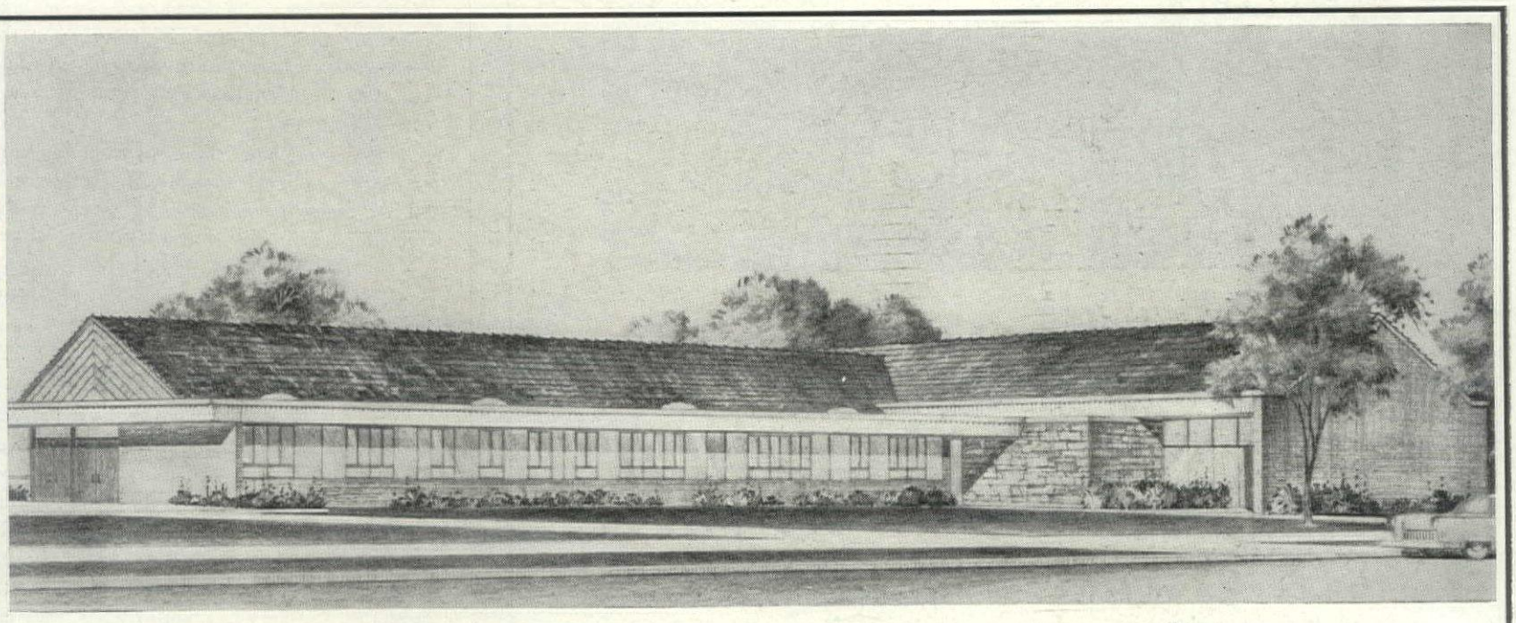
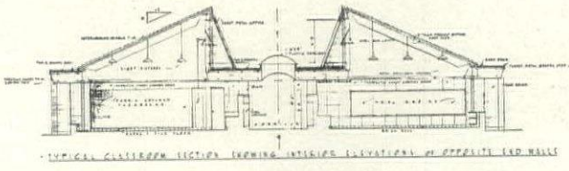


a case in point

Washington School Addition
Evanston, Illinois
Perkins & Will, Architects-Engineers
Chicago, Illinois



For only 1½% more

than the total cost of the building, this new school will receive absolute roof fire protection and a permanence for the life of the structure which indicates the very minimum of maintenance cost. These architects are particularly adept in solving the numerous problems of modern school architecture and realize the economy of tile on their cleverly designed roof construction.

Obviously, for schools there should be no compromise with quality and quality is the very essence of economy. Ludowici Tile Roofs cannot be equaled for economy first and *last.* We invite architects to consider tile roofs as the immediate solution in modern school architecture for protection and permanence. Samples and estimates will be gladly furnished on request.

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LETTERS *continued*

problems—the replacement of the bad with good (or better) is worth doing, human-wise and tax-wise. If private capital will do it, fine; if not, government (local, state, federal) should. Delay is costly.

This civic and social need should be the architect's inspiration, guided by the leadership of the social agencies and the enthusiasm of the housers, who incidentally should be following the lead of social forces—not the reverse. It is from the resulting understanding of the problem that a worthy architecture can be expressed.

There is one more thing, strangely and unexpectedly touched upon by Alan Brockbank in his report on the nation's slums in the September issue of HOUSE & HOME. He wrote:

"You can't eliminate slums just by tearing down old buildings and replacing them with new ones. It [the problem of slums] is basically a problem of people."

That is management's part in this drama—the one too soon forgotten—in the mad rush for structures. Housing projects are living, dynamic, hence beautiful things designed by raising the standards in particular localities to contribute to the level of living in the whole community—not just shelter. As architects keep that in mind their designs will cease to be sterile, as Henry Churchill regrets, whether they are projects, integrated units, multiple-story buildings, single-family houses on vacant land or slum clearance.

It's the purpose, not the product, that needs reapproaching.

B. M. PETTIT, *chairman*
Committee on housing
San Diego Community Welfare Council
San Diego, Calif.

P. S. It can be, for it has been done.

• Reader Pettit was the former director of the Housing Authority in New Haven, Conn.—Ed.

FORGOTTEN MAN

Forum:

In your article, "The Need for Better Planning" (AF, June '53), I was impressed by the first sentence: "Good planning before construction starts is more important today than ever before." However, I was very surprised when looking over the names of these outstanding men of the panel that not a single landscape architect was present.

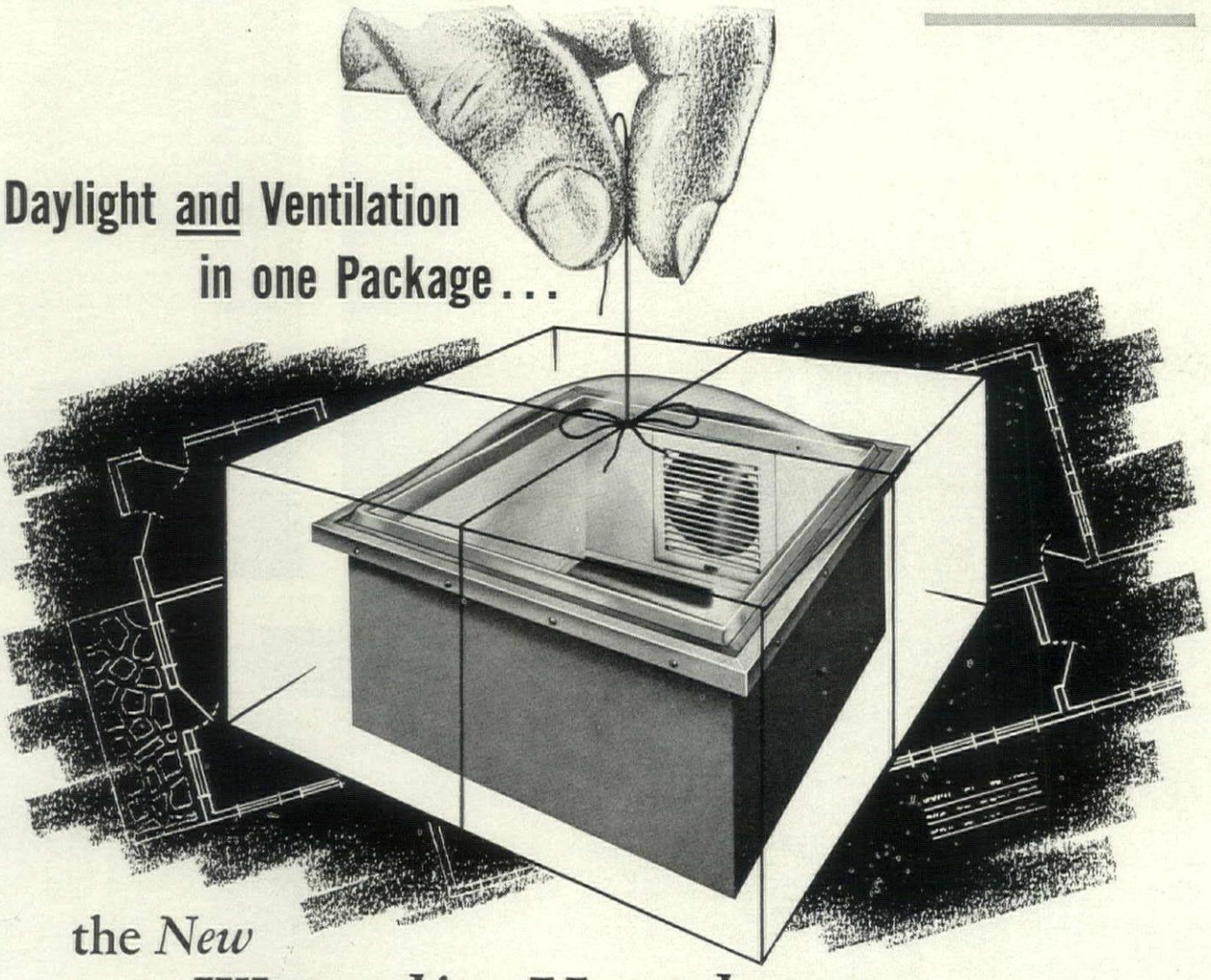
The landscape architect plays a very important part in planning today's living. I have found that if the architect consults with me, then the client is more aware of the cost of landscape development and is prepared to set aside a fund for outdoor living areas as well as further developments later.

H. DURWARD THOMPSON, *president*
Texas Landscape Assn.
Athens, Tex.

continued on p. 106

ANOTHER WASCO FIRST

Daylight and Ventilation in one Package...



the *New*

*Wascolite Ventdome**

put it anywhere in the plan—

Now, for the first time, the superior daylighting of Wascolite Skydomes — with ventilation added! You can revolutionize home, school and plant layouts — yet allow adequate daylighting and air circulation for all interior areas. And all of these radical changes can be planned without designing special roof, curb or flashing construction!

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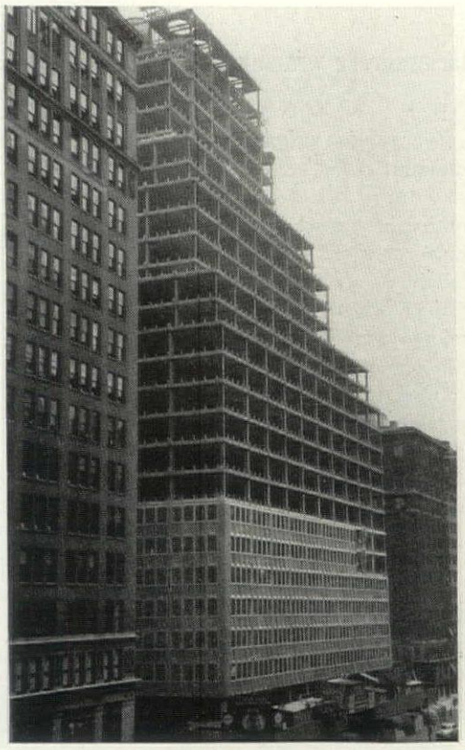
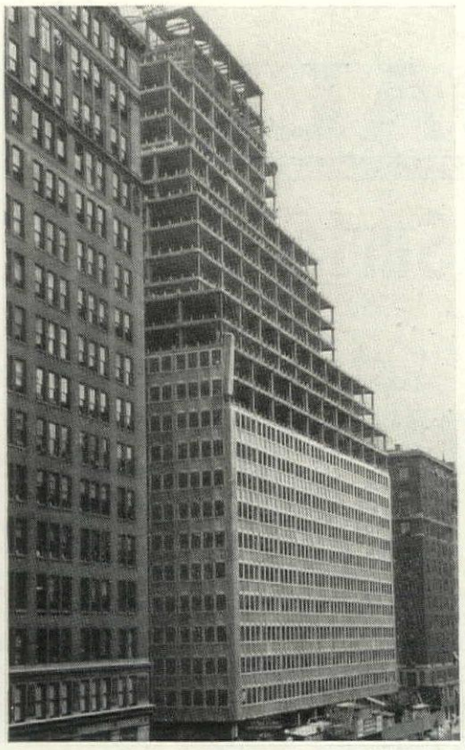
89 Fawcett St., Cambridge 38, Mass.

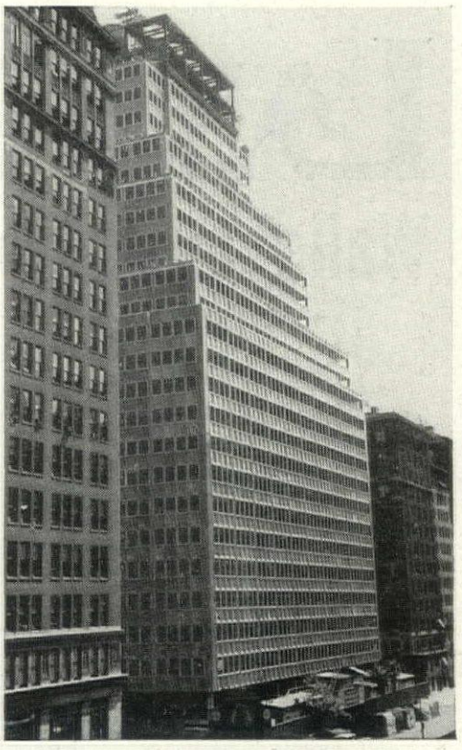
TUESDAY



WEDNESDAY



THURSDAY



MONDAY

26-story Skyscraper clad in Alcoa Aluminum in 6½ days!

Building—Tishman Building, 99 Park Avenue, N. Y., N. Y.

Owner—Tishman Realty & Construction Company, Inc.

Architect—Emery Roth & Sons

General Contractor—Tishman Realty Corporation

Subcontractor on Aluminum—General Bronze Corporation

The entire job of erecting the outside walls of this 26-story office building was done in 6½ working days. The conventional masonry construction originally planned would have taken eight weeks or longer. Alcoa helped develop the materials and the methods which made this record possible.

The first plans of the $14,000,000 structure being erected by Tishman Realty & Construction Company, Inc., were redrawn as a result of careful study of the Alcoa Building. The pioneer use of aluminum curtain-wall construction in the Pittsburgh headquarters of the Aluminum Company of America forecast the building economies dramatically proved by this walls-in-a-week record.

The 1800 exterior panels were prefabricated, each complete with two windows, by General Bronze Corp. within a period of three months—two stories high and over 4½ feet wide, they were trucked from the assembly line to the building and stored on the floor they were to enclose. Three crews installed the panels from inside the building without the use of exterior scaffolding.

The economies of modular, curtain-wall construction with lightweight, low-maintenance aluminum panels are available to you for new construction or modernization of existing buildings. A phone call to your local Alcoa sales office, listed in your classified directory under "Aluminum", can acquaint you with full details. Make the call today. Or write: Aluminum Company of America, 1887-K Alcoa Building, Pittsburgh 19, Pennsylvania.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

LETTERS *continued*

ARCHITECTURE WITHOUT RELIEF

Forum:

Your caption writers are even more ignorant of the art of landscape than architects in general. On p. 109 of your August issue, a new low has been reached in speaking of a "curved terrace that relieves the rectangularity of the building."

Since when has rectangularity had to be relieved?

Landscape Architect Halprin has done better work than this (p. 121, same issue) and, as landscape, the work of Sert and Wiener (pp. 124-131, same issue) deserves high praise: it expresses their building, which, if it needed relief, would not be architecture.

JAMES FANNING, *landscape architect*
New Canaan, Conn.

WANTED

Forum:

Two architects and I are establishing an architectural and engineering practice.

We are interested in building up our reference files and would like to have your advertisers advised that we are interested in receiving their catalogues or brochures on product information.

JOHN WENDELL ANDERSON, *engineer*
Port Allegeny, Pa.

• FORUM, from time to time, gives its advertisers a list of subscribers who request to receive product information. The next such list will be compiled about Dec. 1.—Ed.

VENEZUELA'S PATIOS

Forum:

The article "Can Patios Make Cities" in the August FORUM contains work done by our firm and presented without proper credits. We feel obliged to make the following clarification of the facts:

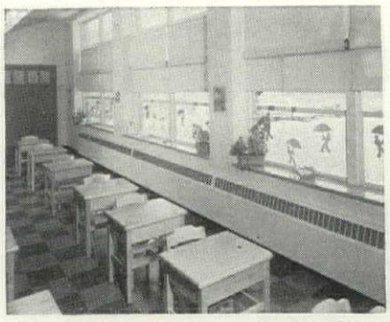
1. Oficina de Planificación y Vivienda, Caracas, whose principals are Francisco Carrillo Batalla, Carlos Guinand Baldó, Moisés Benacerraf, was contracted by the Orinoco Mining Co. (a US Steel subsidiary) to do the planning and architectural work at Puerto Ordaz and Ciudad Piar, the new Venezuelan cities. Town Planning Associates of New York, Paul Lester Wiener and José Luís Sert, were consultants to us for this work.

2. Likewise, Oficina de Planificación y Vivienda was contracted by the Banco Obrero (Venezuelan Housing Agency) to do the planning and architectural work for the Pomona project in Maracaibo, Venezuela. Town Planning Associates was also consultant to us for this work.

3. The hospital shown on p. 129 will be built in Maracaibo for a private owner and not in one of the steel towns as stated in the article.

FRANCISCO CARRILLO BATALLA, *director*
Oficina de Planificación y Vivienda
Caracas, Venezuela

Tru-Perimeter* Heating for Schools!

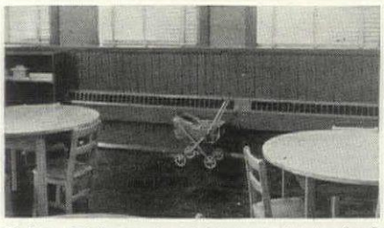


Webster Walvector stops down-drafts in modernized Garfield School, Maywood, Ill. Heating installation by Tropf Heating & Ventilating Co., Inc., with the approval of Chiaro & Chiaro, Architects and Engineers, school architects.

New School Building from Old

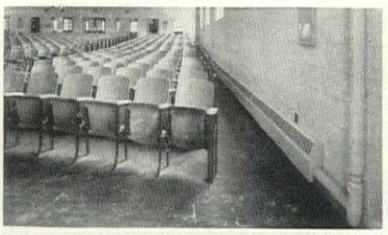
Maywood, Ill. . . . Public school officials here have extended the usefulness of the old section of the 53-year-old Garfield School by comprehensive modernization. Outstanding feature was replacement of obsolete hot air system with forced hot water using Webster Walvector.

Rejuvenation of the old section of the Garfield School in 1951 involved such things as fresh, light-colored paint, sanitary asphalt floor tiles and modern, movable desks. These improvements would not have been long-lasting with the obsolete duct-type hot air system. Hence, Webster Tru-Perimeter Heating and Webster Walvector were vital to the plan.



Webster Walvector in kindergarten is completely safe for children. Nothing too hot to touch.

Here's what Joseph Lorenzo, Building Superintendent, says: "We like the new system. Heat is spread evenly along outside walls and under all the windows with a minimum of piping. It is much more economical than our old system."



Webster Walvector in auditorium of Norfolk Catholic High School. Architects: Gleeson and Mulrooney, Phila. Assoc. Architect: T. David Fitzgibbon, Norfolk. Consulting Engineer: William G. Flurer, Phila. Heating Contractor: Coley and Petersen, Norfolk.

Solves Heating Design Problems in

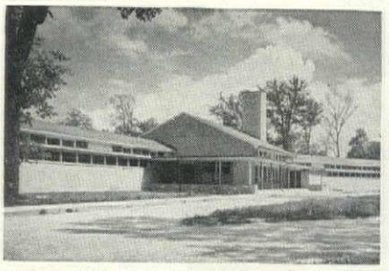
500-STUDENT HIGH SCHOOL

The designers of the new Norfolk Catholic High School were able to attain long sought objectives by using Webster Walvector Radiation and forced hot water for the basic heating need, supplemented by Webster Convectors and Webster-Nesbitt Unit Heaters.

Norfolk Catholic High School, Norfolk, Va. Auditorium wing at left, gymnasium wing at right. Cafeteria wing in rear.

Economy in first cost was helped by the simplicity of Webster Walvector with its reduction in distribution piping and use of only limited space, well illustrated in the auditorium view.

Comfort was assured by spreading the heat the full length of the outside wall. Minimum operating costs were obtained by division of the installation into five zones.

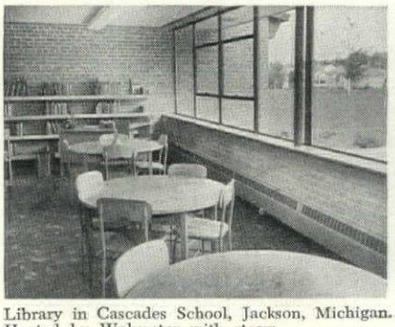


Clyde L. Lyon School, Glenview, Illinois. Photo by Hedrich-Blessing. Heated by Walvector with forced hot water.

Functional Schools

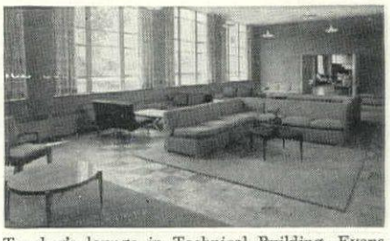
Perkins and Will, nationally known Architects and Engineers specify "perimeter" heating for comfort and economy . . .

Many of the schools designed by this Chicago firm feature large glass areas. To off-set resulting heat losses, the consulting engineers, E. R. Gritschke and Associates, have specified Webster Walvector, Tru-Perimeter Heating.



Library in Cascades School, Jackson, Michigan. Heated by Walvector with steam.

Webster Walvector gently warms the exposed walls of a building. Heating-up is quick and easily controlled. Less piping is needed than in conventional radiator systems. No fans, blowers or filters are used.



Teacher's lounge in Technical Building, Evanston Township High School, Evanston, Illinois. Heated by Walvector with steam.

If you want more information about Webster Equipment for school heating, write us. Address Dept. AF-108.

*What is Webster Tru-Perimeter Heating?

Webster Tru-Perimeter Heating uses Webster Baseboard, Webster Walvector, or a combination of both, to replace the heat at the perimeter where heat loss occurs. Heating elements are mounted close to the floor along outside walls, spreading the heat the entire length of the exposed walls. Webster Tru-Perimeter Heating warms the air within a room, warms the floors, and warms the inside surface of outside walls where a normal coolness occurs during the winter months. Gently moving warmed air is drawn to floor level and across the floor into the inlet opening of the radiation. Radiant heat rays strike the floor along the full length of the exposed walls. Floors are warm and comfortable even with slab floor construction.

WARREN WEBSTER & COMPANY

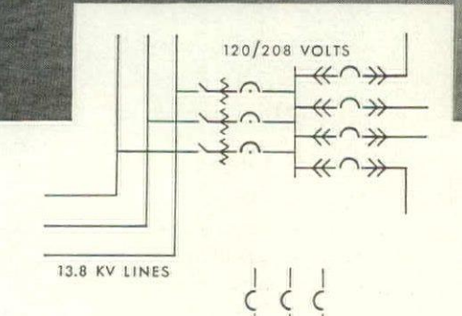
Camden 5, N. J., Representatives in Principal U. S. Cities

In Canada, Darling Brothers, Limited, Montreal

Webster WALVECTOR

REG. U. S. PAT. OFF.

For Steam or Hot Water Heating



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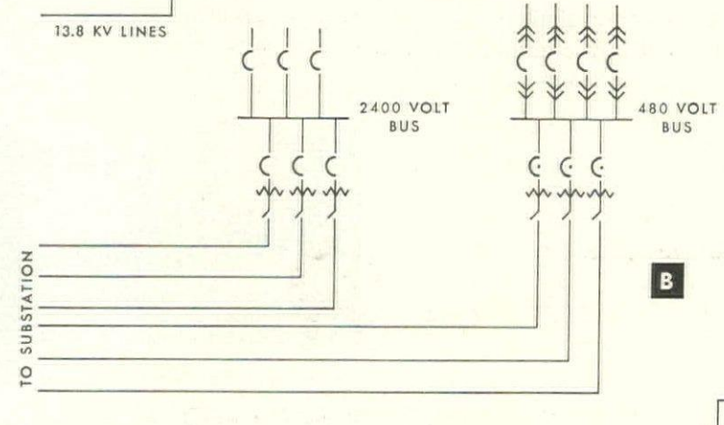
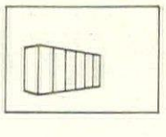
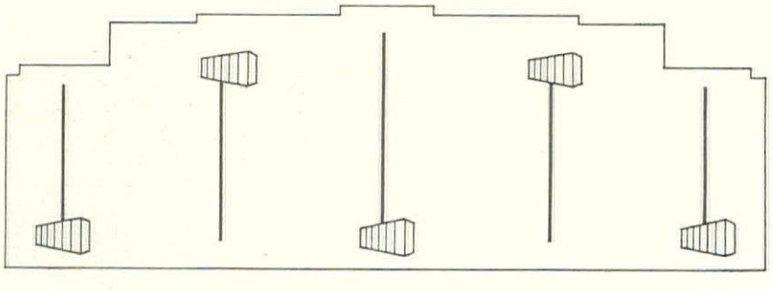


B

TRANSFORMER
BREAKER
NETWORK PROTECTOR



C



Power is supplied at 13.8 kv to:

(A) ALL SPOT NETWORKS throughout the project. Three feeders serve each power center. Should one fail, the other lines still serve all loads. If two fail, all nonessential load is dropped. If the third fails, all loads are dropped and only designated ones are supplied by a 5000-kva emergency turbogenerator set, located (B) IN THE POWERHOUSE. There, both 2400-volt and 480-volt service is available for power loads. (C) IN THE MAIN HOSPITAL, five spot networks feed all loads through bus duct risers.

Architects & Designers:
General Services Administration
Public Building Service

Electrical Contractors:
Harry Alexander, Inc., H. P. Foley Co.,
E. C. Ernest, Joint Adventurers
Electrical Construction

WORLD'S NEWEST RESEARCH HOSPITAL

U. S. Public Health Service's new National Institutes of Health at Bethesda, Maryland, is an excellent example of advanced hospital design—based on a sound functional program that covers both present and future requirements.

The entire architectural plan, in fact, reflects the Institutes' critical mission: to conduct research on virtually every known disease. All buildings have been designed specifically for that function. Result: ultimate in research and treatment facilities.

The key in this plan is the 500-bed, air-conditioned main hospital building, upper left. Here, treatment efficiency dictated floor layout. Practically every patient's room has been located adjacent to laboratory facilities.

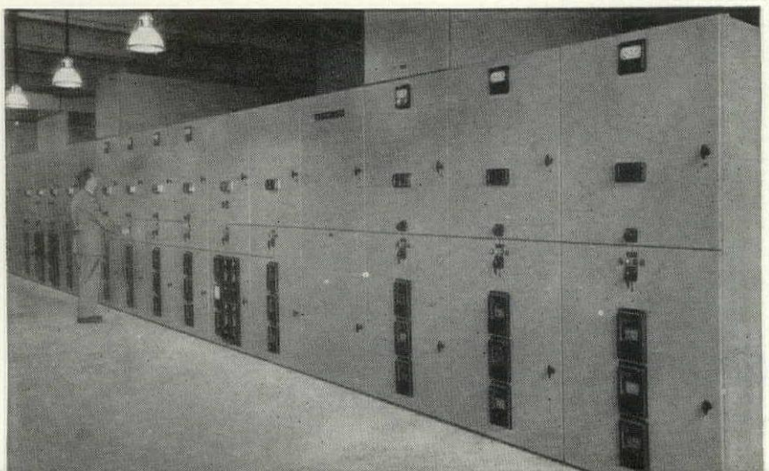
Future hospital requirements have also been adequately covered in the original plan. Without any additions to the building, present facilities can be expanded to 2500 beds in an emergency.

What makes a Functional Electrical System

Function again became the guide when a method for distributing electrical power was selected. After a complete analysis of the Institutes' vital assignment, the project's engineers adopted a spot network system, described at left. And, by matching it with the unitized distribution equipment covered on the next pages, the National Institutes of Health is assured uninterrupted electrical service . . . in all areas . . . with adequate provision for future expansion.

The construction application engineer in your nearest Westinghouse Office offers this same kind of planning help to you and your engineers. Call him for complete details. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-94006

YOU CAN BE SURE...IF IT'S Westinghouse



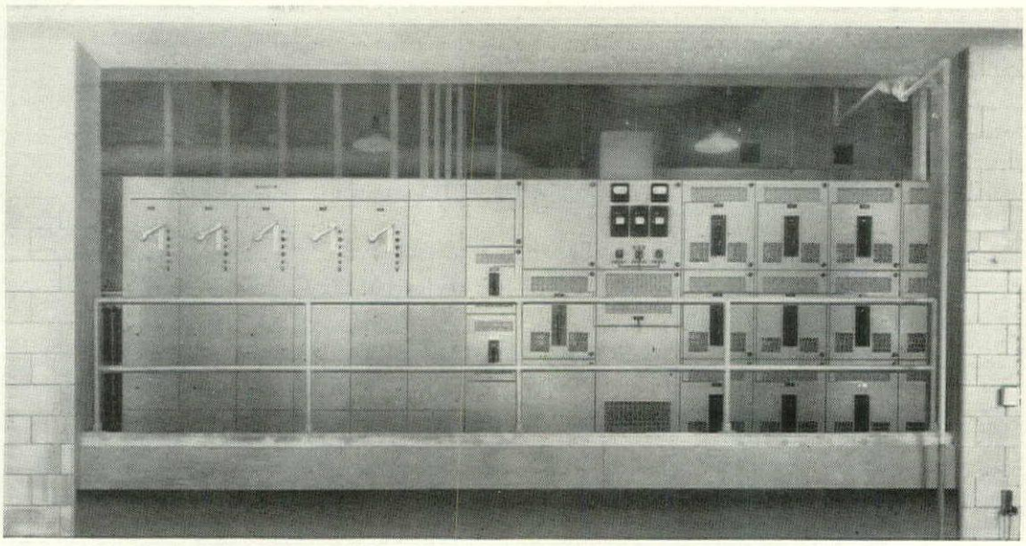
MAIN HIGH-VOLTAGE SWITCHGEAR feeds and protects 19 spot networks throughout the 15-building research center.

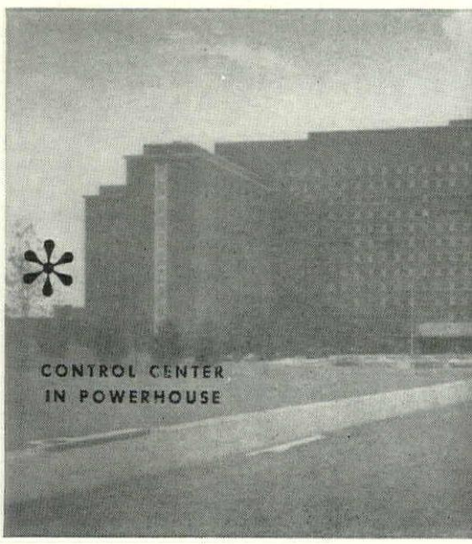
CONTROL CENTERS...FOR FLEXIBILITY...*a vital factor*

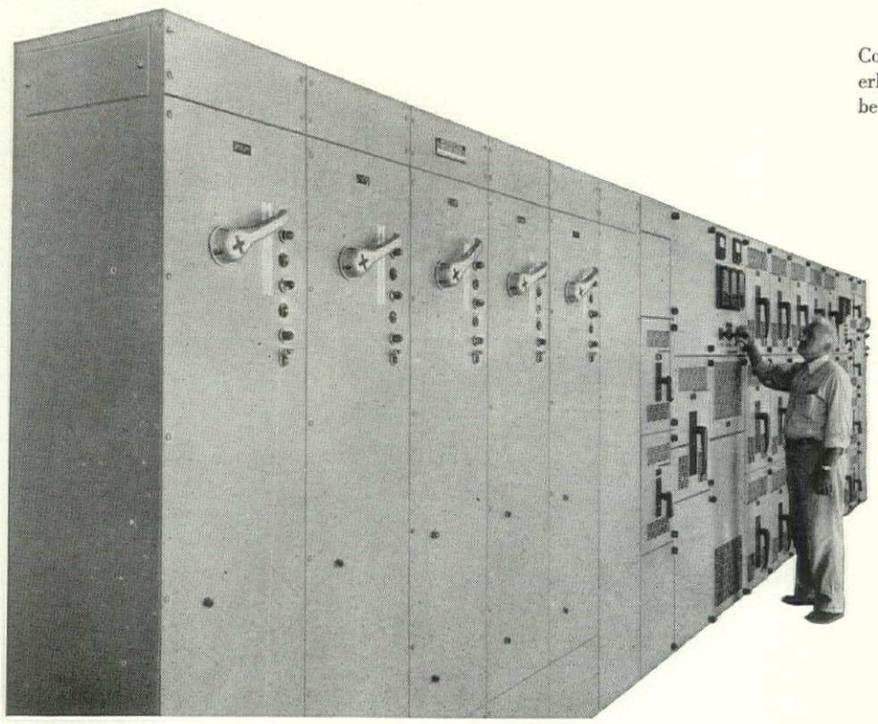
In the powerhouse, grouped motor control—in Westinghouse centralized control centers—contributes substantially to smoother operation of the hospital. All motor starting and circuit protective devices are housed in a neat bank of unitized, easy-to-service structures. In just a few steps, then, one man covers the extent of motor control for all air conditioning and other important service facilities. As a result, trouble-free and more efficient operation of these services is assured.

Complete flexibility of electrical components, as well as modular-constructed units, gives the Westinghouse Control Center ability to expand to any future needs of the research center. This type of structure may hold as many as five motor starter units and can be added to, moved anywhere, or repositioned as needed. Arriving at the National Institutes of Health completely assembled, wired and tested, the control center was ready to operate after a minimum of installation effort.

J-27040

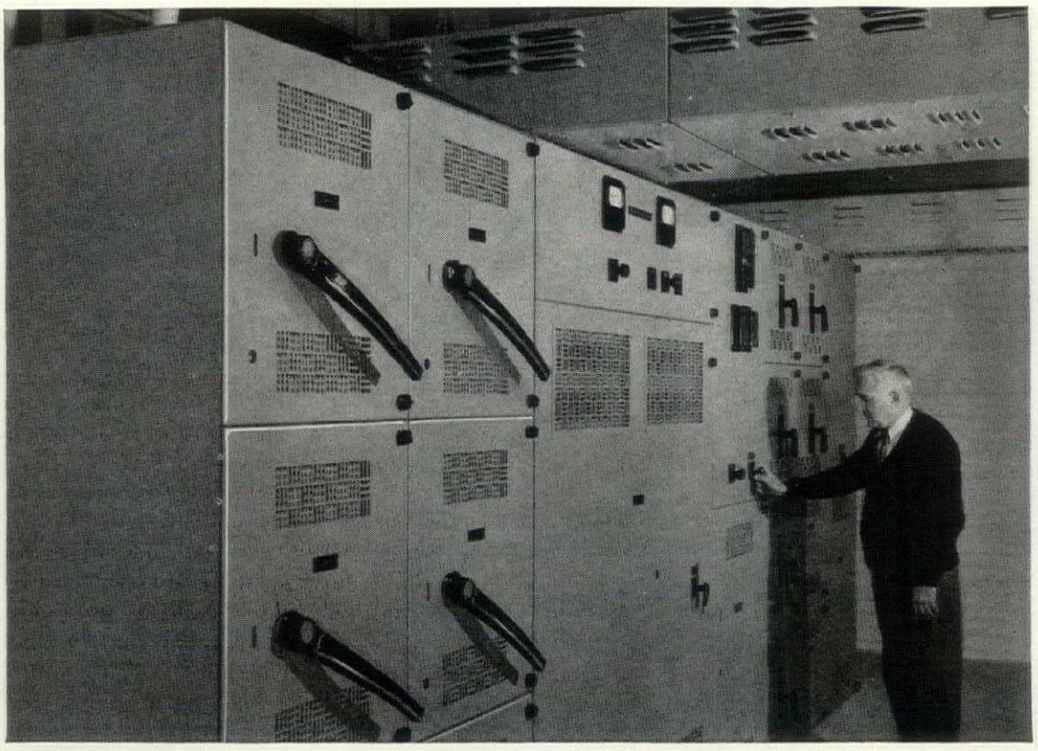






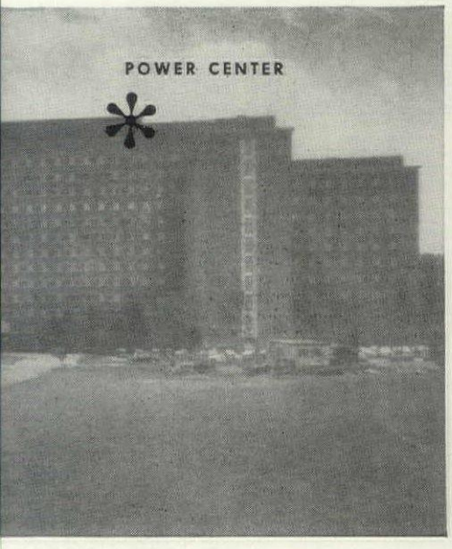
Control Center Balcony Location in the powerhouse allows the operator to see the motor, below, while inspecting its control unit.

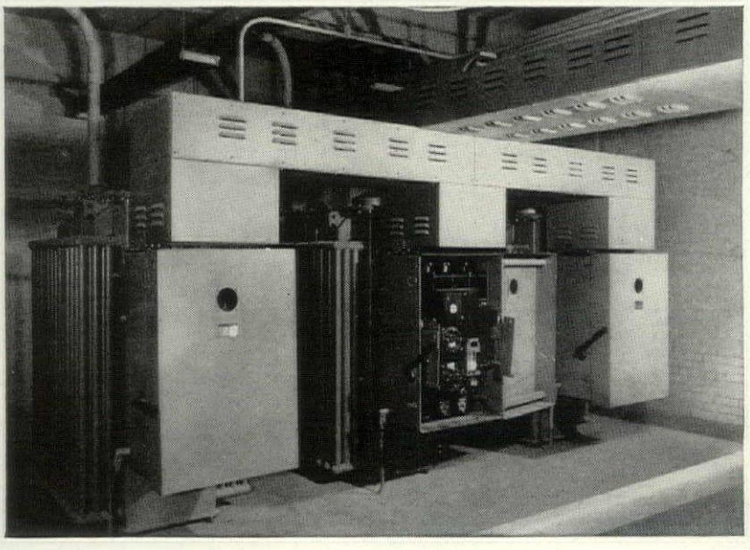
Installation Flexibility permits control center to be close-coupled to the power center, further centralizing the control equipment serving this area.



Modern power centers can be located at the center of load for most efficient and economical power distribution. At right is switching portion of power center.

Lower right. Here is transforming section of power center, showing the low-voltage network protectors.





HIGH SERVICE CONTINUITY AND ECONOMY... *designed in*

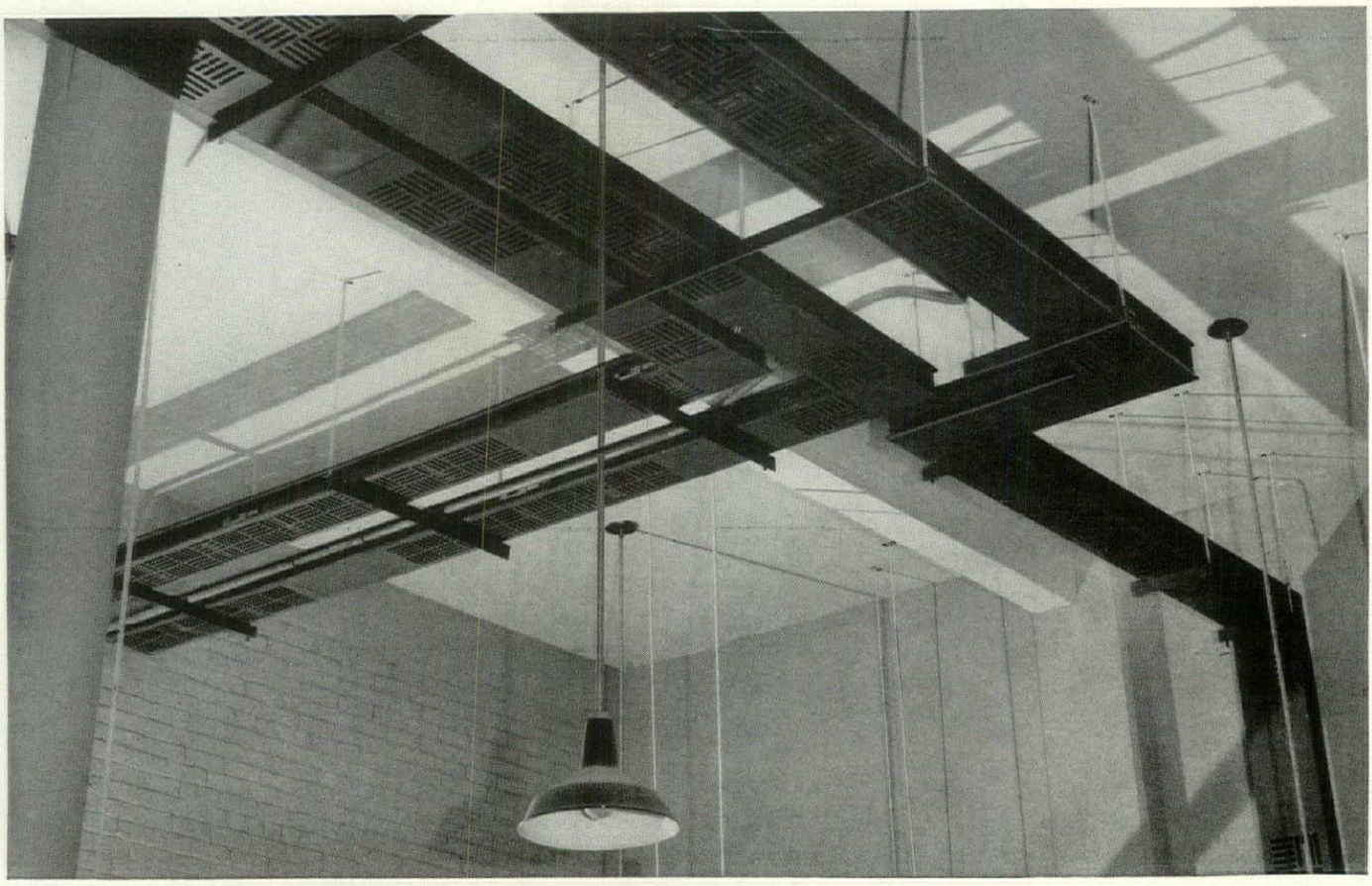
Electrical distribution facilities at the National Institutes of Health are matched to functional needs. The project's engineers designed a system that provides all research areas with exceptionally reliable service—and it does this economically.

Primary 13.8 kv feeders are carried throughout all buildings to spot network power centers. This reduces wiring costs and minimizes power losses.

One to five "spot-network" units have been located in every building to transform the high voltage down to utilization level. Each network contains three transformers. Should trouble develop on one, the other two carry the load. This not only assures excellent service continuity, but also spells out further savings. Since the transformers in the individual networks share one another's peak loads, smaller size units are permitted.

J-60848

YOU CAN BE SURE...IF IT'S Westinghouse

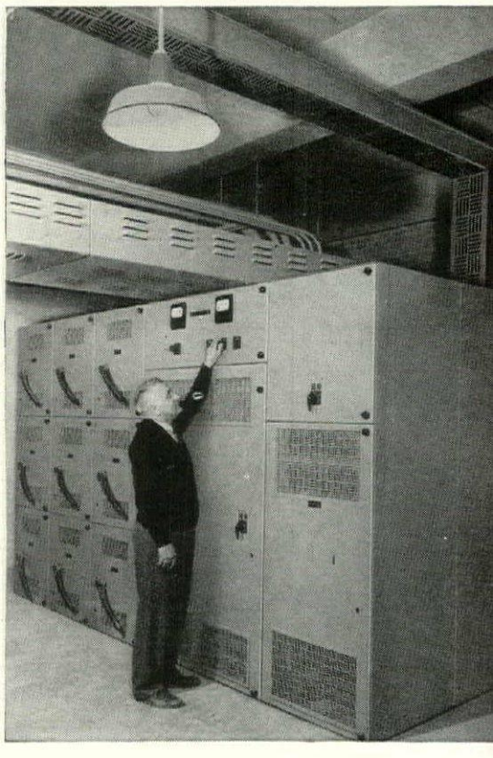


Sound, modern, compact

BUS DUCT IS FLEXIBLE

The power arteries of this hospital are Westinghouse Low-Impedance Bus Duct. It was a sound choice. For bus duct is the ultimate in modern, flexible power distribution.

Due to greater current-carrying capacity, bus duct required considerably less space than cable and conduit . . . carries power more efficiently. Standard, prefabricated sections coordinated perfectly with building plans . . . were quickly and easily installed. Bus duct is smart, modern in appearance . . . runs and risers blend smoothly into the interior design of the hospital. Best of all, bus duct is flexible—meets changing load demands; provides sufficient reserve capacity to handle future loads without expensive rewiring. J-30167



Low-impedance bus duct riser carries power from low-voltage switchgear to panelboards, located in wire closets on each floor.

Space, safety, added load with

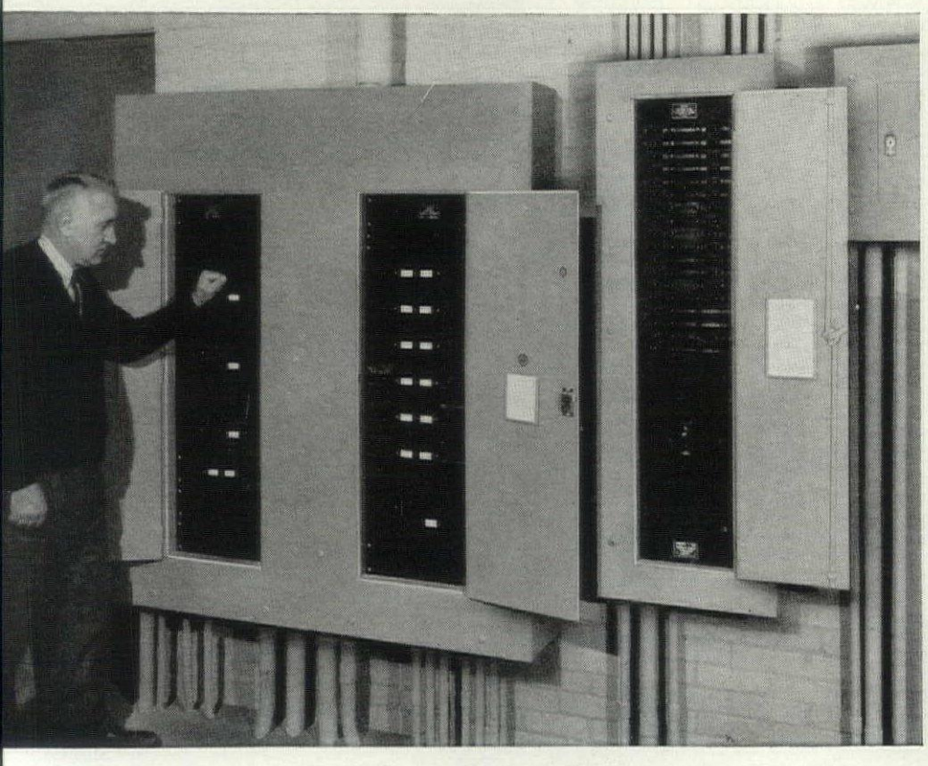
PLANNED-IN PANELBOARDS

The final, functional link in this hospital's unique electrical distribution system is provided by Westinghouse De-ion® Circuit Breaker Panelboards. Built to one unvarying standard of quality and performance, each Westinghouse Panelboard was, nevertheless, individually engineered to match the requirements of specific, local electrical services.

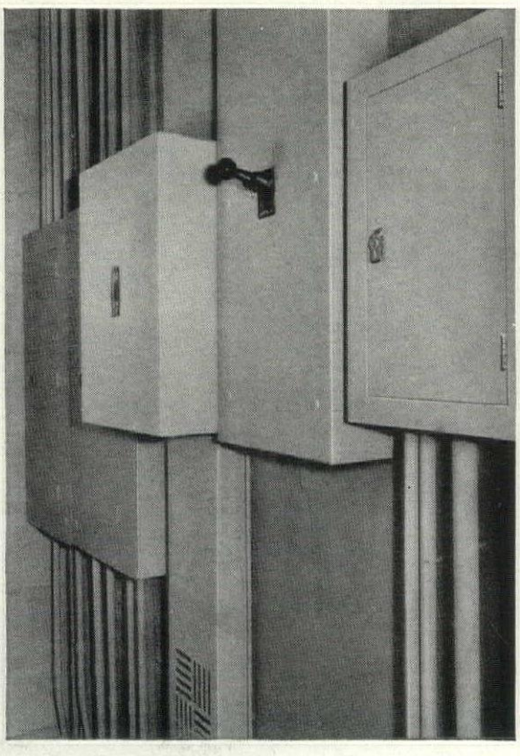
Critical space was saved—because Westinghouse Panelboards are compact. Safety was gained because Westinghouse De-ion Circuit Breakers in these panels can be operated without danger . . . will not interrupt vital hospital services needlessly. Future additions or changes in load will be easily accomplished—because extra circuit capacity has already been provided.

J-93520

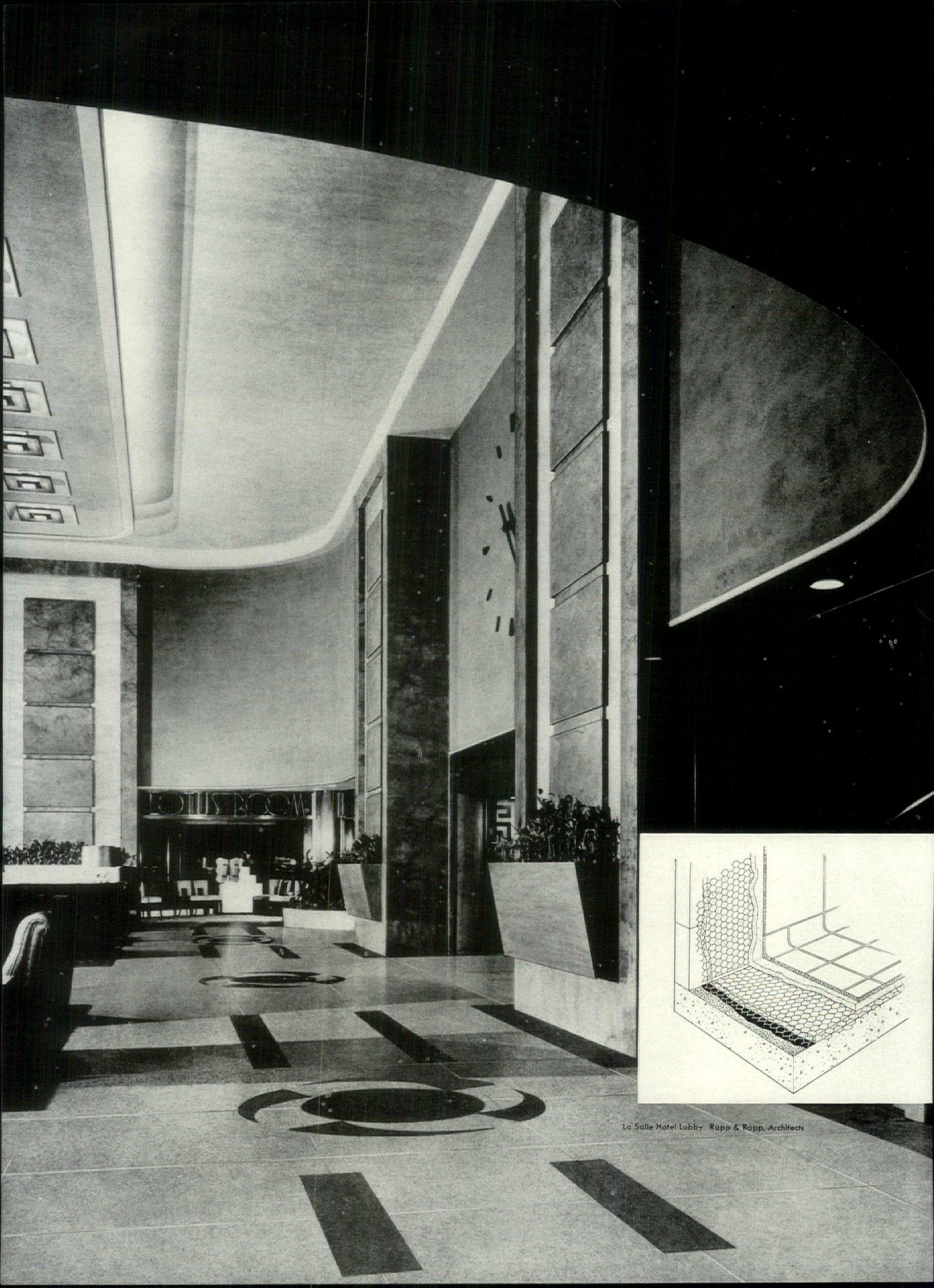
YOU CAN BE SURE...IF IT'S
Westinghouse



Tripped circuits can be seen at a glance—because all Westinghouse De-ion Circuit Breaker handles assume central position on automatic tripping.



Panelboards are mounted in wire closets on each floor. They provide for centralized control of electrical services.



La Salle Hotel Lobby Rapp & Rapp, Architects

specify a FLOATING SLAB with

Terrazzo floors will retain their beauty years longer if you specify "floating slab" construction reinforced with Keymesh. With this construction, the terrazzo base and finish become an independent slab . . . are independent of the structural movement of the framework of the building.

KEYMESH reinforcing for

GALVANIZED REINFORCING

It is easy to see the advantages of Keymesh reinforcing. It's galvanized. You're sure of a good bond because it's free of rust. Made of woven steel wire mesh, it provides multidirectional reinforcement. The exclusive reverse twist weave adds still more strength. Keymesh also has more cross wires per square foot than other types of reinforcement. That means greater reinforcing strength and bonding area, too!

With all its advantages, the cost of Keymesh is low. Usually, you get the "extra" value in Keymesh at lower cost than for other types of light duty reinforcement.

lasting TERRAZZO beauty

The independent reinforced terrazzo structural slab is your most positive assurance against cracking due to structural movement. That's why you get lasting beauty.

Floating slab construction, with Keymesh reinforcement, assures a strong crack-resistant base for tile, oxychloride, asphalt emulsion and mastic floors, as well as for terrazzo.

HERE'S HOW YOU BUILD A FLOATING SLAB WITH KEYMESH REINFORCEMENT

Over the structural concrete base, spread a layer of sand, which provides the floating effect. Add 15 lb. felt paper topped with 1:4 concrete mix. Place 1½ in. x 17 ga. Keymesh over this entire section, lapped two mesh widths at sides and ends. Complete slab with 1 inch 1:4 mortar, dividing strips and terrazzo topping. If cove or wainscot is included, add Keymesh (separated from the floor) to this area for maximum crack protection. If radiant heat is installed, place Keymesh over pipes before pouring mix. Keymesh provides uniform heat distribution, guards against cracks.

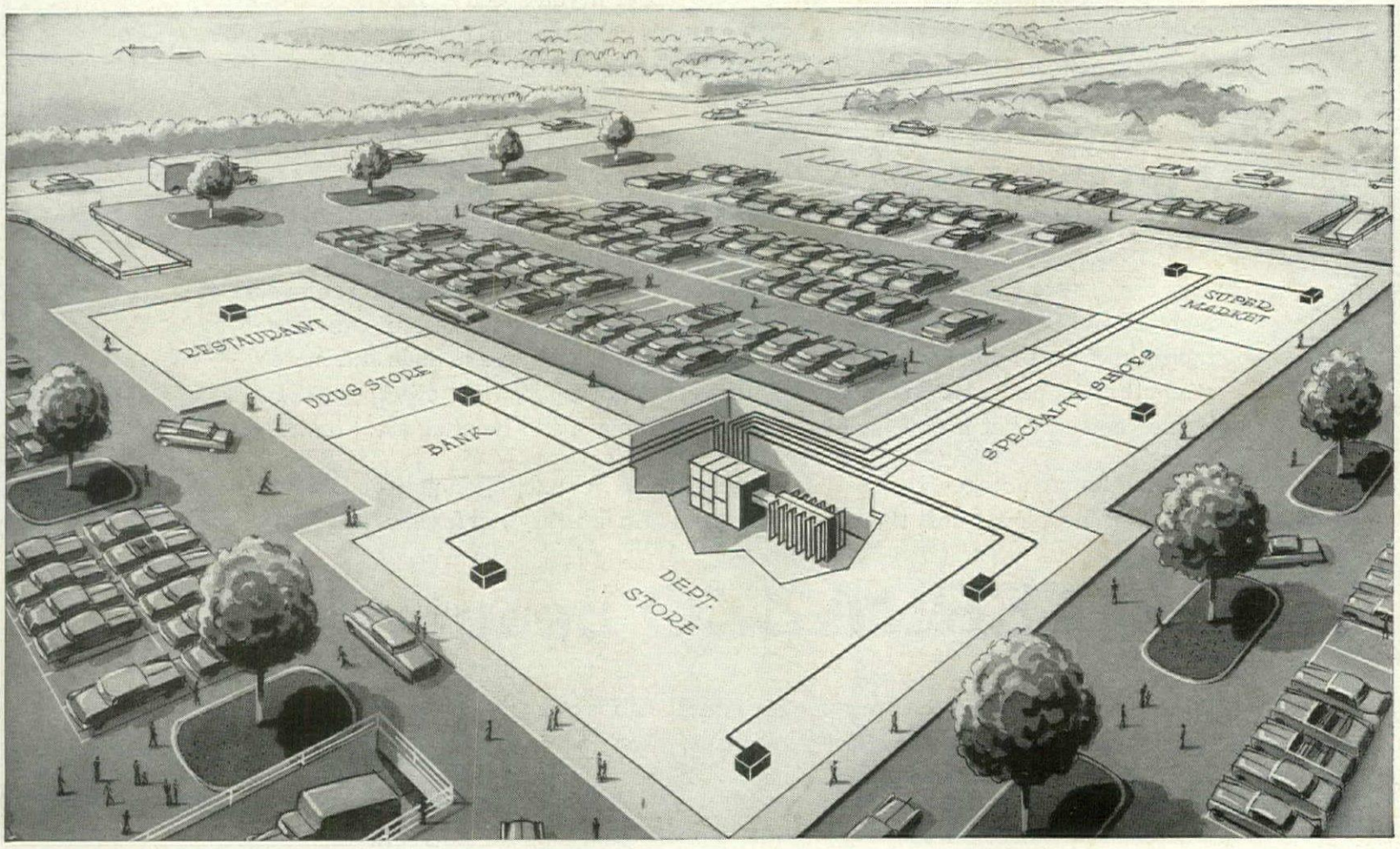
Keymesh is easy to handle. It rolls out flat, stays flat, and lays without bulges. 150′ rolls, 3′ and 4′ wide, in wire gauges to fit the job. Write for details.

KEYSTONE STEEL & WIRE COMPANY, PEORIA 7, ILLINOIS

KEYMESH • KEYBEAD • KEYCORNER • KEYSTONE WELDED WIRE FABRIC
KEYSTONE NAILS • KEYSTONE TIE WIRE • KEYSTONE NON-CLIMBABLE AND ORNAMENTAL FENCE

see our CATALOG in SWEET'S FILE

How to provide an economical wiring system for shopping centers



You can cut wiring costs in shopping centers and other multi-unit buildings by using G-E cables and a high-voltage distribution system. The high-voltage system will cut power losses; and G-E cables, designed for each part of this system, will provide dependable service with minimum installation costs.

This, basically, is the system: First bring in the power from utility lines with G-E Super Coronol* cable. This cable can be run underground to a master unit substation in the basement. No conduit is needed, and unsightly overhead lines are eliminated.

From the master substation, you can supply power at high voltages to load center substations, or at utilization voltages to distribution panelboards—depending on the electrical load pattern. A G-E V-c interlocked armor cable system can prove to be most economical for this application. This armored cable is flexible and needs no conduit. It can be run easily around corners and over beams to save both engineering and installation time.

Other load patterns may call for high-voltage Super Coronol cable feeders. These can be buried directly in the ground, or installed in conduit or ducts.

To supply low-voltage power to the smaller shops and other light load areas, your answer will probably be G-E Versatol* Geoprene cable feeders in conduit or ducts.

Whatever the load pattern, a planned G-E cable system will help cut wiring costs and give your client a dependable and efficient power supply. G-E engineers will be glad to help you with the planning. For more information, write Section W100-104, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

*Registered Trade-mark, General Electric Company

You can put your confidence in—

GENERAL ELECTRIC

CHILDREN, said FORUM in its 1949 School Reference Issue, "were the greatest output of the US during World War II." And it reported estimates that 7 million children added to the school population in 1949 to 1960 would call for $10 billion in public schoolhouse construction.

Alas, both as to numbers and costs, these predictions turned out to be classics of underestimation!

Of those 7 million children expected to greet teacher over a period of 11 years, 4.6 million had already showed up in school by 1953.

Latest census data have caused the US Commissioner of Education to up his estimate to a total gain between 1949 and 1960 of 11.6 million school children instead of 7 million. There will be 7 million between *now* and 1960. (Today's staggering predictions are distressingly accurate compared with 1949's because of the intervening schoolhouse survey of the US Office of Education.)

And, costs have skyrocketed, too.

Upshot is this colossally extended calculation of school need:

Backlog of classrooms needed but not yet built...	345,000
Add new classrooms needed by 1960.....	425,000
Total need	**770,000 classrooms**

At an average cost of $44,000, including land, this means that new schoolhouse construction, properly carried out in the right places, will cost about **$34 billion**

Under such heavy need, is it any wonder some US school boards are already staggering, and economy becomes the top theme?

To help, FORUM called a rounded group of experts together in New York for a schoolhouse economy forum (p. 118).

And it sent an SOS to school architects for schools with their best economy ideas—then culled literally hundreds of plans for the selection that begins on p. 127.

Aware that FORUM's earlier editors set a high tradition that FORUM school reference issues call the turns (in 1935 starting the main wave of modern design and the California finger plan; in 1949 predicting the end of finger-plan dominance and a new era of design experiment, plan freedom), the editors have done their best to watch for *new* trends today:

- In plan freedom we are already marching out with cluster plans, loft plans, zone plans, core plans (p. 127).
- In design too we find a new branching, a new stress at one end on "little house" domestic scale, at the other end on a new kind of institutional treatment (p. 166).
- In lighting we find a new challenge to the big window, experiments with electric light, a whole new vocabulary of top daylighting (p. 184).
- In heating we find a new stress on cooling and the advent of the practical heat pump (p. 179).
- In construction the gimmicks are many (p. 174).

This issue is dedicated to all who would have the best the US can produce for the only Americans there are going to be—today's children.

SCHOOLHOUSE ECONOMY

Photos: LIFE—*Richard Meek*

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FORUM: A roomful of experts tackle the problem of costs, agree on ten major ways to stretch the schoolhouse dollar

Against the challenging background of a growth in school population of 7 million during the next five years and a need for 770,000 more classrooms at a cost of $34 billion, the editors invited a group of distinguished schoolmen, administrators, architects, consultants and engineers to explore every possible avenue of schoolhouse economy.

The stature of the men who participated in this forum and the urgency of the problem they discussed commend their findings to every school board—and to all others concerned with the future of America, which lies in the future of her children.

On this the forum agreed:

School building economy has become urgent because of what is called a great "wave" of children; but we now expect the new higher birth rate to be less like a moving wave than a permanent new high plateau. This year some elementary schools suddenly found their enrollment tripled by children born in 1946-47; between 1953 and 1959 the US school plant must care for an expected increase of 7 million pupils; no slack-off is in sight.

America's schoolhouse financing problem could be compared to any banker's problem in advancing capital for a major expansion to an industrial operation that will be immensely productive—but needs 14 years before its new productivity will start paying off. In the same way our children will be productive and will enrich the much bigger society that will exist after they grow up and have their education. The sudden expansion explains the sudden strain placed upon the school resources and the credit of a country which until World War II had been geared to a declining birth rate, and moreover had not been compelled to set aside any large share of its current income for defense and survival.

Inherited limitations on bonded indebtedness are no true measure of what we can prudently finance

Gloomy assertions that our $34 billion* estimated need in new school plant up to 1959 must be trimmed to the much smaller total debt limitation of municipalities are based on arbitrary assumptions. The debt limit itself is arbitrary, based on earlier expectations which counted neither with the explosive needs of a new generation nor with its later explosive expansion in capacity to repay.

Clear thinking is required to avoid confusing a momentary strain (while climbing the plateau) with an imagined need for skimping. Every youngster of the new generation is a potential new producer, and he will contribute to the new,

* Of which the construction cost is about $25 billion.

bigger society largely in proportion to his education. The greatest wealth of America lies precisely in these children, not in dollars; indeed our children are the entire and only America there is going to be. If we shortchange them we shall be saving coppers and throwing away pure gold.

The American economy has been able thus far to finance bountifully whatever America really wanted . . .

. . . be it cars, fancy foods, television sets—or an investment in school or college education. When a higher want arises, the very act of satisfying it (in our economy) produces not only added prosperity but also greater economy in producing the higher quality of goods. It would consequently be a major mistake to resign ourselves to building shabby schoolhouses in "economy's" name when the very act of producing good schoolhouses will operate to make these better ones cheaper.

The American people must choose what they really want

. . . They now spend annually $1.7 billion for television sets (to complete the broadcasting plant) against $1.4 billion to maintain and extend their school plant. If this relative scale of expenditure is to mean inadequate schooling in the future, then the American people stand self-condemned for gross folly, gross irresponsibility, a disastrous loss of moral fiber in caring for their children. We believe they need only know the facts to rise to the occasion, and we commend warmly the efforts of such groups as the National Citizens Commission for the Public Schools to carry the discussion into every US community.

Building schools costs actually less today in comparison with other goods than it did in 1936! To supply his child with a schoolroom, the taxpayer gives up less wheat, fewer theater tickets, fewer cars in 1953 than he did in 1936; and since the quality of school buildings has meanwhile greatly risen (as has the standard of teaching) economy defined as higher value received for less money is already at high level. Indeed, schoolhouse costs have stayed low compared not only to other kinds of goods but to other kinds of buildings, due to cheaper financing, better planning, more sensible design fostered by educators together with architects.

It would be a major error, therefore, to seek further economies by first, or exclusively, taking a negative cheeseparing approach, especially if cheapened quality results in higher operating and maintenance costs.

It would be most wise, in our opinion, to start first with a constructive approach, seeking *full utilization* of all available resources and combinations through better brainwork, better programming, better administration, better planning. Indeed the greatest economies will be effected before the school architect even touches pencil to paper.

These opportunities involve a whole series of people and agencies: the school board, superintendent, principals and teachers; local, state and federal officials and legislators; educational consultants; architects and engineers, builders and manufacturers in the building industry; code officials and even insurance underwriters.

If the American people really want economical school buildings, here are ten ways to get them:

1. Larger administrative districts to spread the tax base

The public school building job is directed by 77,000 local school districts responsible to local communities. We agree that the first major step toward schoolhouse economy lies in enlargement of a great many undersized school districts as administrative units.

All across the US consolidation or centralization of districts, and cooperative action between districts, are already under way, but they have far to go. South Carolina has just reduced 1,600 districts to 103 larger ones; Michigan, it is estimated, could do better with 250 to 300 districts than with the 4,500 she has inherited from an earlier day when the small district really functioned; New York, Massachusetts, Pennsylvania are among states whose existing boards have joined together to act as regional or consolidated bodies; 43 other states have studies under way looking toward similar action.

Major economies result through balancing out taxes, through putting together enough people, enough space, enough personnel, enough available funds to engage on correlated instead of chaotic building programs, avoiding the stupid reduplication of school buildings each of which (having too small a district to call upon) is inadequate.

Enlargement of the administrative district does not necessarily lead to building larger schools—it may result in building a good many smaller ones—but it does allow more shifting of pupils and adjusting of staff and arrangements.

Adjustability among schools. There is no magic or sacred point at which a child must go to a junior high instead of an elementary school, to a senior instead of a junior high school. A district large enough to possess a number of buildings can shift a grade here and there to meet the ebb and flow, so each building gets fuller utilization and less construction is needed. The junior high school, in addition to its own individual purpose, has the advantage of being a buffer between elementary and high school.

The too small high school is perhaps the chief symbol of inefficient reduplication where small communities vie with one another instead of joining forces. The National Citizens Commission for the Public Schools found in North Carolina that 100 high schools would have sufficed in place of the present 800, if an enrollment of 300 were accepted as the minimum on which an efficient high school could be built. This does not mean that the 100 buildings would cost one-eigth as much—since each would be larger—but it means that labs, special rooms, gyms, etc., could be made adequate instead of being skimped or omitted altogether, and a big share of their cost could be saved by avoiding reduplication of basic classroom space from one town to another.

Small-town chamber of commerce loyalties are often behind the idea that "our town must have its own high school." But there are many communities in which local patriotism has in fact been just as well served by focusing on an intermediate school instead. Where an inadequate too small high school building already exists it can often be converted into the nucleus of a good new elementary or intermediate school (which requires less elaborate facilities), thus salvaging the existing plant. Then the most expensive type of building, the fully equipped high school, can serve a much larger area with a larger tax base.

Here are **50** ideas for schoolhouse economy

that came out of the forum. They are expanded on adjoining pages.

1. Combine small school districts into larger ones, or arrange for joint action, so the building program can avail itself of existing and new buildings in a more efficient pattern.

2. Abandon the too small high school. Turn it into an elementary or intermediate school, build only fully equipped new high schools, centrally located, serving a wider area.

3. Re-examine school schedules for full utilization of the building.

4. Stop department heads from demanding overspecialized space.

5. Re-examine educational dogmas that lead to building waste.

6. Plan the school for evening use and use it over the whole year.

7. Acquire land early. Get state aid in holding it for the school district which has inadequate funds of its own.

8. Prevent slow processing which allows land speculation to take place between the time a site is named and the time it is actually bought.

9. Make early contact with land developers creating new developments. Convince them how important the school is to them, get them to cooperate in setting apart good sites. Otherwise use legislative or planning powers.

10. Try lease-sale arrangements whereby the builder puts up the school—but only with schoolboard retaining every control.

11. Make the school part of a correlated civic plan—so the cost of auditoriums, gymnasiums, playing fields, etc., can be shared and waste cut down.

12. Make joint arrangements with the park board so there is joint use of land for school recreation areas and park.

13. Go through the existing school listing every part that contributes nothing direct to education—cupolas, parapets, columns, fancy touches.

14. Build no basement if you can avoid it.

15. Build no upper floors if they can be avoided. Remember, fire-safety requirements make them more expensive.

16. Use the out-of-doors for all possible learning, including nature study.

17. Use the unbuilt out-of-doors for all possible sports. It may be cheaper than an overelaborate gymnasium.

18. Where possible build sports facilities which require only a wall and no roof, or roof and no walls.

19. Remember not all classrooms need be bounded tightly with four walls. Adapt such public space as cafeterias so corners can be used for teaching.

20. Look at your corridors. Used only for passage they are largely waste. Get multi-use by incorporating corridors with the classroom as alcoves or adjuncts.

21. Eliminate the corridor if you can. Doors from room to room are serving some elementary schools well.

22. Think twice about your proposed cafeteria. Modern food serving may make it unnecessary.

23. Think twice about that tremendous gym. Is it primarily for the school or for spectators of the team? A smaller one may serve every educational need.

24. Consider several smaller gyms. Four small ones cost less than one immense one.

25. Beware, however, of overdoing "multi-purpose" planning. If its dual use as a gym knocks out proper use of the auditorium, economy is false in operation.

26. Look out for that vastly oversized heating plant, designed for the coldest night of the year, at 4 A.M. when nobody is in school.

27. Be sure your engineer is using the less extreme values given for "design temperature" in the newest ASHVE handbook.

28. Remember the main problem is not heating but cooling. And that climate control allows use of the sun to help heating.

29. Examine whether your state needs that elaborate school code, piling up costs through rigid regulations. Connecticut and Texas are making fine progress with none.

30. In any case get your state off the list of those insisting on statutory codes; they are sheer cost-raising nonsense.

31. Demand performance codes in schoolbuilding if any. They prescribe what is to be effected but leave invention and imagination free to find more economical ways how.

32. Demand that your city abandon silly local codes which multiply confusion. Get adherence to those national codes which result in standardization, an important source of cost savings.

33. Get your state governor to call a meeting with architects and fire marshals, to comb out the nonsense likely to be found in most fire marshal regulations.

34. Make sure whether fire regulations are figured to save the building or to save the children. Some regulations merely save the shell, like a stove whose contents have been burned clean.

35. Insist that money-saving structure which protects children fully be permitted. There is criminal folly in state codes that forbid the well-planned wooden one-story school.

36. Demand that insurance companies give credit for safeties deriving from new invention. There is no excuse for charging the same rates for all of today's schools as for yesterday's.

37. Look to sprinkler systems as an inexpensive method of protecting children.

38. Avoid the "economy" trap of the stock plan. Only 10 states now have them and 12 states have already abandoned them. They produce schools that are never really good, never really cheap to operate and maintain.

39. Back every move toward dimensional standardization, whether by AIA, BRAB, ASA, or any other research organization.

40. Seek standarization of parts over a large number of schools—stock doors, window sash, etc., that can be bought cheaper in big quantity.

41. Try if possible to get several schools using the same stock parts bid at once to obtain the economies of quantity purchase.

42. Avoid standardized thinking, however, by architects or engineers. A man who has done large numbers of schools may have high merit or may have had only stock ideas, which are always expensive.

43. Choose professional help with care. The fact that schools have risen in cost less than any other building type is due primarily to architects, educational consultants and engineers with imagination.

44. Avoid the false economy of getting cheap professional help or dispensing with it altogether. No plane can fly that has not had the benefit of science; and the flight of education is vastly more important, more complex.

45. Try occasionally taking in a young architect or an architect who has done no schools. His ideas will be fresh, and you can avoid paying for mistakes by getting him to associate with a more experienced man.

46. Remember, in no field of schoolhouse construction is imagination more important today than in the financing.

47. Watch the bond market like hungry hawks. The difference between 2% interest and 3% interest is something like 20% of the cost of the building.

48. Do not feel confined to the bonded debt limit. Work with all other good men to get it lifted. It was humanly made, and long ago for an earlier condition now nonexistent.

49. Investigate the various new methods of lease-purchase if you cannot get out from under the bond limitation.

50. Remember our children are the purest gold we have, and no economy is real that tarnishes their chance for a magnificent future. The future of these children is America's future.

Barthelme, Caudill, Harriman, McLeod, Radoslovich and Reid

2. Long-range planning to reduce the high cost of land acquisition

Land has one steady characteristic: its price seems always to rise as population becomes more dense.

No school board can dodge its responsibility for acquiring land at the earliest possible moment, but this requires long-range planning and a district large enough to have a range of choice.

Major savings have accrued to districts acquiring land well ahead.

State aid. So that districts financially less opulent may acquire land ahead we recommend state provisions similar to those of California, where the state advances funds to districts announcing their need for a new site in a new area, holding the site in trusteeship for the district up to five years.

The scandalous situation in large cities such as New York, where the school board must give advance notice of sites chosen and then wait often a year or more for processing by a whole string of city agencies, thereby against its will giving a field day to land speculation on the site in the interval, must be removed from the realm of possibilities.

School boards must work early with land developers. Because fresh subdivision on raw land so often creates a roaring need for new schools, it is a galling condition for school boards to have had no forewarning of the development and to find no adequate provision made for schools by land developers. Too often land must be condemned at high cost because new houses are on it.

Some relief is imaginable, where a really large new subdivision is held in single hands, through ordinances which require an arrangement for suitable school land to be made before the city will furnish services. Yet the vast majority of US subdivisions have 20 houses or less, and any statute making so small a developer responsible for school land is unthinkable. Boards will be better advised to make a habit of contacting developers as early as possible to educate them on the importance of good schools to their own success. Cases are known where such a direct early appeal has led developers to set aside not poor "unbuildable" land but adequate school sites.

Where residential "redevelopment" is done in existing urban areas, aided by city, state or federal funds or benefits, there is no excuse for failing to make provision for an adequate school site in advance of reconstruction. Most unhappily, this has happened in our largest cities.

Lease-sale arrangements are a new device worth exploring, whereby the developer builds and rents the school to the district which thereby gradually acquires title without stretching its bonded debt. But greatest care must be used so the board retains full control over the details of planning and construction, appointing its own architect and consultants with full power.

Sharing of land and buildings with other civic enterprises is an opportunity grossly neglected today. An extreme case was an eastern community where a school for 2,000 pupils lived for many years on a cramped 3½-acre site before anybody thought of using the 30-acre park across the street, owned by the city, for its playground.

We recommend to all school boards that they attend to the example set by Grand Rapids, where the board of education and the city have a standing agreement covering joint purchase and joint development and operation of combination school and park sites. Where such joint action is undertaken it is important that the cost be equably shared, lest the school board seeking an economy end instead with an extravagance.

Similar savings can be effected by correlated civic building programs. Many a town thoughtlessly though enthusiastically supports the construction of separate auditoriums for the city hall (for rare political hearings), for the veteran's organizations (whose meetings are intermittent), for scouts or firemen or lady's aid societies. We recommend as a model the planning of the Canadian town of Kitimat, where a correlated survey has been made for economical construction of *all* civic halls for maximum use. If the decision is that the best place for an auditorium is the school, then other civic organizations should help the school board in financing it. Let school boards also explore the advantage of the "capital budget," thus associating school-board needs in an agreed-upon integrated plan.

3. Better programming to make classrooms do a full day's work

The great waste we are aiming at here is the "dark classroom." Supposing that the best possible programming of the school day results in use of classrooms 90% of the time, then a classroom that is "dark" and unoccupied 50% of the school day represents a building dollar spent for only 55¢ of obtained value.

"Dark classrooms" are chiefly due to the following misconceptions which we join in urging school superintendents and teachers to combat vigorously:

▸ *Overspecialization.* Said a superintendent member of the forum: "Three years ago I was shouting for teacher participation in school planning. Today I fear such participation because the method has so often been wrong." Department heads in high school in particular can greatly overexpand the total plant by fighting, each for his own department. Only the superintendent can wisely guide departmental planning into channels of cooperation and concern for economy of the whole.

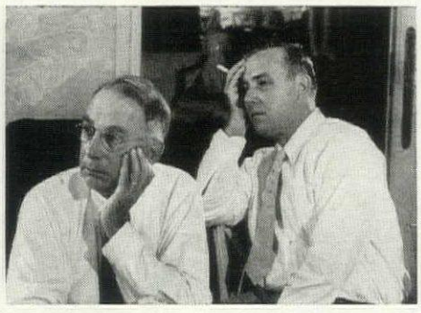
▸ *Unexamined educational dogma.* Though this forum has no intention of prescribing or advising on methods of education, it yet must point out that some of these lead to high building expense. For example, in a case now in progress, insistence of principals that every high school student start the day in a standard classroom used as a "home room" means that a school will accommodate 1,200 instead of 1,500 pupils—in other words, the cost will be a full 25% higher. Is this not a high price to pay for the privilege?

▸ *Thoughtless scheduling.* The art of balancing schedules to secure the best, both in educational effectiveness and in building utilization, is complex. Different ways of handling schedules can lead to wild differences in building utilization, hence in economy. Here the educator can lose more than the architect can possibly save.

▸ *Wasting "spare hours."* Schools built so they can be used only by day, never for night classes or adult education; school programs that pay no attention to the three summer months between mid-June and mid-September—these may yet be with us for a long time but they spell waste.

Hersey, Toy and Prentice

Barthelme and Caudill



Harriman and Linn

4. Restudy of the building to see what can be subtracted and added

There are two ways to approach real economy in planning and designing the building itself, both good. The first is subtractive: to start at the top of the existing kind of building and see what can be taken away without really imparing education. The second is additive: to start at the bottom with zero and decide to build only what we really need, so frills will automatically be left out.

We recommend that both approaches be taken and checked against one another; but with the added note that the second, the additive, method is the most promising and yet the least tried.

The subtractive process, starting at the top, involves these steps:

▸ *First to go: cupolas, parapets, fancy roofs.* An upstate New York firm of school architects of long experience sadly buried its founder three years ago but gladly buried with him the repertory of cupolas, parapets, columns, urns, "adjuncts" that he and his school-board patrons had so dearly loved. The firm found at once that it could now build schools for 15% less. And the new schools were no less handsome, either.

▸ *Second to go, the upper floors.* We make no recommendation for the universal abolition of upper floors but merely say that where it has been possible to plan schools on a single floor these have generally been less expensive. Last year 76% of all schools built were one story and the proportion is rising. Safe upper floors require firesafe stairs and most costly Class A or B fireproof or fire-resistant construction, whereas a ground-level, one-story school offers instant evacuation of pupils and may justify use of less precaution in the structure. (For insurance, see later discussion.)

The contention that a second floor saves by sharing the same foundation and roof seems to be erroneous because of the extra fireproofing and the extra areas needed for stairs and circulation.

▸ *Third to go, the basement.* Again we make no recommendation for universal abolition of space below grade but observe that today's structural methods generally favor the basementless building and a great many buildings are being thoughtlessly planned with basements that introduce less desirable space at no cost saving or even a higher cost.

The additive process, starting with zero construction, begins as one member of the forum said, in "the cow pasture" and progresses to the multi-use corridor:

▸ *Not necessarily must all education take place under a roof!* In rural areas in particular, and in all schools, the out-of-doors is an almost wantonly neglected educational resource today both for learning and for sports. With a wealth of environment all around them our children are falsely taught to observe only what they see in books, and many a wall we build isolates children

from education instead of furthering it. The classical story of the boy graded down for answering that robins appear in October instead of May is a case in point. The book had been printed in New England but he lived in the South—and he was being discouraged from believing what his own eyes had faithfully seen!

Again, in areas rich with opportunity for outdoor sports all year, whether warm-weather areas favorable to year-round outdoor games or cold-weather areas favorable to skiing, skating and hiking, not necessarily does an effective health-building program at elementary school age demand an elaborate gym.

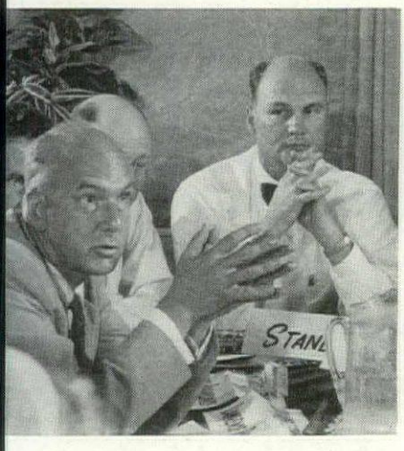
▸ *Not necessarily does all education requiring shelter require walls also*—it may require only a floor and roof. No comprehensive survey yet exists of what can be done with "outdoor" shelters.

▸ *Not all classrooms need be walled in on all four sides.* Emergencies have taught us that some teaching can be done in corners of rooms marked on the plan as "cafeterias" or "gyms" or "auditoriums." Such teaching would be better if the architect had it in mind in his initial plans. Again, in some Texas schools teachers have reported favorable results from throwing together two rooms, leaving only low barriers of furniture.

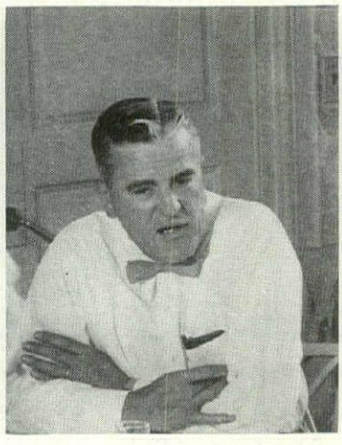
▸ *Not every passageway needs walls.* This is a major source of possible savings. Long since, warm-climate architects have designed "corridors" as outdoor passages sheltered only by an extension of the roof. Yet that is but a beginning. Even in New England, advanced architects are now planning schools wholly anew, as "campus plan" groups of clustered "little houses" where the only connecting link is a mere rain canopy. The brief exposure while moving rapidly from class to class is not a health hazard, especially compared with the danger of wearing warm clothing in overheated rooms.

And in the Detroit area the walls have gradually been melting around indoor corridors. First, teachers decided they needed only glass between the room and the passage; then that not even glass was needed; finally that the passage area might better be absorbed as an extension of the classroom! This raises some problems of safety of exit but they are easy ones. (See p. 161.)

Adding such challenges together, teachers and planners may end with a school "built up" to a mere fraction of earlier ones and yet not worse but better for purposes of education. The wall-less corridor, for example, becomes the multi-use corridor.



Perkins and Sharp



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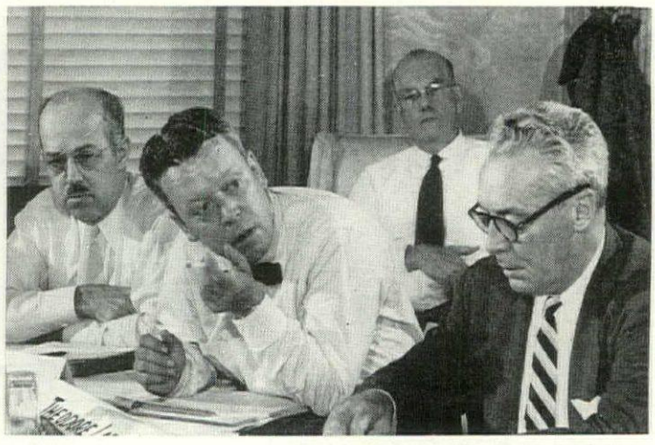


Taylor, Larson, Lehnert and Dunn

5. Intensive use of nonclassroom facilities to save square footage

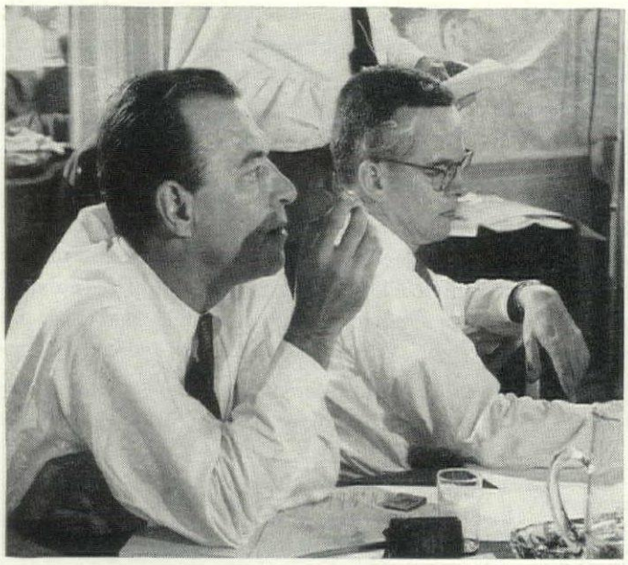
Not only parents but also experienced school men may be shocked by realization that not over one-fourth or one-third the total area of many a school is devoted to "classrooms." The rest is given not only to administration and circulation but to gyms, auditoriums, cafeterias and their adjuncts. Despite recent thinking on "multi-use" of such features, there are other avenues toward true economy.

▸ Not every school that is getting a cafeteria really needs it. Shocking though it may be to many an older school man to think of the "mess" of children eating in their own rooms, modern invention in food heating and food serving makes it possible to give children this sociability and this educational experience; and modern classroom furniture minimizes the mess. We by no means advocate abolition of all school cafeterias but urge a selective policy in determining how food is to be served.

▸ Not every school, and especially not every elementary school, needs the big auditorium that is now being planned for it. In elementary schools a too big auditorium is in fact directly contrary to educational benefit. And where a high school does build an elaborate room, not merely for its own use but for that of the town, the school board should not be asked to act as an eleemosynary body but the construction cost should be shared. Again, in many a town the high school might better use, at least temporarily, existing auditoriums that stand vacant most of the time. There is, as we have already remarked, great need for more correlated over-all civic planning.

▸ Not every school, and especially not every high school, really needs the big double gym that is being planned for it. In many a US community it is an open question whether the town builds the high school primarily for education or for training up the young gladiators called the Basketball Team. Where education is primary, a smaller gym can sometimes make the school possible instead of not possible, and boys and girls can be rotated in using the same floor. Though one member of the panel emphasized the value of competitive sports, no one has yet advocated building bleachers in classrooms to rouse competitive spirit.

▸ On the other hand, despite much recent talk about multi-use of all common facilities, so the cafeteria doubles as class or rumpus room, and the gym as auditorium, we advocate caution lest the economy prove false and lest education suffer.



Wright and Newman

Radoslovich, Reid and Sharp

6. Careful study to bring mechanical equipment in line with need

Today's schoolhouse is composed up to 35% of mechanical equipment, as compared to the early school that depended on a stove, a pump and a pair of outdoor toilets.

Overdesign of mechanical equipment is a major source of waste.

Overdesign of heating plants can add as much as 10 to 15% of needless cost. How many mechanical engineers know that the ASHVE Handbook lists "alternate" values for winter design temperatures for most US cities 10° to 12°F higher and consequently less costly? How many mechanical engineers have acquired a clear understanding of the difference between heating schools and other kinds of buildings? What sense does it make to supply boilers sized to produce comfort on the coldest night of the year when nobody is in school? The problem is how to have the building warm enough when children arrive at 9 in the morning. After school opens, so much body heat and often so much electric-light heat is given off that the usual problem is how to keep classrooms cool rather than how to keep them warm. How many engineering designs acknowledge this? How many avail themselves of solar heat that can pour into the classroom, properly oriented, in the morning? Is there recognition of the difference in metabolism between adults and children? Are not schools designed for adults, not too warmly clad, rather than for vigorous children? Further economies in heating could be achieved if educators were willing to accept gymnasium heating standards that meant sacrifice of the gym on the very few days of excessive cold. Questions of ventilation and of plumbing are dealt with in the next section.

7. Revision of obsolete codes to protect, not exploit, the child

We call attention of the American public to the fact that school boards and their architects must today climb a veritable mountain of codes before they can start digging a foundation. This begins with city building codes, continues through fire marshal regulations, underwriters' codes, insurance ratings, and concludes with state school codes. Eternal vigilance is required to prevent codes, which are an essential safeguard against ignorance and skulduggery, from becoming the very matrix of ignorance and skulduggery. There are a certain few politicians, certain few manufacturers, certain few labor leaders just as ready today to exploit children as were the early despised exploiters of child labor.

Generally speaking, however, state school codes are administered by devoted men hampered by broad misconceptions of other people.

We believe all states must depart from the "statutory" form of school code, as a great many already have. This form makes every regulation a subject of separate legislative enactment, so men who do not understand the technicalities involved not only set the rules but make them impossibly cumbersome to correct.

The recent emancipation of Connecticut's boards of education from restrictive codes is not expected to result in less safe, less usable, or less economical school structures. We recommend that legislatures not only delegate the details to administrative officers under broad definitions of policy, but also that such administrators be instructed to set standards of *performance* and not dictate the expedients so long as performance is attained.

For example, all will agree that adequate and well-distributed light is of utmost importance both to health and learning; and objective standards of good lighting quality have been agreed to by the American Standards Assn., the Illuminating Engineering Society and the American Institute of Architects together. Yet the pursuit of such quality is best left to architect and engineer. When a state code requires, as many do, that room ceilings must be high for the sake of better lighting, then such codes are merely insisting on a method predicated on early unilateral daylighting design which antedated the wonderful improvements in multilateral daylighting design, in new kinds of glass and plastics and in the electric lighting of the past two decades. No motor engineer could improve engine efficiency with a legislator at his elbow dictating stroke and piston displacement!

Again, fire safety is universally desired. Yet the many states which still apply to one-story schools the same rigid fireproofing

that made sense for yesterday's three-story schools are raising costs to no purpose. If children are the primary concern (as they should be!) then the instant escape possible at ground level directly from the classroom makes a properly designed and planned one-story school built of wood actually safer for the child than the best fireproofed three-story school. Again, if children are the first concern rather than the structure, even the best fireproof building must be considered a stove which can stand unharmed while the contents burn freely. The principal loss of life in recent fires has come from noxious fumes released from the wall covering and other flammable contents which are present inevitably. Again, if extreme precaution against fire is considered necessary even in a one-story wooden building, then it should be recognized that a wooden building with sprinklers is safer than a completely fireproof building without sprinklers.

Fire marshal regulations concerning schools are in many cases conceived in dense ignorance of children and their behavior and some of them would be actually murderous in the case of fire. To every state governor concerned with undue school costs we suggest calling a meeting of the best school administrators and architects with the fire marshal to cull out the finespun theoretical nonsense from the fire regulations.

Insurance rates and fire regulations are interwoven and we ask all forward-looking insurance companies as a patriotic duty to meet similarly with school administrators and forward-looking responsible architects with a view to reducing rates where advancing techniques of design have reduced the actual risk.

Ventilating requirements of a great many states are so antiquated as to rest on theories of health found incorrect in 1888. The demand in some states for 30 cfm of fresh outside air per pupil fails to note that this is more air than a track champion could breathe after a 2-mile race. Today's maximum demand for ventilation is in the interest of adequate cooling for the room, not of fresh air for occupants to breathe, and although large quantities may still be desired, there is no need whatever for all this air to be fresh and heated, with the enormous added heating load which this creates.

City and state codes further complicate the search for economy, and cities which have yielded to entrenched interests are now hoist with their own petard. Not only do many state statutory codes insist, for example, on more toilets than even an epidemic could demand, but on top of that almost every community has a local plumbing code which makes all plumbing—including plumbing for schools—cost far more than is necessary.

▸ A great many communities have *plumbing codes* whose requirements are in excess of those developed by the leading sanitary engineers, the US Public Health Service, the Department of Labor and other authorities for the new National Plumbing Code. The school plumbing bill runs more than 10% of the total construction bill and most communities will find adherence to the National Plumbing Code one of the quickest ways to reduce school construction cost.

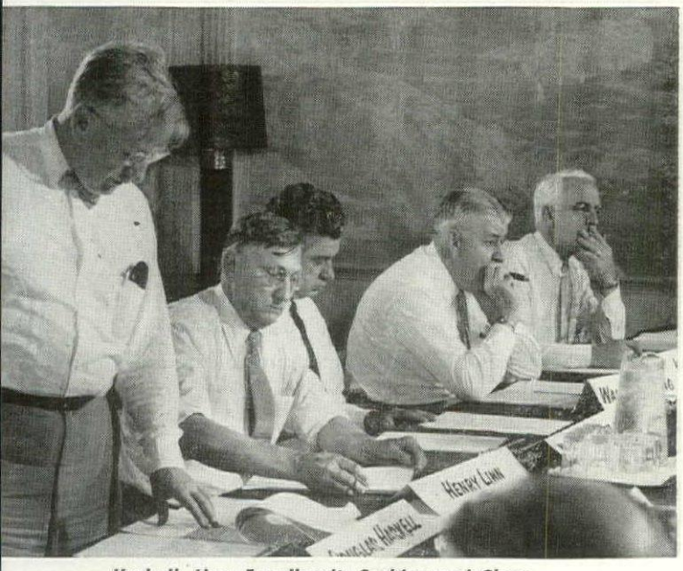
▸ A great many communities have an *electric wiring code* whose heavy requirements are in excess of the safety requirements of the National Electrical Code. There is no excuse for this.

▸ A great many communities have *construction codes* that are far behind the times and forbid architects to take advantage of many good new materials and construction economies. These communities could cut their school costs and all other construction costs by adopting one or another of the standard codes and keeping updated each year by reference or renewal.

The waste caused by mischievous codes is much greater than the sum of specific little wastes which the codes require. By far the greatest waste imposed by obsolete and conflicting codes is that they block the progress of standardization and the development of standard prefabricated parts and assemblies of parts that have been the greatest source of economy in every other industry.

8. Standardization without loss of self-respect —not stock plans

It would be a mistake to blame all waste and all lack of standardization in school construction on conflicting codes and antiquated state requirements. A great many opportunities to economize are being missed by failure to capitalize on standardization already possible or available. We sympathize with the *aims* of those hardheaded businessmen and legislators who have been seeking adoption of "stock plans" either in the form of ready-made prefab schools or in the form of plans drawn by bureaucratic designers for whole states or districts. It is notable, however, that in 53 cities of over 200,000 population surveyed by the AIA school committee, 18 school systems use private architects exclusively; 23 systems use private architects but have staff architects to coordinate their work or to perform maintenance or repair work. Four are a combination of the above, and only 5 use staff architects exclusively.

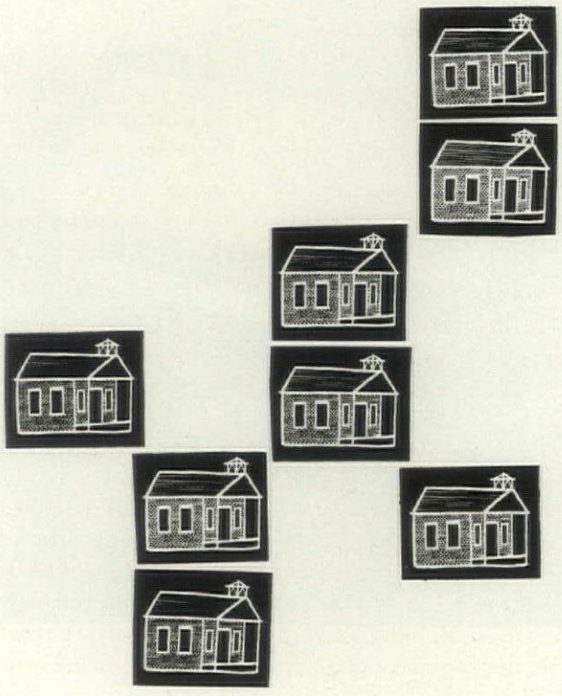


Haskell, Linn, Engelhardt, Cocking and Clapp

▸ Our first count against the entire stock plan idea is that it is just the not too good first notion of how to achieve economical standardization and not the best latest idea. The people now backing stock plans could serve themselves better with a slightly more knowing approach. Among the states, only ten states have stock plans available—for limited use for small one-room, two-room, or rural schools; 23 states do not use or never have used stock plans; 12 states that formerly used stock plans have now abandoned them.

continued on p. 192

CASE STUDIES *of the latest trends in*



CLUSTER PLAN—the "little house" or "campus" idea

Instead of gathering classrooms together along corridors, this plan breaks them into separate houses of from one to eight rooms. It usually puts general activities, administration and the like into a main house.*

The cluster is 1953's biggest news in schoolhouse planning (forecast in AF, Oct. '52). This is the approach that pioneering thinkers in design and education are exploring today beyond all else—for all kinds of different reasons as shown by the cluster case studies that follow.

Here is what the idea has in its favor:

Educationally: Child-size scale; intimacy; uninstitutional, unregimented atmosphere; grouping into "age neighborhoods"; semi-isolation of disparate activities. Most elementary school teachers who have had experience with the plan (mainly, so far, in actual houses with partitions removed, as a temporary expedient) seem to like it for roughly the same practical and psychological reasons that most mothers would rather live in a house than a housing project.

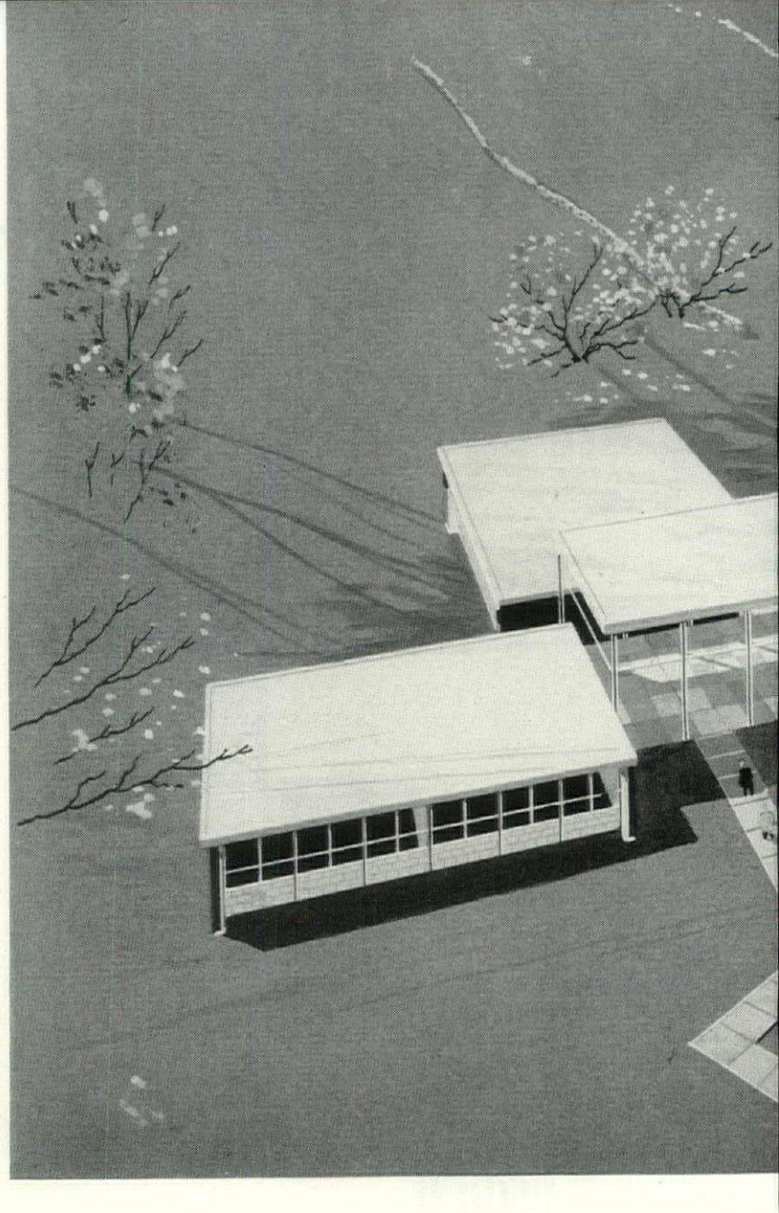
Economically: Simplicity.

Biologists like to point out that big animals are not big because they are complicated; they are complicated because they are big. Same with schools. "Little house" planning automatically simplifies lighting, ventilating, grading, framing and provisions for expanding. It lowers ceilings and cuts out corridor. It invites bids from a wider range of contractors. It is also a natural in isolated communities for residential-type heating plants using hot air—a possibility that a few finger-plan schools are already trying and that gives promise of economies in sprawled-out plans.

Against the idea are length of utility runs, problems of snow removal in some climates and (in some communities) reluctance to accept the idea of children going outdoors to get about the school. (This objection is raised most seriously for high schools, although the campus plan is old hat to New England's famed prep schools.)

One complaint: Esthetically most cluster plans thus far (Oak Manor and Heathcote, p. 140, are exceptions) look as if their designers had followed too literally the notion of "an institution broken into its parts." The clusters have an air of being separated chunks of something bigger, rather than the different things—little houses—that they are. Here is unused scope for imagination. How about some (economical) romanticism? It seems appropriate both to the form and its users.

* Note that this point is an especially radical change in high school planning, in which general activities areas are customarily scattered on the periphery of a unified classroom area.



ELEMENTARY SCHOOL

Darien, Conn. ▲ 16 classrooms. ▲ 520 students.

ECONOMIES

Three-dimensional dispersal on irregular terrain (seven different floor levels for nine units) resulting in low site and foundation costs. ▲ Trees thus saved control sun for all but three units ($2,000 saved). ▲ 9′ ceilings ($9,000 saved). ▲ Acoustical treatment only as needed ($16,000 saved). ▲ Covered outdoor playroom instead of gym (about $34,000 saved). ▲ Compact multipurpose area. ▲ Absolutely repetitive construction (28¢ per sq. ft. or $5,200 saved in framing alone). ▲ A module that eliminates cut and trim, thus permits exposed structure.

COST

$323,000; $12.42 per sq. ft. ▲ $20,200 total building cost per classroom. ▲ $621 per pupil.

CONSTRUCTION

Slab on grade. ▲ 6″ x 8″ steel columns exposed on exterior. ▲ Open web steel joists. ▲ 8′-8″ module gives greatest span for least expensive (18-gauge) roof decking. ▲ Cement block (six to module) walls with brick veneer on ends. ▲ Radiant panel hot-water heat. ▲ Interior roof drain over plumbing.

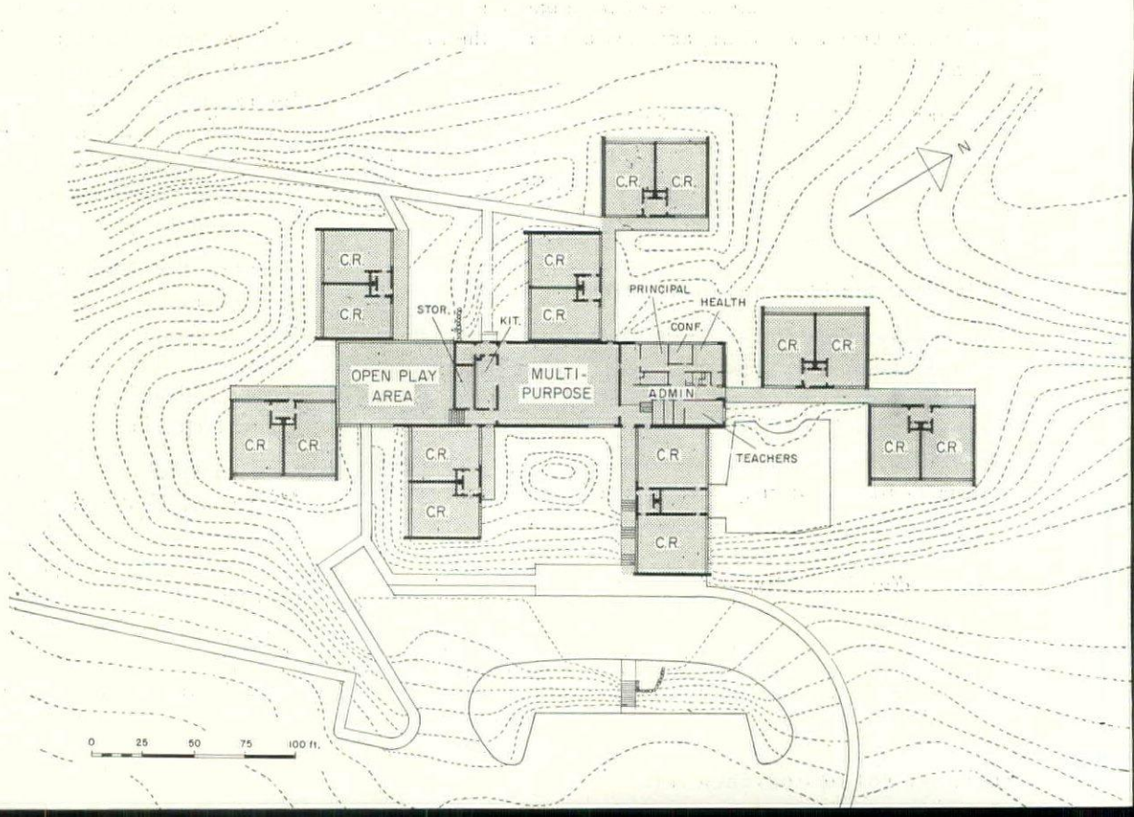
FEATURES

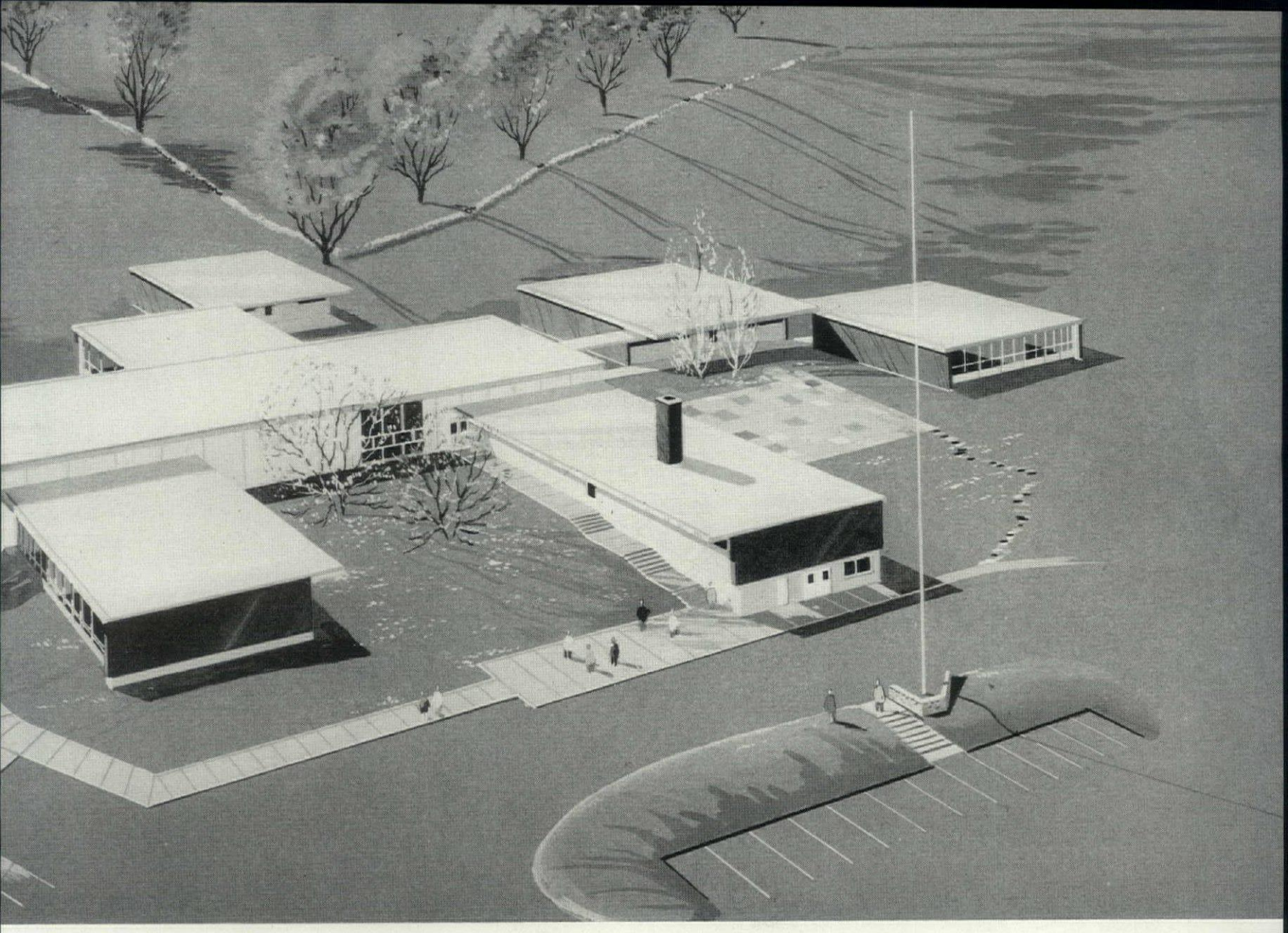
Versatile "live" walls taking acoustic, chalkboard and tackboard panels or shelving as needed. ▲ Cabinet-door visual-aid blackouts. ▲ "Multipurpose" vestibules. ▲ Library shelves doubling as stage backdrop. ▲ Module exploited for decoration and scale.

CREDITS

Ketchum, Gina & Sharp, architects. ▲ Sam Grasso Co., Inc., general contractor.

In Darien, Conn., the cluster plan offers a classic study in





Classrooms cluster *about activities area; walls will be varicolored to emphasize small scale*

little schoolhouse amenities and economies

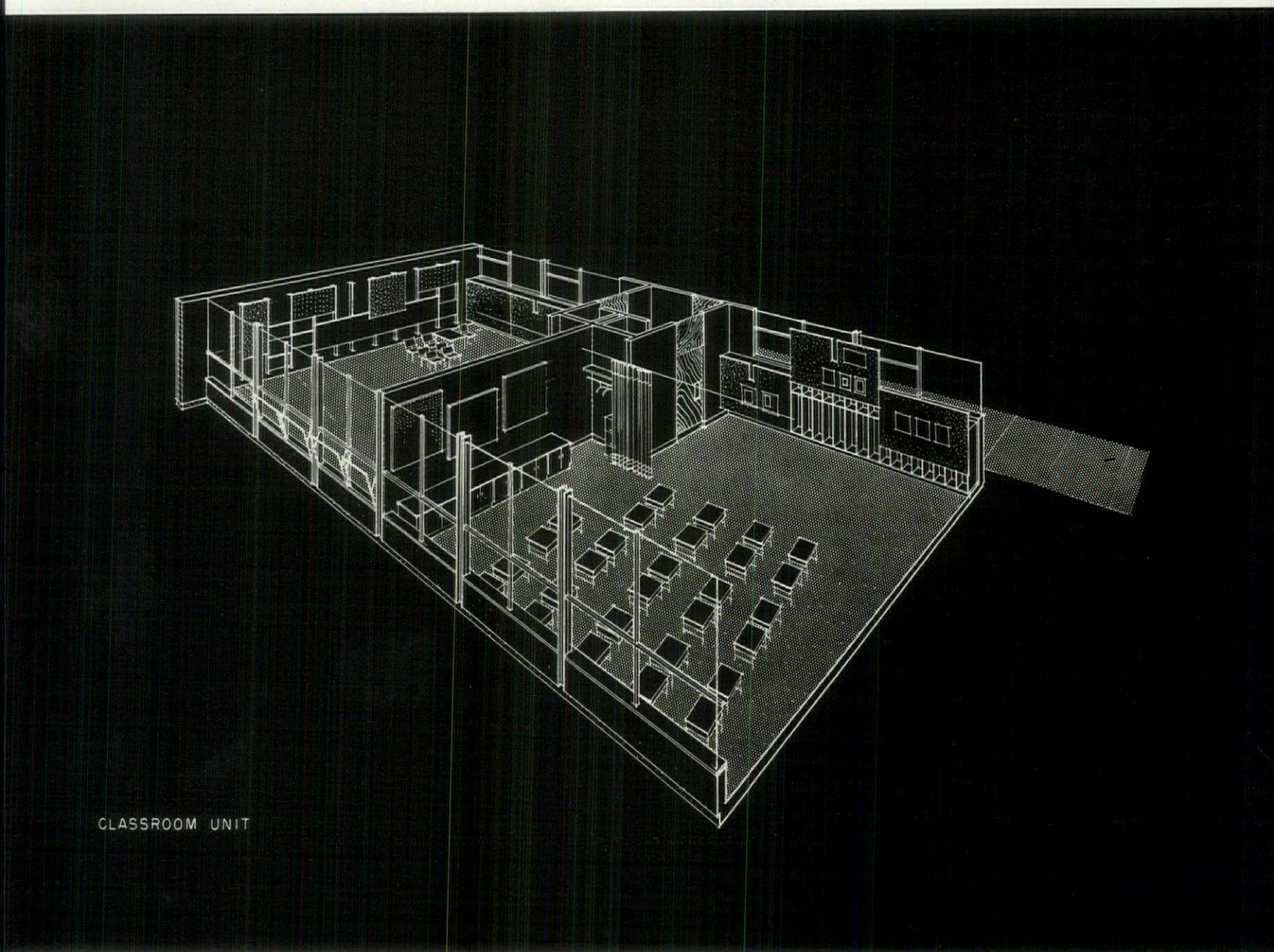
Cluster-type planning has only begun, but already it has produced a design that for economy and amenities looks like one of the classic additions to elementary school thinking. Bids came in 10% below the budget and the town vote for the bond issue was unanimous! This school is so useful as a reference point for these three reasons:

1. It is "generalized"—first requirement of any good prototype. No special conditions determined this solution—only the general problems of a moderately uneven site and the need for reconciling stringent construction and maintenance economy with top-notch teaching space.

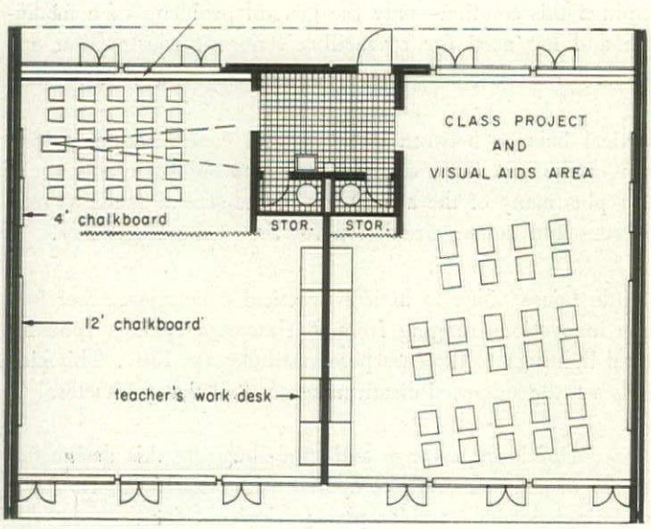
2. It strikes a practical balance between dispersal and concentration, getting all the advantages of the first (such as "little schoolhouse" scale and use of existing contours) plus many of the advantages of the second (such as relatively short pipe runs and indoor circulation for the youngest grades).

3. It follows the "little house" idea to logical practical conclusions, therefore is full of sensible innovations ranging from 9′ classroom ceilings (possible because of bilateral lighting) to three-purpose vestibules (p. 130). This kind of thinking cancels out the supposed disadvantage of "all that perimeter."

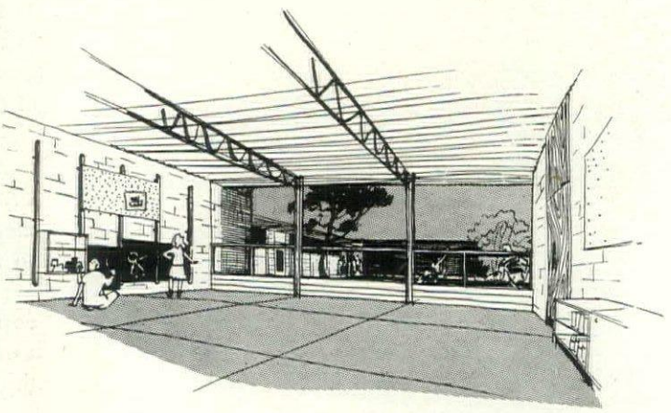
Some figures: because of lower ceilings and grade-hugging this design has 17,943 gross sq. ft. of exterior wall, compared with 19,616 sq. ft. for a more conventional single-loaded corridor plan worked out for the same site to the same program. This design has only 49 gross sq. ft. of floor area per student, against 71 for the last two elementary schools (double-loaded corridor buildings) built in Darien; but 80% of this school's floor area is used for education (39.5 sq. ft. per student) against 56% (39.8 sq. ft.) in the two previous schools.



CLASSROOM UNIT



Classroom vestibule *treatment solves three cluster-plan problems: how to get economy with multiplicity of slop sinks and of toilets; how to keep many entrances clean. Vestibule floor, backwall and base are tiled, can be hosed. Slop sink is replaced by low faucet and floor drain for bucket filling. Eliminating separate toilet vestibules makes scheme more economical than battery toilets. Washstand and drinking fountain will be bright yellow against chocolate-colored tile. Note (above) the wardrobe doors which slide up to cover the high windows in the visual-aids area.*



In Port Arthur, Tex., clustered classrooms enjoy light and air under

big, inexpensive umbrella

PHYLLIS WHEATLEY ELEMENTARY SCHOOL
Port Arthur, Tex. ▲ 7 classrooms. ▲ 250 students.

ECONOMIES
Outside corridors which double as rain shelter, sun and sky control. ▲ Compact four-classroom back-to-back cluster with central heating and plumbing core. ▲ Repetitive structure. ▲ 9′ ceilings (possible because of floor-to-ceiling biangular windows). ▲ Simple umbrella roof with no breaks, parapets, gutters.

COST
$117,947; $9.12 per sq. ft. ▲ $16,850 total building cost per classroom. ▲ $472 per pupil.

CONSTRUCTION
Drilled footings, reinforced concrete floor slabs and beams. ▲ Pipe columns, wide flange steel beams and wood joists. ▲ Built-up roof on diagonal wood decking. ▲ Plywood and acoustic tile ceiling. ▲ 12″ cavity brick walls. ▲ Forced warm-air heat.

FEATURES
"Pressure walls" facilitating natural ventilation. ▲ Sill forming continuous exterior concrete bench.

CREDITS
Caudill, Rowlett, Scott, Neff & Associates, architects. ▲ J. W. Hall Jr., mechanical engineer. ▲ H. B. Foster Co., general contractor.

Because of torrential Gulf Coast rains the architects did not want roof breaks or toplighting in this school. (And rain falls on every US school.)

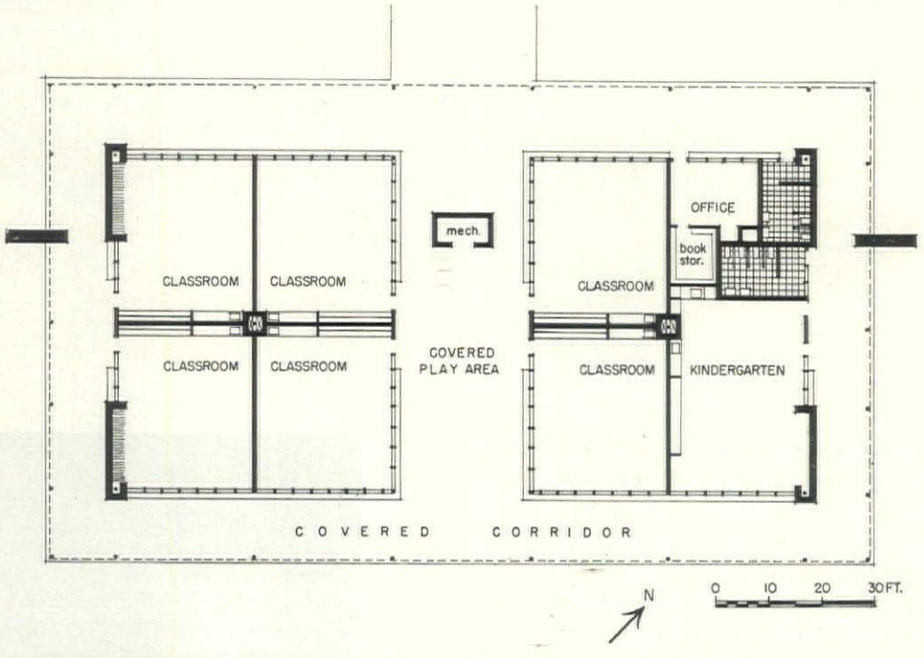
Because of Gulf Coast heat, they wanted ventilation and plenty of it. (And natural ventilation is good for schools in many other areas.)

Because of economy they wanted natural lighting and compactness. (And economy is a prime requisite everywhere.)

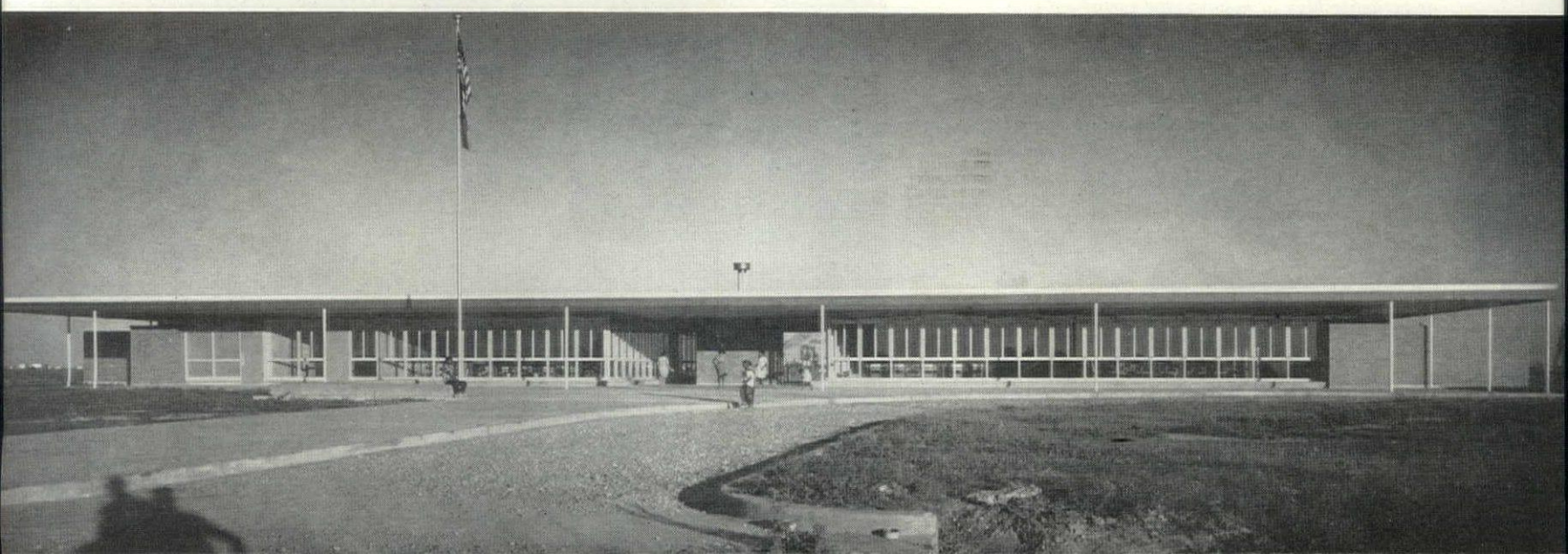
Their solution—a big umbrella with light and air entering between and around the classroom clusters—merits study for drier and cooler climates too: wherever ideas for simplicity of construction and economy of lighting and ventilating are sought.

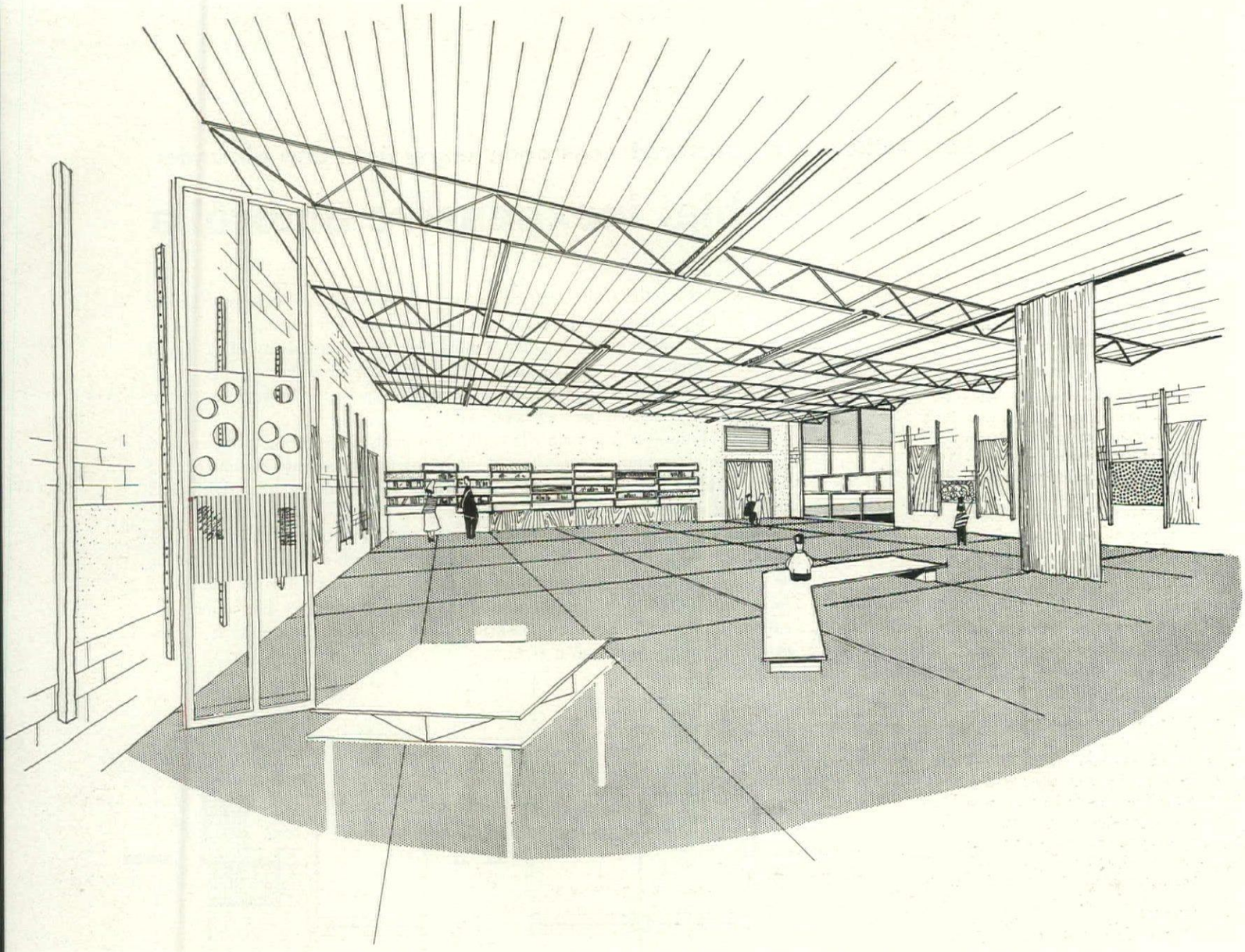
It does impose one condition that will seem peculiar to many school boards—classrooms with windows looking directly into one another. This is not new for the Southwest and many educators there favor it; they say it gives students a feeling of interclass community and interest, has proved no distraction.

For a very neat idea on how to harness the wind, study the architects' "pressure walls" in the diagram at right.

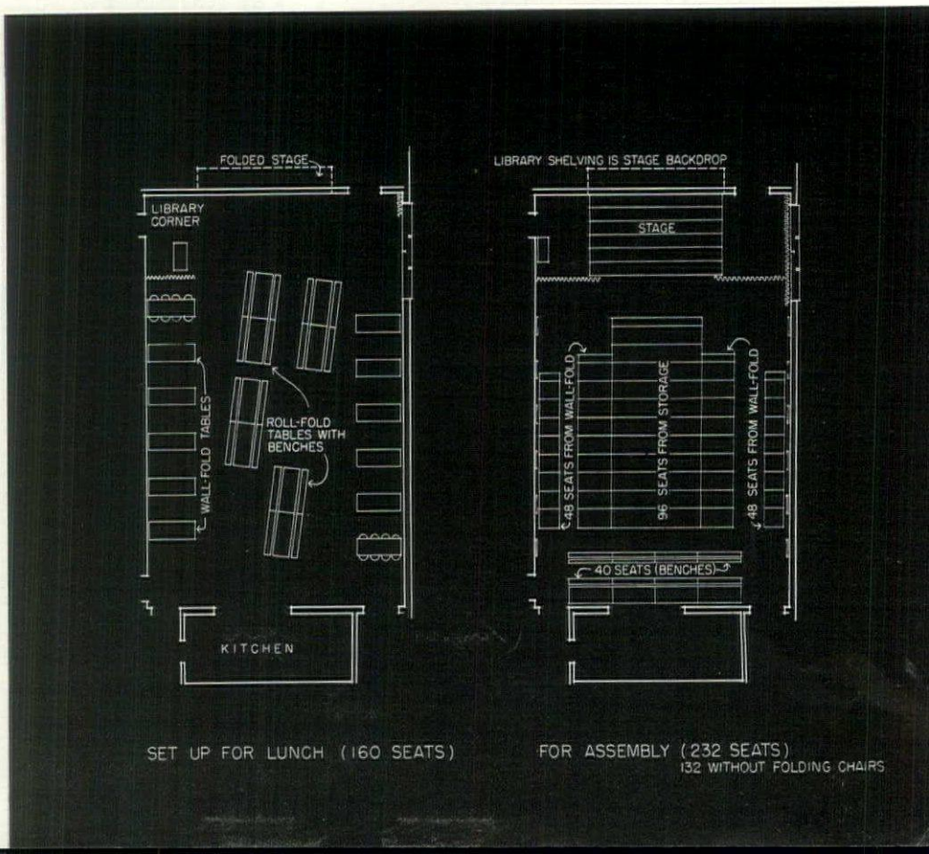


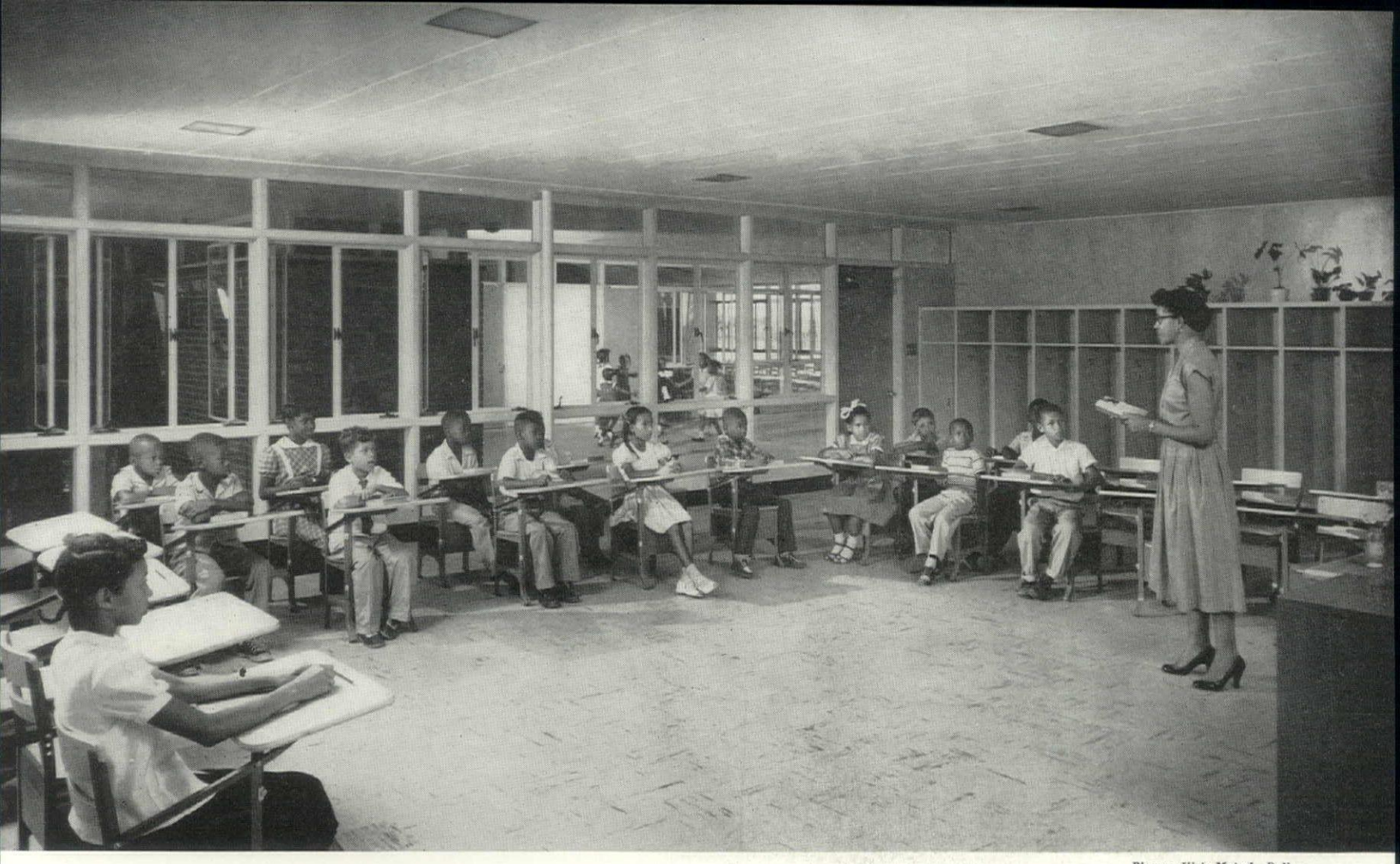
Four-room groups *exploit cluster economy with central cores and peripheral open corridors*





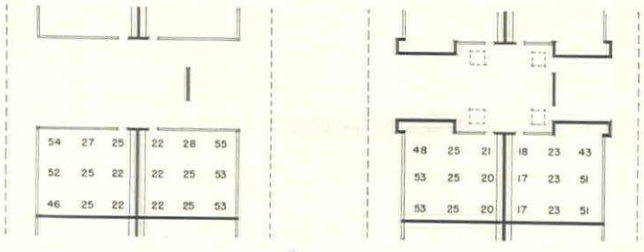
Multipurpose area *(view above is toward library shelves over pull-out stage) can be converted from dining to assembly seating 136 in 20 min.; to assembly seating 232 in 45 min. For rare whole-school assemblies, neighboring junior high will be used. School will also experiment with bringing food from junior high in hospital-type carts. (If satisfactory this may lead to central kitchen for town school system.) Teak wall standards for multipurpose area and classrooms bring a merchandising idea to school: they will take 4' shelving or tackboard, chalkboard and acoustic panels. Placement of acoustic panels on walls and vertically from ceiling will be determined by meter tests after construction.*

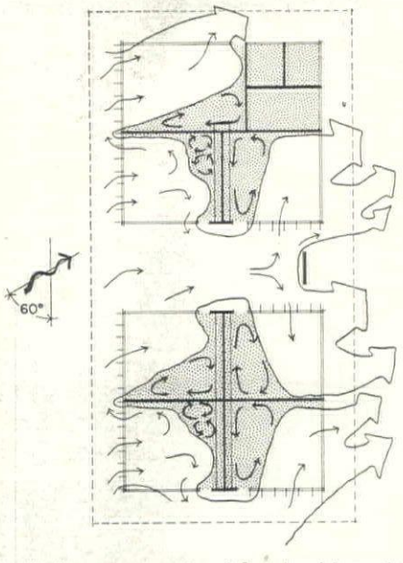




Photos: Ulric Meisel—Dallas

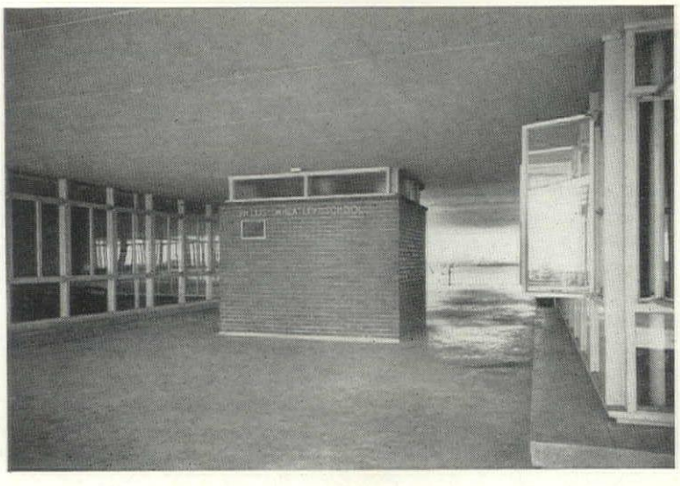
Light for four center classrooms *enters through big breezeway bisecting the school. Diagram at left, below, shows light-meter readings with test model. Diagram at right shows poorer results with toplighting and masonry storage cupboards at corners. Toplighted design without cupboards gave test results (not shown) almost identical with final scheme.*

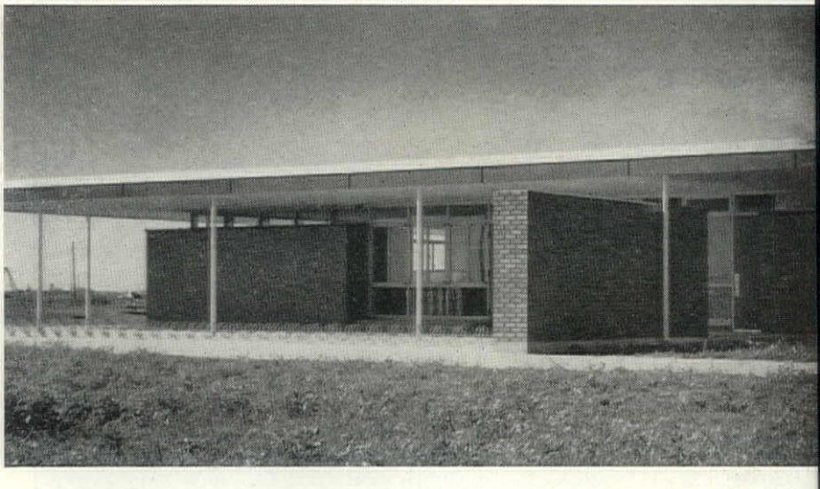


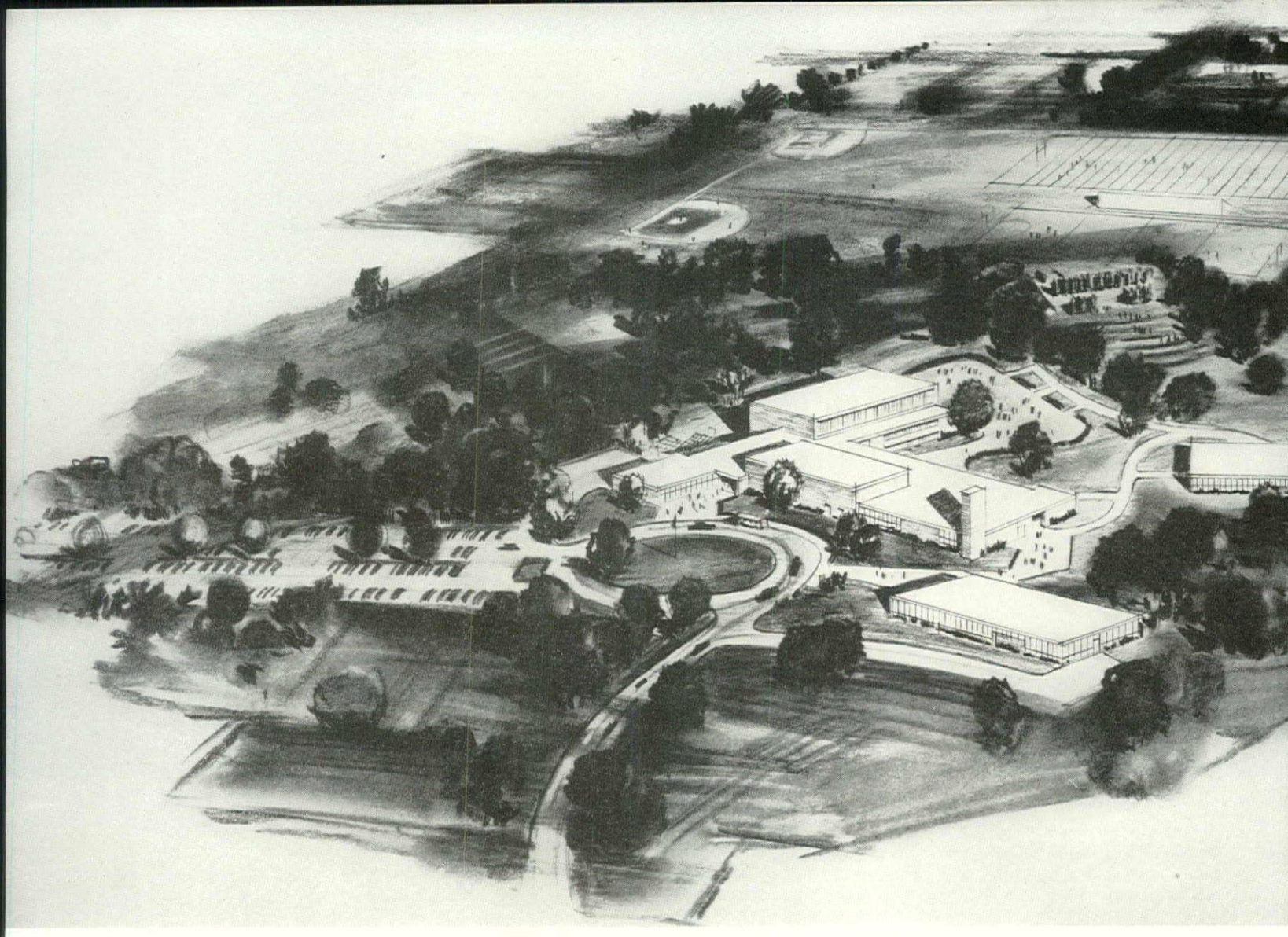


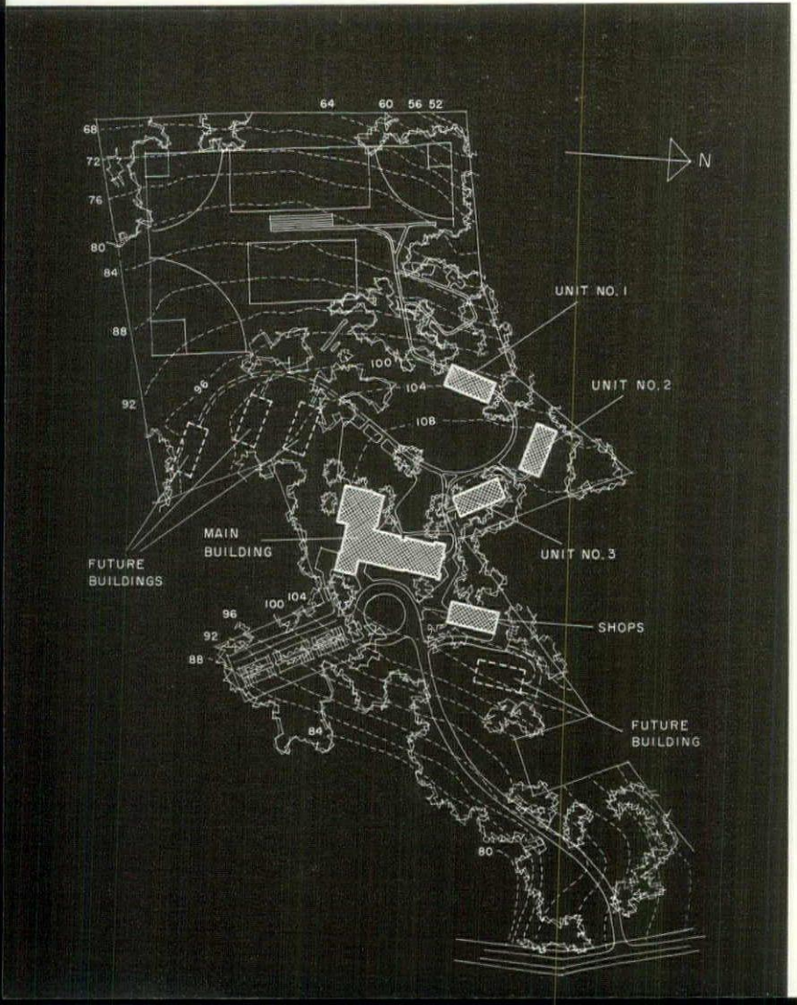
"Town common in a breezeway": *Ample outdoor space sheltered from frequent heavy rains is appreciated by adults when classrooms are used for community or parent meetings. Note sill-bench.*

Ventilation test results *(above) with model show how breeze, meeting mechanical-room wall in breezeway, is deflected into classrooms. Final scheme (see plan and below) has "pressure walls" also at sides.*









In Groton, Conn., cluster planning breaks

SENIOR HIGH SCHOOL

Groton, Conn. ▲ 26 classrooms, 650 students.

ECONOMIES

Dispersal using existing contours ($75,000 to $100,000 saved). ▲ Few corridors. ▲ 83% of gross area for educational use. ▲ Repetition of classroom "houses" (all variety achieved with interior partitioning). ▲ "Double-duct" air system eliminating steam pipe tunnels ($18,000 saved). ▲ Light troffers for luminous panel ceiling cast in roof slab ($3,200 saved). ▲ Painted slab for finished ceiling ($10,000 saved); acoustic treatment on walls. ▲ Loose - weave curtains for window light control.

COST ESTIMATE

$823,000. ▲ Per sq. ft.: $14, main building; $11, classroom units; $12.65, average. ▲ $31,654 total construction cost per classroom. ▲ $1,265 per pupil.

CONSTRUCTION

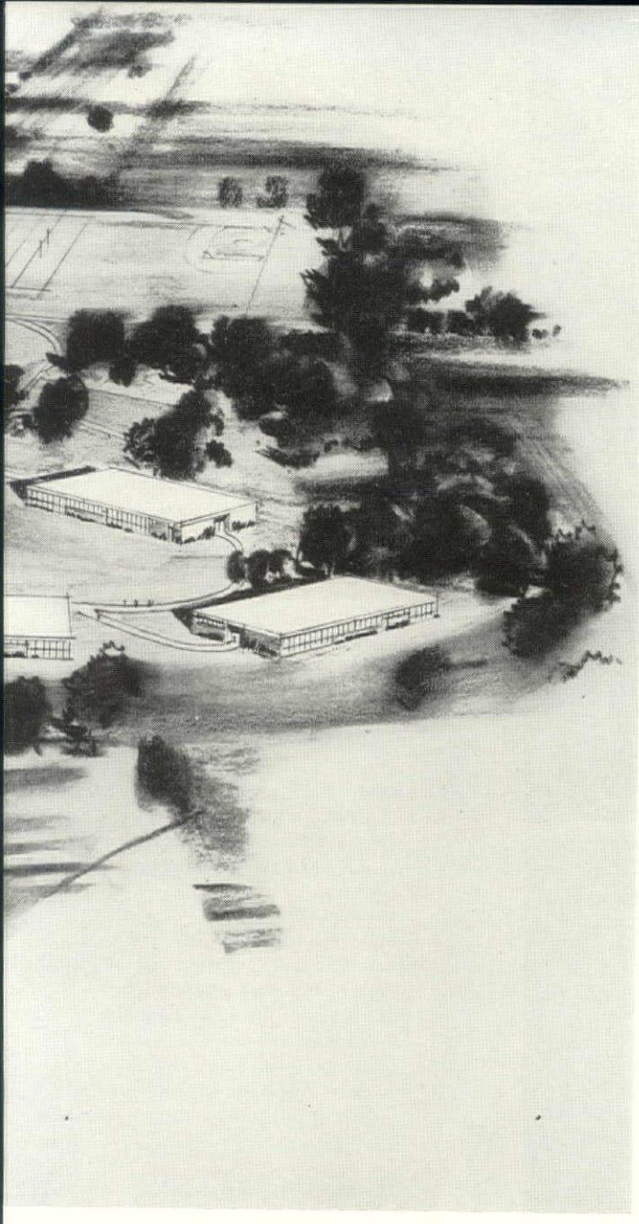
Slab on grade. ▲ Reinforced concrete structure integrating air heat ducts and luminous panel lighting. ▲ Glass walls with aluminum sash. ▲ Brick and cinder block walls. ▲ Lally columns and rigid steel frame in gymnasium.

FEATURES

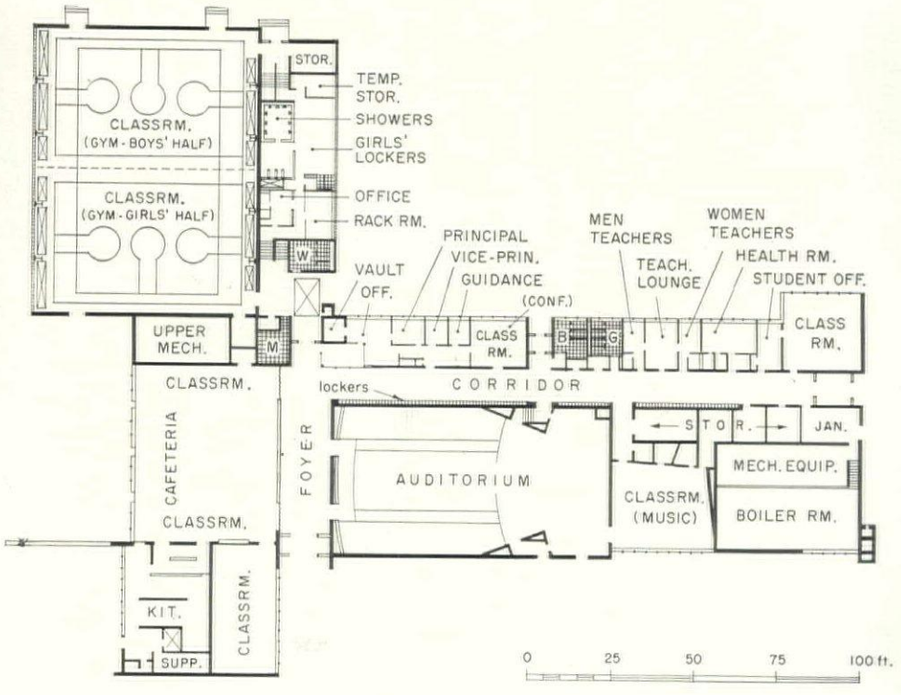
Classrooms are outlying elements, special rooms are central (instead of usual reverse). ▲ Cafeteria equals "town common," doubles as gallery, informal meeting place, equates eating with sociability, leisure. ▲ Classrooms grouped according to pupil use, not departmentalized by subject.

CREDITS

Warren H. Ashley, architect. Marchant & Minges, engineers. ▲ Charles Currier, site planner. ▲ Engelhardt, Engelhardt & Leggett, educational consultants.



Campus plan *for senior high school has classroom units of identical size and construction, varied by interior partitions. Rendering shows main building and four "learning units" to be built in first stage; plot plan shows eventual addition of four more units. Eliminating most corridors gives an astonishingly high (83%) proportion of total area for educational use.*



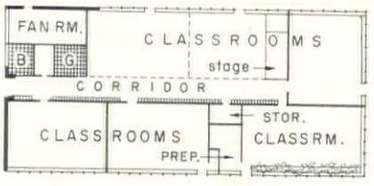
a senior high into 150-student neighborhoods,

creates a hedge against obsolescence

The educational revolution that began transforming elementary schools 20 years ago has never been followed up in the high schools. Educational Consultants Engelhardt, Engelhardt & Leggett suspect it will be. They fear that most of the plants to go up in the coming high school building boom will feel like so many strait jackets in another two decades.

Clusters at Groton's senior high are calculated to avoid such educational obsolescence, come what may. The Engelhardts and Architect Ashley think they will accommodate gracefully any kind of setup—orthodox classes in amiable isolation one from another or thoroughgoing "core curriculum" (projects integrating various subject matters); lone teachers or teacher-teams; or any mixture of methods. In any case, they like the idea of breaking the bewildering and amorphous senior high mass into 150-student "neighborhoods" related to a "community center." As enrollment grows, more "neighborhood units" will simply be added at a cost of about $80,000 each.

Ashley reports that, equipped and ready to operate, the school will cost about $120,000 less than any other Connecticut high school of equal size to date.



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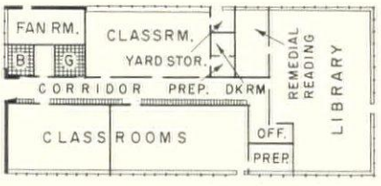

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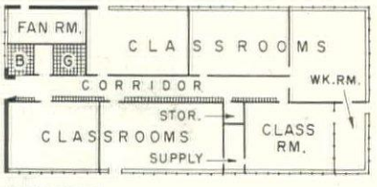

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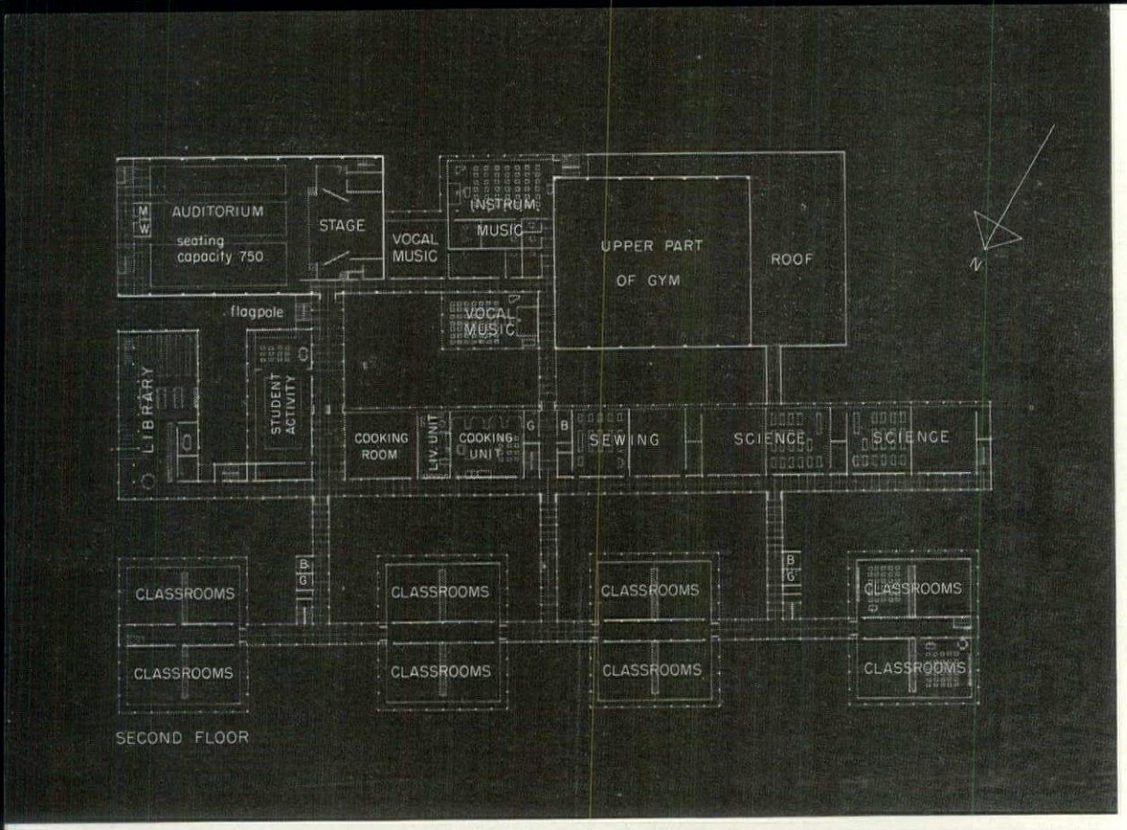
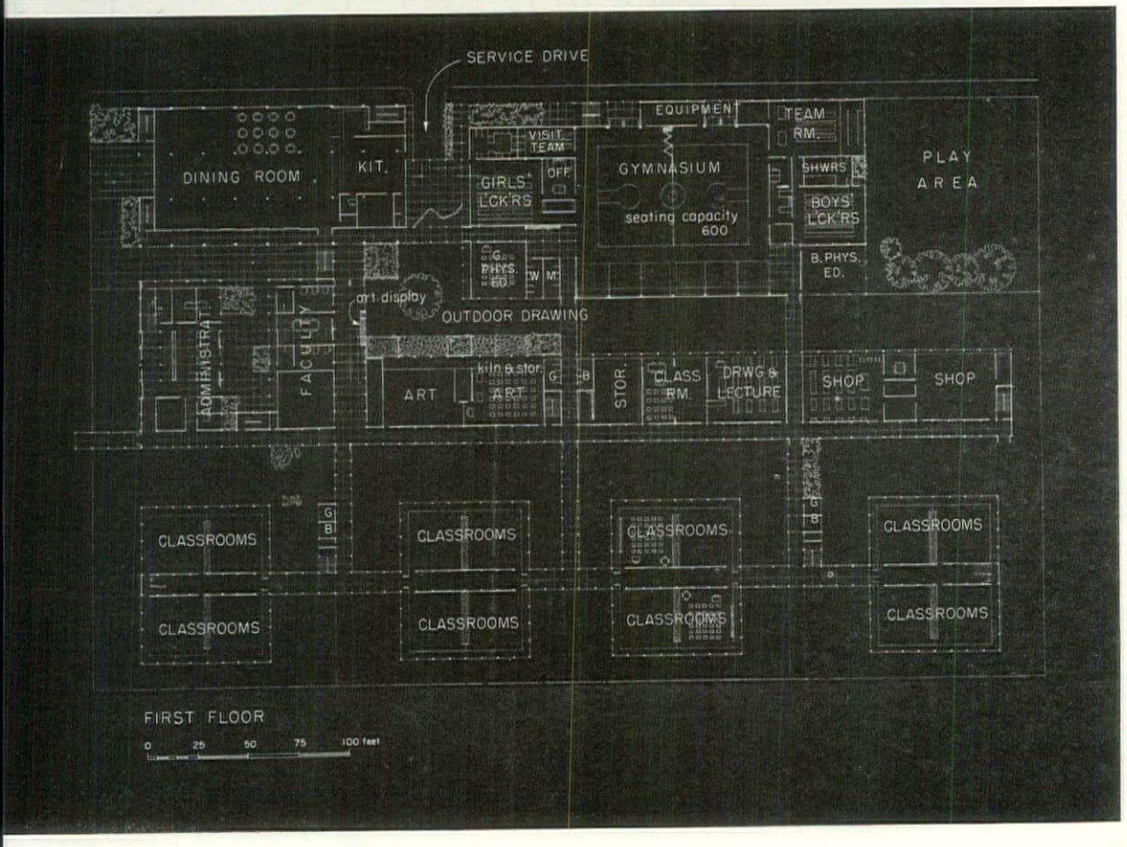




UPTOWN NEGRO JUNIOR HIGH
New Orleans. ▲ 52 classrooms, 1,500 students.

ECONOMIES
Maximum use of land (at $150,000 an acre!). ▲ Many wall-less outdoor corridors. ▲ Natural lighting and ventilation for classrooms. ▲ Flat roofs without breaks. ▲ Sloping auditorium floor forming cafeteria ceiling. ▲ Prefabricated insulating and acoustical slabs used as concrete forms, then left in place as ceiling finish. ▲ Repetitive structure. ▲ Curtain walls set back from columns. ▲ Steel channel bridging for lighting fixtures cast in bottom edge of exposed concrete beams ($3,000 saved). ▲ Unit heaters (no central heating) between classroom pairs ($50,000 saved).

COST
$1,396,000. ▲ $11.70 per sq. ft. $26,845 total building cost per classroom. ▲ $931 per student.

CONSTRUCTION
Slabs supported on 40′ piling. ▲ Reinforced concrete on 8′ module. ▲ Cement asbestos board and glass as fillers. ▲ Aluminum extrusions as sills and opaque panel caps. ▲ Structural mullions on 4′ centers. ▲ Metal louvers outside columns for direct sun control.

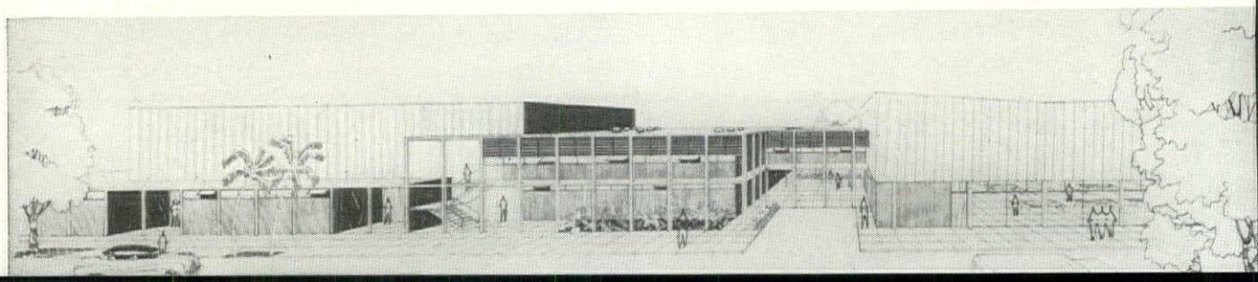
FEATURES
Nice gradation of buffer zones (technical-vocational, then athletic - assembly buildings) between quiet classrooms and public park with noisy playfields. ▲ Patio arrangement of library and administration. ▲ Attractive public entrance. ▲ Exciting visual effect from second-floor outdoor corridors. ▲ Heaters tied into program clock system.

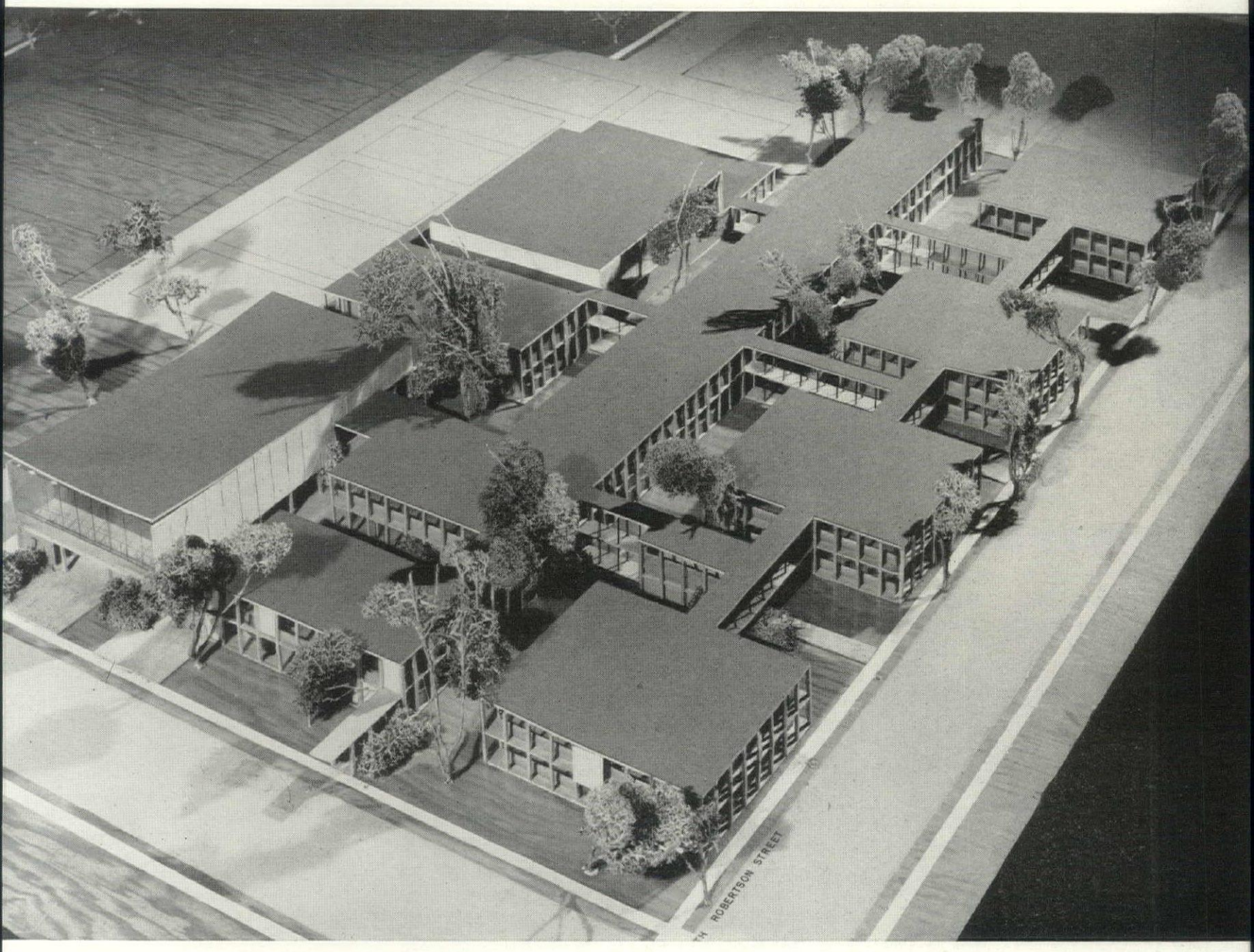
CREDITS
Favrot, Reed, Mathes ▲ Bergman, architects. ▲ De Laurel & Moses, consulting electrical enginers. ▲ R. P. Farnsworth Co., general contractor.

In New Orleans, classrooms are clustered in detached **two-story units**

to make most of cramped site and construction economy

View from public park *shows (left to right) gymnasium, music department and cafeteria-auditorium building*





The four two-story classroom clusters *are at right in the model photograph, the F-shaped unit for special and elective facilities runs down the center, and "noisy" facilities are at left. A public park with playfields is across from the "noisy" units; eventually street between school and park will be closed.*

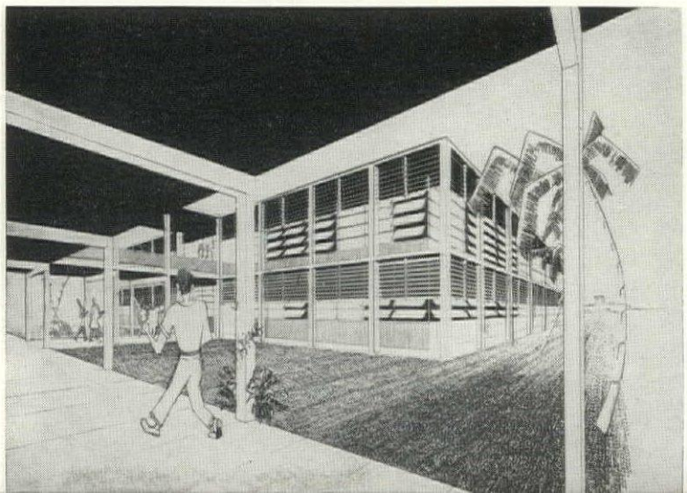
How to get 107,000 sq. ft. of building (not counting outdoor corridors or overhangs) on 90,000 sq. ft. of land?

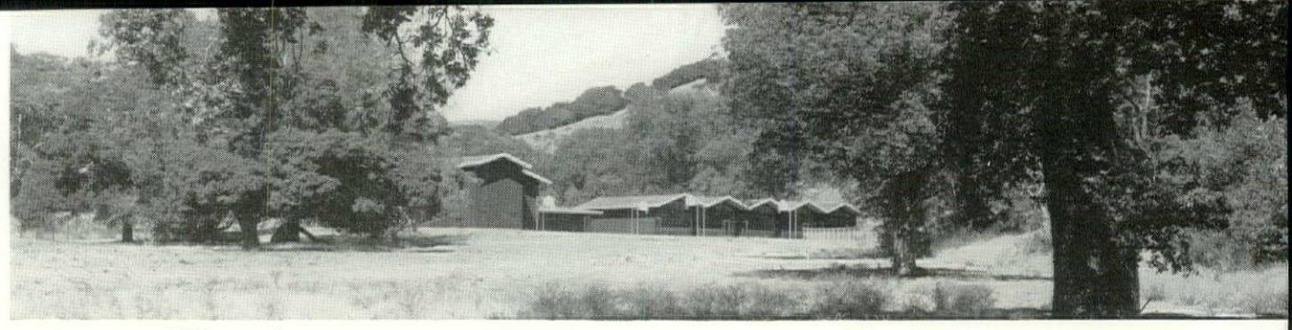
This is the kind of problem every big city faces; the obvious (and usual) answer is a compact block of a building with the open land thus saved becoming a pathetic token of a school yard.

New Orleans has made a bold and admirable departure. This cluster plan uses token leftover land to give maximum visual relief in a slum area that badly needs the sight of green and open patches among buildings.

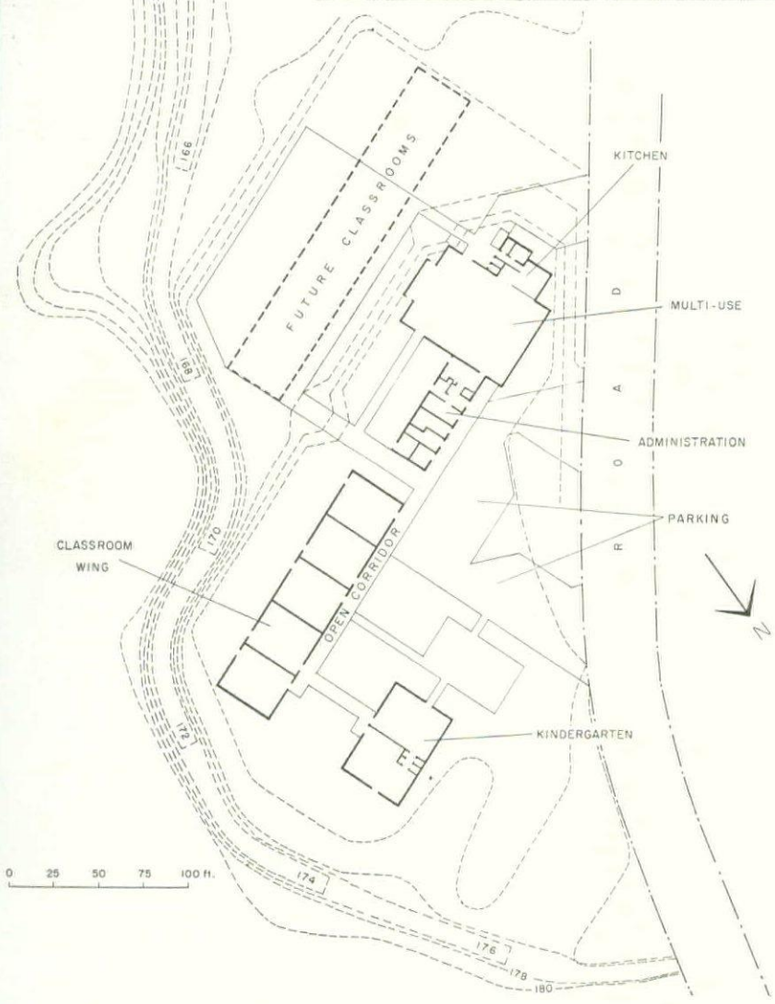
These two-story classroom clusters proved remarkably economical too, a fact that also recommends the idea for sites with more elbowroom than this. They add the economy of two-story construction to the cluster's innate simplification of lighting, ventilating and construction problems. The design seems not to take full advantage of cluster possibilities however; it ignores the interesting and tricky problem of how to get fullest economy of corridor space in a multistory cluster.

Below: view of classroom *cluster as seen from the second of the three corridors linking "electives" building with the classroom groups. Classroom walls are set 3'-6" behind the rear face of columns; on south and west side (as seen here) metal louvers are hung outside the wall, between columns, for sun control. Windows are awning type except for the top pane, between beams, which is fixed. Opaque portions of the wall are cement asbestos.*





CLUSTER PLAN



In Fairfax, Calif., the rooms are clustered in

OAK MANOR ELEMENTARY SCHOOL
Fairfax, Calif. ▲ 270 students, 7 classrooms.

ECONOMIES
Laminated wood arches, Y-shaped, use only one post instead of two for equivalent rigid frame (cost of Y-arch $500; cost of conventional laminated arch to do same job, $575). ▲ Open corridors. ▲ Multi-use room doing quintuple-duty as lunchroom, assembly, indoor play, rainy-day activity rooms and theater; total area of this unit is less than 4,000 sq. ft. (separate lunchroom, playroom, theater would have required 4,900 sq. ft. more plus connecting corridors at $60,000).

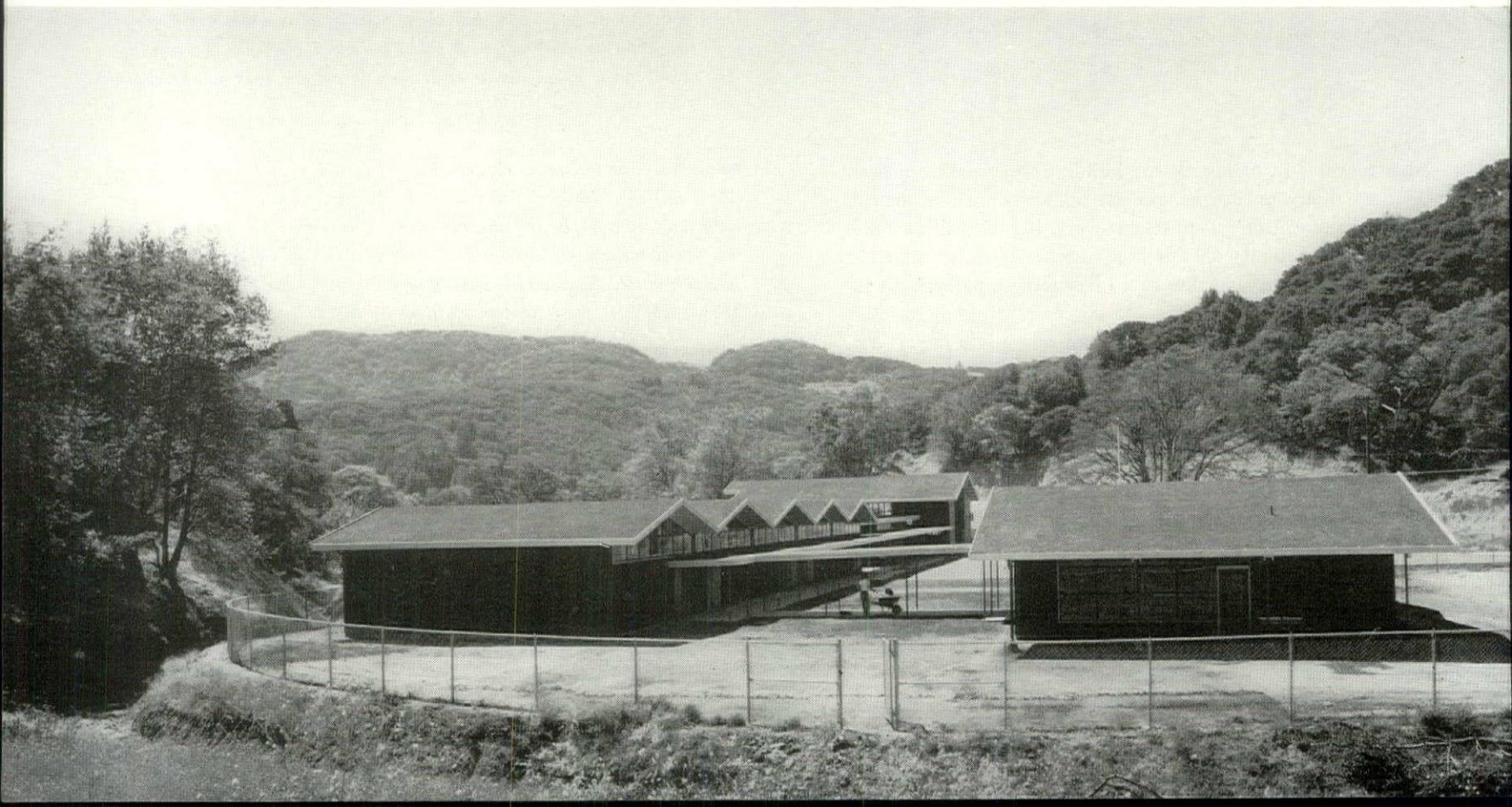
COSTS
$199,141. ▲ $13.80 per sq. ft. ▲ $28,410 total building costs per classroom. ▲ $740 per pupil.

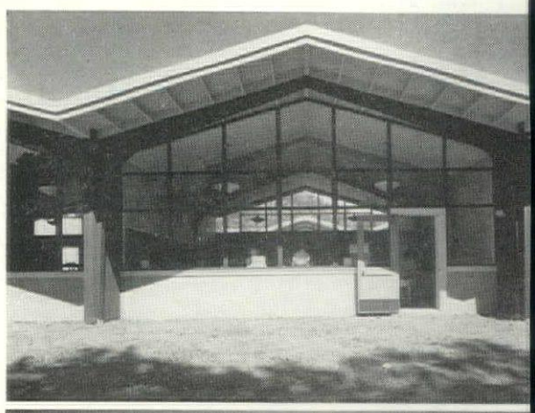
CONSTRUCTION
Y-shaped, laminated wood arches (see section), three-hinged, 12′-3″ o.c., span 28′. ▲ 2″ x 6″ framed stud partitions between classrooms, finished with plywood. ▲ Roof-ceiling of acoustic tile. ▲ Pitched roof framed with 2″ x 8″s.

FEATURES
Very intimate appearances; it looks as if every classroom were a little red schoolhouse all by itself. ▲ Fire rating of laminated timber structure as good as, or better than, light steel, at lower cost. ▲ Excellent bilateral lighting and good acoustics due to roof pitch. ▲ Flexibility of classrooms greater than in usual masonry partition schools. ▲ Independent use of each school unit easily possible.

CREDITS
John Lyon Reid, architect. ▲ Bayha, Weir & Finato, mechanical & electrical engineers. ▲ L. H. & B. L. Nishkian, consulting structural engineers. ▲ Dariel Fitzroy, acoustical enginer. ▲ A. Von Rotz, contractor.

Three separate units *make up this school: two-house kindergarten (right), five-house classroom wing (left) and big house multi-use wing. All three are connected by open, sheltered walks.*





Beautiful setting, *at foot of hill and among bay and oak trees, suggests a pleasant country school. Wavy roof line echoes silhouette of hills. Low-hanging branches were preserved to encourage tree-climbing.*

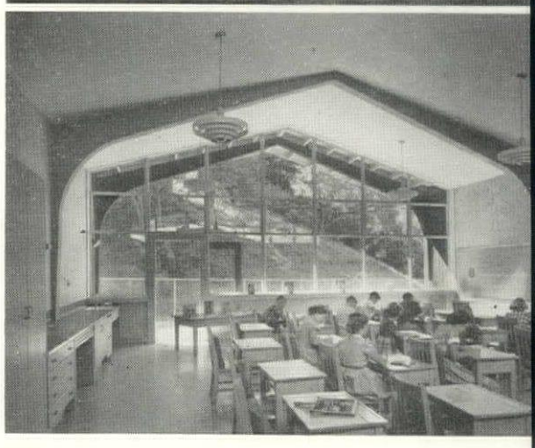
three separate units

to reduce scale and cost

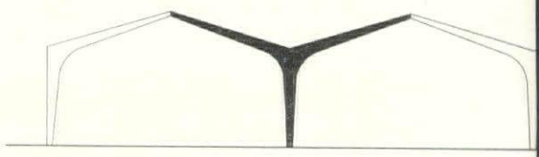
This "school of many gables" is of special interest because it so neatly combines the educators' "little house" ideal with an engineer's ingenious invention. And on top of that it is as charming a piece of architecture as the year is likely to bring forth.

Architects of elementary schools, where rooms are almost certain to stay fixed for keeps, have always had their choice between building the supporting structure either lengthwise to the building or crosswise to it. The advantages of a school made up of a series of cross walls are these: 1) the walls are usually of masonry and sound insulative, 2) the roof is spanned from wall to wall and no supporting members have to be built in with the glass, and 3) the school can be designed if desired with a series of little gables making each classroom a little house. (Architects seem never to have thought of this.)

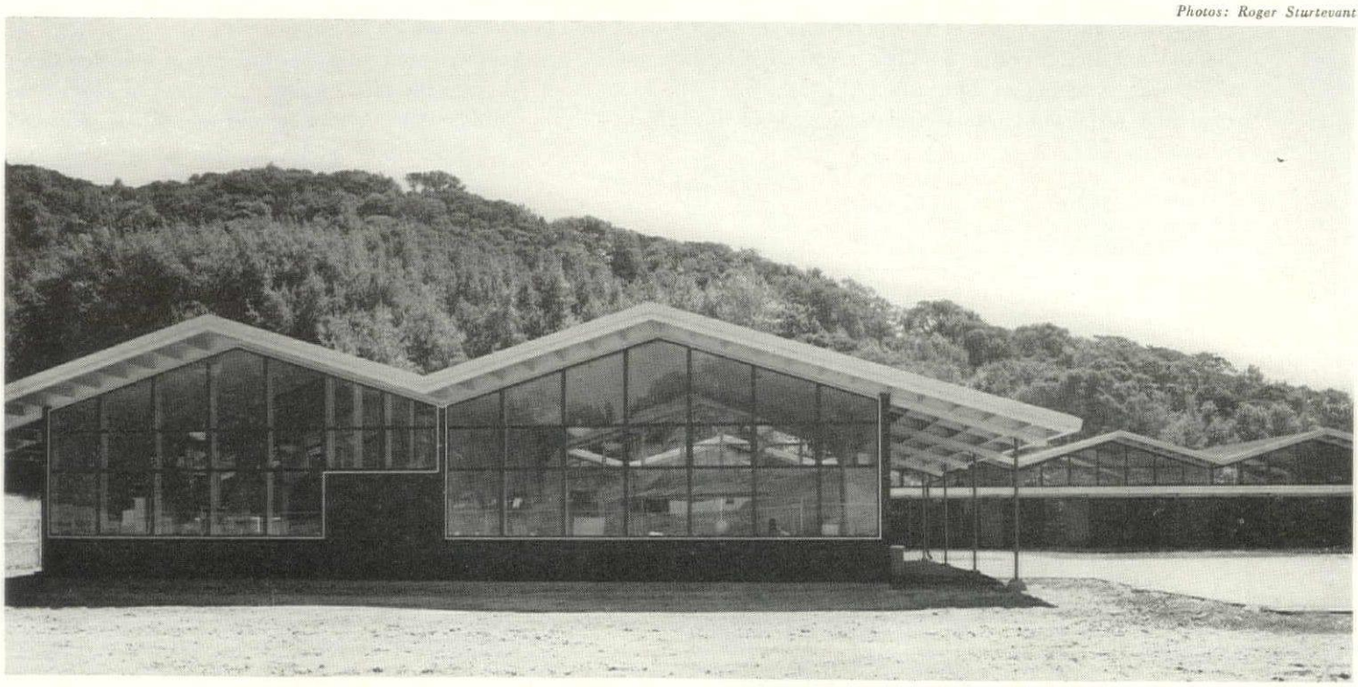
In this school Architect John Lyon Reid worked a double change on the cross-wall little house school. First, in place of the usual bearing walls between rooms, he made his structure of a series of rigid frames of laminated wood. Next he built these rigid frames themselves in a highly original and completely logical cost-saving manner. The usual wood frame arch is composed of two boomerang-shaped posts that meet overhead. But Reid made his posts Y-shaped. Each post, instead of helping to frame the classroom on only one side, now helps to frame a classroom on either side, contributing half an arch to each. These Y-shaped posts are not only balanced (unlike the boomerang) but can be made lighter because they are cantilevered both ways and compel the side thrust of one gable against that on the opposite side.



Three-hinged, Y-shaped frames *are independent of walls and partitions. Deep roof overhangs, plus trees outside glass gable end, provide plenty of shade (see cut). Glass gable ends face northeast and southwest (but on northeast side glass is limited to clerestories above corridor roof). Partitions between classrooms could be knocked out to create bigger spaces.*



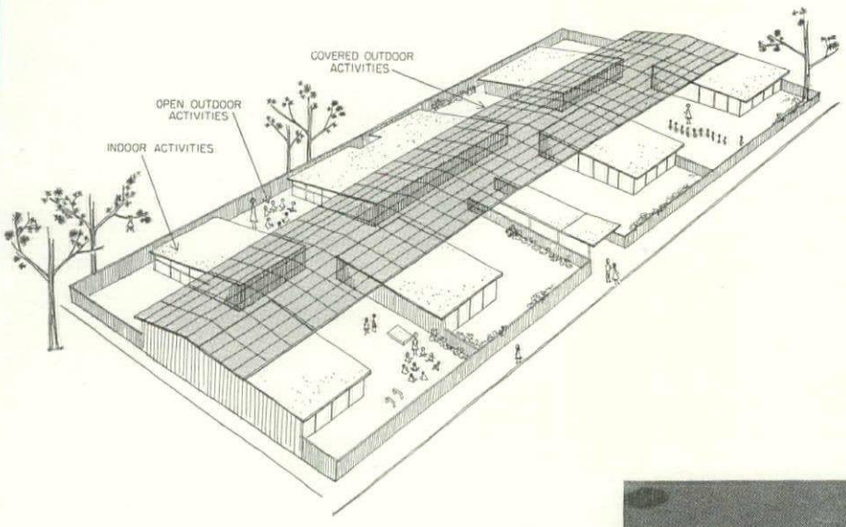
Photos: Roger Sturtevant

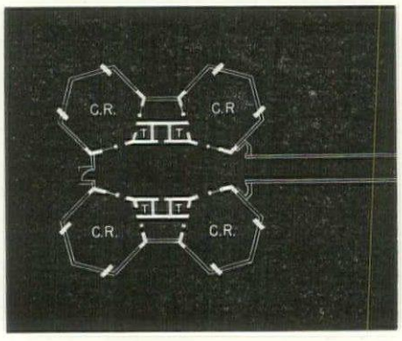


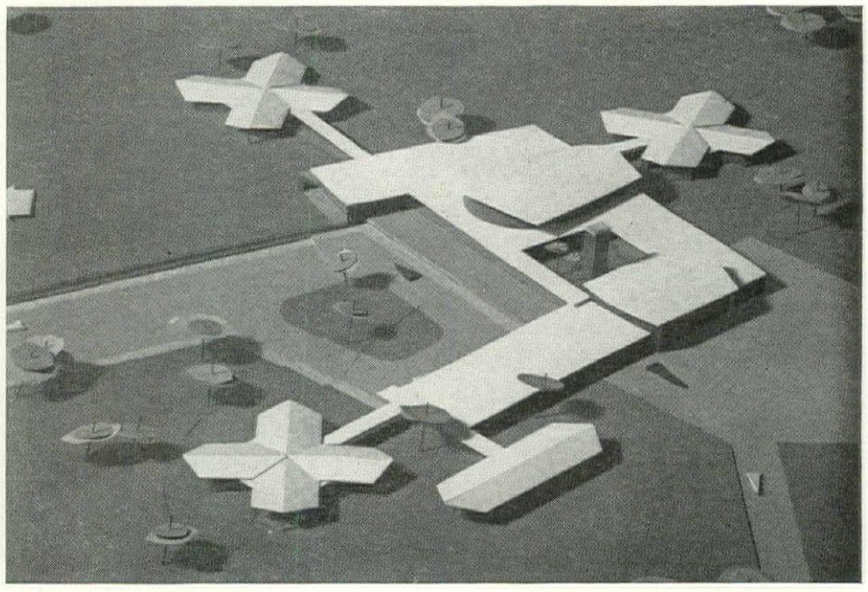
Kindergarten wing *is two "houses" with glass gable ends. Redwood siding jogs up to screen separate toilet facilities. Architect Reid says that special sash in gable ends was somewhat costly, but laminated arches more than compensated for extra expenses.*

More clusters: 1. One-room schoolhouses extract 100% educational use from a little site in this design by Architect John Carl Warnecke. It is for a kindergarten and primary annex to an existing school across the street in San Carlos, Calif. Warnecke tied the units together with a skylight-covered open corridor which becomes an integral part of the roof where it intersects the buildings. The scheme gives each room both its own yard and access to covered outdoor space, and beautifully satisfies a requirement that "each classroom provide a transition between school and the child's familiar home and yard."

Construction is almost completed; in a forthcoming issue FORUM will present the finished school in detail, together with the thinking behind the design.



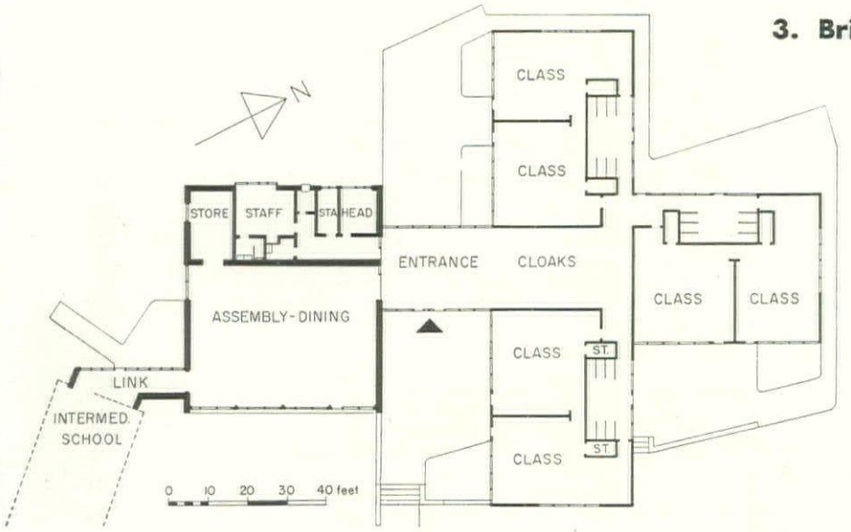




2. Patriarch among cluster plans is Perkins & Will's Heathcote elementary school at Scarsdale, N.Y. It is a young patriarch indeed, with construction only now nearing completion. In a preview of Heathcote one year ago FORUM pointed out that Perkins & Will's seemingly startling notions bear watching as forecasts (AF, Oct. '52); the fact that their dispersed clusters of classrooms were then almost unique is a commentary on how fast design is moving.

Perkins & Will settled on this scheme not for economy but for educational value, were able to give each cluster the benefit of an activities corridor.

Another commentary on rapidity of school design change: a year ago the idea of leaving connecting corridors open in the Middle Atlantic climate was too radical to consider.

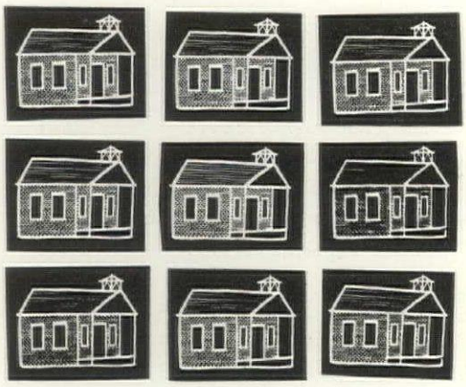


3. British variation on the cluster-plan theme is this cross-shaped school by Architects F. R. S. Yorke, E. Rosenberg & C. S. Mardall for a primary school at Kidderminister. Austerity has made British school architects past masters at eliminating non-educational space; ways of achieving child-size scale has long been a livelier topic there than new wrinkles in lighting or heating. One result: this clusterlike plan with circulation cut to a minimum. Non-educational space savings beyond austerity regulations have gone into bigger classrooms.

The building is prefabricated with 4′ plastic sheeting panels. Extruded aluminum shapes form edging strips and columns to carry 2″ x 9″ roofing timbers; a second series of 2″ x 9″s crosses the first at right angles with bolts at intersections. Construction of this unusual school addition is now under way.

THE LOFT PLAN

—economy of compactness



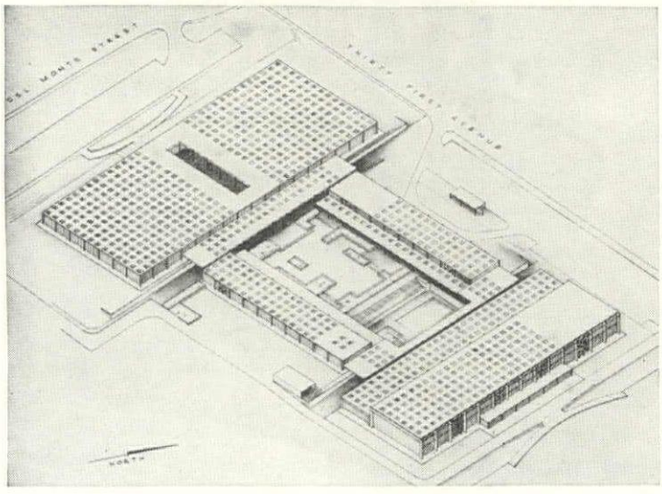
This kind of planning puts the school into a compact, short-periphery block and uses economical toplighted interior space.

The first loft plan was a hypothetical scheme commissioned of the late, brilliant Matthew Nowicki by FORUM as a new approach to economy for its 1949 School Reference Issue. Rarely has a hypothetical solution proved so fruitful or borne out so well the economies expected of it.

All the major possibilities of loft-plan economy were encompassed in the "FORUM school": absolutely standard bays, short perimeter, short communication lines, corridor put to double use. But as shown by the case studies following, the advantages of loft planning are not dependent on theoretically pure exploitation. For instance, while Reid (below and p. 142) does use the repetitive bay, Smith (p. 143) has put his classrooms into structurally separate groups, then roofed over the common space between. Smith does use the interior for circulation and general activities, while the school by Caudill, Rowlett, Scott & Associates (p. 141) separates activities and circulation (and thereby manages to keep toplight out of the auditorium). And Reid, while adopting the fundamentals of compact block, toplight and repetition, has created a school unlike any dreamed of (at least articulately) before.

Two principal problems of the loft plan are noise control and circulation. Smith's and Caudill's designs exemplify opposite views on noise. Caudill points out that much of the time windows of adjoining classrooms will be open and that this gives only a 25- or 30-db reduction in sound; ergo, why aim for more in interior partitions if the noise will come in anyway? Smith (whose activities space backs right up to classrooms) uses bearing-type partitions with insulated cavity, backed up by cabinets. For three very different treatments of loft circulation and toplighting, see the case studies.

In Hillsdale, Calif., the economical loft plan is pushed to the limit and divided with a central court into twin blocks



The academic block of this 1,750-student senior high will test the loft-space idea on the biggest scale yet. For that reason and because Architect John Lyon Reid uses toplighted interior space not for general activities areas, as in other loft schemes, but for classrooms, this is one of the most controversial schools in years.

Reid's big academic rectangle is completely flexible—movable interior and exterior partitions plus space for adding more rows of 28′ square bays make all kinds of arrangement possible, including pushing courts into or through the mass. The school will not go out for bids until December, but already Reid's rearrangements of his flexible loft space on paper demonstrate some fundamental points about big-block school planning.

When FORUM previewed this school a year ago Reid's classroom area was a single 82,320 sq. ft. block—7 bays wide, 15 long. His final scheme now bisects the block with a two-bay-wide covered

court, lobby and open garden area. This gives him in effect two classroom blocks of 41,160 sq. ft. each. The total academic rectangle is now 17 bays long instead of 15.

Reid made the change "for two reasons of equal weight: cost and amenity."

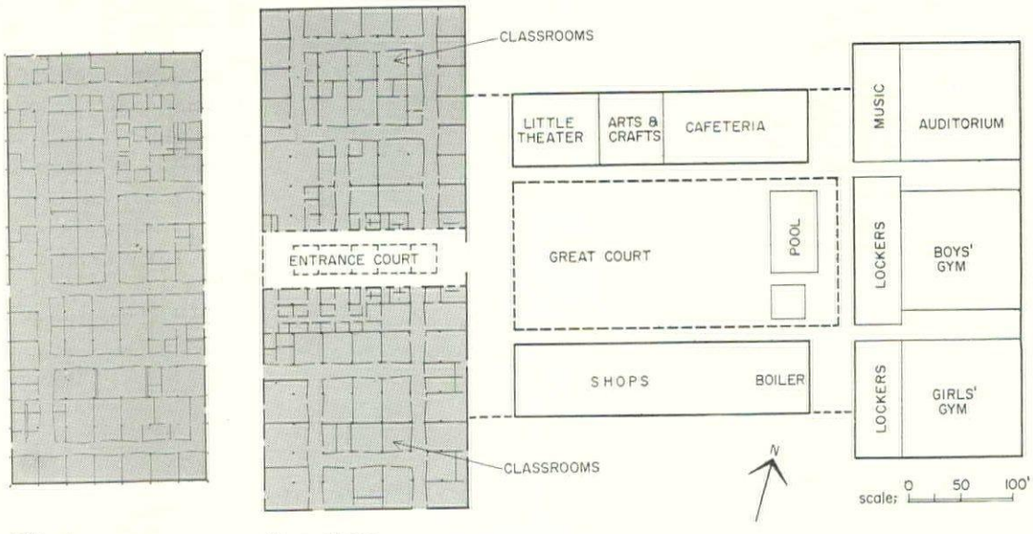
By bisecting the block, he was able to go from Type I construction (required for fire safety in the first version) to Type IV. This saving will at the very least cancel out the over-all addition of 10,976 sq. ft. of covered and open court. And although the number of interior bays remains the same, there is a gain of about 5,000 sq. ft. of classroom area because of saved corridor space in the two smaller enclosed blocks.

A glance at the two plans shows what Reid means by "amenity." The final scheme is more in accord with human scale, will be infinitely easier to navigate and gains immensely from the spaciousness of the central court.

What about those inside classrooms? Well, at the University of Michigan where the lighting studies were done, they have a full-size model of an interior classroom. Reid spent two full days in it to see if he got claustrophobia; he did not. Other visitors have not only made no complaints on that score; they have professed themselves delighted with the room's pleasingly lit, airy atmosphere. (For detailed accounts of the integrated toplighting-heating-ventilating units, see AF, Oct. '52.)

Cost estimate:

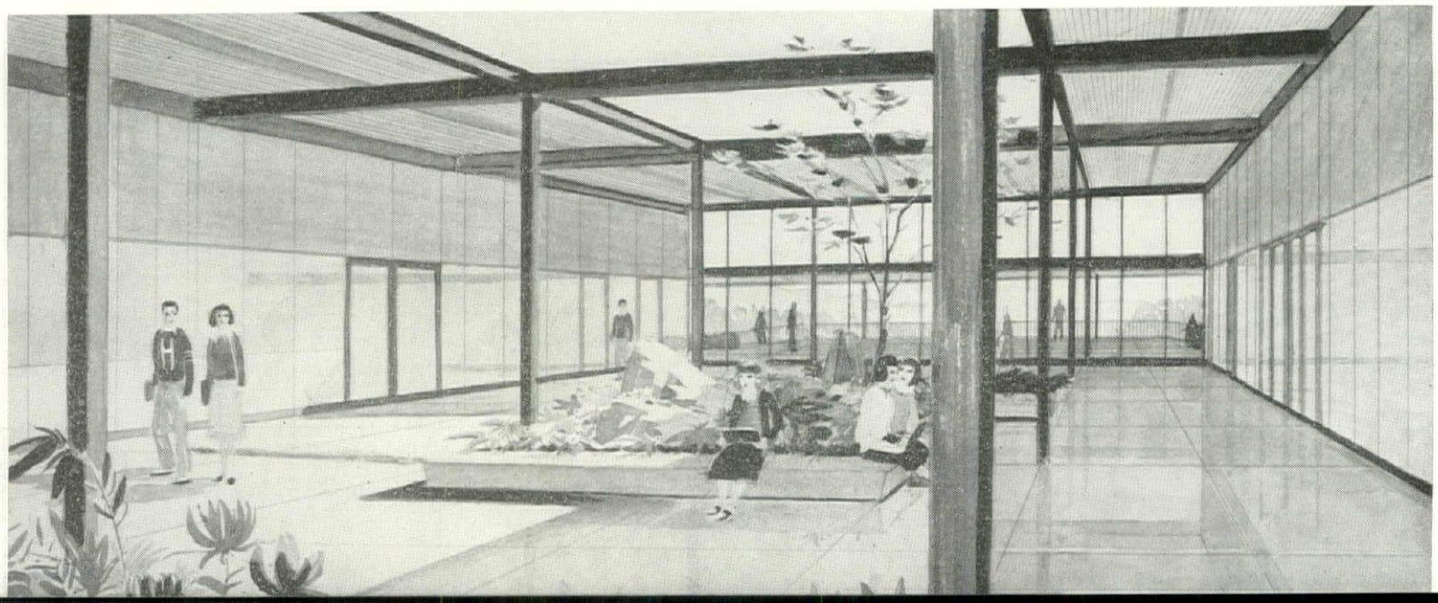
Total building cost.....	$3,217,925.00
Per sq. ft.	
academic area	15.37
shops and boiler room.	12.22
cafeteria, little theater.	12.92
gymnasium	15.20
music department	17.00
auditorium	19.94
average	14.90
Total building cost per classroom	51,900.00
Per student	1,839.00

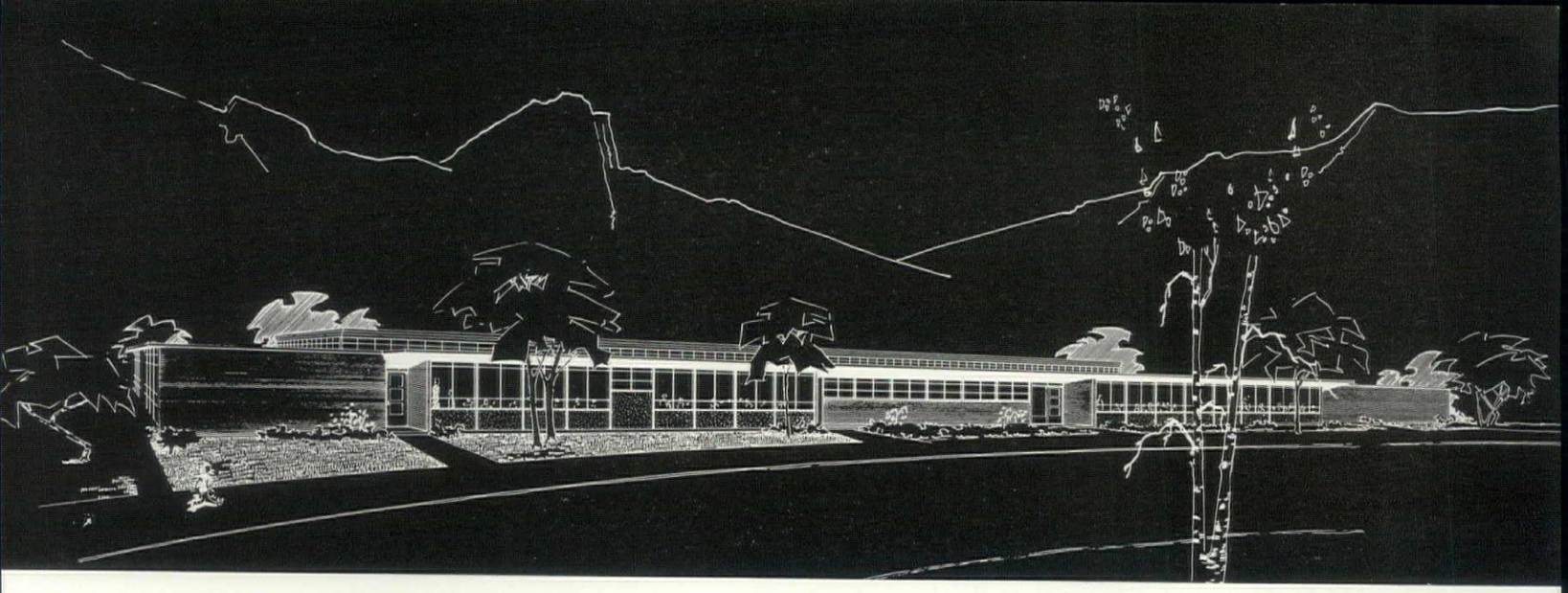


Old scheme

New scheme

***Plans at right** contrast old and new schemes for big, loft-type academic block. The new scheme is bisected by a wide entrance court and central corridor, **sketched below,** which has square gardens down its unroofed center.*





Facade *features precast concrete panels above and below classroom windows*

OREM ELEMENTARY SCHOOL
Orem, Utah. ▲ 14 classrooms. ▲ 500 students.

ECONOMIES
Compact loft plan (only 9,000 sq. ft. of exposed perimeter). ▲ But classrooms in structurally separate units with simple framing. ▲ Central corridors absorbed into activities space. ▲ Foundation walls only 6" thick, centered under bearing walls; face brick carried on 4" cantilevered shelf. ▲ Main piping tunnels serve as air ducts to classrooms, return air travels through joist space. ▲ Repetitive structure on 7'-4" module established by block sizes. ▲ Wainscoting, hollow masonry block honed and filled with masonry filler (terrazzo-like character). ▲ Bid was $159,000 below construction budget of $450,000.

COST
$291,900. ▲ $10.60 per sq. ft. ▲ $20,850 total building cost per classroom. ▲ $584 per student.

CONSTRUCTION
Concrete slab. ▲ Masonry bearing walls, lava block and brick. ▲ Steel skeleton clerestory walls. ▲ Long-span steel joists.

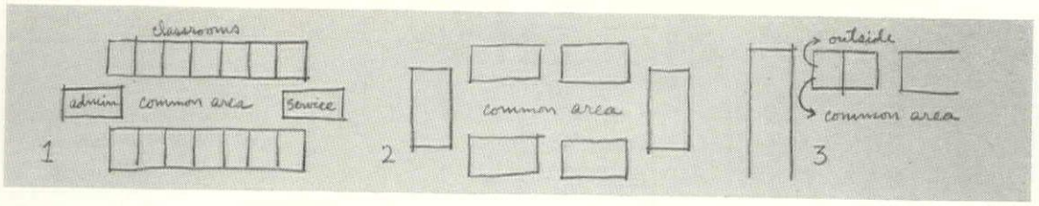
FEATURES
Stubby entry hall corridors for classrooms. ▲ Block, insulation and cabinets for noise deadening between class and activities areas. ▲ Air to classrooms picks up steampipe heat loss in tunnels, also warms floor at perimeter. ▲ Return air picks up solar heat in joist space, saves it (in winter) or exhausts it.

CREDITS
William Rowe Smith, architect. ▲ Fred W. Needham, Richard H. Johnson, associates. ▲ George W. Poulsen Jr., structural and mechanical engineer. ▲ F. C. Bates, electrical engineer. ▲ Tolboe & Harlan Construction Co., general contractor.

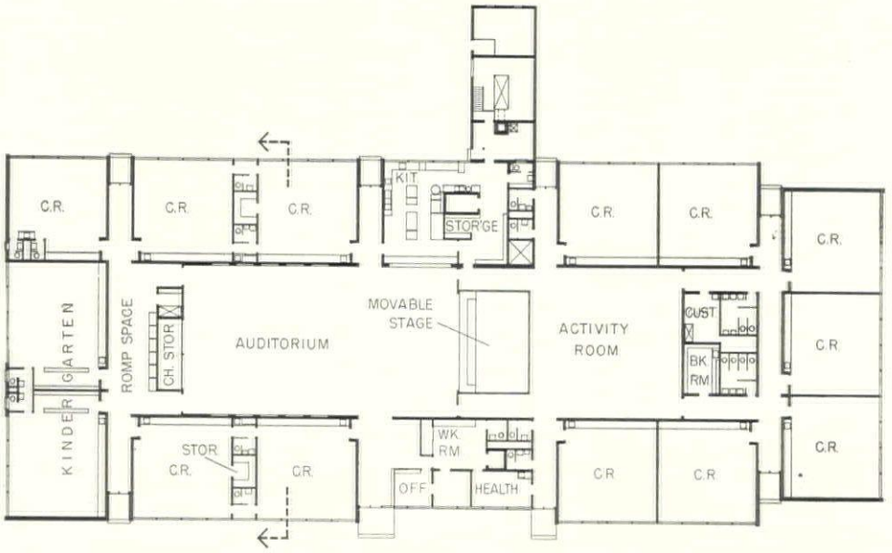
In Orem, Utah, the block plan saves land, gets

sound and circulation control

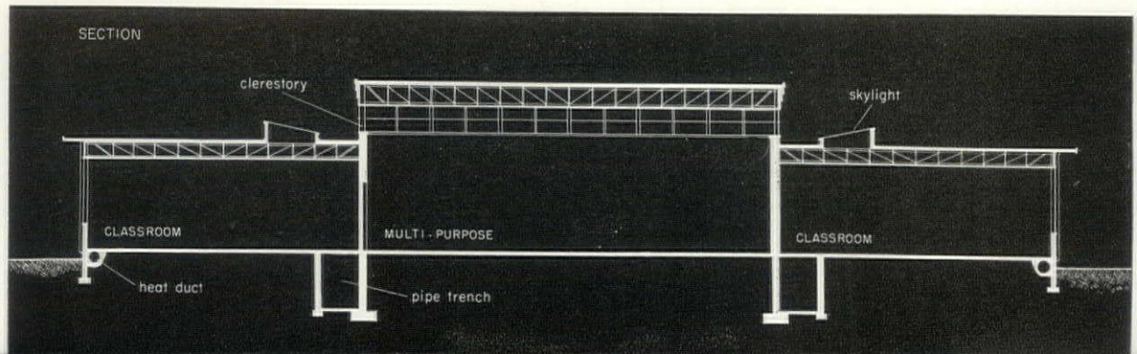
with eight stubby entries

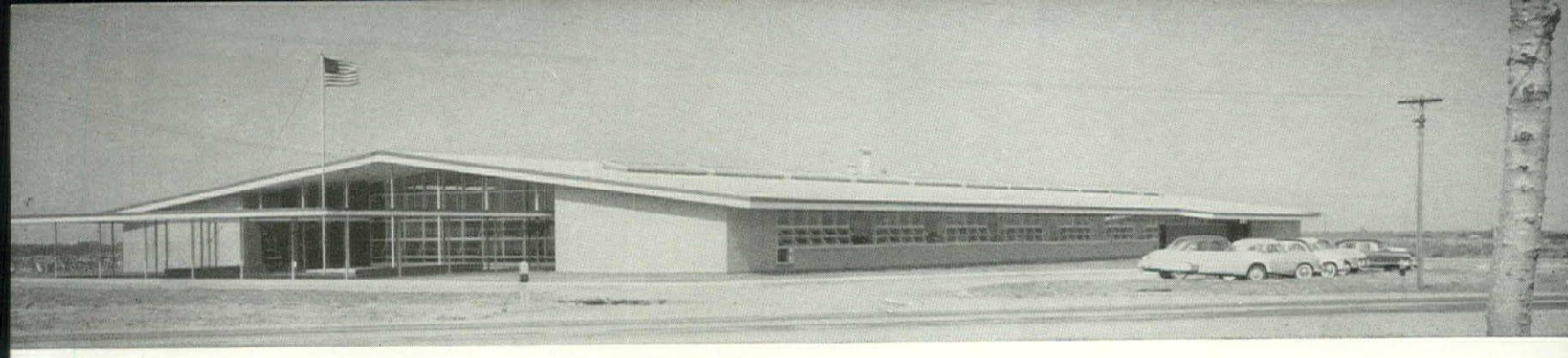


"Instead of thinking of this compact scheme as a large *unit* **(1)**, *we started thinking of it as a group of* small *units* **(2)** *backed up on a common area. Roofing the common area gave a large space economically. Each classroom's entry* **(3)** *leads both to the common area and to the outside."*



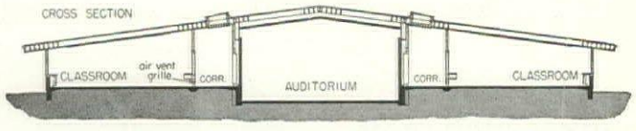
Section *shows structurally separate classroom units joined by roof of "common area." Note classroom skylights*



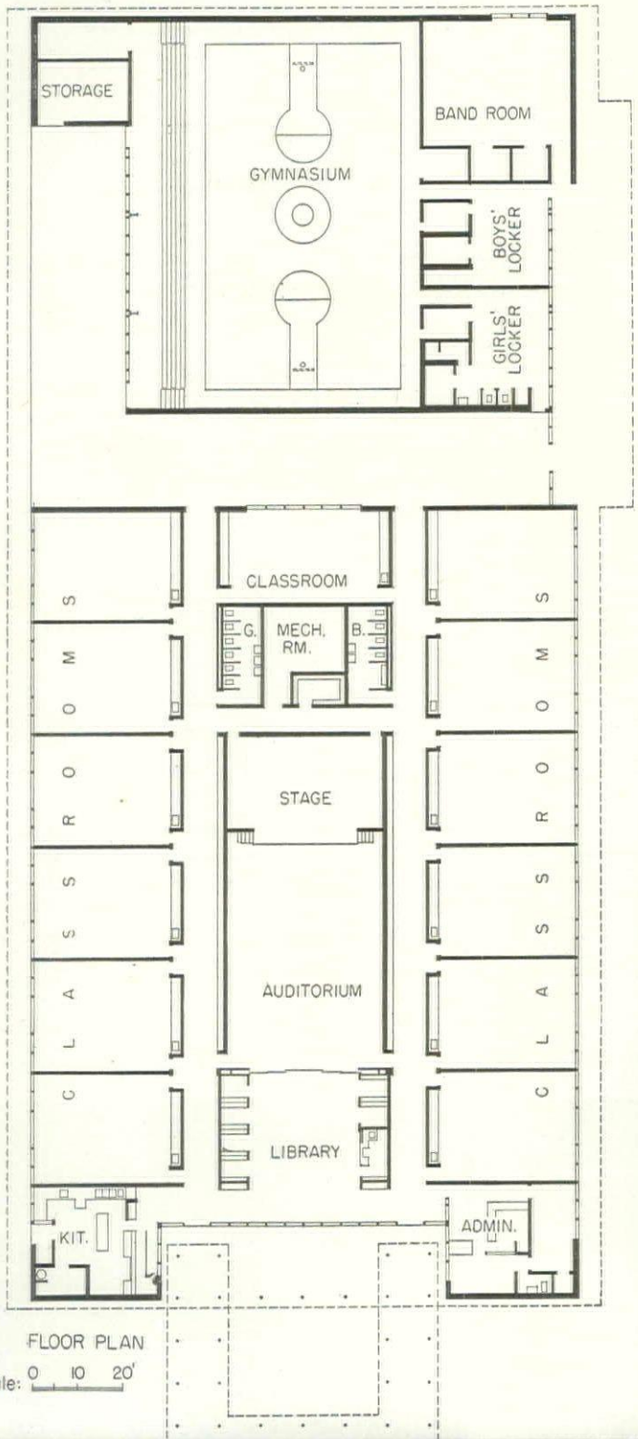


In Electra, Tex., bulldozers dig down inside the block plan to get

dropped multipurpose space under a cheap, simple roof



***For added height** in the auditorium, the architects dug down! Use of a dulldozer instead of scaffolding gave cheaper cubage; unbroken roof slope will save maintenance.*



ELECTRA JUNIOR HIGH SCHOOL

Electra, Tex. ▲ 13 classrooms. ▲ 383 students.

ECONOMIES

"Geometry of compactness," horizontal and vertical, cuts out about one-third of usual area. ▲ Loft plan with deep classrooms, educational use of interior. ▲ Pitched roof embracing in one gentle slope everything from 7′ overhangs to high assembly space. ▲ Additional central cubage bulldozed out of ground. ▲ Bids came in so low, air conditioning (for summer community use) and an extra bay for gym were added.

COST

$317,323.40. ▲ $9.83 per sq. ft. ▲ $24,409 total building cost per classroom. ▲ $828 per student.

CONSTRUCTION

Slab on fill. ▲ Pipe columns. ▲ 5″ x 12″ wood beams over classrooms, wide flange sections over gym and auditorium. ▲ 2″ x 12″ wood joists throughout. ▲ Built-up roof on wood decking. ▲ Wire glass skylights. ▲ Exterior walls, face brick and backup tile. ▲ Partitions, corkboard (one wall each classroom) and plywood.

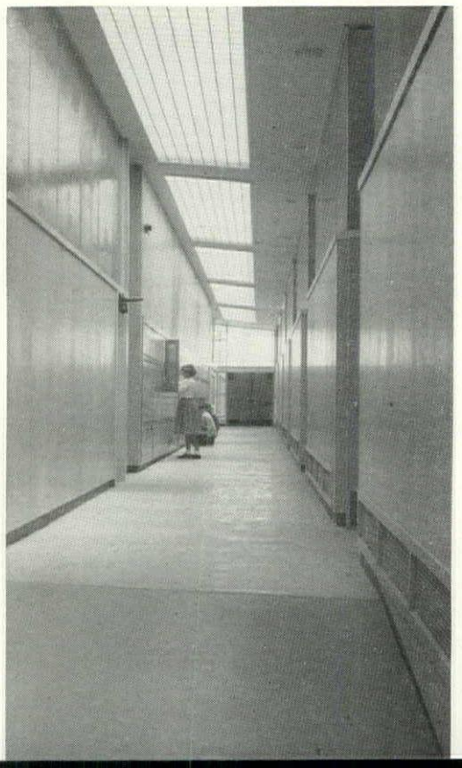
FEATURES

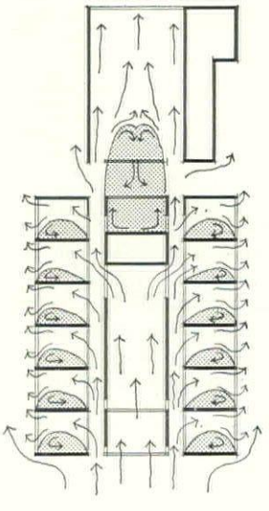
Low and intimate child scale. ▲ Entrance court for outside dining, milling around. ▲ Library-dining space (compatible furniture) serving also as lobby-lounge and assembly overflow for graduation or Christmas crowds. ▲ Kitchen (and cooking odors) pulled back from multipurpose areas. ▲ Ingenious natural ventilation for activities space, corridors and all but one classroom (see diagram). ▲ Big outdoor covered play shed, protected on north. ▲ Tackboard (cork) on 2″ x 6″ studs doubles as partitioning for one wall of each classroom.

CREDITS

Caudill, Rowlett, Scott & Associates, architects. ▲ J. W. Hall Jr., mechanical engineer. ▲ Walter Droemer, general contractor.

Photos: Ulric Meisel—Dallas





***Wind test** shows how corridors take in breeze, pass it to classrooms through low wall vents. Corridors also pass light to classrooms through glazed upper walls.*

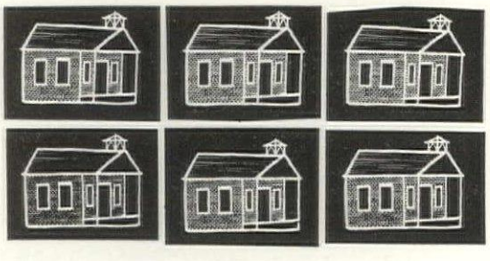
CORE PLAN saves periphery and money

In an effective maneuver to defend their building budgets, a number of US architects (particularly in southern climates) are grouping their classrooms on a central service stem, or core. The plan is a modern parallel to Kipling's hollow-square regimental defense against the enemy in that it presents a tightly grouped set of classrooms, back to back, side to side, with a shortened ring of exterior wall. In the center, on the stem, are vital services like plumbing, heating, electrical lines.

With a few blocks you can discern the great advantage of a central service core.

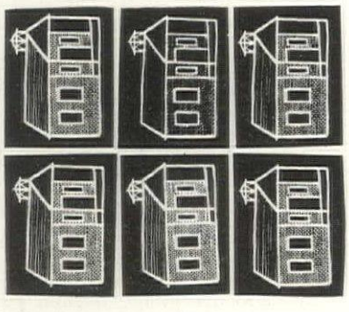
Think of these as six classrooms, each 25′ x 36′:

Lighted and ventilated in the conventional way around the periphery the classrooms will probably have to be arranged this way:



Call the exterior wall 316′ long in this case.

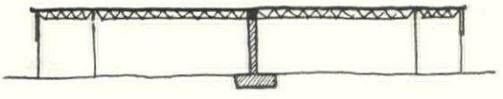
But if you can depend on the center of your wing, the spine, for services like light and ventilation, you can arrange your classrooms this way in plan:



You have saved 22′ of exterior wall length; and you have discovered the great advantage of the core scheme. With a wing of 12 classrooms the advantage really amounts to something: 16½% of exterior wall.

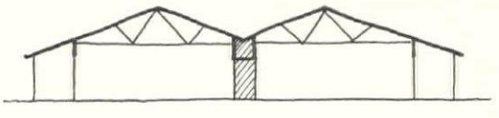
You may also have saved considerably by consolidating and thus shortening your pipe runs, and you will probably save every winter on your heating bill because the shorter exterior wall area will lose less heat. On the other hand, the latter savings will probably be eaten up by the extra cost of lighting the interior end of the deep classrooms electrically or by skylight.

The core idea, in its simplest application is this, in section:



It is a typical classroom wing of De Anza high school by Architect John Warnecke, which will be built in El Sobronte, Calif., with a pipe trench running down the middle of the finger-plan school between the back-to-back classrooms.

A more sophisticated application, the Foster junior-senior high school in Seattle by Architect Ralph H. Burkhard (AF, May '53) has an actual service-core corridor built into the structure.

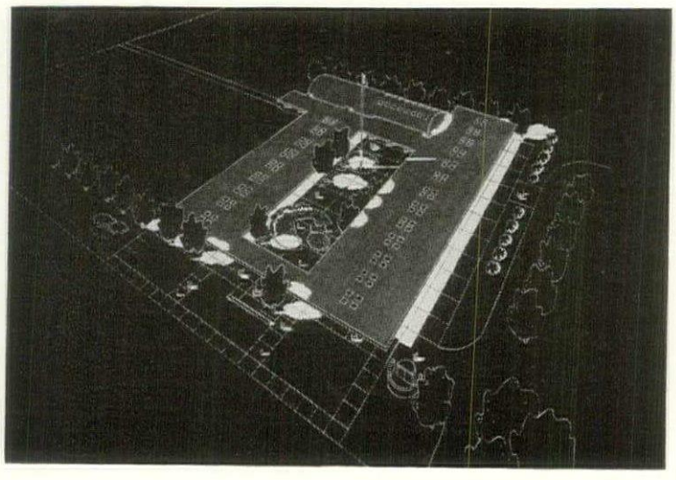


There is one small worm in the core plan, especially for cold climates. Really to exploit the idea, exterior corridors should be used, and this is a hard thing to do in multistory schools.

But for a resplendent example of how good a core school can be, see the next five pages.

Photos: *Ulric Meisel—Dallas*

In Laredo, Tex., a school is built **around a plaza,**



Although this school sprawls luxuriously around an expansive central plaza, it is not an expensive school. To balance the genial atmosphere of hospitality which they brought to this design by including the pleasant open patio for between-class society and community functions, the architects had to develop an ingenious cost-killing utility system which justifies all the design aspects of the structure. For, postponing the problem of utility, they first had visualized a school as cheap as they could make it good.

To do this, they 1) set the classrooms back to back the short way and used outdoor corridors, cutting the expensive perimeter 14%, and 2) pushed the ceiling down to 9′-8″ height. Then they refused to accept the normal penalties of both these moves.

The first penalty should have been lack of classroom ventilation. Short of an interior partition that could stop sound but not air movement there was no answer to that. So they invented the breathing service core shown on the opposite page.

LAREDO JUNIOR HIGH SCHOOL
Laredo, Tex. ▲ 25 classrooms. ▲ 800 students.

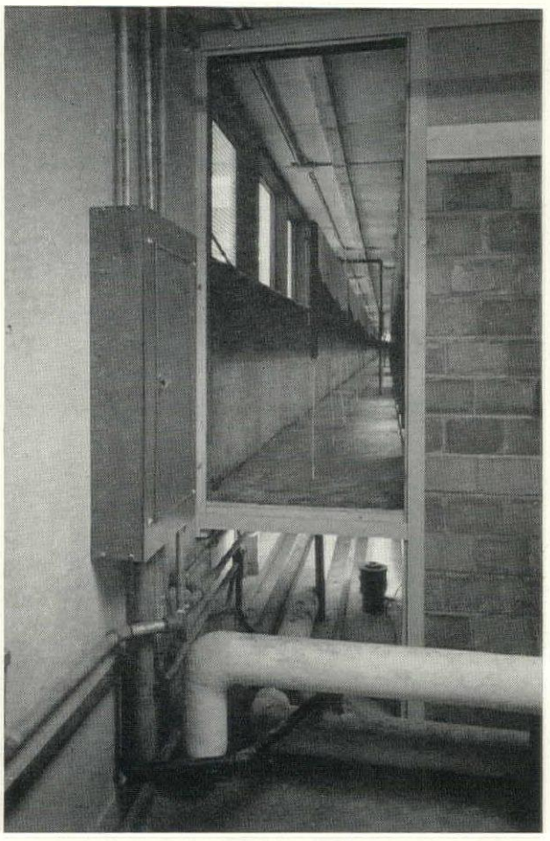
ECONOMIES
Deep back-to-back classrooms with low (9′-8″) ceiling and flat roof; savings, compared with double-loaded corridor arrangement with long wall to exterior: 368′ of exterior wall plus 4,220 sq. ft. of floor and roof plus 630′ of interior wall finish plus 26% of cubage over usual 12′ ceiling. ▲ Integration of partitions and teaching aids into "teaching space dividers." ▲ Outdoor corridors. ▲ Compact service core.

CONSTRUCTION
Lift-slab concrete roof on steel columns. ▲ Fillers of glass and 12″ brick cavity wall. ▲ Laminated wood arches over gymnasium and auditorium.

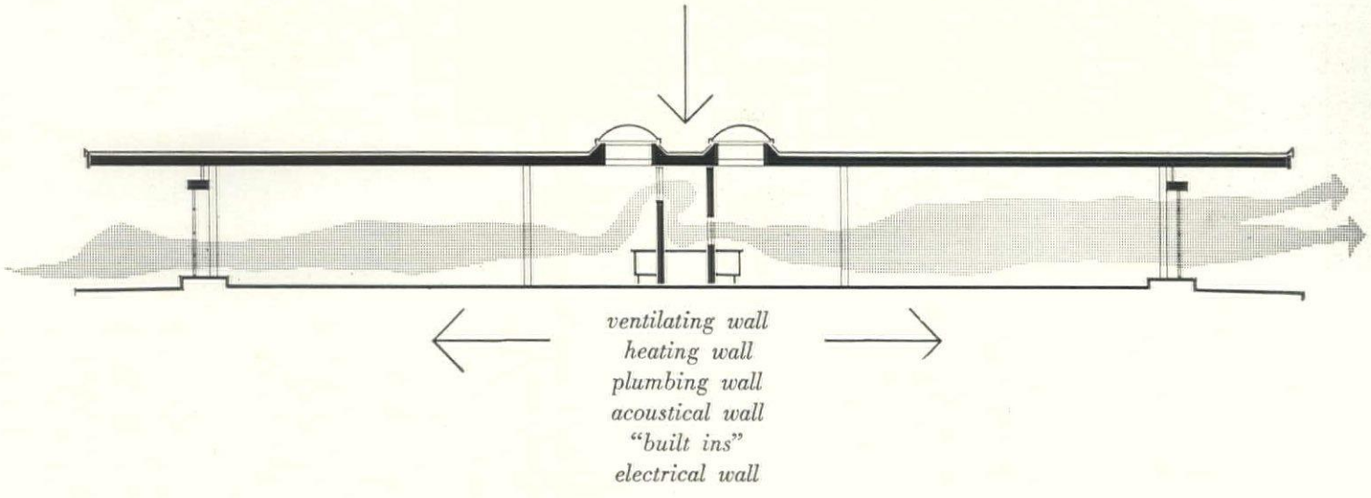
COST
$631,591.95. ▲ $10 per sq. ft. ▲ $25,260 total building cost per classroom. ▲ $800 per student.

FEATURES
Toplit lift-slab. ▲ "A partition that breathes": ventilation through the back wall of back-to-back classrooms. ▲ "Vertical teaching spaces": partitions as useful as desks. ▲ Central outdoor patio for social life. ▲ Gymnasium with a disappearing exterior wall. ▲ Unique expression of lift-slab structure.

CREDITS
Caudill, Rowlett, Scott & Associates, architects. ▲ A. A. Leyendecker, associate architect. ▲ Rambo Construction Co., general contractor. ▲ J. W. Hall Jr., mechanical engineer.



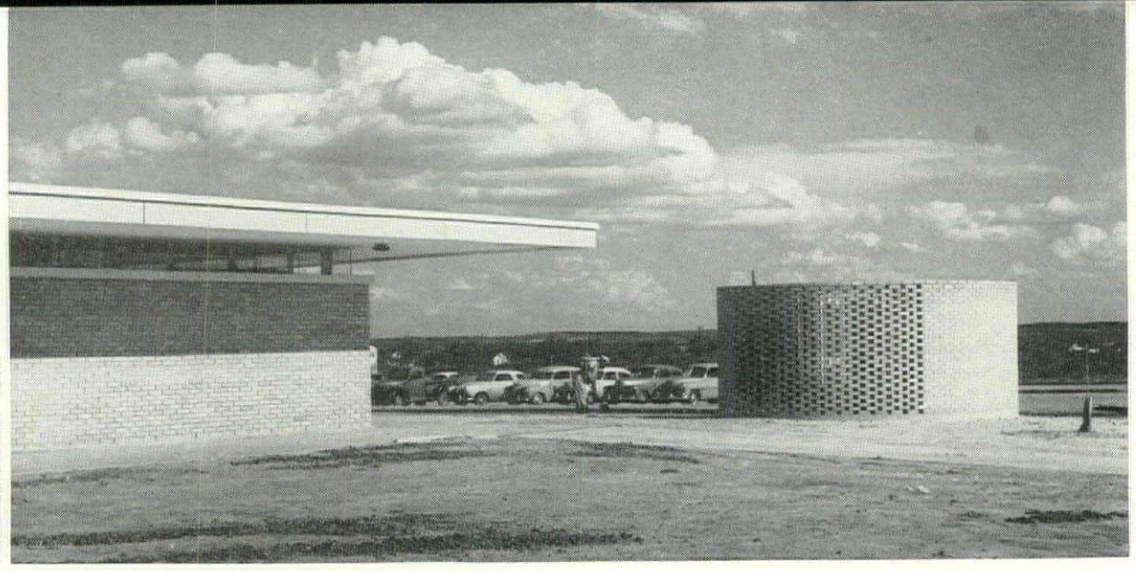
Service core *consists of ventilating "corridor" atop a shallow pipe trench.*



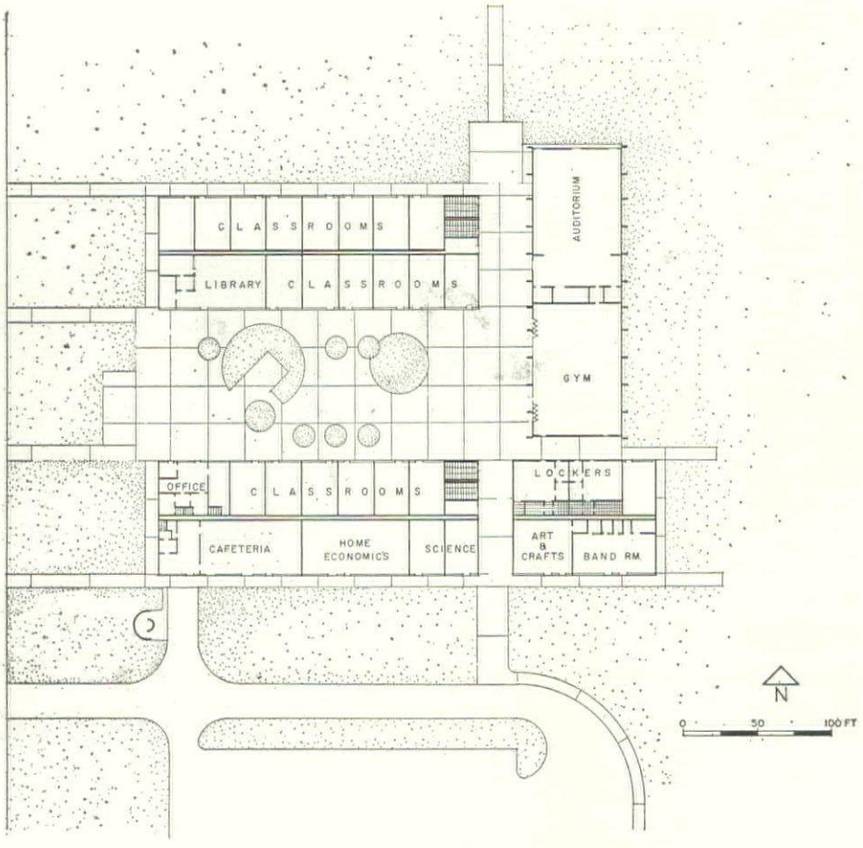
nourished with a low-cost service core

A service core that breathes. Down the center of each classroom wing is a 2½′ hallway that no one but the plumber walks down. Adding only 5′ of exterior periphery to each wing, it performs all the services noted above, and is completely accessible. The most ingenious of its abilities is sound baffling. Air enters the core high on the windward side, has to go through a sound chamber before it emerges to circulate through the leeward classroom. The tested decibel reduction is equal to the solid partitions siding each classroom, a 34-db loss (low, but only sensible in warm-weather schools, say the architects). But this is just part of the original thinking in this slick new Caudill, Rowlett & Scott school, the 47th they have done in the last five years. Turn the page for more details.

CORE PLAN

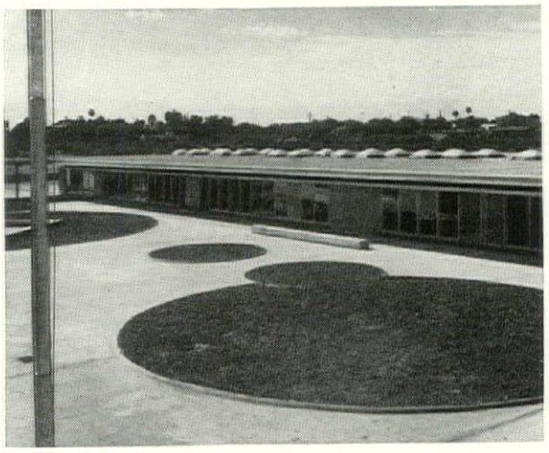


Photos: Ulric Meisel—Dallas

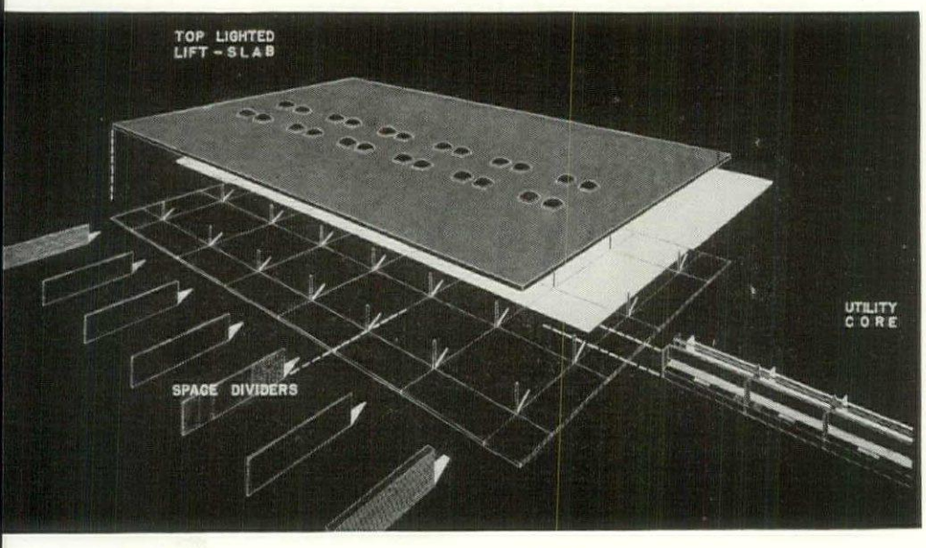


***Lift-slab** construction is clearly expressed in corner of school above. Round structure of partially pierced brickwork is a storage shed for garbage waiting collection.*

***Within the plaza,** grass patches are rounded deliberately to contrast with angularity of the rest of the design. Plaza is gathering place between classes, is also used for community affairs. Landscaping is still to be added.*



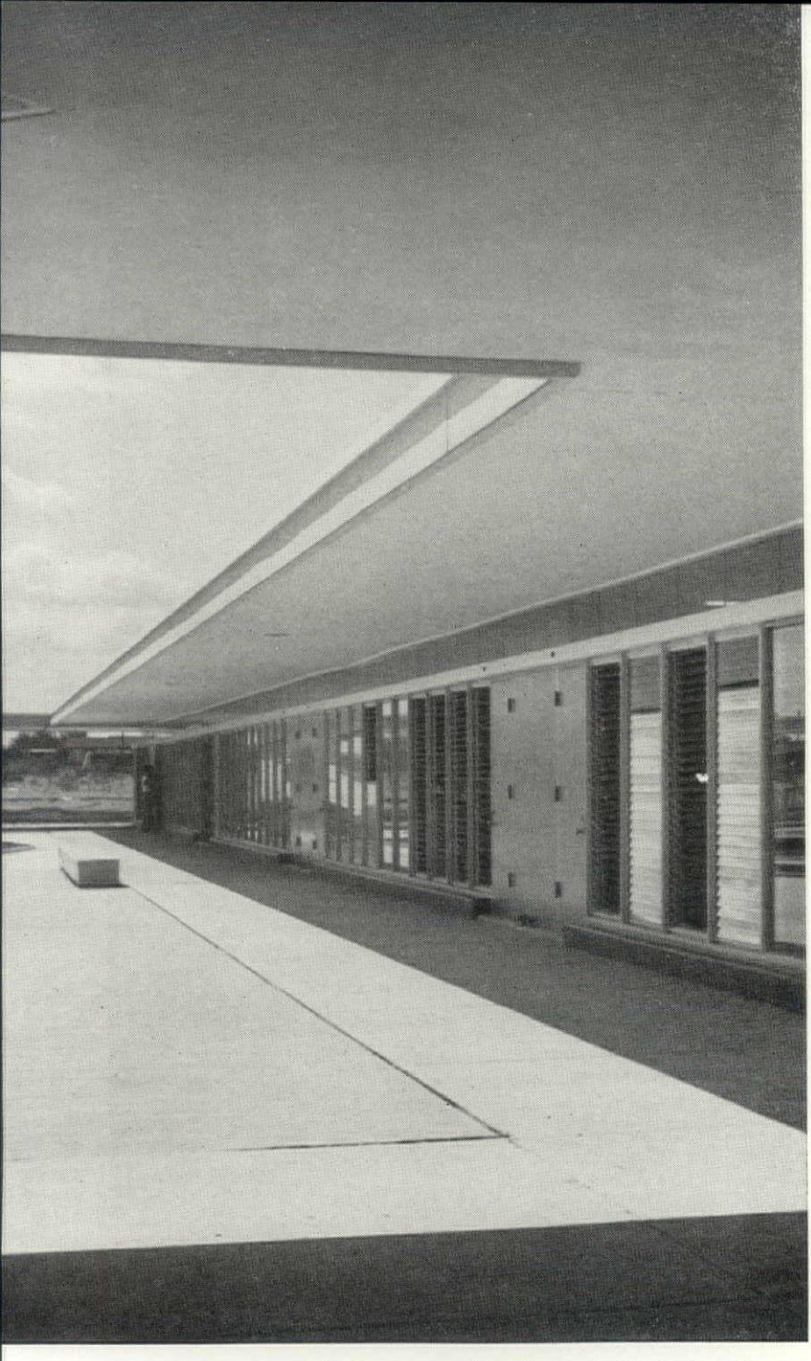
The service core and the structure



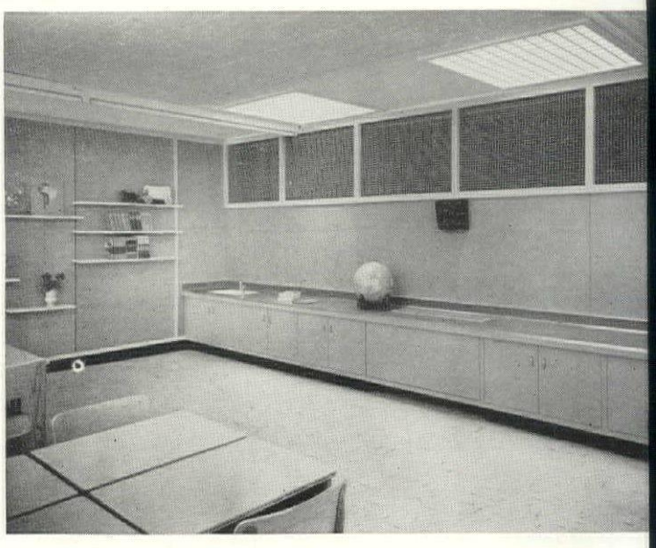
The architects pushed to take advantage of their ingenious central-service avenue by jacking up their lift-slab to a ceiling height of only 9′-8″, but that raised the problem of lighting the inner recesses of the low shoe-box-shaped classrooms. Solution: plastic bubbles.

The perforated lift-slab is expressed beautifully by the exterior vertical walls, which all turn to glass a foot or so short of the slab, proving that they carry no weight. Design of the entire building is very planar except for 1) the half-theater, half-gymnasium vault, which is supported on laminated timber arches; 2) the handsome punctuation mark of a round brick garbage-gasoline storage shelter beside the school.

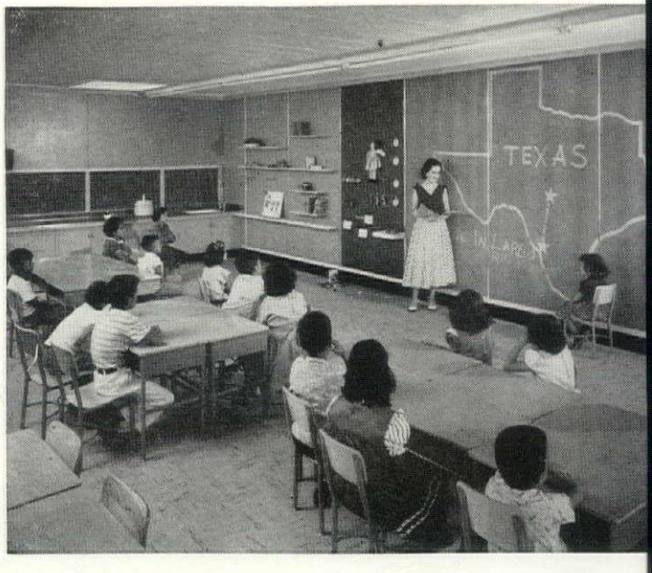
The architects found that the lift-slab method was $24,000 more expensive than the usual steel frame with wood joists and deck, but picked it as a better fire risk. In this and several elementary schools that Caudill, Rowlett & Scott designed for Laredo, the firm hit the budget estimate within ½%.



Under plaza overhang *is classroom wall made principally of glass jalousies. Overhangs shade glass, also shelter exterior corridors.*



Rear classroom wall *bordering on service core has ventilation grille, skydome ports, and long line of built-in cabinets.*



Partition, *is a "Vertical teaching surface". (This one is in a similar grade school in Laredo by same architect).*

The service core and the classrooms

The most noticeable feature of the novel service core is the large ventilating grille set in the back wall of each classroom, but there are bigger effects both direct and indirect. The most direct, of course, is the room shape. An economically deep room is permitted. But the service core also pulls all built-ins such as sinks to the rear wall and frees the partitions to become what the architects call . . .

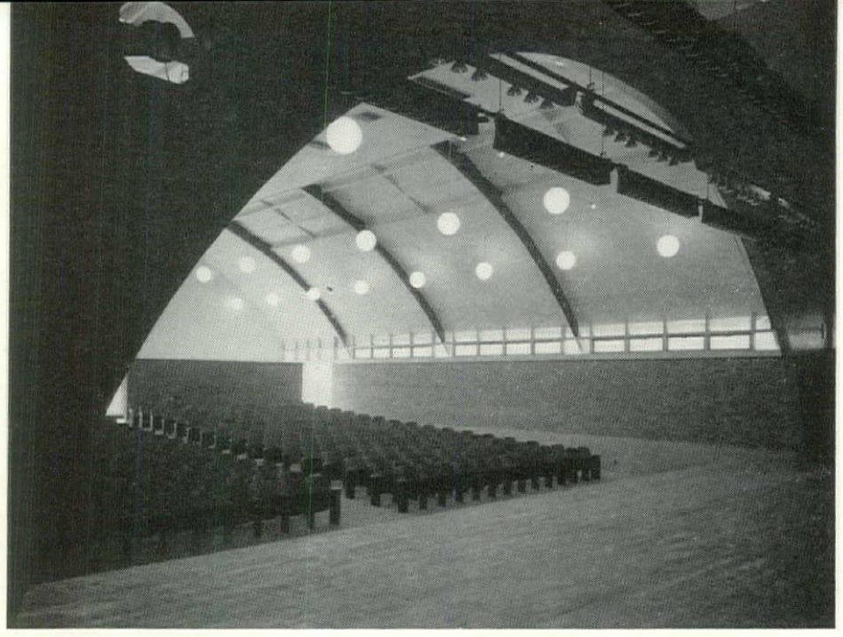
Vertical teaching surfaces. There are no partitions as such. Instead, Caudill, Rowlett & Scott have transformed all the room dividers into surfaces just as useful—according to the teachers—as the classroom desks. They are made of corkboard, chalkboard, pegboard, or dowelboard, and—most important for fiscal reasons—are not mounted over a wall, as the usual schoolroom aid is, but are nailed directly to the studs, even the corkboard. An estimate of the money saving involved:

Cost comparison of teaching surfaces:
(floor-to-ceiling vs. 4′ band)

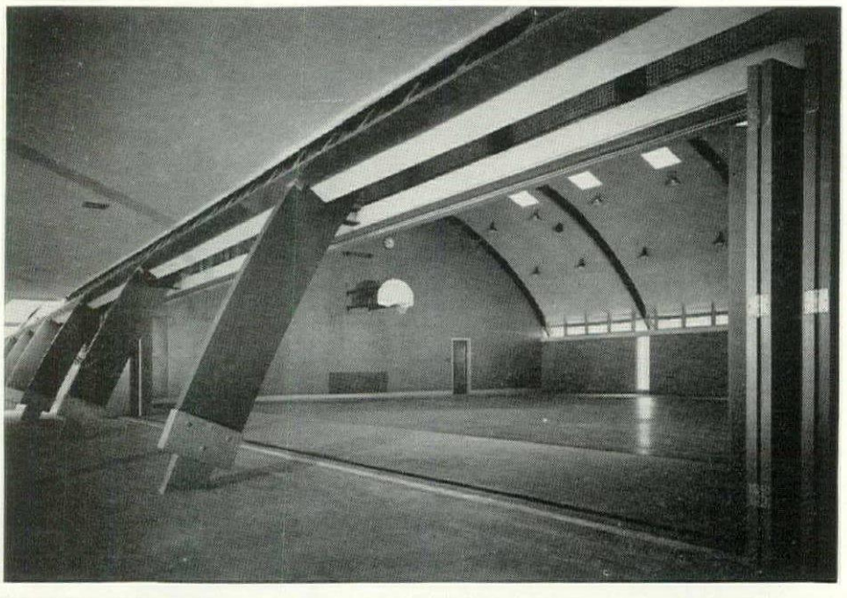
Finish	8′ high	4′ band & 8′ plaster	Extra per lin. ft.
Chalkboard	$6.00	$5.10	$0.90
Tackboard	6.48	5.16	1.32
Perf. hardboard	4.16	3.16	1.00

When teaching surface runs from floor to ceiling it is assumed that the plaster can be eliminated.

The architects let the contract for these teaching space dividers separately from the rest of construction and established that their cost was only 4% of total construction cost. Another advantage: they can easily be demounted and shifted to meet changing demands of fluctuating enrollments. Disadvantage (in more confined climates): doubtful acoustical value.



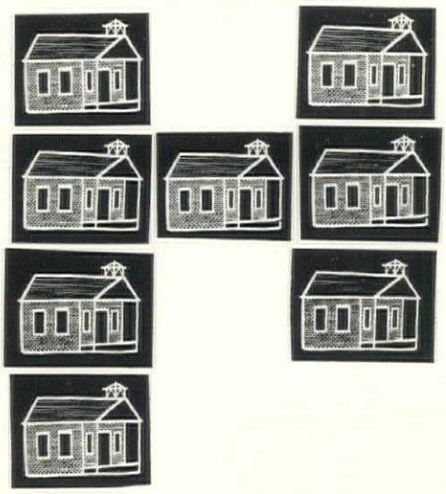
Auditorium *under vault supported by laminated timber arches is simple in finish but dignified. View right is from stage. Crown of vault was deliberately broken for acoustical reasons, to prevent focusing of noise down center.*



Gymnasium *is structural continuation of auditorium. It adjoins the plaza (see below) and has an unusual feature (particularly unusual in an economy school): an exterior wall that folds up and disappears.*

Broad plaza, *lying across the middle of the school (below), is a continuation of a Southwest tradition. To the rear of this photo is the vaulted gymnasium with its disappearing wall.*

Photos: Ulric Meisel—Dallas



ZONE PLAN helps control noise, traffic and children

Every plan—whether it is for a house, office building, hospital or school—is zoned. But while zoning is not so very important in a spread-out, articulated plan, it is a "must" in any concentrated, compact layout.

The two schools shown on the next five pages are compact in plan. They have a few wings that shoot off here and there, but, by and large, their plans are highly concentrated. Both are examples of clear zoning that made the difference between a workable school and a nightmare of inefficiency.

Zoning in schools means three things:

1. Zoning for noise—isolates noisy areas, separates them from quiet classroom wings (p. 152).

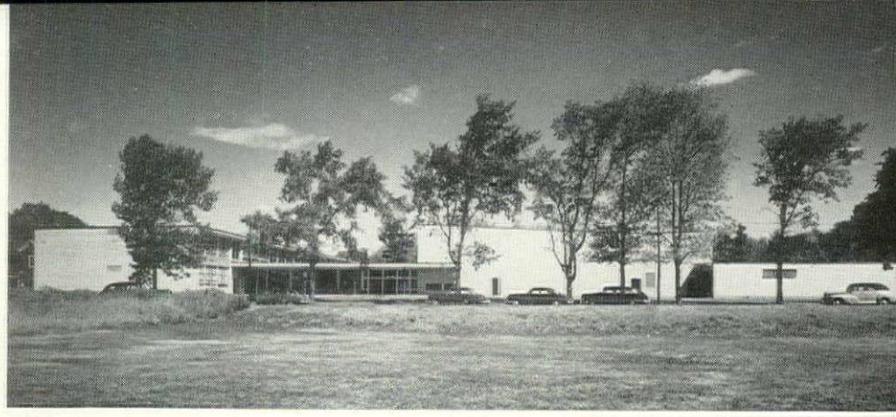
2. Zoning for use—links areas of related use, such as the auditorium, the music and art rooms and the shops; or the gym and the athletics field (p. 153).

3. Zoning by age groups—separates (in elementary schools) the kindergarten crowd from older children, and the first to third graders from the fourth to sixth (p. 154).

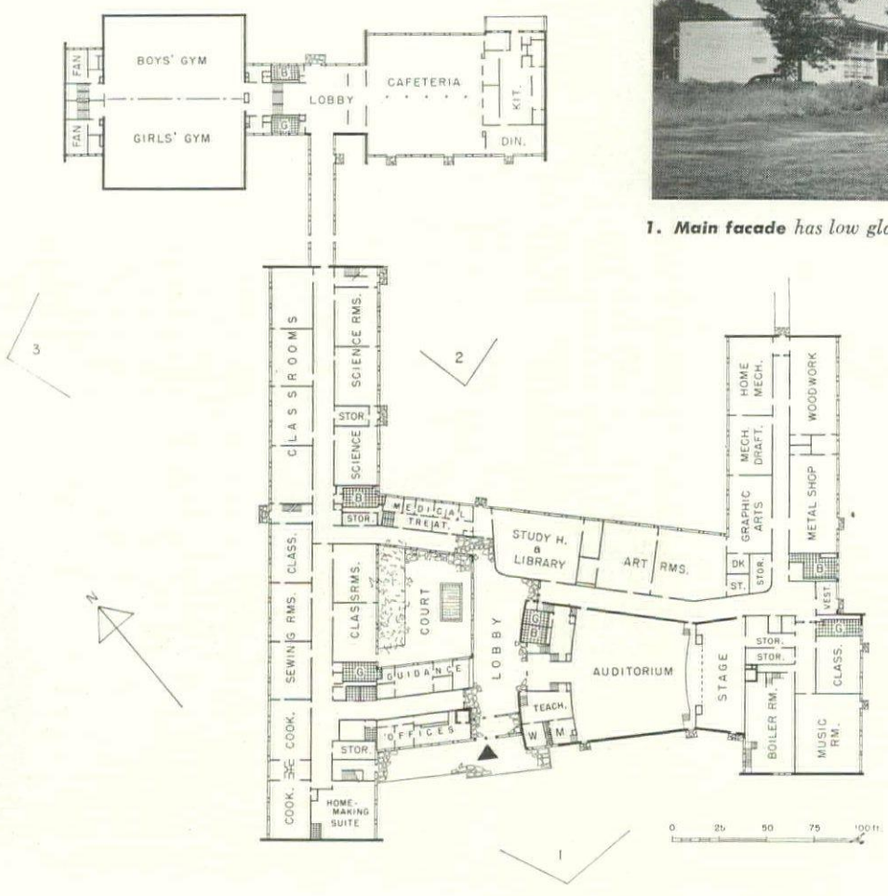
Zoning can be achieved both horizontally (all on one floor) or vertically (by changes of floor level). The TAC & Johnson school on p. 152 is zoned in a horizontal plane only—with noisy areas placed far away from areas used for quiet study and with "related use" areas bunched together. The Perkins & Will school on p. 154 is zoned vertically as well as horizontally, for its split-level plan efficiently separates different age groups, and its "spoke" or "finger" plan keeps noisy areas such as the kindergarten out of the way of classroom wings.

No zoned school can be a prototype—for each school represents a new zoning problem, depending upon site conditions and the local educational program. But these two schools are examples of clear zoning as compared with the fuzzy zoning that marks plans conceived carelessly or hastily. They are also evidence that good zoning need not mean costly decentralization.

ZONE PLAN



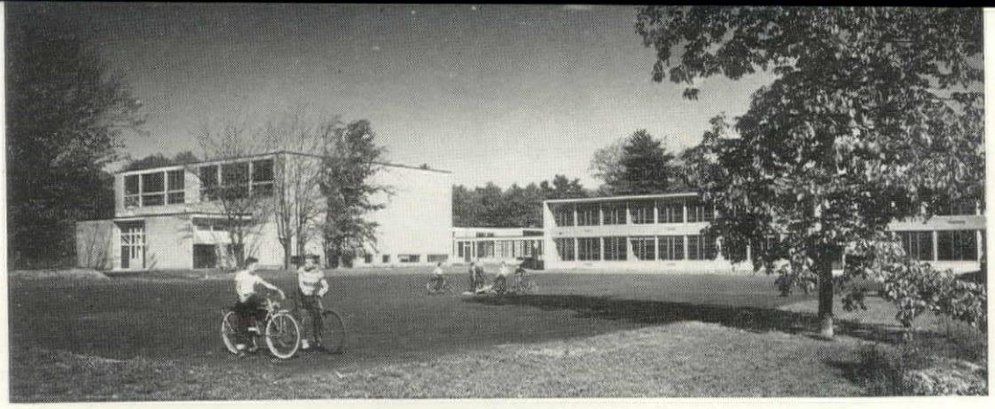
1. Main facade *has low glazed entry and office wing center*



In Worcester, Mass., the zoned plan

2. Noisy zone: *Beyond row of shade trees is one-story cafeteria in a separate wing with the gym connected to the two-story main classroom building (left, below) by a 65' long glazed walk.*

Photos: Ben Schnall



3. Gym and classroom wings *face northwest toward playfield (foreground)*

helps produce a **fully equipped junior high** for only $15 a sq. ft.

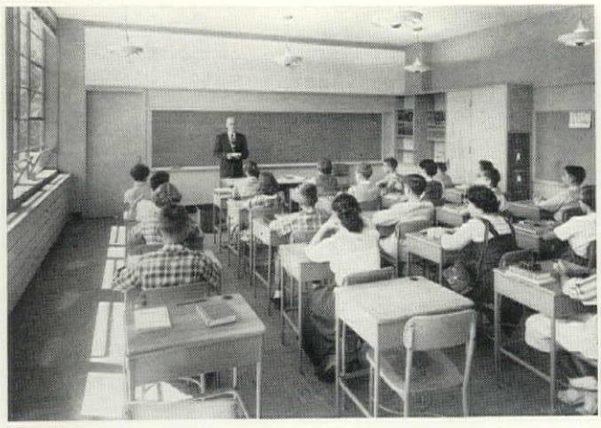
CHANDLER ST. JUNIOR HIGH
Worcester, Mass. ▲ 900 students. ▲ 37 classrooms or shops.

ECONOMIES
Two-story classroom wing with double-loaded corridors. ▲ Highly concentrated plan (perhaps too tightly concentrated resulting in some plan congestion). ▲ No plastered ceilings in shops; steel structure exposed (estimated saving: $3,550, or 25¢ per sq. ft.). ▲ Precast concrete slabs on second floor (estimated saving over poured slab on steel: about $4,500). ▲ Omission of toplighting in second-story classrooms was necessary to reduce the construction bid.

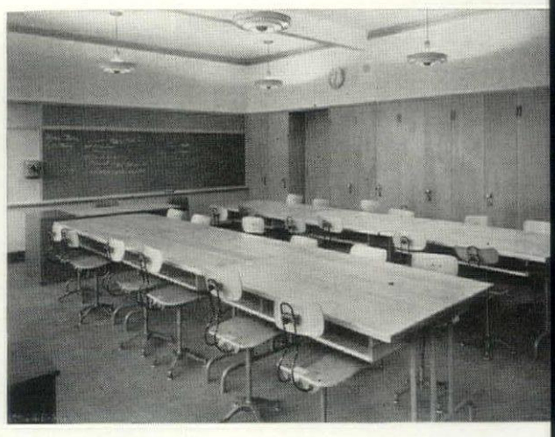
COSTS
$1,576,000. ▲ $15.61 per sq. ft. ▲ $42,600 total building cost per classroom. ▲ $1,750 per pupil. Note: in such a well-equipped school in New England these costs, which include all built-in equipment, are remarkably low.

FEATURES
Unusually complete junior high school plant. ▲ Good zoning of plan — all noisy areas are grouped together (auditorium, shops, music rooms at one end, gym and cafeteria at the other). ▲ Quiet areas similarly isolated. ▲ Despite very tight concentration of plan, individual units were planned for separate use—auditorium for community use, gym for use in connection with outdoor athletics area, etc. ▲ Close plan relationship of potentially related areas — auditorium near shops, music and art.

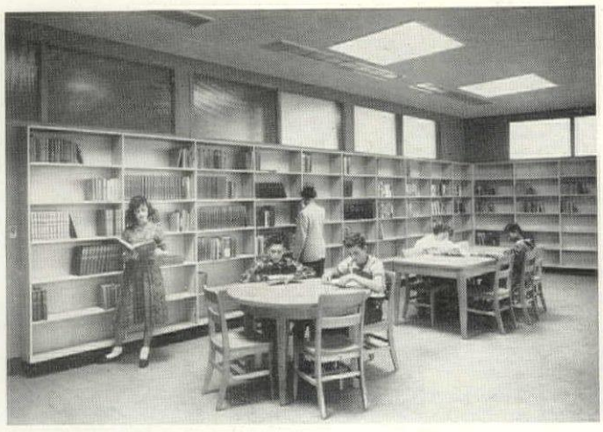
CREDITS
The Architects Collaborative and G. Adolph Johnson, associated architects. ▲ Homer Anderson, school consultant. ▲ Thomas Powers, superintendent of schools. ▲ Leo T. Doherty, assistant superintendent of schools, in charge of buildings. ▲ John Capobianco, general contractor.



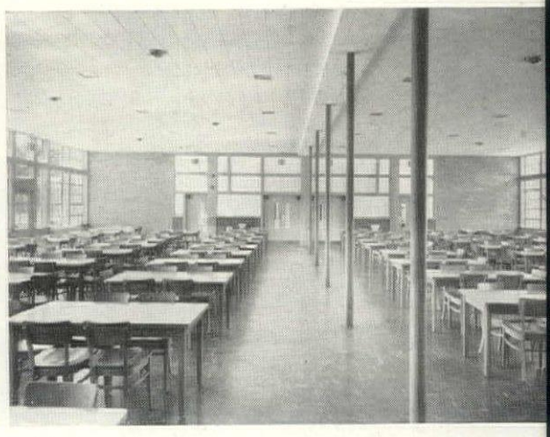
Typical classroom



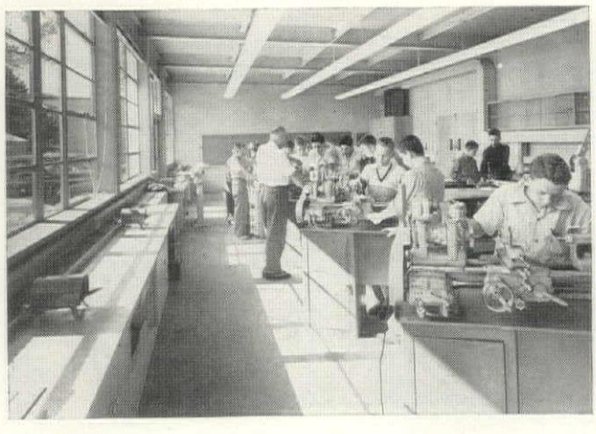
Sewing room



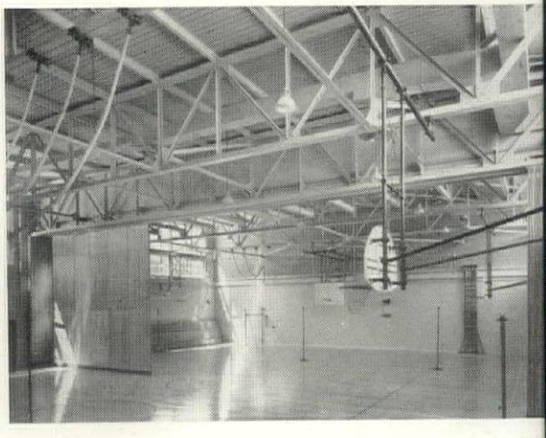
Library-study hall



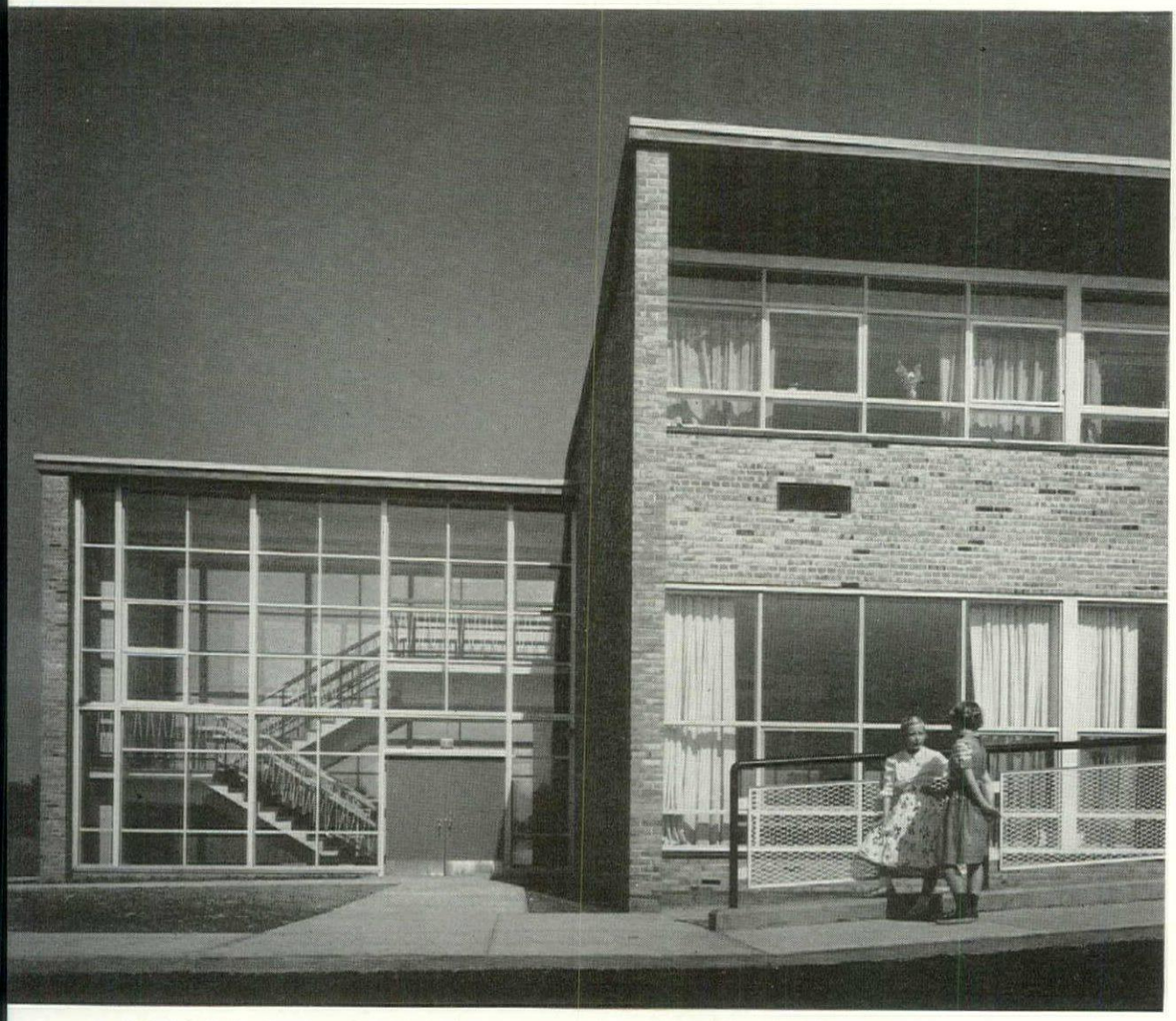
Cafeteria



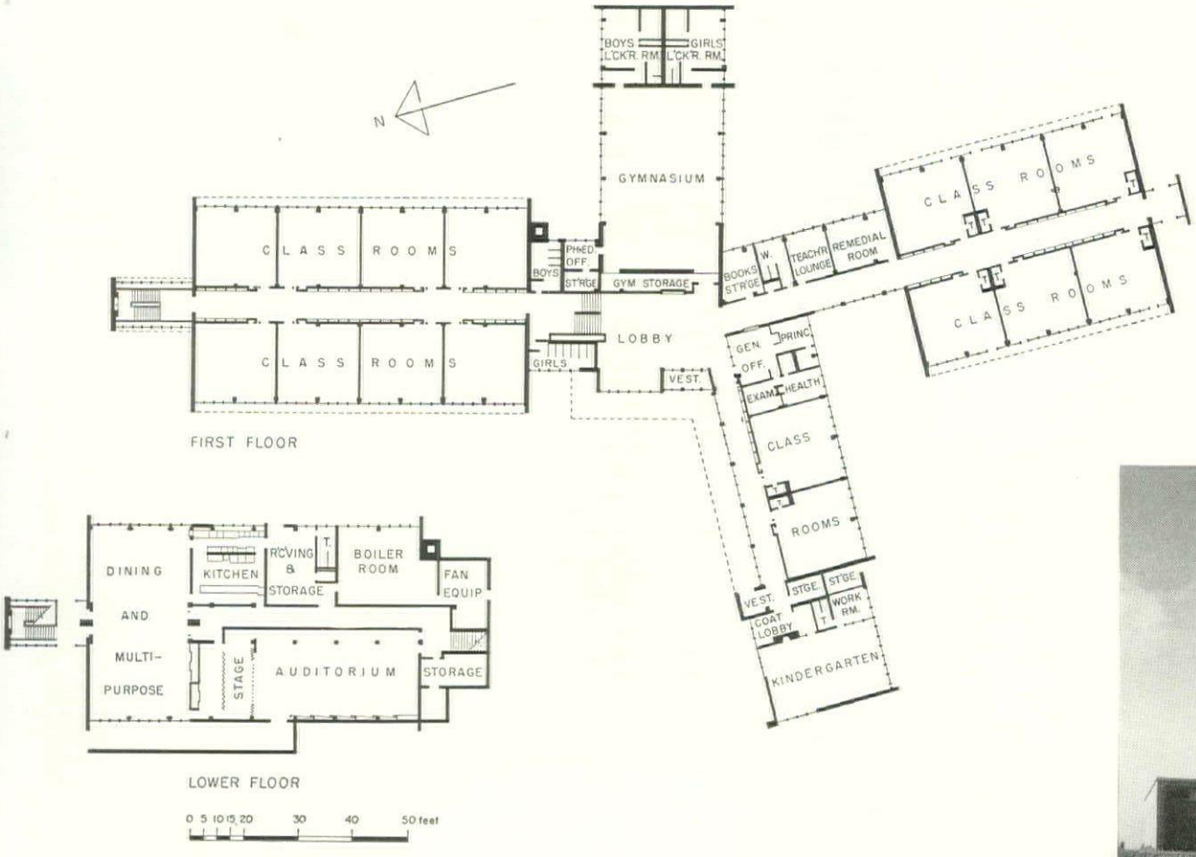
Metal shop



Gym



***Split levels** fit the site, are bridged by handsome stairs. Admittedly a slightly more expensive detail, glassy stair shaft is just the kind of thing that sets this school apart from run-of-the-mill institutions.*



RALPH R. SMITH ELEMENTARY SCHOOL

Hyde Park, N. Y. ▲ 596 students. ▲ 17 classrooms.

ECONOMIES

Double-loaded corridors. ▲ Floor levels closely follow changes in grade. ▲ Local stone, taken from nearby wrecked building, cost only 50¢ more per sq. ft. than fine brick, helped to give school a luxurious, well-finished look. ▲ Good materials will reduce maintenance costs.

COST

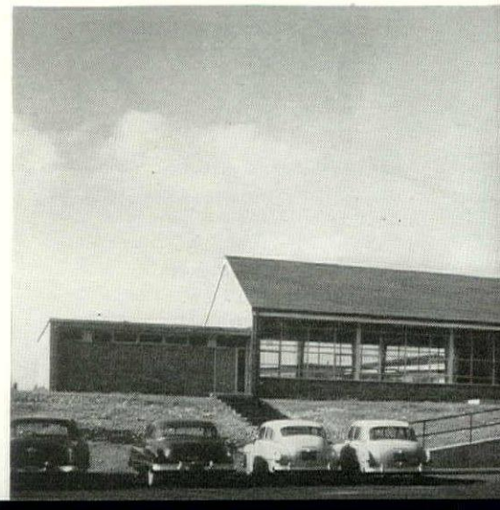
$1,000,000. ▲ $19 per sq. ft. ▲ $58,000 total building cost per classroom. ▲ $1,840 per pupil. ▲ Because they were opened at the peak of the Korean war, the bids were high. (Another reason: a concrete roof, expensive in a "steel" area, was used to eliminate "critical" steel.)

FEATURES

All finger-plan advantages plus advantages of "spoke plan," shorter circulation radiating from administrative center. ▲ Only three spokes mean wide, spacious re-entrant angles around central core. ▲ Links between wings articulate building, separate different age groups (as do split levels), permit excellent control and separate use of each wing. ▲ Glass over lockers (see section) lets corridors borrow light from classrooms. ▲ Kindergarten at the end of one spoke is well separated from rest of school. ▲ Glassed-in secondary stair is handsome, practical. ▲ Lower-level auditorium is small in scale to suit children. ▲ Clever use made throughout of inexpensive, good-looking materials where they count to take away any "institutional" drabness. ▲ Classrooms nearly square in shape for more flexible use.

CREDITS

Perkins & Will, architects. ▲ W. W. Kingston & Co., Inc., general contractor.



Photos: Hedrich-Blessing

Stone building *is a fine art in Hudson Valley. Architects Perkins & Will found an old stone wall on an adjacent site, used the native material to enrich their school and make it blend with local tradition.*

In Hyde Park, N.Y., a zoned school uses

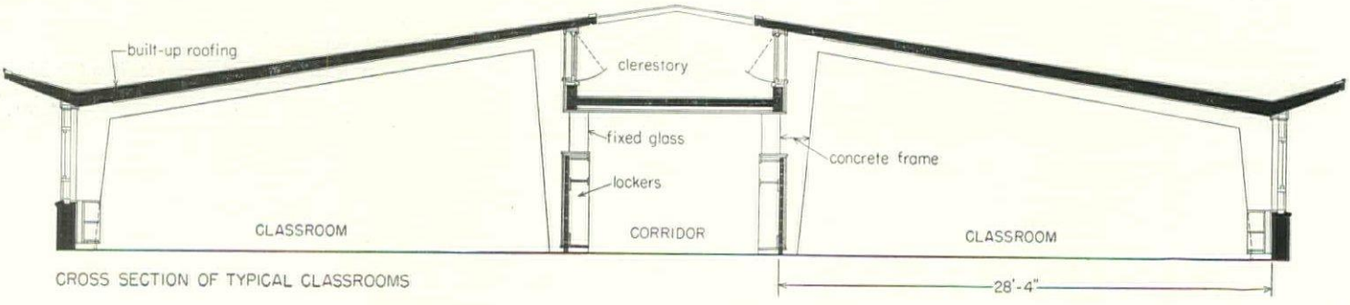
radiating classroom wings around an administration hub

Full extra story *under one wing is gained by split-level plan. Architects used it to house lunchroom, kitchen, services, auditorium. Pitched-roof building in rear is gym.*

A tough break against architects is the fact that the public thinks that good-looking buildings must be expensive, that ugly buildings must be cheap. This discourages ingenuity, lowers pride. Here is a school whose most handsome features add little or nothing to cost. And it has a well-zoned plan to boot: its four wings are spread wide apart to keep the noises of the gym or the kindergarten from the classroom areas; a system of split levels (that closely follow the contours of the site) helps separate other noisy areas (such as the cafeteria) from spaces that demand quiet; and all this has been achieved in a "spoke plan" whose spokes are so arranged as to avoid the usual, ugly, tight re-entrant angles.

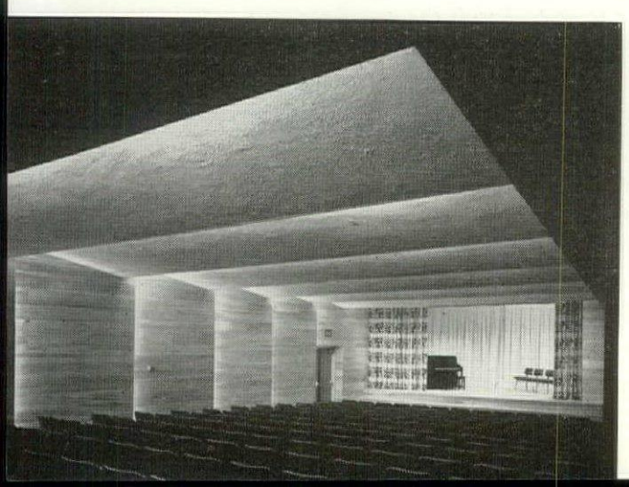
Photos: Hedrich-Blessing

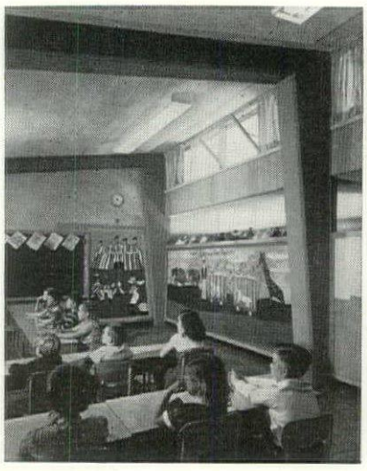
Kindergarten *looks like a big living room. Stone fireplace, curtains, flowerboxes outside windows make children feel at home. Glass around fireplace increases sense of spaciousness.*

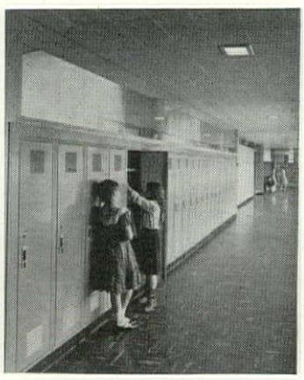


CROSS SECTION OF TYPICAL CLASSROOMS

Auditorium *is deliberately informal to make children feel at ease. At same time, slanting of walls and arrangement of lights help focus their attention on stage. Walls are paneled with pine boards; ceilings are acoustic plaster.*







Classroom wings *were designed with double-loaded corridors. Section shows usual bilateral lighting achieved through the type of clerestory on which Perkins & Will have generally standardized after much experience (one advantage: it balances solar heat gains). Note unusual device for lighting double-loaded corridors: fixed glass panel between tops of lockers and corridor ceilings permit corridor to borrow light from bright classrooms. Backs of lockers are used for tackboards to display children's paintings.*

SMALLER WINDOWS

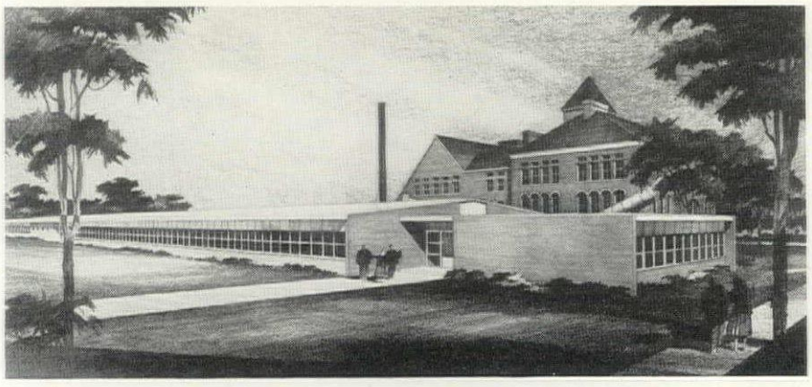
may mean lower operating costs

The movement to limit glass in office buildings is already in full swing. That a similar movement may be starting in school buildings will come as a shock to many of the uni-, bi-, tri- and quadrilateral architects of the country, but here are two examples.

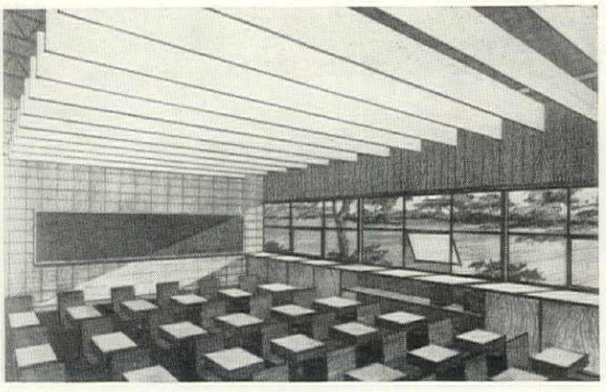
The location of both these schools is northern, and cost is the biggest of several arguments in favor of less glass: 1) there is less heat loss, 2) lights must be on most of the time anyway, 3) less glass maintenance is required, and 4) multistory schools are easier to build with small windows.

But in this economic regionalism is also a hard heart of conviction, particularly for high schools: light with electricity and you will know how much light you can always count on. Glare can be controlled easily. Over-all uniformity in heating is easier to achieve when you cut the unbalancing influence of glass. Circulation can be brisker in an artificially lighted school because the design can be more compact.

FORUM questions this development not on its economics, not on its convictions, but on its architecture. Schools are not basically built for money, or for efficiency, but for children, and enforcing a totally artificial environment on young children may be stealing something from them. School is at best an enforced regime; to tighten this regime architecturally with small-windowed schools may move against the main trend toward relaxed and comfortable educational buildings. FORUM has for some time been interested in smaller windows for office buildings, welcomes the experiment in schools, but is still the man from Missouri.



Long low wing *of classrooms for Hawarden is simplest, least expensive solution*



Hanging baffles *mask lighting fixtures overhead*

In Hawarden, Iowa, low windows, low heat bills, low overhead

Hawarden, Iowa, needs 17 new classrooms, but has only a $233,000 maximum taxable base to pay for them, an alarming fact of life considering classrooms in that climate generally cost $20,000-25,000 per unit.

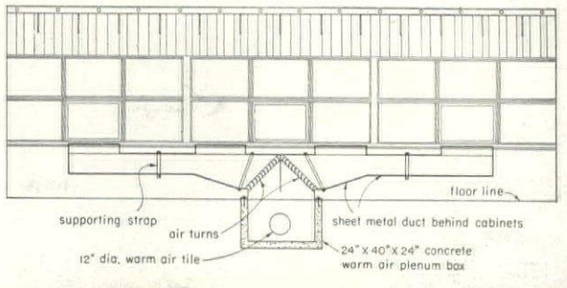
But bids are in for the new design and it looks as though Hawarden will get the classrooms without exploding its tax structure. Architect Harold Spitznagel designed a straight, simple structure that cuts two cost corners:

▸ It has vision strip windows only 4′ high and relies for its lighting on fluorescent ceiling fixtures masked with acoustical baffle board (tested light level with shades drawn, 63.6 foot-candles, on desk top with new lamps; 50.5 foot-candles two years later without lamp replacement or cleaning). Disregard for daylighting saved money by permitting classrooms almost square in plan and by allowing selection of lowest cost scheme for exterior wall. From sill up, including porcelain fascia, this wall would cost $26.93 per lin. ft. (see detail) against glassier alternates up to $76.93 per lin. ft.

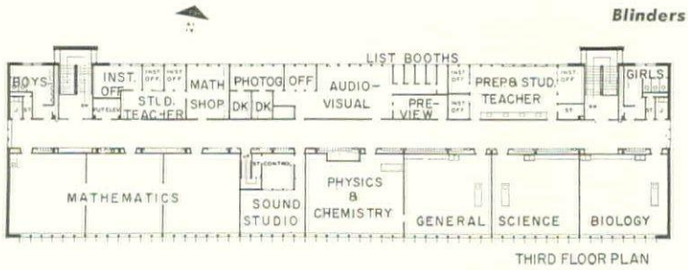
▸ It has a low-cost heating system. Based on the principle of preheat and reheat, its central tunnel-plenum supplies 60° air to underfloor ducts made of sewer tile; the air is then introduced into each classroom, through individually controlled reheat coils near the windows. The return is through a hung corridor ceiling plenum.

Bids: General contract—$173,785; heating, plumbing and temperature control—$23,939; ventilation—$8,950; electrical—$21,530.

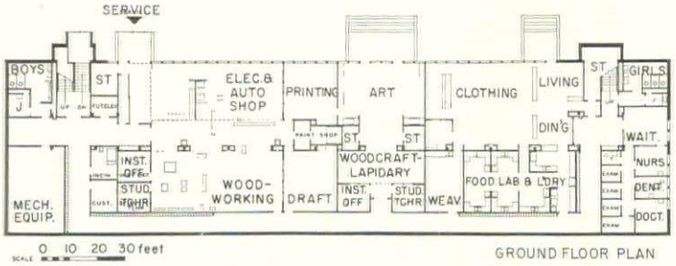
Says Spitznagel: "Observation of the older buildings had convinced us that most teachers drew the translucent shades to the mid-point of the old double-hung windows and lit the lights, which burned constantly irrespective of the intensity of the natural illumination. We therefore concluded that we would draw these shades permanently by so constructing the building, and thus eliminate the initial cost of the larger glass area, the heat loss and the heat gain resulting therefrom and the maintenance which a glazed area requires."



Blinders *mask glare from classrooms, cost about $36 each—$6 for material, $30 for labor*



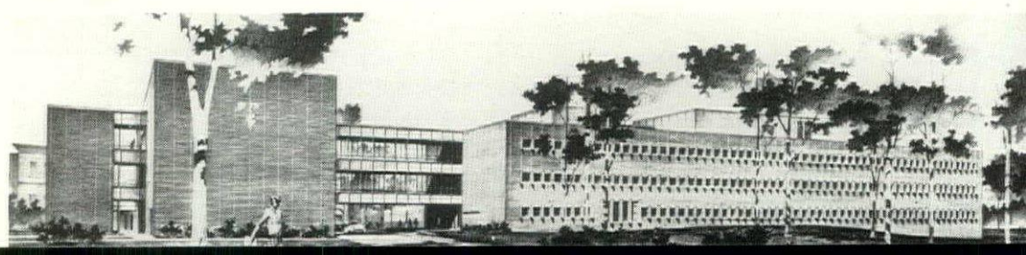
THIRD FLOOR PLAN



GROUND FLOOR PLAN

In Minneapolis, Minn., a university tests economies of less glass in a cold climate under

electric light



SECONDARY LABORATORY HIGH SCHOOL

University of Minnesota, Minneapolis. ▲ 24 classrooms. ▲ 450 students (plus 235 student-teachers and staff members).

ECONOMIES

Multiple-story, double-loaded corridors. ▲ Low (9′-9″) ceilings (saving: $260,000). ▲ Square classrooms resulting in small periphery. ▲ Closed-circuit television system (instead of glass booths) for observation of teaching by student-teachers (saving: $20,000). ▲ 4′ modular construction.

COST

$1,460,693. ▲ $16.87 per sq. ft. ▲ $60,000 total building cost per classroom. ▲ $2,100 per pupil.

CONSTRUCTION

Steel frame with concrete floor slabs. ▲ Exterior walls, concrete panel and brick veneer.

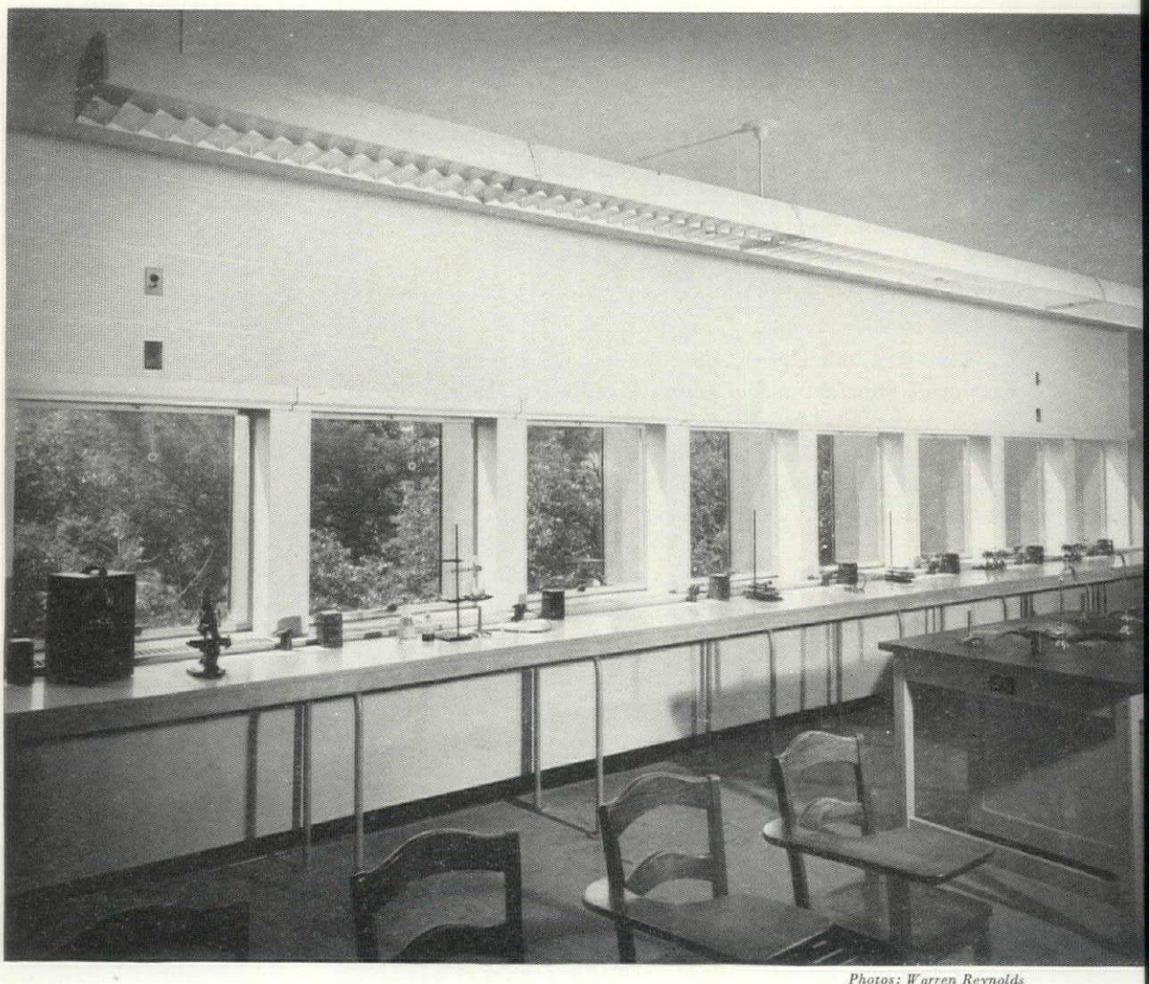
FEATURES

Complete facilities for use of visual aids. ▲ Extensive acoustic treatment. ▲ Closed-circuit TV system. ▲ Vertical baffles on south windows. ▲ Classrooms tailored to departments (built-in aquarium for biology, etc.). ▲ Space for demonstration of master teaching techniques. ▲ Greenhouse on roof ▲ Windowless gymnasiums.

CREDITS

Magney, Tusler & Setter, architects and engineers. ▲ Winston A. Close, University of Minnesota advisory architect. ▲ D'Arcy Leck Construction Co., general contractors.

Short windows *leave good vertical surface for upholstering with acoustical absorbent, important in view of wide use of television and other teaching aids in this laboratory high school. Note that wall over windows is painted light color and has luminaire close to it to diminish contrast with light through windows.*



Photos: Warren Reynolds

This winter in Minneapolis' newest high school the lights will be on *every* school day *all* day. Reason: in this school the windows are only 3′ high. In no classroom is natural light considered as any part of the source of illumination. Many other schools may also be running their lights constantly this winter—especially if their weather prediction is as dour as Minnesota's (December, for example, is expected to be completely overcast 16 days, clear 7 days, partially overcast the rest).

But the special point of this startling design is that the lights will still be burning in these classrooms next April and May, when they are turned off in most other modern schools.

This is a glove thrown squarely in the face of most advanced US school design theories and it is not thrown casually. The new high school is the training high school for the School of Education at one of the great US universities, and the decision of these educators to turn away from daylight illumination was not mere whim. Their reasons can be divided into those of 1) economy, and 2) conviction:

Economy. The cramped site on the crowded campus of the giant University of Minnesota, necessarily near the other Education buildings, and the required large number of classrooms made it obvious that rooms would have to be stacked in a multi-story structure. Another demand of the program: square "activity-type" classrooms. That ruled out overhead natural lighting and raised another problem: Minnesota's requisites for daylighting from the side wall would call for a glass height one-half the depth of the room. This meant a 14′-6″ ceiling.

This was turned down in favor of a 9′-6″ ceiling with artificial lighting,* and the architects estimate that the reduced volume saved $2,920 per classroom, figuring the omitted cubage at 75% of average. (An estimate by an independent appraiser would place this saving closer to $732, figuring in glass, extra partitions and a $200 allowance per classroom for stairs, columns, pipes, etc.)

Cost of lighting and otherwise maintaining the low-ceilinged, electrically illuminated classroom also was investigated by the

* Classroom 29′ x 32′, 9′-9″ high, is lit by two rows of 4′ T fluorescents with leading and lagging tubes for stroboscopic correction mounted on 8′ channels and shielded by a louver bottom (upward component, 194 foot-lamberts on ceilings; downward, 35 foot-candles at task level).

designers. Their figures (still using the 75% cubage computation):

Classroom with vision strip—as built

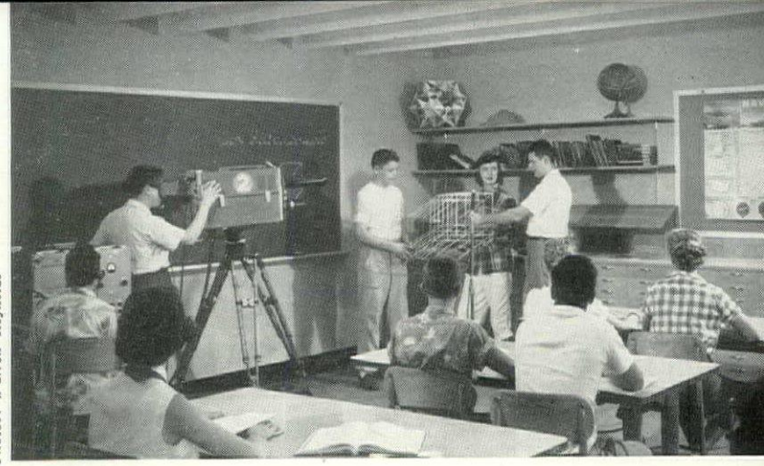
1. Lighting costs per year (electricity at $.013 per kw-h), interest at 3%, 50-year amortization
   - a. Owning cost $38.70
   - b. Operating cost 32.20
   - c. Lamp cost 6.67
   - d. Cleaning cost 10.80
2. Heat cost (fuel at $1.00 per million Btu delivered).. 31.14

Total cost, heating plus lighting per year..... $119.51

Classroom with glass height equal to one-half classroom depth

1. Lighting costs
   - a. Owning cost $25.80
   - b. Operating costs 14.26
   - c. Lamp cost 2.99
   - d. Cleaning cost 7.20
2. Heat cost 64.60
3. Additional building cost per year includes increased amount of radiation and of glass, also blackout shades, plus 4′ increased story height. The 50-year amortization of these costs: $2,920/1,000 x 38.87..... 114.00

Total cost, heating, lighting plus extra building cost, per year $229.05



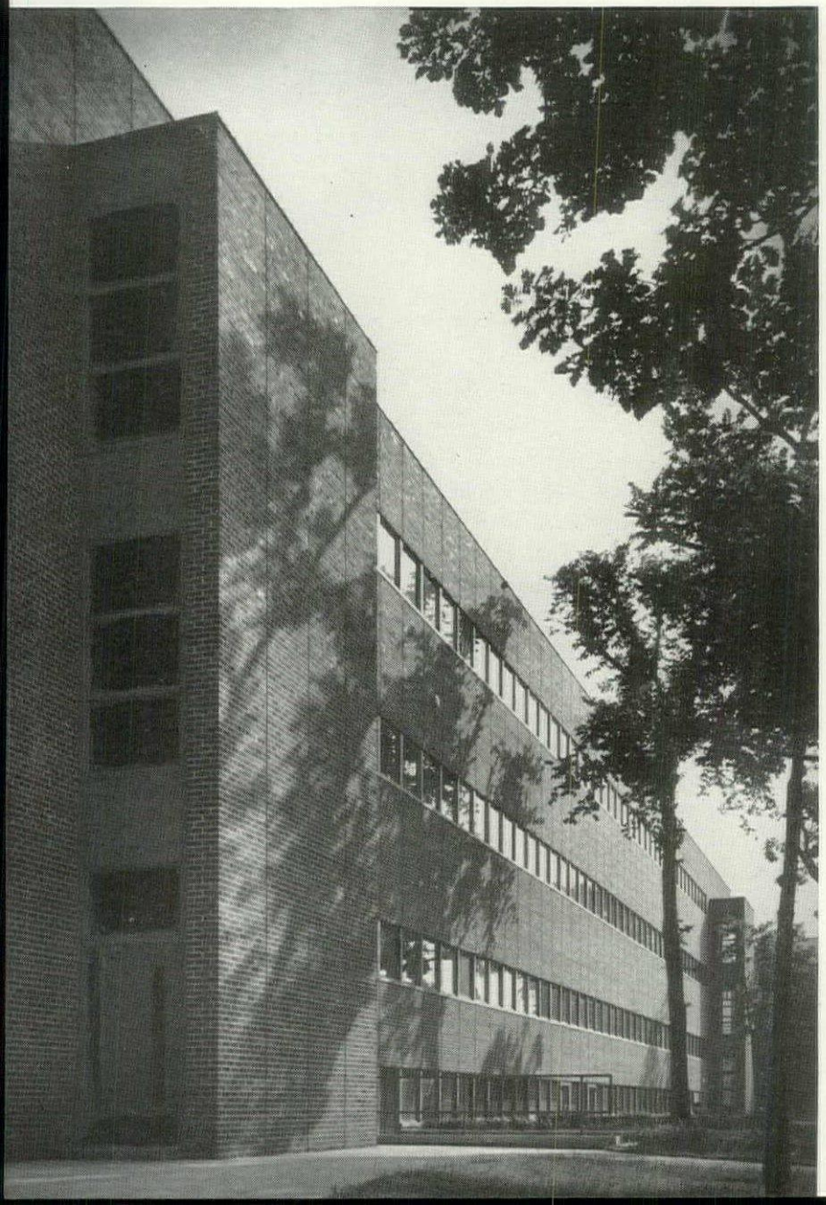
Photos: Warren Reynolds

Closed-circuit TV system *replaces usual glass-enclosed observation booths beside classrooms for university student-teachers studying teaching operation.*

Conviction. But it was not all a matter of money. Even if a more spacious site had been available, the designers would have made this school a three-story structure with double-loaded corridors. Principal M. W. Stout and Architect Richard F. Hamel question "whether the type of circulation inherent in high school class scheduling as opposed to that in elementary schools indicates the desirability of a one-story rambling structure."

A determination to avoid glare also contributed to the decision to use only a vision strip. There are no brightness contrasts in classrooms in excess of one to ten; even the small windows are masked with blinders (see picture) to block anything but a straight-out glance outdoors.

North elevation *does not need baffles on windows. Stair wells project from flat classroom facade.*

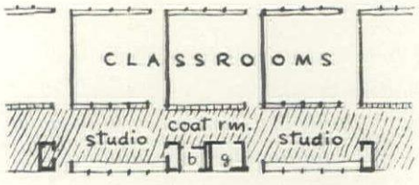


Inside stair well, *big windows emphasize fact that these architects think glass can be used liberally in non—teaching areas.*

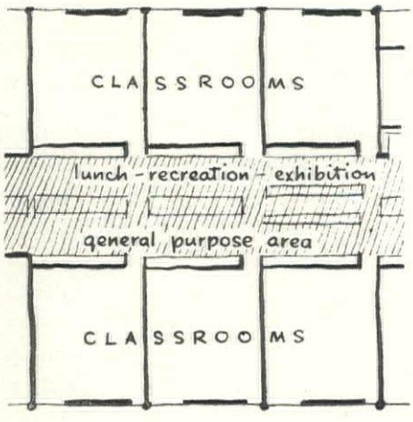
MULTI-USE CORRIDOR

Early experiments in economy put hall space to multi-use; now they put it in the classroom

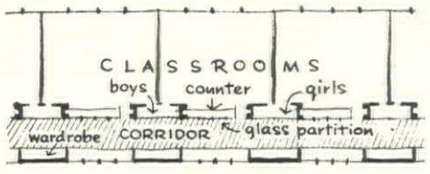
One of the easiest ways to cut the cost of a school is to make part of it do double duty. Here are some experiments in getting double use out of corridor space—100 to 250 sq. ft. per classroom, which is normally used only for circulation.



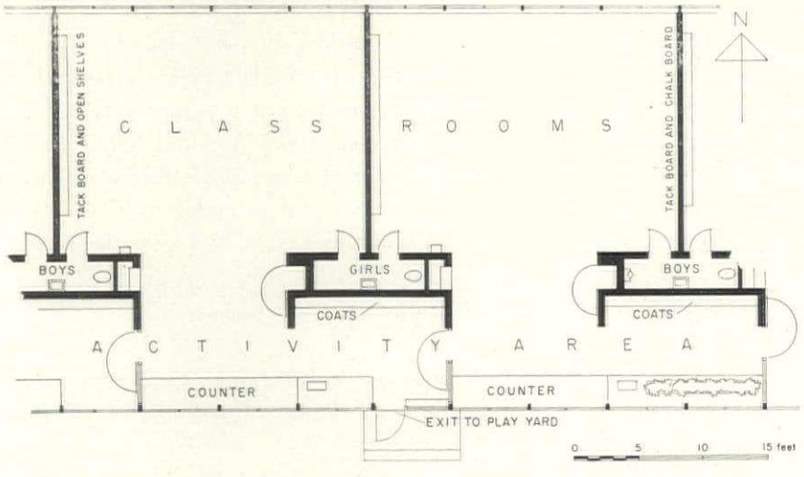
1. In 1949 FORUM introduced the subject of making economical dual use of corridors by presenting this pioneer school plan by Architect Walter Bogner for Dedham, Mass. (AF, Oct. '49).



2. Starting from Bogner's design, FORUM gave the late Matthew Nowicki the problem of incorporating the multi-use corridor in a theoretical school, "FORUM's school for the '50s" (AF, Oct. '49).



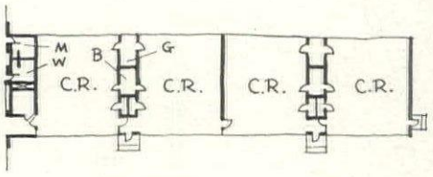
3. About the same time, Architects Eberle Smith & Associates found that, before glass was installed between corridor and classrooms of Ferndale, Mich. school, corridor was used for class space.



Elmer L. Astleford

4. In the 1952 addition to the same Ferndale School, the architects omitted the glazed partition, rearranged the work counters, wardrobes and planting boxes to make corridor use deliberate (left).

Meanwhile, Architects Perkins & Will in their pioneering cluster-plan school at Scarsdale created lozenge-shaped corridors for deliberate use as social space connecting the clustered classrooms (p. 140 and AF, Oct. '52). And, Architects Eberle Smith & Associates eliminated the corridor altogether in their school design for Plymouth, Mich.:



The idea of multi-use corridors is capable of further development. Its economy is not one of penny-pinching, but of enhancing classroom use at little or no cost. Warning: while some multi-use corridors have appeared in architect's drawings cluttered with furniture, arrangement of furniture must be such that a passage is always clear for emergencies.

DESIGN STANDARDS AND DATA

FORUM introduces a new department by the co-author of *Architectural Graphic Standards* to help keep architects current on new design details

Beginning this month FORUM updates the most thumbed book in every architectural office: *Architectural Graphic Standards* by Ramsey & Sleeper.* Each month this new department will present several new pages of design standards and data developed by Architect-Author Harold Sleeper for future publication in a companion volume.

The three pages of school details that follow are the first in this monthly series of plates. They are additions of important new material not covered in *Graphic Standards*. But, like the plates in the book, these present only accepted standards,† checked with appropriate authorities, associations, manufacturers and architects. The cost sheets to be included in the series will be prepared from data furnished by Carleton F. Rosenburgh, vice president and chief estimator of Turner Construction Co., one of the nation's largest contractors.

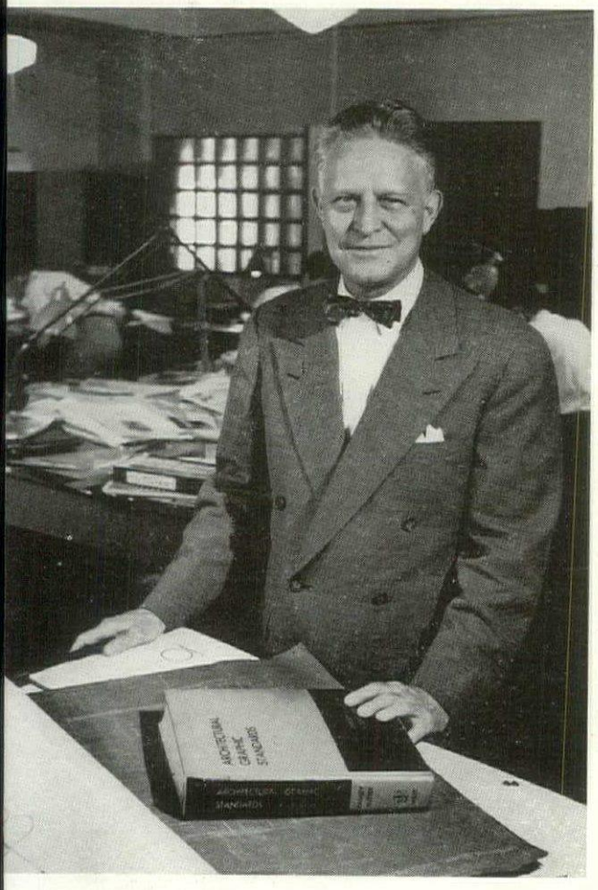
Subsequent plates, already being prepared by the Sleeper office, cover such timely subjects as store fixtures, church details, motel planning, layout of architects' offices, suspended ceilings, comparative roofing and flooring costs, sunshading devices and a unique table that will permit anyone to calculate easily and accuraetly the size of sunshade required for any kind of window, for any orientation, for any part of the country. This table is based on 5,000 separate calculations.

Meanwhile, FORUM's sister publication, HOUSE & HOME, will present a similar series of house design standards and data by the same author.

FORUM believes its readers will find this new department as useful as they have found the book it supplements—the book Architect Ralph Walker, past president of AIA, has praised as "an encyclopedia of all sorts of building information that is tested and true . . . a part of architectural practice and a reference for all of us who work in architectural and allied fields. . . ."

* Published by John Wiley & Sons, Inc., New York City, and Chapman & Hall, Ltd., London. $12.50 per copy.
† Such newsworthy pioneering data as are presented will be clearly designated as such.

NOTE: *If clipped on the dotted lines, these pages will fit handily in an ordinary 8½" x 11" file folder.→*

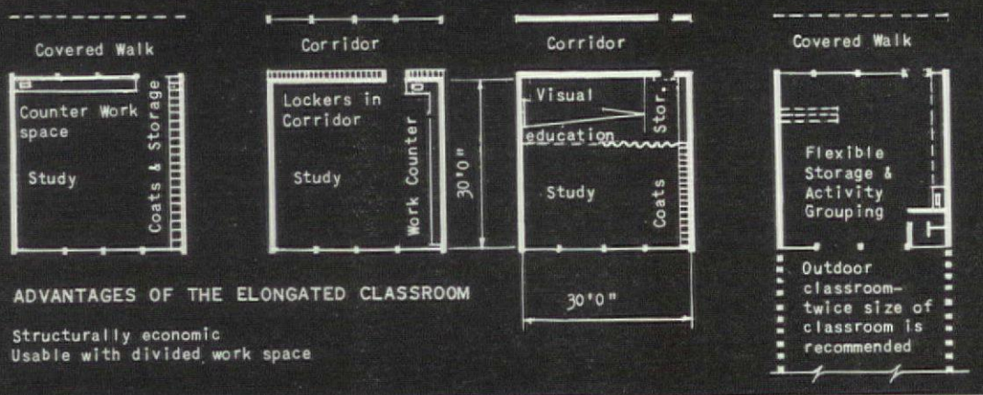


***HAROLD R. SLEEPER** is an author of note as well as an architect of broad experience. His books include* Architectural Graphic Standards, *which he co-authored with Charles G. Ramsey,* The House for You, *which he co-authored with his wife Catherine, and* Architectural Specifications, *which he authored alone.*

Sleeper's architectural career began in Cornell (BA) and New York University, and has included successive associations with several of New York City's prominent architects: Starrett & Van Vleck, Trowbridge & Ackerman, Charles G. Ramsey and Daniel Schwartzman. Today, on his own, he is at the head of an office of 12, applying the knowledge gained in a broad architectural experience that has covered everything "from barns to banks, from comfort stations to colleges, from asylums to apartments, from public housing to houses."

When not busy with his books and buildings, Harold Sleeper may be seen at New York's Architectural League (of which he is past president), at Columbia or Princeton or the New York School of Interior Design (where he lectures), at AIA's Octagon (he is a fellow and a member of the important public relations and education committee), at a manufacturer's office (where he may be consulting on product development or product literature) or at FORUM's *offices discussing his new series of design standards and data.*

CLASSROOM SHAPES AND SIZES



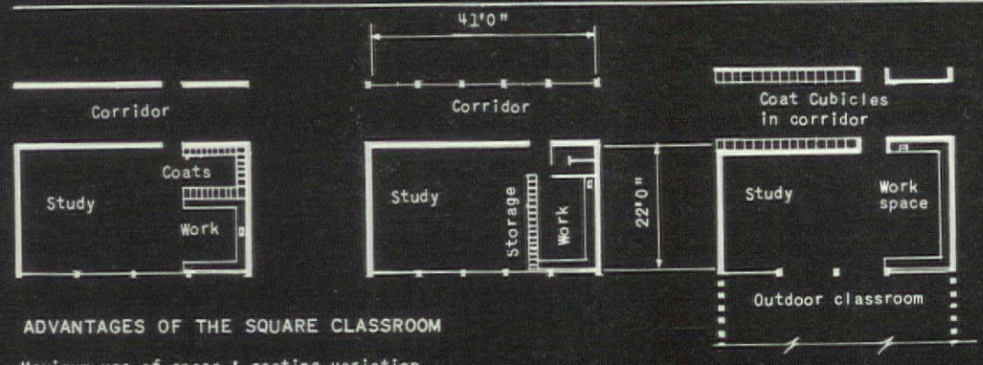
ADVANTAGES OF THE ELONGATED CLASSROOM

Structurally economic
Usable with divided work space

SQUARE CLASSROOM

SCALE: 1/32"-1'0"

	avg.	good
Size (ft.)	28 x 28	30 x 30
Area (Sq. ft.)	780	900
Area per pupil	26	30



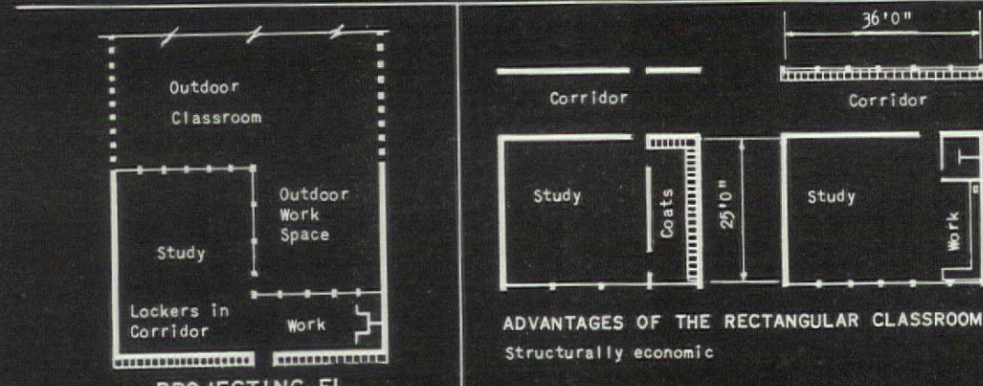
ADVANTAGES OF THE SQUARE CLASSROOM

Maximum use of space & seating variation
Ease of supervision

ELONGATED CLASSROOM

SCALE: 1/32"-1'0"

	avg.	good
Size (ft.)	22 x 36	22 x 41
Area Sq. ft.)	790	902
Area per pupil	26	30



PROJECTING EL

Similar to Crow Island School Illinois
Perkins & Will Architects

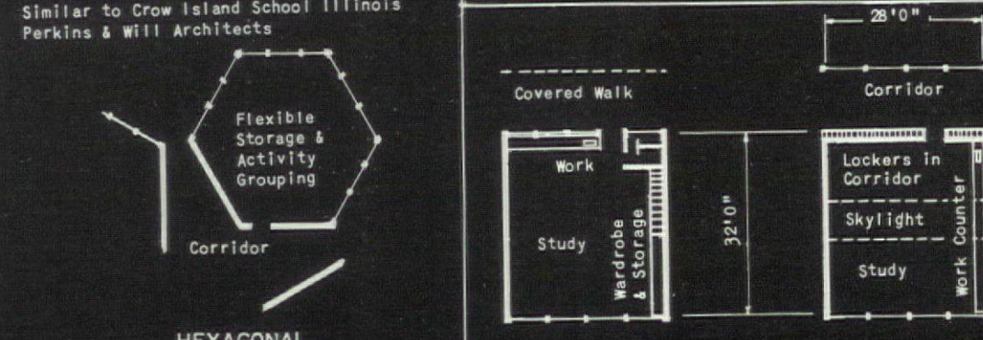
ADVANTAGES OF THE RECTANGULAR CLASSROOM

Structurally economic

RECTANGULAR CLASSROOM

SCALE: 1/32"-1'0"

	avg.	good
Size (ft.)	22 x 34	25 x 36
Area (Sq. ft.)	748	900
Area per pupil	25	30



HEXAGONAL

Similar to Heathcote School, New York
Perkins & Will, Architects

IRREGULAR CLASSROOMS

ADVANTAGES OF THE DEEP CLASSROOM

Economy of perimeter wall & corridor
Ease of supervision

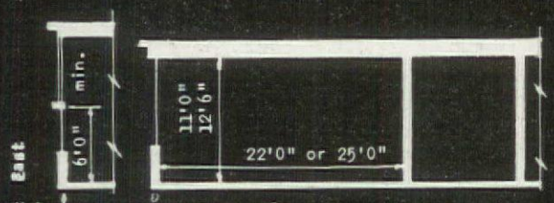
DEEP CLASSROOM

SCALE: 1/32"-1'0"

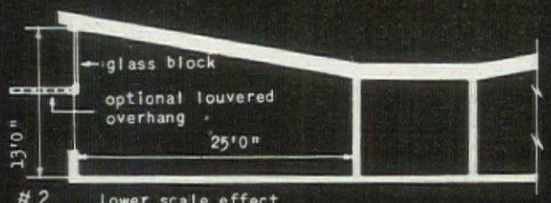
	avg.	good
Size (ft.)	30 x 25	32 x 28
Area (Sq. ft.)	775	896
Area per pupil	26	30

NOTE: Plans shown illustrate modern school types which have proved acceptable for their purpose. If selecting one of these types for a specific use or for modification, consider all factors of codes, site, climate, teaching methods, class size, budget, etc. The "irregular" classrooms are isolated examples. The others are in general usage. A plan type does not call for a specific method of daylighting, except that two sources of daylight are recommended for rooms over 25'0" deep.

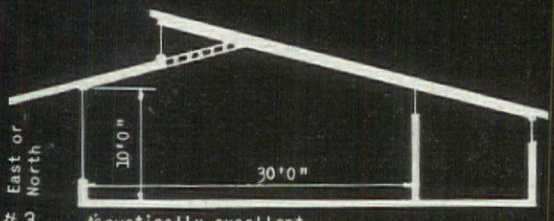
CLASSROOM DAYLIGHTING



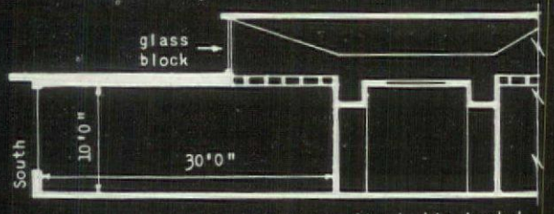
#1 Structurally economic
Alternate – glass block diffuses and directs light to ceiling



#2 Lower scale effect

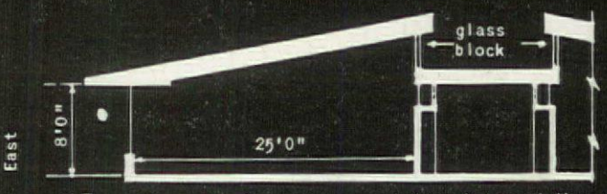


#3 Acoustically excellent
Toplight protected from weather
Structurally relatively economic
Good drainage

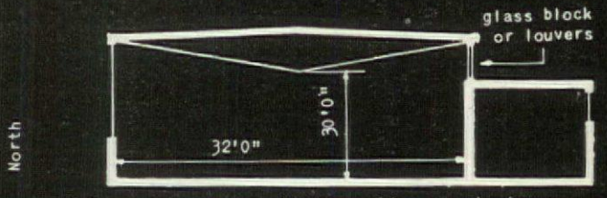


#4 Eastern version of #4 permits double-loaded corridor

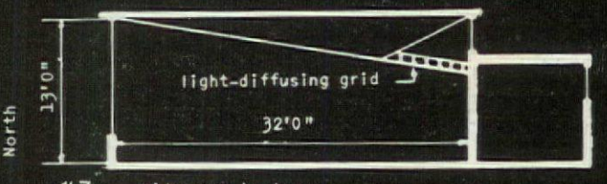
UNILATERAL DAYLIGHTING



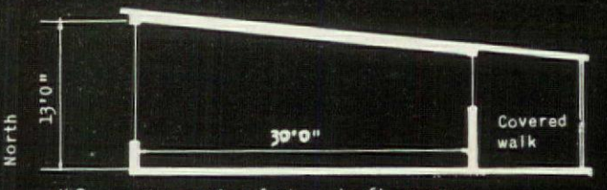
#5 Thermal gains and losses better balanced than #4
Allows bilateral lighting with economy of double loaded corridor



#6 As compared with #5 – wider span by truss
Effect of lower scale
Permits single or double-loaded corridor

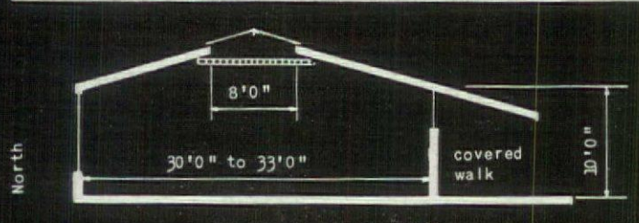


#7 Wide span by truss
Unbroken ceiling
Permits single or double-loaded corridor

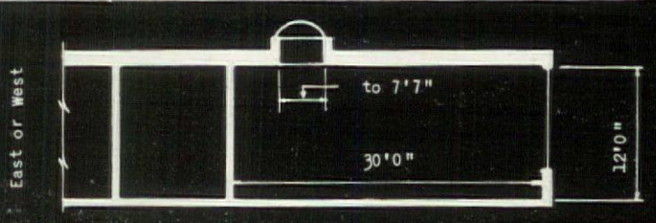


#8 High ratio of glass to floor area

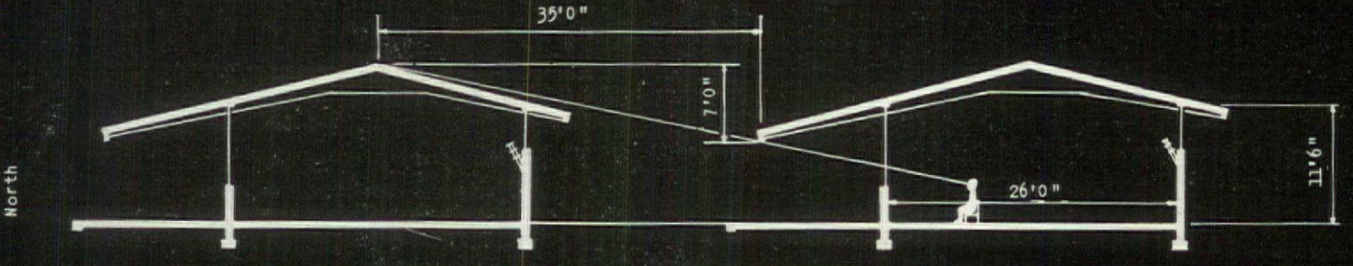
BILATERAL DAYLIGHTING



CENTRAL SKYLIGHT



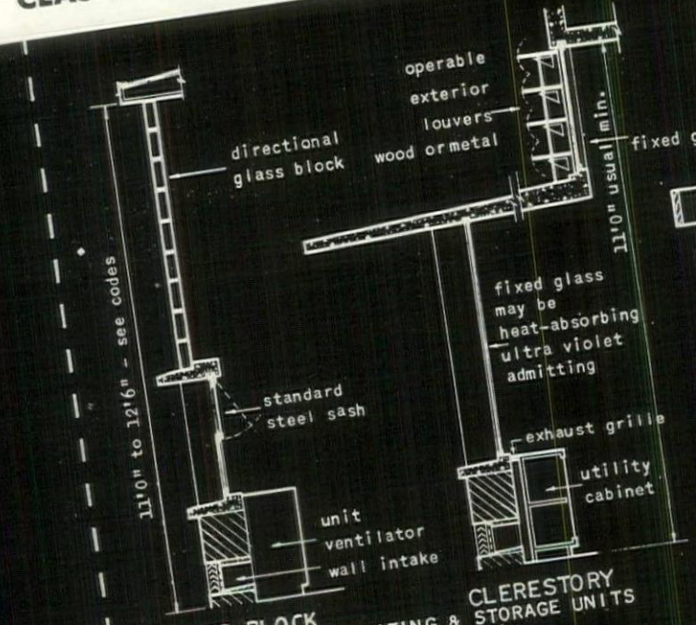
SUPPLEMENTARY DOME SKYLIGHT



USE OF NEIGHBORING SCHOOL WING AS SKY CUT-OFF

architectural forum
DESIGN STANDARDS AND DATA

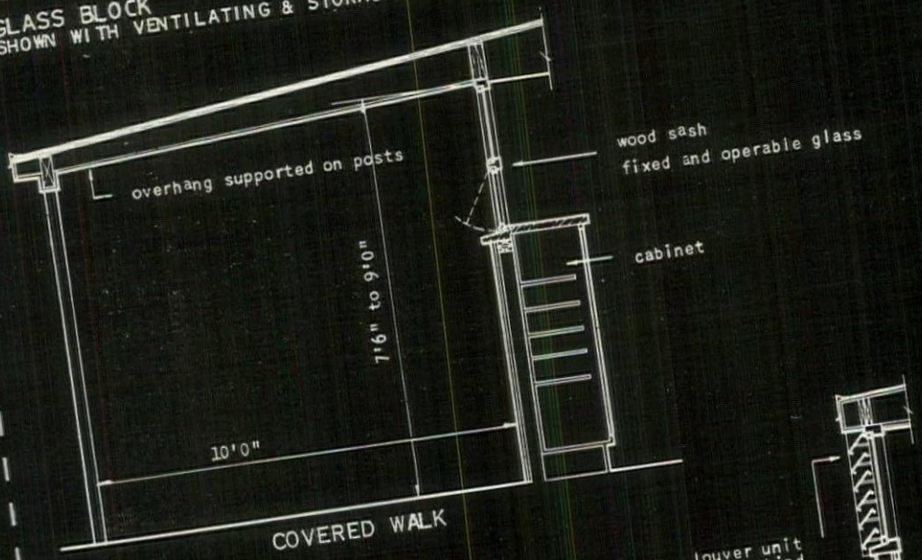
CLASSROOM WALL SECTIONS AND SKYLIGHTS



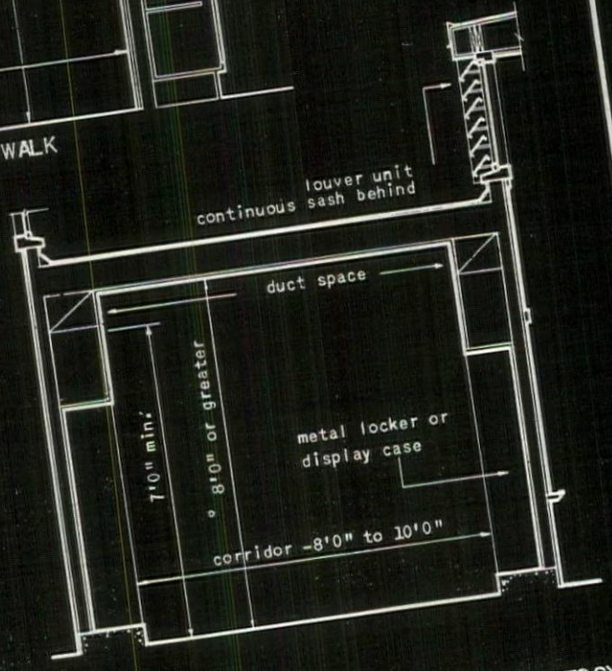
GLASS BLOCK SHOWN WITH VENTILATING & STORAGE UNITS

CLERESTORY

SLIDING GLASS WALL

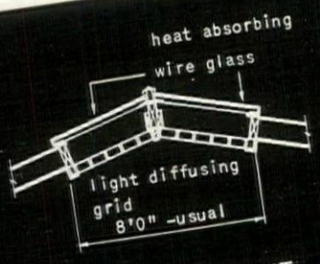


COVERED WALK

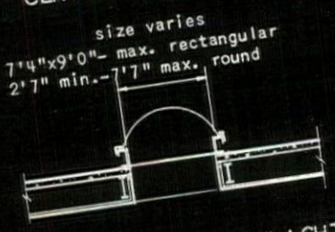


DOUBLE-LOADED CORRIDOR WITH CLERESTORY

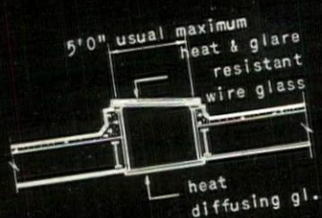
WALL SECTIONS
SCALE: $\frac{1}{4}$" = 1'0"



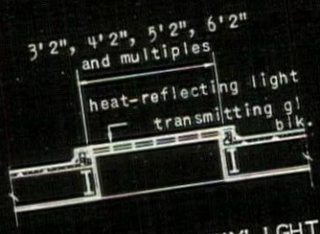
CENTRAL SKYLIGHT



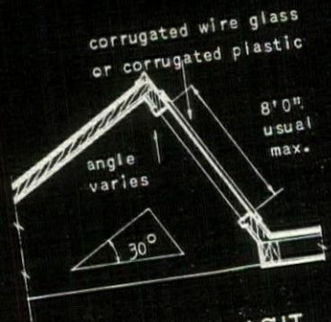
PLASTIC DOME SKYLIGHT
ROUND TYPE



STRIP SKYLIGHT



GLASS BLOCK SKYLIGHT

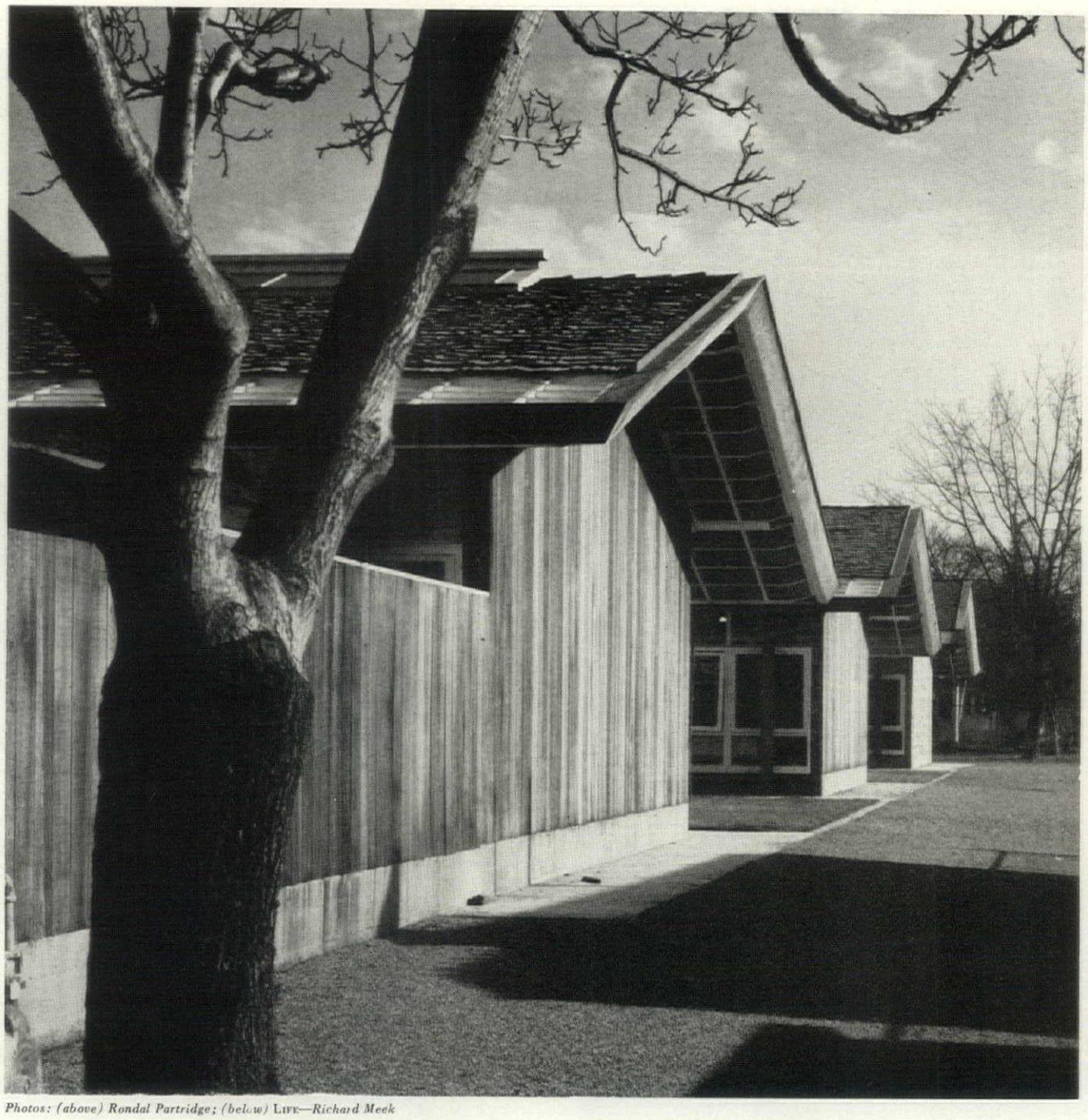


SAWTOOTH SKYLIGHT

SKYLIGHTS
SCALE: 1/8"=1'0"

DESIGN

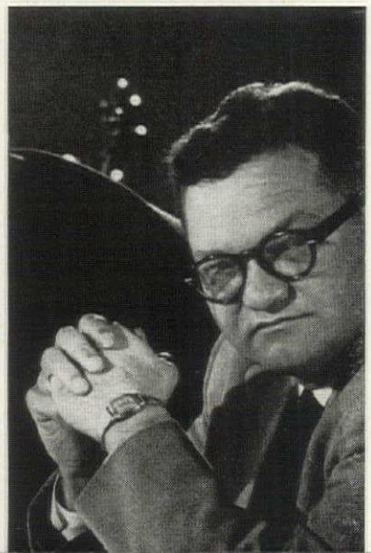
Broadway elementary school, San José, Calif.
Ernest J. Kump, architect
E. A. Hathaway & Co., Nielsen & Nielson, general contractors



Photos: (above) Rondal Partridge; (below) LIFE*—Richard Meek*

Should the design of today's school be **domestic . . . . . .**

ERNEST KUMP, 42, *who rose to national architectural fame after World War II, is a restless, searching young California professional who is impatient with most other architects and contemptuous of narrowly confining styles. In designing factories, residences and many schools, he has nurtured the seeds which have grown into these two different designs. At present Kump is, on typically Kumpian impulse, taking time out of his practice to "study architecture" in Italy.*



Two answers to the same question by the same architect in the same school district

Children in the San José school district live their elementary school days in a warm, friendly redwood building tucked among the forest of FHA-financed homes in the Willow Glen–Lincoln section.

But when the time comes for high school there is as abrupt an architectural change as could be imagined within the range of today's accepted "good" architecture. From a woody atmosphere the children enter a brick-glass-and-steel world. They get out from under the wide sheltering overhangs which ward off sky glare in the Broadway elementary school, and go into San

San José high school, San José, Calif.
Ernest J. Kump, architect
Williams & Burrows, Inc., Carl N. Swenson Co., general contractors

Roger Sturtevant

or institutional?

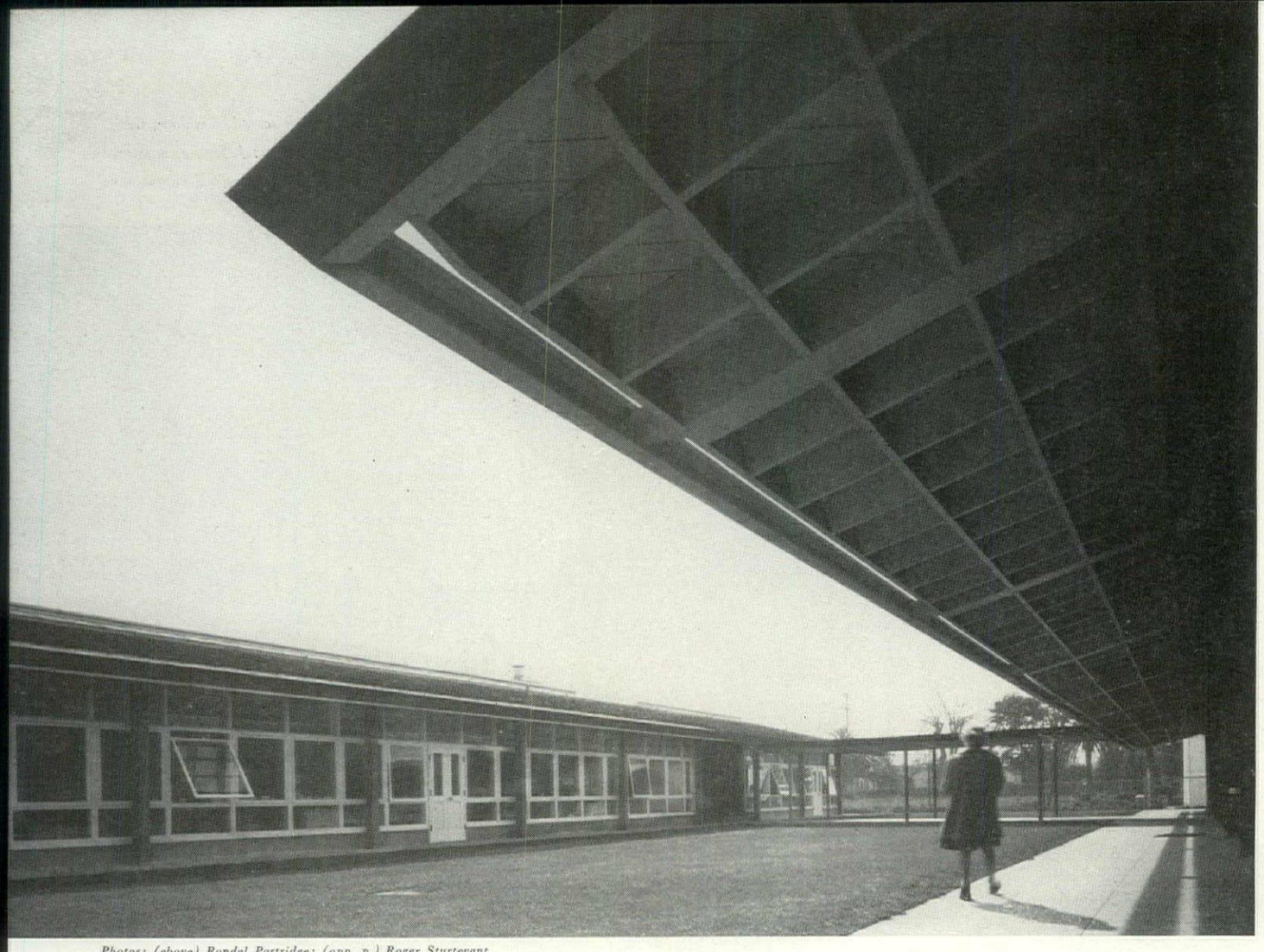
José high school behind straight vertical sheets of glare-effacing glass that deal with the sun problem flatly, without extra parts. They are torn from the womb of natural architecture (or perhaps they leave willingly) to enter the cool, formal world of sophisticated modern structure.

That the same architect designed both of these schools is interesting on several counts:

▸ It is an effective demonstration of a plain truth which recently has been obscured in the wrangling between adherents of various design styles in the US. For most practicing architects, the styles are servants, not masters. Most working architects today pick and choose among design styles and vary them (and are accused by some serious critics of vacillating), trying to make the solution fit the program not only in plan and materials but in spirit. Basically it is the materials that should set the manner of assembly.

▸ It is an indication of a generality in school design: as children mature, the architecture around them can also mature. But, although there is nothing new about putting up a high school that looks frankly institutional, like an industrial or office building, it is still relatively new anywhere in the country to find one that looks like a *good* industrial or office building. Why?

▸ It is a demonstration of regionalism in reverse. The differences between these two schoolhouses state in chorus that you can solve the same general space problems in a way that looks scientific or in a way that looks home grown—and each can be an adequate physical solution. This regionalism is less geographic than mental. Or more specifically it is the "regionalism" of age groups.



Photos: (above) Rondal Partridge; (opp. p.) Roger Sturtevant

▸ It is a denial of the common assertion that people do not even notice the difference. In the San José high school, they requested a difference; the school board wanted something more "monumental," the same thing that many prominent architects and critics have wanted for a long time.

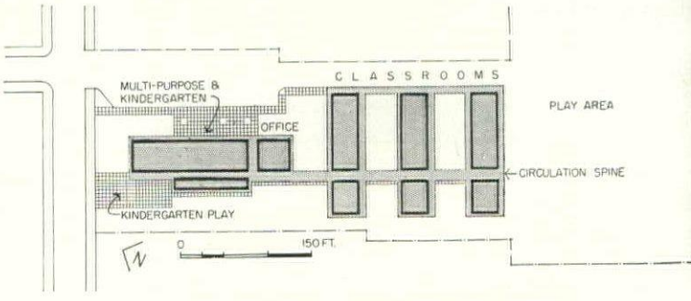
▸ Finally, it is probably an excellent example of the confusion which has resulted in the architectural profession from too early and too specific a labeling of styles. It is this that has led to a premature choosing up of several teams to defend the same general goals of good modern architecture.

In the physical details of the two buildings, there are numerous differences, but also a surprising number of similarities.

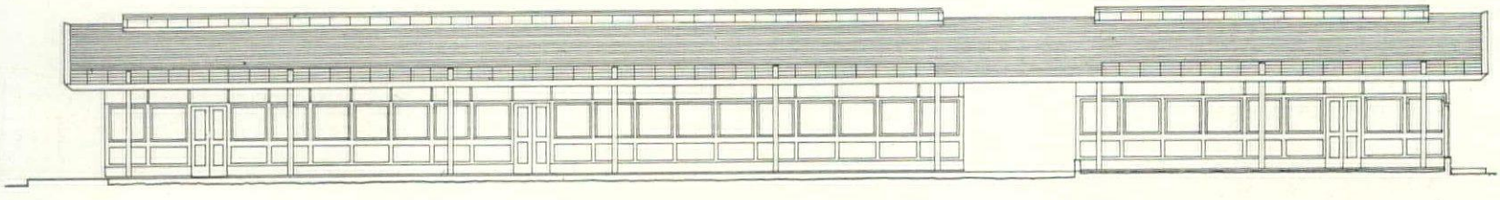
Sites: The elementary school is smack in the middle of a residential community of houses, and fits so well that it hardly even interrupts its neighborhood. It actually is built in the hollow interior of a king-sized residential block with very little street frontage. The traffic is straightforward except for one good trick: kindergarten children are picked up at their own entrance.

In strong contrast to the smaller school, the high school not only is surrounded by streets, but also straddles one. A heavily traveled arterial street slashes between the main school area and one of the athletic fields. The two areas are connected by a broad, well-lighted tunnel. And the high school, in strong, deliberate contrast to the elementary school, is a notable landmark.

The solacing shelter of wood . . .

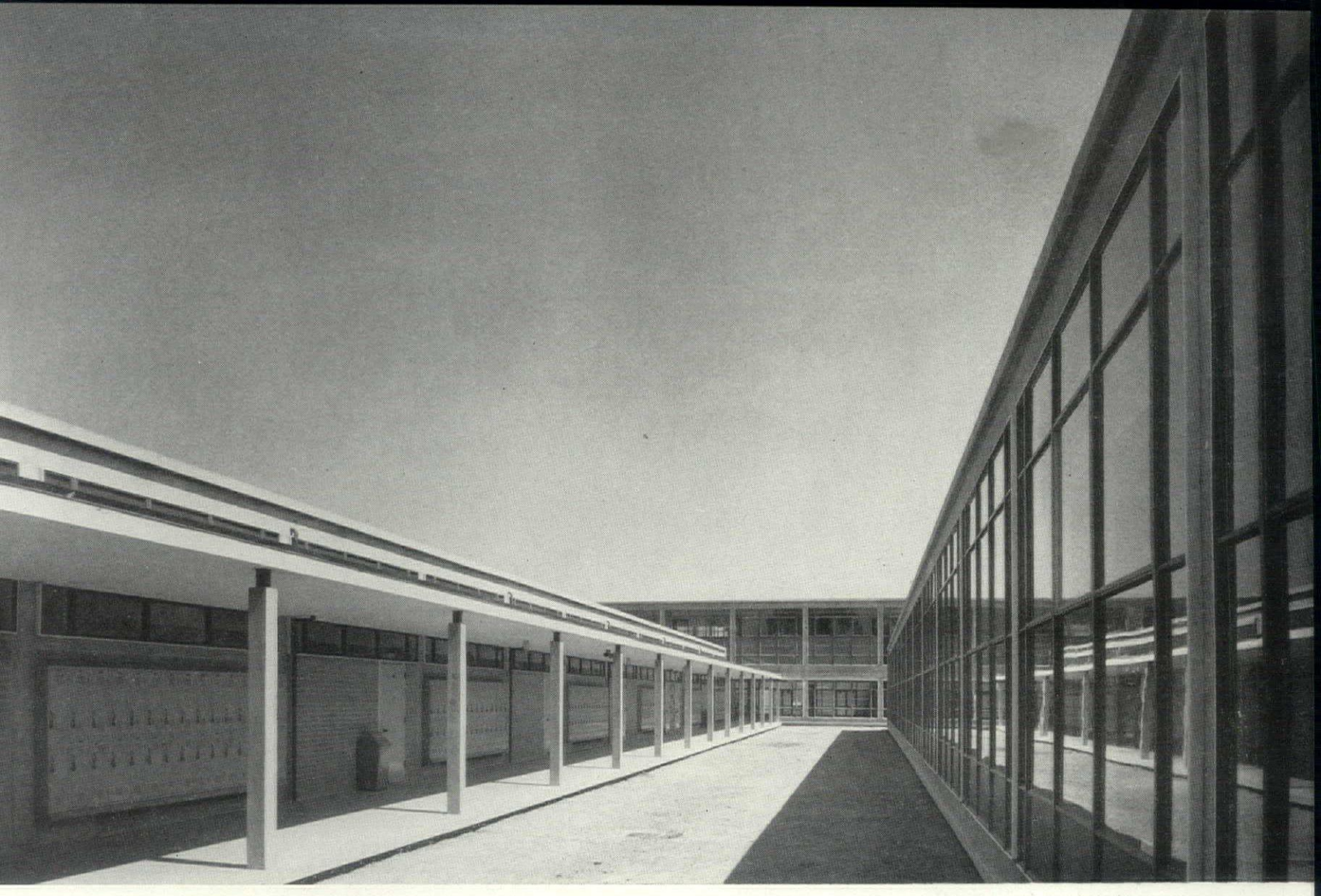


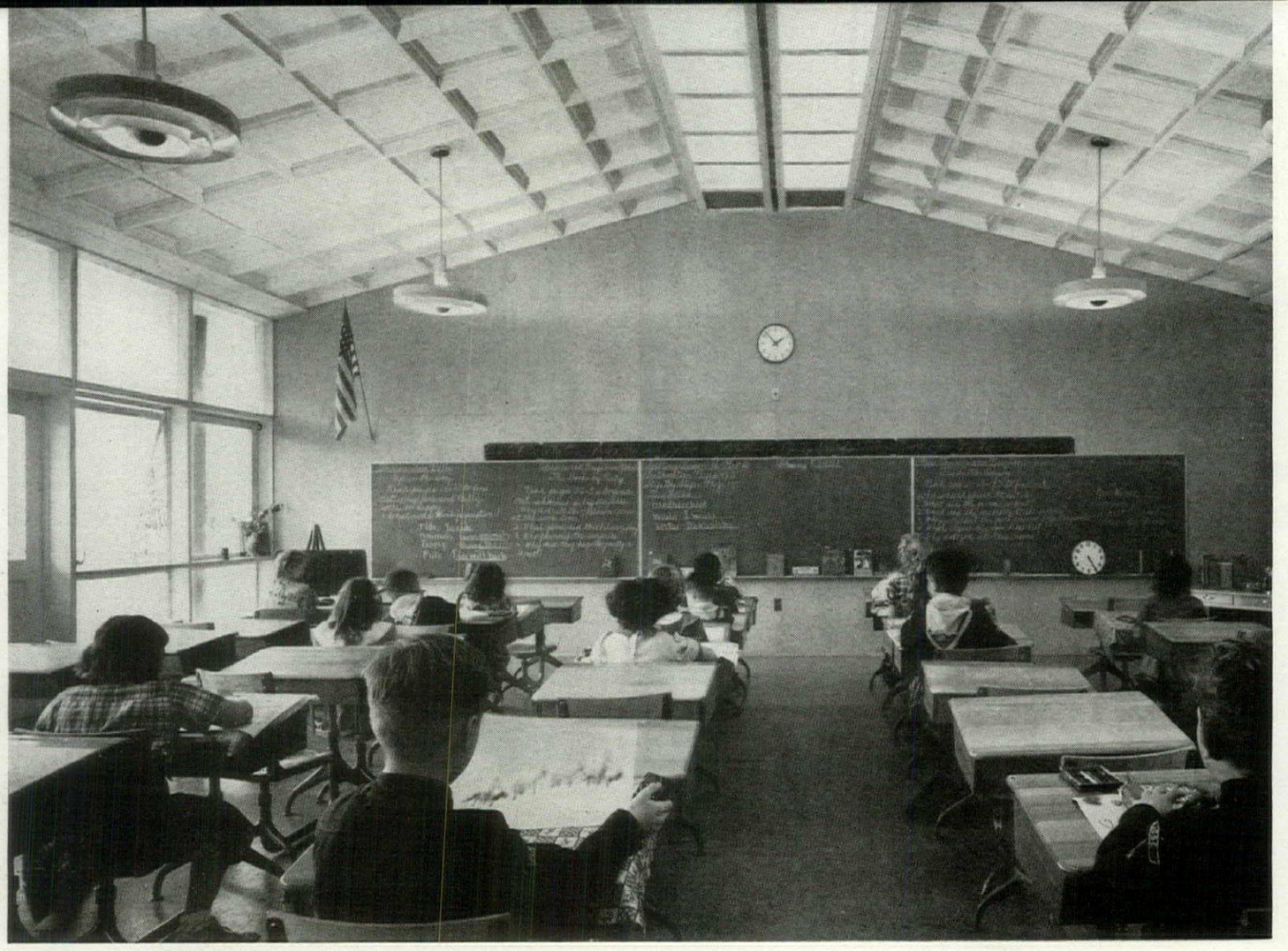
***Elementary school** has finger plan, with what the architects call a "spinal" corridor cutting through the classroom wings. Elevation below is of one classroom wing with the open corridor cutting through it.*



or the solid strength of masonry?

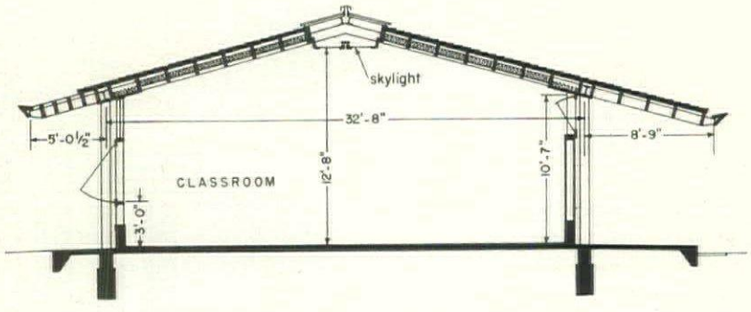
High school *also has finger plan for its classroom wings, has the "spinal chord" corridor too. Elevation drawing is of part of one classroom wing. Photo inset of administration wing shows how Kump, for clarity, deliberately separated structural frame and pattern of fenestration.*





***Elementary school** has a double-pitched roof, penetrated at peak by a long, continuous skylight; there also is a high window up under eaves on side not shown in above photograph.*

Slanted ceilings patterned with a wooden grid . . .

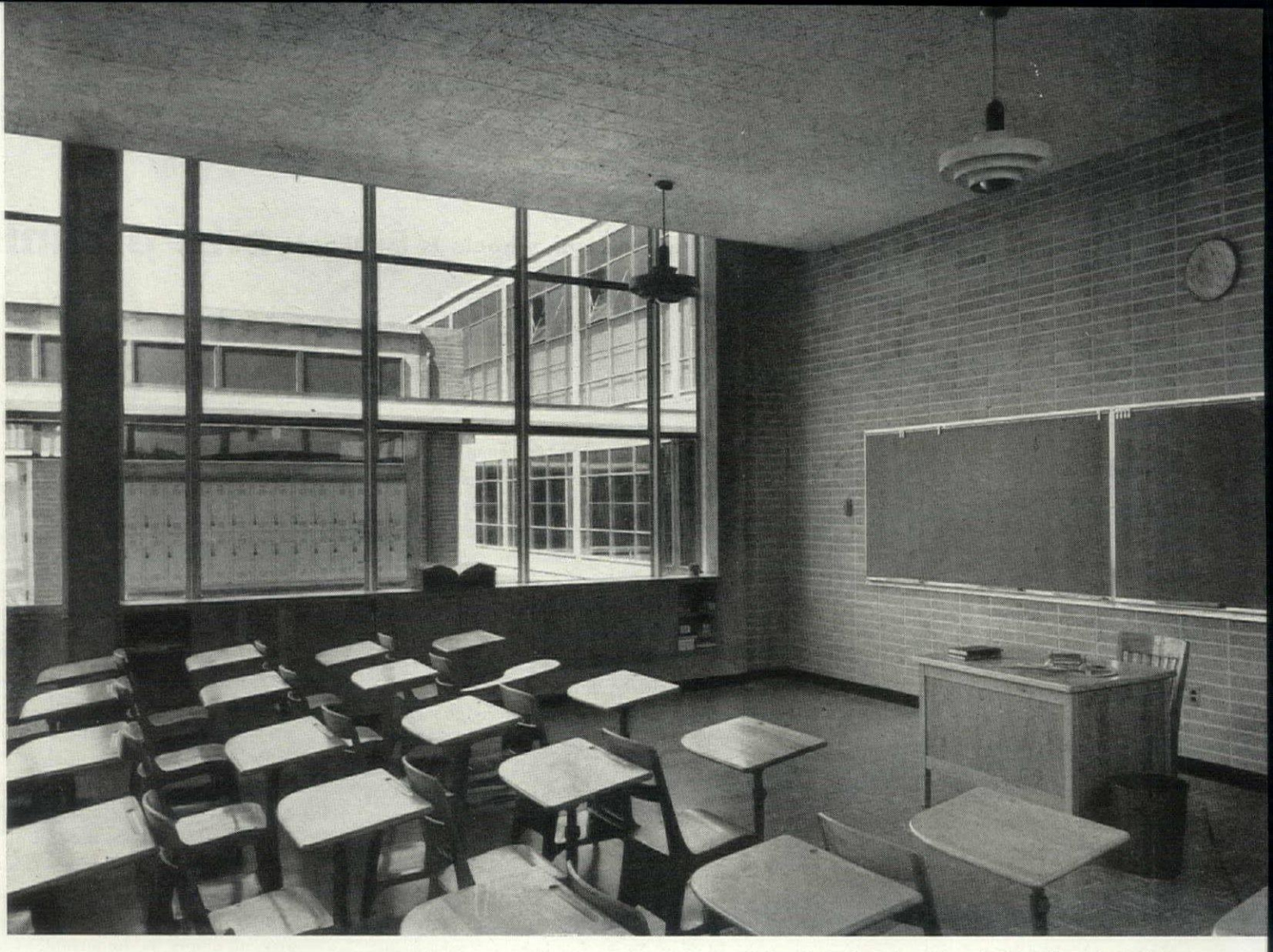


Photos: (p. 170) Rondal Partridge; (p. 171) Roger Sturtevant

Plans: Despite differences in size and character, plans of both schools are really much the same. They are finger plans, with outdoor "corridors" connecting the wings of classrooms.

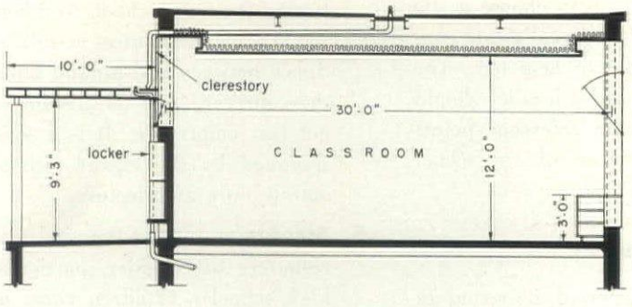
Materials: Both schools have rigid steel frames. The little school has walls of 1″ x 8″ redwood vertical shiplap on 2″ studs with horizontal blocking. Inside finish: ⅜″ Douglas fir plywood. Partitions are 2″ x 6″ studs, 16″ o.c. with ½″ fiberboard on each side and ⅜″ plywood finish. The high school places more emphasis on maintenance, with masonry finishes.

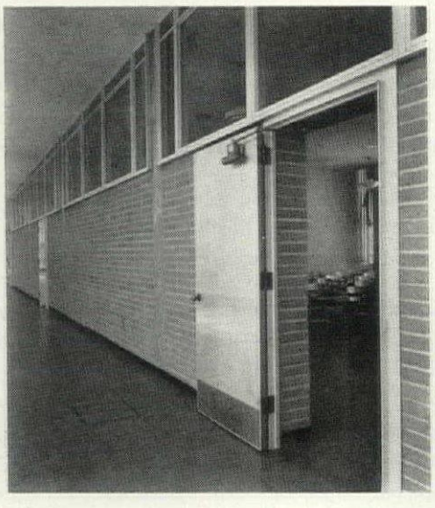
Costs: These are not comparable according to the builders because the elementary school was started in 1947, three years before the high school, which was built at a cost peak. Cost for the elementary school, $9.10 per sq. ft.; for the high school, $15.25.



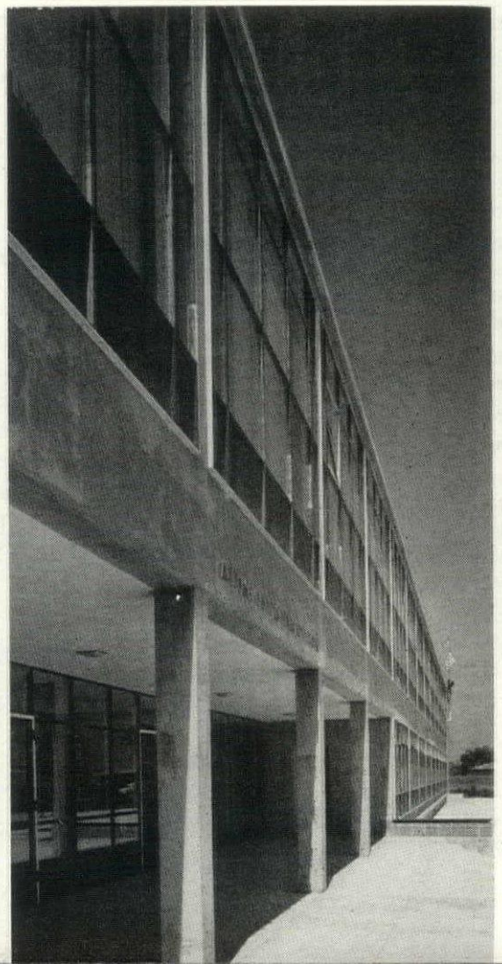
High school *has more formal atmosphere, but also is well daylighted. High window on circulation side is heat-absorbing, glare-killing glass. Low-maintenance materials were stressed in this design.*

or straight, clean, right-angular planes?





Detailing *is distinctly different. Elementary school (left) has fixed- and awning-type sugar-pine sash. High school window walls are steel sash in steel plate frames. Note how high school classroom doors swing neatly to wall of corridor.*



TECHNIQUES

The genesis of attractive, economical schools is intelligent **site planning**

by Carl Feiss

MAJOR REFERENCES FOR SITE SELECTION:

1. Land-use plan showing existing schools of all types and generalized location of proposed school expansion or new schools, with attendance districts keyed in.
2. Population density and distribution map.
3. Residential neighborhood map with parks, playgrounds, streets.
4. Major thoroughfare traffic pattern.
5. Zoning map and ordinance.
6. Neighborhood redevelopment, rehabilitation and conservation plans.

EARMARKS OF A GOOD SCHOOL SITE:

1. Residential neighborhood.
2. Quiet adjacent and access streets. No school should ever be on a major highway.
3. Absence of industry and its by-products: trucking, noise, fumes, unpleasant views, rush-hour traffic, railroads, airports.
4. Proximity to parks and other permanent open areas for light, air, quiet views. Examples: church grounds, cemeteries, lakes, rivers and hospital grounds.
5. Sufficient land area for a complete school plant.
6. Planning and zoning protection of the amenities of surroundings.
7. Relation of site location to present and future child population densities. Some excellent grade school sites today may become appropriate high school locations in ten years.
8. General attractiveness. There is a very real economy in beauty. A school which does not inspire affection and pride is doomed to careless or malicious treatment. (So beware of the "Mary Anne" back too.)
9. Low cost of land acquisition, if possible.
10. Low site-development costs: accessibility to utilities, favorable soil conditions and topography.

Sound site selection and site planning together may provide school economies as great as any other combination of factors affecting costs. But everyone concerned with school policy or planning should know that economy in site selection is not a matter of acquiring the cheapest land available.

By this time it should be clear that obsolescence of site is a major factor in the increased rate of schoolhouse obsolescence.

Town fathers have often banked on schools to prevent the downgrading of neighborhoods; unfortunately they have often been wrong. Residential neighborhoods inadequately protected by planning and zoning or by enforcement of building and housing codes are deteriorating so fast that it is common to find sound old—or even brand-new—schools stranded in the tide of residential blight and the encroachment of business and industry. There is no economy in this for anybody.

In New York, for instance, school sites have often been selected primarily to avoid the loss of tax ratings. Bad sites are frequently the result. The taxpayer takes a double lambasting.

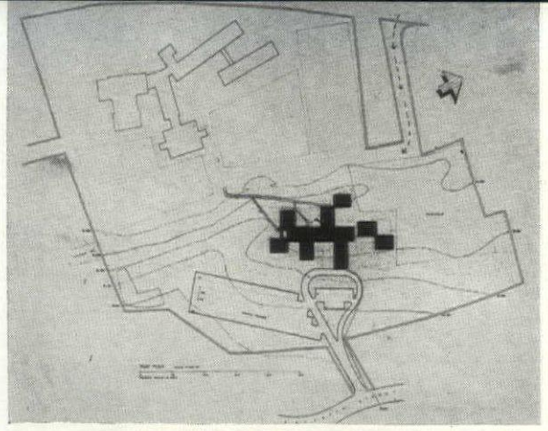
If the school board has good sense, the architect, as well as the local planning board, will be asked to help choose a site for a new school. A good real estate consultant should be asked to help too. The general or master plan of a locality should and usually does contain reference points on which the basic success of any school development program rests.

Use the site's resources

Once a site has been selected, its resources must be exploited to the full. The site plan may make or break a school no matter how good the architecture of the structure. Actually, of course, good architecture includes good site design. And good site design takes advantage of every resource:

1. **Shape and size** of the site are the prime design resources. Ideally the site should be an educational superblock.
2. **Topography** means one thing for the cramped urban school, a totally different thing for the school in a small town or suburb. In the city, hilly or rough sites generally complicate planning and can run into a lot of expensive cut and fill, slope stabilization and retaining walls. But where there is enough land to play with, slope can be a definite advantage; contour planning can result in a charming and flexible design.
3. **Orientation** for sun and wind remains important even though the techniques of light, ventilation and temperature control have advanced to the point where the architect can accomplish physically nearly anything he wants.
4. **Planting** is inseparable from architecture, particularly in the one-story school. The professional landscape architect's services to the modern open school plan are as essential as the services of the structural or heating engineer. Trees cut both direct light and sky glare and reduce the cost of forced air and air-conditioning equipment. School yards need the sound control that shrubbery provides. Erosion control of slopes is important. Children love to slide; either provide a slide on the slope or plant it with thorny shrubs or vines. Preserve existing trees and shrubs.
5. **Soil and space** together form the foundations of the broadened architecture of the open school. And here again the landscape architect is indispensable. Space between and around buildings—the courtyard and the distant view—is not just empty air. It is a solid to be designed by the expert technician in out-of-doors architecture.
6. **Streets** are one of the vital man-made resources to consider, particularly for high schools. Children come on foot, roller skates, bicycles; in jalopies, street cars and buses. All of them use public rights of way which are frequently substandard in design. Safety and convenience both demand careful planning of access paths and roads into the site, drives, parking lots and loading platforms.
7. **Adjacent resources** belonging to the community affect the site plan, just as community use of the school and grounds affects the school proper. In densely populated areas, lack of a joint recreation program between park department and schools is a sign of inefficient management on both sides and a deterrent to neighborhood development.

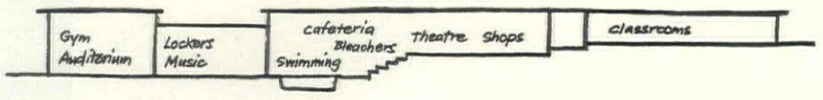
The good site plan uses natural resources;



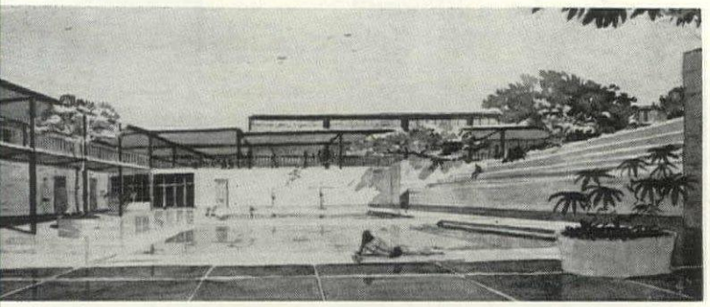
Darien

for instance . . .

The activities unit of Darien elementary school (Ketchum, Gina & Sharp, architects) sits on a ridge while the play porch and most classrooms are dropped anywhere from 1½' to 8' down the slope. This variation enhances the "little schoolhouse" scale and without sacrificing economy gives the level areas to play and parking. Another good point: sufficient land; when this site was acquired for the junior high, the elementary school was not yet planned but an eventual need to expand the junior high was foreseen. Eventually this new elementary school will be a junior high annex; meanwhile the site is a godsend to the elementary system. The plan nicely separates students of the two schools. The strip of land between the lots the school could not acquire gives elementary school children their own pathway from the rear of their site (see also p. 128).



Hillsdale



. . . slopes

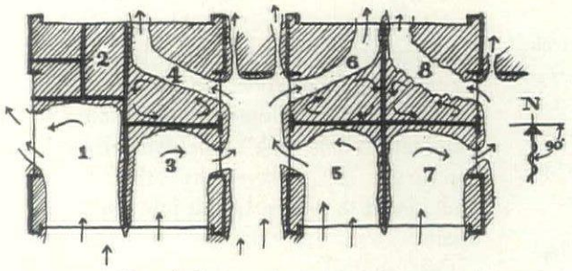
The site of Hillsdale high school (John Lyon Reid, architect) slopes down its long axis and the buildings step down with it. Note (sketch) how the slope was used to provide bleachers in the court above the pool; in the same way, the boys' playfield and football field are separated by bleacher stairs. Other good points: placing the lowest-ceilinged unit (academic block) on the highest ground, the tallest elements (auditorium and gym) on lower land and the medium-high elements (cafeteria, little theater, shops) in between, gives only gentle steps in roof line and helps integrate this big plant visually (without, on the other hand, pushing it into monotony). Community-use portions of the buildings are nicely planned for public access (see also p. 141).

Roger Sturtevant

Oak Manor

. . . trees

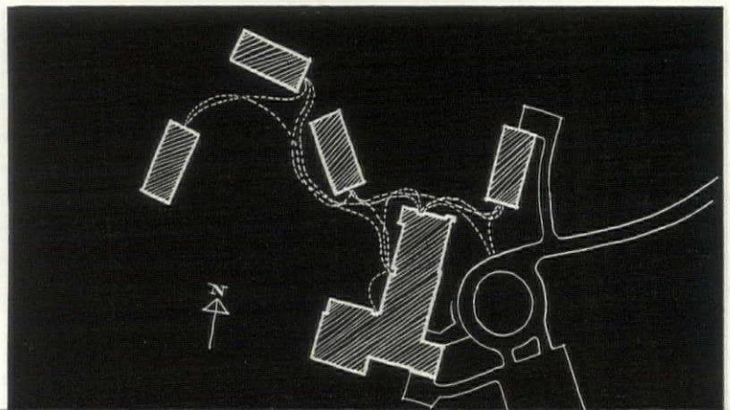
The buildings of Oak Manor elementary school (John Lyon Reid, architect) were carefully placed to leave ample play space around a clump of low-branching live oaks because the architect realized these were wonderful climbing trees, better than any artificial jungle gym. And the photograph of a classroom south window shows how pleasantly and economically a tree-covered slope helps control glare (see also p. 138).



Port Arthur

. . . wind

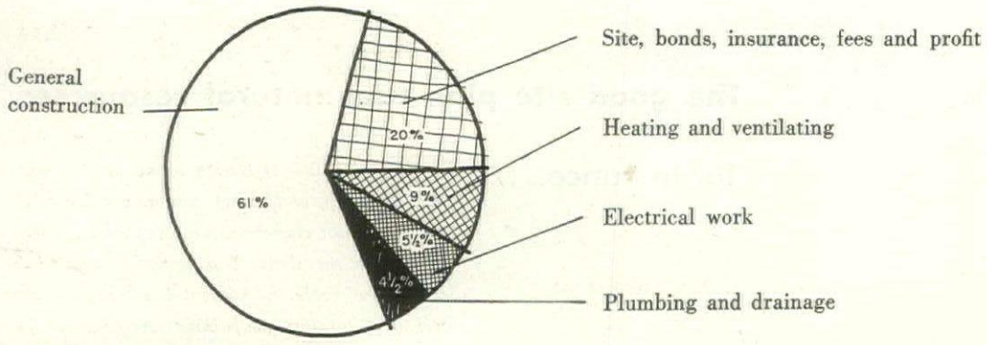
Ventilation test models of Port Arthur's elementary school (Caudill, Rowlett, Scott & Associates, architects) showed how important a slight turn in the building can be. With the breeze at right angles to the building, as in diagram at left, room 8 got a very bad deal. Even the "pressure wall" at right angles to the room did not force in sufficient air. But turning the building 30° gave every classroom a good, stiff air stream. The next step was to tinker with windows to improve breeze distribution inside the rooms, which simultaneously cut down interior velocity. For results of the 30° turn plus refinements, see p. 146.



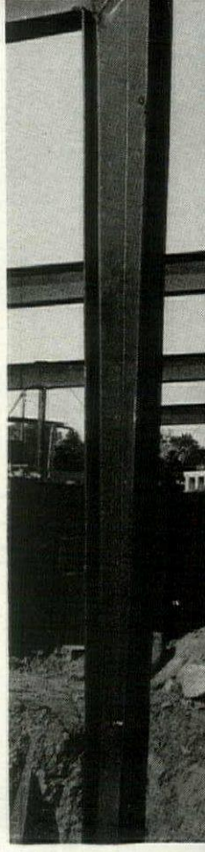
Groton

. . . and children's feet

At Groton high school (Warren Ashley, architect) only the most rudimentary path system (doubling as a seldom used service drive) will at first connect the scattered buildings of this campus plan. The students are being depended upon to create short cuts; then these empirically determined paths will be paved. Other good points: location of the main building limits vehicular penetration of the campus to the less desirable eastern slope. Classroom units, on the brow of the hill, parallel to contours, get a handsome panoramic view of Long Island Sound. Slope between classrooms and playfields is used for an outdoor theater (see also p. 134).



SCHOOL CONSTRUCTION COSTS
(Based on New York City 1952 averages)



Structural economy—where can most savings be achieved?

Economical school structures in steel, timber and concrete are shown on the succeeding pages. However, no structural system can by itself produce low-cost school construction. Framing costs form only part of total costs (ranging from 8% for nonfireproofed steel to 15-18% for fire-resistant concrete), thus a 10% economy in framing might result in only a 1% saving in total costs.

Prime essential for low-cost school construction is to determine exactly where each building dollar is being spent and where the effort to reduce costs might most usefully be directed. This calls for rigorous cost analysis, such as the process outlined below. It was used by Architect Lawrence Monberg to achieve 28% savings without sacrificing space or quality.

In 1951 Wisconsin Architect Lawrence Monberg ran full tilt into the perennial obstacle that makes school design so much more difficult than the design of warehouses or office buildings. His initial plans for a 450-pupil, 43,000 sq. ft. Central high school at Kenosha, Wis. were bid at $560,000, or $120,000 over the budget ($442,000, excluding $50,000 for equipment) set by the school district's bond limit. He now had to find a way to cut costs by 21%. Any economy meant either sacrificing some of the 95 sq. ft. allocated per pupil (possible by more efficient planning) or finding a way to reduce drastically the unit construction cost of $13 per sq. ft.

Architect Monberg chose not to squeeze the pupils into a smaller school plant. Instead he sought through rigorous cost control to cut a few cents per square foot from each element of the construction. He used a twofold process. First, *cost analysis* of each element: walls, floors, framing, plastering, etc. These he expressed functionally in terms of cost per square foot of school area, and carefully examined them to see which parts of the construction appeared unduly expensive or showed promise of economy. Second, *cost planning* to combine the various elements in such a way that the total construction cost falls within the target—in Monberg's case within $442,000, or to $10.30 per sq. ft.

This cost study proved more than satisfactory. Final cost of the Central high school was cut 28% to a bid price of $419,349, or $9.50 per sq. ft., while the new area was actually increased to 44,200 sq. ft. (98 sq. ft. per pupil) without sacrificing any quality in construction. Typical of the many economies achieved are these two cases:

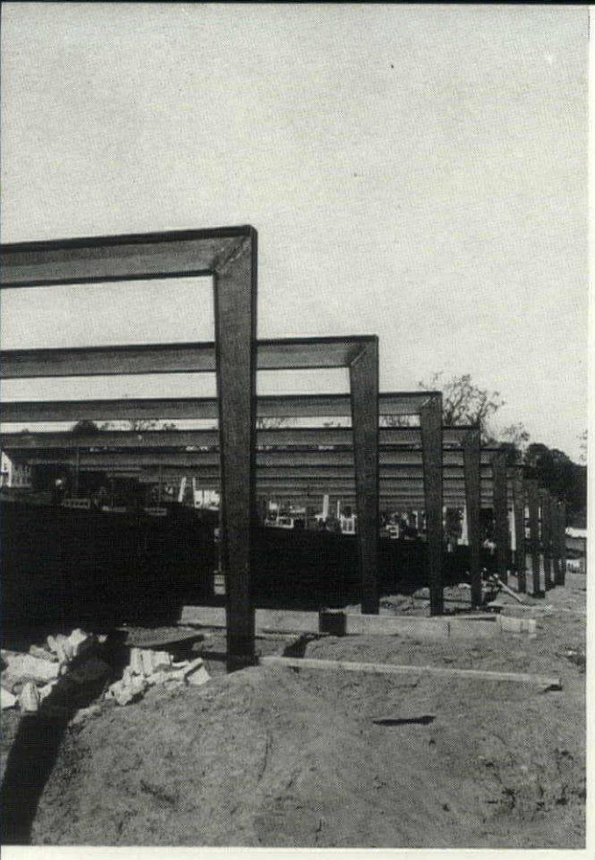
▸ Light-gauge, welded, acoustic steel deck, a double-duty factory-built material, saved 59¢ per sq. ft. ($26,000 in all). It was erected in only ten working days, replaced separate roof deck and framing and eliminated acoustic ceilings and plastering.

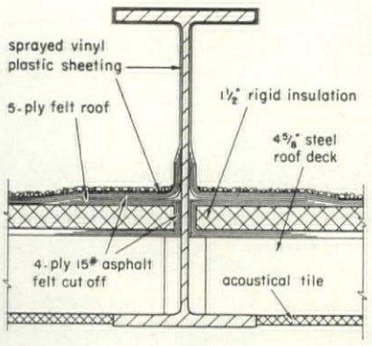
▸ Dry-built storage walls between classrooms saved an estimated 22¢ per sq. ft. ($10,000). The back-to-back lockers with sound insulation between them cost no more than plastered block walls, eliminating plastering and separate locker construction (photo p. 178).

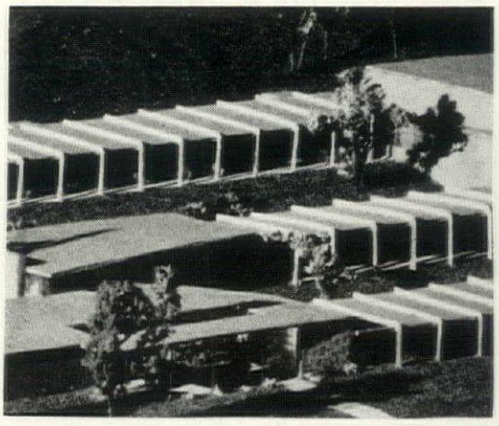
Although such rigorous cost control is not new, it takes on new importance when studied in relation to the whole building process. There is no quick panacea to lower building costs without sacrificing quality. The savings that can be made are generally small but added together they become substantial enough to justify the considerable work involved.

In effect, this is the first step toward industrialization of the building process. Having established which elements of the construction appear expensive, it is comparatively easy to examine the construction sequence and determine whether the high cost is due to materials or labor. The next step is to see whether some other material might be more suitable or whether time-consuming processes can be avoided by more prefabrication. In his latest Wisconsin schools, Architect Monberg aims to eliminate "come-back" time, whereby subcontractors are delayed by other trades and forced to return to the job again and again.

Cost control is a necessary prelude to prefabrication and modular control, which, for successful application to school conconstruction without dull standardization, should be considered with three principles in mind: 1) the module must be flexible, permitting wide variations both horizontally and vertically—Monberg now uses a 4′ grid; 2) it should reduce site labor, relying on prefabricated standard components; and 3) it should produce permanent high-quality construction, which is possible when the components are designed with proper specifications and skill.







Welded rigid frames *in Newton, N. J. school by Architects J. C. van Nuys & Associates carry steel deck on lower flanges. Speedy erection of a covered frame having a flush ceiling for direct application of acoustic tile helped cut bid price to $13.90 per sq. ft. Exposed steel is mothballed with sprayed plastic to simplify flashing (above). Model (right) shows how simple framing actively defines sheltered outdoor corridors in classroom wings on steep site.*

Framing with steel

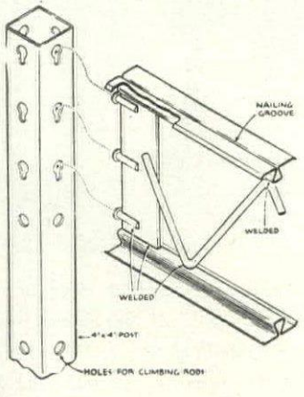
Until the fall of 1952, steel was not generally available for school construction. Since then steel fabricators have produced welded rigid frames and easily erected light joists for very low cost framing. The interlocking joist system shown below, for example, cost $1.50 per sq. ft. in place for both steel frame and an 18-g. welded deck (materials cost $1.20 per sq. ft., labor another 30¢). However, where Class A fire-resistant construction is demanded (as it is in 60% of the nation's schools) the steel has to be separately fireproofed, which slows up construction and absorbs most of the savings.

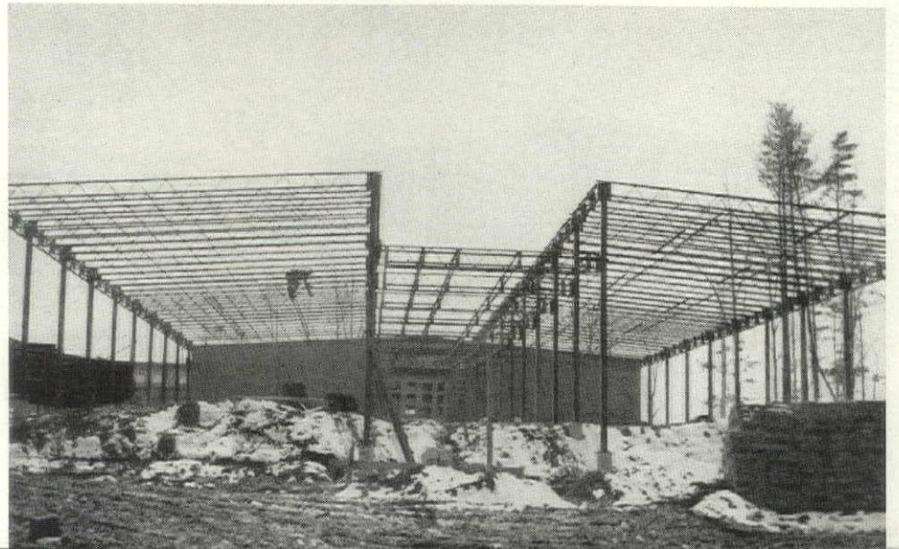
The high strength of steel makes it particularly useful for long spans or heavy loadings, but the need for frequent painting is a factor to be carefully evaluated. In some cases the more expensive aluminum frames favored in England might prove economical here since they are light, quickly erected and need no painting.

Hugo Rebentisch

David Reider

Erector-set space-frame *is the latest development of the industrialized school (AF, Nov. '51). This steel classroom frame at the University of Michigan is loaded with 60 psf of water (contained in plywood bulkheads). Strain gauges showed that the three-dimensional bolted truss, made of light uniform members, has tremendous strength. Weight of finished roof: 16 psf.*



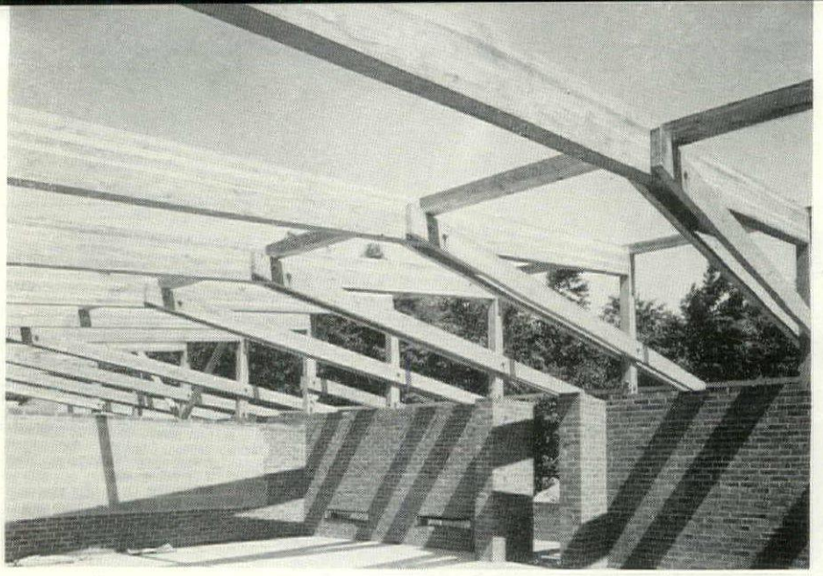


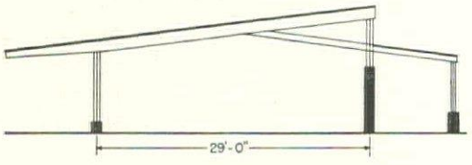
Modular interlocking joists *permitted entire frame of West Lanham Hills, Wash. school (Architect Ronald S. Senseman) to be erected and roofed with a welded deck within a week without expensive hoisting equipment. Joists are raised by pulleys mounted atop columns. Construction cost: $12.25 per sq. ft.*

Framing with timber

Laminated timber is becoming more and more economical, even in the eastern industrial area where timber construction costs average 14% more than in California (in the southern states it runs 6% less). Main advantage for timber is that rapid, dry construction is made possible. Most of the work can be done by the general contractor with consequently more efficient organization and elimination of many subcontractors' profits. While timber often means comparatively high insurance rates (up to 80¢ per hundred on the West Coast), in the 111,000 sq. ft. Seattle school, right, Architect Johnson was able to cut insurance rates 25% by putting in two concrete fire doors. Obsolete rulings still prevailing in some states (including New York) that a wood-framed school cannot be bonded for more than 15 years while Class A construction can be bonded for up to 30 years often make timber construction too expensive taxwise.

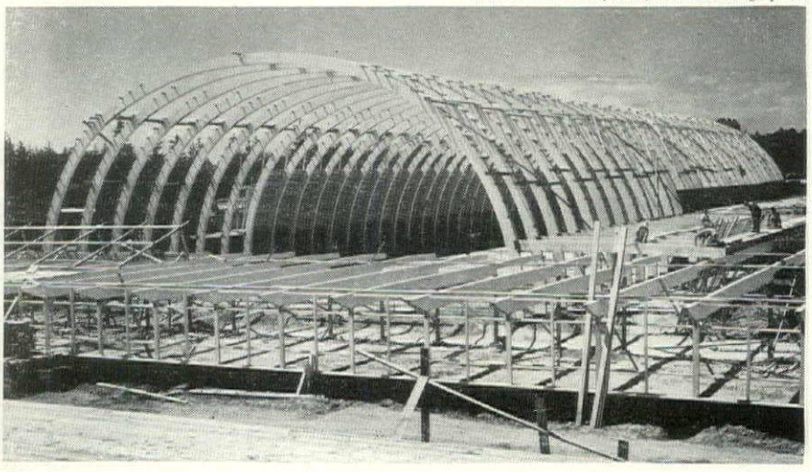
Modular control holds the key to efficient timber design. At Johnson's Seattle school it is estimated to have cut costs 15%, while framing costs ran only 8% of total construction costs.



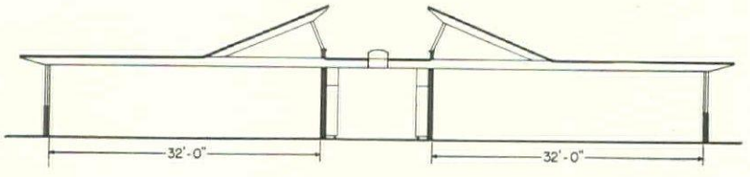


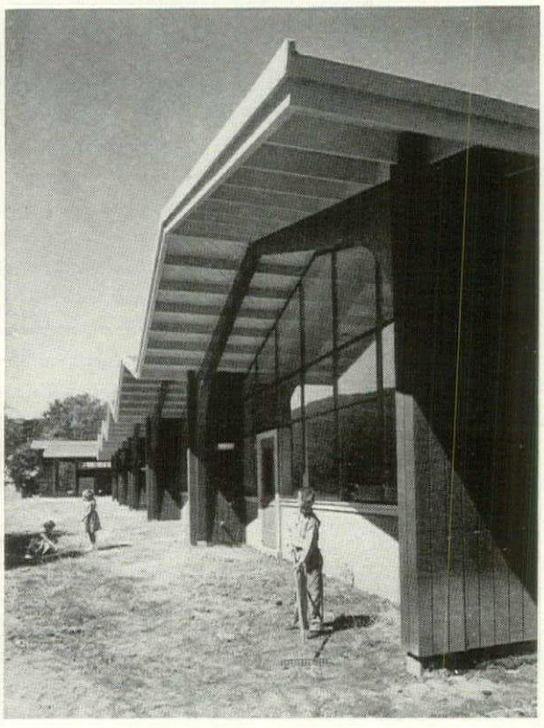
Exposed laminated beams *on 7' centers span 26' in this Dearborn, Mich. school by Architects Jahr & Anderson. Double 2" x 12" joists frame corridors to north of classrooms. Construction cost: $14.94 per sq. ft.*

Photos: Roger Sturtevant; Timber Structures, Inc.; Forde Photographers

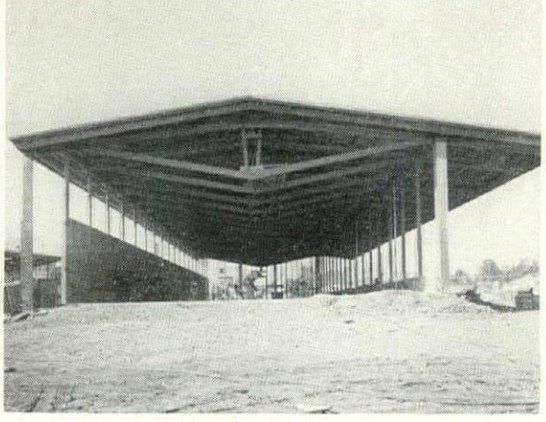


Modular design speeds construction *of Seattle, Wash. school by Architect Wm. A. Johnson and Engineer H. A. Botesch. Laminated timbers on 8' centers (based on 4' module) were fully prefabricated, including bolt holes, holding costs to $10.87 per sq. ft. Classroom section (below) shows two continuous laminated beams spanning 32' classrooms and 16' corridor.*

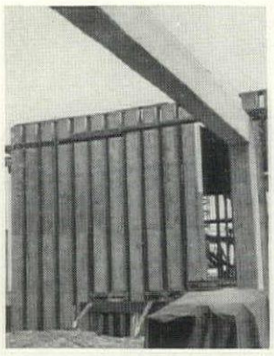




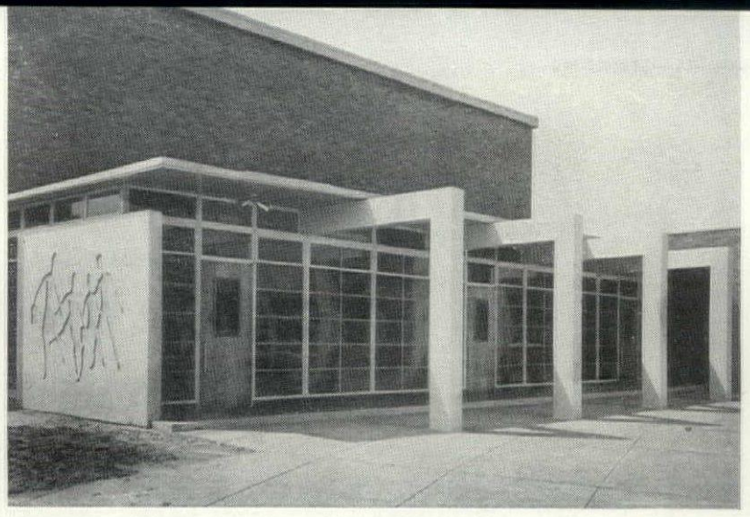
Y-shaped laminated bents, *connected at ridge in each classroom, saved 13% framing costs at Fairfax, Calif. school by Architect John Lyon Reid (see p. 138). Erected cost of each bent was $500 compared with estimated $575 for two-hinged arches. Construction cost: $13.80 per sq. ft.*



Inverted truss *in Compton, Calif. school by Architect H. L. Gogerty is achieved with low-pitched laminated beams. Vented attic space is available for utility ducts and piping while sloping ceiling gives excellent lighting and acoustics. Construction cost: $14.62 per sq. ft.*

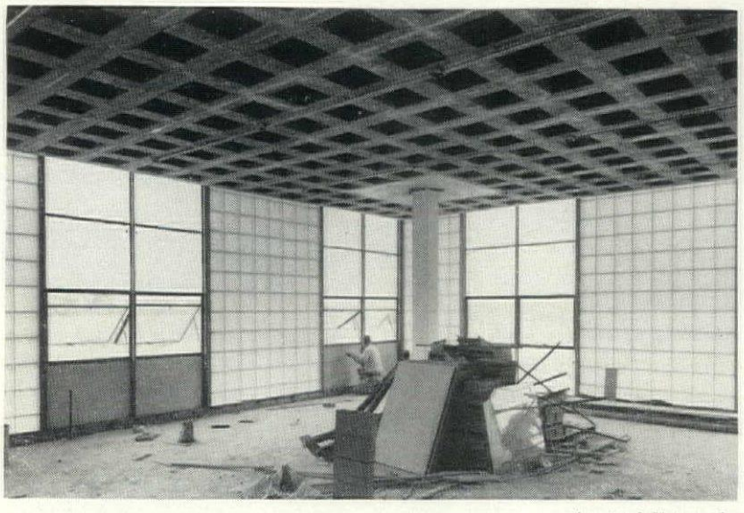


Clusters of concrete bents *were precast together at Palmetto high school, N.C. by Architects Lyles, Bissett, Carlisle & Wolff. In all, 200 framing bents were precast for an average $176 each, producing low construction cost of $7.50 per sq. ft.*

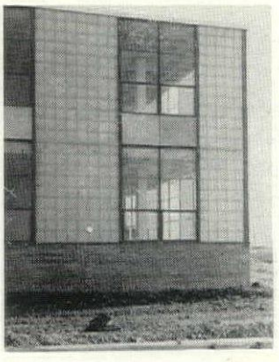


Framing with concrete

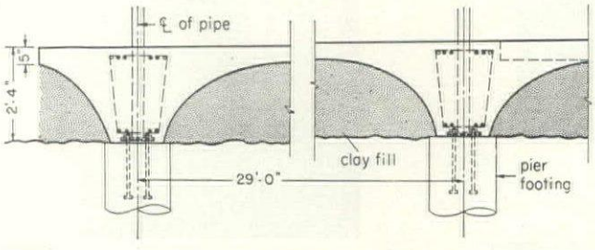
Where durability and fire-resistant construction count, concrete is still supreme. To reduce the high labor costs of concrete construction engineers are trying to cut formwork costs by greater use of precasting techniques, including tilt-up and lift-slab construction. They are also trying to cut finishing costs after the member is cast, by paying more attention to the design of durable forms that leave a satisfactory texture in the cured concrete. At the Central elementary school in Seattle, for instance, Architect John Graham precasts the exterior walls of each classroom on the floor slab as a unit, complete with window sill, overhang and a framed saw-tooth roof line which support the clerestory north lights in each classroom, then tilts each panel into position. Construction cost of this school: $13.25 per sq. ft.



Associated Photographer

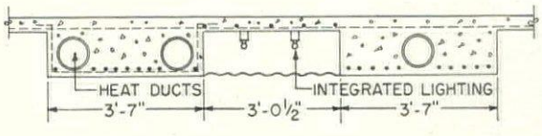


Waffle lift-slabs *in Peoria, Ill. school by Architects Hewitt & Bastian provide wide, flexible spans for $2 per sq. ft.. erected (AF, Sept. '53). Lightweight blocks in each slab were left exposed, giving 50% noise absorption. Construction cost of the two-story school: $11.48 per sq. ft.*



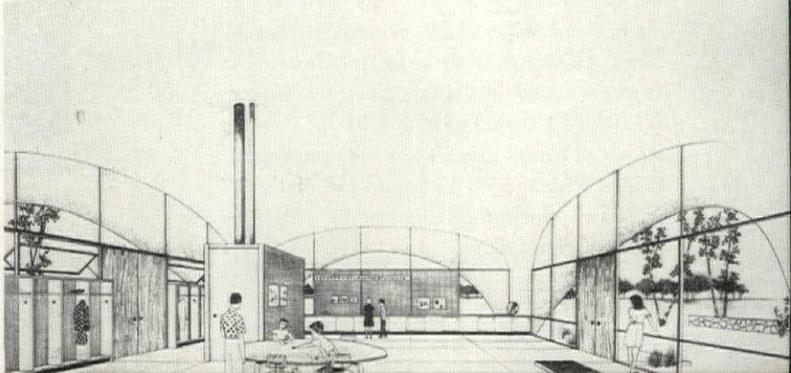
Slabs poured on plowed clay *by Architects Caudill, Rowlett & Scott. Pier footings are poured first, then slab is poured on clay fill covered with building paper. Clay settles, exerts no pressure.*

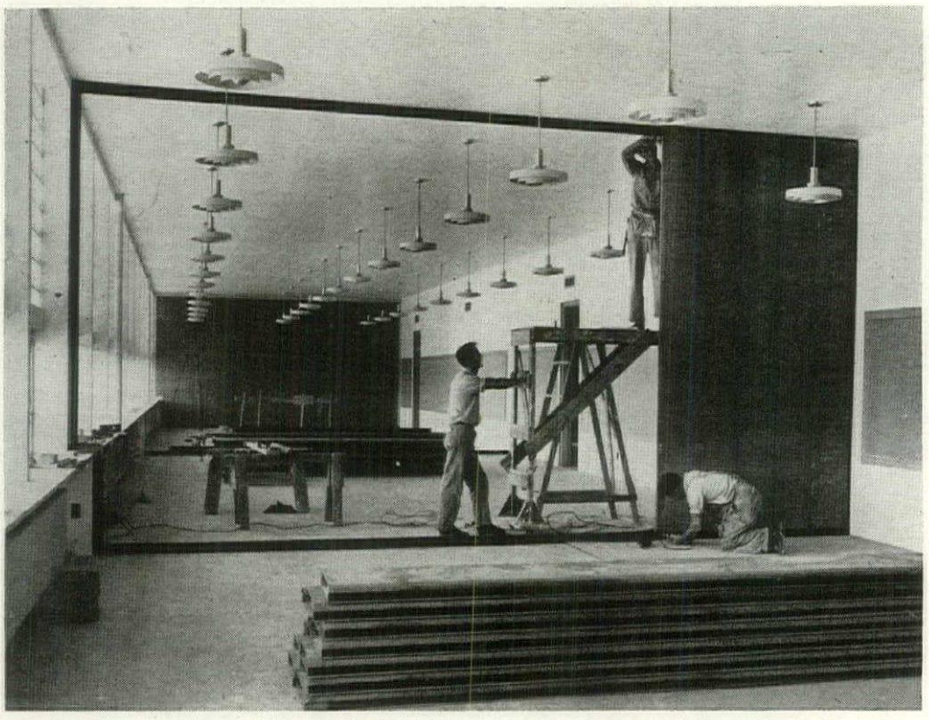
Integrated floor slab *at Naugatuck school by Architect Warren H. Ashley is cast around heating returns and lighting troffers (photo p. 181), showing how services are disappearing into the structure to cut separate installation costs.*



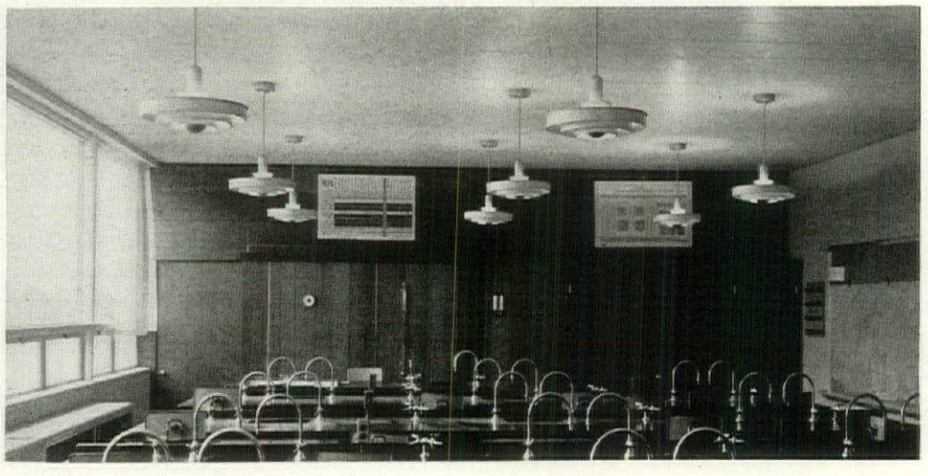
Concrete sprayed over balloon *might produce economical classrooms for "cluster-type" schools. Designer Eliot Noyes estimates these 32' square classrooms, with reinforced concrete shells comprising a layer of insulation between two layers of concrete and complete with foundations and radiant-heated floors, could be built for $6,000 each ($6 per sq. ft.).*

E. J. Cyr





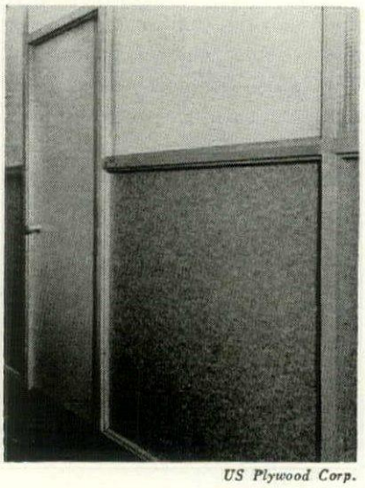
Partitions or storage walls. *This 3″ light-gauge steel partition (above) at a school in Peoria, Ill. (Architect Carter E. Hewitt) has an insulating value of 30 db, its cost: $2 per sq. ft. Another approach (below) is to erect storage walls, as Architect Lawrence Monberg did in Kenosha, Wis. (see p. 174). Storage walls cost little more than partitions, and separate cabinets are eliminated.*



Glazed-faced blocks *produce a finished wall in a single operation. Cost of 4″ single-faced wall: $1.10 per sq. ft.*

Marc Veuhof

Hard-faced wood panels *cost the same as fir plywood but do not splinter or warp. They are composed of small wood segments bonded together. Architect, George Dibbell.*

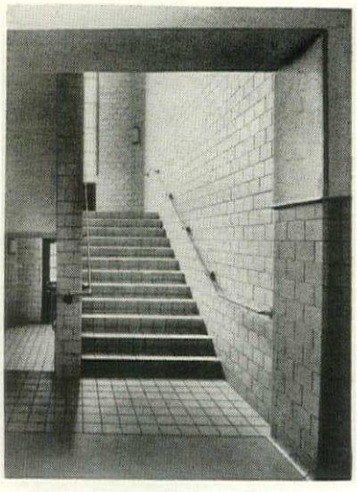


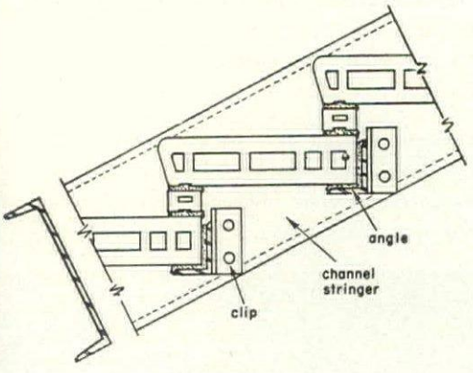
US Plywood Corp.

Interior walls

A great part of the building dollar is spent on interior walls and finishes. Thus more attention is being given to prefinished materials that eliminate plastering (saving 25¢ per sq. ft. for three coats) and painting (saving 2¢ to 3¢ per sq. ft. per coat).

Light-gauge steel and aluminum panels, some of them painted or enameled and insulated with a wide variety of materials, are on the increase but the cost is yet comparatively high at $2 plus per sq. ft. (compared with $1.20 per sq. ft. for 4″ block plastered both sides). Also, about the best sound insulation given by the prefabricated panels is around 30 db, through which ordinary speech can be heard; partitions with the 40-db insulation of the 4″ plastered block wall are usually preferred between classrooms.





Nonskid stair treads, *used for several years in Pittsburgh schools, have proved simple to erect and low on maintenance costs. Tiles are carried on steel angles laid across stair well.*

Low-cost school heating

Can it be attained by lowering minimum ventilation requirements and raising the velocity of warm air to blast proportions?

—by Henry Wright

Today's school heating and ventilating system is up against four tough criteria:

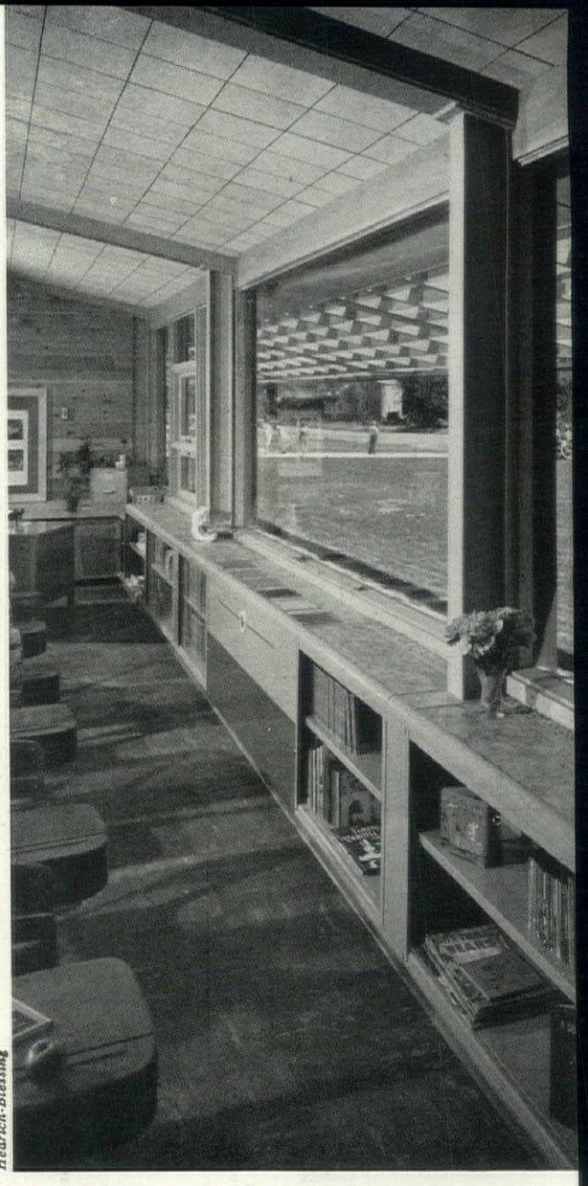
1. It must bring in cool air in sufficient quantity to handle the classroom's surprisingly big cooling load.

2. It must heat a room quickly enough to meet the classroom's rapidly changing heating requirements.

3. It must provide for natural ventilation to prevent overheating in warm weather.

4. It must be prepared to handle the cold surface and draft problems created by today's big classroom windows.

Against these criteria, Henry Wright, in the following article, measures the success of various heating systems.



Hedrich-Blessing

Heating and ventilation *is integrated with architecture in Columbia, Wis. classroom by Architects Weiler & Strange. Generous sunshade minimizes periodic solar gain. Glass is largely fixed. Unit ventilator beneath window supplies mixture of outdoor and recirculated air, controlled to heat or cool room as necessary. Location of continuous ventilator return behind flanking cabinets traps any downdraft from windows before it can enter room.*

It is now widely recognized that the school "heating" problem is largely a problem in controlled cooling.

Like other buildings, schools require heating, and plenty of it, to bring them up to a comfortable temperature in the mornings and to hold them there throughout very cold days when solar gain is at a minimum. But this is less than half the problem. In fact, the latest research shows that school classrooms may require cooling (by admission of outdoor air) 80 to 90% of the time they are in use (AF, May '52, p. 118).

Unfortunately, cooling a classroom satisfactorily is much harder than heating it. Air that is cooler than room air, especially if it is in motion, creates a real "draft"—even if it is not much cooler than room air and is not moving very rapidly. Yet large quantities of cool air must be introduced into the average classroom much of the time if its temperature is not to rise to a point that slows up the learning process by inducing drowsiness and inattention.

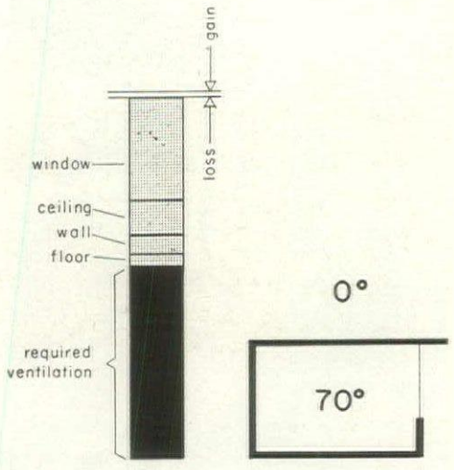
Schoolrooms are a good deal like theaters and auditoriums: once they have been brought up to temperature, body heat from the occupants goes a long way toward satisfying their heating requirements, supplying (from the average class of 30 pupils) about 6,000 Btu's an hour whether it is needed or not. Schoolrooms are also a little like offices, since their lighting systems chip in another 6,000 or so heat units every hour they are on. And classrooms—especially the kind of classrooms being built these days—are a great deal like solar houses. A south-facing classroom with 250 sq. ft. of window area may receive as much as 50,000 Btu's per hour from direct sunshine on a clear winter day, and from 5,000 to 7,500 Btu's from diffuse solar radiation even when the sky is overcast.

In contrast, 1,000 cfm of air entering the room at 60° (with the room temperature at 74°) has a cooling effect of about 6,700 Btu's per hour, and the same quantity of air at 55° provides a little over 9,000 Btu's per hour in cooling. Thus a classroom may often require more cooling than the usual system of mechanical ventilation is able to provide, and a good deal more cooling in mild spring or fall weather than can be obtained by opening the windows.

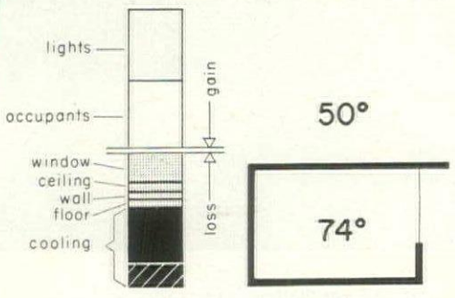
Winter "air conditioning"

When confronted with such a problem in summer cooling, air-conditioning engineers introduce cool—but not too cold—air into the upper part of the room in such a way that it will mix with room air before reaching the occupied zone, and thus reduce its temperature without causing perceptible drafts. Cooling a schoolroom with outdoor air in winter is no different. To do the job properly it is necessary, first, to mix the incoming outdoor air with indoor air until it is within 10° or 15° of the prevailing temperature; and second, to blow it into the upper part of the room where it can continue to mix with warmer air, losing its kinetic energy and gaining heat before reaching the occupants.

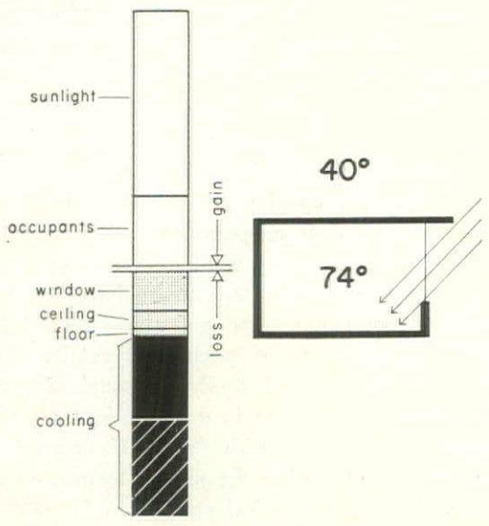
In mild weather this cooling job can be done by just opening the windows, but whenever outdoor temperatures fall below about 55° such "open window" ventilation is bound to create drafts. Conversely, when the outdoor temperature goes above about 60°, most systems of mechanical ventilation are incapable of supplying enough air to do the cooling job; in that case best results are obtained with "natural" cross-ventilation. But when the outdoor temperature is low, mechanical ventilation is essential not only to avoid drafts, but also to ensure that the proper amount of air will be admitted to maintain favorable classroom temperatures despite constantly changing heat gain from the pupils, the lighting system and the sun.



Worst heat-loss condition *is usually taken as criterion for design. For a zero "design temperature," losses for typical classroom are divided as shown above.*



Actual daytime condition *is usually considerably warmer than "design temperature." Result, in mild winter weather, is cooling rather than heating problem, due to heat gain within classroom.*



In cold weather *solar heat gain, when added to other sources of heat, still overbalances heat loss, necessitating cooling. Most classrooms require such cooling with outdoor air most of time they are in use.*

Odor control

In addition to temperature control, classroom ventilation has another and more obvious job: the control of classroom odors and humidity. Most state codes require the constant admission of from 10 to 20 cfm of outdoor air per pupil whenever classes are in session. Such codes are stepchildren of the thoroughly outdated and erroneous notion that the air in crowded rooms becomes toxic unless "fresh" air is admitted. In the late twenties, when the scientific knowledge that this was not true finally percolated to the level of state authorities, codes were revised to require the admission of some fraction of the 30 cfm per pupil of outdoor air formerly called for—usually one-third or one-half of the former figure. At the same time, the code writers usually retained the figure 30 cfm per pupil as the amount of air to be *circulated* within the room, for no very good reason except that it had obtained in the past.

Is the "fixed minimum" obsolete?

Actually, the concept of a "fixed minimum" outdoor air requirement has very little basis in fact, since an east classroom, for example, which has been receiving large quantities of outdoor air for cooling purposes during the morning, is unlikely to become odoriforous or excessively humid in the course of a single afternoon if the outdoor air supply is cut off entirely. On the other hand, there is no doubt that classrooms without positive ventilation do become stuffy whenever their heating equipment is unable to keep up with a continuing drop in outdoor temperature and the windows are kept tightly closed for a day or two at a time.

Ideally, the "perfect" ventilating system would admit sufficient outdoor air to meet cooling requirements, mixing this air with a sufficient amount of room air to bring it within 10° or 15° of the room temperature, and then admit "tempered" outdoor air to prevent the build-up of humidity and odors during periods when cooling was not needed. Control of this "tempered" air might be based upon relative humidity.

To attain such ideal conditions either more air would have to be circulated than the standard 30 cfm per pupil usually required, or the classroom would need to be protected more carefully from solar gain. Moreover, during heating periods, considerably less fresh air would be admitted than most codes now call for, with consequent fuel savings. In cold climates, where the required 10, 15 and even 17½ cfm per pupil frequently drives the indoor humidity to abnormally low levels, a relaxation of code requirements would both improve pupil health and save fuel. Equipment would last longer, too, since in such climates wooden tables and desks have a distressing habit of splitting with excessive drying of the wood.

Calculate the heat gain

Since codes cannot be changed overnight, the "fixed minimum" ventilation requirement will probably remain with us for some time in areas where it is in force. However, we can ensure sufficient "maximum" ventilation to do the kind of cooling job our present school designs call for. First, school designers should make a habit of calculating heat *gain* as well as heat *loss*, using the excellent data developed for air-conditioning work. With the probable maximum heat gain, a known quantity of ventilation could then be provided to maintain optimum classroom temperatures at all times without releasing into the room air colder than 60° or, at the very least, 55°. For a classroom with an anticipated maximum gain of 15,000 Btu's per hour, this would mean providing a means for admitting at least 1,600 cfm of 55° air in place of the usual 1,000 cfm per classroom.

Such a means of mechanical ventilation should be capable of doing three things, regardless of the type employed:

1. *Mix* outdoor and indoor air to control the minimum temperature at which the ventilating air—either for cooling or odor control—enters the classroom.
2. *Regulate* the temperature of the mixture on a room-by-room or zone basis to suit the momentary cooling (or heating) requirements of each classroom or bank of classrooms—preferably the former.
3. *Distribute* the ventilating air without creating drafts.

"Blast heating"

Provision of really adequate air circulation pays an economy dividend by making heating an extremely simple matter. In the morning schoolrooms often need a great deal of heat in short order. This is easiest to provide by adding a heating element (needed anyway to warm the incoming ventilating air in cold weather) to the forced system of air circulation. Architect Alonzo Harriman's schools in northern Maine have been relying solely on such "blast heating" ever since 1938. Such systems have been found very satisfactory in performance and economical to install and operate. Again, the virtual elimination of thermal "lag" in a blast-heating system makes possible precise temperature control.

Thus, the true performance criteria of school heating and ventilation systems, in all but the mildest or cloudiest climates, are these:

1. Can the system introduce sufficient cooling air into each classroom, at a predetermined minimum temperature, to do the required cooling job? This depends more on the quantity of air circulated than on the pattern of circulation used.

2. Can the system add heat to the room quickly enough to meet the changing needs of a light structure having widely varying solar heat gain and large heat losses through big window areas? This depends first on the heat capacity of the heating element and then upon forced air circulation.

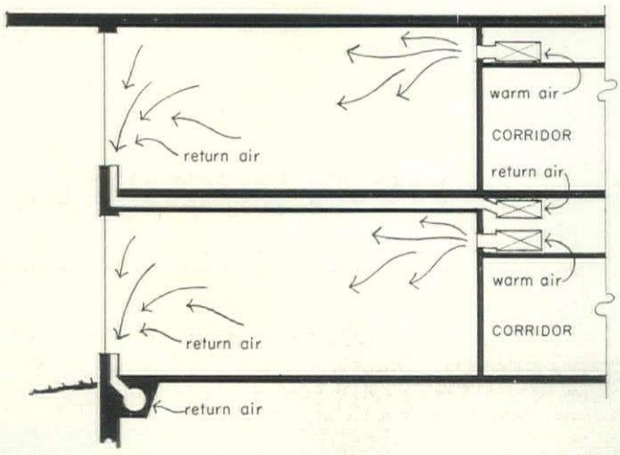
3. Is good "natural" ventilation available to prevent overheating of classrooms in warm weather? It can be achieved by large-capacity exhaust ventilators or clerestory windows opposite the main window wall, as demonstrated in the excellent studies on warm-weather natural ventilation by William W. Caudill and his associates at the Texas Engineering Experiment Station (AF, Jan. '52, p. 150).

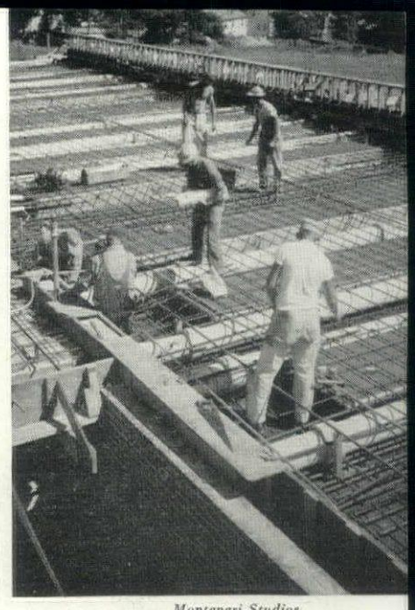
The "cold glass problem"

These criteria leave unanswered one big question that is also a determining factor in classroom comfort: the question of the cold-weather effects of big glass areas, including skylights and clerestories. In winter, even when the classroom requires cooling and even when huge quantities of solar energy are coming in through the glass, the big glass areas are often a source of "cold." Thus, if cooling air is blown toward a big window in winter, the air becomes colder and the draft problem is aggravated.

Many engineers attempt to counteract the cooling effect of big glass areas by installing continuous convectors or long air-delivery slots beneath the windows. In schools, however, where the classrooms often require cooling rather than heating, a better approach is to locate the ventilating *returns* in this position, so as to draw off the air which has contacted the window and keep it out of the classroom until it has been mixed with warmer room air. In addition to being technically correct, this is obviously the most economical solution.

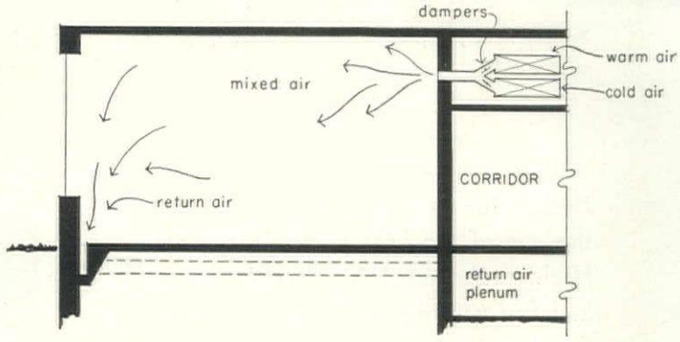
Thus, the fourth criterion of classroom ventilating systems is that all such systems should be evaluated in terms of the pattern of air distribution produced in relation to the disposition of the glass. Creating a draft-free pattern of air distribution, especially during periods of cooling, calls first for the introduction of cooling air into the upper, unoccupied portion of the room either by a central duct system or by unit ventilators and, second, for the withdrawal of air from beneath the windows, so as to intercept and control window downdrafts.



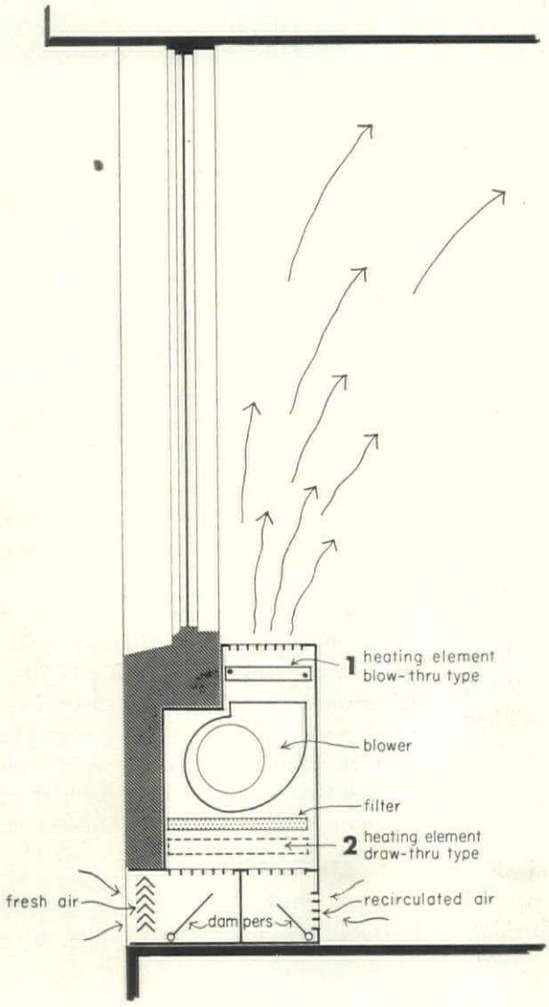


Montanari Studios

***"Central fan" systems** by Architect Warren H. Ashley and Engineers Marchant & Minges illustrate one way to satisfy the cooling requirements of the modern classroom. Above, each classroom is fed with tempered air from fan room. Return ducts serve banks of rooms, drawing air from beneath windows to trap downdrafts. Photo shows second-floor return ducts being laid prior to pouring of floor slab around them (see also p. 177).*

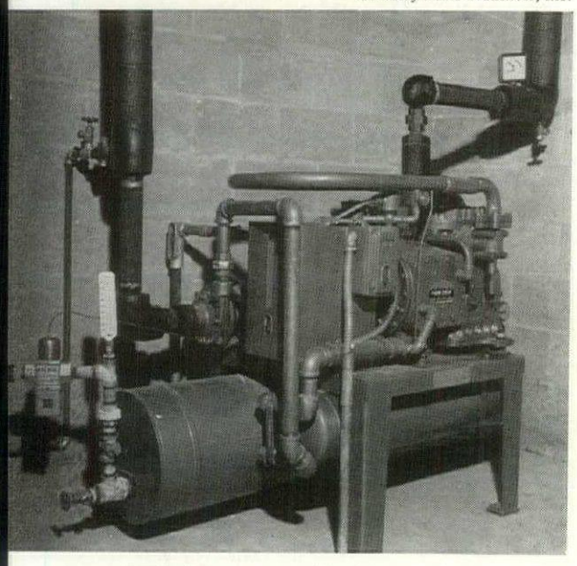


***Similar central fan system** by the same designers contains two trunk ducts (above), one carrying cold and the other hot air, supplying each classroom with the mixture required for comfortable learning conditions.*



***Typical unit ventilator** contains a continuous duct from which air is blown upward in front of the glass. Another type has continuous finned-tube convectors located beneath windows to provide an insulating blanket of warm air to overcome draft from a cold window. A third solution is to draw off air falling from the glass and to mix it with room air before readmitting it to the ventilating system.*

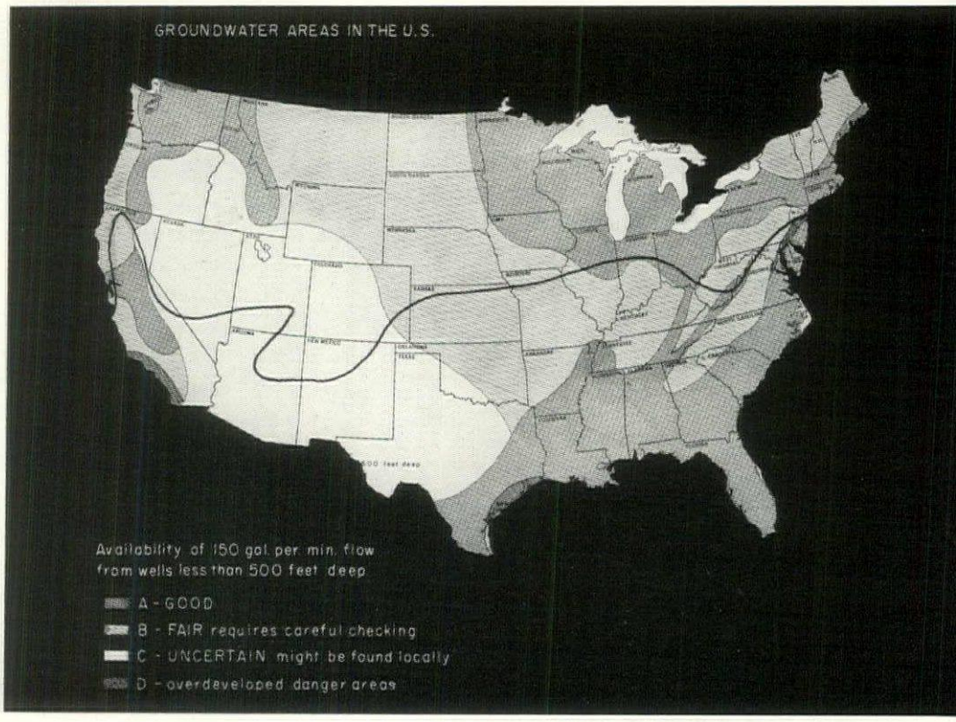
Courtesy Acme Industries, Inc.



Typical heat pump *in these schools is simply a standard 7½ hp refrigerating compressor unit.*

Heat pumps beat furnace costs

in six new schools, offer added benefits of electric power and by-product air conditioning



Here is the first report on the pioneering use of the heat pump in schools. Highly successful in office buildings and fast gaining popularity in houses, the heat pump cracked the school market last September when pilot systems went into six Florida schools.

These heat-pump installations were made in the Pinellas County school system's new elementary schools in and around St. Petersburg for three good reasons:

1. Lower first cost. Total cost for these heating systems averaged 2 to 5% less than alternate bids for conventional heating. (Moreover, heat-pump operating costs are running virtually neck and neck with the bills for oil heat in similar schools.)

2. No fire hazard. Since these heat pumps are powered solely by electricity there is no flame, no fuel to store and no need to get rid of gases.

3. By-product air conditioning. The same heat pumps can be switched over in hot weather (the local temperature tops 90° spring through fall) to air-condition such spaces as cafeteria and auditorium—an added benefit that tipped the scale in favor of heat pumps. (In the deep South bigger units are needed for air conditioning than are needed for heating only.)

Heating design. St. Petersburg's 74th St. elementary school is a good example of how these heat pumps work. This 360-pupil, $225,000 school has three parallel wings finger-planned to a common corridor, each wing containing four classrooms. An administration building and a combined cafeteria-auditorium flank the three wings as shown on the next page.

Five 7½-hp heat pumps are used, one each for classroom wings, administration offices, and "cafetorium." Individual units were selected because they were cheaper than one big heat pump for the whole school. An important point is that these are water-to-water type heat pumps; extensive coils are not buried in the ground; nor are auxiliary electric resistance heaters needed. Here the main heat source is well water.

Each unit, basically a standard air-conditioning compressor, actually cools 20 gal. per min. of 78° well water to 70°. In other words, 8° of heat is extracted from every gallon. The units also generate substantial compression heat which when lumped together with well-water heat adds up to an output of 120,000 Btu's an hour per unit.

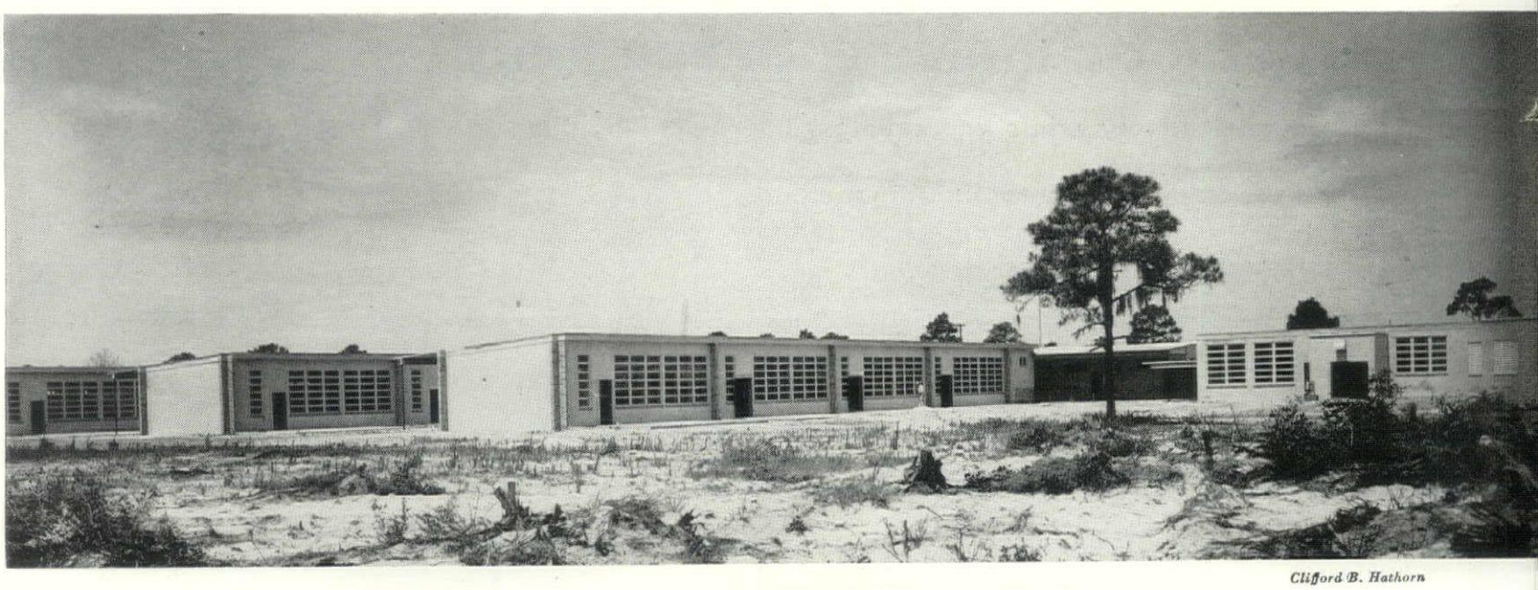
Radiant heat. Classrooms get their heat by means of a secondary water circuit, entirely separate from the primary well-water supply. Pipes run from the heat pumps directly to a network of radiant coils in the slab floor. Each unit supplies 25 gpm of 113° water to a classroom wing; floors are maintained at 81° to 85°.

Although many school architects shy away from radiant systems because they are prone to overheat, these schools count on three facts to lick this problem:

1. All classroom wings are aligned on an east-west axis with big windows on the north and overhangs on the south. Thus sun heat is minimized in the first place. (Windows, of course, can be opened practically every day of the year for ventilation, an advantage peculiar to the South.)

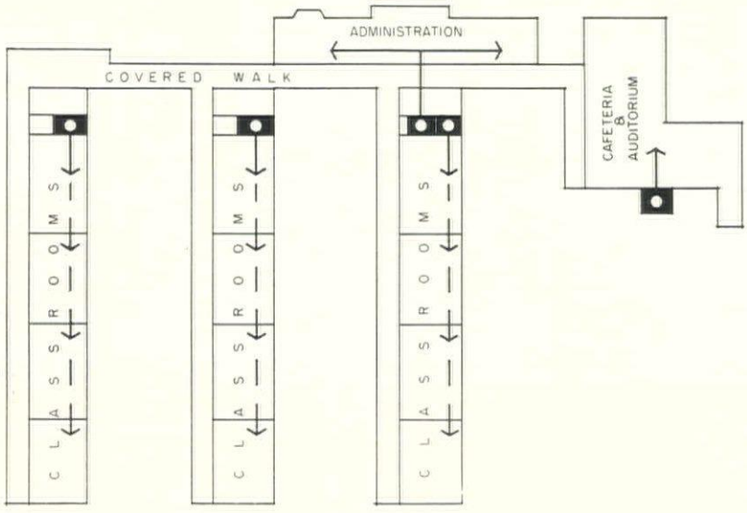
2. To make up for the storage of heat in the slab, outdoor thermostats anticipate the weather so the floor temperature is regulated as the outdoor temperature changes.

3. Slab pipes are buried only 1" below the floor surface and consequently the floor temperature responds quickly to its water supply temperature; i. e., there is relatively



Clifford B. Hathorn

Classroom wings *of this typical Pinellas grade school are heated by hot water pumped to radiant slab coils. Cafeteria-auditorium building top right is air conditioned by means of ductwork. Location of individual heat pumps is shown on plot plan (right).*



Ground water map *of US shows where chances are good, fair and uncertain for obtaining adequate well water to operate heat pumps.*

little time lag due to the concrete mass. With conventional boiler systems the pipes must go at least 2″ to 2½″ under the floor.

Air-conditioning design. Unlike the classrooms, the "cafetorium," which is often used for public affairs, is air-conditioned, and this dictated the use of ductwork instead of radiant pipes. The coil of the air-conditioning unit for this 2,380 sq. ft. space is fed either hot (120°) or cold (46°) water piped from the 7½-hp heat pump. Air blown through this coil is heated or cooled and then channeled through the ducts to the air-conditioned space. And during a hot spell the heat pump works like any other air-conditioner: well water is used to carry heat away from the building.

If the classrooms are later air-conditioned, similar cooling coils can be added easily. Architect-Engineer Philip Kennard, designer of these Pinellas schools, estimates that cooling could have been originally provided using the same heat pumps with ducts instead of radiant heating for as little as $125 extra per classroom. (Classrooms and offices were not mechanically cooled because officials feared that taxpayers might consider this amenity a luxury.)

Initial costs. Excluding the wells, radiant heating by heat pumps averaged 91¢ a sq. ft. installed vs. $1.00 a sq. ft. bid for oil-fired boilers and fin-type convectors. Cost for the wells is balanced off against the savings on boiler room and chimney. (Where air conditioning is also provided, however, total cost is naturally higher than for heating alone.) Total heating costs for all six schools (66 heat pumps) averaged 2 to 5% less than the bids for conventional heating.

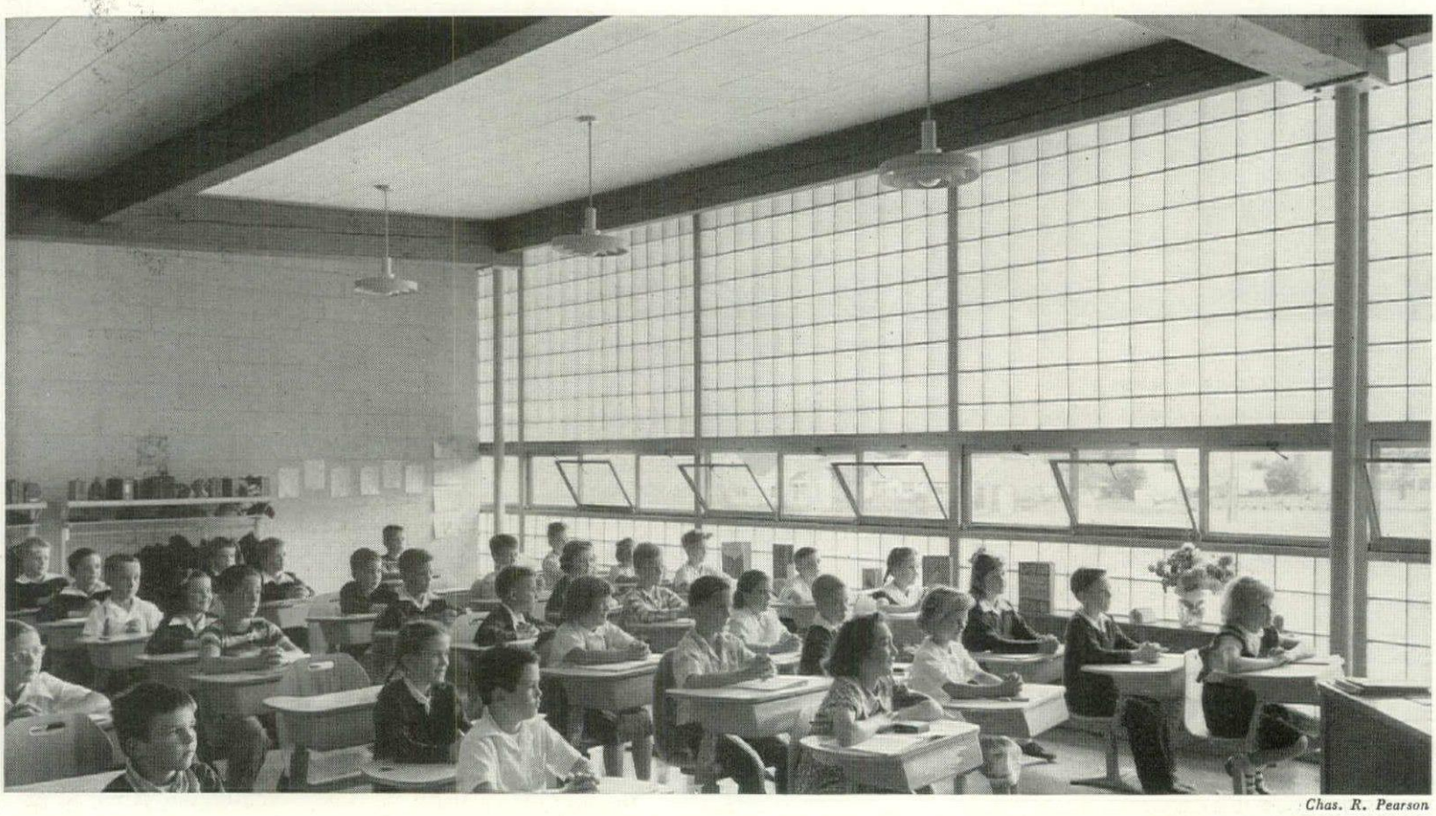
Operating costs. Using 2¢ per kw-h electricity, the heat pump is competitive with oil at 14¢ a gal. according to the Florida Power Co. For 1952-53, heat-pump operating costs at the 18,702 sq. ft. 74th St. school was $385, or 2.05¢ a sq. ft. At the same time a similar school six blocks away was heated with 14¢ a gal. oil for 1.9¢ a sq. ft. With allowance for the fact that the electrical bill includes the cost for all testing when the heat pumps were first turned on, it is apparent that net operating costs are virtually equal.

In these six schools the heat pump has proved so successful that bigger installations are now under way in three Pinellas high schools. In these bigger schools, however, it has proved cheaper to install a large centrifugal compressor for all classrooms and individual units for other spaces than to use all individual units.

Is the heat pump economically feasible for schools elsewhere in the country? For large slices of the US engineers say yes. First, well water is abundant in many areas as shown by the ground-water map (left). Secondly, many electrical utilities encourage use of the heat pumps; e.g., the American Gas & Electric Service Corp. system offers a complete engineering service at no charge. In the last analysis, however, economical use of the heat pump will depend on local power rates and how the pump can be adapted to a specific school.

Thirty foot-candles with economy

through luminous walls and ceilings, fluorescent lighting, low-cost high-voltage wiring and an array of new toplighting methods.



Chas. R. Pearson

Glass-block wall, *once merely a means of functional efficiency in redirecting daylight to the rear of a classroom, has now become a design thoroughbred as well. This Seattle school by Architect Paul Thiry goes a step beyond most glass-block schools, uses inverted block below vision strip. Block panels are framed by steel pipe columns which carry timber roof. Construction cost of school: $12.40 per sq. ft.*

Five recent studies of eye problems among several thousand school children from New York to Colorado have established that, from kindergarten through high school, the need for eyeglasses increases from 5 to 25%. This underlines the importance of good visibility in schools. While the American Standards Assn. recommends a *minimum* of 30 foot-candles at desk height, most schoolrooms are still lit by the old globes delivering under 10 foot-candles.

To obtain 30 foot-candles during school hours every day by daylighting alone, is theoretically possible in one-story schools, though expensive in many areas. In spite of its greater initial cost, fluorescent lighting can be more economical than incandescent due to greater efficiency and cheaper wiring. After careful tests the New York City Board of Education employs 40 foot-candle fluorescent lighting in its new public schools for all rooms used over 6 hours a day where the cost of electricity is over 3¢ per kw-h, even though the initial cost of fluorescent is over double that for incandescent (90¢ vs. 38¢ per sq. ft.).

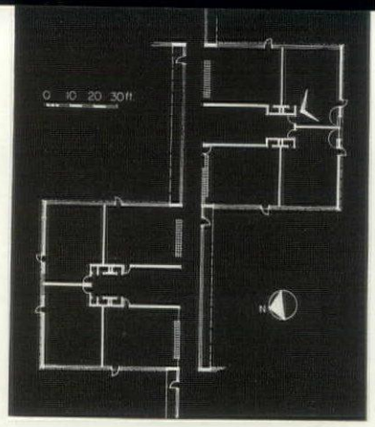
Other noteworthy developments:

▸ **Luminous plastic ceilings,** installed at Glendaal and Glen Worden schools, Glenville, N.Y., by Architects Sargent, Webster, Crenshaw & Folley, provide a uniform 55 foot-candles of light but cost only $1,300 per classroom ($1.97 per sq. ft.). In several other schools the architects halved lighting costs with a luminous panel covering only the inner half of the classroom, the outer half using daylight from windows.

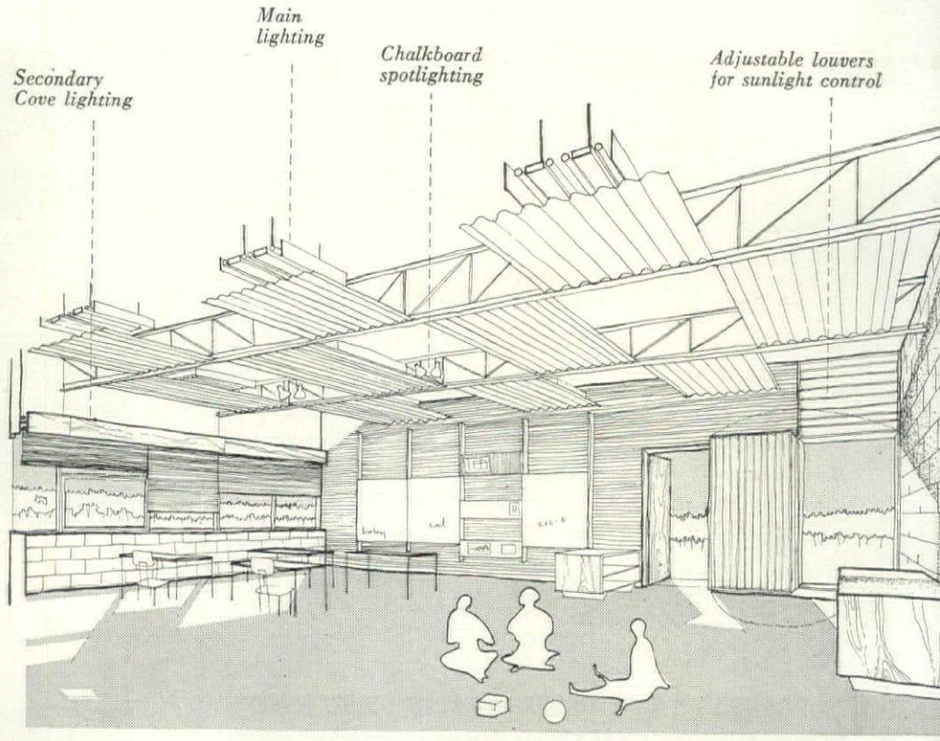
▸ **Partial luminous ceilings** at the Western elementary school, Naugatuck, Conn., by Architect Warren Ashley are even more economical. Three 22½′ long lighting troffers, 3′ wide and 12″ deep, are cast in the concrete slab above each classroom (perpendicular to the windows). Two fluorescent tubes are set along each troffer with 3′ wide corrugated plastic diffusers flush with the ceiling below each troffer (see p. 177). This ingenious design provides an average 38 foot-candles at desk height at an installation cost of $695 per classroom (78¢ per sq. ft.).

▸ **High-voltage wiring,** the new 277/480-v. 3-phase 4-wire system, only recently approved for schools by the National Electrical Code, effected installation savings of $20 per kva (approximately $1,500 in all) through reduced cost of distribution wiring in the 82,000 sq. ft. Twin Falls high school, Idaho, by Architects Paradice, Evans & Lash.

▸ **Daylight by toplights,** using plastic bubbles at $10 per sq. ft., corrugated plastic at $1.50 per sq. ft., light-directing and diffusing insulating glass block at around $6 per sq. ft. or heat-absorbing, glare-reducing wire glass at $2.10 per sq. ft., is being boldly exploited. The best examples strive to provide not only adequate, but also high-quality, stimulating lighting; the best of these are illustrated on the next two pages. (Further details on p. 212.)

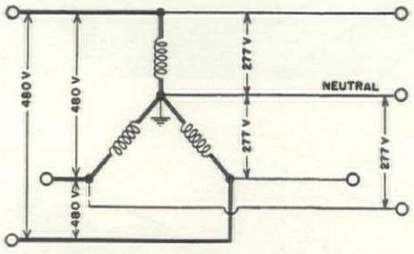


Integrated lighting design *for Darien, Conn. school by Architects Ketchum Gina & Sharp exploits welcoming value of morning sunlight (view looking southeast). Design includes diffused overhead lights, covelighting and spotlighting to give maximum variety and stimulation.* *(See also p. 128.)*

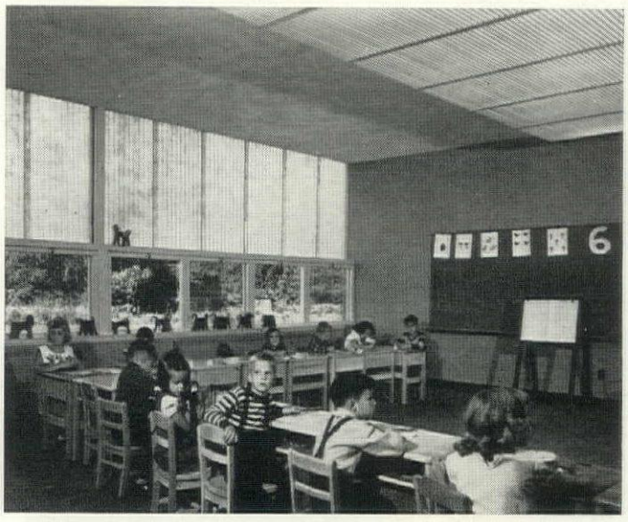


Ralph Trumbull

Brightness without glare *results when this luminous ceiling of corrugated plastic merges with all-glass wall. Fluorescent tubes are hung above plastic diffusing panels.* *(See text.)*



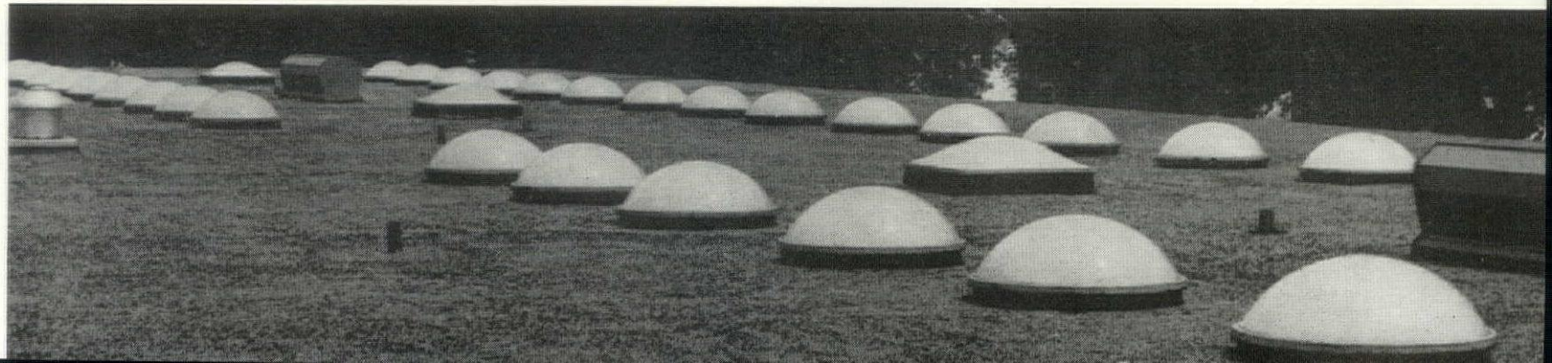
Higher voltages *cut wiring at Twin Falls (Idaho) high school; 3-phase, 4-wire system gives power at 480 line volts (for 120-v. plug-in circuits) and 277 phase volts for fluorescent lighting using 24-v. remote-control switching.*

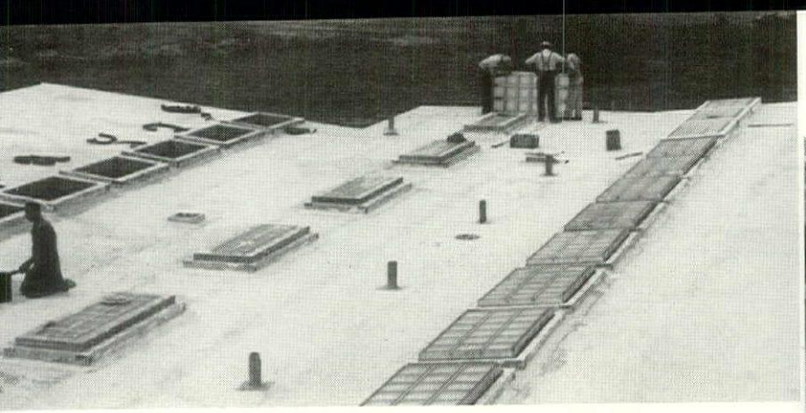


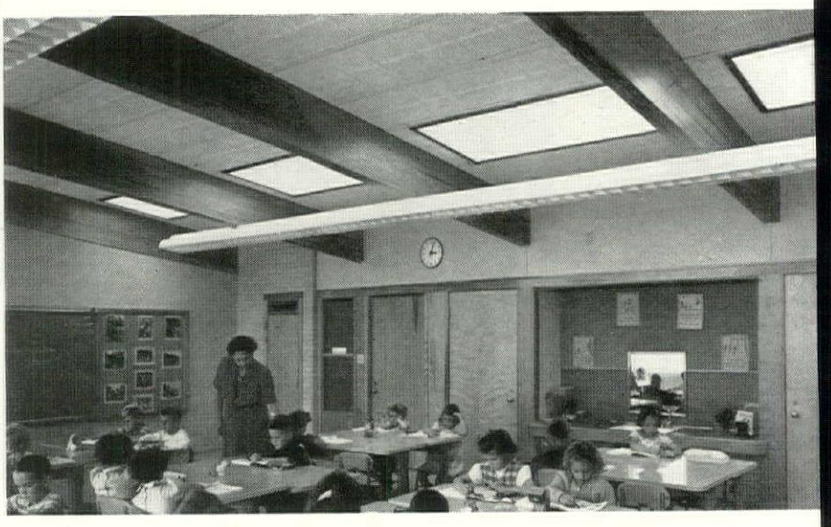
Corrugated plastic walls, *used as fixed windows, eliminate glare and cut breakage in Liverpool, N.Y. schools. In this and another school, Architects Sargent, Webster, Crenshaw & Folley report savings of $5,000 in installation costs over original glazing bids.*

Plastic roof bubbles *admit extra daylight to classrooms and center corridor of elementary school in Ottawa, Kan., by Architect Joseph W. Radotinsky. With sky brightness of 1,000 foot-lamberts, each bubble gives 40 foot-candles immediately beneath and 12 foot-candles 7' to one side. Cost: $10 per sq. ft. including flashing* *(see also p. 212).*

Bill Wright

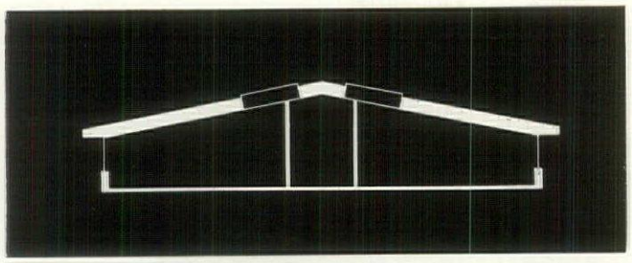


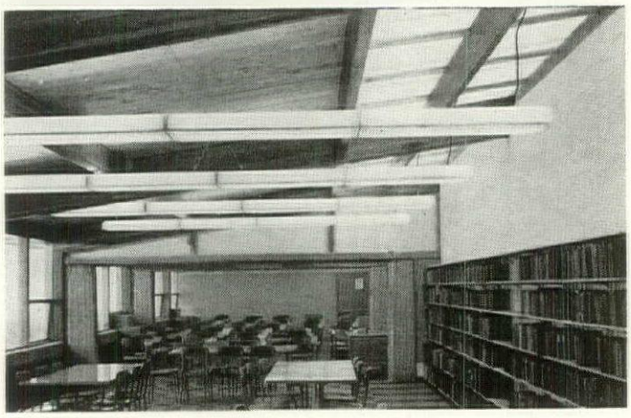




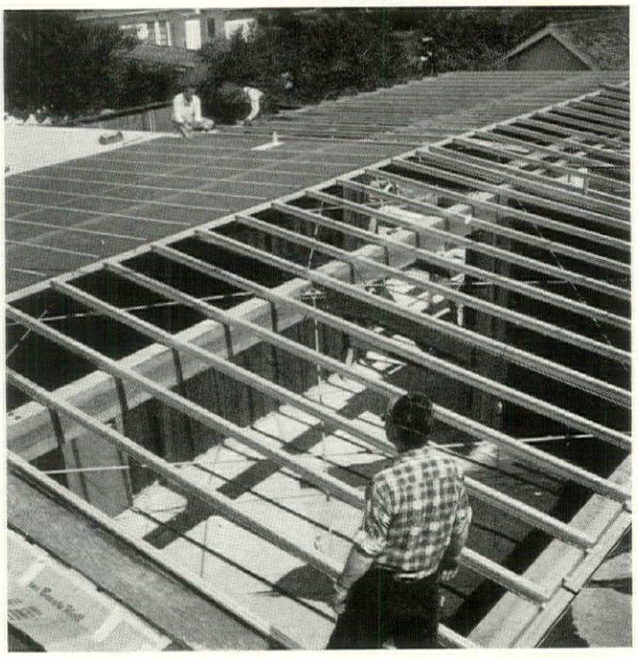
Prefabricated panel skylights *going up at new Middleville, Mich. school (Architect Louis C. Kingscott) are made with light-directing glass block set in aluminum frames. Block transmits north light and low winter sun but reflects high summer sun (AF, Mar. '53); erected cost: $7 per sq. ft. Right, interior view of skylights.* *(See also p. 212.)*

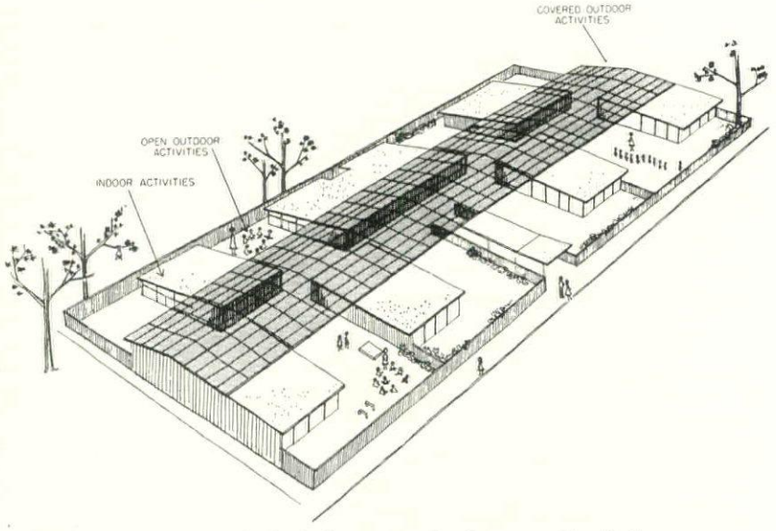
Photos: Kimble Glass Co.; M. J. Humphrey; Rondal Partridge; Martin Moyer





Double-glazed plastic skylights *cover inner third of classrooms and extend 1' into center corridor at high school in Grand Marais, Minn. by Architect Myron M. Kehne. School was built with laminated timber frame for 78¢ per cu. ft.*





Glazed roof *over two-thirds of elementary school annex at San Carlos, Calif., designed by Architect John Carl Warnecke, stimulates children by high brightness and wide use of primary colors. Heat-resistant wire glass is set in aluminum frames for $2.10 per sq. ft. erected.*

North-light monitors *give good lighting over desks at Architect John Graham's elementary school in Seattle, permitting economical short side of classrooms along exterior window wall. Chalkboard, however, appears dark and might benefit from the kind of spotlighting shown in Darien school (top, opp. p.).*

Low cost of electric light

All factors considered, it may cost more to use Mother Nature than to rely on the light bulb — a denial of the theory on which many of today's classrooms are designed

—by Kenneth Welch & H. G. Daverman

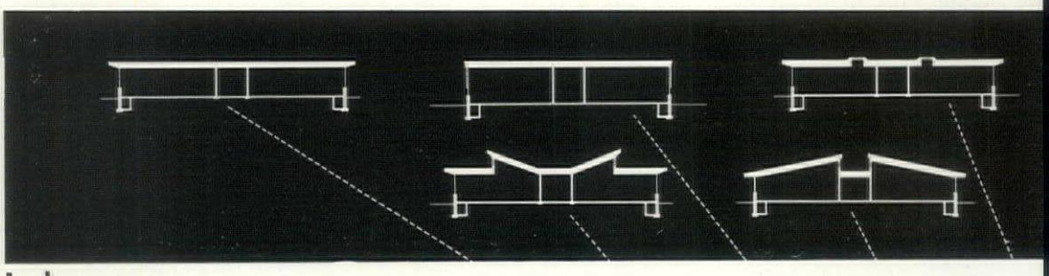
For years the trend in classroom design has been toward more and more daylight. This trend is now challenged by Architects Kenneth C. Welch and H. G. Daverman of Grand Rapids, who have analyzed the costs of various kinds of classroom lighting and come up with the discovery that electrically lighted classrooms may be as much as 6% cheaper to build and no more expensive to operate and maintain than classrooms which use big windows, clerestories, skylights, etc., to minimize the need for artificial light.*

In brief, this conclusion is based on these three facts: 1) Even a daylighted classroom must have stand-by electric lighting. 2) The devices for admitting daylighting boost construction, maintenance and heating costs. 3) The electrically lighted room may put one of its narrow ends (rather than one of its long sides) to the outside, thus reducing building periphery, corridor length and square footage. The tables show the statistical reasoning and detailed conclusions of Welch and Daverman. Below is their discussion of their findings.

Lower construction costs. Our figures are based on a double-loaded six-classroom wing with heating costs prorated on a square-footage basis by estimating the additional square footage required for a kindergarten, administrative area, toilets and boiler room.

Costs exclude plumbing since some schools use the self-contained classroom with individual toilets, while others use gang toilets. Costs also exclude built-in cabinets or lockers. Roof drains are included, together with conductors ending 5′ outside the building. (More detailed specifications for the five-classroom types are listed on p. 220.)

Cost per square foot is less for the electric light school even though there is less square footage over which to distribute the cost. The cost per square foot of classroom area gives a clearer picture of the possible savings of electric lighting because of the more compact plan. This also shows up in the cost per classroom. These costs are below the standard $13 to $15 per sq. ft. usually used to budget school costs, because the buildings being considered here are stripped and since plumbing is excluded. (Unit costs listed are for fluorescent lighting; there would be a slight decrease for incandescent lights.)



	SCHOOL TYPES	Type 1	Type 2	Type 3	Type 4	Type 5
INITIAL COSTS	Area, 6-classroom wing,* sq. ft.	6,700	6,830	6,830	6,830	6,830
	Architectural trades	$38,172	$45,680	$42,880	$44,300	$47,700
	Fluorescent fixtures	9,700	8,800	8,580	8,880	8,580
	Incandescent fixtures	8,000	7,800	8,040	7,800	7,800
	Roof drains	744	2,180	744	2,180	744
	Heating	12,057	12,849	12,579	12,849	12,560
	Blackout curtains	286	425	450	352	450
	Total with fluorescent	60,959	69,934	65,233	68,561	70,034
	Total with incandescent	59,259	68,934	64,693	67,481	69,254
	Cost per sq. ft., total (with fluor.)	9.10	10.24	9.55	10.04	10.25
	Cost per sq. ft., classroom* (with fluor.)	11.34	13.00	12.13	12.75	13.03
	Cost per classroom (with fluor.)	10,160	11,656	10,872	11,427	11,672
OPERATING & MAINTENANCE COSTS	Lamp types	Fluor. / Inc.	Fluor. / Inc.	Fluor. / Inc.	Fluor. / Inc.	Fluor. / Inc.
	Lighting level, foot-candles — Night	31 / 26	25 / 18	25 / 26	25 / 18	25 / 18
	Lighting level, foot-candles — Day	34 / 30	35 / 28	33 / 34	35 / 28	35 / 28
	No. of fixtures	11 / 12	6 / 6	6 / 9	6 / 6	6 / 6
	Power quantity, kw-h	5,800 / 15,580	4,000 / 10,200	5,000 / 14,700	4,000 / 10,200	4,000 / 10,200
	Power cost	$174 / 467	120 / 306	150 / 441	120 / 306	120 / 306
	Maintenance labor cost	$75 / 57	60 / 39	51 / 39	60 / 39	60 / 39
	Lamp replacement cost	$9.00 / 9.50	4.50 / 7.15	5.50 / 8.00	4.50 / 7.15	4.50 / 7.1
	Total electric operating cost	$258.00 / 533.50	184.50 / 352.15	206.50 / 488.00	184.50 / 352.15	184.50 / 352.1
	Heat loss, Btu	269,600	311,800	271,850	304,400	308,400
	Oil per year, gal.	7,800	9,044	7,894	8,830	8,946
	Oil cost	$962	1,112	971	1,086	1,100
	Total heating, electrical costs	$1,220	1,297	1,177	1,271	1,285

* Wings consist of six classrooms of identical size (5,376 sq. ft. in all types) and varying corridor areas.

Low operating costs. A saving in capital costs for an electrically lighted school alone does not justify this design. What happens to maintenance and operating cost is of equal importance. These costs (based on the assumptions listed on p. 216) are shown in the lower half of the tabulation.

With the exception of the glass-blocked school (type 3), the electrically lighted school has the lowest maintenance and op-

continued on p. 212

* For a similar challenge by Magney, Tusler & Setter, who have designed a small-window school for the University of Minnesota, see p. 158.

School acoustics—careful planning with new double-duty materials gives more efficient noise control at less cost

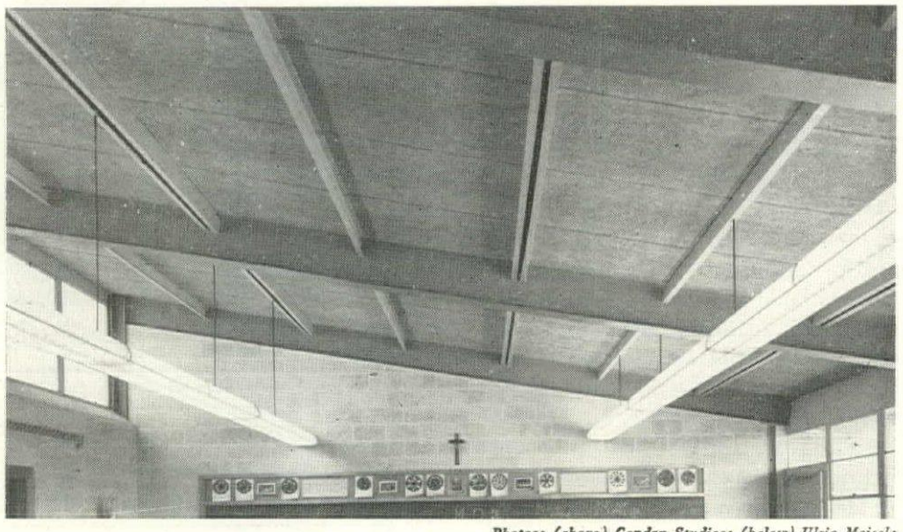
In the past it has been customary first to build the school and then, as funds permit, to smother noisy areas with sound absorptive tile. Nowadays this hit-or-miss method has given way to closer cooperation between the architect and his acoustics engineer from the very earliest stages of the design. Together they plan the layout, separate the noisy gymnasium and workshops from the quiet study areas, ensure maximum sound insulation between the two areas, and make full use of prefabricated roof decks and partitions that combine strength and durability with sound insulation or sound absorption and, where required, heat insulation too. They still use separate acoustic tile, but use it more intelligently on only part of wall and ceiling surfaces. (For the standard rectangular classroom, they recommend acoustic tile only above the chalkboard upon two adjacent walls and around the perimeter of the ceiling; the rest of the walls and ceiling are left as hard, reflective surfaces to aid sound distribution.) Noteworthy instances of the new approach:

▸ Architect James A. Mitchell cut his acoustic materials cost 50% and achieved good acoustics in his Lincoln school at San Mateo, Calif. by balancing sound-absorptive with sound-reflective surfaces. Patches of acoustic tile cover only half of the sloping ceilings and upper walls (see picture); most of the tile on the walls is below the chalkboard level to bring the control down to voice level.

▸ At the Fairview school, Elk City, Okla., Architects Caudill, Rowlett, Scott & Associates go even further. Their east- and west-oriented classrooms contain no sound absorptive materials at all. Sound distribution is improved by exposed steel framing and wide, vertical window baffles inside the window wall (illustrated). Made of cement asbestos, these panels also keep direct sunlight out of the classrooms.

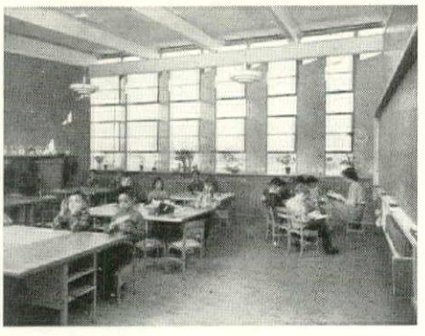
▸ Many schools are being built with acoustic roof decks made of wood fiber and cement, having a noise-reduction coefficient of 80% and a heat-insulation value of 0.23 for a 2″ deck. At his West Columbia elementary school in Texas, Architect Donald Barthelme uses such a deck laid upon exposed steel joists. Cost of the deck is 60¢ per sq. ft., excluding a lightweight concrete topping. At the Grandview school

continued on p. 224



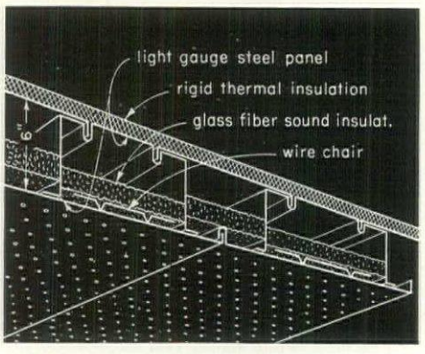
Photos: (above) Condax Studios; (below) Ulric Meisel; (bottom) Phil Palmer

Exposed acoustic roof deck *was prime factor in saving 12% construction costs at St. Andrew's parochial school, Pa., by Architects Haag & d'Entremont, as compared with conventional construction. Three-inch boards span 4′ between purlins; noise reduction is 70%.*

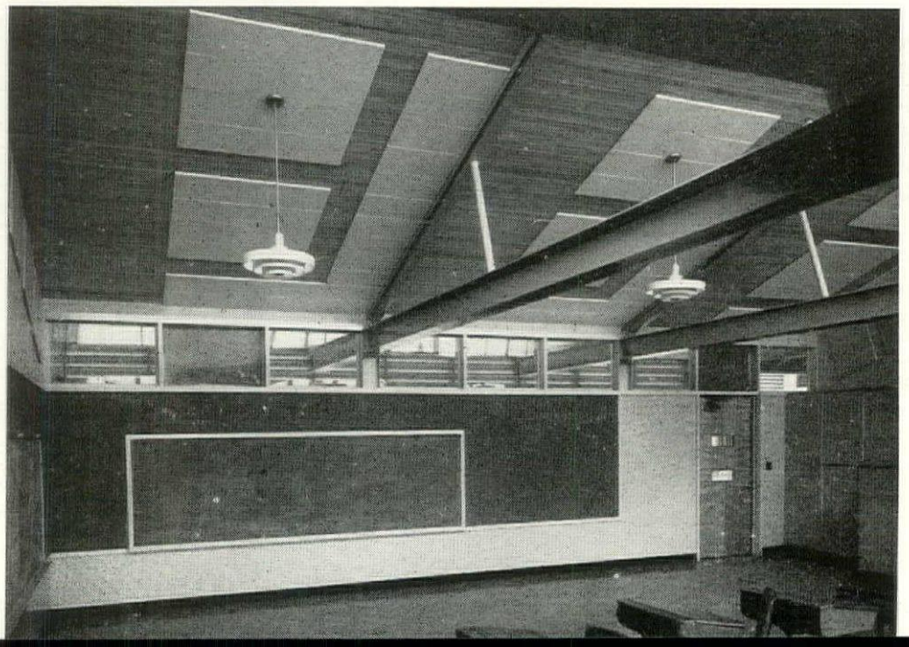


Large reflecting surfaces *of interior window baffles eliminate need for acoustic treatment at Fairview school, Elk City, Okla. Teachers report that acoustics throughout are excellent.*

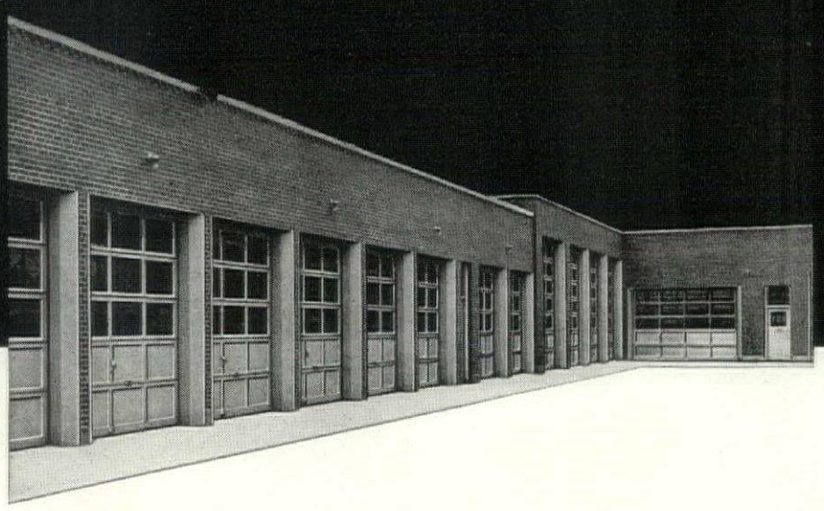
Light-gauge steel box framing *is acoustically treated to give a 6″ structural deck with 80% noise absorption at the Union free high school, Kenosha, Wis., by Architect Lawrence Monberg.*



Absorptive and reflective surfaces *are balanced in this acoustically "live" classroom at Lincoln school, San Mateo, Calif. Advantages: better sound distribution with a 50% saving in acoustic tile.*



THE Magic IN A NAME



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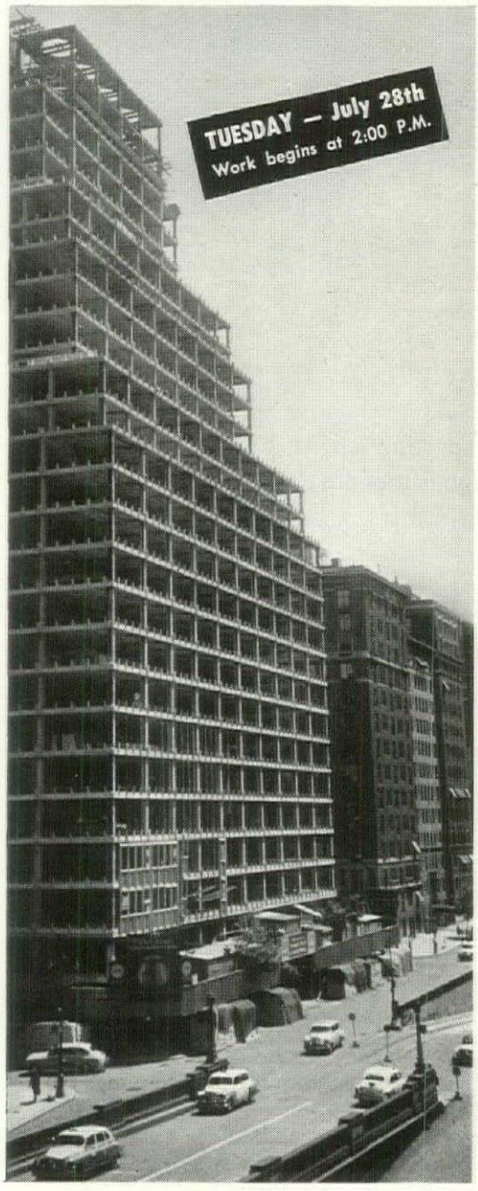

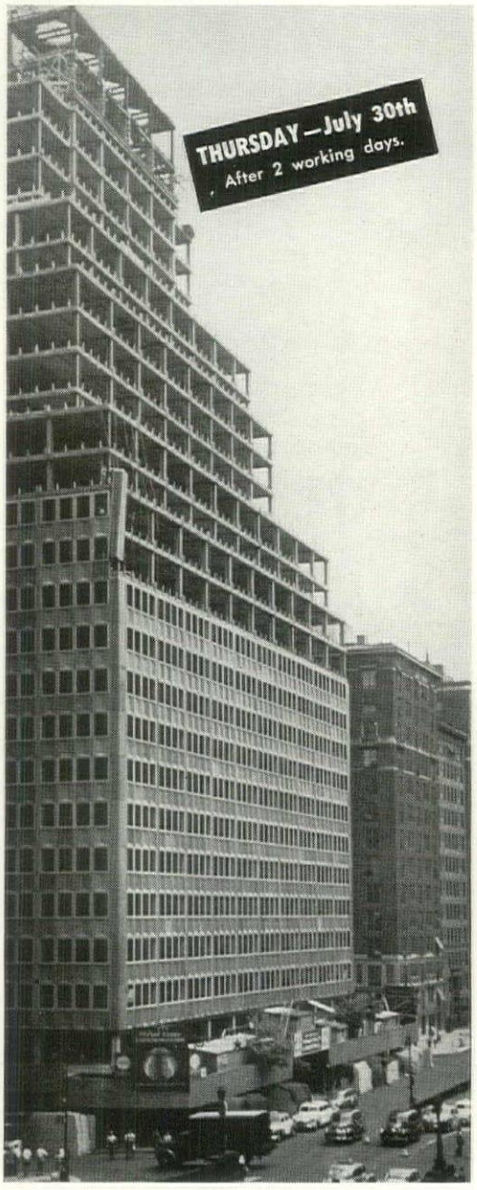

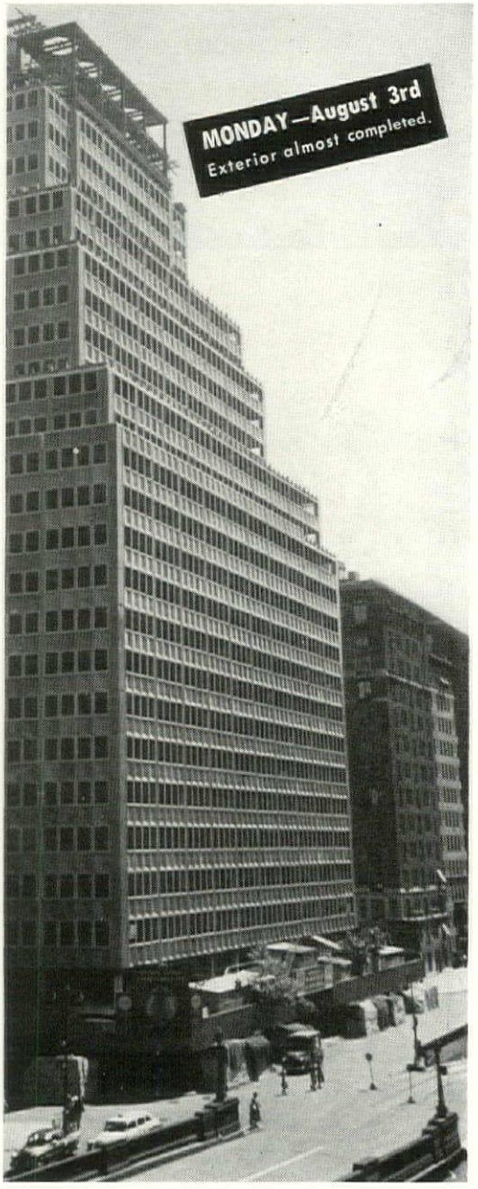

99 Park Avenue Building, New York, N. Y.
Architect: Emery Roth & Sons
General Contractor & Owner:
Tishman Realty & Construction Co., Inc.

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The drastic saving in construction time, dramatized by this building, is, of course, only one of the dividends offered by metal curtain wall construction. In addition to obtaining much earlier rent returns, owners benefit from the increased floor area made available for rental by the thinner exterior wall. The durable aluminum skin also cuts maintenance costs to a minimum, is more weather-tight and less subject to deterioration than other types of construction. Six-foot high, vertically pivoted, reversible aluminum windows, with stainless steel weatherstripping, are incorporated in the building panels to greatly reduce the expense and danger of window cleaning – they can be cleaned easily from inside the building.

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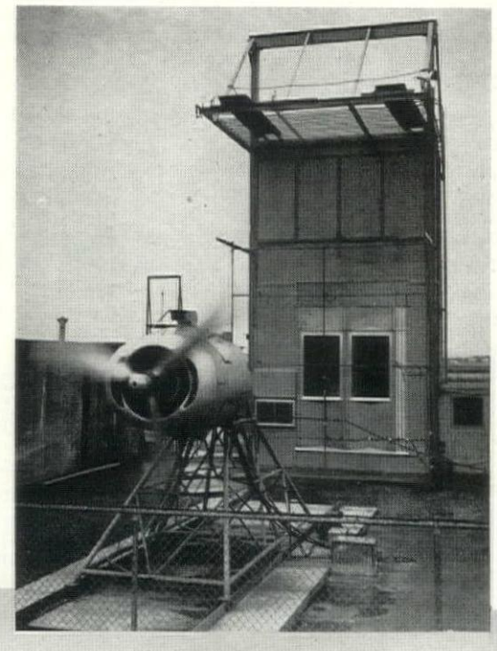
Extensive testing by General Bronze proves weathertightness of prefabricated panels and windows before production begins.



GENERAL BRONZE CORPORATION

GARDEN CITY, N. Y.

SCHOOLHOUSE FORUM

continued from p. 126

9. Professional know-how to solve each school's differing problems

The distinction to be made is this: there exist no two schools and no two school sites in the US whose needs are genuinely identical *in toto*. There exist countless schools, however, that can use identical parts: all the way from identical windows, doors, chalkboard panels, lights, heating elements to identical or nearly identical plans for at least the structure of individual rooms such as classrooms and gymnasiums.

As a model of efficiency we recommend to school boards a study of the joint building program now under way for a group of hospitals for the Welfare Fund of the United Mine Workers (AF, Aug. '52, p. 132). Every building will be different, and three firms of architects are working each in its individual style to produce variety and to give the program the benefit of individual imagination. Yet all have agreed on standard details, so the purchase of doors, windows and countless other parts will be made in huge quantities through a central purchasing bureau. It is such quantity purchase that brings down the cost by creating efficiencies of manufacture and marketing for the producers which are passed on to the large-scale consumer. Where a contractor is bidding simultaneously on identical details in several schools these savings apply, and under competitive bidding he is likely to pass on a good share of them.

We already possess, in the joint work of the AIA committee on schools and the National Research Council through its Building Research Advisory Board (BRAB), the instrument needed for the study and promotion of dimensional standardization, for study and promotion of manufactured parts designed to fit into economical design correlation at highest performance. The

continued on p. 196

Haskell, Linn and Engelhardt

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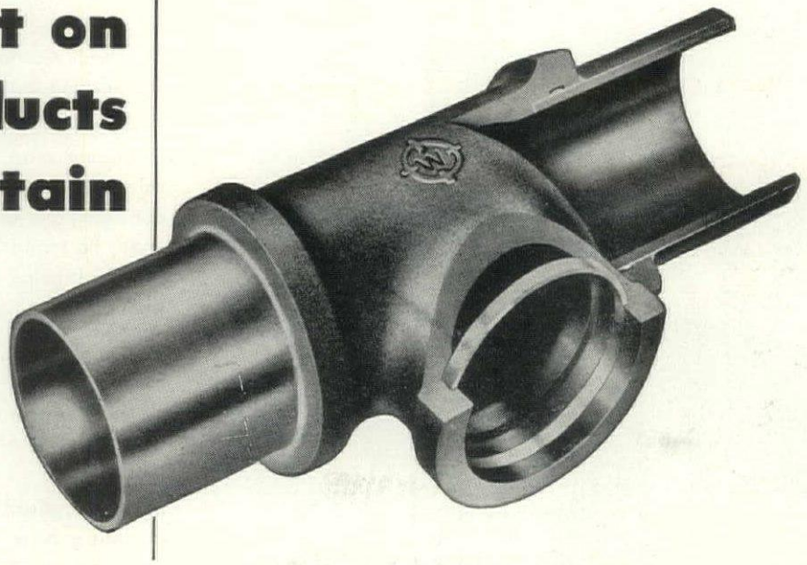

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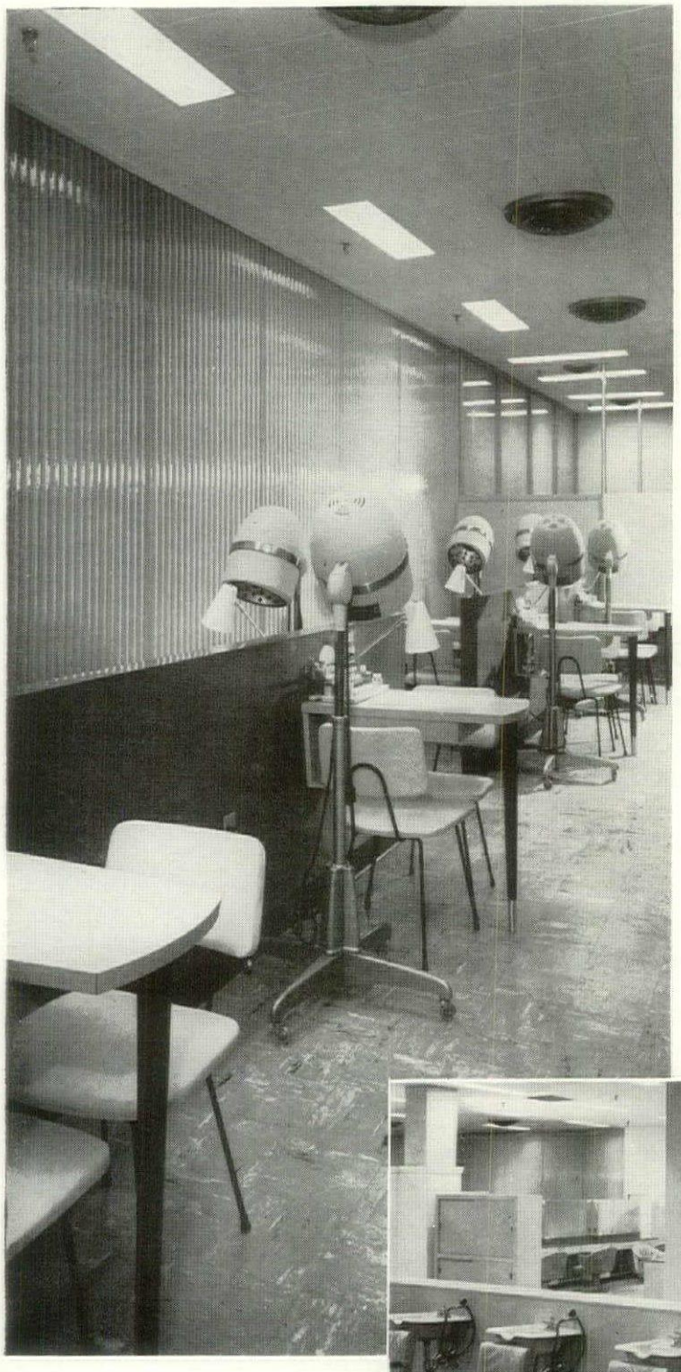

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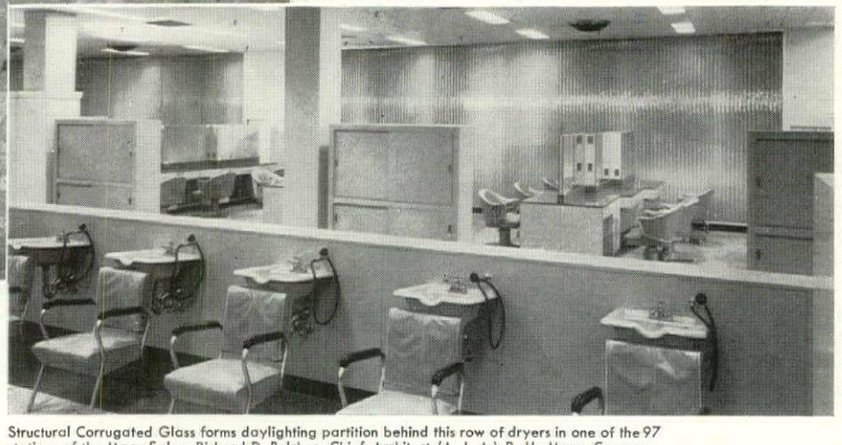

Structural Corrugated Glass forms daylighting partition behind this row of dryers in one of the 97 stations of the Macy Salon. Richard D. Belcher, Chief Architect (A. I. A.) R. H. Macy Company.

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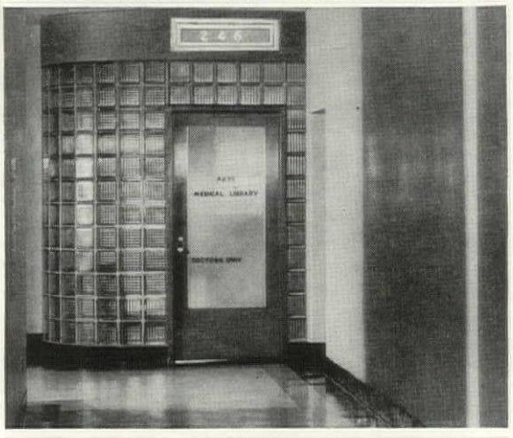

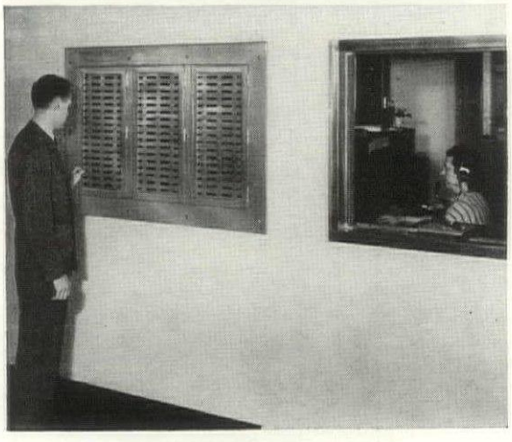

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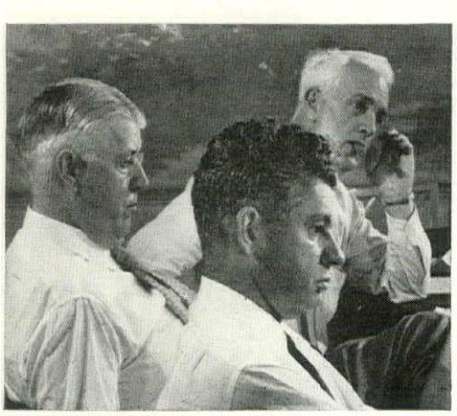
gist of what they are seeking and achieving needs only be translated into nontechnical language so school boards made up of intelligent laymen can understand it.

▸ Our second count against the stock plan is that it saddles the community permanently with loss of self-respect. Those pupils, for example, who are assigned to schools in mean, cheap, "temporary" buildings feel that they are being secondhanded by mean, cheap parents; and they are taught by teachers who are made to feel mean and cheap like chattel servants. Nor does it help any if the outer wall is tinny and shiny.

▸ Our third count against the stock plan is that the low standard it accepts is a positive bar to progress. The lowering of cost that has hitherto been attained in schools has been attended by the highest plan ingenuity and the heightening, not the lowering, of standards. For example, where imaginative architects have omitted the partition between classroom and corridor they have done it in such a way that the classroom, far from being harmed, has been made more useful; where they have faced limited city lots they may have put the school on stilts, gaining sheltered play space with no loss of classroom space. America is far from the status where it must produce second-rate buildings for bargain children.

It is a great regret that we are unable to come up with some one brilliant scheme—some unprecedented school plan, some miracle material, some Ponzi stroke of finance, that would solve the school economy problem in one swoop and send everyone happy to the ball game. Yet we tender to school boards this report in itself as evidence that professional men, and professional men only, can view the problem as it is, ramifying and interrelated. The worst misconception of all, parallel with the stock

continued on p. 200



Cocking, Engelhardt and Clapp

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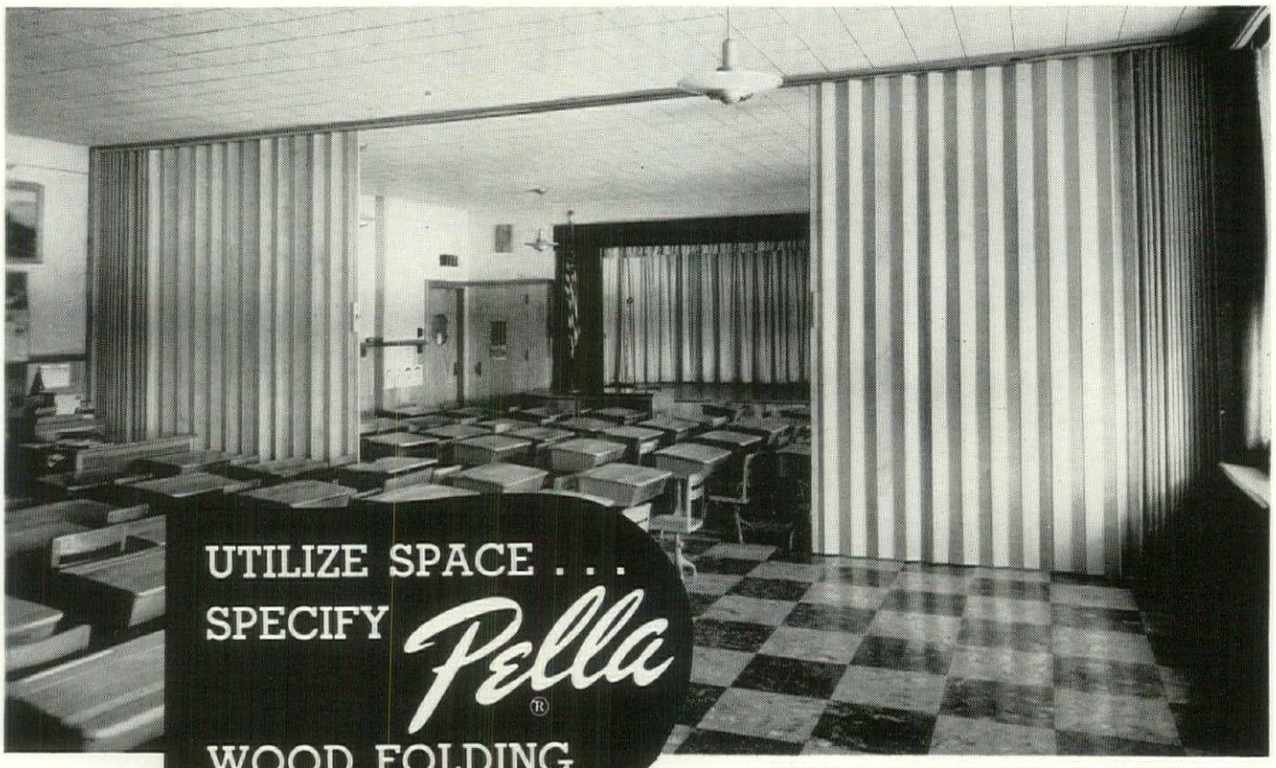

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"We are happy to advise you that Pella Wood Folding Doors installed in the auditorium of Wickliffe Elementary School have proved eminently satisfactory in every respect. The installation harmonizes beautifully with woodwork, furnishings and trim.

"The Pella Doors are mechanically perfect in operation and have given us two greatly needed classrooms, side by side, inside the auditorium. Best of all, the mechanical operation is so simple that a sixth grade child can throw open the doors, permitting use of the entire space for auditorium purposes."

Marcus V. McEvoy, Superintendent
Austintown Public Schools
Youngstown, Ohio

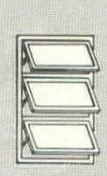
Give your clients full use of their rooms by specifying Pella WOOD Folding Doors. In schools, churches, hospitals and other institutions, there's no substitute for the *natural beauty* of space-saving Pella WOOD Folding Doors. Individual panels, 3/8" thick and 3 5/8" wide, joined by continuous spring hinging, stack to 6" for average interior door opening. Track with concealing wood mould, all attaching hardware *and latch* are supplied as standard items. Prefitted to opening to install quickly and easily. Fashioned from pine, oak, mahogany or birch. Specify painted, clear varnished or unfinished. Stock sizes or custom-built.

For complete details write Dept. E-47, Rolscreen Company, Pella, Iowa

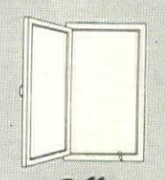
see our catalog in SWEET'S ARCHITECTURAL FILE or write for copy

PRODUCERS' COUNCIL

PLAN WITH *Pella* PRODUCTS MADE BY ROLSCREEN COMPANY, PELLA, IOWA



Pella MULTI-PURPOSE WINDOWS



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Panawall ends owners' decorating problems!

Panawall ends costly repainting and repapering. It actually saves money through the years. The easy-to-handle 4′ x 8′ x ¼″ panels can be installed directly on the studs in new construction, or over existing walls in remodeling.

Get the facts on Panawall now!

Ask your nearest Roddiscraft warehouse for complete information on Panawall and other Roddiscraft decorative paneling: Craftwall, Parquetwall, Cedrela and Plyweave. He'll be glad to show you samples.

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Houston 10, Texas .....2403 Sabine St.
Kansas City 3, Kan. .....35 Southwest Blvd.
Los Angeles 58, Cal. .....2620 E. Vernon Ave.
Louisville 10, Ky. .....1201-5 S. 15th St.
Marshfield, Wis. .....115 S. Palmetto St.
Miami 38, Fla. .....255-315 N.E. 73rd St.
Milwaukee 8, Wis. .....4601 W. State St.
New Hyde Park, L. I., N. Y. .....1756 Plaza Ave.
New York 55, N. Y. .....920 E. 149th St.
Port Newark 5, N. J. .....103 Marsh St.
Philadelphia 34, Pa. ..Richmond & Tioga St.
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San Leandro, Cal. .....720 Williams St.

plan misconception, is the notion that more economical schools can be built adequately by dismissing professional skill and turning the problem over to local carpenters. Schoolteaching and the buildings to house it are at least as important to the survival of the US as an atom research program—and nobody is proposing economy in this latter field by dismissing all trained scientists.

The experience of New York City is indicative, where the employment of trained private architects effected instant savings averaging 10% compared to the previous work of bureaucratic employees—and with better schools, too.

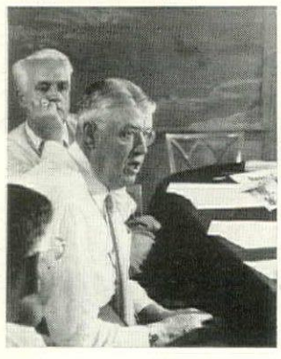
Again, there is no way under the sun of getting rid of the function performed today by the educational consultant; somebody will have to try to do it if he does not; and although an individual board may think it can get by in a parasitic manner by profiting from the past thought of such consultants elsewhere, the pay-off can easily be as much as 25% of hidden extra costs through having nobody present to resolve the conflicting ideas of board and staff members as to the educational program.

At the same time we must admit to our sorrow that not all architects are equally good, nor are all consultants: there are a few members of both professions whose ideas are strictly stock, pulled out of a drawer just as readily as cheap makeshift in any other field of endeavor. And some of these men have profited from gullibility to the extent of their own very considerable enrichment from undertaking literally hundreds of schools. Yet these are but the racketeers whom wisdom avoids in any sort of operation; the vast majority among these professional men are devoted to their task.

The compass of this report does not allow advice on how to choose professional help; we can only refer the amateur schoolboard member to such advice on how to pro-

continued on p. 204

Clapp and Cocking

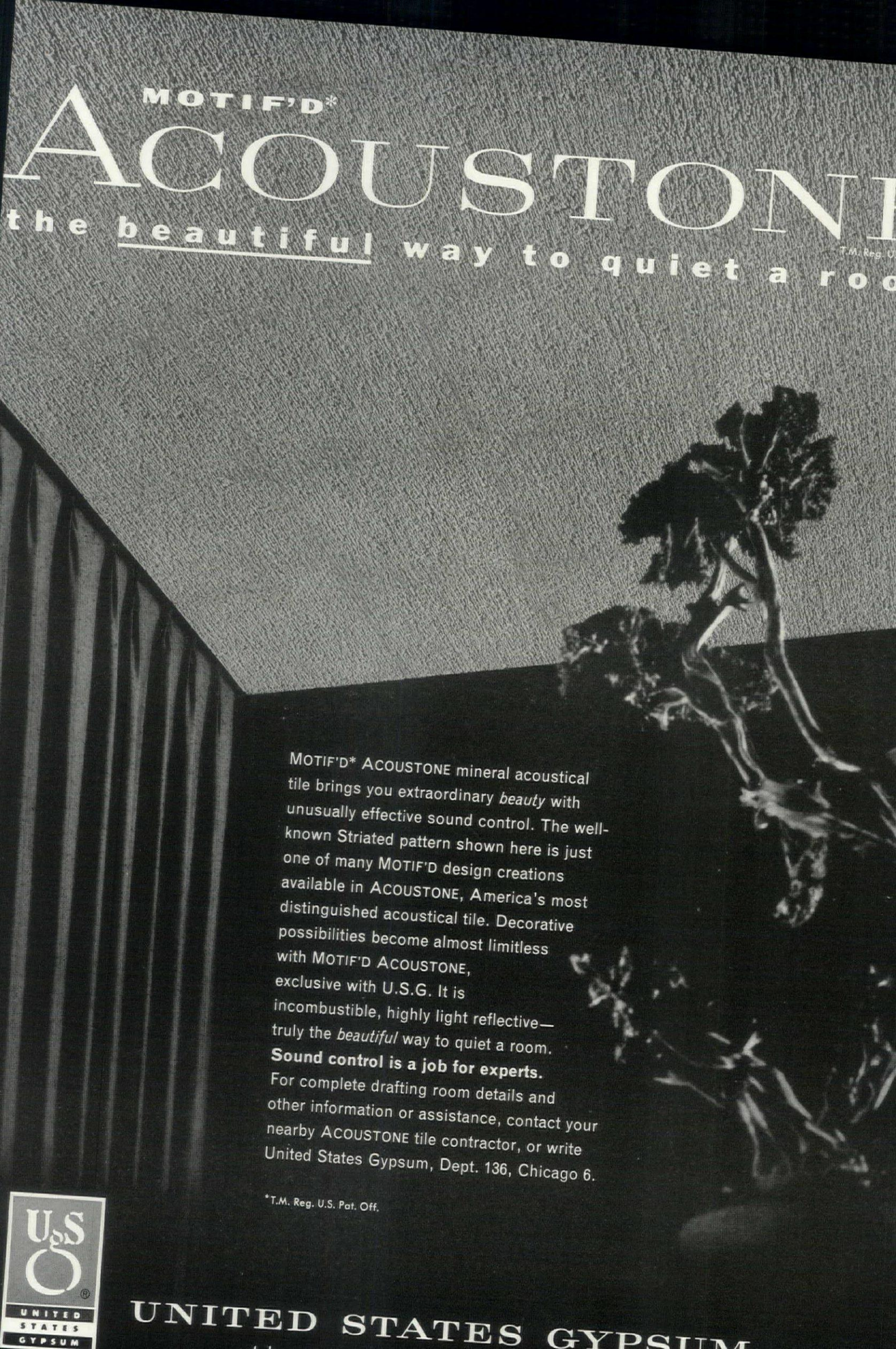


MOTIF'D*

ACOUSTONE

T.M. Reg. U

the beautiful way to quiet a roo



MOTIF'D* ACOUSTONE mineral acoustical tile brings you extraordinary *beauty* with unusually effective sound control. The well-known Striated pattern shown here is just one of many MOTIF'D design creations available in ACOUSTONE, America's most distinguished acoustical tile. Decorative possibilities become almost limitless with MOTIF'D ACOUSTONE, exclusive with U.S.G. It is incombustible, highly light reflective—truly the *beautiful* way to quiet a room.

Sound control is a job for experts. For complete drafting room details and other information or assistance, contact your nearby ACOUSTONE tile contractor, or write United States Gypsum, Dept. 136, Chicago 6.

*T.M. Reg. U.S. Pat. Off.

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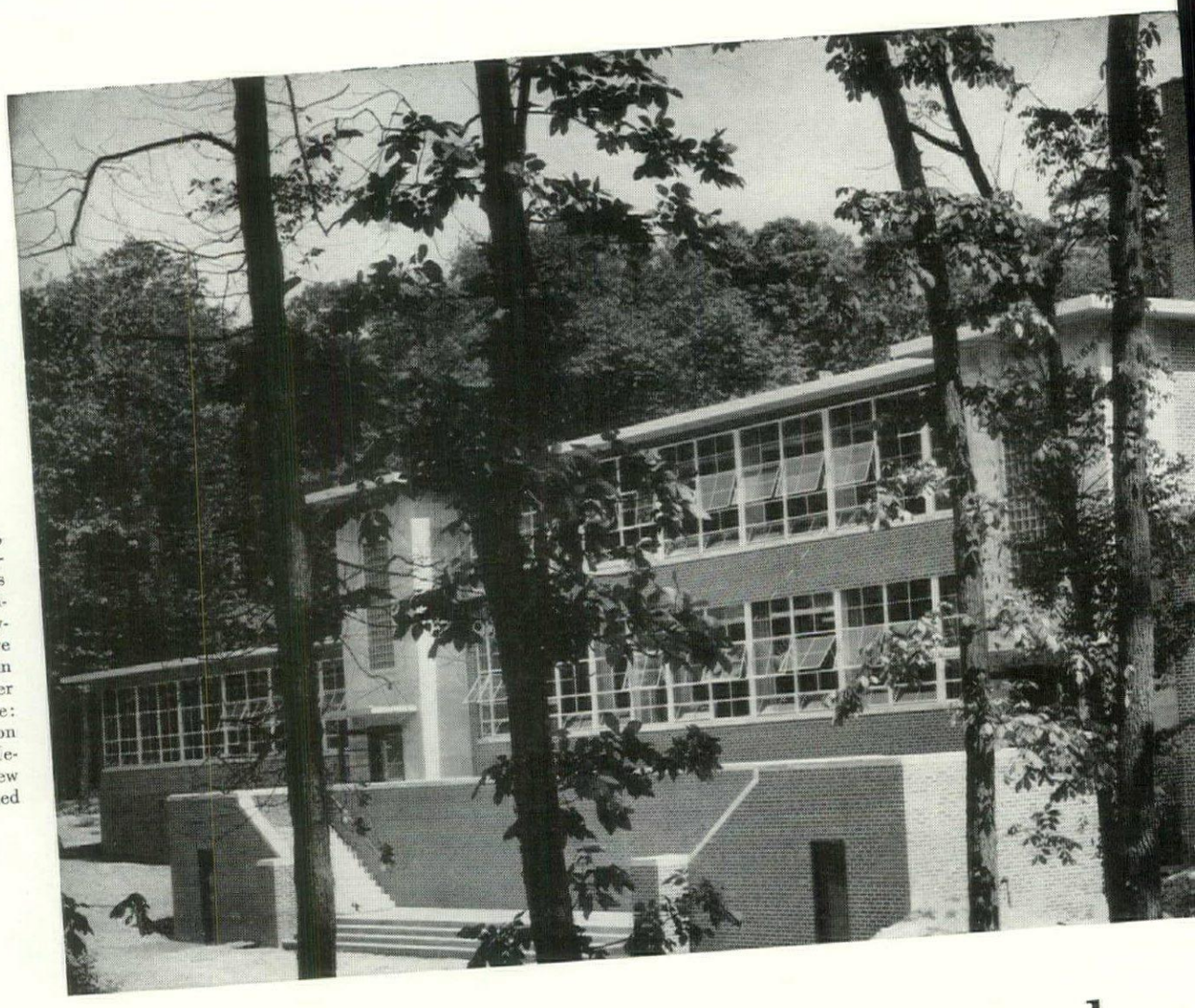


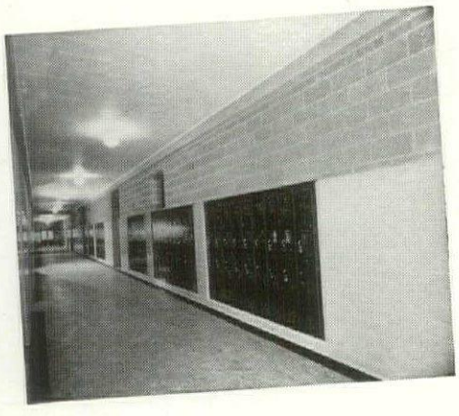
Warren, Knight and Davis, architects and engineers, realized that large exposed glass areas, typical of school buildings, created a need for Honeywell Customized Temperature Control in the Charles B. Glenn Vocational High School. Other participating firms were: General Contractor, Richardson Construction Company; Mechanical Contractor, H. L. Eskew and Sons. All firms are located in Birmingham.

New high school demonstrates need for Honeywell Customized Temperature Control even in mild climate of the South

Birmingham's Charles B. Glenn
Vocational High School features individual room temperature control

In developing the new school you see here, an enterprising architectural-engineering firm and an understanding school board are leading the way to greater comfort and more efficient learning for thousands of southern teen-agers.

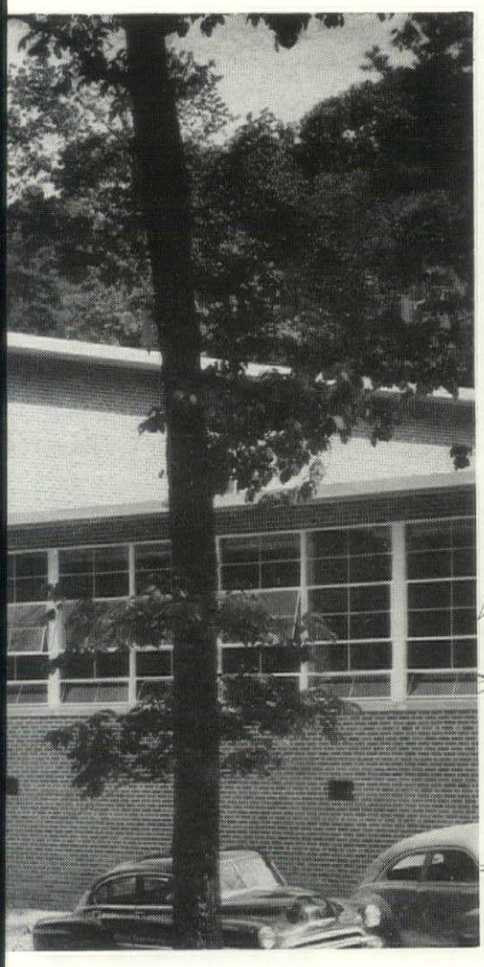
And a Honeywell Customized Temperature Control installation is helping them provide these benefits for Birmingham students.

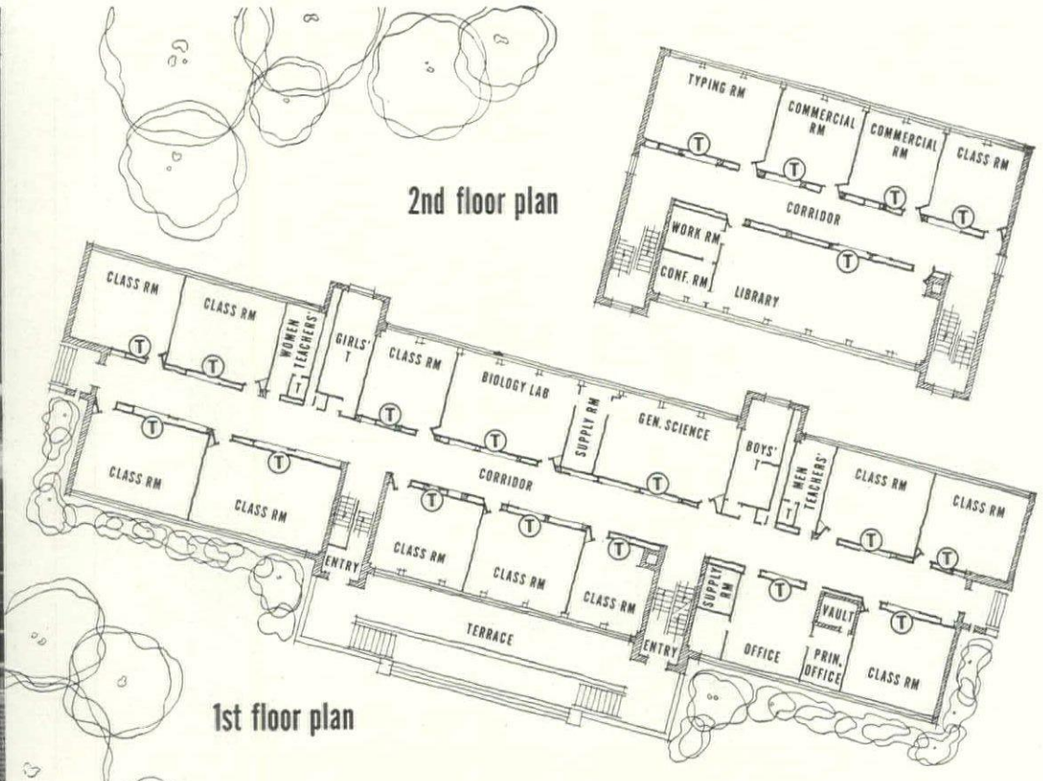


In the case of the Glenn School, the Honeywell installation is in the form of individual room temperature control—a thermostat in each classroom. The floor plan at right gives the location of the thermostats.

Today, in this school, teachers may keep temperatures right for most efficient learning—simply by adjusting a dial.

If the wind blows cold against the windows of their individual classroom they can easily adjust for the extra heat loss. And if during certain periods of the day the room is crowded, or the sun is hot, they can as easily *lower* the temperature.





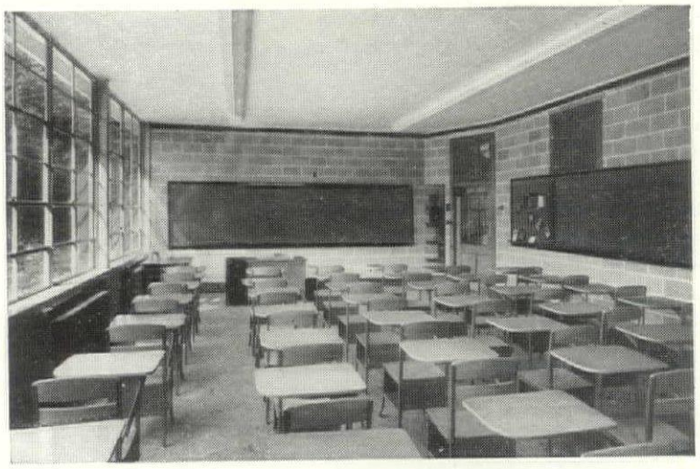
For Comfortable, Even Temperature in New or Existing Buildings—of any size—Specify Honeywell Customized Temperature Control

Whether it's a school, office, factory, hospital, apartment, store, garage—or any size building—new or existing, Honeywell Customized Temperature Control can help meet your clients' heating, ventilating, air conditioning and industrial control problems.

Once equipped with Honeywell Customized Temperature Control, they'll have an ideal indoor "climate"—and save fuel besides.

And with a complete line of pneumatic, electric and electronic controls to choose from, Honeywell Customized Temperature Control offers you the greatest flexibility in design. Then, too, when it comes to performance, Honeywell-built controls assure years of trouble-free operation. And they're backed by the finest service organization in the controls industry.

For full facts on Honeywell Customized Temperature Control, call your local Honeywell office. There are 104 across the nation. Or mail the coupon today.



In winter months, even in the South, classroom windows are a major source of heat loss. Chill winds reduce their temperature greatly—and this "draws" heat in large quantities. But with an adjustable Honeywell thermostat in each classroom such heat loss is easily compensated for. Above you see a typical modern classroom in the Charles B. Glenn school.

H. L. Eskew, heating contractor of Birmingham, says: "More and more in the South we're coming to realize the importance of proper temperature control and adequate heating methods. I think the Charles B. Glenn High School job is good evidence of that."

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Dept. MB-10-05, Minneapolis 8, Minnesota
Gentlemen:
I'm interested in learning more about Honeywell Customized Temperature Control.

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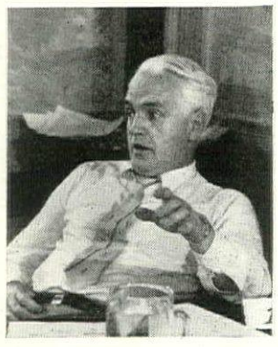
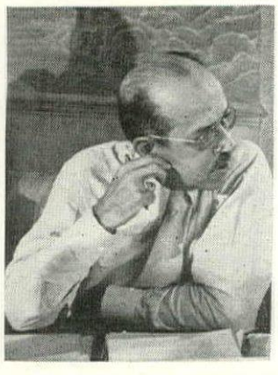
SCHOOLHOUSE FORUM *continued*

ceed with his problem as the excellent little volume *"So you want to build a school"* by John Lyon Reid, one of our members. One remark is in place here: many boards have thought they might save by employing young architects or those not yet familiar with the school field. Many such a young man or nonspecialist has come up with fine ideas by virtue of his freshness of thinking. For the board that does not want meanwhile to risk paying for his mistakes there is an expedient not known to all: the possibility that architects can work in *association*—a young man or beginner doing the work but associating with an experienced man or firm which will check his errors like a sort of elder brother. The cost to the board is no greater and the result may be splendid.



Clapp



Taylor

10. Imaginative financing to gain the easiest, biggest saving of all

The tiny figure of 1% sounds so small that an inexperienced board may miss its enormous importance in school bond financing. Yet a community that pays 3% instead of 2% on its bonds—a 1% difference—must realize that this is equal to paying about 20% more for land and construction! This is an error which impatience has brought

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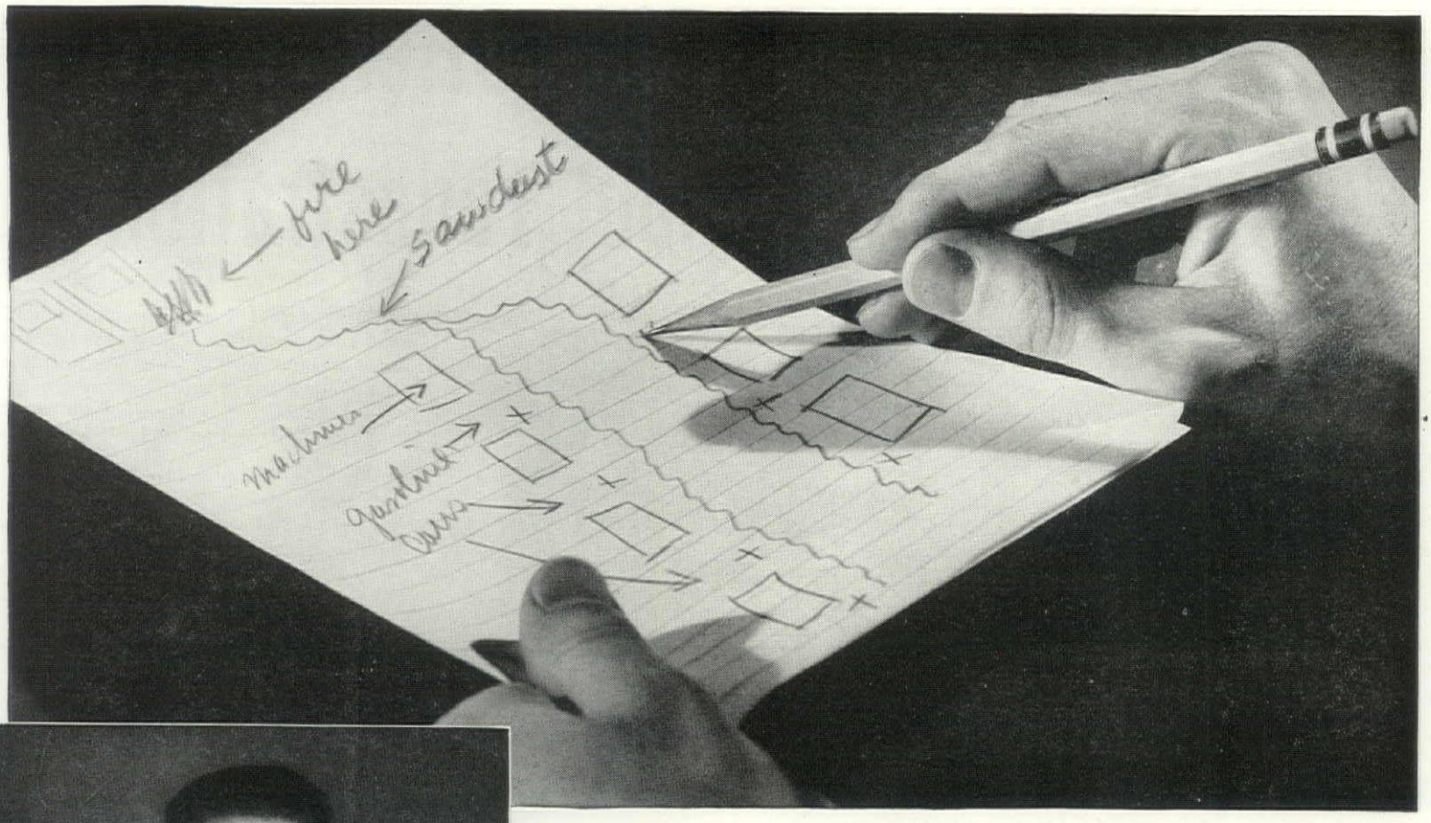
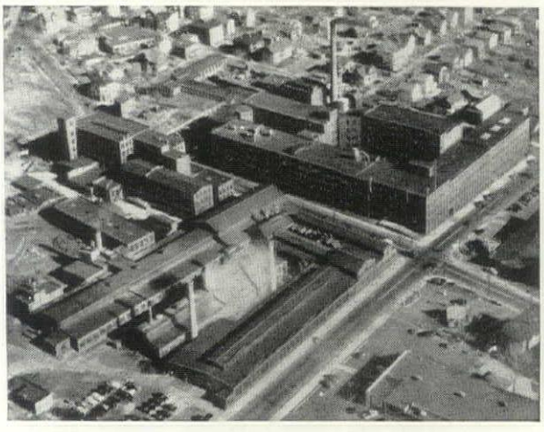


FREDERICK L. MORROW, President
North & Judd Mfg. Co., New Britain, Conn.



Air view of North & Judd manufacturing plant.

It was the "*perfect fire*" except for one thing

"This fire didn't *happen* . . . it was planned! Planned so shrewdly and thoroughly that the North & Judd plant might have burned to the ground that night", said Mr. Frederick L. Morrow, President, North & Judd Mfg. Co., world's largest manufacturer of buckles and fastening devices, in New Britain, Connecticut.

"It was back in the 1930's. At that time, we had leased floor space in several of our buildings adjoining the main plant.

"One evening as our night watchman was making his rounds, he opened a door on one of these floors. Suddenly, flames raced across the room toward the machines. They never made it. In seconds, heat from the blaze set off a sprinkler head which checked the flames, preventing a disastrous fire.

"Gasoline cans, we discovered, had been planted near each machine. A path of sawdust, gasoline-saturated, wound from the cans to the doorway. The door frame had been thoroughly soaked with gasoline. And two exposed wires were cleverly twisted around one of the hinges on the door so as to cause a spark the moment the door opened.

"Here was the '*perfect crime*'. A building destroyed so completely by fire that no one would ever know how it happened. The scheme mis-fired *only* because one important detail had been overlooked — our automatic sprinkler system."

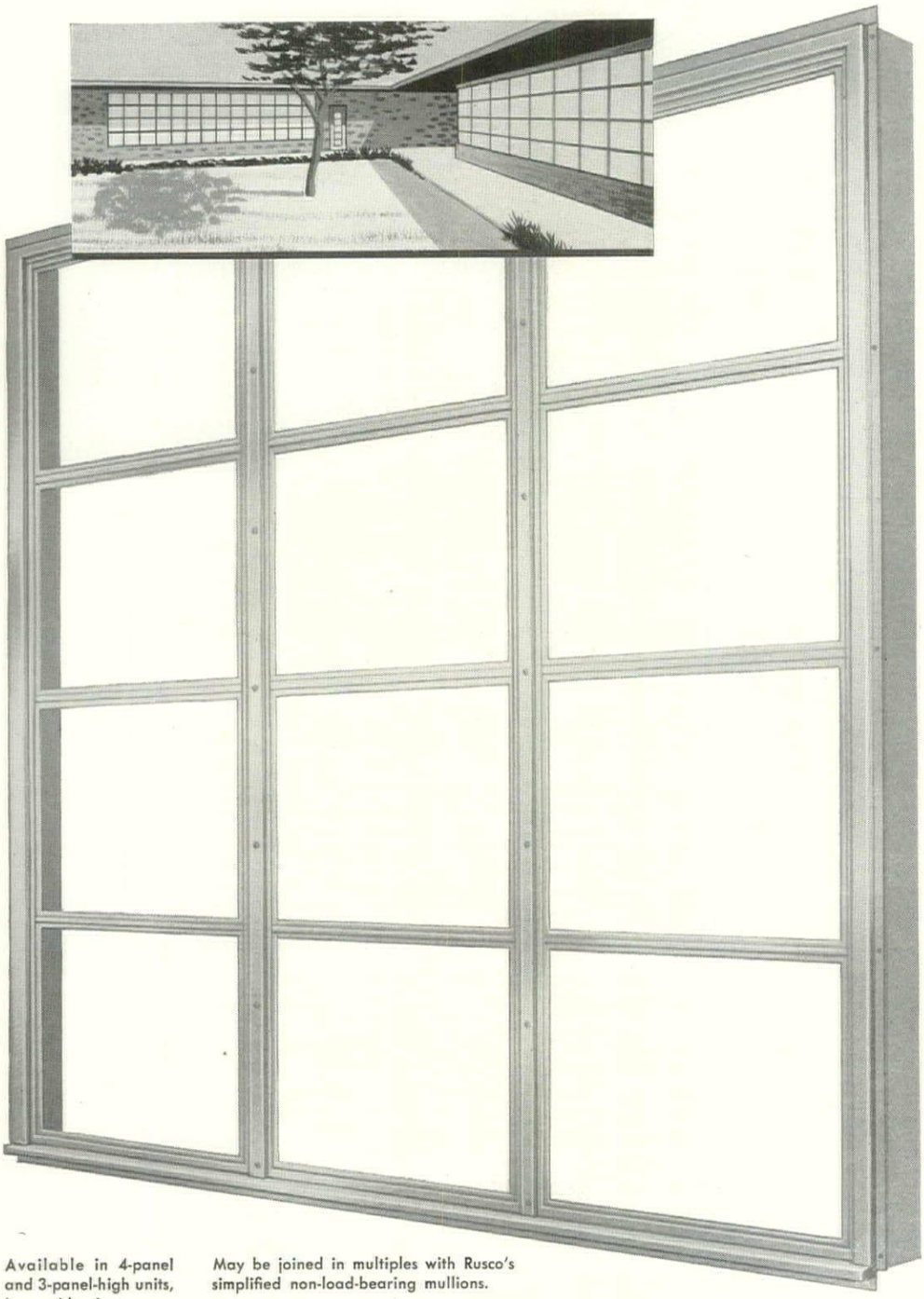
Most fires, of course, start accidentally. But no matter *how* they start, Grinnell Sprinklers stop fire at its source, wherever and whenever it strikes, night or day, *automatically*. 75 years experience proves this.

The time to act on Grinnell Protection is *now* . . . before fire burns you out, or cripples your business. Remember — a Grinnell Sprinkler System often pays for itself in a few years through reductions in insurance premiums. So if you have fire insurance, you're probably paying for Grinnell Protection anyway . . . *why not have it!* Write for booklet on Grinnell Automatic Spray Sprinklers — new in method, spectacular in performance. Grinnell Company, Inc., 250 West Exchange Street, Providence, Rhode Island.

GRINNELL
FIRE PROTECTION SYSTEMS

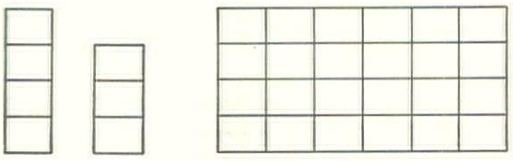
Grinnell Company • Manufacturing, Engineering and Installation of Automatic Sprinklers since 1878

RUSCO FULVUE WINDOWS Offer Important Advantages for School Fenestration



Available in 4-panel and 3-panel-high units, in a wide size range.

May be joined in multiples with Rusco's simplified non-load-bearing mullions.



"ALWAYS ONE STEP AHEAD OF THE WEATHER WITH RUSCO"

● **MAXIMUM LIGHT** Rusco's streamlined tubular steel construction gives great strength without excessive bulk or weight in frames. 3-panel-high and 4-panel-high design, plus narrow mullion for joining windows in multiples, permits exceptionally large glass areas.

● **LOW COST** In addition to their low initial cost, Rusco Prime Windows provide other very substantial savings. Because they come in fully assembled units, glazed and finish-painted, installation time and costs are cut way down. Full weatherstripping, insulating sash (optional) and precision manufacture reduce air infiltration to a minimum and make important savings in heating.

● **MINIMUM MAINTENANCE** Rusco windows reduce maintenance costs in *three* ways: 1. Made of hot-dipped galvanized steel, bonderized and finished with baked-on outdoor enamel, they are highly weather-resistant. 2. They have no sash cords, weights, balances or chains to get out of order. 3. Glass inserts are removable and interchangeable. Consequently "spares" can be carried for immediate substitution when breakage occurs. Glass replacement is simple, due to Rusco's plastic splines.

● **SAFETY** Rusco Fulvue Windows are vertical-sliding, with positive spring bolt locking. They eliminate the dangers of projecting vents, accidental dropping, swinging, etc.

● **EASIER SHADING AND SCREENING** Vertical-slide construction simplifies window shading and darkening for use of visual education materials. Rusco's Fiberglas Safety Screen (optional equipment) cannot rust, rot or corrode and never needs painting—is ideal for cafeteria areas and other applications where screening is desired.

● **CONTROLLED VENTILATION** All Rusco Fulvue window styles have vertical-sliding ventilating panels. Available also with insulating sash which permits controlled rainproof, draft-free ventilation.

● **DESIGN FLEXIBILITY** Rusco offers a variety of sizes and styles in the Fulvue window. This fact, coupled with the simplified mullion feature for joining units in series, permits wide flexibility in fenestration design.

FOR ILLUSTRATED CATALOG AND COMPLETE SPECIFICATIONS, WRITE DEPT. 7-AF 103

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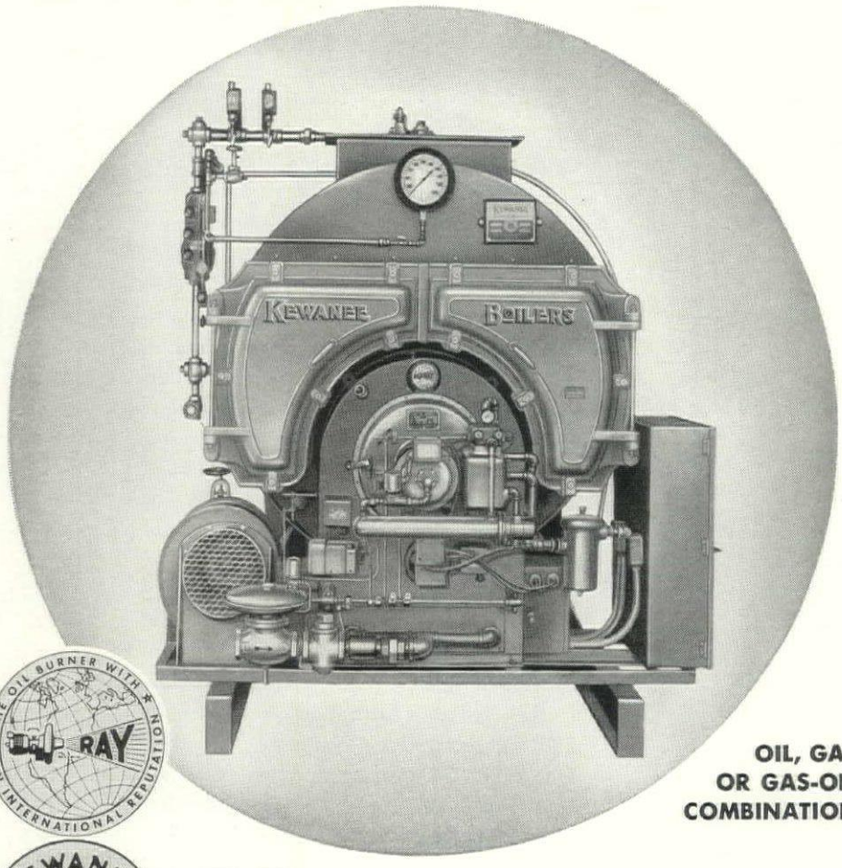
RUSCO

Hot-Dipped Galvanized Steel

PRIME WINDOWS

FULLY PRE-ASSEMBLED, GLAZED, FINISH-PAINTED, READY-TO-INSTALL



OIL, GAS
OR GAS-OIL
COMBINATION

A real advance in steam generation

KEWANEE-RAY
BOILER-BURNER UNIT

Produce steam more economically, more efficiently, with the new Kewanee-Ray Boiler-Burner Unit. Use heavy catalytic residual fuel oils or light oils in combination with high or low pressure gas in a single unit!

New multi-stage, forced draft, secondary air control on the burner provides a constant velocity air stream to the combustion zone. Resulting high turbulence, high turndown ratio and high CO_2 content give you high combustion efficiency.

Quickly Installed . . . Simple to Operate. Matching connections are provided so that when the boiler and burner are brought together they can be easily connected with a minimum of field effort. A flip of the switch and the unit goes to work on either oil or gas. To change fuels, flip the switch again. *That's all.* Fully automatic operation throughout.

The Kewanee-Ray Boiler-Burner Unit is *complete.* Boiler, burner, all automatic controls and accessories as specified. No special foundation is required. All refractories are integrally mounted at the factory. And a built-in forced-draft fan eliminates need for high stacks.

For High or Low Pressure Steam or Hot Water Heating. High pressure units, for 1350 to 15,800 lbs. of steam per hour developing 39 to 456 horsepower at 125 and 150 psi. Low pressure units for 15 lb. steam or 30 lb. water rated at 1,313,000 to 15,300,000 btu.

The complete boiler is shipped from Kewanee, the burner including windbox and control panel from Ray... so each shipment can be timed to arrive when you want it. The boiler should be on the job site before the new plant walls are up. (Exposure to weather does no harm). The shipment of the burner can be delayed until the new building is enclosed. Arrival of unit in two separate shipments is another important advantage when Kewanee-Ray is specified.

RAY OIL BURNER COMPANY 1301 San Jose Avenue, San Francisco, California

KEWANEE-ROSS CORPORATION 102 Franklin Street, Kewanee, Illinois

Please send me your 16-page KR-1031 Catalog giving complete description and specifications on your Boiler-Burner Unit.

NAME_____

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CITY_____ STATE_____

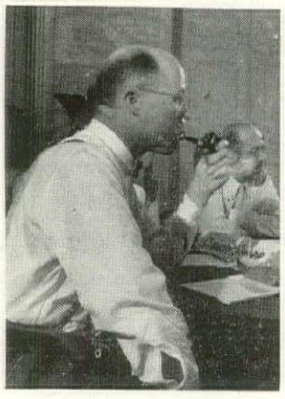
SCHOOLHOUSE FORUM *continued*

about all too often. No architect, no school consultant, no engineer, and not all three in combination, can easily make up such a loss of funds; and successful boards must watch the bond market with hawklike sharpness.

The wretched problem of working against a set bonded indebtedness limit has been met in states such as Georgia and Pennsylvania by the creation of "school authorities" as independent corporations, who rent the school to the board under a lease-purchase arrangement. We are divided as to the validity of such a procedure. All agree that it involves a clear and present danger when the authority which supplies the funds assumes control over the details of the program.

In the US there exist a large number of nationwide advisory bodies and helpful agencies, all the way from the US Office of Education to the private associations such as the National Education Assn. and its affiliated groups, the National Council of Schoolhouse Construction (composed of state school construction officers), the National Citizens Commission for the Public Schools, the US Chamber of Commerce and various research bodies. Yet all are auxiliary to the school board, not superior to it.

America may have lost quite a bit of efficiency by insisting that ultimate control over its schools must rest at home, in the parents and teachers and superintendents of those particular children, among the businessmen whose children go to school alongside the children of the workmen who build them. Yet no efficiency of remote control can make up for the loss it brings of intimate responsibility by those who will care for their children because these are their children and they love them.



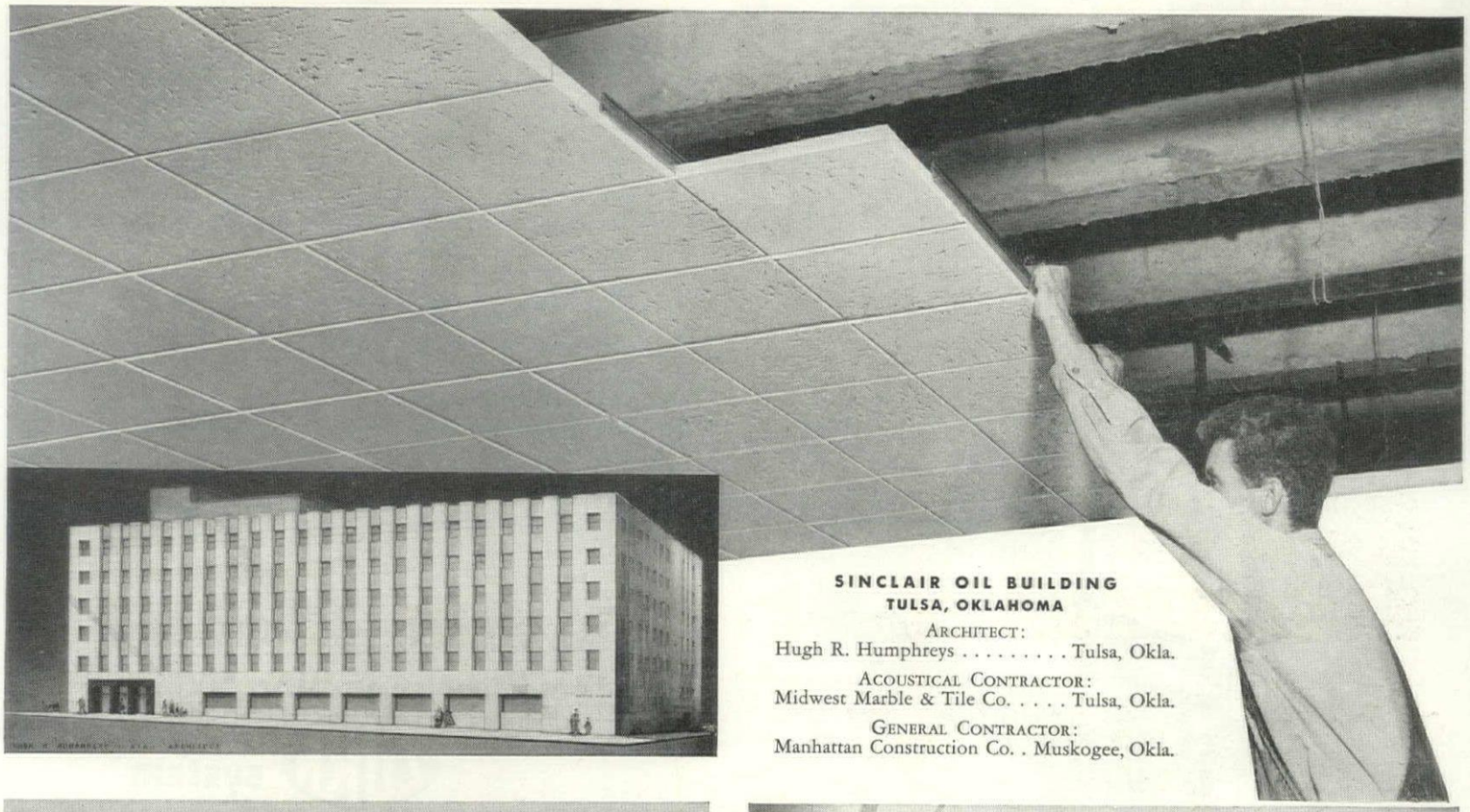
Reid

AMERICA'S FASTEST GROWING CEILING SUSPENSION METHOD

Gold Bond "J" System for Attachment of Acoustical Materials

● It's *simple*... it's *flexible*... it's *easy to install!* It's the ceiling suspension system that was an immediate hit with architects. Introduced only nine months ago, the Gold Bond "J" System is now one of the most widely specified methods of building suspended acoustical ceilings. In the 140,000 sq. ft. application shown here, the Gold Bond "J" System hides ductwork and utilities above a suspended ceiling of Gold Bond Travacoustic. The result—a strong, level, incombustible acoustical ceiling with the appearance of expensive travertine stone.

The Gold Bond "J" System is installed only by approved Gold Bond Acoustical Contractors. Write today for Technical Bulletin No. 577.

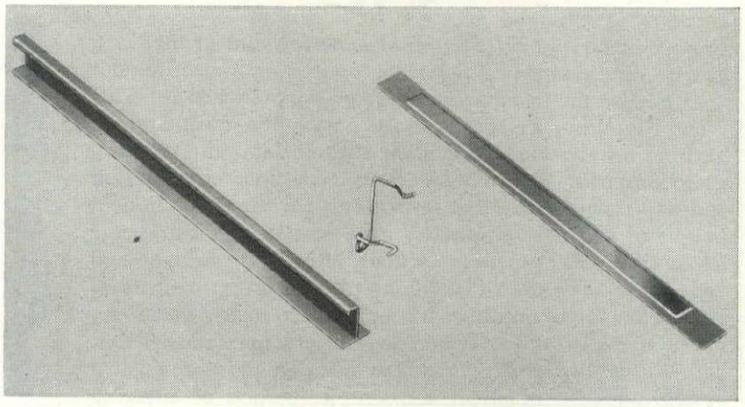


SINCLAIR OIL BUILDING
TULSA, OKLAHOMA

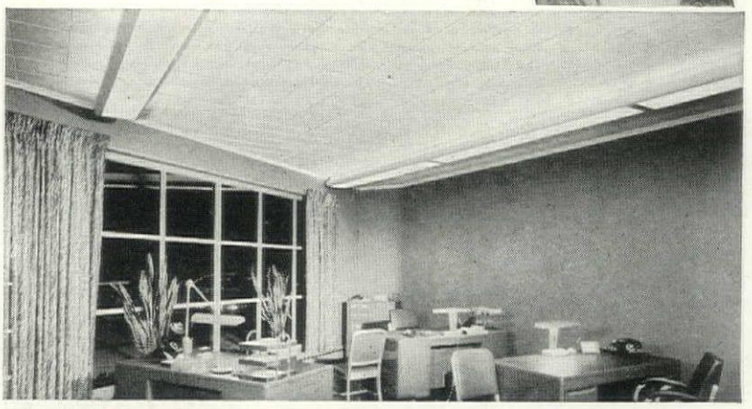
ARCHITECT:
Hugh R. Humphreys . . . . . Tulsa, Okla.

ACOUSTICAL CONTRACTOR:
Midwest Marble & Tile Co. . . . . Tulsa, Okla.

GENERAL CONTRACTOR:
Manhattan Construction Co. . Muskogee, Okla.



SIMPLE! The Gold Bond "J" System is made up of these three basic parts—channel, clip and spline. It can be used equally well over large or small ceiling areas. It is competitive in cost with conventional metal suspension systems. Compared with building a preliminary base ceiling of lath and plaster, the "J" System is an economical method of installing acoustical materials.



FLEXIBLE! Completed offices in the new Sinclair Oil Building will have handsome, sound-absorbing ceilings like the typical Travacoustic installation shown here. The Gold Bond "J" System, used with kerfed and rabbeted Travacoustic, is adaptable to designs that include recessed light troffers and complex stepped ceiling assemblies. It can also be used with gypsum board bases to which acoustical materials may be applied.

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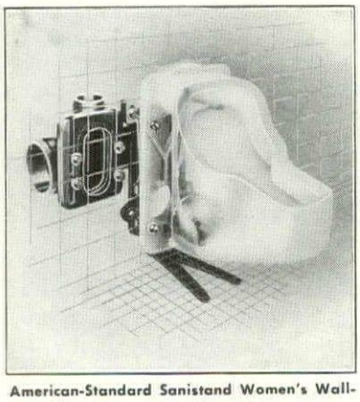
Lath, Plaster, Lime, Sheathing, Roofing, Sidings, Gypsum Roof Decks, Wall Paints, Textures, Rock Wool Insulation, Metal Lath, Sound Control Products, Fireproof Wallboards and Decorative Insulation Boards.

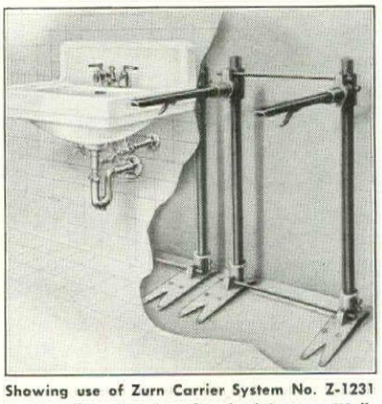
You'll build or remodel better with Gold Bond®

This combination opens the way to major savings in the over-all cost of a building!

A battery of American-Standard Wall-Type Toilets installed with the Zurn System provide all necessary facilities up to the drainage stack. The Zurn System of installing wall-type toilets simplifies rest room layouts, and opens the way to major savings in the over-all cost of a building.



American-Standard Sanistand Women's Wall-Type Urinal installed with the Zurn System especially designed for this fixture lifts sanitation in public rest rooms to an all time high and reduces maintenance cost.



Showing use of Zurn Carrier System No. Z-1231 for installing American-Standard Lucerne Wall-Type Lavatory Fixture reduces wall thickness; usable with all types of wall construction.

AMERICAN-Standard off-the-floor plumbing fixtures

INSTALLED WITH THE ZURN system*

Important *savings in quantity of materials* and in *time costs* can be obtained when decisions on rest room equipment are based on the installation of American-Standard Off-The-Floor Plumbing Fixtures installed with the Zurn System. Such an installation effects many substantial savings in construction costs; permits use of any type floor construction and any type of wall construction; permits reduction in height of ceilings; eliminates need of furring-in drainage lines; eliminates caulking to floor; simplifies drainage and vent piping layout. Off-the-floor plumbing fixtures insure against untimely obsolescence and reduce cost of rest room maintenance to an all-time low. American-Standard Off-The-Floor Plumbing Fixtures installed with the Zurn System afford a practical and simple method of effecting major savings in the over-all cost of a building.

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*T. M. Reg. U. S. Pat. Off.

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These booklets present up-to-date factual information for planning Modern Rest Rooms. The ideas presented are the result of experiences of engineers, architects, general contractors and plumbing contractors who have specified and installed American Standard Off-The-Floor Plumbing Fixtures installed with the Zurn System.

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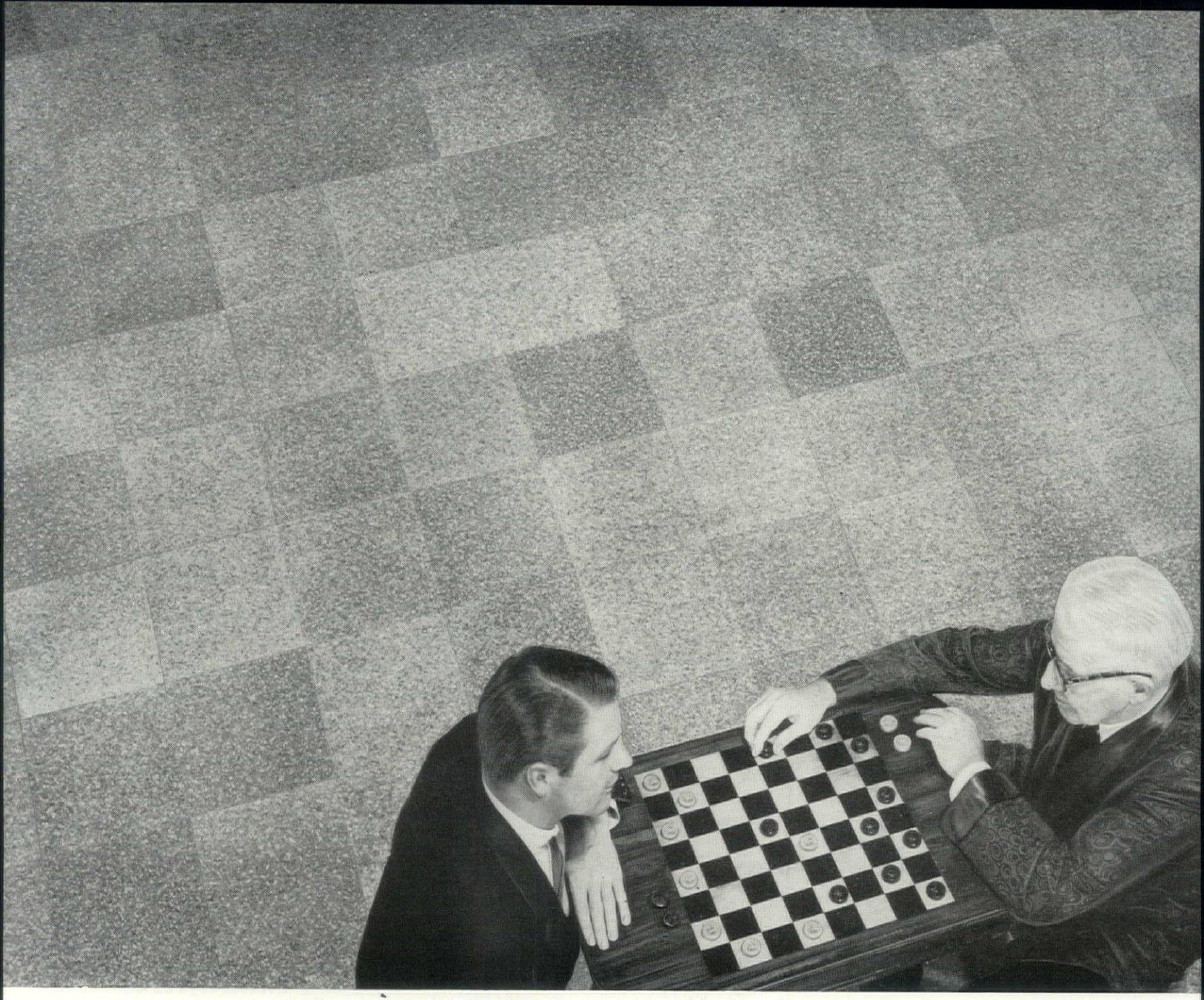

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ELECTRIC LIGHT *continued from p. 187*

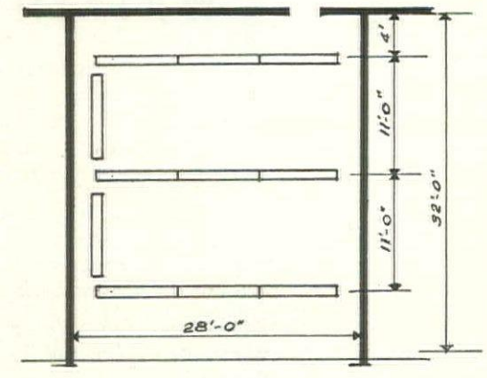
erating costs even though it requires less initial capital expenditure. The former has a $42.40 lower yearly maintenance cost, but it is necessary to spend $4,274 more initially to achieve this. This is a return of slightly less than 1% and therefore is not justifiable.

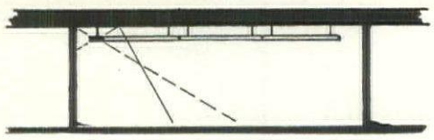
The operational costs of fluorescent compared to incandescent lighting quite readily prove the soundness of installing fluorescent fixtures. For example, in the electrically lighted school there is a difference in operating and maintenance costs of $245.50 per year in favor of fluorescent, although the original investment is $1,700 more—or a return of 14.4% on the additional expenditure. This is more than twice the usual 7% figured for interest and amortization of capital investment. At the same time fluorescent fixtures produce 5 foot-candles more at night and 4 more in the daytime.

Design for electricity. In the design of electrically lighted classrooms, lighting equipment is selected and distributed to create the best possible total brightness environment. The fixtures selected have about a 50% up-component and 50% down-component. There should be this amount of totally indirect light to control brightness environment and to produce a necessary amount of total diffused illumination. There is enough direct light to create the necessary highlights and shadows. Along the chalkboard wall, by removing one of the side reflectors, a planned brightness can be created and this vertical task illuminated as you would an art-gallery wall (see cut).

We are fully aware of the desirability and necessity of controlling the brightness ratios in the field of view but not to the point of

continued on p. 216





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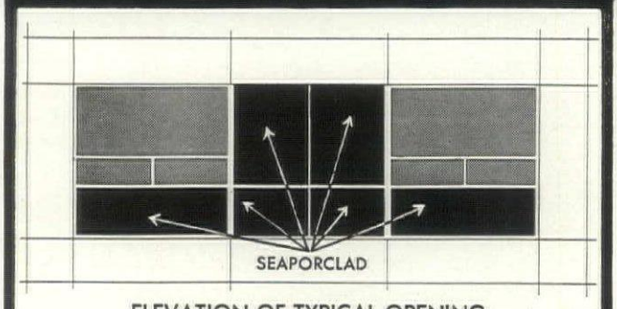
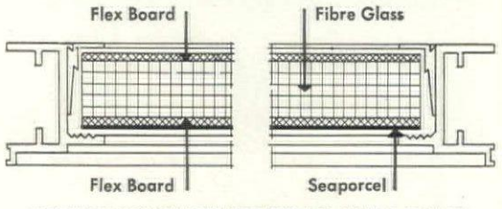
Geo. A. Fuller, Contractor
Aluminum windows by Universal Corporation, Dallas, Texas
photograph by Louis Checkman from model by Theodore Conrad



ELEVATION OF TYPICAL OPENING



SECTION THRU SEAPORCLAD WALL PANEL

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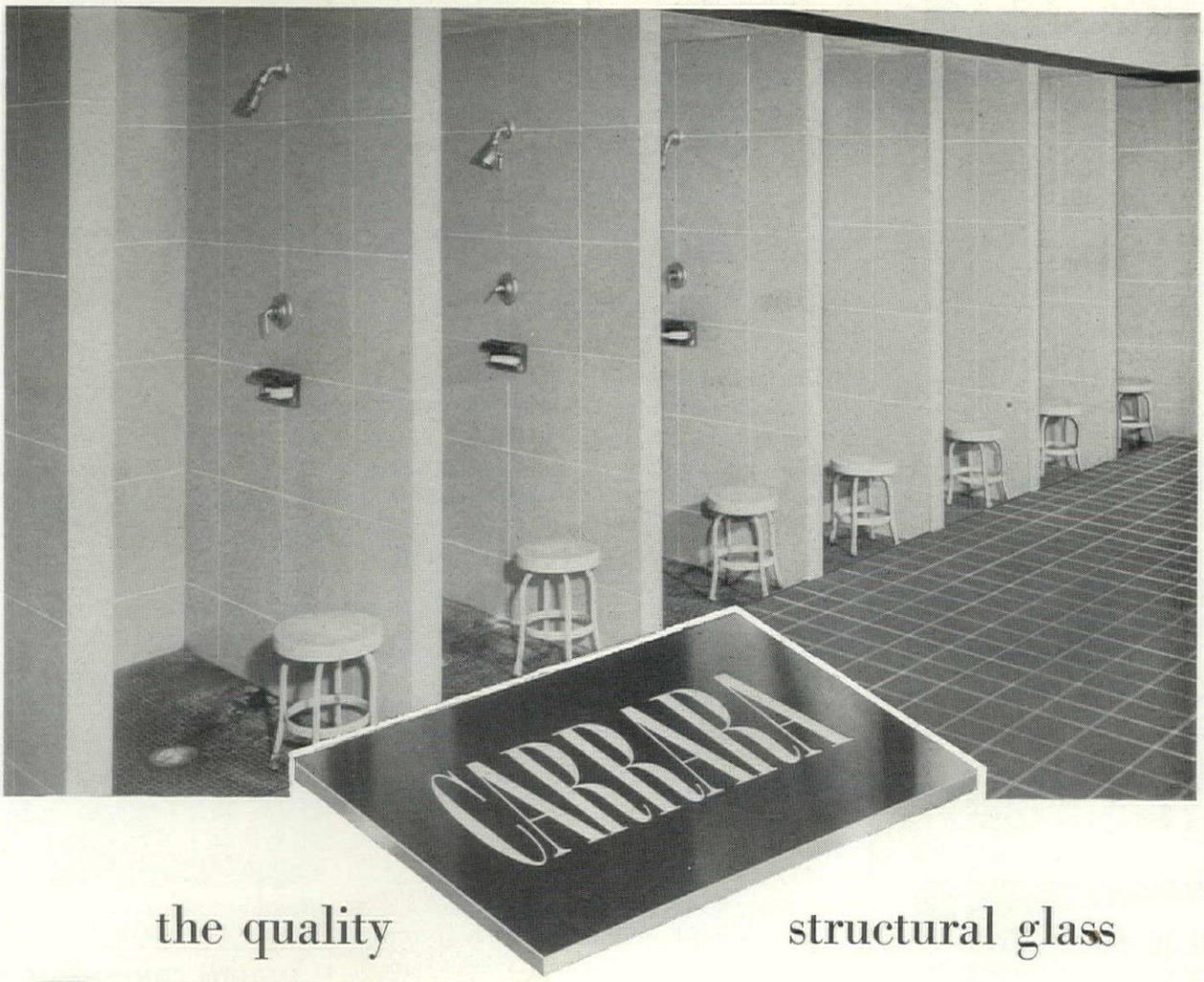
Pittsburgh Field Club, Fox Chapel, Pa.
Architect: Francis A. Berner, Pittsburgh, Pa.



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ELECTRIC LIGHTING *continued*

scientific monotony. The control of the sky brightness that comes within the total vision of the child seated nearest to the window is obviously the most difficult. In addition to a reasonable overhang, this can best be done by coordinating the planting and landscaping with the design of the building. The more the indoor-outdoor environment becomes a reality, the more this coordination becomes essential — and why not? If for some reason this cannot be done by landscaping, it is necessary to introduce some of the more conventional controls so that sky brightness, particularly to the south, can be controlled from the interior viewpoint.

Behind the operating costs. Operating costs shown in the table are based on experience in the Grand Rapids area. In this area there are 100 days each year in which less than 30% of the sky is covered by clouds, and an average of 160 days in which more than 70% of the sky is covered. School is in session from Sept. 15 to June 15, or for 275 days. Of the 160 cloudy days, at least 140 occur during the 275 school days, or roughly half of the days during the school year are cloudy days in which the sky is more than 70% covered by clouds.

School is in session in this territory from 8.45 to 11:30 A.M. and from 1 to 3:30 P.M. During December, January and February it is still relatively dark at 8:45 in the morning and tends to get dark again by 4 P.M. This further reduces the hours under which daylight can be depended upon. School is in session 180 days at 5¼ hours per day for a total of 945 hours a year. It can be safely assumed that the lower grade classrooms are in use 1,000 hours per year.

In the electricially lighted classroom it is assumed that the inner row of lights will burn 800 hours per year, the middle row and chalkboard lights 600 hours, and the outer row of lights will burn 400 hours per year. For types 2, 4 and 5 it is assumed that all lights will burn 500 hours per year. In type 3 with unilateral lighting glass block, it is assumed that the inside row of lights will burn 800 hours per year, and the outer row of lights will burn 500 hours per year. It is assumed that corridor lights burn 1,000 hours per year—all the time that the school is in use.

Maintenance costs are an assumed cost based on experience records and cover cleaning the fixtures once a year. A rate of $1.50 per hour was used. Lamp replacement costs are based on manufacturer's standard lamp life and cost to the school of

continued on p. 220

Schoolrooms built while you wait!

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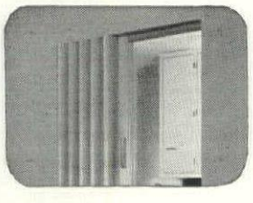

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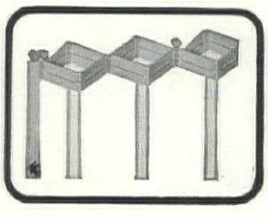

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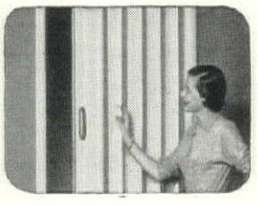

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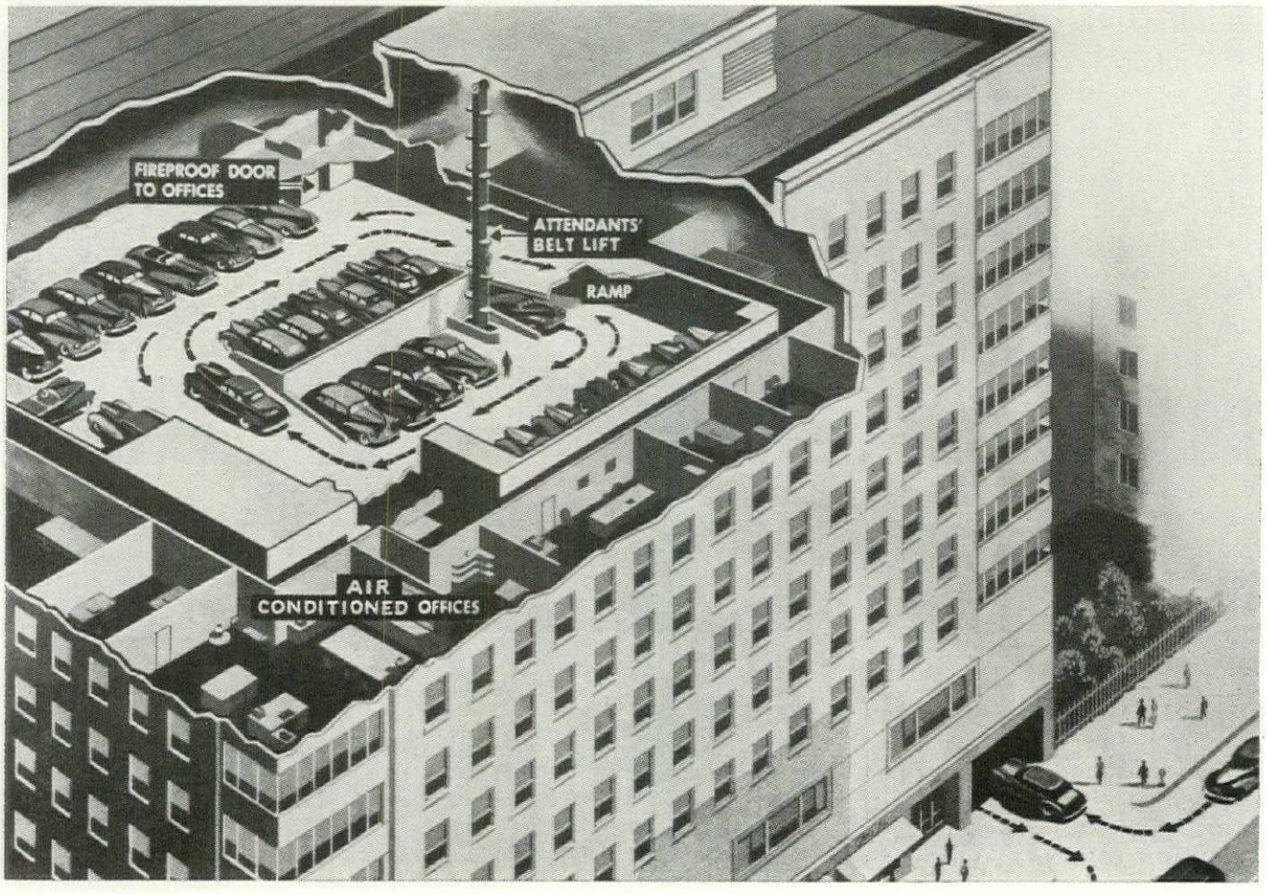

in each office, (2) saves space by using small, high-velocity air conduits, (3) cuts costs because of its simplified installation and centralized maintenance. ▪ So successful is the Cafritz Building that another will be started before the end of the year. ▪ Carrier equipment can meet the most exacting requirements whether your plan involves a new kind of office building or a modernized old building. Carrier people founded the air conditioning industry more than 50 years ago. All this experience is yours to command. Look for Carrier in the Classified Telephone Directory. Or write Carrier Corporation, Syracuse, New York.

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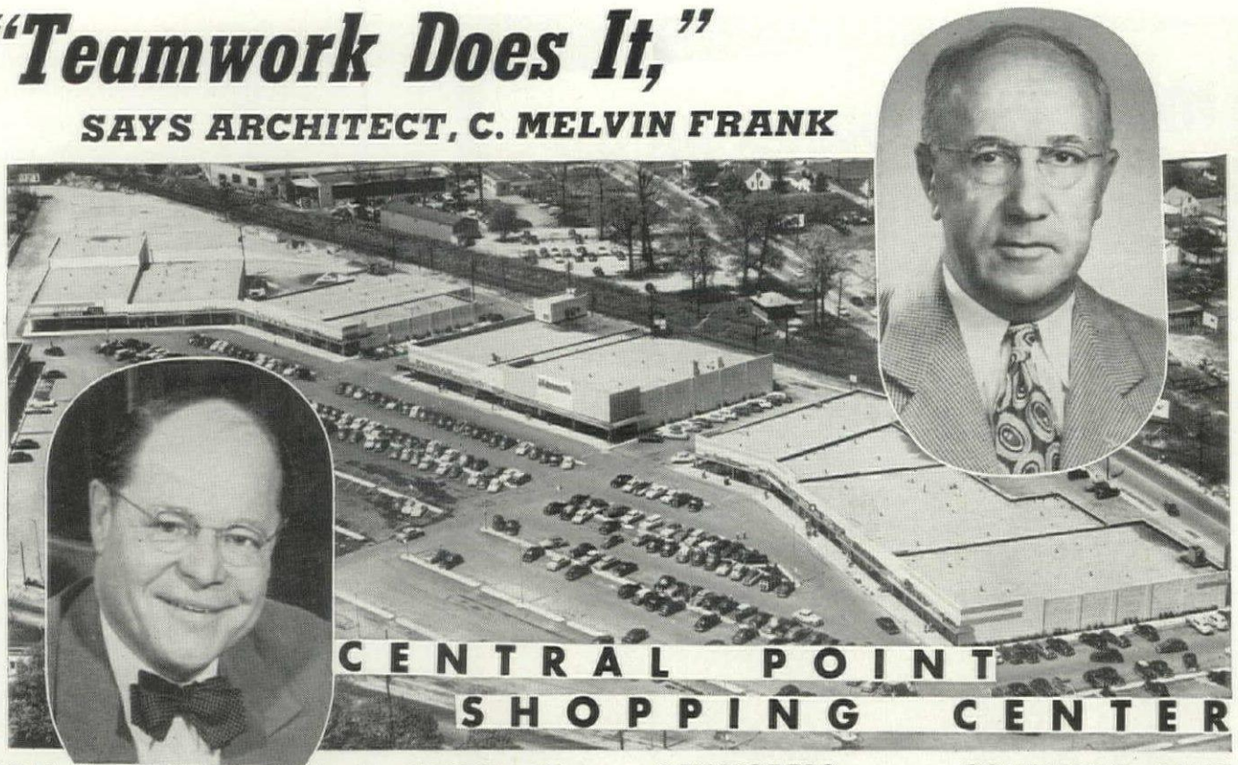
SAYS ARCHITECT, C. MELVIN FRANK



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these units. No maintenance costs are figured for replacement of parts, since this is a very minor item and hard to judge. Power costs are based on the rate in the Grand Rapids area of 3¢ per kw-h.

Heating costs are figured with oil as the fuel. Purchase price is 12.3¢ per gal.

Outline specifications of the five classroom types:

1. Standard-size 28′ x 32′ classroom with narrow end to outside wall. Glass carried to ceiling to eliminate steel lintel and brickwork. Ceiling height 9′-6″. Fluorescent fixtures: 2 tubes 96″ T-8 200 M.A. 8′ above floor. Incandescent: 300-w. 3-ring silver bowl 8′ above floor.

2. Unilateral light with saw-tooth monitor. Glass in outside wall and glass block in the monitor. Standard 32′ x 28′ classroom with side to outside wall. Ceiling height 9′-6″ to 13′. Fluorescent fixtures: 2 tubes 96″ T-2 425 M.A. 8′ above floor. Incandescent: 500-w. 3-ring silver bowl 8′ above floor.

3. Flat roof unilateral—vision strip below—glass block to ceiling. Standard 32′ x 28′ classroom with side to outside wall. Ceiling height, 12′. Fluorescent fixtures: 2 tubes 96″ T-12 425 M.A. 9′ above floor. Incandescent: 500-w. 3-ring silver bowl 9′ above floor.

4. Bilateral lighting with clerestory, outside walls glass, clerestory glass block. Standard 32′ x 28′ classroom with side to outside wall. Ceiling height, 8′ to 13′. Fluorescent fixtures: 2 tubes 96″ T-12 425 M.A. 8′ above floor. Incandescent: 500-w. 3-ring silver bowl 8′ above floor.

5. Toplighted with 4′ x 20′ directional glass block, outside wall glass. Ceiling height 9′-6″. Fluorescent fixtures: 2 tubes 96″ T-12 425 M.A. 8′ above floor. Incandescent: 500-w. 3-ring silver bowl 8′ above floor.

The following basic details are standard for all five types: 1) concrete footings 3′ below grade; 2) reinforced concrete walls to floor level; 3) interior walls concrete block exposed and painted; 4) exterior walls same, faced with brick outside; 5) 4″ reinforced concrete slab on earth covered with ⅛″ asphalt tile; 6) steel bar joist spanning between division walls, 2½″ gypsum deck on gypsum lath, 1″ rigid insulation over gypsum deck with 4-ply tar and gravel roof, ¾″ gypsum lath and brown coat of plaster with ½″ acoustical tile; 7) unit ventilators with wall-to-wall air intake strips and cabinets complete with individual room temperature control, plus day and night temperature control.

Fenestra
BUILDING INFORMATION

Fenestra Awning-Type Windows in Clemson College (Chemistry Building), Clemson, S. C.

Architect: Hopkins, Baker & Gill, Florence, S. C.

Contractor: Industrial Builders Inc., Anderson, S. C.

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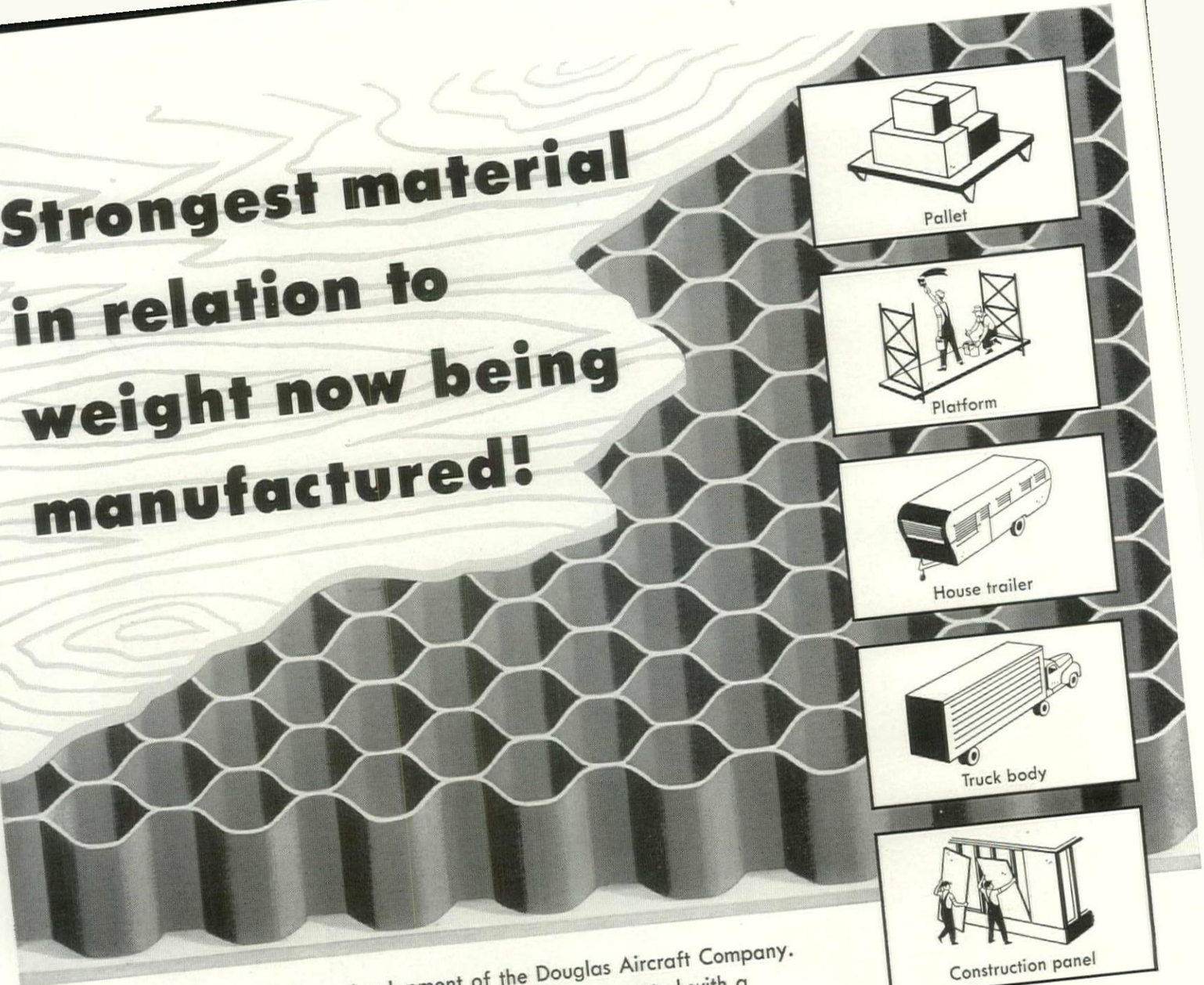


Pallet

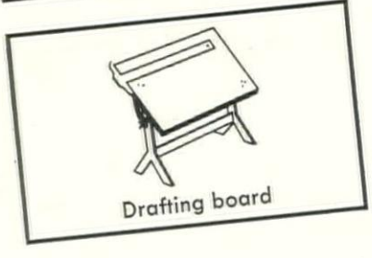
Platform

House trailer

Truck body

Construction panel


Air-Cargo container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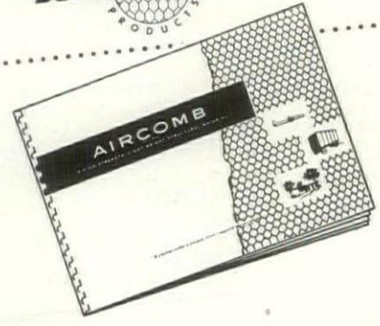

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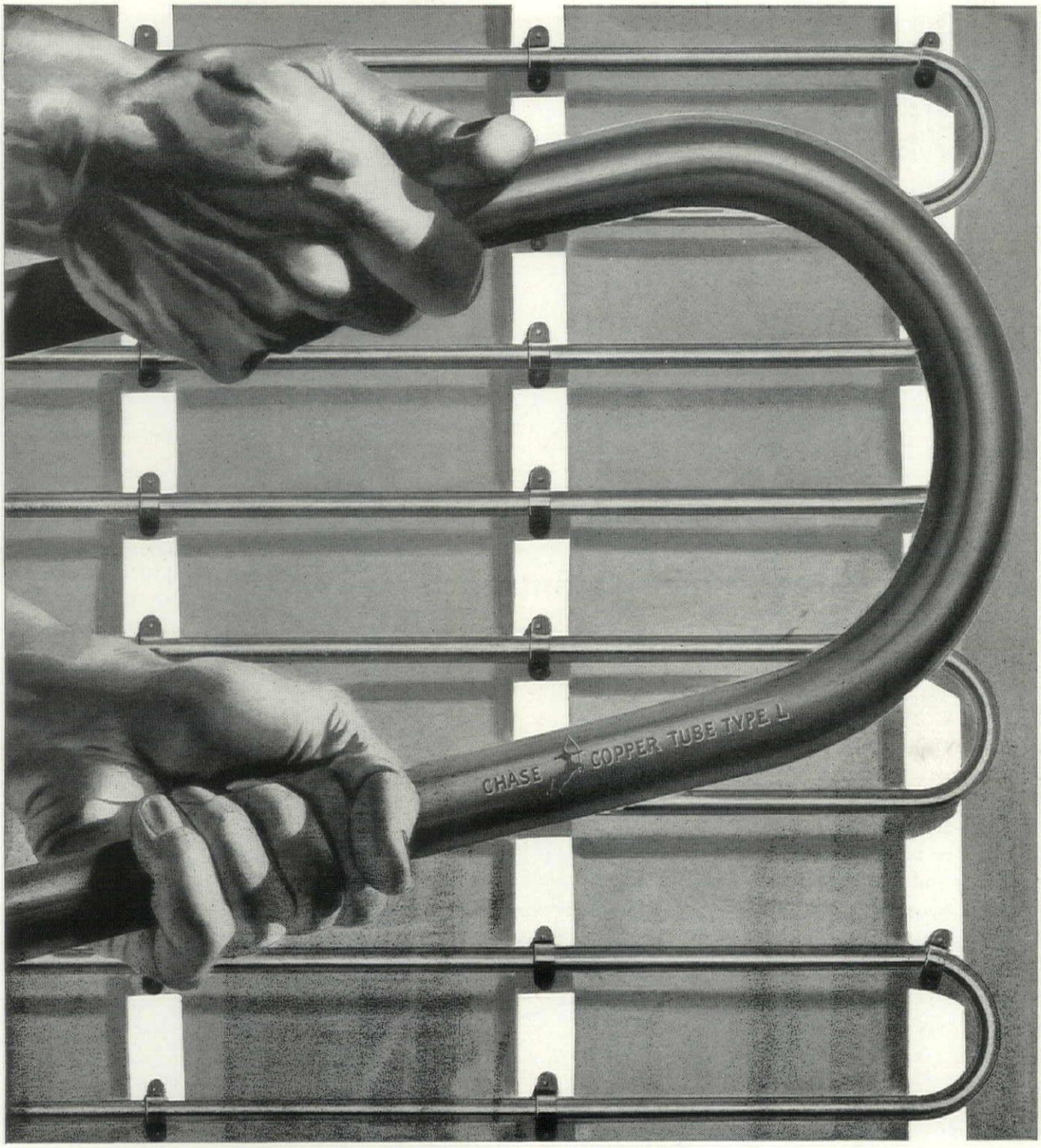

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ACOUSTICS *continued from p. 188*

addition in the Catskills, N.Y., Architect Henry L. Blatner uses a similar deck 4″ thick spanning 8¾′ between exposed welded steel beams; the deck costs 70¢ per sq. ft. in place.

▸ Acoustic roof decks are also made of light-gauge steel welded into hollow box sections that double as framing members. At the Union Free High School, Kenosha, Wis., Architect Lawrence Monberg uses 16-g. prefabricated box sections, 6″ deep, spanning 23′ across classrooms. Each section contains sound-absorptive material and the steel underside is drilled with ⅛″ holes, giving a noise-reduction coefficient of 80%. Cost of this deck is $1.67 in place.

▸ In the two-story lift-slab limestone Township High School, Peoria, Ill. (AF, Sept. '53), Architects Hewitt & Bastion used precast, light aggregate hollow blocks as formwork for their slabs. Left exposed in the finished slab, the blocks cut noise 50%. Cost of slab: $2 per sq. ft.

Insulation and absorption

There are two distinct facets to the problem of noise control in schools. First, the reduction of noise transmission between rooms, which calls for the use of sound-*insulating* materials; then the control of noise within a room using sound-*absorptive* materials. These two materials are quite different. Sound insulation is dependent upon weight and, roughly, doubling the weight adds about 5 db to the wall construction, thus:

Homogeneous wall	Wt. per sq. ft.	Sound trans.
2″ block plastered	18 lb.	35 db
4″ block plastered	35 lb.	40 db
4½″ brick plastered	60 lb.	45 db
9″ brick plastered	115 lb.	50 db

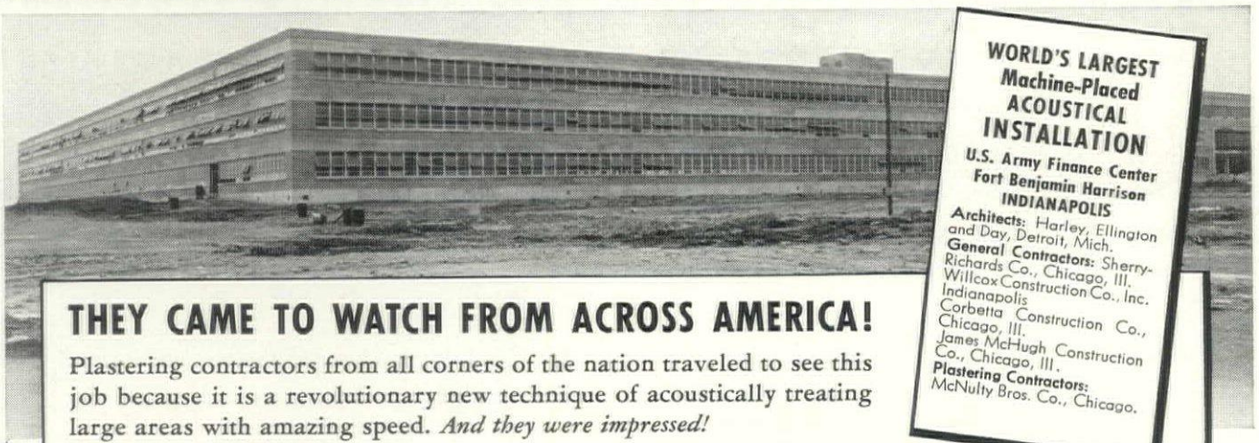
Note: discontinuous construction, with an air space or sand fill between the two faces of a partition, is considerably more efficient.

In contrast, sound-absorptive materials are porous, designed to take in and absorb sound energy, but give no insulation.

The place for sound-absorptive materials is in the noisy areas of the school—in gymnasiums, handicraft shops, typing classrooms. If possible these should be physically separated from the more quiet study areas—best of all, in distinct building groups separated by planting. Normal speech is easily heard through a 30-db partition wall, consequently a minimum of 40 db is usually specified between classrooms. Adjoining open windows or ducts might be a source of noise leakage; solutions: a solid, impervious baffle between windows, acoustical linings for the ducts.

Here's the Interesting Story of

AMERICA'S MOST AMAZING ACOUSTICAL JOB



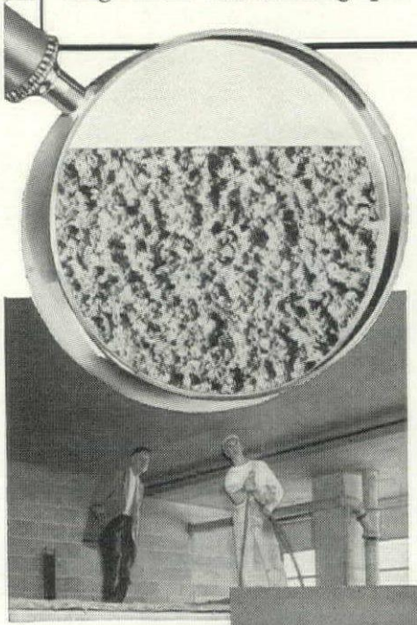
WORLD'S LARGEST Machine-Placed ACOUSTICAL INSTALLATION

U.S. Army Finance Center
Fort Benjamin Harrison
INDIANAPOLIS

Architects: Harley, Ellington and Day, Detroit, Mich.
General Contractors: Sherry-Richards Co., Chicago, Ill. Willcox Construction Co., Inc. Indianapolis Corbetta Construction Co., Chicago, Ill. James McHugh Construction Co., Chicago, Ill.
Plastering Contractors: McNulty Bros. Co., Chicago.

THEY CAME TO WATCH FROM ACROSS AMERICA!

Plastering contractors from all corners of the nation traveled to see this job because it is a revolutionary new technique of acoustically treating large areas with amazing speed. *And they were impressed!*



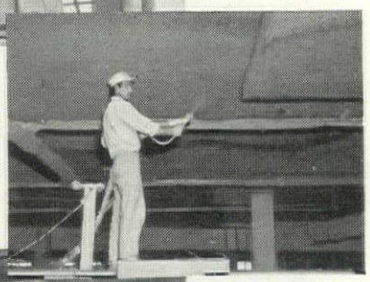
30 ACRES OF ACOUSTIC!

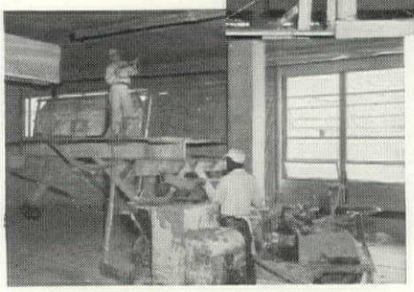
Unbelievable, but true!

2250 Square Yards of Finished Acoustical Per Day!

No wonder Zonolite Acoustical Plastic was specified in the Army Finance Center project! Ease of application, plus Zonolite's benefits of top sound absorption, beauty, and super fire protection make Zonolite the ideal acoustical material for government buildings, hospitals, hotels, office buildings, stores, homes, etc. Find out how you can make Zonolite Acoustical Plastic *work wonders for you* in maintaining the maximum degree of sound conditioning, beauty and fire protection—at low cost.

ATTRACTIVE FINISH— beautiful finish achieved without use of plaster tools. Magnified inset shows decorative texture produced; traps sound, gives noise reduction coefficient of 0.65.





NO FURRING! Photo shows application of Zonolite Acoustical Plastic. Adheres direct to exposed concrete.

Photo shows secret of this high speed acoustical treatment. Combination of Zonolite Acoustical Plastic and plaster placing equipment accomplished unprecedented record acoustical installation.

FREE BOOK Before starting *your* next job get the full story of the world's largest machine-placed acoustical job. Mail coupon for story, *"30 Acres of Acoustic!"* and free descriptive booklet giving complete information about time-saving, cost-cutting Zonolite Acoustical Plastic.

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Dept. AF-103, Chicago 3, Illinois

Gentlemen: Please send story "30 Acres of Acoustic" and free descriptive booklet PA-5 on Zonolite Acoustical Plastic.

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☐ Architect ☐ Builder ☐ Other

Good Hospital Design Includes

ARCHITECT-SPECIFIED DAY-BRITE LIGHTING FUNCTIONS AS AN INTEGRAL DESIGN ELEMENT IN MERCY HOSPITAL

The new Mercy Hospital in New Orleans is a credit to the architects who designed it . . . another of a growing number of really fine medical centers to come from architects' boards in the last decade.

Mercy Hospital is a good hospital because its designers rejected half-answers to problems that came up during its planning.

The lighting, for example. It might easily have been overlooked and underplanned because of the maze of specialized and difficult problems that always confront the hospital designer. It wasn't.

In Mercy Hospital, the lighting helps tremendously to create a pleasant, cheerful and comfortable atmosphere for the hospital staff, patients and visitors. The architects have used good lighting as a tool to heighten the value, efficiency and workability of a well-conceived circulation pattern. In each of its many applications, Mercy Hospital's lighting system was given a major job to do . . . and it does it well.

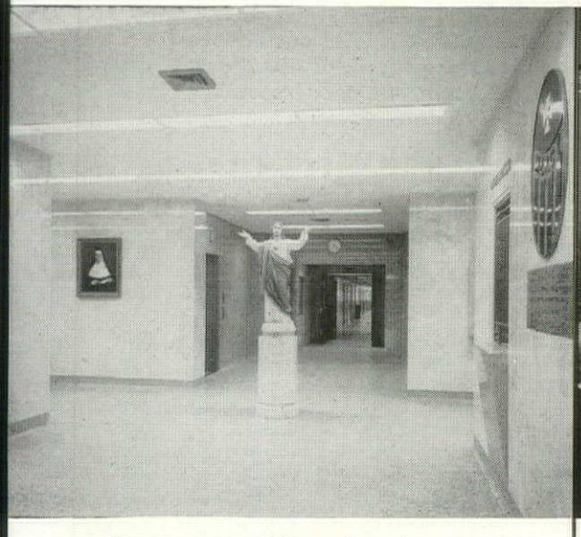
Favrot, Reed, Mathes & Bergman chose Day-Brite to get the one line of lighting equipment that matched the quality of their conception.

☆ ☆ ☆

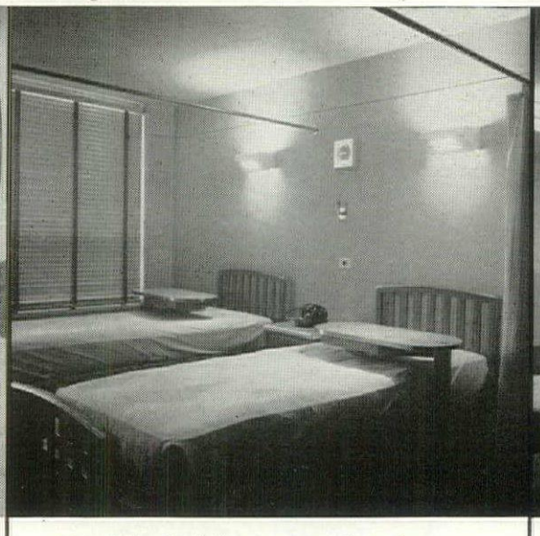
Good lighting is a basic element of any form of good architecture.

The Day-Brite line is not a substitute for the thought and planning you give your lighting problems. But it is the one line of modern lighting equipment with the versatility . . . the clean, simple design . . . the quality of engineering and construction . . . the extremely low maintenance factor . . . that guarantee the effective results you want.

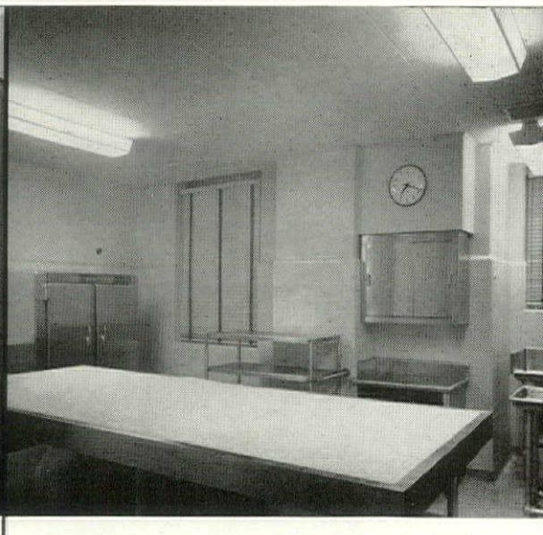
We invite your thorough investigation of Day-Brite equipment . . . and the claims we make for its superiority. We think your opinion—and decision—will be mutually beneficial to both of us.



The clean, smart lines of continuous rows of glass-enclosed Day-Brite troffers give a cheerful and distinctive appearance to the hospital entrance and corridors.



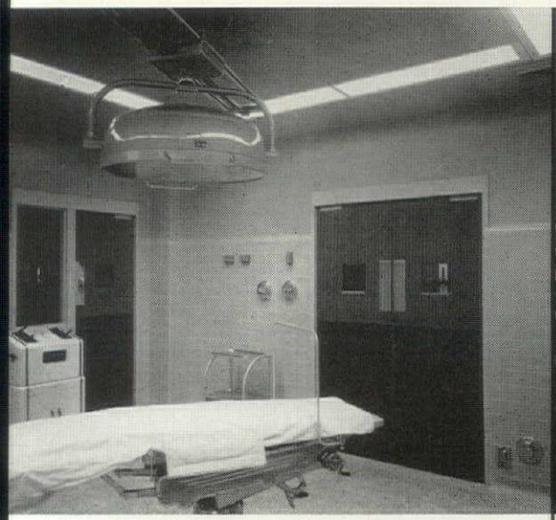
Day-Brite bed lamps provide soft, comfortable illumination in patients' rooms. These direct-indirect units are designed especially for hospital installation.



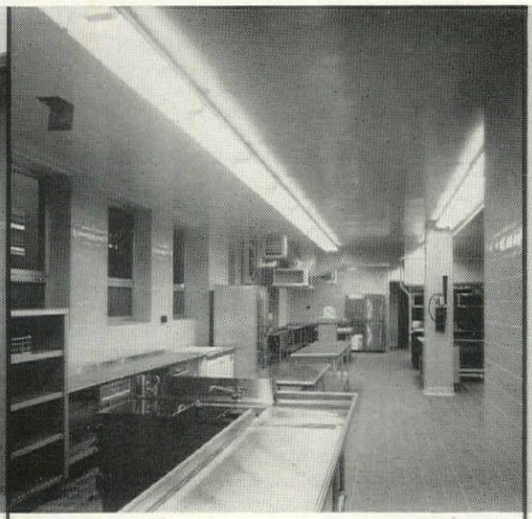
Service areas in Mercy Hospital are lighted with the famous Day-Brite VIZ-AID® fixtures. These modern, all-white units are efficient and easy to service and relamp.

Good Lighting

Mercy Hospital in New Orleans, Louisiana • Favrot, Reed, Mathes & Bergman, Architects
DeLaureal and Moses, Consulting Engineers • Farnsworth & Chambers Company, Inc., General Contractors



In major operating rooms, Day-Brite troffers provide peripheral lighting around the operating table to keep down brightness and shadow contrasts for surgeons.



In the hospital's kitchen, Day-Brite CFI DAY-LINE® industrial fixtures were used. Slotted reflectors permit 10% uplighting to reduce brightness contrast.

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TOPLIGHTING FOR CLASSROOMS

Illuminating engineers reveal new technical data on use of plastic domes and glass-block skylights

Among the many papers presented at the National Technical Conference of the Illuminating Engineering Society last month in New York, three on toplighting were of particular interest to school architects and school officials. Excerpts from these three papers appear below.

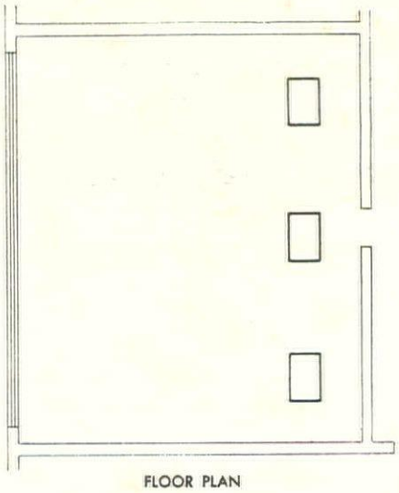
Daylighting with plastic domes *

Plastic domes have been found to be effective for complete daylighting of an interior and as an adjunct to side-wall windows. With unilateral side-wall fenestration, the illumination is at a maximum near the window and decreases as the distance from the window increases. With a daylighting fixture such as the dome, the daylight can be put where needed, so as to result in a uniform illumination distribution.

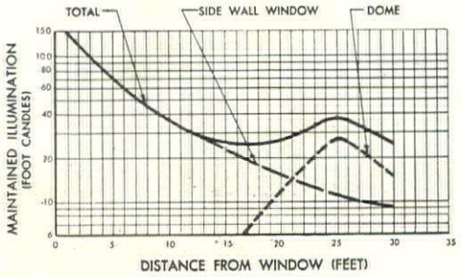
Domes fill in with daylight where the side-wall illumination drops off. Where the classroom is not deep in comparison with the win-

continued on p. 232

** By Bernard F. Greene, consulting engineer of New York, based on studies sponsored by Wasco Flashing Co.*

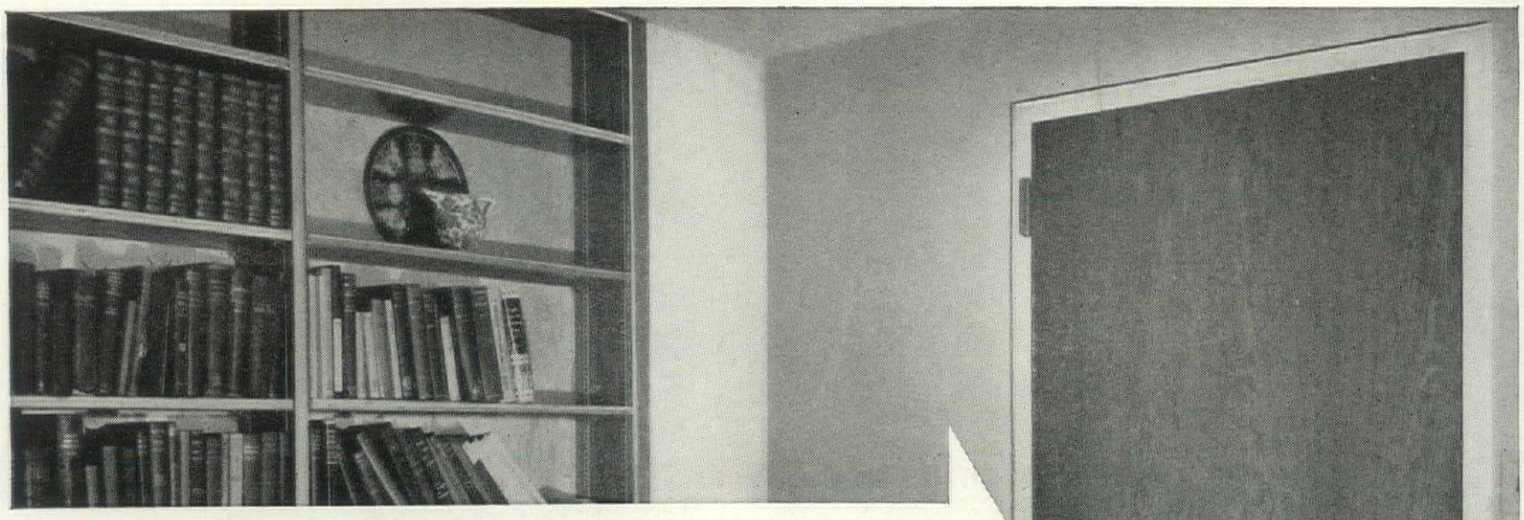


FLOOR PLAN



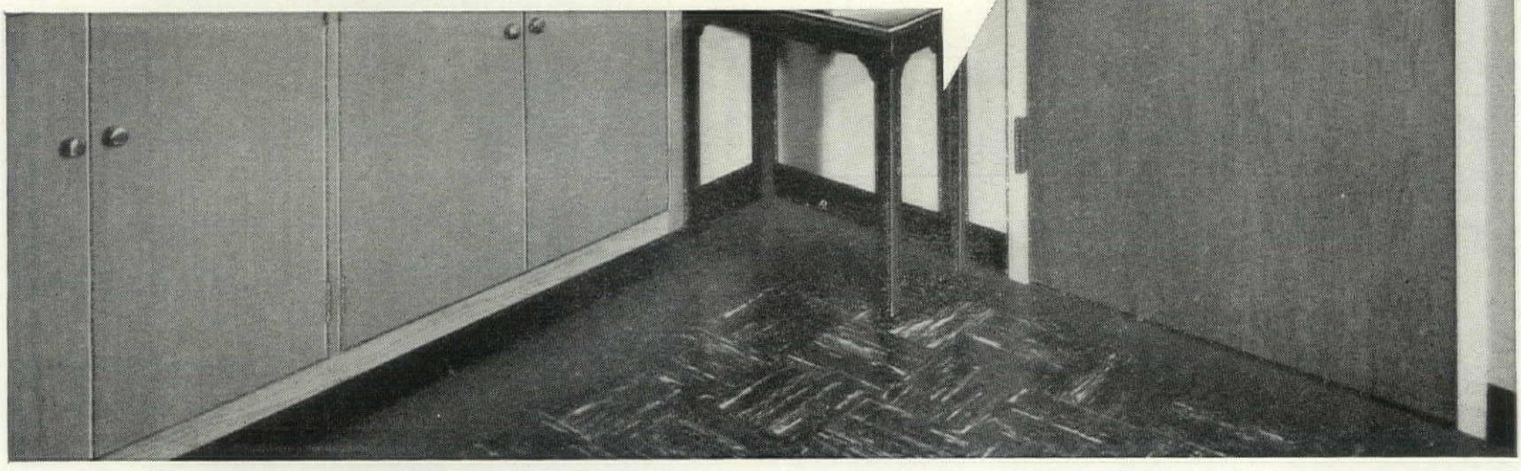
CURVE OF ILLUMINATION VERSUS DISTANCE FROM WINDOW

Three 3' x 4' domes about 25' from 7' high windows raise lighting curve in otherwise dark area of 30' deep classroom.



THE DOOR WITH THE UNBEATABLE GUARANTEE

This Weldwood Fire Door in the Union Theological Seminary has faces of genuine oak veneer. Rotary-cut unselected birch is standard veneer, but other sliced or rotary-cut domestic or foreign woods are available. *Architects:* Collins, Willis and Beckonert.



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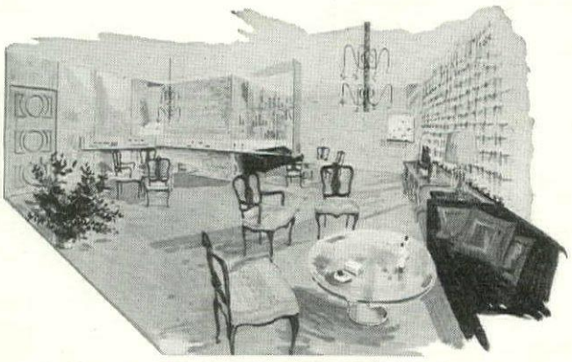
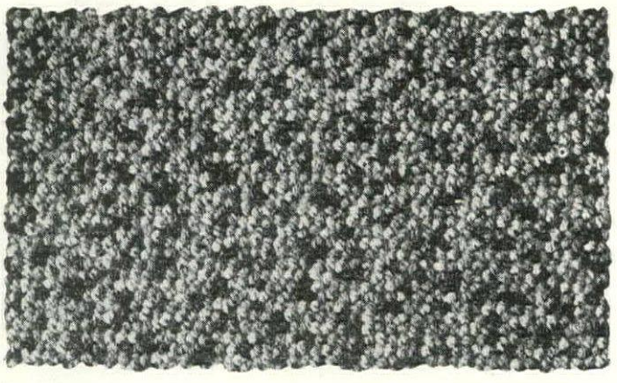
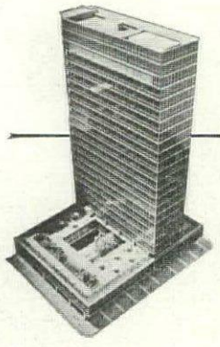
A flying trip through Lever House on those heavenly carpets by LEES!



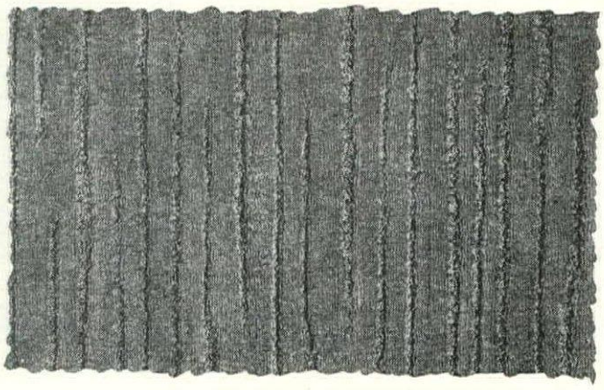
A glimpse into Harriet Hubbard Ayer Buyers' Salon gives the visitor a feeling of fashion and feminine delicacy. The carpet is Lees Locksett in soft dusty pink.



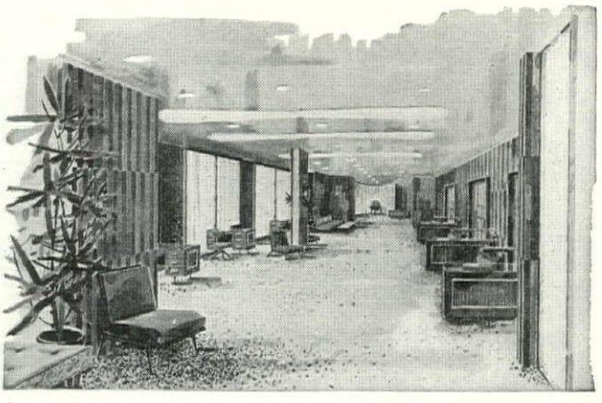


Lever House, where Lees Carpets set the decorative keynote. Interior installations by the Contract Division of W. & J. Sloane. Raymond Loewy Corp., Interior Designers.

Lever House elects Lees! Engineered for tomorrow, Lees Contract Carpets make the perfect floor covering for Lever Brothers' spacious new glass-walled wonder-of-the-world! Here—air, light and perfectly co-ordinated color effects—open the door to a vast new architectural world. Lees Carpets fit perfectly into this great new design for industry. Specially constructed to withstand wear and steady traffic, they come in a wide range of colors, patterns, textures, and custom designs for special interiors. Send for specific information from James Lees and Sons Company, Contract Carpet Division, Bridgeport, Penna., or offices in principal cities.



Gracious Glowtuft by Lees, an embossed effect Wilton carpet, spreads hospitality and gentle color over the broad expanse of the 21st floor reception plaza.



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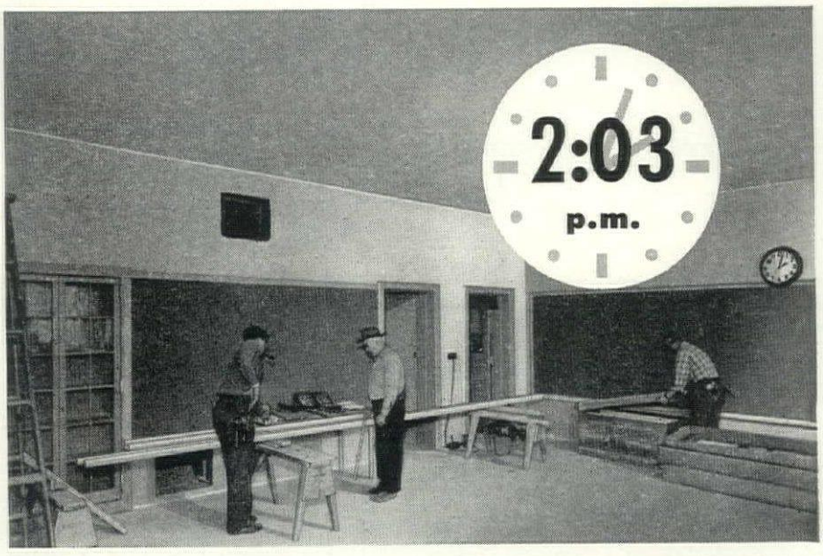
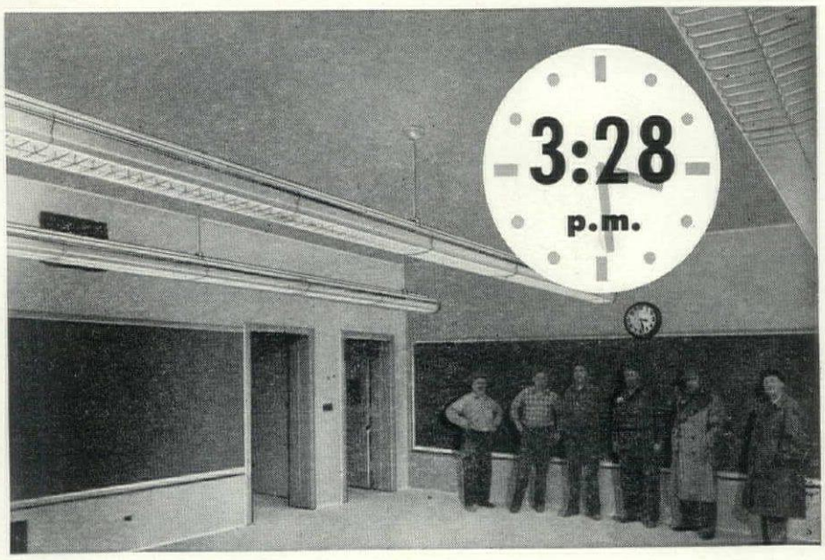
costs cut 27% with UNISTRUT® channel and fittings





New fluorescent lighting was recently installed in 18 classrooms at Lincoln School, Eau Claire, Wisconsin, in record time at a huge savings in cost over conventional methods. "Before and after" photos prove how fast the job was done. In first photo fixtures are just being unpacked at 2:03 p.m. At 3:28 p.m. second photo shows installation of three 24 ft. rows completed, room cleaned, tools and accessories moved to next room for installation there. Total time 85 minutes.

This job* is just one of hundreds where the UNISTRUT system has helped produce the maximum in lighting efficiency while saving installation time and money.

PERFECT ALIGNMENT
UNISTRUT channel is rigid, straight and strong—gives true alignment that servicing can't disturb.

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UNISTRUT installations are safer. Continuous row becomes a single integrated unit—weight is equally distributed along all suspension points.

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The UNISTRUT system is quickly, easily erected. Saves costly installation time—permits wiring to be done at working level. Fewer hanger rods are needed. Approved as wireway in Chicago and more than 20 major cities.

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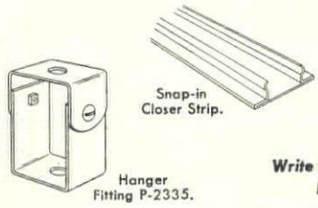
*Garden City Plating Company, Chicago, Ill. Fluorescent Fixtures.
E. F. Klingler & Associates, Eau Claire, Wis. Architects and Engineers.
Roshell Electric Service, Chippewa Falls, Wis. Electrical Contractor.



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2327587 2329815 2345650
2363382 2380379 2405631
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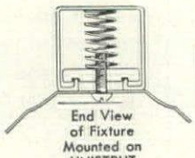

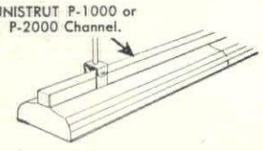

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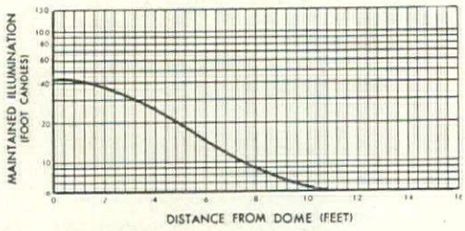

CURVE OF ILLUMINATION VERSUS DISTANCE FROM DOME

dow height, one row of domes is all that is required. For rooms that are deep in comparison to the window height, two or more rows of domes should be used. The required number of domes also varies with the room length, as the wider the side-wall window, the greater is the light penetration into the room.

For rooms without side-wall windows, the domes can be placed uniformly throughout the area, similar to the design of an artificial lighting system. In general, the spacing between domes should not exceed one and a half times the ceiling height, while the spacing between the first row of units and the wall should be one-half of this value. For the large-size dome units the spacing can be up to twice the ceiling height. Where the task to be illuminated is high above the floor, such as rows of bins in a warehouse, the spacing between units should be reduced.

Each installation has to be considered separately. The domes have to be arranged to give uniform illumination of the required intensity. For the most economical design, the smallest number of units should be used, as the larger units are more efficient. . . .

Engineering for daylight is more than compensated for by availability of good light throughout the day. It is also possible to illustrate that the added costs for installing a daylighting fixture can be offset by the resulting saving in electrical energy costs. It will be noted that only energy costs are considered, as it would be necessary to install a complete artificial lighting system to take care of the dark days and nighttime usages.

As an example of a cost comparison, let us take a room 75′ long, 50′ wide and 20′ high. The reflectance of the ceiling is assumed to be 75% and the wall reflectance 50%. To obtain 30 lumens per sq. ft., ten 5′ x 8′ domes are required. The cost of these units installed is on the order of $4,000. The cost of roofing, which would have to be installed in place of these units, is approximately $500.

To illuminate this room to the same level using fluorescent luminaires would require a total of 8,000 w. Assuming a use of 250 days per year, 8 hours per day, and an energy rate of 3¢ per kw-h, the usual energy cost is $480. The lamp cost would be about $120. Cost of artificial illumination during days in which insufficient daylight will be available is taken as 15% of $480 plus $120, or $90. The time required to pay off the added cost of the daylight fixtures would be (4,000—500)/(480+120—90) or less than seven years. . . .

Toplighting with glass block*

To assist the lighting engineer in planning proper toplighting panels, some "rules of thumb" have been developed. For example,

continued on p. 236

* *By H. F. Kingsbury, W. H. Billhartz and R. W. McKinley of Pittsburgh Corning Corp.*

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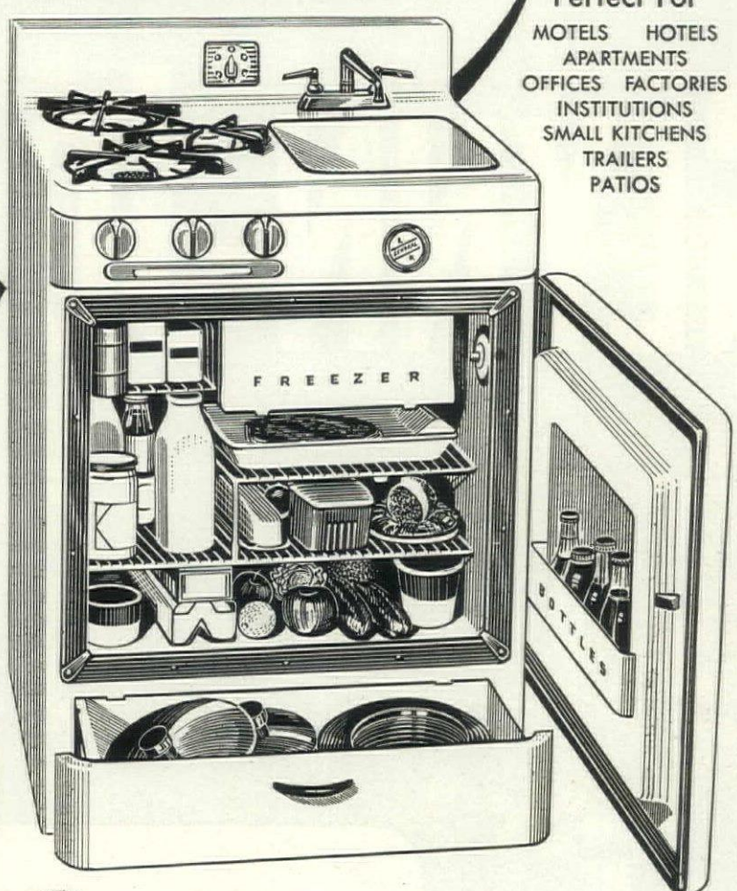

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BURNERS Units come with 3 gas burners (easily adjusted for bottled, natural or manufactured [L. P.] gas), or 3 electric burners (220 V.) or 2 (110 V.).

REFRIGERATOR Four cubic feet of space. *Electric* (sealed, self-oiling Tecumseh unit). Owens-Corning Fiberglas insulation. Convenient bottle shelf in door.

FREEZER Holds 9 ice cube trays, or 12 standard frozen food packages.

STORAGE DRAWER Ample storage space for pots and pans.

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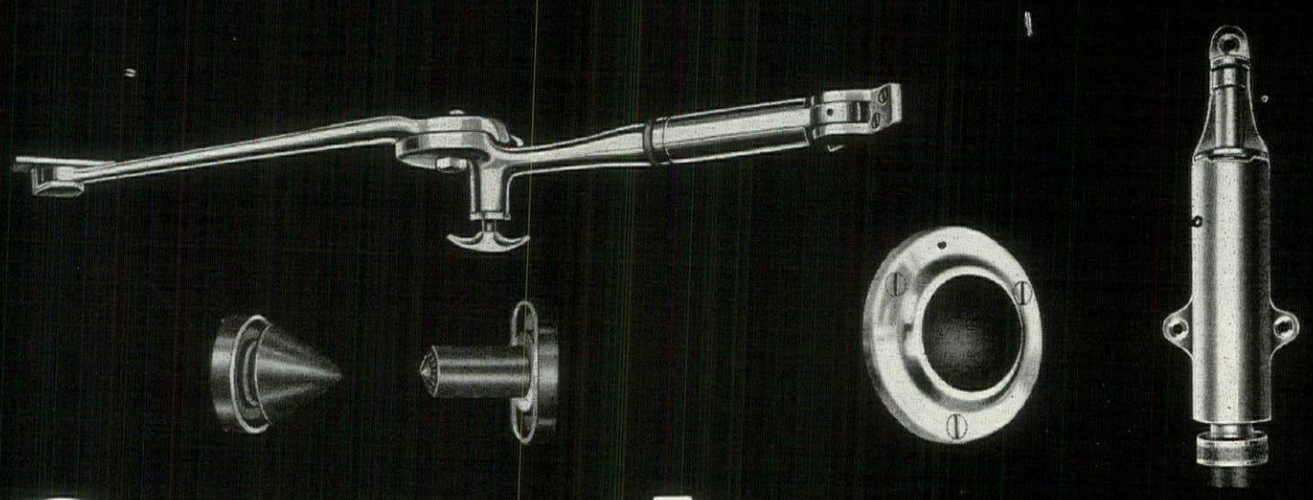

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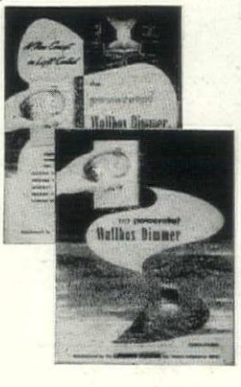

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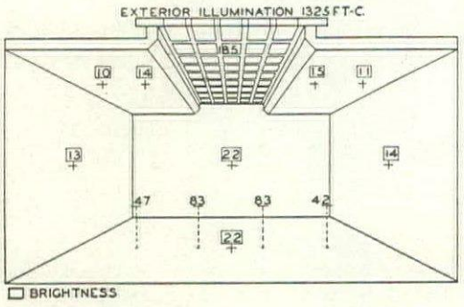


***Brightness and distribution** of light in 20′ square room with skylight 5 blocks wide and 15 blocks long (each block is 12″ square) in 10′ high ceiling ranges from 10 to 22 (brightness) and 42 to 185 foot-candles, respectively.*

for corridors up to a maximum width of about 10′, a skylight composed of 12″ square blocks spaced every 2′ will give adequate corridor daylighting under a wide range of exterior conditions.

For complete toplighting of enclosed spaces, it has been established that the number of glass block required, for most conditions, is about equal to the floor area in square feet divided by 6. This figure applies for most critical seeing areas, such as classrooms, offices, libraries, etc.

For service areas such as corridors, storage areas and rest rooms or where the panels furnish a secondary source of light, such as in deep classrooms, the number of glass block should be about equal to the floor area in square feet divided by 12.

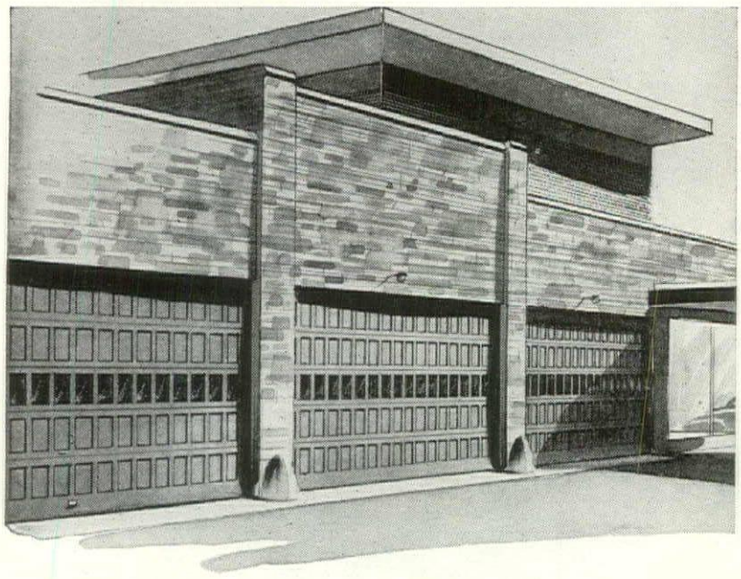
Where several skylight panels are to be used to daylight an enclosed space, these panels should be located approximately on centers equal to the *ceiling height* for uniform illumination distribution, a rule of thumb quite familiar to most lighting engineers. For maximum daylight utilization, it is suggested that the "shafts" between the skylight panel and true ceiling line be kept as shallow as possible and that the shaft walls be maintained at high reflectance, preferably above 80%. As with all good lighting, the reflectance of the floors, desks or other furniture should be kept high, preferably above 30%. To minimize brightness contrasts between the glass block and the concrete joint, and as an aid in raising illumination levels when the concrete web is large in area compared with the glass, it should be maintained at 80% or higher reflectance. (See also AF, Mar. '53, p. 158.)

A new kind of functional skylight *

The Hillsdale High School of San Mateo, Calif. (see p. 142) follows a design that has been under consideration for several years. The unique plan of this school is its flexibility; that is, all interior partitions are to be movable to allow rearrangement of classrooms, laboratories, etc., to suit the changing needs of the school. . . . It is apparent that such an arrangement of rooms throughout the school allows for an appreciable concentration of building area. This plan calls for each 14′ x 14′ unit to be self-sufficient in daylighting, heating, ventilation and supplementary artificial lighting; these facilities to be supplied through the ceiling and attic space. . . .

continued on p. 240

* *By R. A. Boyd of the University of Michigan Daylighting Laboratory and Architect John Lyon Reid, with the cooperation of Kimble Glass Co.*



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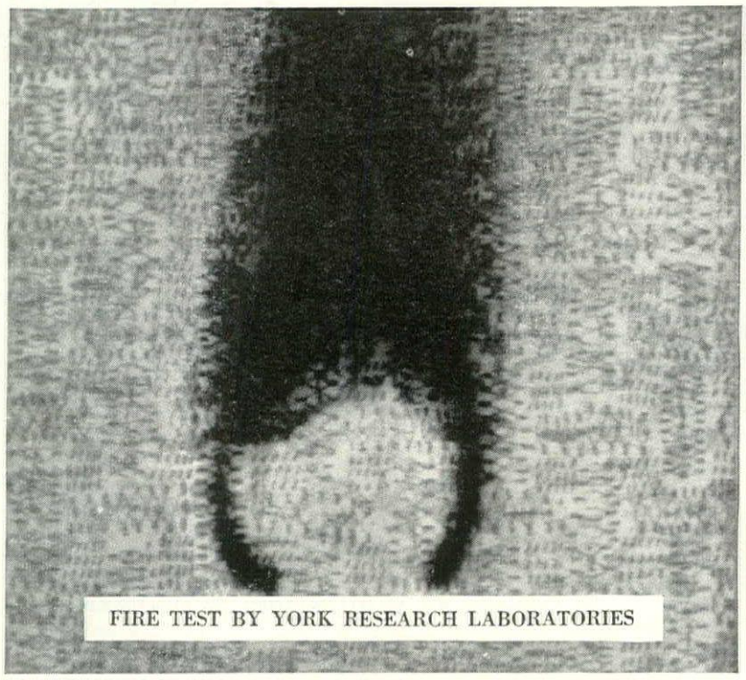

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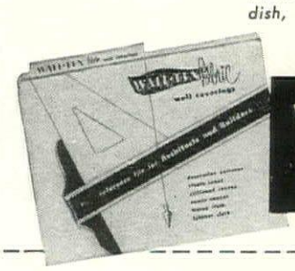

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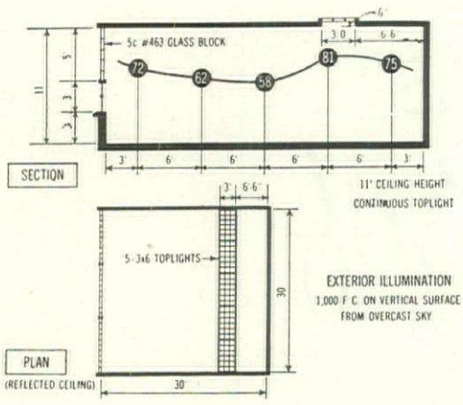
TOPLIGHTING *continued*



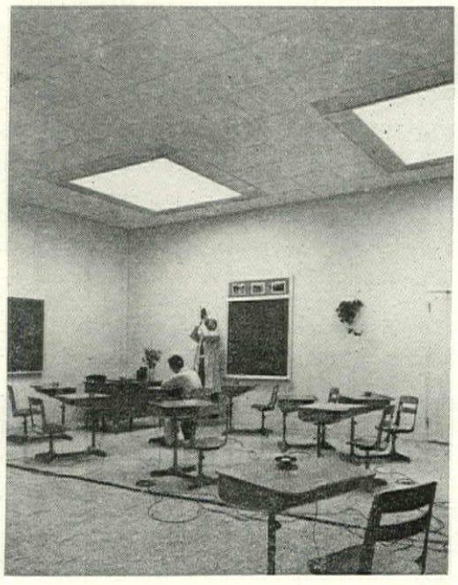
Illumination data *for 30′ x 30′ classroom shows how glass-block skylight panels maintain relatively even lighting of room. Its window wall is also glass block.*

Problems associated with the daylighting of this school were solved by the development of factory-assembled skylight units using glass blocks designed to transmit north light and low winter sun, but to reflect high summer sun (AF, Mar. '53, p. 158). Since such a plan represented a considerable departure in school design and construction, a typical classroom of the proposed school was constructed. . . . This mock-up has a floor area of 28′ x 28′ and a ceiling height of 12′; that is, it represents four of the basic units of the school. . . .

Measurements of the daylighting of this mock-up have been made periodically since it was completed on Feb. 9, '53. The average reflectances of the room are 80, 72 and 45% for the acoustical ceiling, walls and floor, respectively. The average working plane illumination is 40 foot-candles for an overcast day that provides 1,000 foot-candles on an exterior vertical surface and 2,500 foot-candles on an unobstructed horizontal surface. The ratio of maximum illumination to minimum illumination is less than 2.0, the maximum being directly below one skylight and the minimum near one corner of the room. On a clear day in February the average working plane illumination at midday was 120 foot-candles, the diversity being substantially the same.

The quality of the daylighting is high for all exterior conditions; the maximum brightness ratio being 10 to 1 between the sides of the wells and the adjacent ceiling. The brightness ratio between the top light and the sides of the well is 2 to 1 for an angle of view of 45°.

Hedrich-Blessing



Experimental mock-up *of typical classroom in Hillsdale High School shows two of the ceiling light wells that are topped with glass-block skylights. Also integrated in the hung ceiling are air-conditioning ducts and grilles, recessed lighting and acoustical treatment.*

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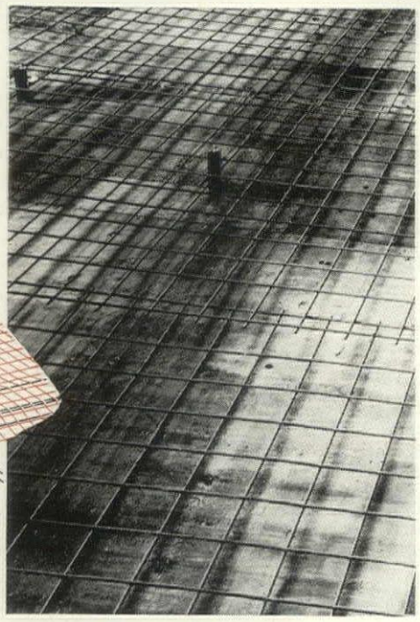

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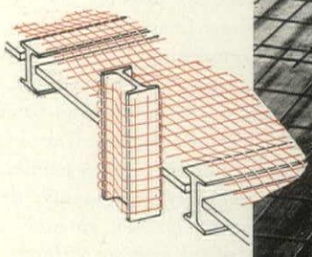

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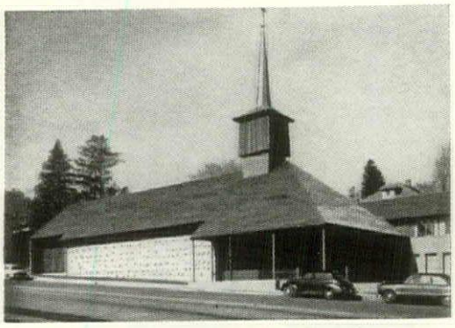
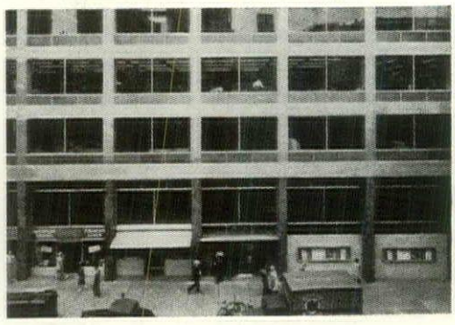


Belluschi church *for Zion Lutheran congregation in Portland has "village character with many new and effective features."*

Photos: (left) K. E. Richardson; (right) © Ezra Stoller



Belluschi office building *for Equitable Savings & Loan Assn. in Portland is "an ethereal tower of sea-green glass and aluminum."*

BOOK REVIEWS

THE NORTHWEST ARCHITECTURE OF PIETRO BELLUSCHI. Edited by Jo Stubblebine. An Architectural Record book. F. W. Dodge Corp., 119 W. 40 St., New York 18, N.Y. 100 pp. Illus. 8″ x 11″. $6.50

Romantic is a word that has frequently been used to describe Pietro Belluschi's architecture and the work of other architects which has even a faintly sensual flavor. But the appellation is really more a comment on the state of today's architectural design in general than on Belluschi. It indicates how narrow and specialized in their efforts are most of the other acknowledged "good" architects, how much they have become limited, repetitive stylists of one particular kind or another, very easy to label. Belluschi differs; he goes out after a variety of effects. But since everyone has to be categorized these days, he must too.

If, however, Belluschi really deserves this rather distrustful tag of romantic in an unromantic world, then a professional's belief in emotion is romantic too. This new book indicates how strongly this belief is at the root of Belluschi's work, in his expressed conviction that architecture should be sympathetic, that it should take forms which laymen will "feel" and enjoy. The text unabashedly talks about Architecture, capitalized, but the core of its conversation comes through as his aspiration to comfort and protect people with fine buildings, not make a brave show of design:

"Man is a very complex animal, full of strange emotion and illogical desires. He is swayed by prejudice, love and hatred. He is a being pervaded by both idealistic and materialistic motives. He can be both gregarious and misanthropic, altruistic and selfish. No one can possibly know enough about man to draw immutable laws, sound conclusions or certainties; I think that planners and architects, just like politicians, must have their ears to the ground and listen; . . . their creativeness must spring from human understanding and even love. A painter, a sculptor, a composer may be haughty, detached and even arrogant, but not an architect, because he has a social task to perform.

"We have taken away many of the established forms, so cherished by our ancestors, and have replaced them with stark utilitarian ones, which give little nourishment to the senses. We have taken away from the man in the street all the stereotyped little ornaments, cornices, cartouches and green fake shutters, but we have not been capable of giving him back the equivalent in emotional value. The fact is that after three decades of rather cold functionalism, we have come to the realization that emotion is a great force in our everyday world; it pervades our actions, our political motives, our very happiness—yet emotions have not been given the

continued on p. 244

guidance they deserve, although they are the very soil in which both architects and public may grow to creativeness and understanding. . . .

"Our immediate task, it seems to me, is to show our concern for the emotional needs of our clients and to show them that we are not reluctant nor unable to impart richness to the background of their lives, or to provide the kind of emotional fullness which played such an important role in the great periods of the past. . . .

". . . We architects, of the common working variety, who must be front-line men, facing frustration and compromise; we, who must understand, absorb, and give visual form to so many of the forces which make our world move, must not be ashamed to listen nor to understand what lives around us . . . not disdainful, temperamental stars—but men of vision among men."

A philosophy like this demands versatility in style, not inflexible dogma, and Belluschi has done more than talked this. He has built it. Witness the contrast between his Equitable Building in Portland, first of the postwar American metal and glass buildings, and one of his churches (see p. 242).

Today the earnest, Italian-born Belluschi is only 54 years old. At present he is steering the architectural department at Massachusetts Institute of Technology (a very unromantic spot) and collaborating in the Boston Center design (little romance, much real estate). It is a safe assumption that teaching, he is still learning, that this important architectural career is still in the ascent.

FIRE STATION DESIGN— Vol. 4. Compiled and distributed without cost by Circul-air Corp., 575 E. Milwaukee Ave., Detroit 2, Mich. 58 pp. 8½" x 11". Paper bound

Although it displays little architectural good taste, this collection of new fire stations should prove helpful to anyone confronted with the problem of designing or building such a structure. Each of the 70 stations is illustrated with a floor plan and a photograph or rendering, and many are briefly described.

Among the best stations selected is Toledo's new fire department headquarters by Architests Bellman, Gillett & Richards, which will be presented fully in a subsequent issue of FORUM.

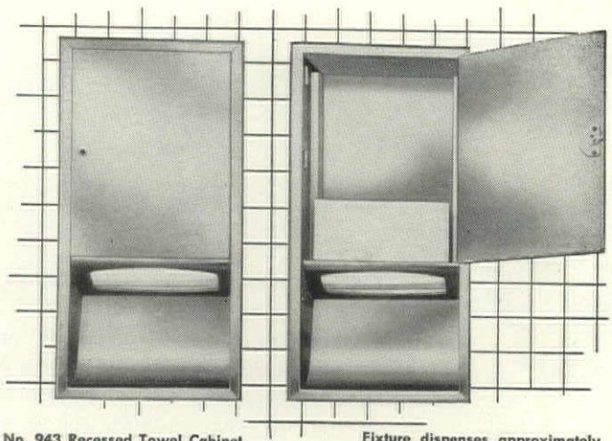
STATICALLY INDETERMINATE STRUCTURES. Their Analysis and Design. By Paul Andersen. The Ronald Press Co., 15 E. 26 St., New York 10, N.Y. 318 pp. Illus. 6" x 8½". $7.50

Prepared as a basic text on the design of statically indeterminate structures, Professor Andersen's new book concentrates upon the behavior of actual designs under load. He shows how to evaluate linear and angular displacements of strategic points in a structure and how to apply these methods to indeterminate beams and trusses. The slope-deflection and Cross's moment-distribution methods are explained in detail. The final chapters deal with the design of three-dimensional space-frames, a new field of structural design that has yet to be exploited in steel construction in spite of the immense progress achieved in shell concrete structures.

SIR CHRISTOPHER WREN. By John Summerson. Published by The Macmillan Co., 60 Fifth Ave., New York 11, N.Y. Illus. 5" x 7½". $1.75

The author expounds the architectural genius of Sir Christopher Wren in this ninth book of Macmillan's Brief Lives Series.

ACOUSTICS IN MODERN BUILDING PRACTICE. By Fritz Ingerslev. The Architectural Press. The British Book Center, Inc., 122 E. 55 St., New York 22, N.Y. 290 pp. Illus. 6" x 8¾". $4.90



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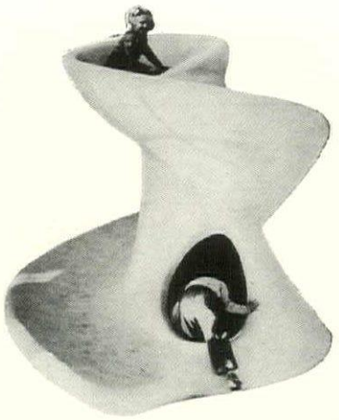

PLAY SCULPTURES made for school children to climb, burrow, romp over, in and around

In staid Philadelphia last month 2,000 park and recreation officials, gathered for the National Recreation Congress, raised favorable brows over the huge spheres, spirals and lumps displayed by Creative Playthings Inc.'s new Play Sculptures Division. These dynamic and pleasant forms melt the stuffiest resistance to abstract sculpture, primarily because they function in a most wonderful and irresistible way: they are play places in and on which children can exercise muscle and phantasy. They provide hidden hollows, slides, secret steps, and hanging-on places—environment usually denied the urban child, and, even where executed by nature, not always so safely engineered. Built of sundry contemporary construction materials — reinforced concrete, plastic and glass fiber, tubular steel framing—the models pictured run $2.000 to $3.500. Other sculptures start at $300.

This break from traditional playground equipment design is no casual one. Internationally known artists and architects, such as Isamu Noguchi of the US, Egon Moller-Nielsen of Sweden, Henry Moore of England, and A. Vitalli of Switzerland, were in on the coup. Modern school architects and educators both are being offered exciting vehicles for combining the esthetic with the useful.

As further stimulus to designers and to promote public interest, the manufacturer is co-sponsoring — with New York's Museum of Modern Art and *Parents Magazine*—a National Play Sculpture competition. Prizes totaling $2,000 will be awarded for the playground equipment judged to fill best the energetic and art needs of children. Details and entry blanks may be obtained from the Museum.

Manufacturer: Creative Playthings, Inc., Play Sculptures Div., 5 University Pl., New York, N.Y.

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Manufacturer: The Glidden Co., Union Commercial Bldg., Cleveland, Ohio.

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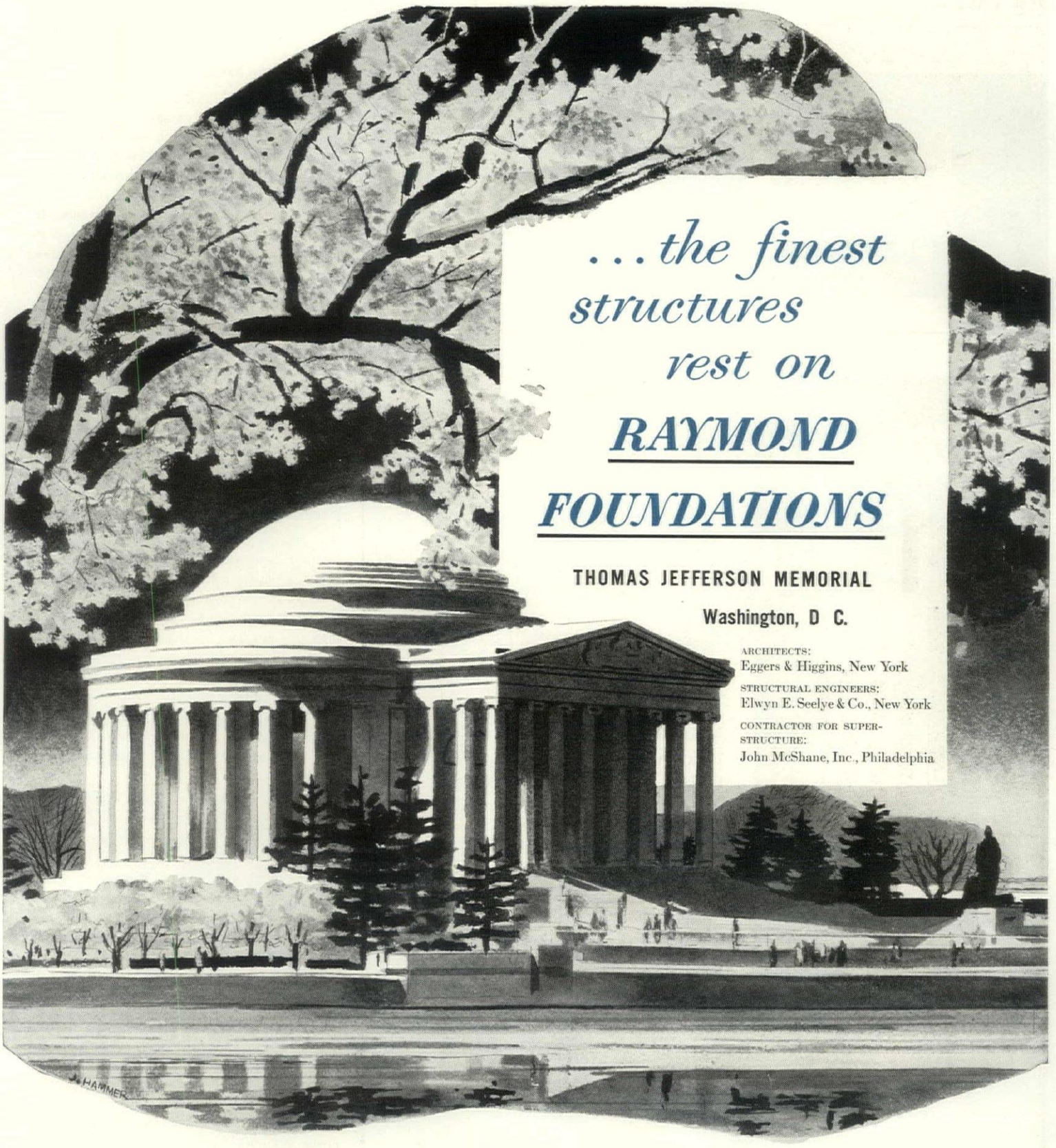

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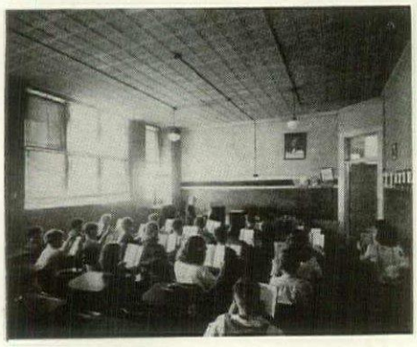

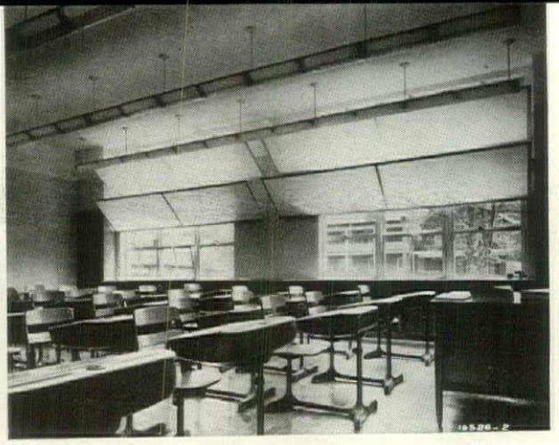

Contemporary daylighting comes to old classroom (left) with installation of woven glass-fiber panels set at an angle along the windows to diffuse harsh sunrays.

GLASS CLOTH PANEL makes effective, low-cost daylight diffuser

With its woven glass yarns acting as myriad tiny diffractors, this simple shade device converts intense sunrays into soft, glare-free light, distributing it evenly throughout the room. Suitable for budgeted installations in existing classrooms as well as in new schools with large window areas, the diffuser panel is quite easy to construct and install. The glass-fiber cloth is tacked taut over a wood frame and mounted at an angle on the window sash. Durable, fireproof and rot-resistant, the white fabric needs only an occasional washing in warm water and soap. The lightweight weave (for north and east exposures) costs about 17¢ per sq. ft.; the heavier weave (suitable for south and west orientations) costs about 23¢ per sq. ft.

Manufacturer: Owens-Corning Fiberglas Corp., 16 E. 56 St., New York, N.Y.

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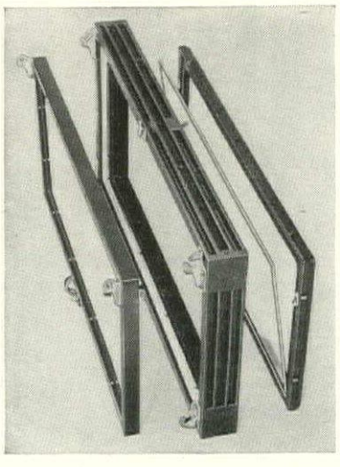

bility. A reversible model is available which opens from either the top or bottom. Designed for use in industrial buildings, barns, garages, the window can be installed singly, in tandem or stacked. Measuring 32″ x 16″ high it fits readily into openings in walls constructed of standard 16″ x 8″ masonry block and is suitable as a ventilator in a wall of 8″ glass block. Used in the latter application, the *Plyco* unit's $13.60 price is considerably less than that of a metal counterpart.

Manufacturer: The Kohl Co., Elkhart Lake, Wis.

continued on p. 250

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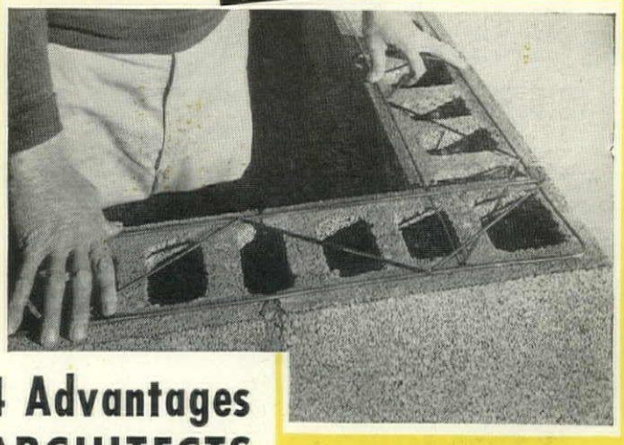
SEE THE DIFFERENCE that makes the BIG difference!

STRONGER! It's NEATER!

Butt Weld DUR-O-WAL WITH TRUSSED Design



4 Advantages ARCHITECTS have been quick to see

1 EXTRA STRENGTH
Premium quality steel to special specifications provides high strength in limited mortar area.

2 TIGHTER MORTAR JOINTS
Compact Dur-O-waL unit is used in the standard modular ⅜" mortar joint. Flush-designed Dur-O-waL is butt welded to do the job.

3 SPEED, ECONOMY
Because of the quality hardness of the steel and manufacturing precision, Dur-O-waL readily falls into place . . . eliminates the wasteful inefficiency of unwieldy rods.

4 DEPENDABLE SUPPLY
With the present increase in steel supply, indications are that Dur-O-waL will continue to be available for prompt delivery.

Patented Dur-O-waL is now available in both lap and butt weld to give maximum strength to masonry walls.

ACROSS the nation the building industry is hailing butt weld Dur-O-waL.

This superior reinforcing member utilizes architecture's oldest reinforcing principle . . . trussed design . . . for both vertical and horizontal reinforcing. Electrically welded of premium quality steel (strength 100,000 p.s.i.), Dur-O-waL handles fast, lays flat, cuts time and costs. Write plant nearest you.

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The backbone of steel for EVERY masonry wall.

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Cedar Rapids Block Company
Cedar Rapids, Iowa

Dur-O-waL Products of Alabama, Inc.
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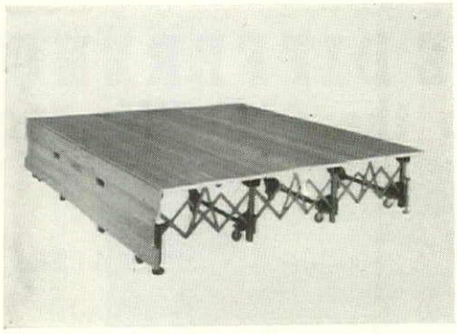
Birmingham 7, Alabama



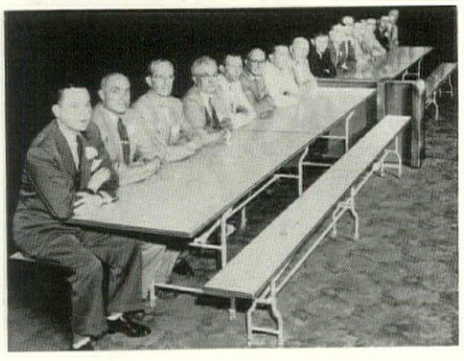
STAGE-ON-WHEELS is easily set up, easily stored

A boon to the flexible schoolroom is the *Horn* folding stage, a completely portable unit with a select fir floor mounted on a sturdy steel understructure. The stage is merely rolled into position and secured with floor stops. When no longer needed, it can be accordioned into a compact bundle and wheeled away to free the area for other purposes. Heights of 15″ and 24″ and widths of 6′ up to 16′ are available. Each size can be purchased with from one to 19 folding sections; each section is 22″ wide and folds into a space 3½″ deep. Average prices run about $4.50 per sq. ft. for the 15″ height and $5 for 24″ height including delivery.

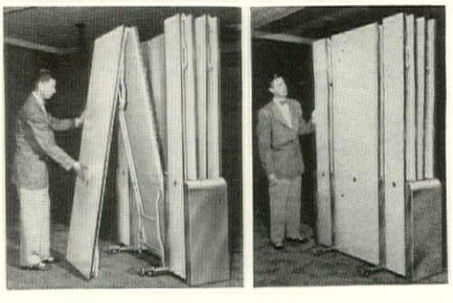
Manufacturer: The Brunswick-Balke-Collender Co., 623 S. Wabash Ave., Chicago, Ill.

BIG TABLE AND BENCH SET folds up, rolls away

Seating capacity for 40 tots or 32 teenagers is supplied by *Mobil-Fold*, a set of two 14′ tables and four freestanding 14′ benches which fold out of a steel caster-equipped truck. For speedy refolding, the set is used attached to the truck, though the six pieces also may be completely removed and rolled around at will.



When not in use the set can be kept against a wall or in a corridor. Made of tubular steel, with plastic-faced ¾″ mahogany plywood



tops, the set is well suited for rigorous school service. It sells for $550 FOB Detroit.

Manufacturer: Schieber Sales Co., Detroit, Mich.

PRIMER made for porous masonry

While concrete blocks made with lightweight aggregates are becoming popular because of their good insulating qualities and easy handling, their interesting texture has posed a paint problem. Now a good finish job on porous masonry is said to be assured by using Medusa's *Ruf-Seal* cement paint, a prime coat developed principally for lightweight aggregate masonry. The manufacturer recommends that it be worked into the surface with a scrub brush and, for best results, cured like regular cement paint with a fine fog spray of water. Available only in white, it retails at $5.75 for a 25 lb. package.

Manufacturer: Medusa Portland Cement Co., 1000 Midland Bldg., Cleveland, Ohio.

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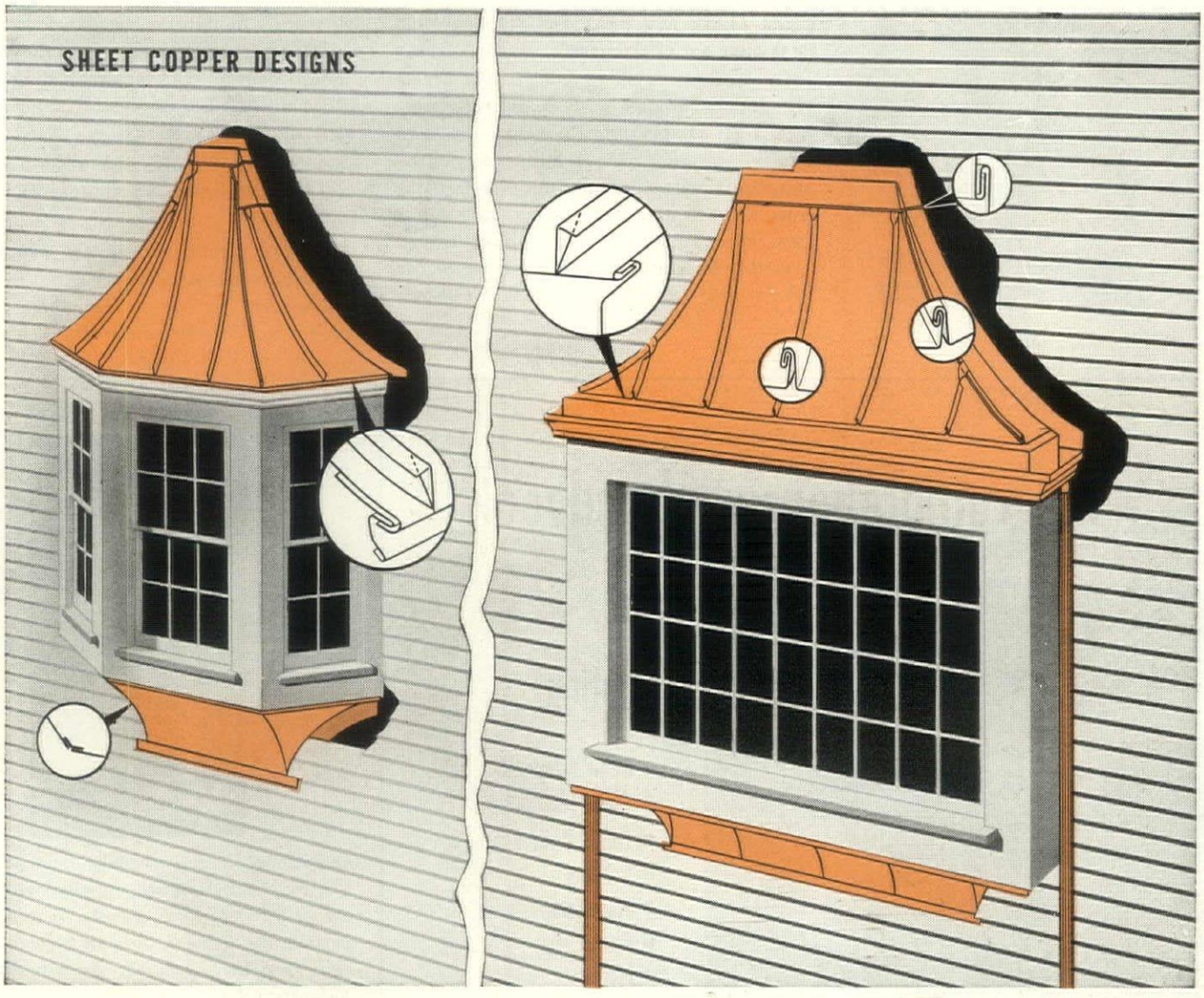


"Economy Copper" Roofing for small areas offers long-lasting protection at lower cost

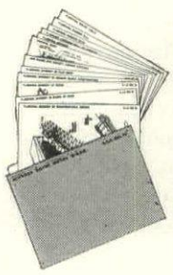
For the roofing of bay windows and entrance hoods, particularly where curved surfaces are involved, copper is the ideal material because of its pliability, ease of joining and soldering.

On such roofs it is possible to reduce material and labor costs by using Economy* Copper Roofing, a lightweight (10 oz. per sq. ft.) copper sheet measuring 16″ x 72″.

Installed according to accepted practices, the closer seam spacings create a desirable architectural effect and the narrower roof pans, with a ¾-inch standing seam, provide a durable, non-rusting roof covering that is strong, rigid and weatherproof.

Economy Copper Roofing is an ANACONDA product and is available from sheet metal distributors handling ANACONDA Sheet and Roll Copper. 5344

*Reg. U. S. Pat. Off.



Do you have the FREE Anaconda Portfolio of Sheet Metal Drawings?
Each drawing shows a new or improved way to apply sheet copper. Each is printed on a separate 8½ x 11-inch page, handy for quick-reference filing. This entire series may be obtained absolutely FREE. Write today for Portfolio S to **The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.**

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CLEAR GLASS AND GRAY PLASTIC SANDWICH keeps glare out of classroom

Taking two layers of window glass and laminating them around a sheet of transparent gray vinyl, Pittsburgh Plate has produced *Dusklite*, an effective yet inexpensive glare-control product. (Actually the process is the same as that used for making auto safety glass except that the plastic layer is pigmented.) Designed primarily for use in ribbon windows and ventilator units in conjunction with light-directing glass-block panels, *Dusklite* is said to eliminate the need for blinds, louvers and other shading devices. Price to the trade is about $1.50 a sq. ft. in sizes up to 15 sq. ft.

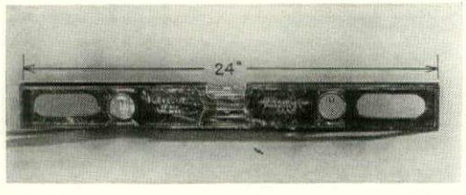
Manufacturer: Pittsburgh Plate Glass Co., 632 Dusquesne Way, Pittsburgh, Pa.

ALUMINUM DOORS put together with bolts resist impact and vibration

Expanding its line of aluminum building products, Kawneer announces a moderately priced series of aluminum doors incorporating bolted construction. The new units, available in sizes from 3′ x 7′ up to 6′ x 7′ in single-

and double-acting models, feature plastic glazing channels which, by eliminating putty, are said to cut glazing costs. The bolts connecting the corners through top and bottom rails are held securely by vibration-proof locknuts. Each door unit is equipped with pull handle and push bar, concealed floor-type closers, threshold, and standard 1-5/32″ lock cylinder. Installed cost of a single-acting door is about $215.

Manufacturer: The Kawneer Co., Niles, Mich.



PLASTIC LEVEL takes hard knocks without breaking

The properties of plastic are put to good use in *Level-it*, a 24″ surface and plumb level which is shatterproof and noncorrosive, does not scratch tile nor conduct electricity, and weighs but 12 oz. The instrument's glass bubble vials are imbedded in acrylic sheaths, which provide protection during rough handling, magnify the bubbles and also, by eliminating metal guards, make the level easier to read from any direction. This model is priced at $5.98; *Level-it* is also available in smaller sizes.

Manufacturer: Creative Plastics Corp., Stony Brook, L.I., N.Y.

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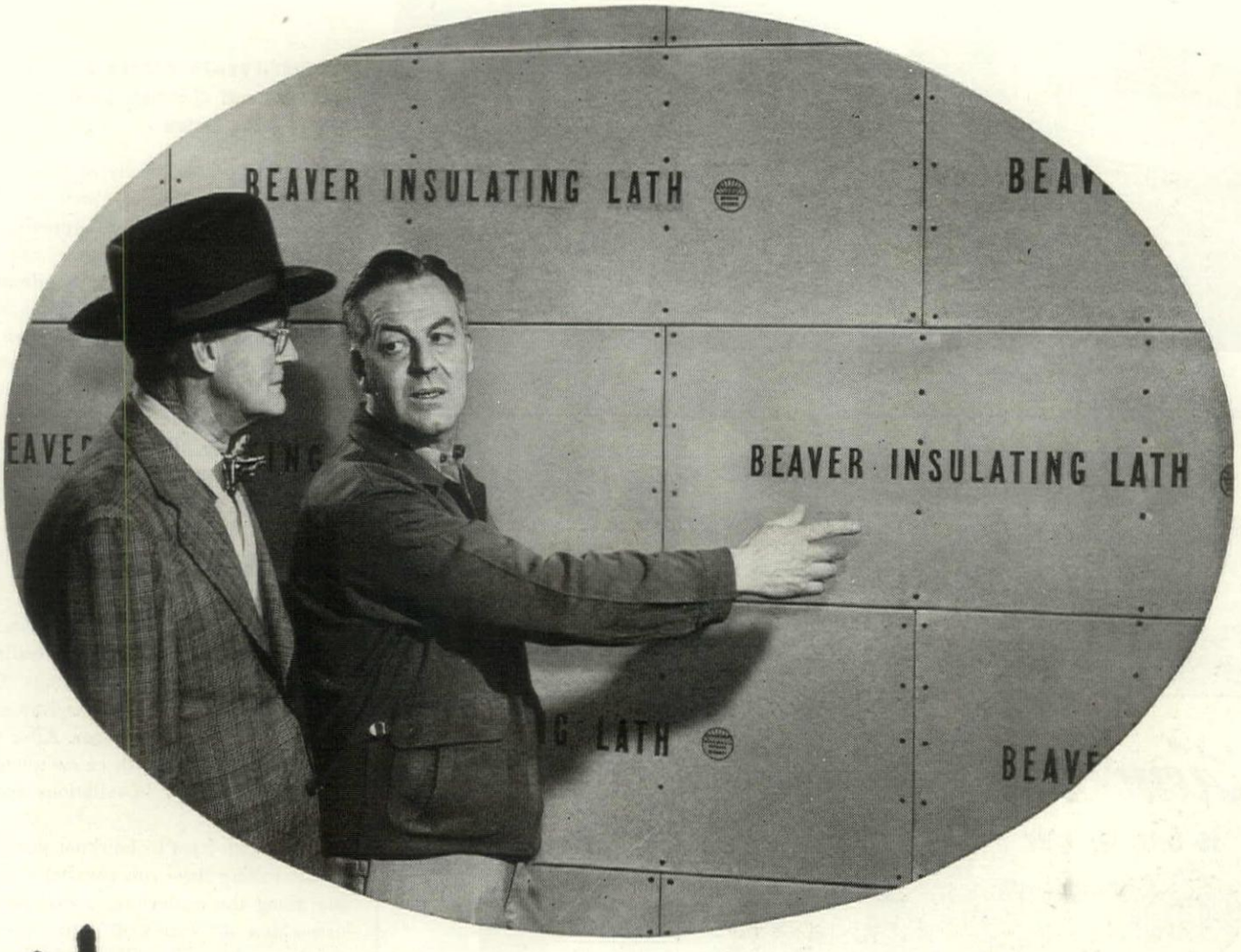

Now... THE ONLY GYPSUM INSULATING LATH YOU CAN IDENTIFY IN PLACE

One More Reason for Specifying BEAVER Insulating Gypsum Lath

To make your job a little easier when checking construction on a lathed-out building, *Beaver Insulating Lath*, as shown, is clearly marked on every piece. It is there for positive identification. It is a quick, sure way for you to tell insulating lath from regular when the lath is in place and to make certain that specifications have been followed. It is a feature that only Certain-Teed's Beaver Insulating Lath offers you.

Beaver Insulating Gypsum Lath, with aluminum foil back, provides an effective barrier against heat, cold, vapor and fire. It is strong—crack resistant; will not swell, buckle or shrink. It provides a perfect plaster base. It combines in one product a highly efficient reflective insulation and vapor barrier with all the advantages of well-known Beaver Gypsum Lath. Whenever you specify insulating lath, make certain it is Beaver Lath.

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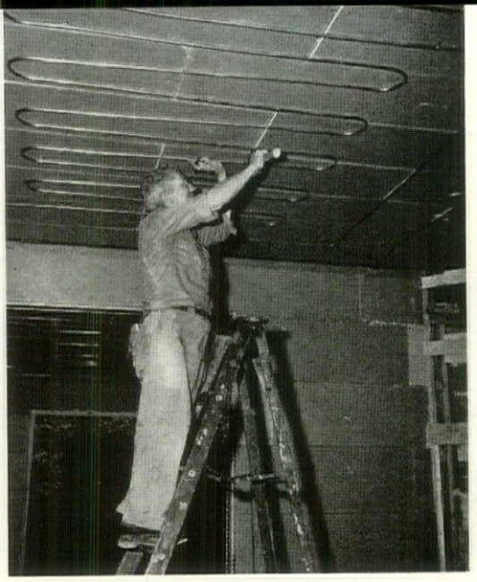
EXPORT DEPARTMENT: 100 EAST 42ND ST., NEW YORK 17, N.Y.

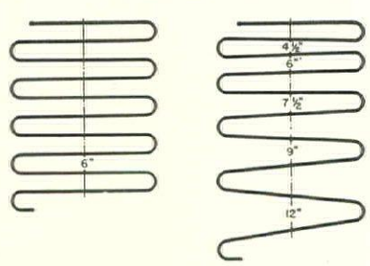


FACTORY-FORMED COPPER GRID knocks 4¢ per lin. ft. off cost of radiant panel; one size adaptable to entire system

Packaged prebent, ready to fasten to ceiling or wall, the Anaconda *Panel Grid* substantially cuts labor costs on copper-coil radiant heating systems. Supplied in one size that can meet all panel design requirements, the new *PG* units are fabricated from 50′ lengths of ⅜″ *type L* water tube. Somewhat harder than the soft annealed copper that contractors purchase in 60′ and 100′ rolls and form into sinuous coils on the job, the *type L* metal has enough give to allow a workman to squeeze or stretch the grid by hand to fit various spacing needs. Leftovers from partially used panels can be straightened out easily for runouts to supply and return lines and for interconnections.

Fewer fittings, less bulk. The trim, straight panels are secured snug to the ceiling in less time and with fewer fastenings than site-formed coils, reports Pennsylvania Heating Contractor Wallace Huebner. After using 100 of the *Panel Grids* in three complete jobs, he stated that the *PG* installations averaged 4¢ less per lin. ft.

Opened up from its bowknot shipping shape so the tubing lines run parallel with 6″ spacing along the centerline, a *PG* section measures about 56″ wide x 60″ long—large enough to serve a 30 sq. ft. ceiling or wall area. (The manufacturer plans to have preformed ½″ tubing for concrete floor slab layouts on the market shortly.) Effective Btu rating for the



6″-spaced grid is 1,800. Over windows and doors and along perimeter walls where there is considerable heat loss, the *PG* units may be compressed to 4½″ spacing. Toward inner walls where less heat is required, the grid can be expanded up to 12″ spacing. Thus the single-size *PG* can be compressed or extended to comply with intricately engineered specifications for a complete radiant panel system.

One end of each section is swaged so the grids can be soldered in series without special fittings. The panels can be attached to rock lath or wood joists above metal lath with U straps, or tied with wire beneath metal lath. More than skin deep, the neatness of application makes it easier for the plasterer to trowel on a smooth, finished ceiling.

Manufacturer: The American Brass Co., Waterbury 20, Conn.

continued on p. 256

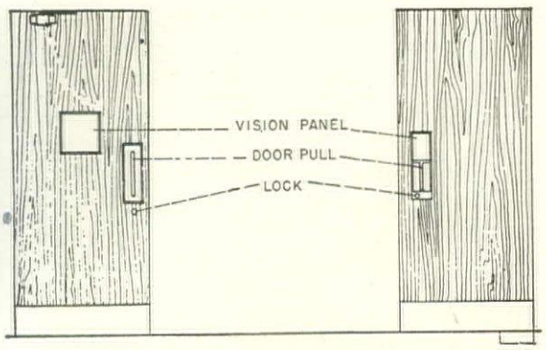
MENGEL *Mahogany* FLUSH DOORS WILL DELIGHT YOUR CLIENTS—

YET COST LESS THAN MANY DOMESTIC WOODS!

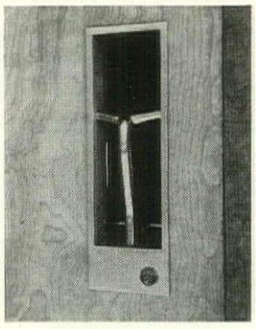
Mahogany! — the very word suggests the ultimate in luxury, beauty, good taste, desirability.

Now The Mengel Company offers you the magic of Mahogany — doors of genuine African Mahogany — *at less cost than for comparable doors faced with most domestic woods!* Get all the facts today!

Door Department
THE MENGEL COMPANY
Louisville 1, Kentucky



Three separate items found on the conventional classroom door (left) are integrated in the Com-Vision hardware.



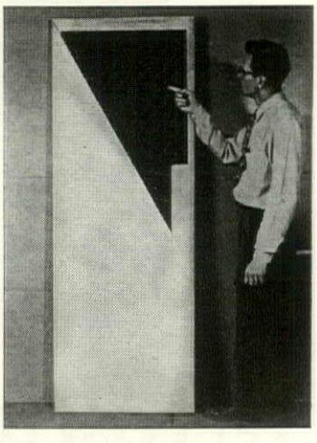
DOOR HARDWARE combines viewer, pull and lock

Thanks to a team of dissatisfied and creative architects, a handsome, cost-saving piece of hardware is now on the market. In planning the Darien Junior High—their first school design commission—Ketchum, Gina & Sharp carried a fresh approach through to the smallest details — in this case, the conglomerate items found on a conventional classroom door. Instead of accepting the standard individual parts, K, G & S summed up vision panel, door pull and lock in one specially made item. It proved to be far less costly than separate stock items; in fact, $10 is the minimum estimated saving on each door. Now Hardware Sales Co., Inc., the unit's custom-crafters, are putting it up for sale as *Com-Vision # HSC-3.*

The hardware comprises a Y-shaped pull, cast of brass and chrome plated, machine-screwed into the exterior half of an aluminum frame. A ½" thick glass push plate doubles as the viewer. The glass sets into the inside half of the frame and is held snug by brass clips. A mortised cylinder lockset with 4½" backset is mounted below the pull and is keyed from the outside, worked by thumb turn from inside.

Com-Vision measures 6½" wide x 18⅝" high and is mounted in a rough opening 5⅞" x 15¾". The unit, with dead lock, costs about $57 not installed as compared to more than $70 for separate items.

Manufacturer: Hardware Sales Co., Inc., 383 Post Road, Darien, Conn.



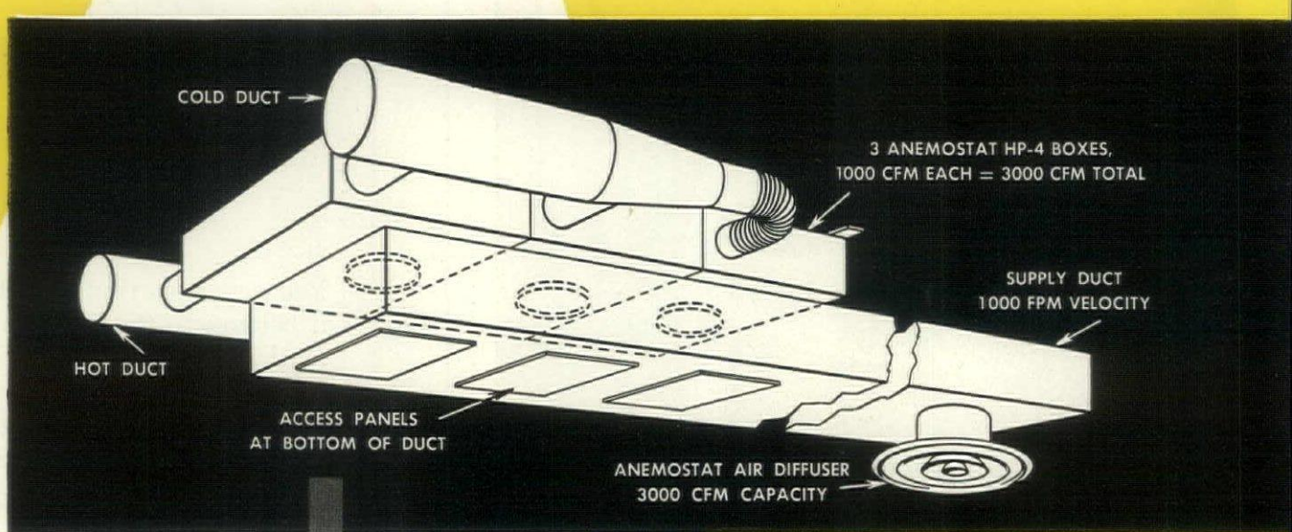
HONEYCOMB CORE DOOR with plastic face resists warpage & wear

The *Chemclad* door for interior or exterior use is constructed to resist dimensional change even in warm, damp climates. Between its moistureproof plastic laminate faces is a honeycomb core of resin-impregnated kraft paper. Only the frame for this rigid, stressed-skin unit is made of wood. The door's smooth, tough surfaces will show little effect from any scratching or scuffing it might receive in school and institutional applications. Prices: $30 to $60, depending on style and size.

Manufacturer: Bourne Manufacturing Co., Detroit, Mich.

Technical Publications p. 260

High Velocity with Unlimited Capacity



High Velocity air conditioning is constantly posing new problems. Here is one of many for which Anemostat has a practical solution.

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How can you handle unlimited volumes of air from a single air diffuser on a High Velocity single or dual duct system?

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Pass-through unit with doors on both sides for use between kitchen and service area.

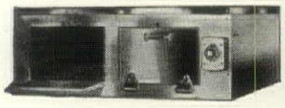
4 of the complete line of 11

Thermotainer Type E

Four compartment unit with full width doors. Large capacity. Shelf supports for 12 x 20 pans.

Thermotainer
ELECTRIC FOOD WARMERS

Ideal hot food storage for domestic, institutional and commercial use



Thermotainer Type UC

Small, one or two compartment unit for use under steam table or serving counter. Ideal where space is limited.

Thermotainers made in standard types and sizes, or to your specifications

Thermotainer Type AA

Combination worktable and hot food storage unit. In 2, 3 or 4 section sizes. 34 inches high, 30 inches wide.

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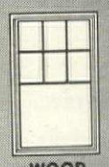
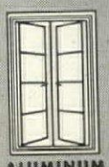
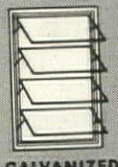


WOOD



ALUMINUM

STEEL



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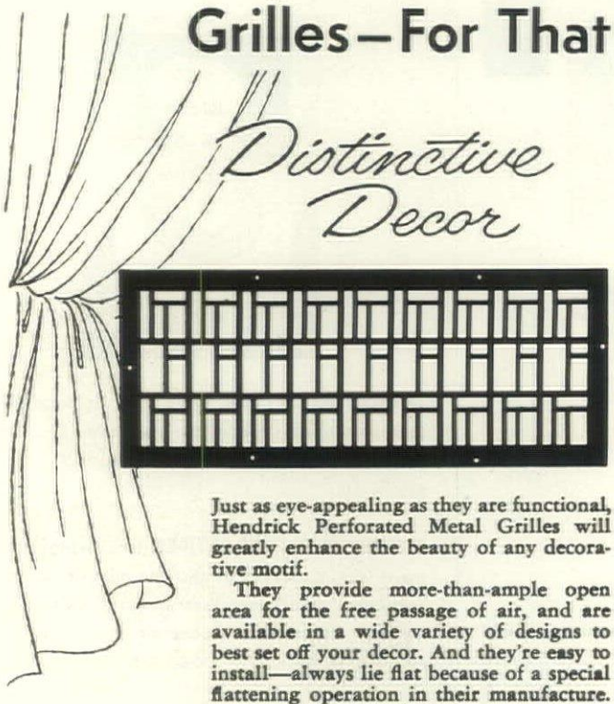

Just as eye-appealing as they are functional, Hendrick Perforated Metal Grilles will greatly enhance the beauty of any decorative motif.

They provide more-than-ample open area for the free passage of air, and are available in a wide variety of designs to best set off your decor. And they're easy to install—always lie flat because of a special flattening operation in their manufacture. For more complete details write Hendrick today!

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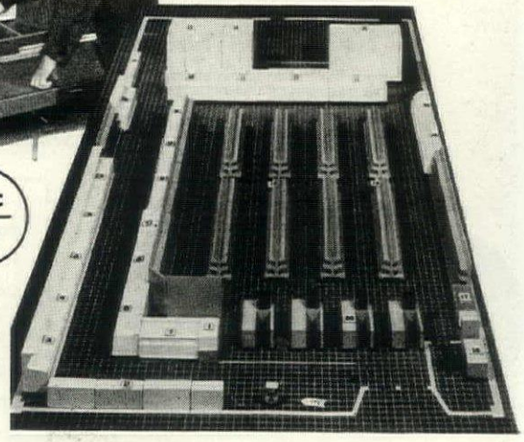

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Write Store Planning Department
Tyler Fixture Corporation, Niles, Michigan

TECHNICAL PUBLICATIONS

SUN CONTROL. Sun Position, Heat Gain and Shading Data Calculator. Ingersoll Products Div., Borg Warner Corp., Chicago 4, Ill. 2 pp. 8½" x 11"

This easy-to-use slide chart presents comparative data on heat gain through bare glass windows and through windows shaded with *Koolshade* louvered screening. Worked out according to data derived from ASHVE guide and Pittsburgh Testing Laboratories, the Calculator covers all window orientations from sunup to sundown through the four seasons. Insert cards corresponding to any part of the country are available from 26° to 46° latitude in 4° intervals.

FLOORING. The Effect of the Use of Floor Wax on Vinyl Flooring. Chemical Specialties Manufacturers Assn., Inc., 110 E. 42 St., New York, N.Y. 11 pp. 8½" x 11"

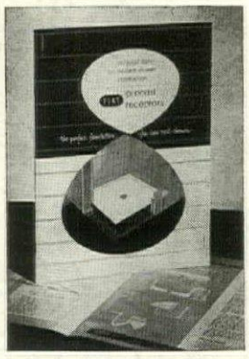
While vinyl plastic flooring has rapidly gained favor as a resilient floor covering, there is considerable variance of opinion—largely the result of different statements by manufacturers—on how to take care of it once put down. To help clear up the confusion voiced by dealers, installers and maintenance people, the Chemical Specialties Manufacturers Assn. tested representative brands of vinyl flooring. Slip, scratch and soil resistance and gloss were compared on waxed and unwaxed specimens. According to the tabulated results in this report it looks as if waxing is still desirable for good maintenance. (Alternate upkeep suggestion from makers of all-vinyl tile is that the flooring be machine-rubbed occasionally with fine steel wool for a rich satin finish.)

MASONRY PAINTS. Bakelite and Vinylite Resin Coatings for Masonry. Bakelite Co., 260 Madison Ave., New York 16, N.Y. 8 pp. 3½" x 8½"

AIR CIRCULATION. Aerovent Macheta Airfoil Axial Fans, Catalogue No. 20-A. Aerovent Fan Co., Inc., Piqua, Ohio. 64 pp. 8½" x 11"

HEATING. Guide to the Selection and Use of Portable Space Heaters. Herman Nelson Div., American Air Filter Co., Inc., 1824 Third Ave., Moline, Ill. 36 pp. 5½" x 8½"

ACOUSTIC MATERIAL IN INTERIOR DESIGN. Tone. Armstrong Cork Co., Lancaster, Pa. 10 pp. 8¼" x 10½"



SHOWER RECEPTORS. Fiat Precast Receptors, Manual 115. Fiat Metal Manufacturing Co., 21-33 Borden Ave., Long Island City 1, N.Y. 12 pp. 8½" x 11"

INDUSTRIAL TESTING DEVICES. Measuring Equipment for Laboratory and Production Testing Including Radiation Instruments, GEC-1016A. General Electric Co., Schenectady 5, N.Y. 64 pp. 8½" x 11"

MAINTENANCE LIGHTING. Group Lamp Replacement Pays Off, 1B-3239. Inquiry Bureau, General Electric Lamp Div., Nela Park, Cleveland 12, Ohio. 10 pp. 8½" x 11"

PLANT ELECTRIC POWER. Industrial Power Distribution Idea Book, GEA 5900. General Electric Co., Schenectady 5, N.Y. 28 pp. 8½" x 11"

continued on p. 264

Your *buck* goes further!

MINNESOTA, famed land of wildlife and changing seasons, is headquarters for some of the country's finest White-Tail deer hunting... it's a stimulating sport in the beauty of Minnesota's late autumns.

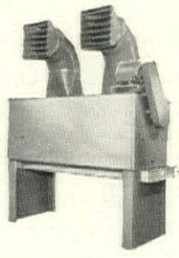
HORIZONTAL UNIT HEATERS

These unit heaters are offered for normal applications where horizontal air flow is desired. In 24 sizes with capacities ranging from 21,600 to 360,000 Btu per hour.

McQuay Down Flow Unit Heaters

Heating dollars go further when McQuay Down Flow Unit Heaters are installed. They are especially recommended for saving heat ordinarily wasted in buildings with high ceilings. These vertical unit heaters have the famous Ripple Fin Coils. Providing peak heating efficiency, they lower heating costs by circulating evenly and gently this normally stratified air.

In the McQuay line are 22 down flow units to meet your exact requirements. Capacities range from 25,400 to 500,000 Btu per hour. Four styles of directional air diffusers are available to provide any desired air distribution. Consult the McQuay representative in your city or write McQuay Inc., 1609 Broadway N.E., Minneapolis 13, Minn.

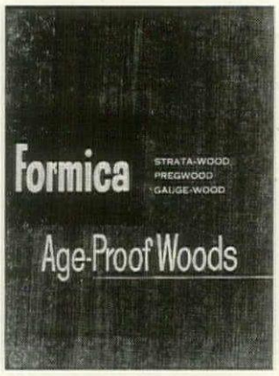


BLOWER TYPE UNIT HEATERS

For effective heat distribution over large open areas. Available in 8 sizes... in suspended and floor models, with one and two row coils; capacities from 20,620 to 1,632,000 Btu per hour.

McQuay INC.

HEATING • AIR CONDITIONING REFRIGERATION



RESIN-TREATED WOOD. Formica Age-Proof Woods. The Formica Co., 4539 Spring Grove Ave., Cincinnati 32, Ohio. 8 pp. 8½" x 11"

LIGHTWEIGHT AGGREGATE. Permalite, the Leading Perlite Aggregate for Better Plaster and Concrete, PA-26. 8 pp. Typical Fireproofing Details for Steel Columns, PA-7. 4 pp. Typical Fireproofing Details for Suspended Ceiling under Noncombustible Construction, PA-9. 4 pp. Permalite for Residential, Commercial and Industrial Construction, PB2. 4 pp. Building Products Div., Great Lakes Carbon Corp., 18 E. 48 St., New York 17, N.Y. 8½" x 11"

WIRING COMPUTER. Hatfield Wire Data-Wire Weight Computer. Hatfield Wire & Cable Div. of Continental Copper & Steel Industries, Inc., Hillside, N.J. 6½" x 3"

WIRING. Type C. Silic-O-Netic Overload Relay, Bulletin 5101A. Heinemann Electric Co., 388 Plum St., Trenton 2, N.J. 4 pp. 8½" x 11"

HEATING. Heating Problems? It Pays to Use Unit Heaters, Bulletin No. 14. Industrial Unit Heater Assn., 2159 Guardian Bldg., Detroit 26, Mich. 12 pp. 8½" x 11"

HEATER MAINTENANCE. The Care and Maintenance of Steam and Hot Water Unit Heaters, Bulletin No. 12. Industrial Unit Heater Assn., 2159 Guardian Bldg., Detroit 26, Mich. 4 pp. 8½" x 11"

PUMPS. For Medium Pressures. CNTA Multi-Stage Centrifugal Pumps., Form 7251. Ingersoll-Rand Company, 11 Broadway, New York 4, N.Y. 16 pp. 8½" x 11"

AIR EXHAUST. Jenn-Air Power Exhausters, Bulletin 53-B. Jenn-Air Products Co., Inc., Architects & Builders Bldg., Indianapolis 4, Ind. 6 pp. 8½" x 11"

PLASTER. Metal Lath and Plaster Solid Partitions with Channel Studs, Technical Bulletin No. 5. Metal Lath Manufacturers Assn., Engineers Bldg., Cleveland 14, Ohio. 8 pp. 8½" x 11"

GLASS FIBER PRODUCTS. How Fiberglas Products Make Schools More Efficient, Comfortable, Economical. Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, Ohio. 11 pp. 9" x 12"

FILTER. M.S.A. Ultra-Aire Space Filter for Air Purification. Bulletin 1505-1. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa. 4 pp. 8½" x 11"

HEATING. Powermaster Packaged Automatic Boilers for Light Oil, Heavy Oil, Gas or Combination Gas/Oil Firing. Bulletin No. 1219. Orr & Sembower, Inc., Morgantown Rd., Reading, Pa. 14 pp. 8½" x 11"

WIRING. Wire and Cable for the Chemical Industries, Booklet No. 19-312. Construction Materials Div., General Electric, Bridgeport 2, Conn. 19 pp. 8½" x 11"

STAINLESS STEEL. You Can Get More Square Feet per Pound of Stainless Steel Sheet with Stainless Rigidized Metal. Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga. 4 pp. 8½" x 11"

Stopping rust with Rust-Oleum 769 Damp-Proof Red Primer
. . . for double protection use Rust-Oleum finish coatings
available in many colors, aluminum and white

RUST-OLEUM®

STOPS RUST!

Applied by brush, dip, or spray.

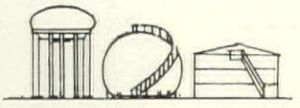
Just scrape and wirebrush to remove rust scale and loose particles . . . then brush Rust-Oleum 769 Damp-Proof Red Primer *directly over the sound rusted surface.* Chemical pre-cleaning and other costly preparations are *not* usually required. Rust-Oleum finish coats in many colors provide *double protection.* Specify Rust-Oleum . . . prompt delivery from Industrial Distributor stocks in principal cities.

RUST-OLEUM CORPORATION
2505 **Oakton Street, Evanston, Illinois**

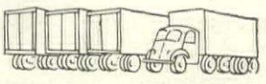
FREE SURVEY: Ask a Rust-Oleum specialist to conduct a survey including actual applications, tests, and recommendations. No cost or obligation.
See Sweets for nearest Rust-Oleum distributor or write for literature today.

. . . proved throughout industry for over 25 years

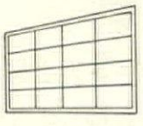
Such fields as Petroleum, Marine, Railroad, Mining, Agricultural, Steel, General Industry are but a few who rely upon Rust-Oleum. General weathering, heat, chemicals, salt water atmosphere, fumes, etc., are only a few of the conditions resisted by Rust-Oleum.



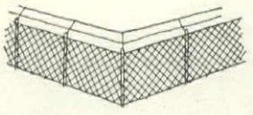
Water tanks, gas tanks, fuel tanks—Rust-Oleum protects your investment.



One truck, or a fleet of trucks, applied over rust, Rust-Oleum keeps them looking better . . . in service longer.



Metal sash and steel windows, roofs, gutters, fire escapes, railings—indoors and out need Rust-Oleum to stop rust.



Wire fence maintenance? Rust-Oleum's Extra-Long Nap Lamb's Wool Roller cuts re-coating costs up to 50% in some cases.

There is Only One Rust-Oleum

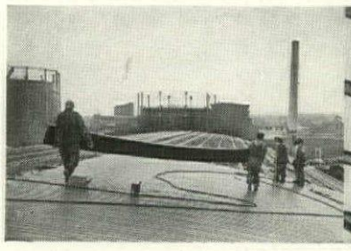
Rust-Oleum is an *exclusive formula* developed by a Master Mariner during more than 20 years battling actual rust conditions at sea. It incorporates a *specially-processed* fish oil vehicle that will *dry*, is odor-free, and is formulated in *many colors.* Be sure you specify genuine Rust-Oleum. Accept no substitute.

ATTACH TO YOUR LETTERHEAD-MAIL TODAY!

RUST-OLEUM CORPORATION
2505 **Oakton St., Evanston, Illinois**

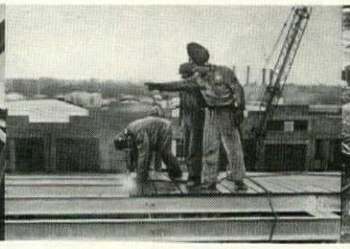
- ☐ Have a Qualified Representative Call
- ☐ Free Survey
- ☐ Complete Literature
- ☐ Nearest Source of Supply

YOU SAVE TIME... MONEY... STEEL...



Pre-cut, pre-curved (if desired) sheets, up to 22 feet in length, in 18 inch widths, permit fast easy, handling.

Grooved for simple end-over-end attachment, Tri-Rib sheets go down quickly, save valuable building time.



They fasten quickly, too, either by clipping or welding. No complicated dovetails or attachments to slow down work.

And Tri-Rib Roof Deck's sheet size is ideal for fast coverage of large areas because the sheets span several purlins.

WERE QUICK TO SEE ITS POSSIBILITIES—

Wheeling Tri-Rib Steel Roof Deck!

Imagine a roof deck so *light*, so *strong*, it actually saves up to 22 lbs. per sq. ft. of dead weight. Imagine it *saving steel:* not only does it *weigh* less, but it results in lighter supporting structure as well. Imagine it installed so *fast* that a 4-man crew can lay up to 4,000 sq. ft. a day. Then think of it *costing less* than comparable types of roofing. This is Wheeling Tri-Rib Steel Roof Deck – one of the most versatile building products available today. No wonder it has captured the imagination of architects and builders.

The Wheeling line of building materials includes Expanded Metal, Metal Lath and Metal Lath Accessories, Steelcrete Reinforcing Mesh, Tri-Rib Steel Roof Deck, ExM Angle Frame Partitions, Steelcrete Vault Reinforcing.

WHEELING CORRUGATING COMPANY, WHEELING, WEST VIRGINIA

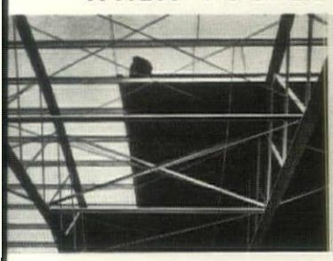
BUILDING MATERIAL DIVISION

ATLANTA BOSTON BUFFALO CHICAGO COLUMBUS DETROIT HOUSTON KANSAS CITY
LOUISVILLE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA RICHMOND ST. LOUIS

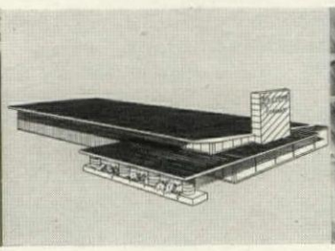
Also when you build specify Wheeling Metal Lath, choice of leading builders for over 60 years!

Wheeling
CORRUGATING COMPANY

WHEN YOU BUILD WITH WHEELING TRI-RIB STEEL ROOF DECK!

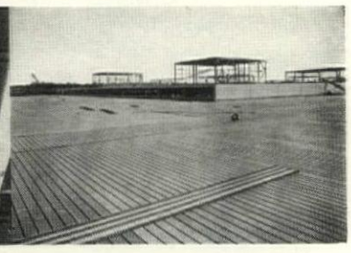


Strength plus lightness permit use of fewer columns, shallower footings, eliminate need for sub-purlins.



Roofs last longer because Tri-Rib is made of Cop-R-Loy, the Copper Alloyed Steel, protected by a baked-on coat of primer.

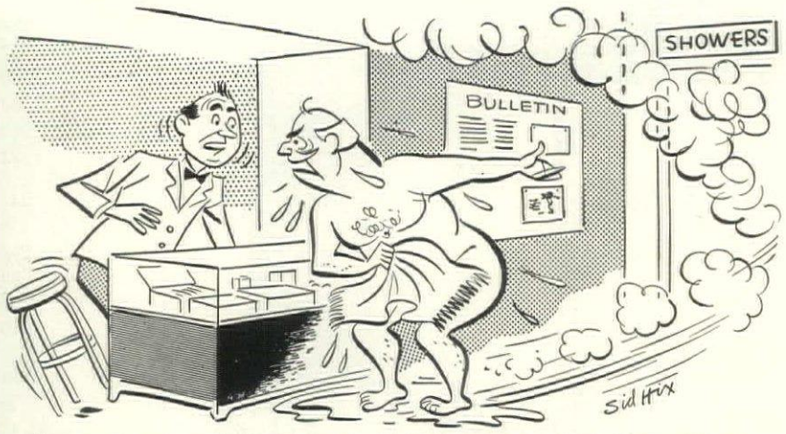
Its pleasing appearance often allows using the deck sheets as a "ceiling" without underfinishing, attaching fixtures to roof.



Designed in accordance with specifications adopted by A. I. S. I. for light gauge structures, dated Jan., 1941.

Advertisers index:

One Moving Part Easily Accessible from the Front. Easy removal of Thermostatic Motor and Valve Assembly with only a screwdriver makes it possible to inspect, clean or flush out mixer if necessary.



"FOR THE LAST TIME, WHEN'S THIS CLUB GOING TO PUT POWERS MIXERS IN THOSE @☆%!!!☆%! SHOWERS!"

Simple

Durable

Construction

Insures Long Life and Minimum of Maintenance

Banish "Booby Trap Showers"

in Clubs, Schools, Hospitals, Hotels, Apartments and Residences

Specify POWERS Thermostatic Water Mixers

"POWERS REGULATED SHOWERS ARE TOPS NO "HALF-SAFE" SHOWERS FOR ME!"

Refreshing · Relaxing Safe Showers

—are always enjoyed by bathers in Powers Thermostatically Controlled showers. Water temperature stays where the user wants it. There's no danger of slipping and falling while trying to dodge an unexpected shot of cold or hot water.

Labor Costs no more to install a quality shower mixer. Powers mixers cost more. They're worth more. They're Safe* 3 ways.

1. No unexpected shots of hot or cold water caused by *pressure* or *temperature* changes in water supply lines;
2. Failure of cold water supply instantly shuts off shower delivery;
3. Being thermostatic Powers mixers stop scalding caused by dead-ends in hot water lines.

POWERS Mixers Stop Waste of Hot and Cold Water. Bathers quickly get water at the right temperature. No waste of time. No waste of hot or cold water. Shower temperature always remains constant wherever bather wants it.

"Keep Everybody Happy" with Powers Regulated Showers

(b34a)

See our catalog in Sweets or Write for POWERS Bulletin 365

***Just ONE Shower ACCIDENT* may cost many times more than POWERS mixers.**

* This mixer complies fully with Federal Specifications WW-P-541a.

Established in 1891 • **THE POWERS REGULATOR COMPANY** • SKOKIE, ILL. • Offices in Over 50 Cities

Advertisers index—continued

For Skylights at their BEST...

DOMED PLEXIGLAS

When you admit daylight through the roof of a building by means of PLEXIGLAS acrylic plastic formed into a dome, you gain the advantages of:

One-Piece Construction—The entire opening is covered by a single leak-proof dome. Troublesome joints, supports and sealing compounds are eliminated.

Light Weight—A complete skylight unit, including weatherproof framing for the dome, has an average weight of only 2 pounds per square foot. You have greater freedom from structural considerations in the placement of skylights.

Breakage Resistance—Safety overhead because of the structural rigidity of the dome shape and the strength and resilience of PLEXIGLAS.

Daylighting Efficiency—White translucent PLEXIGLAS transmits 60%-75% of the daylight, provides complete diffusion, and reduces solar heat. Clear material gives 92% transmission. One-piece dome eliminates opaque cross members.

Minimum Maintenance—Dome shape promotes self-cleaning. Skylights with strong, durable domes of PLEXIGLAS give long trouble-free service.

Domed PLEXIGLAS skylight units, easily and quickly installed, have brought maximum flexibility to daylighting systems in hundreds of installations from coast to coast.

CHEMICALS FOR INDUSTRY

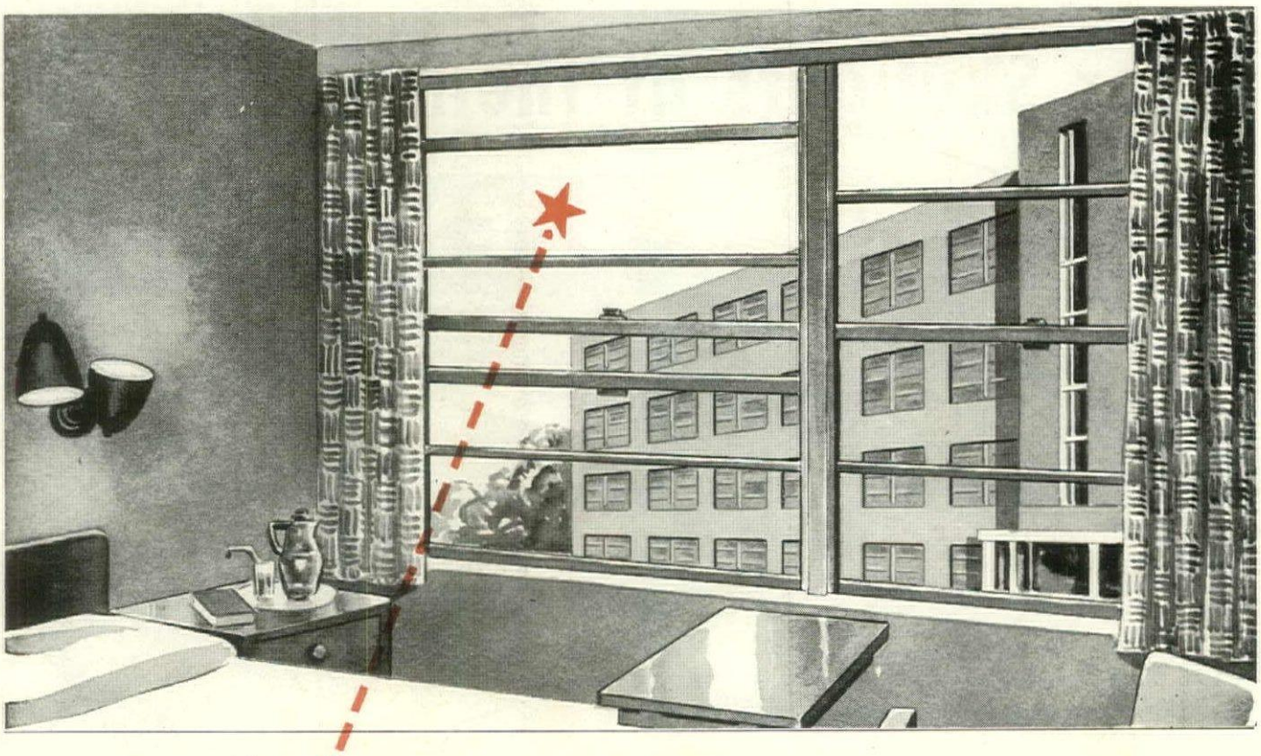
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

PLEXIGLAS *is a trademark, Reg. U.S. Pat. Off. and other principal countries in the Western Hemisphere.*

Canadian Distributor: *Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.*



Giving Buildings . . . Homes . . . and Budgets

Increased Worth

Ualco
U-AL-CO

UALCO ALUMINUM
Double Hung
WINDOWS

Keeping in mind the basic design of the traditionally favored Double Hung Window, Ualco developed it of aluminum to assure everlasting service.

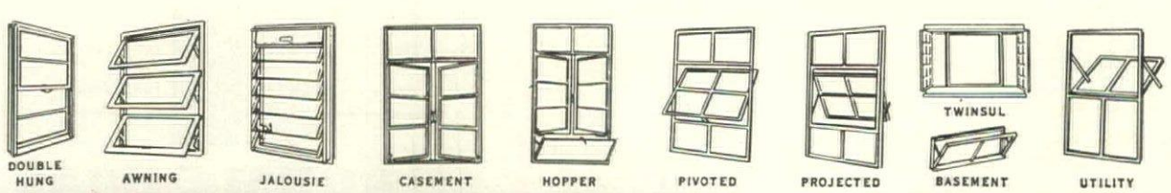
It is structurally perfect. Multi-styled to fulfill the needs of any type of construction. . . institutional, commercial, residential. Engineered to be maintenance-free for the life of the structure.

Precision-built to exacting specifications, the Double Hung includes all the customary details. . . plus added, advance features in keeping with modern architectural trends.

FEATURES: UALCO'S DOUBLE HUNG IS A COMPLETE UNIT WITH **INTEGRAL FIN COMPLETELY SURROUNDING THE WINDOW** . . . EASY, **LOW-COST INSTALLATION, JUST SQUARE** IN OPENING AND **NAIL TO STUDS** . . . FRAME RIGIDITY GIVES **MAXIMUM STRENGTH** . . . WILL NOT FLEX, BIND . . . **COMPLETELY WEATHERSTRIPPED** WITH STAINLESS STEEL AND KOROSEAL . . . **DRAFT-FREE** . . . **DUST-FREE**. . . SCREEN SLOT BUILT-IN . . . **SATIN-SMOOTH FINISHED** BY SPECIAL PROCESS . . . **NO PAINTING EVER.**

SEE OUR CATALOG IN SWEET'S ARCHITECTURAL FILE $\frac{16a}{Un}$ OR WRITE US FOR COMPLETE INFORMATION

UNION ALUMINUM COMPANY, INC. • SOUTHERN SASH SALES & SUPPLY CO. • SHEFFIELD, ALABAMA



WORLD'S LARGEST MANUFACTURER OF ALUMINUM CASEMENT WINDOWS

The *Virgin isle* ... one of the world's most luxurious hotels ... equipped exclusively with ELJER Plumbing Fixtures

Riviera Bath
E-1125

Sylenta Closet
Combination E-5120

Martha Washington
Lavatory E-3045

Caribbean Studios

Managing Director: Henry L. Kimelman
Architect: Harold Sterner, Long Beach, N. Y.
Associate Designer and Interior Decorator: Jac Lessman, New York City
General Contractor: Virgin Islands Construction Co., Inc., St. Thomas, V. I.
Plumbing Consultant: Herman Witchell, New York City

One of the world's most luxurious hotels, the Virgin Isle Hotel on the beautiful Island of St. Thomas in the Caribbean, was designed and built to provide the ultimate in comfort and luxury.

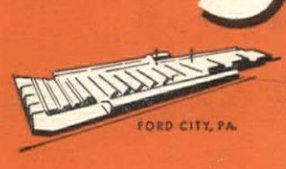
It is extremely significant that Eljer's Fine Plumbing Fixtures and Brass Trim were used exclusively in this 123-room hotel for both private baths and service facilities.

Similarly, *you* will find that Eljer's *complete* line of plumbing fixtures and brass goods will satisfy your most discriminating specifications . . . for every type of building, anywhere in the world. So, for beauty, convenience features, long life . . . for outstanding quality . . . specify Eljer.

For more information on Eljer Fixtures, see Sweet's Architectural File, Sweet's Light Construction File, or write Eljer Co., Ford City, Pennsylvania.

Quality
THROUGH AND THROUGH

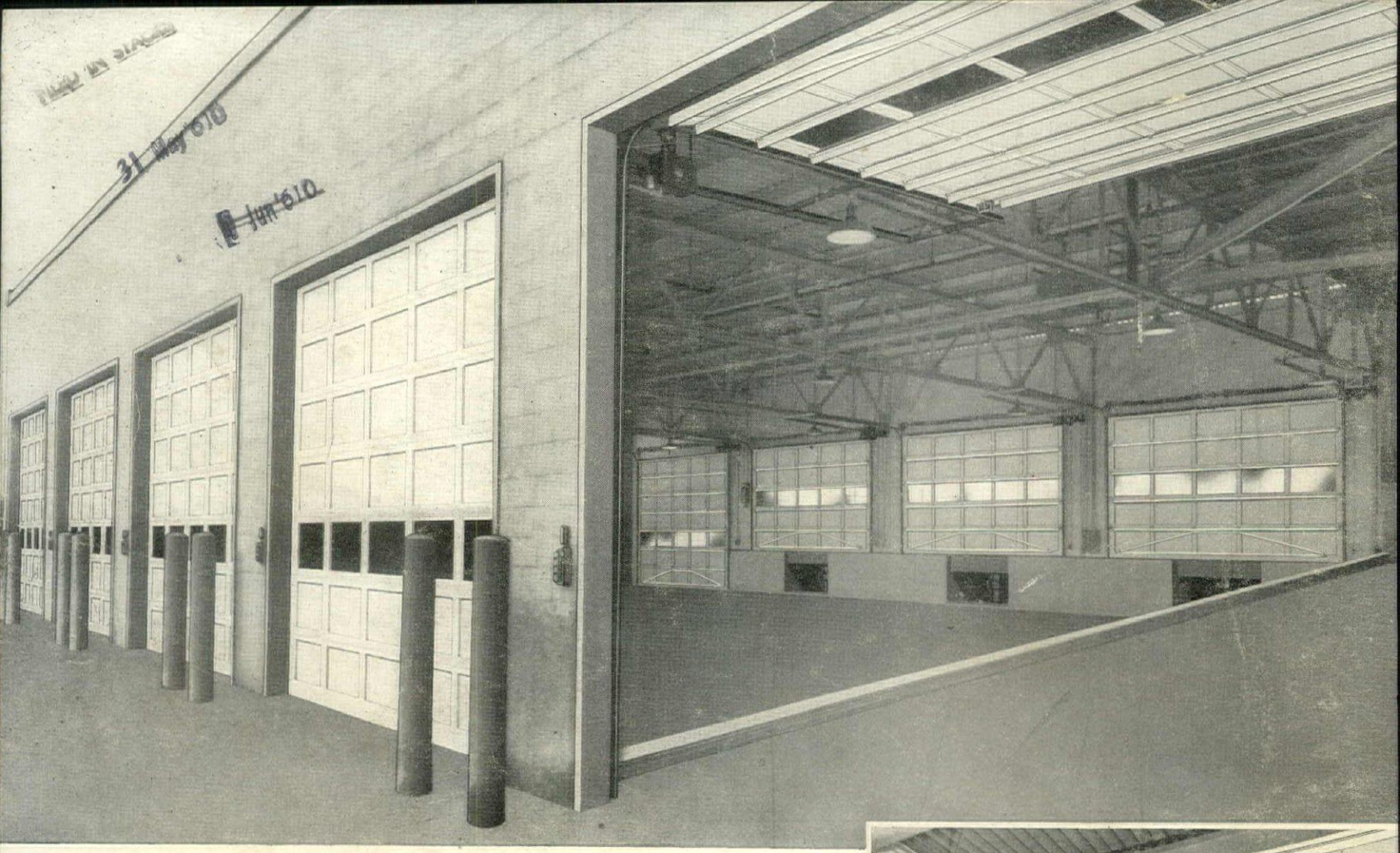
ELJER

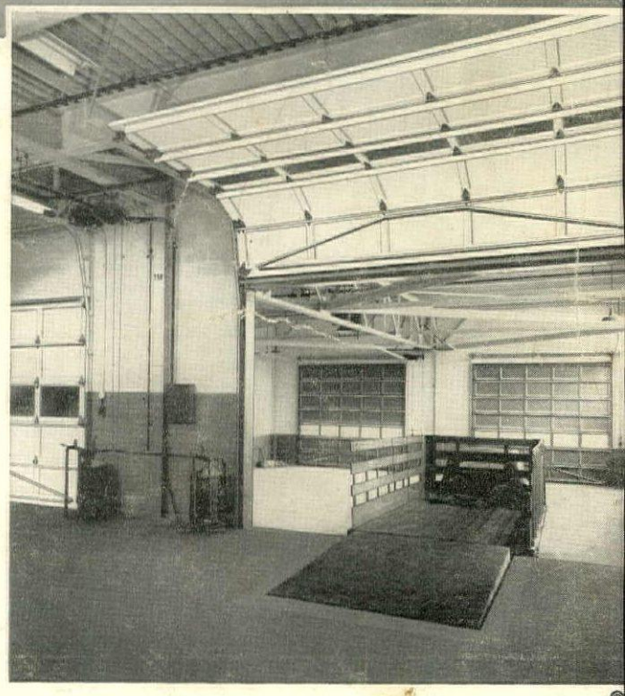


FORD CITY, PA.

MARYSVILLE, OHIO

SALEM, OHIO





Effective use of

The "OVERHEAD DOOR"

Speeds Production

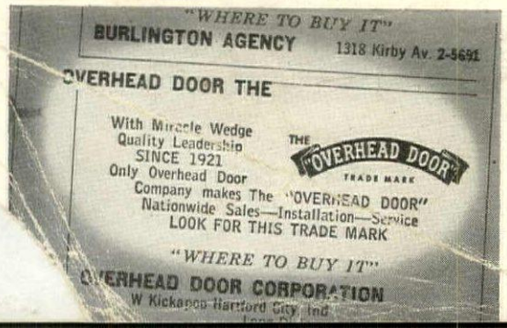
Electric operators soon pay for themselves in time and labor saved. Push button, pull switch or key switch controls expedite traffic and step up production. Electrically operated doors move at a *controlled* speed, saving wear and tear. Operators furnished for The "OVERHEAD DOOR" have rugged, gear-head motors; they give reliable service for many years.

OVERHEAD DOOR CORPORATION, Hartford City, Ind.

Manufacturing Divisions

Hillside, N.J.	Cortland, N.Y.	Oklahoma City, Okla.	Portland, Ore.
Nashua, N.H.	Lewistown, Pa.	Dallas, Tex.	Glendale, Cal.

Look for this trade mark in the yellow pages of your telephone directory. It stands for more than 32 years of quality and leadership!



America's Great Name in QUALITY DOORS...

THE "OVERHEAD DOOR" TRADE MARK

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