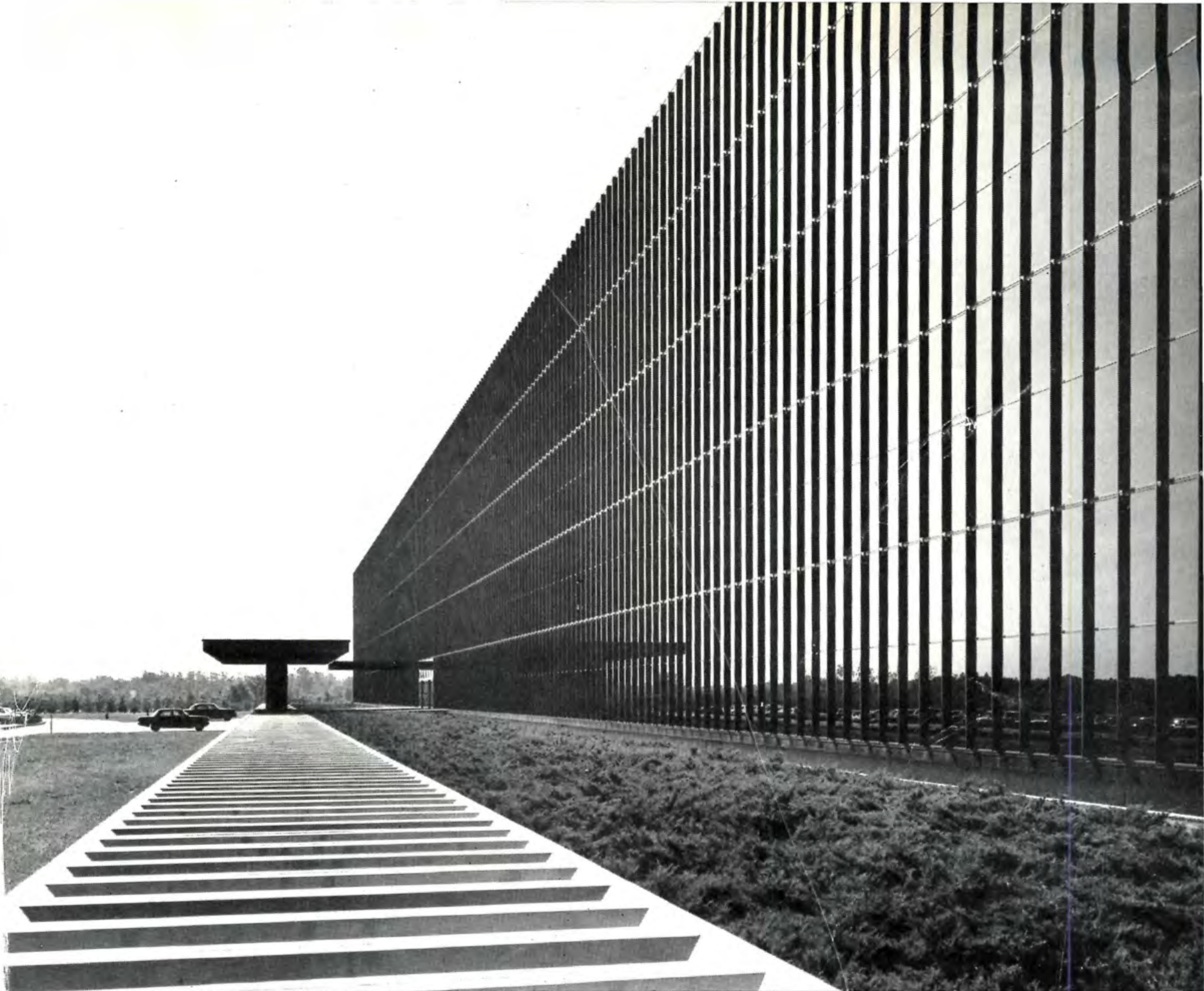

ARCHITECTURAL RECORD

10 OCTOBER 1962 • TWO DOLLARS PER COPY

BUILDING TYPES STUDY: SCHOOLS

"THE DISAPPEARING CITY" BY LEWIS MUMFORD

NEW WORK OF EDWARD DURELL STONE

ENGINEERING LABORATORY DESIGNED BY EERO SAARINEN

FULL CONTENTS ON PAGES 4 & 5

Architectural Engineering

Cover:

Development Center, Bell Telephone Laboratories, Holmdel, N. J. Architect: Eero Saarinen. Photograph by Joseph W. Molitor

ARCHITECTURAL RECORD October 1962 Vol. 132, No. 4 Published monthly, except May 1962, when semi-monthly, by F. W. Dodge Corporation, a McGraw-Hill Company.

Executive, editorial, circulation and advertising offices: 119 West 40th Street, New York 18, N. Y. Western Editorial Office: 2877 Shasta Road, Berkeley 8, Calif. Office of Publication, 10 Ferry Street, Concord, N. H.; second-class mail postage paid at Concord, N. H.

Subscription rate for individuals in the field served $5.50 per year in U. S., U. S. Possessions and Canada; single copies $2.00, except Mid-May 1962 issue $2.95. Further details on page 6. Postmaster: Please send Form 3579 to Circulation Manager, ARCHITECTURAL RECORD, 119 West 40th Street, New York 18, N. Y.

(Western Edition, including *Western Architect and Engineer*)

ARCHITECTURAL

Record Reports

Architects and Buildings

Authors and Articles

Features

RECORD

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October 1962

Building Types Study 312: Schools

Coming in the Record

SIGNIFICANT ARCHITECTURE OF MANY DIRECTIONS

Next month's feature on new houses by Paul Rudolph provides a dramatic indication of how various are the responses of a creative architect to the various opportunities of site and client requirements and material; here, in three completed houses as well as new projects, is current architecture of the first significance.

DESIGNING FOR INDUSTRIAL RESEARCH

One of the most varied and rapidly changing building types today is the industrial research facility, which may be anything from a routine testing laboratory to a space technology research complex. The November Building Types Study will analyze a variety of examples and will feature an article by Frank L. Whitney on basic considerations of laboratory planning.

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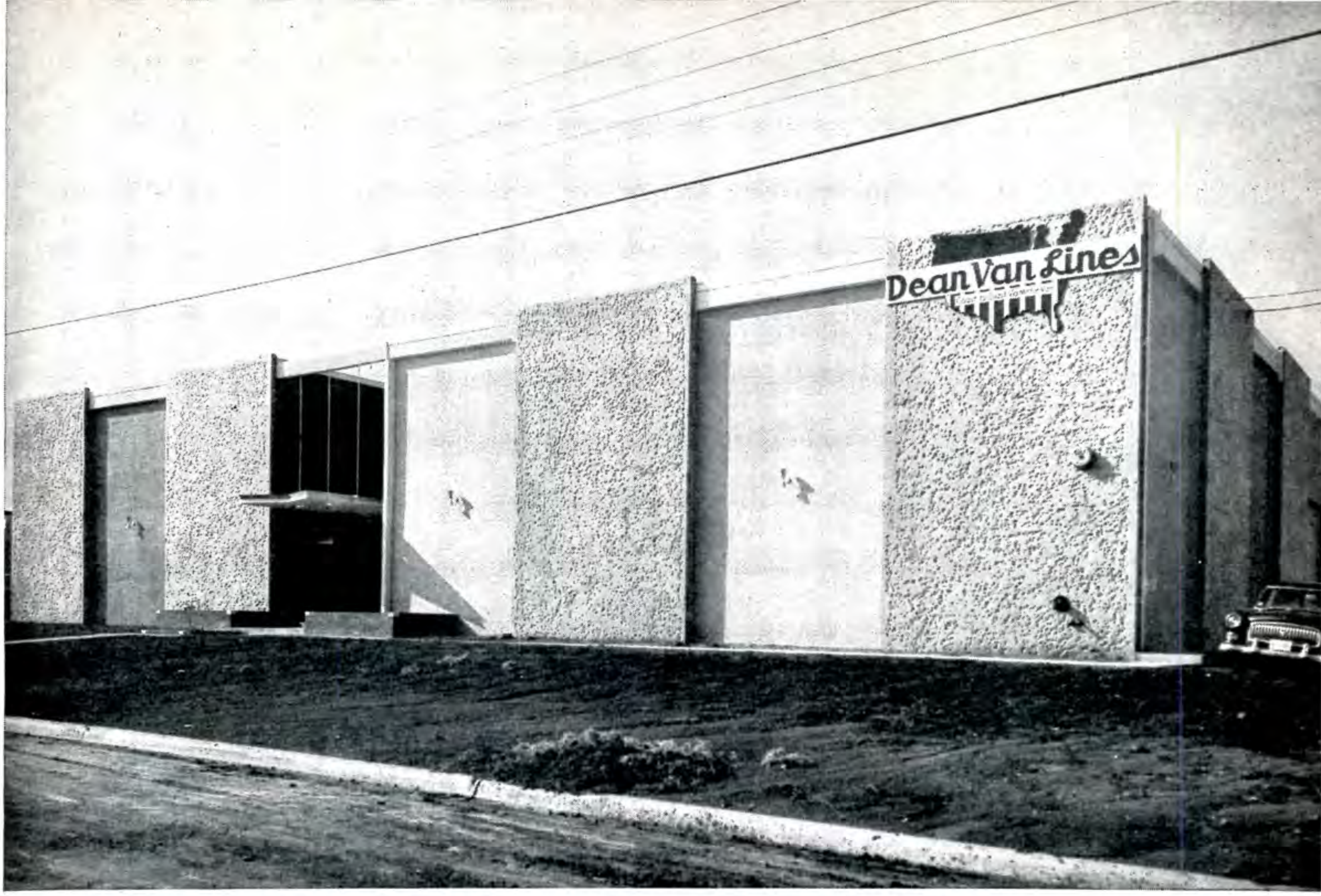

How they're using tilt-up
for savings and distinction

The new storage warehouse of Dean Van Lines in Dallas shows how the economies of tilt-up can be combined with handsome styling. One other business-like touch —the use of uniform, high-quality Lone Star Portland Cement—gets this structure off to a solid start in its profit-making career.

Wall panels were fabricated in two designs. The larger panels were cast over polyethylene-covered sprinklings of crushed rock to give them an interestingly variegated surface. These were left in their natural cement color. The recessed panels were cast with a smooth surface texture, and each painted in one of three colors. The result—a pleasing departure from the conventional warehouse format, and a well-deserved award for design excellence at the 1961 Convention of the American Registered Architects.

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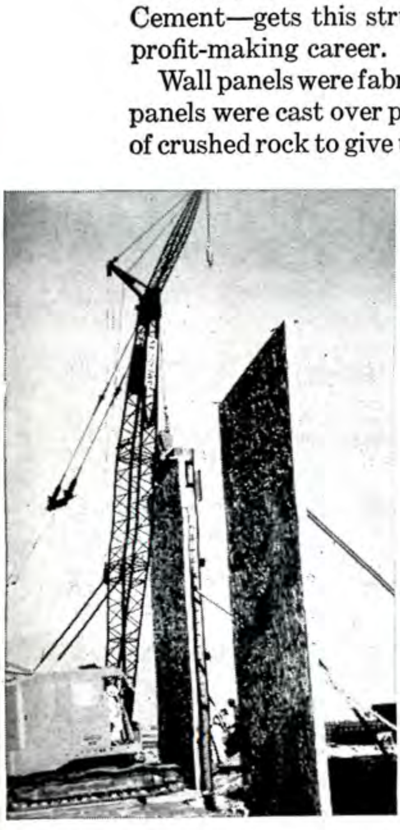

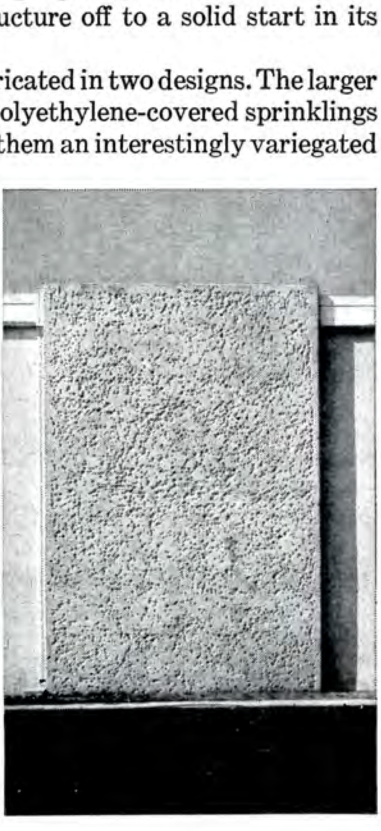

DEAN VAN LINES WAREHOUSE
Owner: HAUGHTON, HINES & TEMPLETON INVESTMENT BUILDERS
Architect: JOHN PRESTON TRAVIS III
Structural Engineer: CHARLES PERRY
General Contractor: TEMPO CONSTRUCTION COMPANY
Subcontractor for Tilt-Up Panels: CONCHO CONSTRUCTION CO.
Lone Star Cement Concrete Furnished By: DALLAS CONCRETE CO.
(All of Dallas)

Walls of Dean Van Lines' 20,250-sq-ft warehouse consist of 6 in. thick x 30 ft high tilt-up panels cast on the slab floor of the building.

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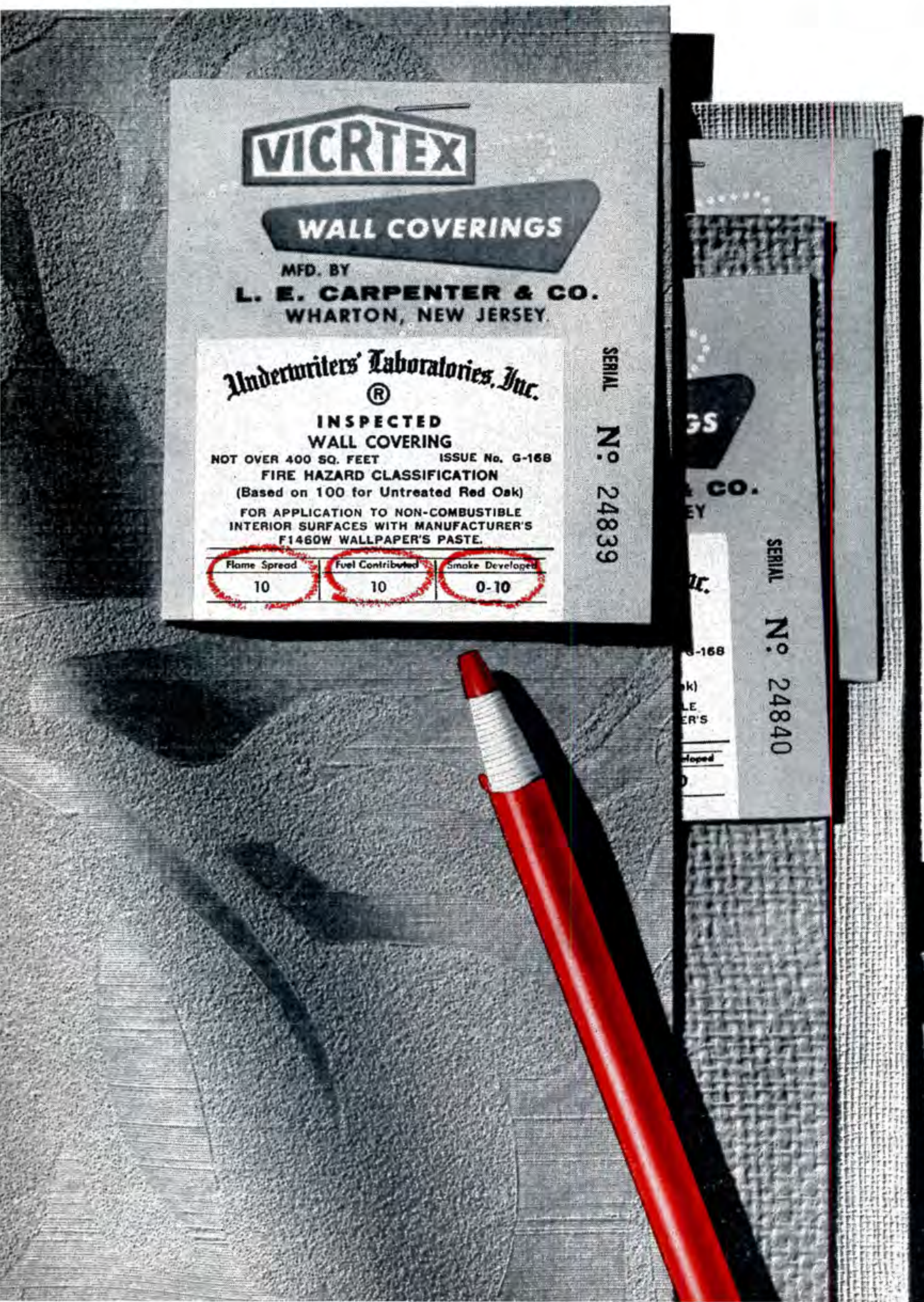

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Mediocrity by Fiat

Governmental attitudes about architecture have always caused this cynical unenthusiast to turn slightly green around the gills. Two months ago in this space I changed the key and wrote hopefully about "Better Federal Architecture?" The question mark in the title is suggestive of a certain amount of caution, but I did express approval of a Presidential directive "which calls for a swing away from what might be called a policy of studied mediocrity." This month the stance is the more familiar one: damn the studied mediocrity.

This time, however, there is a positive note: the cudgels are really those of Congressman Clem Miller of California. He recently used his platform in the House of Representatives to administer a verbal spanking to the General Accounting Office for its attack on "unnecessary or wasteful" expenditures in a public housing project in Marin City, Calif., and so architecture finds another champion.

Last April the GAO, in its role of watchdog over public expenditures, had issued a gratuitous statement to the press criticizing the design of the project. Their objections were pretty picayune: they charged extravagance for the use of balconies, outside access corridors, doors of glass, tile roofs and concrete block walls to enclose yards. The architects, Aaron G. Green and John Carl Warnecke, had no trouble defending themselves. But defending oneself against charges of extravagance is an unhappy duty, and in this case a completely unnecessary one. The project cost was within the budget, and the local housing authority was pleased with the buildings, especially pleased with an architectural achievement which clearly represented amenity value.

What aroused the wrath of Congressman Miller, however, was the assumption by the GAO of the role of arbiter on matters architectural. He particularly spells out the charge that the accounting mind strains to achieve a design for mediocrity.

"In the world of barracks-like public housing, these structures at Marin City give satisfaction and pleasure to see. Yet this is a project singled out by GAO to report adversely. The report was a long time coming, over a year of investigation by a platoon of accountants. GAO seemed determined to find adversely against Marin City. It did this in face of the fact that it met the requirements of law. Yet GAO pressed ahead until it found a basis of its own choosing for an adverse report. It almost seems as though the very fact of creating a pleasing public housing project must find some censure at GAO; that public housing must be spartan rather than esthetic."

This attitude is familiar in government circles, but it never fails to incense this usually humble and obedient servant. We have seen it in the military and in the housing bureaus, in virtually every department of every unit of government that has anything to do with building. Make it look dull; make it look cheap. Congress is no stranger to this attitude; it largely ruined the wonderful program of foreign buildings by the State Department.

But let the Congressman continue:

"The age of accounting stifles some of that [an architecture of imaginative sweep]. And let no man say that we can forego beauty for utilitarianism. Utility is beauty, and has been so for all ages. The angry critic who accepts the barracks architecture at home is crossing to Europe by the planeload to see the outpourings of other cultures and other ages. It is quite clear to me that the Parthenon could never have been built under the watchful eye of GAO. Notre Dame at Paris would not have been attempted with GAO approval. We need not fear for our country when we are putting up great buildings of imaginative design. We need fear for ourselves when we stop doing it."

—*Emerson Goble*

A.I.A. ANNOUNCES 1963 HONOR AWARDS PROGRAM

With the aim of encouraging excellence in architecture, the American Institute of Architects announces its 15th Annual Program of National Honor Awards for current work. Awards will be made for distinguished accomplishment in architecture by an American architect for any building completed since January 1, 1958.

Entries eligible are executed architectural projects designed by registered architects practicing professionally in the United States.

Open to architectural projects of all classifications, the program does not require entrants to designate entries by categories. Equal emphasis will be given to all classifications. An entry may be one building or a related group of buildings forming a single project. It will not be judged in competition with other entries, but on the basis of the architect's solution of the problem and its worthiness for an award of excellence in architecture.

The jury, to be appointed by the A.I.A. Board of Directors, will consist of five architects, corporate members of the A.I.A. representing various regions of the country, one of whom must be an architectural educator.

Judgment of the entries will be made at the Octagon in Washington, D.C., January 28-30, 1963. Deadline for entry slips and fees is November 28. For entry blanks and information, write: 1963 Awards Program, A.I.A., 1735 New York Ave., N.W., Washington 6, D.C.

PRODUCERS SEEK NEW TIES WITH HOMEBUILDERS

The Producers' Council, Inc., an organization closely affiliated with the American Institute of Architects and founded 40 years ago as the "Producers' Committee" of the A.I.A., has decided to seek equally close ties with the nation's home builders.

Don A. Proudfoot, general marketing manager for Barrett Division, Allied Chemical Corporation, made this determination the theme of his acceptance speech as the Council's new president at last month's 41st annual meeting of the Council, held at the Commodore Hotel in New York City.

Mr. Proudfoot noted that while two thirds of the present members of the Council have a "significant interest" in reaching the builder, there are many more top-level companies who are interested in the builder and who are not members today. They *will* be members, he added, when the Council "becomes the effective mechanism with the builders that it is with the architects and the engineers."

First steps toward this end, as outlined by Mr. Proudfoot, will closely parallel the approach to architect relations—close liaison at the local level between Council chapters and home builder associations, development of a seminar series to carry the product message to builders and builder sales representatives' institutes (the first to be held Oct. 18).

Advice from Architects

Two architects were among the speakers on a two-day program which ran concurrently with the Council's annual Chapter Presidents' Conference. Over-all theme was "Serving the Entire Construction Industry."

D. Kenneth Sargent, F.A.I.A., dean of the School of Architecture at Syracuse University, was the architect panel member at a "Critique of Manufacturer Advertising" session based on a recent survey of architect and builder reaction to advertising in the Council's *Technical Bulletin* and the *Journal* of the National Association of Home Builders. Dean Sargent made a strong plea for more informative advertising to architects, reiterating the familiar complaint that too much promotional literature as well as advertising ignores the architect's need for factual, technical data.

Lawrence B. Perkins, F.A.I.A., of the Chicago architectural firm of Perkins and Will, dramatized the key architectural role of the producers by telling them: "You have changed the architectural world more than the architect has."

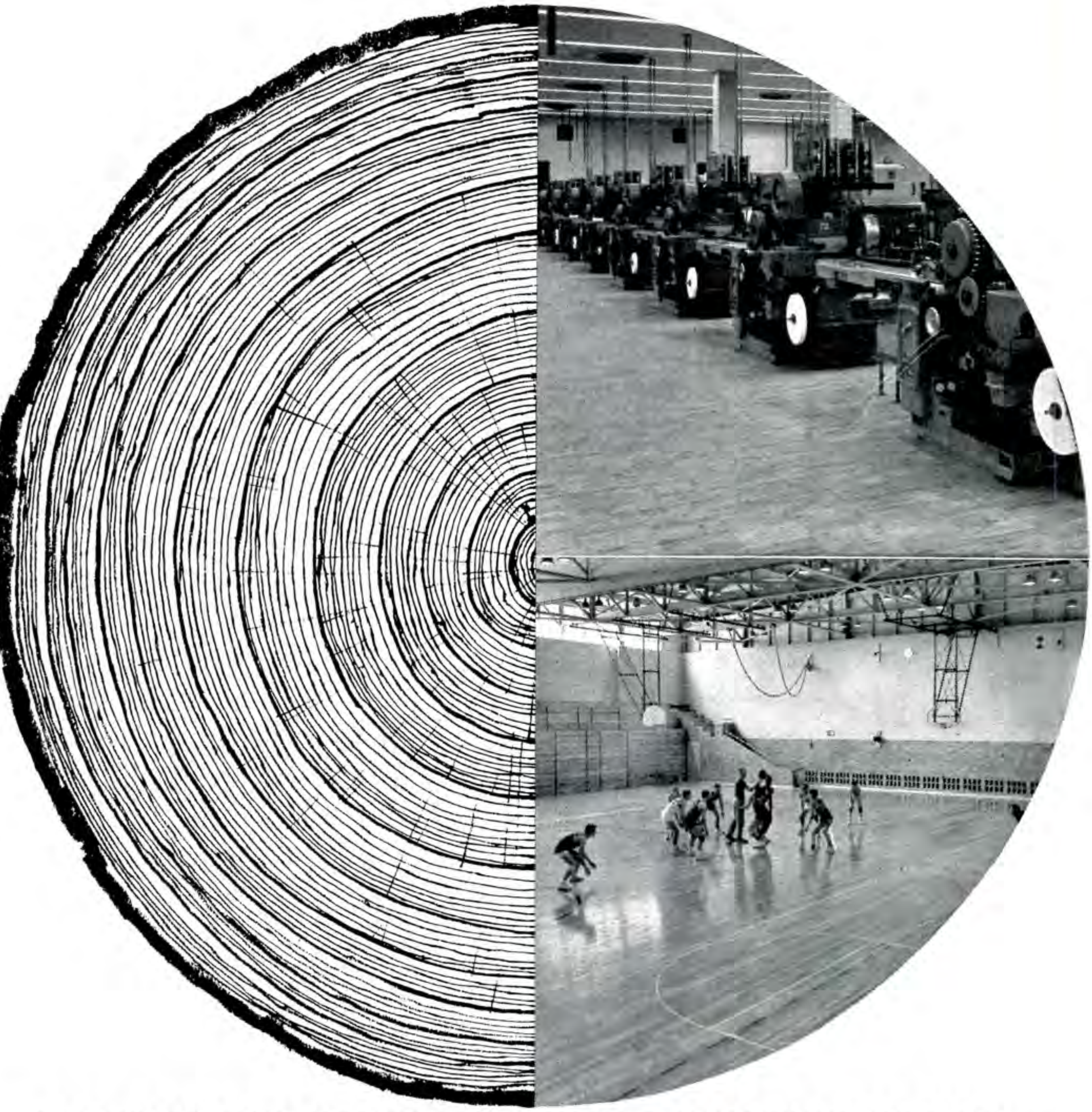
Ernest P. Mickel, Washington, D.C., representative of the F. W. Dodge Corporation construction newspapers and contributing editor of ARCHITECTURAL RECORD, was awarded a Presidential Citation by the Council in recognition of his many years of informed and perceptive reporting on the construction industry.

Proudfoot Succeeds Lundberg

As president, Mr. Proudfoot succeeded Elmer A. Lundberg, director of architectural services for Pittsburgh Plate Glass Company and the first architect to head the Council.

Other new officers are: *first vice president*—Charles S. Stock, American Air Filter Company, Inc.; *second vice president*—A. M. Young, Libbey-Owens-Ford Glass Company; *secretary*—Harold L. Cramer, Westinghouse Electric Corporation; *treasurer*—Earl F. Bennett, Koppers Company, Inc.

Newly-elected directors are: E. Phil Filsinger, Gladding, McBean & Company; Otis Mader, Aluminum Company of America; Albert L. Munsell, Formica Corporation; Robert W. Williams, American-Standard; John E. Haines, Minneapolis-Honeywell Regulator Company; W. J. Hodge, LCN Closers, Inc.; M. P. Komar, Inland Steel Products Company; A. Naughton Lane, Monarch Metal Weatherstrip Corporation; Roy E. Mayes, Carthage Marble Corporation; David S. Miller, E. F. Hauserman Company; Russell C. Stabern, Armstrong Cork Company; C. H. Topping, E. I. du Pont de Nemours & Company, Inc.; Richard D. Tyler, The Lindsay Company; and T. D. Wakefield, Wakefield Corp.



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TWIN PARKS IS DUAL MOTORIST DEVELOPMENT

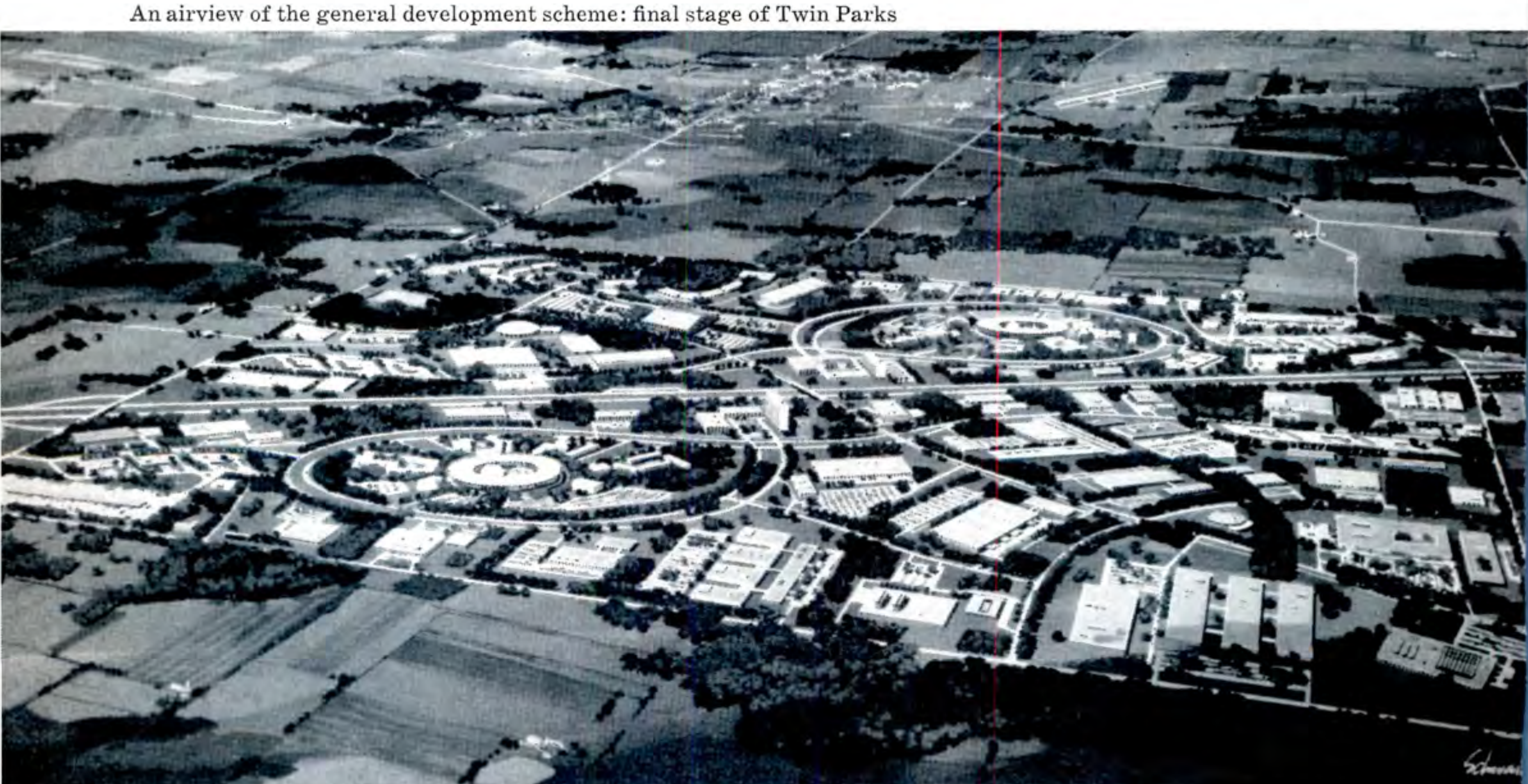
Motorlodge accommodations of Twin Parks

One of several Twin Parks' service stations, which are designed in groups

Twin Parks, a $75 million motorists' service community, will be built some 50 miles south of Cleveland, Ohio, on 1,752 acres which border both sides of Interstate Highway 71. The development is to have two central pedestrian cores and two industrial parks, one on each side of the thoroughfare. Various motorlodge accommodations are all within easy walking distance of the central ring-shaped commercial area of shopping facilities and services. Service stations are designed in groups, with separate facilities provided for trucks.

Designers of the comprehensive project, planned to include eventually a civic center, are J. Marshall Miller, associate professor of planning, School of Architecture, Columbia University; Robert E. Schwartz, R.A., A.I.A.; and Henry W. Stone, R.A., A.I.A., as the firm of Miller Associates. Consulting engineers are the Austin Company.

An airview of the general development scheme: final stage of Twin Parks



Sheraton-Lincoln Hotel, Houston, occupies 20 floors in the 28-story tower of gray glass and white spandrels of the Lincoln Liberty Center. The tower rises from a white marble base. Architects were E. F. Quinn & R. T. Christiansen with Kenneth E. Bentsen, associated architect. The hotel, which has 513 rooms, provides underground parking space for 300 cars

A. F. Sozio

Sheraton Motor Inn, New York City, a 20-story reinforced concrete structure, is built in an L-shape, the façades angled so that each guest room has views. Containing 450 rooms, the new motor inn has a swimming pool on the twentieth floor and a four-level ramp garage for 300 cars. Architects were Morris Lapidus, Harle and Liebman. Builder was Louis J. Glickman

Trinidad-Hilton Hotel, Port-of-Spain, Trinidad, *(below)*, is built over the edge of Belmont Hill, on the eastern rim of a park. Nine stories in all, the hotel has seven guest floors with 261 rooms. Guests enter at the top and descend by elevator. The hotel is spread out in its design, cascading down the hill, with the building elements set on benches in the side of the hill, using spread footings. Exterior walls are plastered masonry, decorative block masonry and glazed walls in native wood frames. Architects were Warner, Burns, Toan and Lunde; associate architects, Toro-Ferrer and W. H. Watkins and Partners, in collaboration with Hilton Hotels International

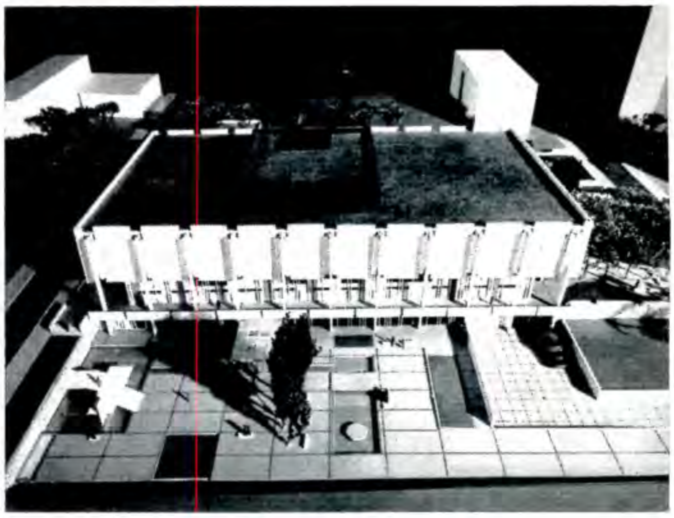
THREE NEW HOTELS AND A MOTOR INN

Southern Cross Hotel, Melbourne, Australia, *(left)*, is a 500,000 sq ft complex, a 12-story, 435-room, blue and white tower rising from one side of a three-level base. The $12,500,000 half-block development contains a two-level central plaza which is open to the sky and is surrounded by shops, restaurants and offices. Parking for 300 cars is on the lowest level, accessible to the street. Architects were Welton Becket and Associates, in association with Leslie M. Perrott & Partners. General contractor was E. A. Watts Pty. Ltd., with Bechtel International Corp. acting as coordinators for the project and construction supervisors

Two College Libraries

Lawrence S. William, Inc.

Lafayette College Library, Easton, Pa., scheduled for completion in the fall of 1963, was designed by Vincent G. Kling. The two and one-half story building, with a total floor area of about 60,000 sq ft, will provide for about 450 students and 300,000 volumes. The $2 million structure whose exterior is gray cast brick and limestone also contains faculty studies, a music room, soundproof typing alcoves and staff offices



Temple University Library, Philadelphia, designed by Nolen-Swinburne and Associates, is part of a comprehensive total plan for the University's development and will be in full use by 1964. A $5.5 million project, the five-level building with its precast concrete panel exterior will provide a library for freshman and sophomore students on the ground floor and one for upperclassmen, graduate students and faculty on the four upper levels. The building contains 190,000 sq ft, has a capacity for 2,500 students and 900,000 volumes. Incorporated into the design are provisions to double the facilities. Library consultants were Ralph E. Ellsworth, director, University of Colorado Libraries, and Warren S. Owens, Director of Libraries, Temple University

Hedrich-Blessing

Hedrich-Blessing

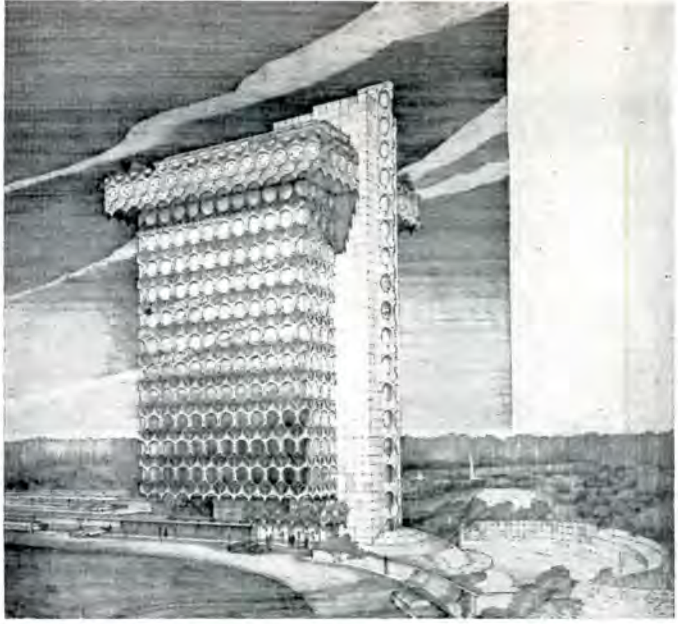
Two Civic Centers

Chicago Civic Center was designed by C. F. Murphy Associates, supervising architects; Skidmore, Owings & Merrill; Loebl, Schlossman, and Bennett, associate architects. On a block site east of the City Hall-County Building, the $58 million, 31-story court and office building, to contain 1,460,000 sq ft, will be of steel construction with concrete caissons extending to bedrock. Exterior surface will be formed of a special alloy steel having a russet brown oxide coating. Setting on 16 columns, the tower will face the new granite-paved Civic Plaza. The building will house 110 courtrooms with provision for expansion to 139 courts, Board of Health offices, Chicago Transit Authority offices, a cafeteria, restaurant and public observation deck

Louis Checkman

National Cultural Center, Washington, D.C., to be built on a 13-acre park site on the east bank of the Potomac River, will contain a 1,200-seat theater, a 2,750-seat symphony hall and a 2,500-seat hall for opera, musical comedy and ballet. Designed by Edward Durell Stone, the building, planned to be ready for occupancy in late 1965, will cost an estimated $30 million. (See Jan. 1960, p. 10 for an earlier design.) A concrete substructure, with three garage levels for more than 1,500 cars will be topped by a steel superstructure, the entire building sheathed with white marble facing. A colonnade of delicate steel columns encased in bronze with a gold finish encircles the building

Four Office Buildings



Home office building for Lincoln Income Life Insurance Company, Louisville, Ky., was designed by William Wesley Peters of Taliesin Associated Architects, an affiliate of the Frank Lloyd Wright Foundation. Comparable in height to a 13-story building, floors are arranged on 18 different levels. Vertical shaft of reinforced concrete supports projecting cantilevered upper floors from which lower floor projections are hung. Behind the outer gold anodized aluminum grill are insulated sandwich wall panels, partly transparent, partly translucent. Park-like garden surrounding the building could include a small orchestra shell

National Headquarters Building for the American Society for Testing and Materials, Philadelphia, designed by Carroll, Grisdale & Van Alen, will be a four-story, concrete, steel and glass structure. To cost $1.7 million, the building will be supported on four large columns, a series of story-high lattice steel trusses spanning between the columns and cantilevering at each end. Truss members' covering is precast concrete with a surface aggregate of quartz and granite chips. Diagonal fixed sash formed by truss members is bronze glazed with glare-reducing glass. Ground level will house auditorium

National Bank of Commerce and Ling Temco Vought (LTV) Tower, Dallas, *(right)*, to be completed within two years at a total cost of more than $16 million, has reinforced concrete structural frame, glare-resistant glass on north and south walls, marble and face brick on east and west walls. The 31-story building was designed by Harwood K. Smith and Partners and Dales Y. Foster-Architects. Structural engineers: Mullen and Powell; mechanical engineers: Herman Blum Assoc.; general contractor: Henry C. Beck and Co.

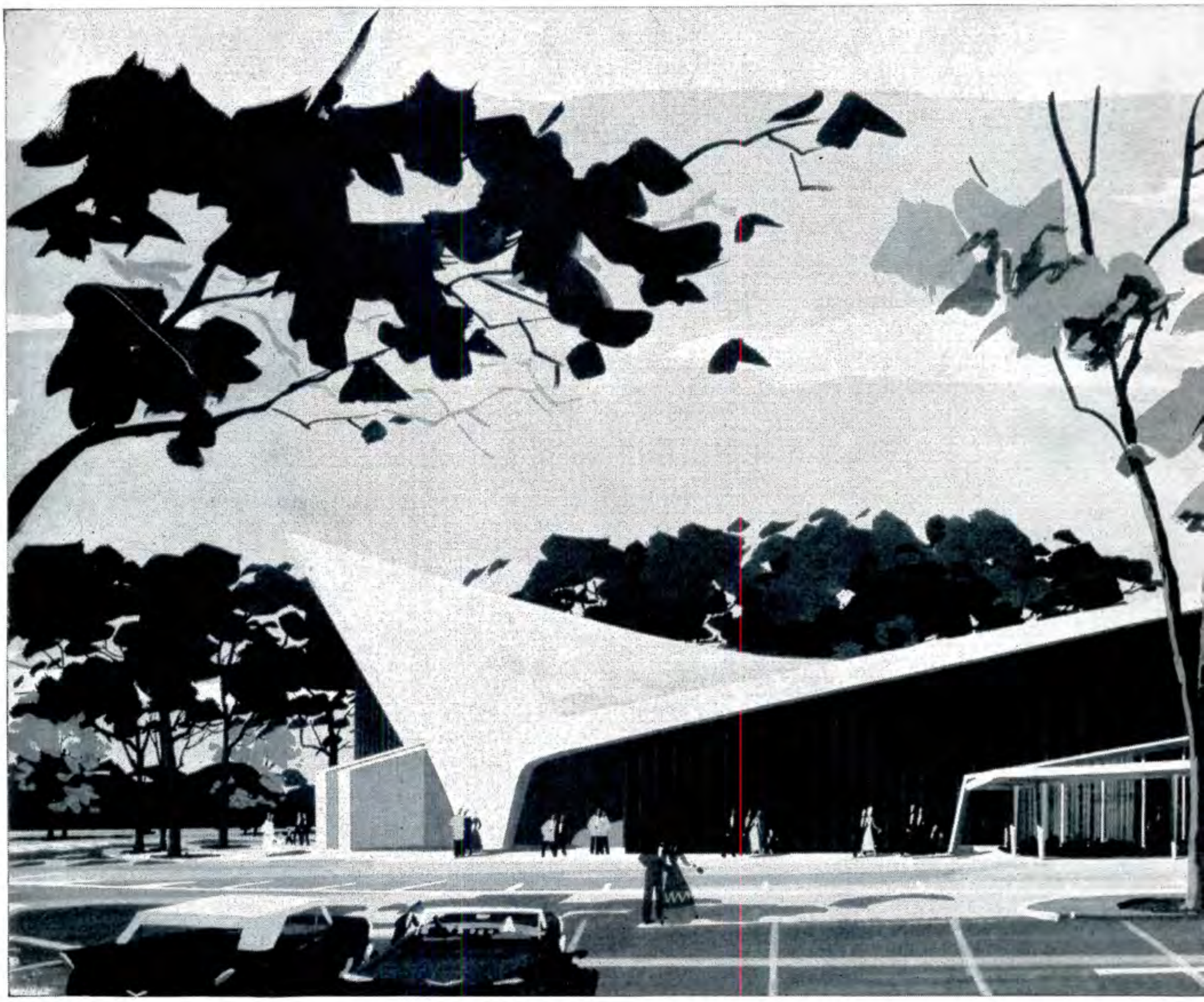
First National Bank Building of Memphis, *(far right)*, now under construction with completion scheduled for 1964, will rise 24 stories on its one-acre site, a tower above a four-story base section. Set back to provide a 150-ft long plaza, the building has a metal façade offset by gray-tinted glass. Architects are Office of Walk C. Jones Jr.; structural engineers: Gardner and Howe; consulting structural engineer: James Ruderman; mechanical and electrical engineers: Allen & Hoshall; consulting mechanical and electrical engineers: Jaros, Baum & Bolles; contractor: J. A. Jones

Tom W. Collins Studios

A Public Building for Georgia

Archives and Records Building for the State of Georgia, Atlanta, designed by A. Thomas Bradbury & Associates, will contain a total of 561,724 sq ft, with 385,476 sq ft underground for storage and parking. The roof of the first floor above this area forms a podium above grade, which supports the colonnade around the building. The high-ceilinged Memorial Room in the center of the podium level is surrounded by administration offices, manuscript and search rooms, microfilm reading room, a small auditorium and vestibule. Exterior finish is white Cherokee Georgia marble. The podium is veneered with granite. Contractor is J. A. Jones Construction Company

LONGER SPANS, LIGHTER SLA



NATION'S LARGEST HYPERBOLIC PARABOLOID ROOF keynotes the design of Edens Theatre Northbrook, Illinois. This saddle shell roof (only 4 inches thick) stretches 159 ft. between working points at th abutments; 221 ft. from tip to tip. The entire shell is rotated about the abutment points so that one tip is 59'6 above lobby floor level; the other 39'6". Vertical Ryerson post-tensioning tendons prestress the abutment wall and these walls rest on post-tensioned foundation pads. To absorb horizontal thrust, the pads are connecte by a post-tensioned tie beam. **Architect:** Perkins and Will, Chicago. **Engineer:** The Engineers Collaborative Chicago. **Contractor:** Chell and Anderson, Chicago.

SOUTHFIELD OFFICE PLAZA in suburban Detroit uses Ryerson post-tensioning to give reduced structural depth despite long spans and relatively heavy loads. Sitting on a 4-ft. terrace the handsome building contains 137,000 sq. ft. of floor space in four rectangular units joined by a central service core under an arched roof. In the structural framing, 50 poured-in-place, post-tensioned beams are supported by double-legged columns placed to provide 24-ft. cantilevers. 5½ ft. overhangs at each level shade the continuous windows and conceal air-handling equipment. **Designed by** Samuel P. Havis, presently Havis, Glovinsky Assoc., Detroit. **Engineer:** McWilliam & Keckonen, Birmingham, Mich. **Contractor:** Harold Soble Construction Co., Southfield, Mich.

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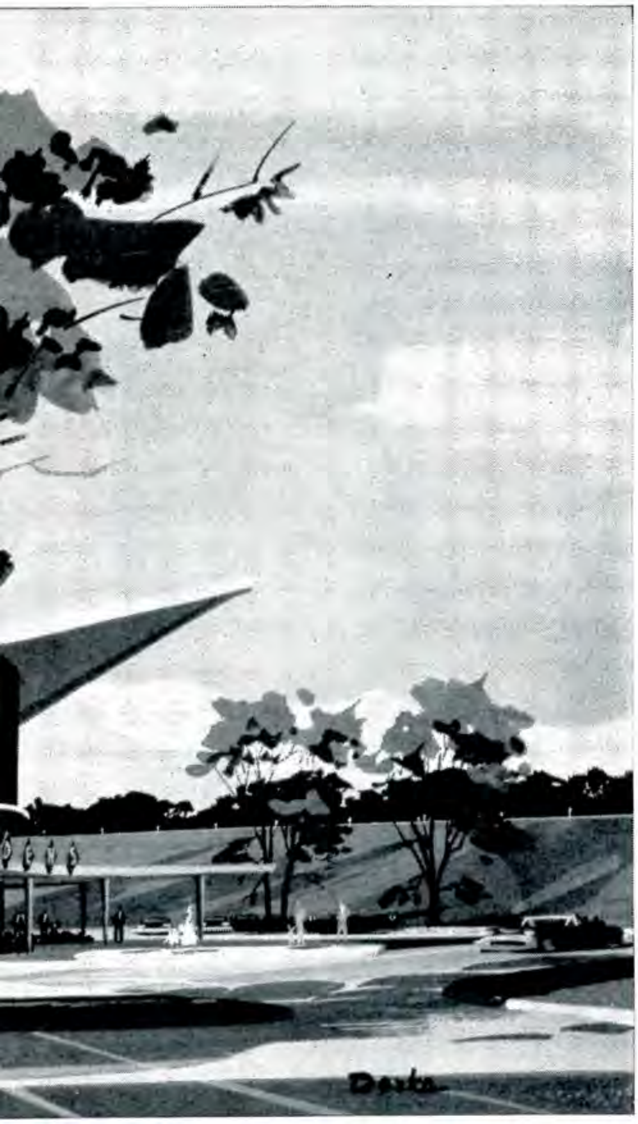

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Three current projects using Ryerson post-tensioning are shown here. On *your* next project consider the advantages of post-tensioning and get in touch with us for comparative cost data, preliminary layouts, force development calculations and any other information that would be of help.

*Precast concrete members may also be economically prestressed by this system.

NURSING CARE BUILDING, Lyngblomsten Retirement Center, St. Paul, Minn., uses Ryerson post-tensioning to maximize the economies and efficiencies of lift-slab construction, and provide deflection control. Four-story structure has 2 lift-slabs (connected by a joining strip after lifting) on each of 5 levels. Each two-unit slab measures approximately 250 ft. x 60 ft. and maximum column spacing is 28 ft., 8 in. x 18 ft., 10 in. **Architect:** Sovik, Mathre & Madson, Northfield, Minn. **Engineering Consultant:** Kolbjorn Saether & Assoc., Chicago. **General Contractor:** H. Halverson Construction Co., Minneapolis. **Lifting Contractor:** Northwest Lift Slab Co., Portland, Oregon.

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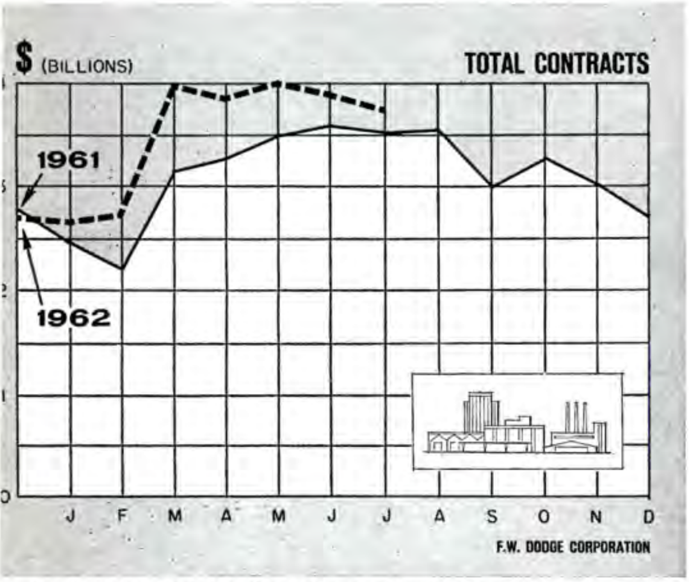
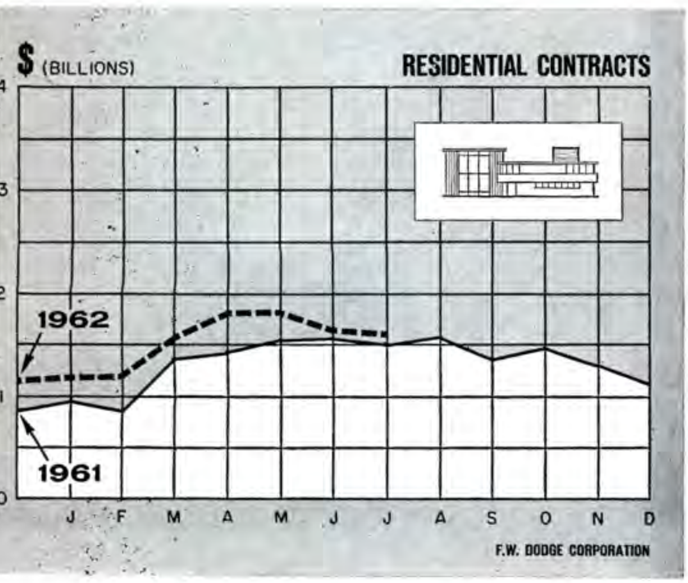


Total contracts include residential, nonresidential, heavy engineering contracts



SCHOOL NEEDS CONTINUE; FEDERAL AID FOR COLLEGES?

OVER THE PAST twelve months, a total of 65,000 bright new elementary and high school classrooms were added to the nation's stock. At the same time, nearly 20,000 old schoolrooms, too dilapidated or too poorly located to be useful any longer, were closed down. And last month, as it happens every September, a year's net gain (this year 45,000 rooms) was suddenly cancelled out as the horde of well-scrubbed kindergarteners outnumbered last spring's graduates (this fall by more than a million).

But looking beyond our still-crowded classrooms and occasional, split schedules, it is possible to see the results of a decade of concentrated school building. Since the early Fifties, when pupils exceeded normal grade school capacity by two and a half million, the gap has been narrowed by one third *in spite of an increase of ten million enrollments.*

By 1960, annual contracts for educational construction had reached $3 billion, roughly double the 1950 rate and equal to a quarter of all nonresidential building. So far in the Sixties, the physical volume of new school building continues to run slightly ahead of the annual gain in enrollments, but even at today's high rate of construction it could take as much as ten more years to eliminate existing classroom shortages.

AMONG THE FACTORS affecting the present and future amounts of school construction, population trends are paramount. In this quarter, all the evidence points clearly upward. But at the margin, year-to-year variations in building are often influenced by other, less prosaic, events.

One such factor which could alter the underlying trend in school building is the availability of Federal funds. Aid to education, administered through a variety of government agencies, currently amounts to between $2 and $3 billion annually, but only a tiny fraction of this total goes for construction. (Research grants, veterans' allowances, the school lunch program, and the service academies account for the bulk.) Despite several attempts at passage of legislation to provide Federal funds for public school construction, with the latest effort recently defeated in a storm of church-state controversy, there is little chance of aid for schools below the college level in the near future.

COLLEGES AND UNIVERSITIES, however, are more likely to see some form of Federal assistance in the next year or two. The bill proposing $1.5 billion in loans and matching grants for college library and classroom construction, which was sent back to committee in the closing moments of the 1962, Congressional session, will probably gain approval in some modified form next year. Meanwhile, colleges have been expanding their facilities as fast as their funds permit to meet the almost certain rise in enrollments from today's four million to more than seven million by 1970. Clearly, no other building type will be subject to stronger demand forces in a few short years than higher education.

GEORGE A. CHRISTIE, *Economist*
F. W. Dodge Corporation
A McGraw-Hill Company

Construction Cost Indexes

Presented by Clyde Shute, Director of Statistical Policy, Construction News Div., F. W. Dodge Corp., from data compiled by E. H. Boeckh & Assoc. Inc.

Labor and Materials: U.S. average 1926-1929=100

	NEW YORK					ATLANTA				
	RESIDENTIAL		APTS., HOTELS, OFFICE BLDGS.	COMMERCIAL AND FACTORY BLDGS.		RESIDENTIAL		APTS., HOTELS OFFICE BLDGS.	COMMERCIAL AND FACTORY BLDGS.	
PERIOD	Brick	Frame	Brick and Concrete	Brick and Concrete	Brick and Steel	Brick	Frame	Brick and Concrete	Brick and Concrete	Brick and Steel
1935	93.8	91.3	104.7	108.5	105.5	72.3	67.9	84.0	87.1	85.1
1939	123.5	122.4	130.7	133.4	130.1	86.3	83.1	95.1	97.4	94.7
1949	243.7	240.8	242.8	246.6	240.0	189.3	189.9	180.6	180.8	177.5
1950	256.2	254.5	249.5	251.5	248.0	194.3	196.2	185.4	183.7	185.0
1951	273.2	271.3	263.7	274.9	271.8	212.8	214.6	204.2	202.8	205.0
1952	278.2	274.8	271.9	265.2	262.2	218.8	221.0	212.8	210.1	214.3
1953	281.3	277.2	281.0	286.0	282.0	223.0	224.6	221.3	221.8	223.0
1954	285.0	278.2	293.0	300.6	295.4	219.6	219.1	233.5	225.2	225.4
1955	293.1	286.0	300.0	308.3	302.4	225.3	225.1	229.0	231.5	231.8
1956	310.8	302.2	320.1	328.6	324.5	237.2	235.7	241.7	244.4	246.4
1957	318.5	308.3	333.1	345.2	339.8	241.2	239.0	248.7	252.1	254.7
1958	328.0	315.1	348.6	365.4	357.3	243.9	239.8	255.7	261.9	262.0
1959	342.7	329.0	367.7	386.8	374.1	252.2	247.7	266.1	272.7	273.1
1960	351.6	337.2	377.7	395.8	380.6	259.2	253.3	274.7	282.5	278.8
1961	362.5	343.0	398.2	422.4	397.0	256.7	249.7	275.8	284.5	275.8
May 1962	369.0	346.8	411.0	437.5	410.0	261.3	254.7	280.0	289.1	278.4
June 1962	370.4	347.4	412.9	440.9	411.2	261.9	255.3	281.1	289.8	279.7
July 1962	375.6	351.2	418.8	449.4	418.4	264.7	257.0	285.2	295.4	283.5
			% increase over 1939					% increase over 1939		
July 1962	204.1	186.9	220.4	236.9	221.6	206.7	209.3	199.9	203.3	199.4

	ST. LOUIS					SAN FRANCISCO				
1935	95.1	90.1	104.1	108.3	105.4	89.5	84.5	96.4	103.7	99.7
1939	110.2	107.0	118.7	119.8	119.0	105.6	99.3	117.4	121.9	116.5
1949	221.4	220.7	212.8	215.7	213.6	213.0	207.1	214.0	219.8	216.1
1950	232.8	230.7	221.9	225.3	222.8	227.0	223.1	222.4	224.5	222.6
1951	252.0	248.3	238.5	240.9	239.0	245.2	240.4	239.6	243.1	243.1
1952	259.1	253.2	249.7	255.0	249.6	250.2	245.0	245.6	248.7	249.6
1953	263.4	256.4	259.0	267.0	259.2	255.2	257.2	256.6	261.0	259.7
1954	266.6	260.2	263.7	273.3	266.2	257.4	249.2	264.1	272.5	267.2
1955	273.3	266.5	272.2	281.3	276.5	268.0	259.0	275.0	284.4	279.6
1956	288.7	280.3	287.9	299.2	293.3	279.0	270.0	288.9	298.6	295.8
1957	292.0	283.4	295.2	307.1	302.9	286.3	274.4	302.9	315.2	310.7
1958	297.0	278.9	304.9	318.4	313.8	289.8	274.9	311.5	326.7	320.8
1959	305.4	296.4	315.0	329.8	323.9	299.2	284.4	322.7	338.1	330.1
1960	311.4	301.0	322.2	337.2	329.2	305.5	288.9	335.3	352.2	342.3
1961	315.1	302.0	329.0	346.8	332.2	308.7	290.2	345.1	362.9	350.2
May 1962	323.6	308.9	342.4	361.9	343.3	313.7	294.4	352.7	370.7	356.1
June 1962	323.6	308.9	342.4	361.9	343.3	313.7	294.4	352.7	370.7	356.1
July 1962	323.6	308.9	342.4	361.9	343.3	316.0	295.7	356.3	375.9	360.3
			% increase over 1939					% increase over 1939		
July 1962	193.6	188.7	188.4	202.1	188.5	199.2	197.8	203.5	208.4	209.3

Cost comparisons, as percentage differences, for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110
index for city B = 95

(both *indexes must be for the same* type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

Conversely: costs in B are approximately 14 per cent lower than in A.

$$\frac{110-95}{110} = 0.136$$

Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926-29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published list prices, thus indexes reflect minimum costs and not necessarily actual costs.

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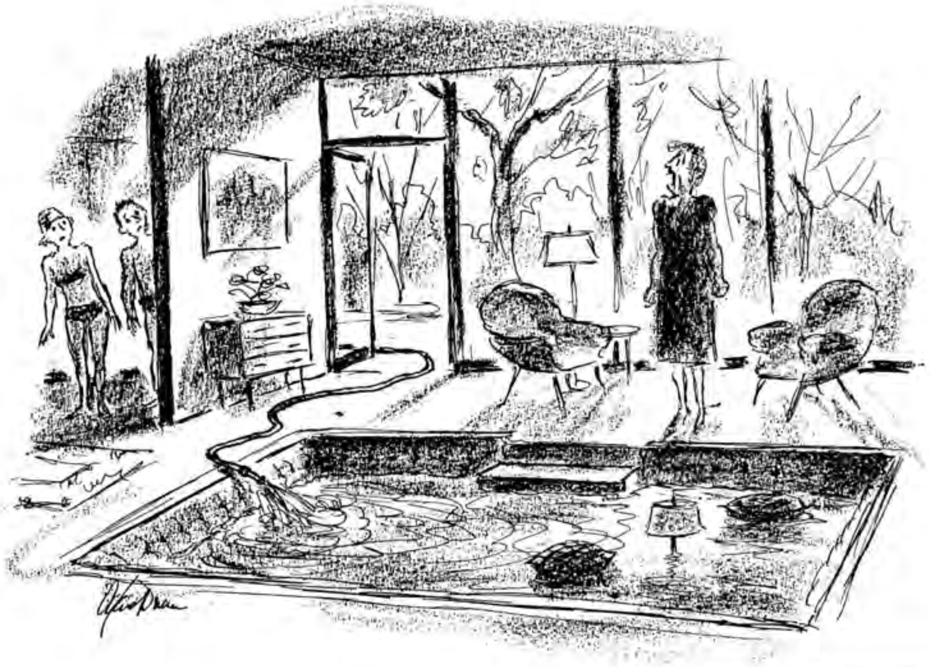


—*Drawn for the* Record *by Alan Dunn*

"Children!"

SPEAKING OF ARCHITECTURE: A SUMMER IN THE REAL WORLD

By Jonathan Barnett

"There go the guys who want to change the world," a draftsman was heard to say. It was the first day of the summer training program at the New York firm of Voorhees, Walker, Smith, Smith, and Haines, which brings to its office every year some 15 or 20 architectural and engineering students from schools all over the East.

As a participant in this summer's program, I can report that changing the world was not in the students' minds that first morning. Most of us were far too busy trying to look as if we were used to inspecting drafting rooms that covered half a city block. In time we would become inured to the endless perspectives of desks which stretched in every direction, and begin to understand the workings of the vast organization in which we were to spend ten weeks. Some of us would even take a few nips at the hand that fed us, by advancing criticisms and complaints which showed that the draftsman had been right after all.

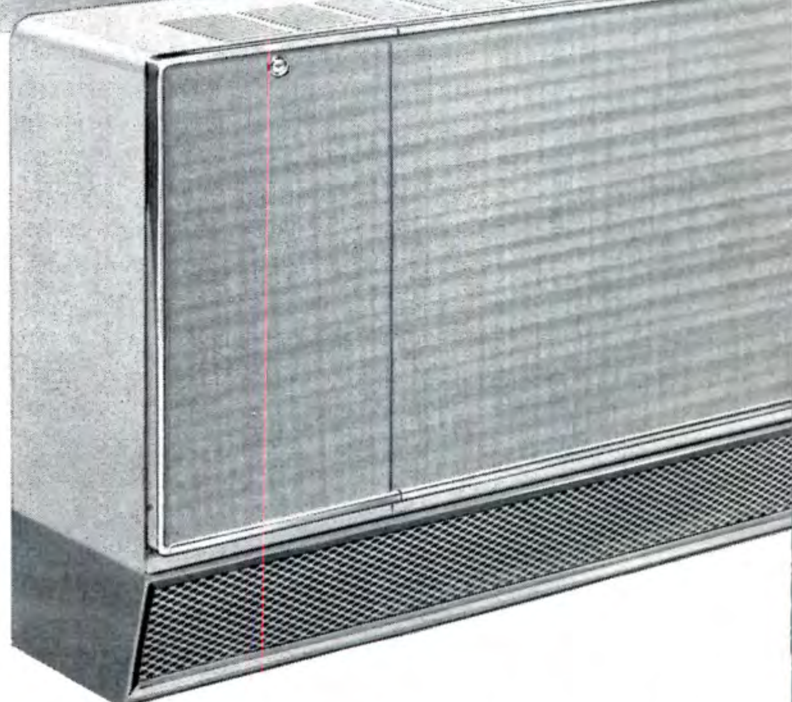
We were the eighth group to participate since Voorhees, Walker first asked the deans of architectural schools to suggest students for a training program. The program offers employment at a "living wage," but it is not a summer job in the ordinary sense. Each student is assigned to one of the seven production groups in the office, where he is given work according to his abilities and the ingenuity of the group architect in finding things for him to do. He attends weekly seminars on various aspects of office procedure and his instruction is supplemented by field trips. Of course, the student is expected to produce some drawings, but his time is charged to general operating expenses, and not to the time budget for a particular job. The primary purpose of the program is educational: to help bridge the gap between the architectural schools and the practice of architecture in an office of this kind. The gap is a considerable one, as the course of the summer would show.

At their first seminar the students were shown alternate solutions for the façade and entrance of an addition to an office building. The alternatives had been fully studied in rendered perspectives and were to be presented to the client that afternoon. Asked to comment on what was theoretically their field of competence, the students could find very little to say. The possibility of true alternatives in esthetic matters is not generally admitted in current teaching theory, which tends to take a dim view of "arbitrary decisions." Instead, the student is taught that esthetic problems solve themselves when studied in a properly systematic framework, through which one arrives at what the building "wants to be."

Thus the students found themselves from the beginning in the paradoxical position they were to occupy all summer. They were constantly reminded that school work, and even some previous office experience, took place in a cloud-cuckoo land of pure theory, where the problems of translating a design into a real building were seldom considered. At the same time, the students were used to thinking about the ulti-

continued on page 26

Another new school chooses



SCHOOL-VENT'S ROLL CALL IS GROWING FAST

- St. Monica's School, Indianapolis, Ind.
- Carver County School, Mayer, Minn.
- Mt. Pleasant School, Racine, Wis.
- St. Stephans's School, Monona, Wis.
- Janes School, Racine, Wis.
- Riverside-Brookfield High School, Riverside, Ill.
- Erlanger School, Erlanger, Ky.
- Rolling Meadows School, Rolling Meadows, Ill.
- Carthage College, Kenosha, Wis.
- A. O. Marshall School, Joliet, Ill.
- Triton Central High School, Shelby County, Ind.
- Goodland School, Racine, Wis.
- Ringwood Elementary, Ringwood, Ill.
- Anderson College, Anderson, Ind.
- Marquette Jr. High School, Madison, Wis.
- Waterloo Township School, Indianapolis, Ind.
- Beth Israel School, Milwaukee, Wis.
- Middletown High School, Middletown, Ind.
- Harlem Jr. High School, Rockford, Ill.
- No. Shore County Bay School, Skokie, Ill.
- Plum Grove School, Palatine, Ill.
- Pachelle High School, Columbus, Ga.
- Marion College, Fond du Lac, Wis.
- New Cass Township School, Dugger, Ind.
- Geo. C. Marshall School, Vancouver, Wash.
- Grand Rapids School, Grand Rapids, Minn.
- Lake Shore Elementary, Vancouver, Wash.
- Glendale Jr. High School, Salt Lake City, Utah
- Lakeview Elementary, Lakeside, Cal.
- Washington Township School, Westwood, N.J.
- San Jacinto College, Houston, Texas
- Brooklyn School, Portland, Ore.
- Olivet Community School, Olivet, Mich.
- Hamilton School, Salt Lake City, Utah
- W. Lamar High School, Houston, Texas
- East High School, Bremerton, Wash.
- Cross Lutheran School, Pigeon, Mich.
- Arcadia Elementary School, Olympia Fields, Ill.
- Washington Elementary School, Westfield, Ind.
- Florence State College, Florence, Ala.
- North High School, Vancouver, Wash.
- Mitchell Jr.-Sr. High School, Mitchell, Ind.
- Negro School for the Blind, Jackson, Miss.
- Mirror Lake School, Federal Way, Wash.
- Horace Mann Jr. High School, Salt Lake City, Utah
- Horlick High School, Racine, Wis.
- Dewey Intermediate School, Bremerton, Wash.
- Thelma Buffey School, Flint, Mich.
- Mississippi Delta Jr. College, Moorehead, Miss.
- Lewis & Clark College, Portland, Ore.
- Bly Elementary School, Bly, Ore.

continued from page 23

mate theoretical consequences of practical matters in a far more "hard-headed" fashion than seemed customary in the office. It was the people from the office who spoke of "massing" and "esthetic decisions," while the students talked of "system" and "the expression of structure."

To make the paradox complete, the office seemed to regard as unnecessary and frivolous the attempt, shown in a number of well-known buildings, to make a rationalization of utility a basis for an esthetic. The ease with which the firm solved comparable functional problems, while proceeding from totally different assumptions, seemed to justify their view.

This discontinuity of approach led to a certain amount of misunderstanding. The office tended to treat the student as more of a child than he perhaps deserved, while the students, in turn, were led to underestimate the intelligence of some of the people for whom they worked.

This situation did not arise simply from the confrontation of theory and practice. The program does operate at that level, and the students are privileged to become acquainted with the highest professional standards, which form a most important supplement to their education. They see how much time is devoted to the conceptual aspects of architecture in a busy and highly successful office. They are reminded that there is much more to most buildings than a sequence of spaces, that not all clients are connoisseurs of architecture with elastic budgets at their disposal, and that the average contract is neither negotiated nor cost plus. In exchange, the office has an opportunity to come into contact with new ideas, which are usually lively and frankly expressed.

The difficulty is that theory and practice do not really mesh, because the students' theories belong to a system which has certain fundamental differences from the practice of Voorhees, Walker, Smith, Smith, and Haines. These differences do not arise entirely because most teachers of architecture operate small offices and Voorhees, Walker is very large. They originate rather in the climate of opinion that permits a teacher at a well-known architectural school to tell his class that a hospital "has no architecture in it," while a member of a New York firm remarks that he is not in the business of producing "esthetic masterpieces."

Each summer training program ends with an overnight field trip to a number of recently completed jobs at some distance from New York. This year our destinations were a research center for the Bethlehem Steel Company in Bethlehem, Pennsylvania, and a library for the Hagley Foundation at the old DuPont mills near Wilmington. Such a *trip might* seem a superfluous, if extremely generous, gesture. It served a very useful purpose, however, in permitting all the students and several associates of the firm to spend two days together in an informal atmosphere. The students had an opportunity to compare notes, and to discuss various aspects of the office with responsible members of the organization. The trip seemed to pull together the whole experience of the summer, and everyone agreed that it had been a valuable one.

It is not surprising if the difference in approach between school and office led to occasional misunderstanding and failure of communication. Such situations do not represent a weakness in the training program; they demonstrate its necessity.

It is surely important for the architectural profession that its schools and its practitioners be able to communicate with each other. Voorhees, Walker, Smith, Smith, and Haines have done much to promote mutual understanding, not only with their training program, but by giving two fellowships a year to teachers, who spend the summer observing the work of the office. In the past eight years over a hundred and fifty students and a dozen faculty members have spent ten weeks at the Voorhees office. How many other firms have offered even half as much?

A. R. A. HOLDS ANNUAL CONVENTION IN CHICAGO

Thurston Munson of Springfield, Mass., was elected president of the Society of American Registered Architects at the Society's fourth annual convention, held August 22-25 at the Edgewater Beach Hotel in Chicago. Mr. Munson succeeded Carroll Hutchens of Kansas City, Missouri, as the national president.

Other new officers elected at the Chicago meeting were: *first vice president*—Theodore E. Samuelson of Chicago; *second vice president*—Robert W. Stickle of Cleveland; *third vice president*—Walter Simon of Denver; *recorder*—Hal Stonebraker of Overland Park, Kan.; and *treasurer*—Fred Raeuber, Manitowoc, Wis.

In addition to business sessions at which A.R.A. organization matters were discussed and officers elected, there was a program of speeches and panels on various professional and technical matters.

Program topics included: "Precast, Post-Tensioned and Prestressed Concrete"; "Masonry Advances Toward New Heights and Unveils Recent Technical Ramifications"; "Steel—Technical Advances Establish New Design Freedoms for Architects"; "Wood and Geometric Gracefulness for Roofs and Structure."

Speakers on the various topics included: Lloyd Hill, analytical engineer, Roebling C., F & I, Chicago; A. H. Gustaferro, Portland Cement Association, Chicago; Jack Janny, Engineers Collaborative, Chicago; Charles H. Goodman, director of new products, Material Service, Division of General Dynamics, Chicago; T. Y. Lin, consulting engineer and professor of civil engineering, University of California; T. E. Samuelson, F.A.R.A., Samuelson and Sanquist, Chicago; Bruce Graham, A.I.A., Skidmore, Owings & Merrill, Chicago; Matt Howard Jr., F.A.R.A., Houston; Frank Kornacher, A. Epstein & Sons, Chicago; and J. J. Liebenberg, F.A.R.A., Minneapolis.

Also George Miller, executive secretary of the Mason Contractors Association of America; Mel Allen, Structural Clay Products Research Foundation, Geneva, Ill.; Robert Schuldes, Portland Cement Association, Chicago; John Gilligan A.S.C.E., U.S. Steel Corporation, Pittsburgh; William Ganser, American Institute of Timber Construction, Washington, D.C.

ARCHITECTURAL RECORD

Western Section©

including *Western Architect and Engineer*

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2877 Shasta Road, Berkeley 8, California

Architecture: Win, Draw — Or Lose?

How far can you get when you appeal on the basis of esthetics? Is it expedience or wisdom to take the practical approach? Is it disloyal to one's convictions on beauty to be practical? Is being practical an ignoble compromise?

These are questions you often hear in the world of architecture. And generations more—as generations before—will hear them. They just aren't the kind of questions that get settled once and for all.

But an interesting commentary on them comes along now and then to whet the interest in them. Sometimes it's from the new young architects who in their idealism will not budge from the stand of esthetic torch-carrying. Sometimes it's from the older architects who have carried torches for many of their years.

But there are more ways than one to skin a cat, and there are more paths than one to achieve the goal of better design. Right now one of these paths is being tried out in a coastal city.

A group of architects—part of a larger group of citizens, appointed by the city planning commission—is studying ways of improving the kind of apartment house design being perpetrated on the city. The group includes an architect who has won numerous awards for design, an architect-professor who has taught many of the West's well-known architects, and several architects of various ages who have done many apartment buildings as well as other types. They represent a good range of ages, experience and training.

The first decision they made was that if there were to be any effective means found to accomplish the goal, it would not be through the esthetic approach.

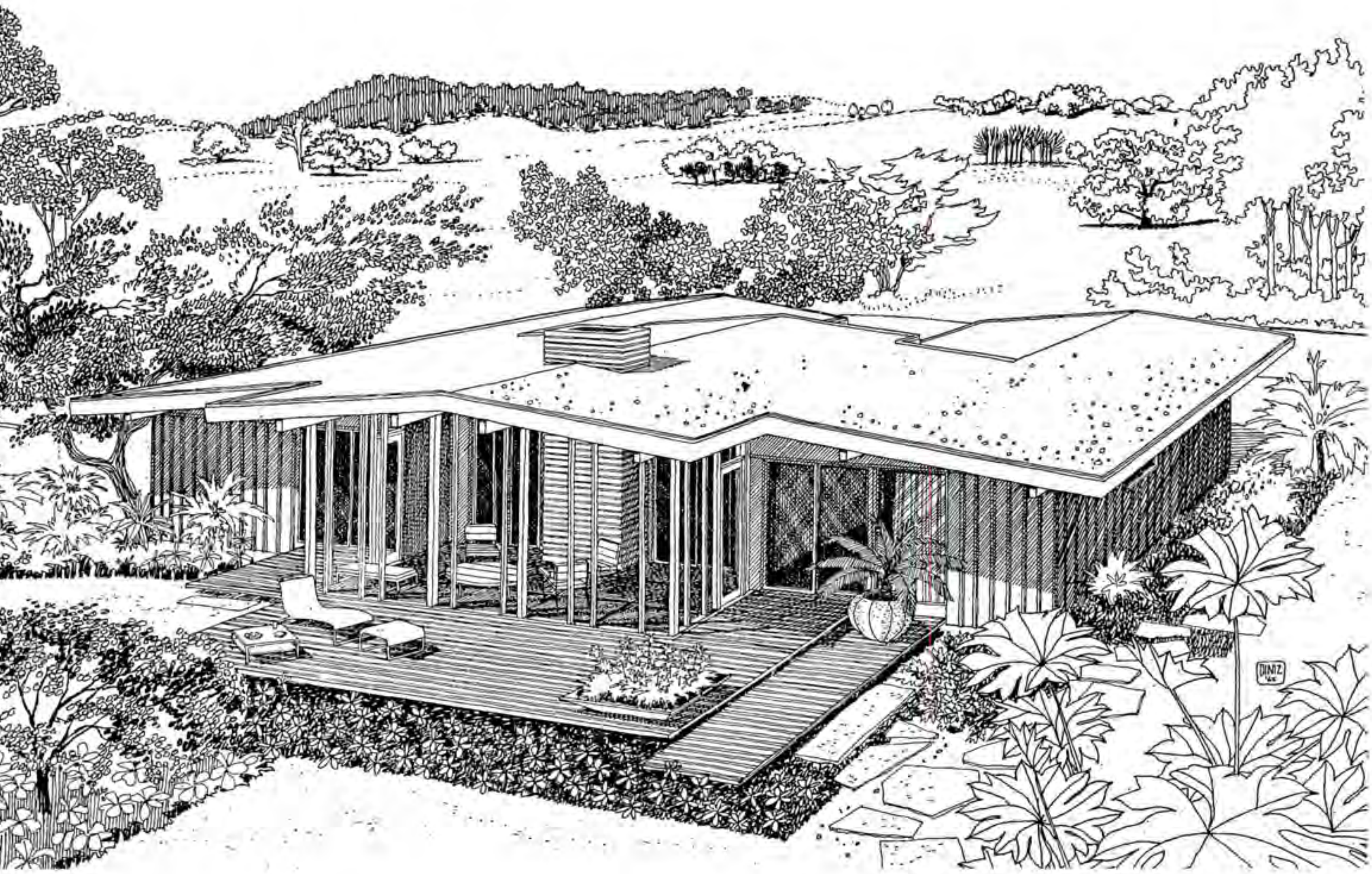
It would have been easy to come out with a high-sounding statement about the esthetic quality of a building and its impact on the community; but would it have accomplished anything? It would have been easy to make a categorical demand for all buildings to be designed by architects; but would it have been possible to get such an ordinance?

Instead, they have chosen to take the hardest course: to search for means to their desired end in the existing documents for zoning, building and housing. For through these documents they feel that it is going to be possible to find the means to control the worst offenders, and the best designs will not be penalized.

It is always the problem of controls that they have to be applied generally. And sometimes the innocent must suffer with the guilty. So controls that hamper good design even though they control bad design have a questionable value, leading to a dull gray of mediocrity.

Rather than have architecture lose completely, this group is being hard and practical. And it has a good chance of *not* losing in this continuing struggle.

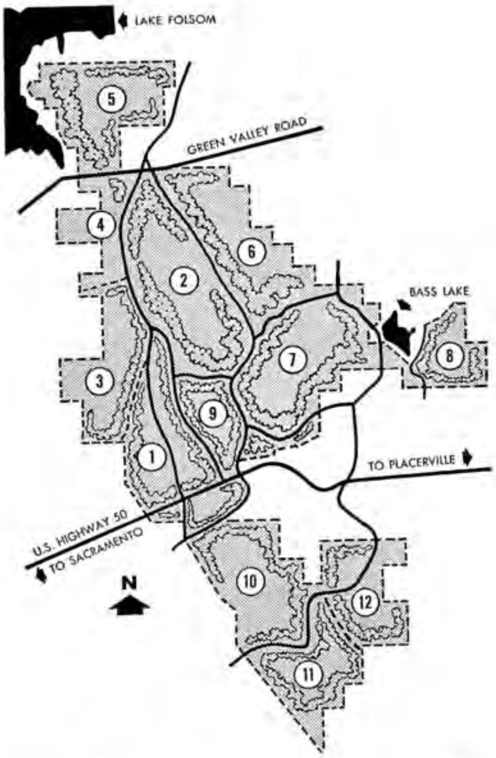
E.K.T.



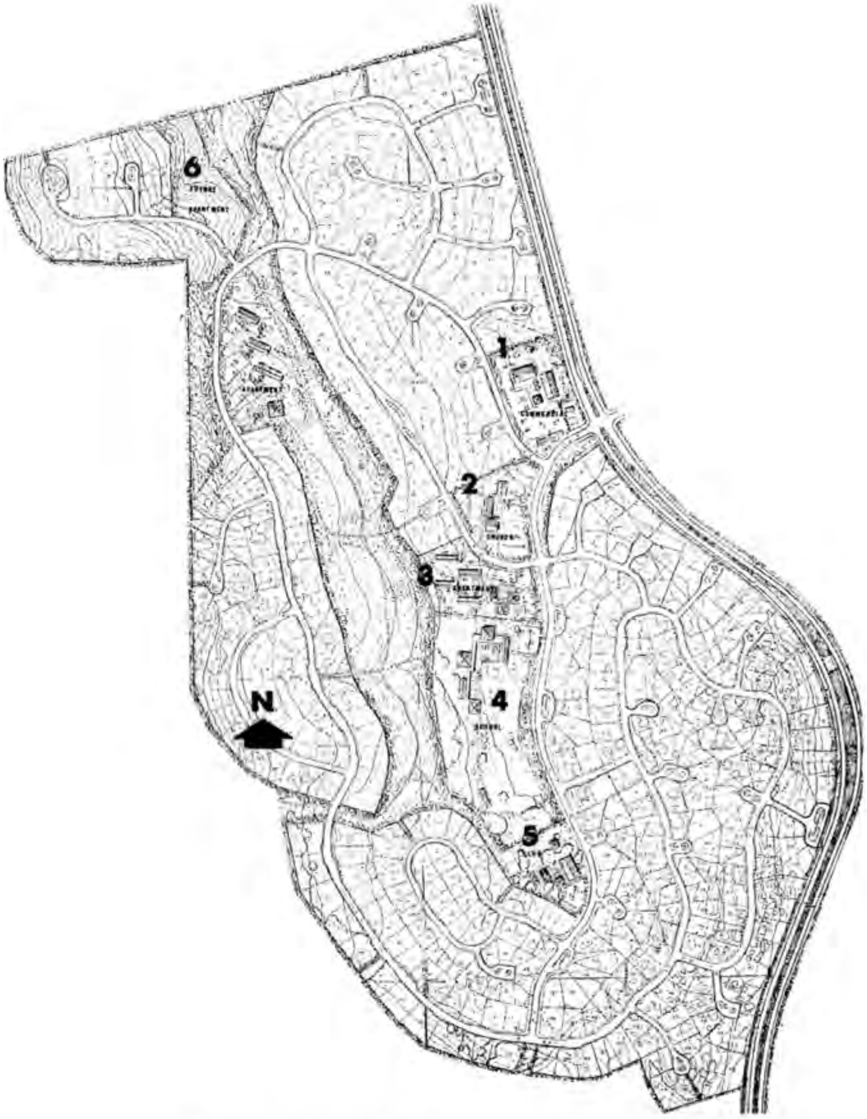
COMMUNITY PLAN KEYS TO SITE AND RECREATION

El Dorado Hills is a 10,000-acre tract in the foothills of the Sierra Nevada, near Sacramento, Calif., which is being developed as a series of "villages," each keyed to the particular advantages of the terrain on which it is situated and to the area's particular recreational potential (golf, swimming, boating, riding, etc.). The villages will give the community—planned for an eventual population of 75,000—considerable variety in appearance since each is to have its own general character and each will probably be designed, according to present indications, by a different architectural firm. The village concept of development makes possible preservation of much of the land's open character; over 2,000 acres will remain in their natural state. This open space will separate villages from each other. Most of the houses will be single family residences, but in some areas there will be multi-family buildings, buffered from single family houses by trees and open space. The first houses to be built are in Park Village near Highway 50; a group of model houses are now under construction at Governors Village. Each village will eventually have its own community center with commercial facilities, church, fire station, etc., and one or two elementary schools. High schools to serve several villages will also be provided.

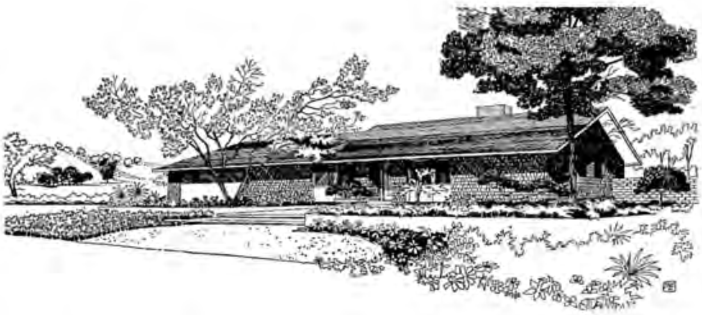
El Dorado Hills, El Dorado County, California. Architects: Victor Gruen Associates; partner in charge, Edgardo Contini; project director: Frank Hotchkiss; planning: Douglas Baylis; landscaping: Evans and Reeves; economics: Larry Smith & Company; architects for Park Village Residences: Anshen & Allen



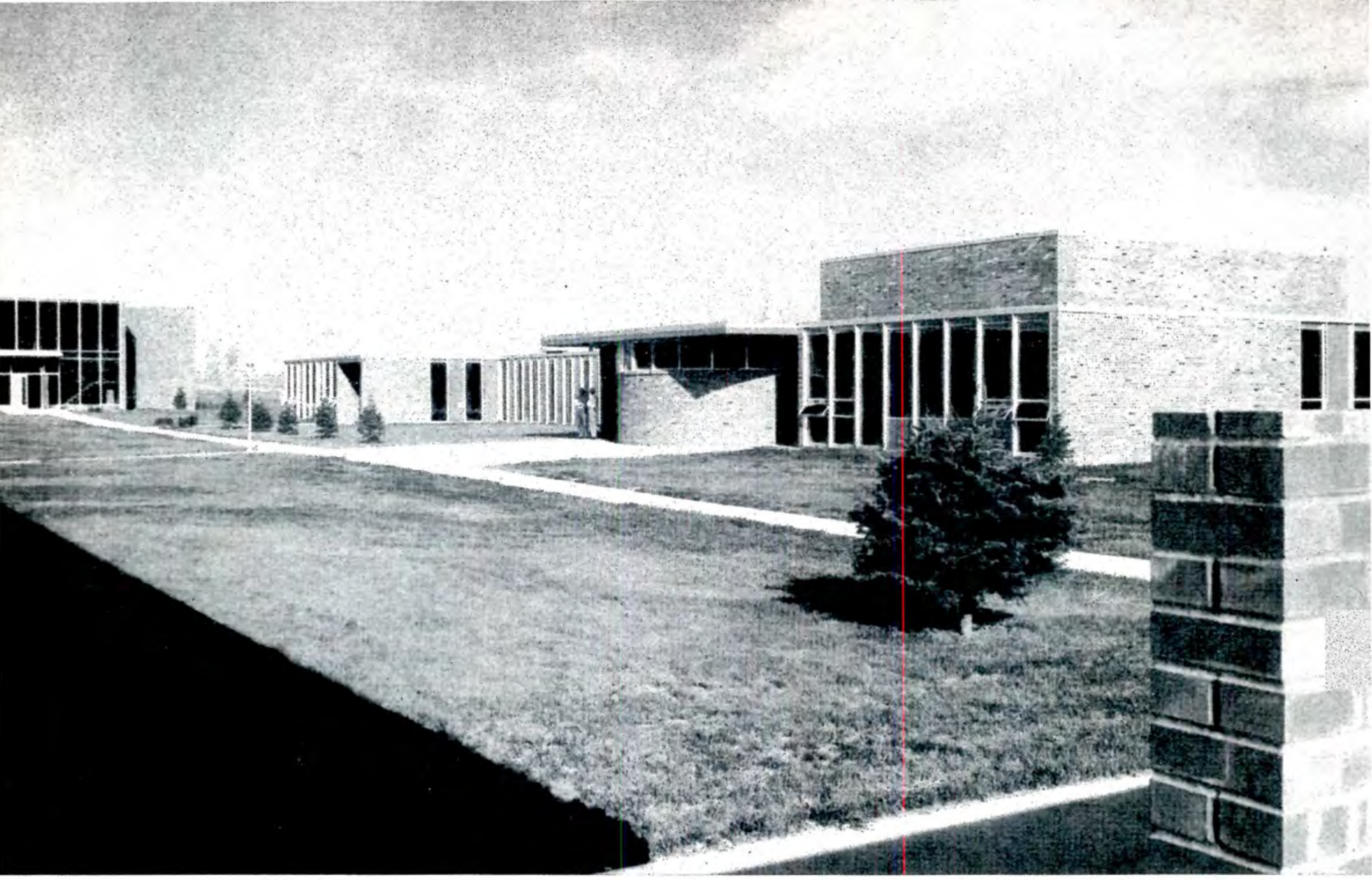
1. Park Village
2. St. Andrew's Village
3. Governors Village
4. Crown Village
5. Marina Village
6. Mission Village
7. Garden Village
8. Star Village
9. Arbor Village
10. Wright's Village
11. Pioneer Village
12. Mountain Village

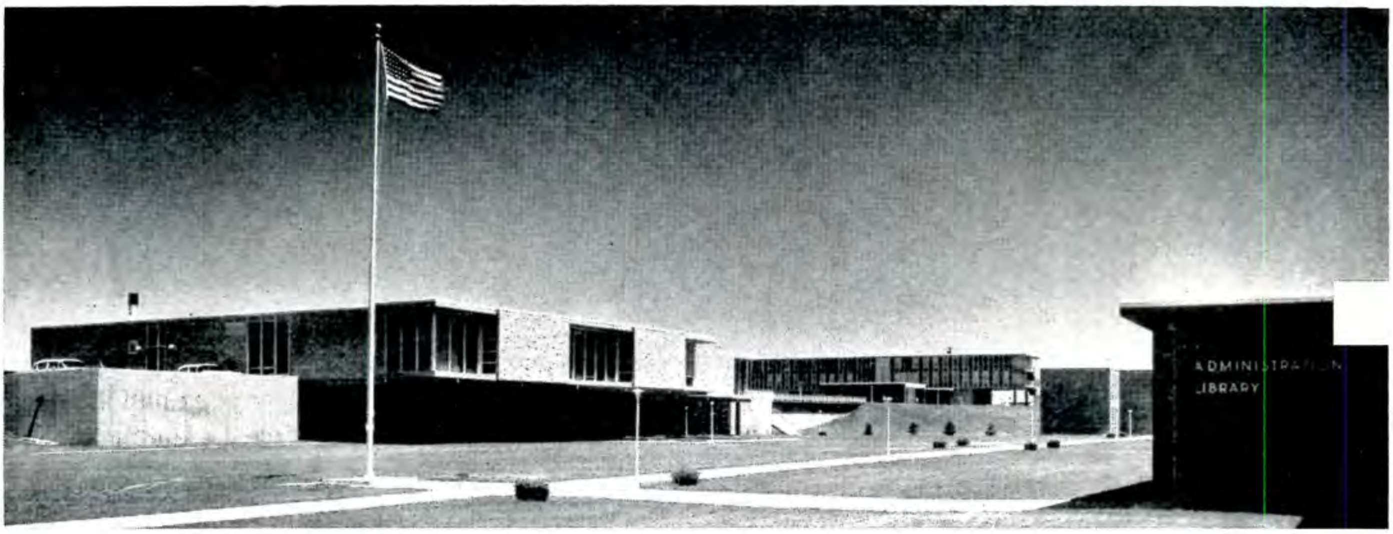


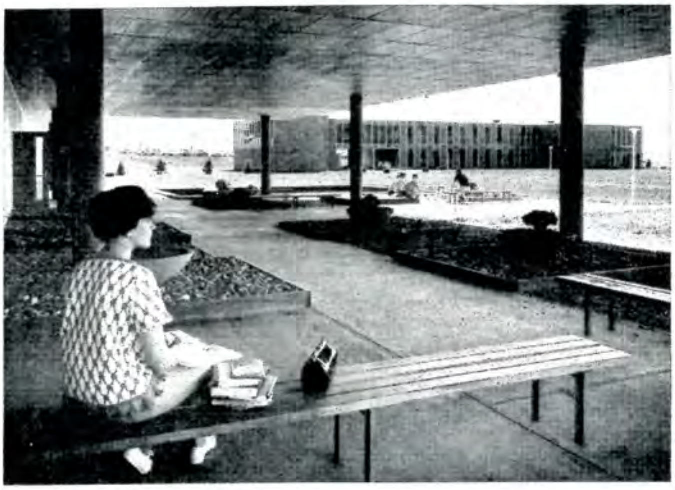
1. Commercial
2. Church
3. Apartment
4. School
5. Club
6. Future apartment

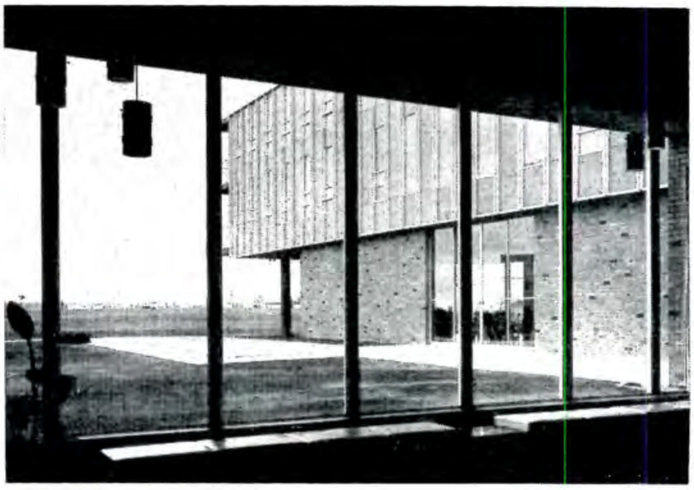


All houses have a family room as well as living room; some provide a screened porch, useful in hot dry climate







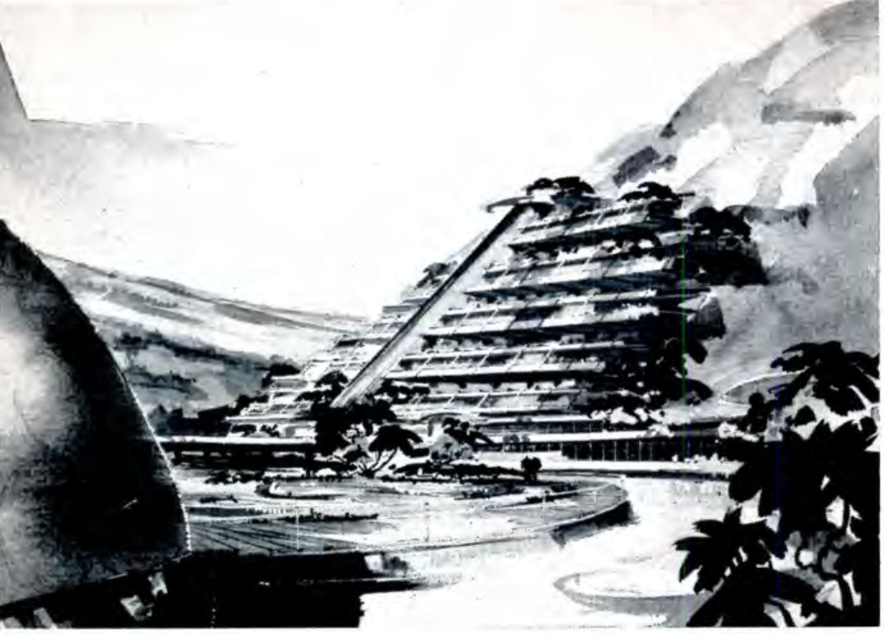


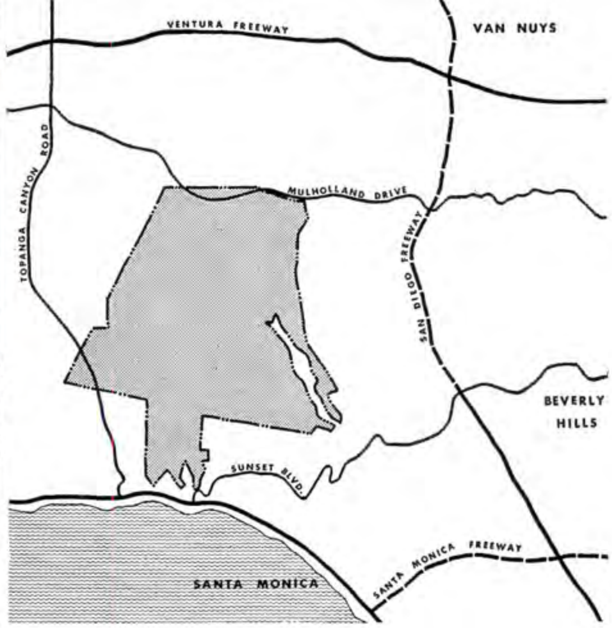
Ingvard Eide photos

MASTER PLAN AND BUILDINGS FOR CO-ED COLLEGE

A commission to master plan a new campus *and* design its initial group of buildings rarely comes to an archtiectural firm, and even more rarely to a young firm. Six years ago, when the College of Great Falls foresaw its need for facilities to take care of a large increase in its students, it engaged a local architectural firm (then Page & Werner) which had opened its office only a few years earlier. Today the college is functioning on its new campus and has eleven new buildings to meet the needs of its expanded program. Although most of the site is level, there is a slight change in grade in one area which has been effectively used to provide a terrace with a view over the campus. Most of the recently planted trees are evergreens suitable to the locality; when grown their color and height will add scale to the campus. The first eleven buildings were done on a tight budget, but careful design and management provided them all for the available $3 million. Among these buildings is a chapel. Other buildings are classroom, science, administration and library buildings, fine arts group, physical education facilities, girls' dormitory, men's and women's faculty units and a student center.

College of Great Falls, Great Falls, Montana. Architects: Page-Werner and Associates





L.A. CONSIDERS MOUNTAIN PARK DEVELOPMENT

Plans for developing the largest tract of undeveloped land within the city limits of Los Angeles, recently unveiled before the Los Angeles city planning commission, show a hillside community made up of eleven villages separated by the natural topography of the area. The proposed scheme for developing the area is unconventional in that it suggests use of the hillsides as actual sites rather than cutting the hills to make level sites. Shown here is a sketch for an apartment structure, each unit of which has an unobstructed view from its cantilevered deck. Another unusual aspect of the plan is to incorporate employment opportunities—resort, cultural or exposition center, research center, etc.—within a number of the villages. Theoretically, at least, residents of Mountain Park would for the most part be employed nearby, so that fewer streets, highways and freeways would be needed than for a typical suburban development.

Architects and planners: William L. Pereira & Associates

Robert Laws

Robert Halbrook

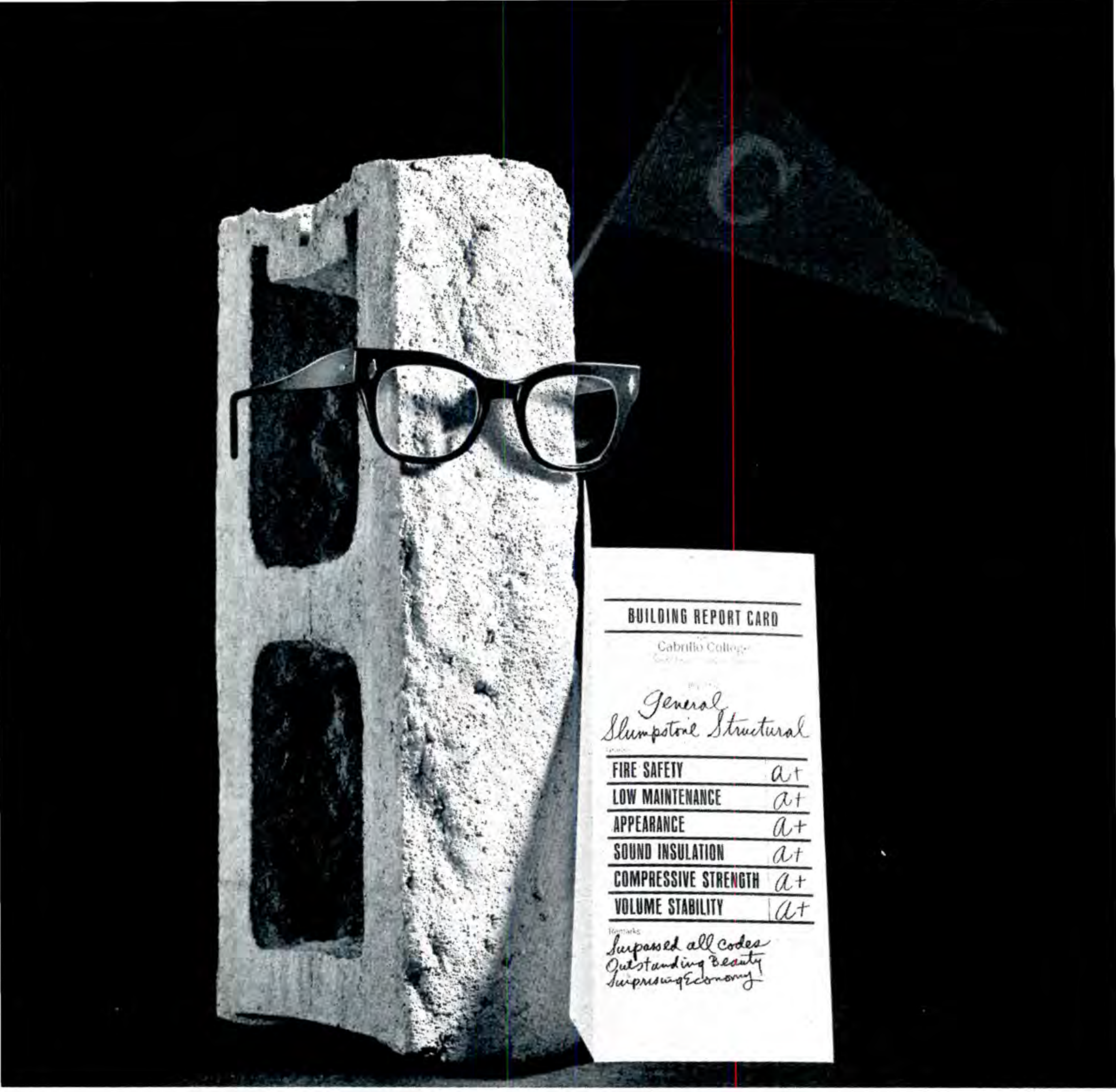
COUNTY CENTER GAINS BUILDING AND SCULPTURE

Santa Clara County's new Welfare Building will provide not only new offices for this department but an unusual sculpture work depicting the society of man—the second piece of sculpture within the county area. The new building is a four-story, $2 million structure located in the San Jose Civic Center. The sculpture is one of two works of art in the building; the other is a mural in glazed brick on the exterior wall of one of the single story wings. Aluminum louvers on the south side of the building operate automatically. End walls are of dark brown brick. The sculpture, with figures twice life size, hangs against the end wall on the east.

Welfare Building, Santa Clara County, Calif. Architects: Higgins and Root; sculptor: Robert Nissen; structural engineers: Jordan, Paquette and Maurer; mechanical engineers: Greene and Herbert; soils and foundation engineers: Woodward-Clyde-Sherard; landscape architect: George E. Martin; contractor: C. N. Swenson Company

L. A. DODGER STADIUM uses Zinsco-built sub stations, primary switch gear and other equipment to serve stadium club and concessions

Arch. and Engrs.: Praeger-Kavanagh-Waterbury, New York
General Contractor: Vinnell Construction, Alhambra, Calif.
Electrical Contractor: C. D. Draucker Inc.



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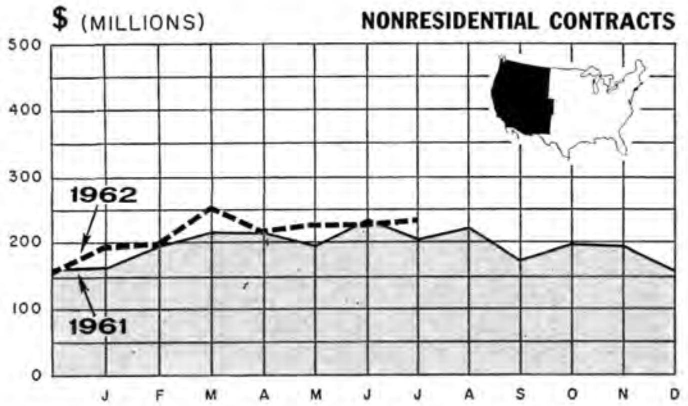
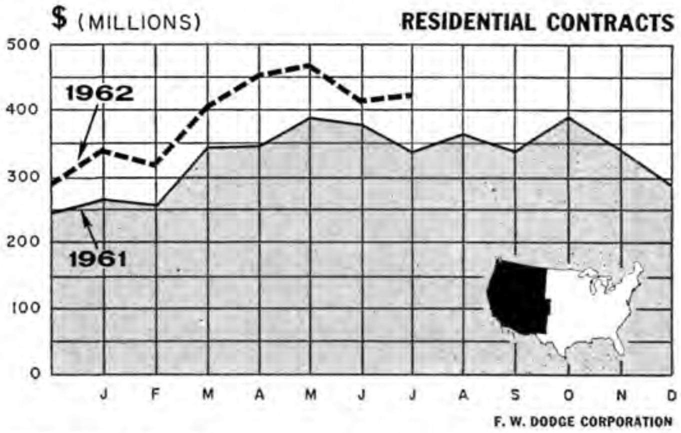




WESTERN CONSTRUCTION TRENDS

(For analysis of construction trends nationwide, see page 18)

On the rebound from a hesitant June, construction in the Western states advanced sharply during July. Total contracts awarded in the latest month amounted to $855 million, a solid gain of 19 per cent over July, 1961. Expansion was evident in all the major construction categories as the total value of 1962 contracts at the end of seven months reached $5.6 billion.

Within the non-residential building group, currently showing a 15 per cent gain over last July, manufacturing was a particularly bright spot. With the extra boost of a multi-million dollar automobile plant to be built in California, this category posted a gain of 82 per cent for the month. But even without this large project the increase would have been very impressive. Commercial building jumped 23 per cent over last July, with stores and office buildings contributing equally. Although commercial building had been lagging behind the 1961 volume throughout the first half, July's activity brought this year's cumulative total to the front by a slim margin.

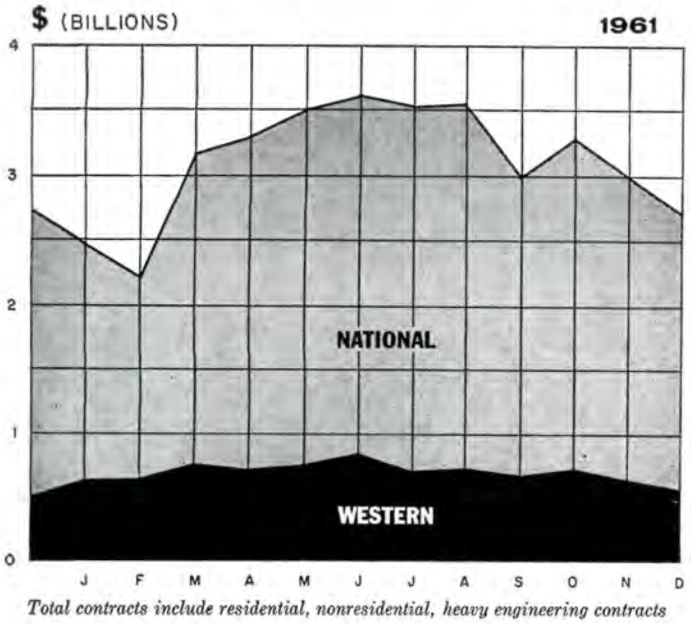
In general, Western non-residential building mirrored the national pattern in July with an excellent showing in commercial and manufacturing contract awards, partly offset by softness in school and hospital categories.

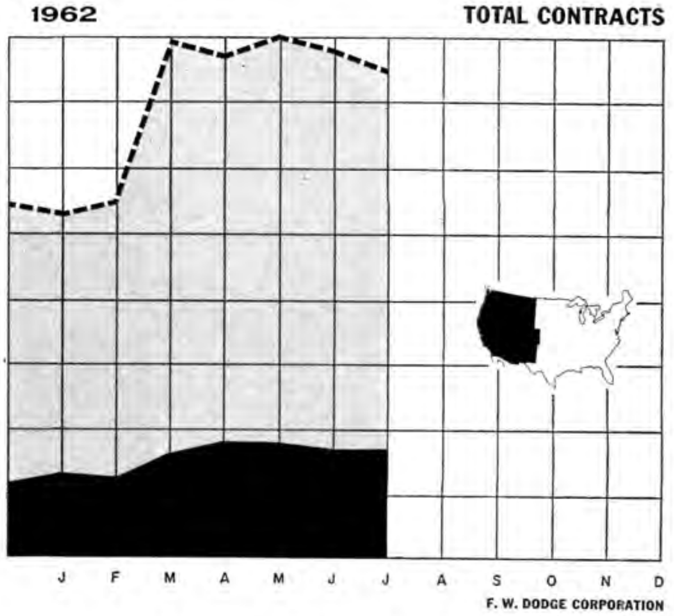
Residential building, which accounts for about half the value of all construction in the West, registered a 25 per cent gain over last July. Apartment building was still setting the pace within the residential group, and July marked the West's fifth consecutive $100 million month for new apartment contracts. (March, 1962 was the first on record.) All other residential types, with the single exception of hotels, advanced in July bringing the seven month total of new dwelling units contracted for in the Western states to 221,000. At this point in 1961 the total was 186,000.

July heavy engineering contracts, beefed up by large dam and power projects in the Northwest, rose 12 per cent above year-ago levels.

At the end of seven months, only four of the eleven Western states were lagging their 1961 pace of total construction contracts. July activity in the seven leading states pulled up the region's total to date to 9 per cent ahead of 1961.

GEORGE A. CHRISTIE, *Economist*
F. W. Dodge Corporation
A McGraw-Hill Company





Total contracts include residential, nonresidential, heavy engineering contracts

Estimator's Guide: LOS ANGELES AND THE SOUTHWEST

The Estimator's Guide alternates monthly among four Western areas. The prices below are compiled from average quotations received by LeRoy Construction Services for commercial work of approximately $100,000-$250,000 total value. Except as otherwise noted, prices are for work installed including all labor, material, taxes, overhead and subcontractors' profit. Material prices include local delivery except as noted, but no state or local taxes.

EXCAVATION

MACHINE WORK IN COMMON GROUND		
Large basement	CY	.80-1.10
Small pits	CY	1.35-1.85
Trenches	CY	1.65-2.40
HAND WORK IN COMMON GROUND		
Large pits & trenches	CY	7.00-11.00
Small pits & trimming	CY	10.00-14.00
Hard clay or shale, 2 times above rates		

SEWER PIPE MATERIAL

VITRIFIED		
Standard 4"	LF	.33
Standard 6"	LF	.63
Standard 8"	LF	.90
Standard 12"	LF	1.94
Standard 24"	LF	7.89
CLAY DRAIN PIPE		
Standard 6"	LF	.34
Standard 8"	LF	.45

CONCRETE & AGGREGATES

GRAVEL, all sizes	TON	3.75
TOP SAND	TON	4.00
CONCRETE MIX	TON	4.10
CRUSHED ROCK		
1/4" to 3/4"	TON	4.00
3/4" to 1 1/2"	TON	4.00
ROOFING GRAVEL	TON	4.10
SAND (#1 & 2)	TON	5.00
CEMENT		
Common, all brands (paper sacks)		
Small quantities	Per Sack	1.40
Large quantities	Per Bll	4.45
Atlas White	Per Sack	3.80
Concrete Mix		
6 sacks in 5-yd loads	Per Yd	15.50
CURING COMPOUND		
Clear, 5-gal drums	Per Gal	1.45

STEEL MATERIALS

SHEETS		
Hot rolled	LB	.105
Cold rolled	LB	.125
Galvanized	LB	.125
PLATE	LB	.105
STRIPS	LB	.125
STRUCTURAL SHAPES	LB	.105
BARS		
Hot rolled	LB	.105
Cold finished	LB	.14
Reinforced	LB	.105
REINFORCED MESH		
6 x 6" #10 x #10	SF	.04
6 x 6" #6 x #6	SF	.07
2000# FOB warehouse		

STRUCTURAL STEEL

$350.00 and up per ton erected when out of mill
$370.00 and up per ton erected when out of stock

BRICK & TILE

All Prices—FOB Plant

COMMON BRICK		
Common 2 1/2 x 3 3/4 x 8 1/4"	M	39.00
Select 2 1/2 x 3 3/4 x 8 1/4"	M	48.00
FACE BRICK		
Standard	M	75.00- 85.00
Roman	M	100.00-120.00
Norman	M	95.00-105.00
HOLLOW TILE		
12 x 12 x 3"	M	160.00
12 x 12 x 4"	M	176.00
12 x 12 x 6"	M	240.00
MANTEL FIRE BRICK		
2 1/2 x 9 1/2 x 4 1/2"	M	160.00
GLAZED STRUCTURAL UNITS		
2 x 6 x 12" furring	SF	.60
4 x 6 x 12" 1 side	SF	.91
6 x 6 x 12" 1 side	SF	1.32
4 x 6 x 12" 2 sides	SF	1.00
Add for color		.25
CONCRETE BLOCKS		
4 x 8 x 16"	EA	.23
6 x 8 x 16"	EA	.29
8 x 8 x 16"	EA	.34
12 x 8 x 16"	EA	.51
Add for color	EA	.02
AGGREGATE		
Haydite or Basalite	CY	6.80
MODULAR FLUE LINER		
8" x 8"	LF	.50
8" x 12"	LF	.70
12" x 12"	LF	.95
12" x 16"	LF	1.30
16" x 16"	LF	1.55
20" x 20"	LF	2.15
24" x 24"	LF	4.50

BRICKWORK & MASONRY

COMMON BRICKWORK, reinforced		
8" walls	SF	2.85
12" walls	SF	4.15
SELECT COMMON, reinforced		
8" walls	SF	3.00
12" walls	SF	4.35
CONCRETE BLOCK, reinforced		
6" walls	SF	1.65
8" walls	SF	1.80
12" walls	SF	2.30
BRICK VENEER		
4" Select Common	SF	1.60
4" Roman	SF	2.40
4" Norman	SF	2.40

BUILDING PAPERS & FELTS

BUILDING PAPER	
1 ply per 1,000-ft roll	4.20
2 ply per 1,000-ft roll	6.40
3 ply per 1,000-ft roll	8.75
Sisalkraft, reinforced, 500-ft roll	9.50
SHEATHING PAPERS	
Asphalt sheathing, 15-lb roll	3.35
30-lb roll	3.80
Dampcourse, 216-ft roll	3.80
FELT PAPERS	
Deadening felt,	
3/4-lb, 50-ft roll	1.95
1-lb, 50-ft roll	2.45
ROOFING PAPERS	
Standard grade, smooth surface 108-ft roll, 432 SF Rolls	
Light, 45-lb	2.20
Medium, 55-lb	2.50
Heavy, 65-lb	2.90
Mineral surfaced	3.50

LUMBER

DOUGLAS FIR			
Construction	2x4-2x10	MBM	98.00-105.00
Standard	2x4-2x10	MBM	94.00-98.00
Utility	2x4-2x10	MBM	78.00-83.00
Economy	2x4-2x10	MBM	59.00-68.00
Clear, air dried		MBM	200.00
Clear, kiln dried		MBM	245.00
REDWOOD			
Foundation grade			140.00
Construction Heart			125.00
A Grade			200.00
Clear Heart			240.00
PLYWOOD (DOUGLAS FIR)			
1/4" AB		MSF	90.00
1/4" AD		MSF	70.00
1/4" Ext. waterproof		MSF	77.00
3/8" AB		MSF	105.00
3/8" AD		MSF	95.00
3/8" CD		MSF	70.00
1/2" AB		MSF	140.00
1/2" AD		MSF	120.00
1/2" CD		MSF	91.00
5/8" AB		MSF	156.00
5/8" AD		MSF	136.00
5/8" CD		MSF	102.00
3/4" AB		MSF	178.00
3/4" AD		MSF	158.00
3/4" CD		MSF	135.00
5/8" Plyform		MSF	170.00
SHINGLES			
Cedar #1		Square	16.50-19.00
Cedar #2		Square	14.50-17.00
SHAKES			
Cedar			
1/2" to 3/4" butt		Square	18.50-21.00
3/4" to 1 1/4" butt		Square	21.00-23.00
Redwood			
3/4" to 1 1/4" butt		Square	22.00-25.00

INSULATION & WALL BOARD

FOB Warehouse	Per M SF
FIBRE GLASS INSULATION foil backed	
1 1/2" thick	42.00
2 1/4" thick	46.00
3 5/8" full thick	56.00
SOFTBOARDS—wood fiber	
3/8" thick	59.00
1/2" thick	73.00
ALUMINUM INSULATION	
35# Kraft paper with alum foil	
1 side only	24.00
2 sides	30.00
GYPSUM WALLBOARD	
3/8" thick	51.00
1/2" thick	60.00
5/8" thick	83.00
HARDBOARDS—Wood fiber	
1/8" thick, sheathing	67.00
3/16" thick, sheathing	82.00
1/4" thick, sheathing	110.00
1/8" thick, tempered	89.00
3/16" thick, tempered	120.00
1/4" thick, tempered	152.00
CEMENT ASBESTOS BOARD	
1/8" flat sheets	127.00
3/16" flat sheets	175.00
1/4" flat sheets	225.00

ROUGH CARPENTRY

FRAMING		
Floors	BM	.24-.29
Walls	BM	.30-.35
Ceilings	BM	.24-.30
Roofs	BM	.25-.30
Furring & blocking	BM	.32-.52
Bolted framing, add 50%		
SHEATHING		
1 x 8" straight	BM	.22-.28
1 x 8" diagonal	BM	.25-.30
5/16" plyscord	SF	.15-.18
5/8" plywood CC	SF	.21-.26
SIDING		
1 x 8" bevel	BM	.39-.48
1 x 4" V-rustic	BM	.42-.50

DAMPPROOFING & WATERPROOFING

MEMBRANE		
1 layer 50# felt	SQ	10.00
4 layers dampcourse	SQ	15.00
Hot Coat walls	SQ	9.00
Konset added to concrete	per gal	1.95
Anti-Hydro added to concrete	per gal	1.40

ROOFING

STANDARD TAR & GRAVEL	Per Square
4-ply	17.00-22.00
5-ply	19.00-24.50
White gravel finish, add	2.00- 4.00
Asphalt Compo. shingles	20.00-24.00
Cedar shingles	24.00-28.00
Cedar shakes	32.00-38.00
Redwood shakes	33.00-40.00
Clay tiles	42.00-50.00

SHEET METAL

ROOF FLASHINGS		
18 ga galv steel	SF	.70-1.10
22 ga galv steel	SF	.60-1.00
26 ga galv steel	SF	.50- .90
18 ga aluminum	SF	1.10-1.60
22 ga aluminum	SF	.90-1.40
26 ga aluminum	SF	.75-1.15
24 oz copper	SF	2.00-2.50
20 oz copper	SF	1.80-2.30
16 oz copper	SF	1.60-2.10
26 ga galv steel		
4" OG gutter	LF	1.10-1.35
Mitres and Drops	EA	2.00-4.00
22 ga galv louvers	SF	2.75-3.75
20 oz copper louvers	SF	3.50-5.00

CHIMNEYS, PATENT

6"	LF	1.45
8"	LF	2.05
10"	LF	2.85

12" .... LF 3.45

Rates for 10-50 LF

MILLWORK

All Prices FOB Mill

D.F., clear, air dried S4S ...... MBM 220.00-250.00
D.F., kiln dried S4S .... MBM 225.00-275.00

DOOR FRAMES & TRIM

Residential entrance .... 17.00 & Up
Interior room entrance .... 8.00 & Up

DOORS

1⅜" hollow core .... 8.00 & Up
1¾" solid core .... 19.00 & Up
1⅜" Birch hollow core .... 10.00 & Up
1¾" Birch solid core .... 22.00 & Up

WOOD SASH

D/H in pairs (2 lts) .... SF .55
Casement (1 lt) .... SF .65

WOOD CABINETS

¾" D.F. plywood with ¼" plywood backs
Wall hung .... LF 10.00-15.00
Counter .... LF 12.00-17.00

Birch or Maple—Add 25%

FINISH CARPENTRY

EXTERIOR TRIM

Fascia & molds .... BM .47

ENTRANCE DOORS & FRAMES

Single .... 60.00 & up
Double .... 100.00 & up

INTERIOR DOORS & FRAMES

Singles .... 35.00 & up
Pocket sliding .... 45.00 & up
Closet sliding (pr.) .... 50.00 & up

WINDOWS

D/H sash & frames .... SF 2.00 & up
Casement sash & frames .... SF 2.25 & up

SHELVING

1 x 12 S4S .... BM .30-.50
¼" plywood .... SF .40-.60

STAIRS

Oak Steps, DF risers
Under 36" wide .... Riser 14.00
Under 60" wide .... Riser 19.00
Newel posts and rail extra

WOOD CASES AND CABINETS

D.F. wall hung .... LF 15.00-22.00
D.F. counters .... LF 18.00-30.00

HARDWOOD FLOORING MATERIALS

OAK 5/16" x 2" strip

Clear .... M 210.00
Select .... M 200.00
#1 Common .... M 190.00

Oak 5/16" RANDOM PLANK

Select & Better .... M 280.00
#1 Common .... M 230.00

OAK 25/32" x 2¼" T&G

#1 Common .... M 190.00

MAPLE 25/32" x 2¼" T&G

#1 Grade .... M 305.00
#2 Grade .... M 280.00
#3 Grade .... M 230.00
NAILS: 1" floor brads .... KEG 18.00

HARDWOOD FLOORS

SELECT OAK

Filled, sanded, stained and varnished
5/16" x 2¼" strip .... SF .50- .55
5/16" random plank .... SF .55- .60
25/32" x 2¼" T&G .... SF .85-1.00
Maple, 2nd grade & better
Filled, sanded, stained & varnished
25/32" x 2½" T&G .... SF .90-1.05
Wax finish—add .... SF .10

RESILIENT FLOORING MATERIALS

Linoleum, standard gage .... SY 2.75-2.95
Linoleum, battleship .... SY 3.10-3.30
⅛" Asphalt tile, dark .... SF .10- .12
⅛" Asphalt tile, light .... SF .14- .18
⅛" Rubber tile .... SF .44- .50
.080 Vinyl tile .... SF .67- .70
.080 Vinyl asbestos tile .... SF .22- .26
⅛" Vinyl asbestos tile .... SF .32- .39
4" Base, black .... LF .14- .16
4" Base, colored .... LF .25- .29
Rubber treads .... LF 1.60-2.30
Linoleum paste .... Gal .75- .90

Rates for quantities of 1000 to 5000 S.F. per job

FLOORS

⅛" Asphalt tile, dark colors ..... SF .25- .30
⅛" Asphalt tile, light colors .... SF .30- .35
⅛" Rubber tile .... SF .60- .70
.080 Vinyl asbestos tile .... SF .40- .45
.080 Vinyl tile .... SF .85- .95
Linoleum, standard gage .... SY 3.75-4.25
Linoleum, battleship .... SY 5.25-5.75
4" Rubber base, black .... LF .35- .45
Rubber stair treads .... LF 2.25-2.75

Rates for quantities of 1000 to 5000 S.F. per job

LATH & PLASTER MATERIALS

METAL LATH

Diamond 3.4# copper-bearing .... SY .57
Ribbed 3.4# copper-bearing .... SY .62

ROCK LATH

⅜" thick .... SY .36

METAL

¾" standard channel .... LF .047
1½" standard channel .... LF .065
3¼" steel studs .... LF .112
4" steel studs .... LF .122
Stud shoes .... EA .03

PLASTER

Browning, hardwall .... Sack 1.55
Finish, hardwall .... Sack 1.70
Stucco .... Sack 2.50

LATH & PLASTER WORK

CHANNEL FURRING

Suspended ceilings .... SY 2.80-3.05
Walls .... SY 2.90-3.25

METAL STUD PARTITIONS

3¼" studs .... SY 3.00-3.30
4" studs .... SY 3.15-3.45
Over 10' high, add .... SY .25- .35

3.4# METAL LATH & PLASTER

Ceilings .... SY 4.15-4.90
Walls .... SY 4.20-5.00
Keene's cement finish, add .... SY .45- .65

ROCK LATH & PLASTER

Ceilings .... SY 3.15-3.65
Walls .... SY 3.25-3.75

WIRE MESH & ⅞" STUCCO

Walls .... SY 4.40-5.50

STUCCO ON CONCRETE

Walls .... SY 3.25-3.70
Metal accessories .... LF .25- .55

TILE MATERIALS

FOB Warehouse

CERAMIC TILE

4¼" x 4¼" glazed .... SF .72
4¼" x 4¼" hard glazed .... SF .74
Random, unglazed .... SF .72
6" x 2" cap .... EA .19
6" cove base .... EA .31
¼"-round bead .... LF .10

QUARRY TILE

6 x 6 x ½" red .... SF .51
6 x 6 x ¾" red .... SF .53
9 x 9 x ¾" red .... SF .65
6 x 6 cove base .... EA .23

TILE & TERRAZZO WORK

CERAMIC TILE, stock colors

Floors .... SF 1.85-2.25
Walls .... SF 1.90-2.40
Cove Base .... LF 1.10-1.35

QUARRY TILE

6" x 6" x ½" floors .... SF 1.75-2.20
9" x 9" x ¾" floors .... SF 1.90-2.35

TERRAZZO

Terrazzo floors .... SF 2.15-2.65
Cond. terrazzo floors .... SF 2.30-2.80
Precast treads & risers .... LF 3.60-4.60
Precast landing slabs .... SF 3.00-4.10

WINDOWS

F.O.B. Warehouse

STEEL SASH

Under 10 SF .... SF 2.55 & up
Under 15 SF .... SF 2.10 & up
Under 20 SF .... SF 1.55 & up
Under 30 SF .... SF 1.05 & up

ALUMINUM SASH

Under 10 SF .... SF 2.80 & up
Under 15 SF .... SF 2.30 & up
Under 20 SF .... SF 1.85 & up
Under 30 SF .... SF 1.35 & up

Rates for standard sections and stock sizes

GLASS—CUT TO SIZE

FOB Warehouse

SSB Clear, over 4 SF .... SF .17
DSB Clear, over 7 SF .... SF .28
Crystal, over 16 SF .... SF .35
¼" Polished plate, over 50 SF .... SF .90
⅛" Obscure, over 7 SF .... SF .55
⅛" Ribbed, over 7 SF .... SF .68
⅛" Rough, over 7 SF .... SF .68
¼" Wire plate, clear, over 40 SF ...... SF 1.90
¼" Wire plate, rough, over 40 SF .... SF .90
⅛" Heat absorbing, over 7 SF .... .90
¼" Tempered plate, over 40 SF .... SF 3.60
½" Tempered plate, over 40 SF .... SF 6.40

GLASS BLOCKS

8" .... EA 1.15
6" .... EA .70
12" .... EA 3.10

GLASS & GLAZING

SSB Clear .... SF .60
DSB Clear .... SF .75
Crystal .... SF .90
¼" Plate .... SF 1.95
⅛" Obscure .... SF .75
⅛" Heat absorbing .... SF 1.35
¼" Tempered plate .... SF 4.70
½" Tempered plate .... SF 9.00
¼" Wire plate, clear .... SF 2.80
¼" Wire plate, rough .... SF 1.40

PAINT MATERIALS

All prices FOB Warehouse

Thinners 5-100 gal .... Gal .63
Turpentine 5-100 gal. .... Gal 1.59
Linseed oil, raw .... Gal. 2.36
Linseed oil, boiled .... Gal 2.43
Primer-sealer .... Gal 3.12
Enamel undercoaters .... Gal 5.54
Enamel .... Gal 5.58
White Lead in oil .... LB .36
Red Lead in oil .... LB .36
Litherage .... LB .32

PAINTING

EXTERIOR

Stucco wash, 1 coat .... SY .48
2 coats .... SY .80
Lead & Oil, 2 coats .... SY 1.10
3 coats .... SY 1.60

INTERIOR

Primer-sealer .... SY .45
Wall paint, 1 coat .... SY .54
2 coats .... SY .98
Enamel, 1 coat .... SY .65
2 coats .... SY 1.14
Doors & trim .... EA 14.00
Sash & trim .... EA 16.00
Base & molds .... LF .18

Old work, Add 15-30%

VENETIAN BLINDS

RESIDENTIAL .... SF .45 & up
COMMERCIAL .... SF .55 & up
VERTICAL .... SF 1.25 & up

PLUMBING

Lavatories .... EA 150.00-200.00
Toilets .... EA 200.00-300.00
Bath tubs .... EA 250.00-350.00
Stall shower .... EA 125.00-175.00
Sinks .... EA 150.00-200.00
Laundry trays .... EA 100.00-150.00
Water heaters .... EA 100.00-300.00

Prices based on average residential and commercial work. Special fixtures and excessive piping not included.

HEATING

Furnaces—Gas-Fired, Average Job

FLOOR FURNACE

25,000 BTU 100.00-130.00
35,000 BTU 110.00-140.00
45,000 BTU 120.00-155.00
Automatic Control, add 30.00-40.00

DUAL WALL FURNACE

25,000 BTU 115.00-135.00
35,000 BTU 130.00-150.00
50,000 BTU 155.00-185.00
Automatic Control, add 30.00-40.00

GRAVITY FURNACE

75,000 BTU 385.00-455.00
85,000 BTU 435.00-535.00
95,000 BTU 485.00-610.00
Forced Air Furnace, add 80.00-135.00
Automatic Control, add 20.00- 30.00

HEAT REGISTERS

Outlet 10.00-20.00

ELECTRIC WORK

Per Outlet

Knob & Tube .... EA 10.00
Armor .... EA 17.00
Conduit .... EA 21.00
110-V Circuit .... EA 26.00
220-V Circuit .... EA 98.00

ELEVATORS & ESCALATORS

Prices vary according to capacity, speed and type.
Consult elevator companies.
Slow speed apartment house elevator including doors and trim about $4,500.00 per floor.

Western Cost Construction Indexes

Presented by Clyde Shute, Director of Statistical Policy, Construction News Div., F. W. Dodge Corp., from data compiled by E. H. Boeckh & Assoc. Inc.

Labor and Materials: U.S. average 1926-1929=100

	DENVER					LOS ANGELES				
	RESIDENTIAL		APTS., HOTELS OFFICE BLDGS.	COMMERCIAL AND FACTORY BLDGS.		RESIDENTIAL		APTS., HOTELS OFFICE BLDGS.	COMMERCIAL AND FACTORY BLDGS.	
PERIOD	Brick	Frame	Brick and Concrete	Brick and Concrete	Brick and Steel	Brick	Frame	Brick and Concrete	Brick and Concrete	Brick and Steel
1948	217.8	218.1	202.7	207.0	206.7	215.9	216.5	205.8	210.0	209.8
1949	215.8	212.9	211.0	215.3	214.6	207.0	203.2	209.9	212.4	210.2
1950	230.0	228.2	218.8	221.3	221.2	224.1	222.8	217.4	219.0	217.5
1951	249.7	246.6	236.5	237.2	238.9	241.0	239.5	235.1	236.9	236.6
1952	253.6	249.4	243.4	245.1	245.6	243.8	241.7	239.8	242.6	241.5
1953	259.6	254.0	255.0	260.9	258.1	250.5	246.5	252.3	258.2	255.3
1954	258.9	252.0	259.1	266.2	263.4	251.0	245.3	257.7	265.7	261.8
1955	266.6	260.9	266.3	273.2	271.7	262.1	256.6	269.3	278.0	273.9
1956	274.9	269.3	275.8	282.3	285.1	272.6	266.7	282.9	292.9	289.3
1957	281.3	272.2	285.4	293.1	296.4	275.4	267.9	292.8	303.3	303.7
1958	282.2	272.0	288.1	295.9	298.8	277.9	286.6	302.6	314.5	316.4
1959	288.7	278.9	295.2	302.9	304.8	288.7	279.1	314.9	326.9	327.6
1960	292.2	282.7	301.3	309.0	310.0	299.8	287.7	329.1	342.7	339.6
1961	294.4	285.0	307.7	316.1	311.9	303.4	288.5	339.4	355.1	347.6
May 1962	298.5	286.6	317.0	327.6	319.5	310.2	294.9	347.4	362.7	355.2
June 1962	298.5	286.6	317.0	327.6	319.5	312.4	296.2	351.0	367.9	359.4
July 1962	300.4	289.8	318.6	327.9	320.3	313.4	297.8	351.8	368.1	359.8
	% Increase over 1939					% Increase over 1939				
July 1962	168.2	158.5	174.4	178.3	173.8	222.4	218.2	223.6	250.9	238.8

	SAN FRANCISCO					SEATTLE				
1948	218.9	216.6	208.3	214.7	211.1	216.3	211.4	211.5	216.6	216.9
1949	213.0	207.1	214.0	219.8	216.1	214.2	203.9	220.7	228.5	225.3
1950	227.0	223.1	222.4	224.5	222.6	224.1	213.6	227.1	234.5	230.3
1951	245.2	240.4	239.6	243.1	243.1	245.1	232.7	247.7	255.8	251.0
1952	250.2	245.0	245.6	248.7	249.6	254.3	239.8	258.8	267.7	263.8
1953	255.2	257.2	256.6	261.0	259.7	254.8	239.0	262.7	273.6	269.5
1954	257.4	249.2	264.1	272.5	267.2	253.3	236.1	266.6	279.1	274.0
1955	268.0	259.0	275.0	284.4	279.6	260.6	243.3	273.7	287.3	282.4
1956	279.0	270.0	288.9	298.6	295.8	273.5	254.0	288.5	303.4	299.0
1957	286.3	274.4	302.9	315.2	310.7	275.6	254.0	298.2	313.1	311.2
1958	289.8	274.9	311.5	326.7	320.8	279.9	256.4	306.0	324.0	320.8
1959	299.2	284.4	322.7	338.1	330.1	291.5	267.8	318.8	336.9	331.8
1960	305.5	288.9	335.3	352.2	342.3	298.9	272.4	330.5	351.2	342.9
1961	308.7	290.2	345.1	362.9	350.2	296.5	268.2	335.3	357.6	345.6
May 1962	313.7	294.4	352.7	370.7	356.1	306.1	278.2	346.0	368.0	354.1
June 1962	313.7	294.4	352.7	370.7	356.1	306.1	278.2	346.0	368.0	354.1
July 1962	316.0	295.7	356.3	375.9	360.3	307.1	278.6	347.3	370.4	355.0
	% Increase over 1939					% Increase over 1939				
July 1962	199.2	197.8	203.5	208.4	209.3	194.1	188.1	191.3	195.6	199.1

Cost comparisons, as percentage differences, for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110

index for city B = 95

(both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

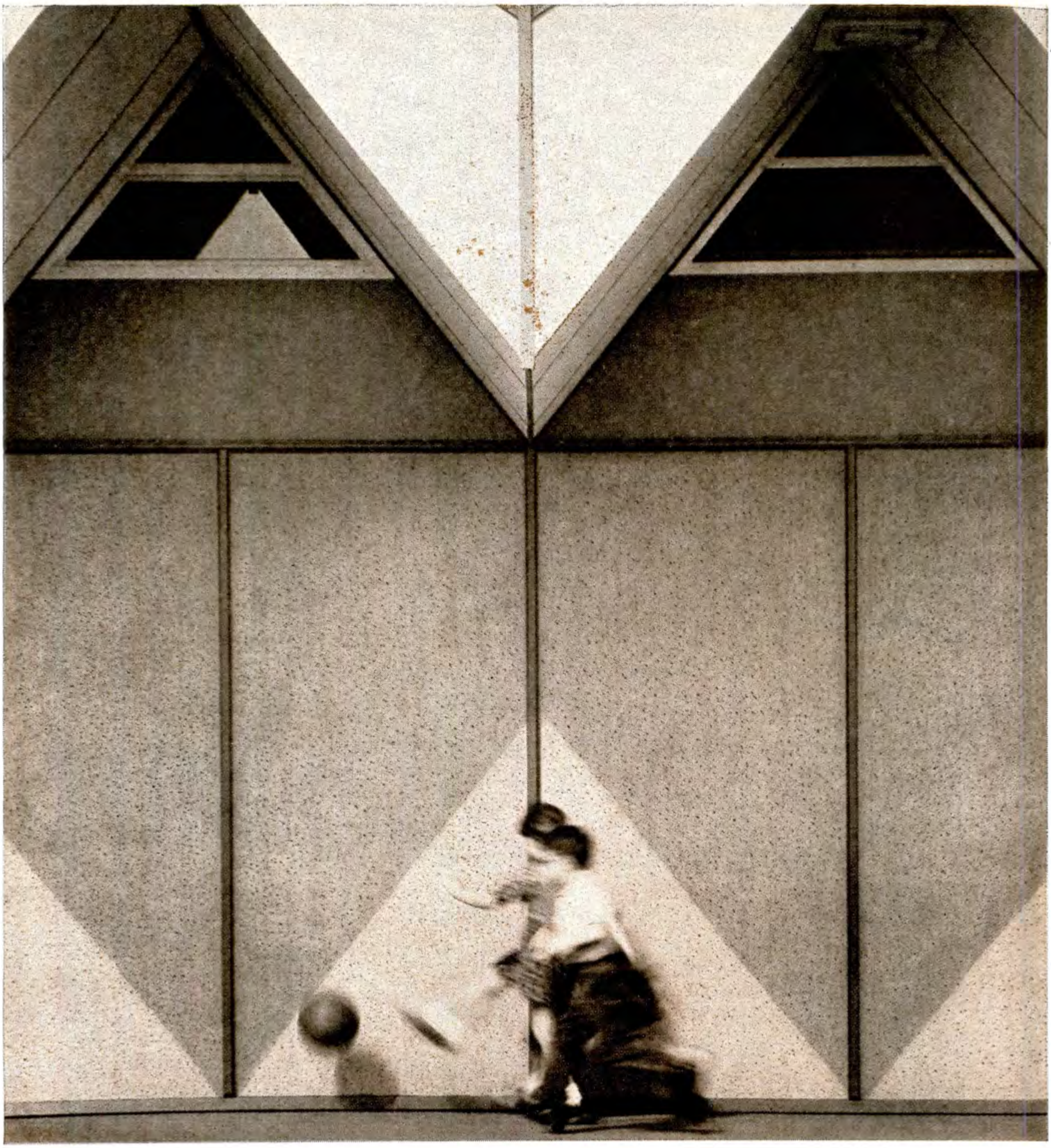
Conversely: costs in B are approximately 14 per cent lower than in A.

$$\frac{110-95}{110} = 0.136$$

Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926-29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published list prices, thus indexes reflect minimum costs and not necessarily actual costs.

Samuel Curtis Rogers School, San Jose, California. Designed by Kal Porter, Porter & Price, AIA and Associates



What's the smartest siding you can use for schools?

New Colored Pab-Flex

(it gets a perfect score.)

1. Easily installed T(✓) F( )
2. Saves Time T(✓) F( )
3. Saves Money T(✓) F( )
4. Lifetime color T(✓) F( )
5. Minimal maintenance T(✓) F( )
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8. Fireproof T(✓) F( )
9. Handsome textures T(✓) F( )
10. Ten striking Western colors T(✓) F( )

We've just finished a handsome new booklet explaining the whys and wherefores of Colored Pab-Flex asbestos-cement board. It shows the variety of colors available, where and how to use Pab-Flex, as well as some new exterior decorator ideas using this versatile siding. For your free copy, drop a note to Dept. R, Pab-Flex, Pabco Roofing Division, Fibreboard Paper Products Corporation, 475 Brannan Street, San Francisco, Calif.

For more data, circle 202 on Inquiry Card

Raise the roof in record tim

Sheffield steel roof deck is fast, economical and versatile. Whether you're building schools, office buildings, warehouses, shopping centers or any other type of commercial building, it will pay you to consider all the advantages of Sheffield steel roof deck:

Fast and Easy to Install. Whether you install Sheffield Steel Roof Deck on steel joists, or other construction, you will approach the shortest possible elapsed time for erecting a completed roof. It can be fastened to the structure by welding the deck sheets to supporting steel members. Use it for flat, pitched or arched roof construction. Best of all, it can be installed even in bad weather.

Lightweight and Strong. Fabricated from 18, 20 or 22 gauge steel. For normal roof load, deck may be spanned up to 10 feet. Type A — with 3/4" ribs — comes in 18" and 24" widths, and in lengths up to 30'2". Type B — a stronger deck with 2" ribs — comes in the same widths and lengths. Weight per square foot varies from 1.9 to 3 pounds, depending on gauge and number of spans.

with Sheffield steel roof deck

ttractive and Low Cost. Improves appearance of all ypes of commercial and industrial buildings. Exposed ibs aid in sound diffusion. Usually costs less than omparable materials. Its light veight reduces dead load—which educes weight and cost of beams, olumns and footings. Insulated onstruction gives further savings. It's strong, durable nd permanent.

SHEFFIELD
Steel Roof Deck

pecial Widths and Accessories. Side closure sheets re available. Also such accessories as clips, cant strips, hip plates, valley plates, closure plates, and sump pans.

Durable. Sheffield Steel Roof Deck becomes a roof that lasts. This deck has a gray primer protective coating with rust-inhibiting Zinc Chromate Pigment.

Write for Free Specification Brochure.
Gives complete technical details, tables, recommended specifications, other information. Write to: **Sheffield Division, Armco Steel Corporation, Sheffield Station, Kansas City 25, Missouri.**

ARMCO Sheffield Division

For more data, circle 203 on Inquiry Card

Western Buildings in the News

CIVIC CENTER MASTER PLAN: This 12-building civic center for Pomona, Calif., is on its way to reality. First structure to be started in it is the public safety building. Others in the center include a city hall, civic auditorium, museum-art center, health center, community center, addition to the courthouse, general office building, and restaurant. The center is designed to serve the growing city and the valley around it. *Architects: Welton Becket & Associates*

PUBLIC BUILDINGS

Jerry Stoll

COURTHOUSE FOR SACRAMENTO COUNTY: Everything about this courthouse has been designed integrally with the building, and the construction contract will include the building, its plaza and the landscaping. The plaza has a pool with sculpture and two public spaces, and will be planted with pollarded trees. The six story, $3 million building has a façade of glass inside the continuous screen of precast concrete which has been finished in white quartz. Parking is under the plaza; cafeteria and law library are on the top floor. *Architects: Starks, Jozens & Nacht; landscape architects: Sasaki, Walker & Associates; structural engineer: Walter Constant; mechanical engineer: Lester O'Meara; electrical engineer: Carl Koch*

CITY HALL: Third building in the Salinas, Calif., civic center, this new city hall is actually two buildings. One is a rectangular office building to house all city departments except fire and police. The other is a circular city council chamber which can be used in the evening for community affairs. Lobby of the council building is glass-walled; its roof is made up of channeled concrete sections. *Architects and engineers: Welton Becket & Associates*

CITY HALL: Santa Fe Springs, Calif., will add this city hall to its town center. Designed to harmonize with the existing library building, first building in the center, the city hall is to be built of concrete block and glass. It will contain public administrative offices and facilities and a large multi-purpose room for community activities. *Architect: William L. Pereira & Associates*

MODERNIZE CLASSROOM LIGHTING

AND REDUCE COSTS!

ARCADE SCHOOL, SACRAMENTO, CALIFORNIA: This teacher and class are reaping the benefits of modern, high-quality lighting while the administration saves money each month in reduced power bills. Average intensity after one month's operation is over 85 footcandles in the seating area. Chalkboards have over 50 footcandles.

Smoot-Holman Perfect Vision® Square Systems for lighting classrooms*

SMOOT-HOLMAN COMPANY · INGLEWOOD, CALIFORNIA

*U. S. Patents Nos. 2,932,728 and 2,933,279

A YOU U I IC BY DIM LIGHT A CHALKBOARD GLA ?

Smoot-Holman Perfect Vision®
Square systems bring classroom lighting up to modern standards...and save enough to pay for themselves!

WHAT ARE MODERN STANDARDS?

Current intensity recommendations for some common school tasks are:

Reading printed material	30 footcandles
Reading pencil writing	70 footcandles
Reading spirit duplicated mtl. (av.)	70 footcandles
Drafting	100 footcandles
Average of 24 school tasks	63 footcandles

HOW DOES THIS LIGHTING BENEFIT THE STUDENT?

Every study made has shown that when lighting is brought up to these standards of quantity and quality, students learn more quickly, more easily, and with less fatigue and strain. The teacher also benefits from a more alert, more attentive class.

AN APPEARANCE BONUS...

To obtain today's recommended intensities for schools, so many fixtures are needed that the ceiling tends to become cluttered. In contrast, this system is trim and clean in appearance. It does not obstruct the ceiling and conforms to the architecture of the room. Its open construction and unobtrusive lines eliminate the feeling of large masses overhead that is typical of many conventional fluorescent systems.

HOW DOES IT PERFORM?

- From 55 to 80 footcandles maintained in the room, very uniformly distributed. No dark corners or "bright spots."
- Excellent brightness patterns, meeting all present or proposed standards.
- Outstanding chalkboard illumination. Over 50 footcandles on chalkboards, bulletin boards and other vertical surfaces. No special chalkboard lighting units required. *No glare* on the boards.
- Cheerful, "live" atmosphere, free from direct glare

ARE THERE ANY RESTRICTIONS...

... on the use of this system? Just one. For proper performance with the standard systems, the ceiling height must be ten feet or more. Under special conditions or for higher intensities lower ceiling heights can be used. Each special application must be examined individually.

Oak St. School, Inglewood, Calif., increased light level 72%, reduced operating costs 58%, and eliminated blackboard glare by replacing incandescent fixtures with this new system.

WHAT SUSPENSION SHOULD BE USED?

When ordering system, ceiling height should be specified. Chart shows recommended fixture suspension for classroom ceiling heights from 10 feet to 16 feet (e.g. 13 foot ceiling should use approximately 44-inch suspension).

TO GET THE MOST FROM THE SYSTEM:

For effective, comfortable and cheerful lighting, the walls, ceiling, floor and furniture finishes should be light in color. The cover photo is a good example. The ceiling and walls above the fixture level should be white, with a reflectance of 80% to 90%. The walls below the fixture level should be light, from 50% to 70%. The floor and desks should have reflectances of 30% to 50%. Outside light should be controlled so that it does not produce glare.

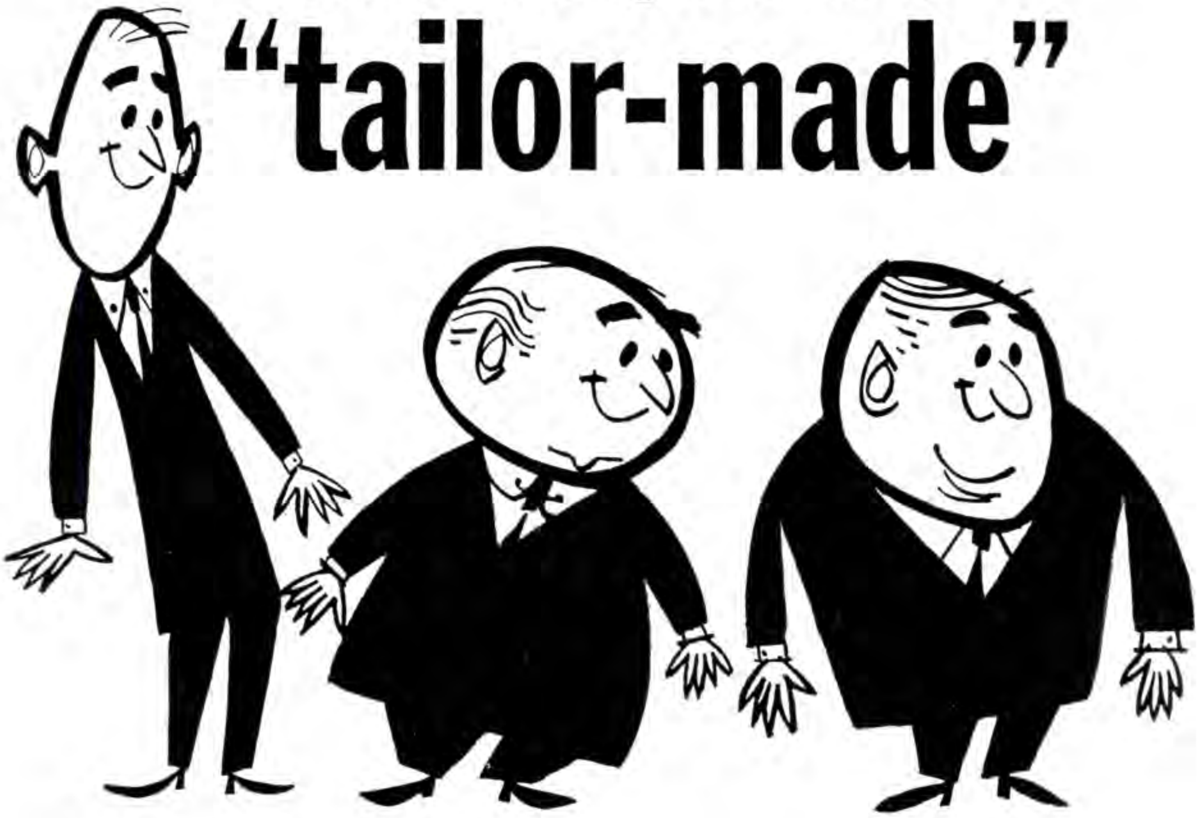
CONCERNING NEW CONSTRUCTION...

Although Smoot-Holman's Perfect Vision® Square System is intended primarily for relighting existing classrooms, its high performance is applicable to new classrooms as well.

- Have you read, "The *A-B-See* of Modern School Lighting"? If not, you may obtain a copy of this non-technical booklet on the principles of school lighting by writing Smoot-Holman Co., Inglewood, California.

there's something to be said for—

"tailor-made"



In suits it's often the fit that makes the big difference—just so in built-up roofing the Asphalt specified should fit the combination of slope and climate.

Asphalt and gravel built-up roofs may be specified for any climate and for any roof slope from "dead-level" to 3" per foot. Maximum service life may be expected if the Asphalt used is of the lowest possible Softening Point (i.e., the softest), consistent with roof deck slope and climate. Simply stated, this means that the Asphalt should be soft enough so that any tiny cracks which may develop through thermal expansion and contraction in the deck, or through building settlement, will tend to flow together, or "heal," during warm weather; but should not be so soft that it will flow down the roof during a hot spell.

Since considerable local variation in climate is typical of many Western areas, selection of Asphalt Softening Point may often be done on the basis of local experience. Where such experience records are meager, the following table will serve as a guide for your selection and specification of roofing Asphalt type:

DECK SLOPE	NORMAL[1] CLIMATE	HOT[2] CLIMATE
0"—½"	dead-level	dead-level
½"—1"	flat	flat
1"—1½"	flat	steep
1½"—2"	flat	steep
2"—2½"	steep	special steep
2½"—3"	steep	special steep

1 Not more than an occasional day with air temperature over 95°F.

2 Extended periods with day-time air temperatures over 95°F, with clear sky, bright sun.

Note: Typical Softening Points are:
dead-level............... 140°F
flat....................... 170°F
steep.................... 190°F
special steep............ 210°F

Assure your next building of trouble-free, low-cost protection by specifying the proper Asphalt roofing materials. Want more information? Fill out and send coupon.

THE ASPHALT INSTITUTE
810 University Avenue, Berkeley 10, California

Gentlemen: Please send me without obligation more information on Asphalt roofing.

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steel sub-floor roof deck and wall panel!

for the new Los Angeles International Airport

The new multi-million dollar jet age terminal at Los Angeles is one of the world's most modern air centers. Using the most up-to-date architectural and engineering concepts, all materials for the project were chosen on the basis of practicality, durability and functional beauty. Mahon M4B and M4BF roof deck, M10B long-span deck and Quad Rib sections are used extensively throughout the 265 acre complex. ■ Theme Building of the Los Angeles International Airport is shown below. Design of the project was a joint venture of the architectural firms of Charles Luckman and Associates, Coordinating Architects; Welton Becket and Associates and Paul R. Williams and Associates. General Contractor was Robert E. McKee, General Contractor, Inc., Los Angeles, California.

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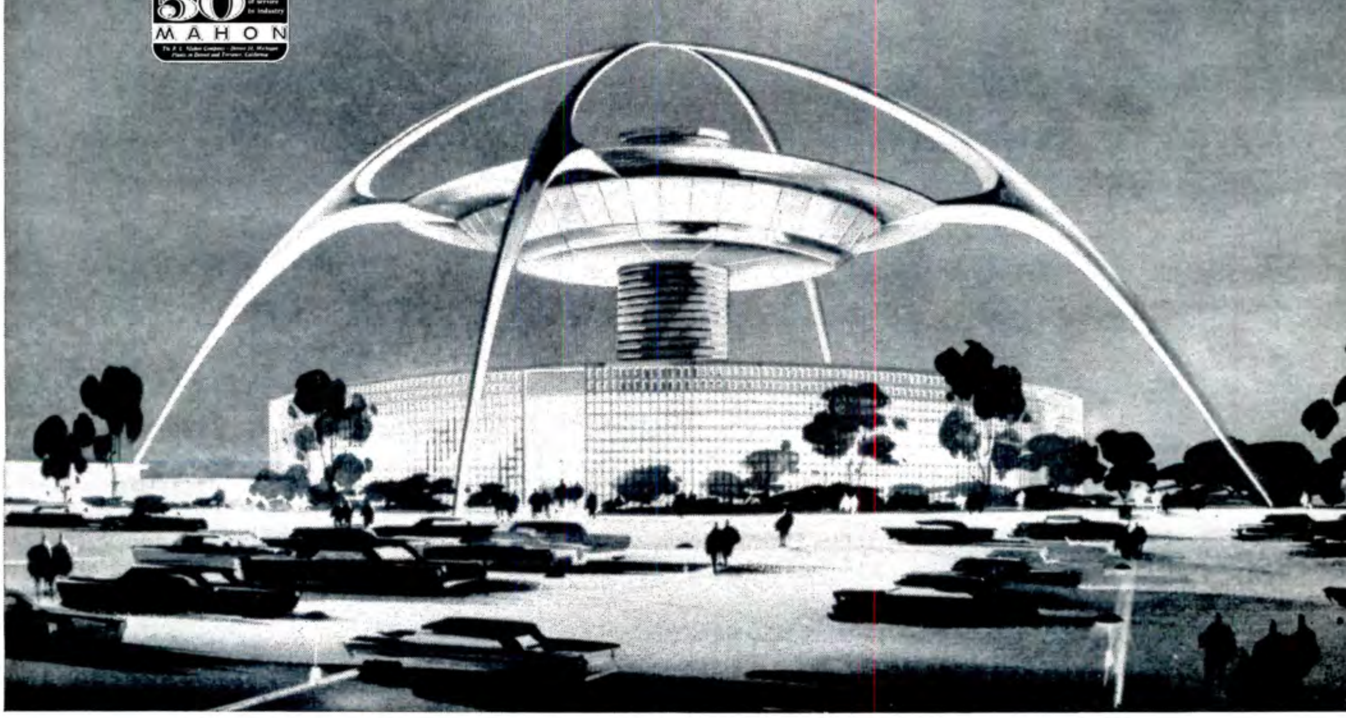
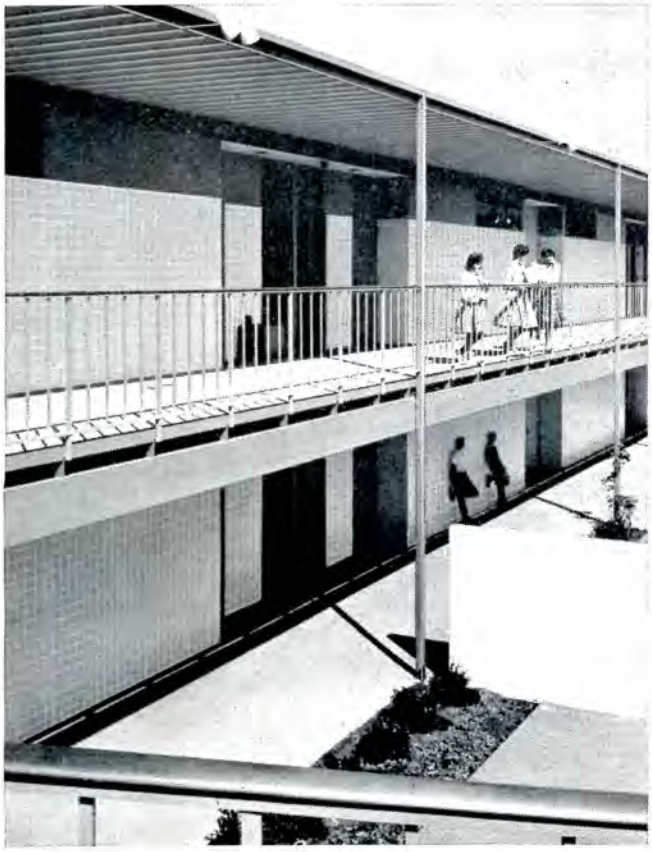
1912-1962 50 years of service to industry MAHON



For more data, circle 206 on Inquiry Card



Virtually No Vandalism Paul Butler, the school district's assistant superintendent, points to a psychological factor. Students, he reports, seem to take pride in their new school. There has been virtually no vandalism.

Additional Savings Use of genuine ceramic tile also has cut maintenance costs in toilet areas, locker rooms and shower rooms. "There is none of the pocking and pitting due to alkali working down through aggregate, that creates germ-breeding places," Mr. Hiestand reports. "Nor is there damage from urine or detergents."

New school saves with use of ceramic tile

Ceramic tile is the most economical material to use for surfacing school corridor walls, as well as shower and restroom areas. This now has been proved beyond doubt at the new Alondra Junior High School, Paramount, Calif.

No Extra Initial Cost Bids revealed that surfacing with Franciscan Hermosa Tile, on lath and plaster, would be comparable in cost to a third coat of plaster and paint. So architects Killingsworth, Brady & Smith, AIA, and a perceptive school board, promptly selected Franciscan Hermosa Tile.

Maintenance Costs Cut According to James Hiestand, maintenance manager of the Paramount Unified School District, plaster corridor walls at other schools must be spot painted annually, and completely painted every three years. "The tile corridors at Alondra," he says, "will never need painting. This saves us an estimated $10,000 every thirty years." In addition, he points out, many pounds of patching material and man-hours of labor are saved.

Daily maintenance costs also are decreased, according to Earl Appleton, head custodian at Alondra. "Dirt and writing easily wipe off with a damp rag," he says. "So we spot the walls every night. This would be impossible with plaster. It takes an hour to clean pencil marks or ball-point ink off plaster, then another hour painting.

"Repair costs also are less. When a truck ran into a wall and damaged four tile, we replaced them in a few minutes. Patching and painting plaster would have required several man-hours." Narrow, flush joints with Square-Edge Franciscan Hermosa help cut cleaning time.

General contractor for the Alondra Junior High School was Flowers, Shirley and R. C. Allen Construction Co.; tile contractor, Continental Tile & Marble Co. Construction cost per square foot was about average for schools built under the State of California program.

For further data that conclusively disproves the "tile costs more" myth, talk to your Franciscan Hermosa Tile representative. Or write Architectural Products Division, Gladding, McBean & Co., Los Angeles 39, Calif.

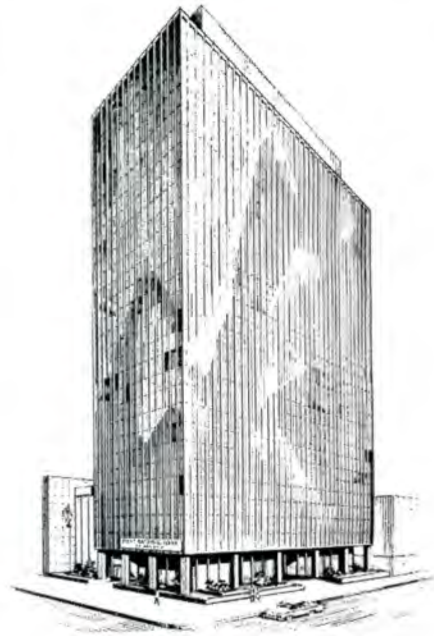
GMB Franciscan Hermosa Tile ®

Gladding, McBean & Co. LOS ANGELES • SAN FRANCISCO
SEATTLE • PORTLAND • SPOKANE • PHOENIX • SALT LAKE CITY

For more data, circle 207 on Inquiry Card

Western Buildings in the News

OFFICE BUILDINGS



RENO'S TALLEST: Construction is under way on this 16-story office building for Reno, Nevada, which will contain offices for rent as well as for First National Bank of Nevada. It will be the tallest building in "the biggest little city in the world." *Architects: Langdon and Wilson of Los Angeles; associate architects: Ferris, Erskine and Calef of Reno; joint venture contractors: L. E. Dixon and J. A. Tiberti*

CO-OP OFFICE BUILDING: Occupants of Executive Center in Pasadena will own the building cooperatively, with each share in it entitling the purchaser to own one square foot of office space (and its normal amenities) and the portion of land on which it stands. Nominal monthly rental in addition will provide for maintenance and mortgage amortization. The center is to occupy a two-acre site in Pasadena's Civic Center. At plaza level, in offices recessed from the building line, will be rental space for architects. Pedestrian promenade encircles the building. *Architects and developers: Ladd & Kelsey*

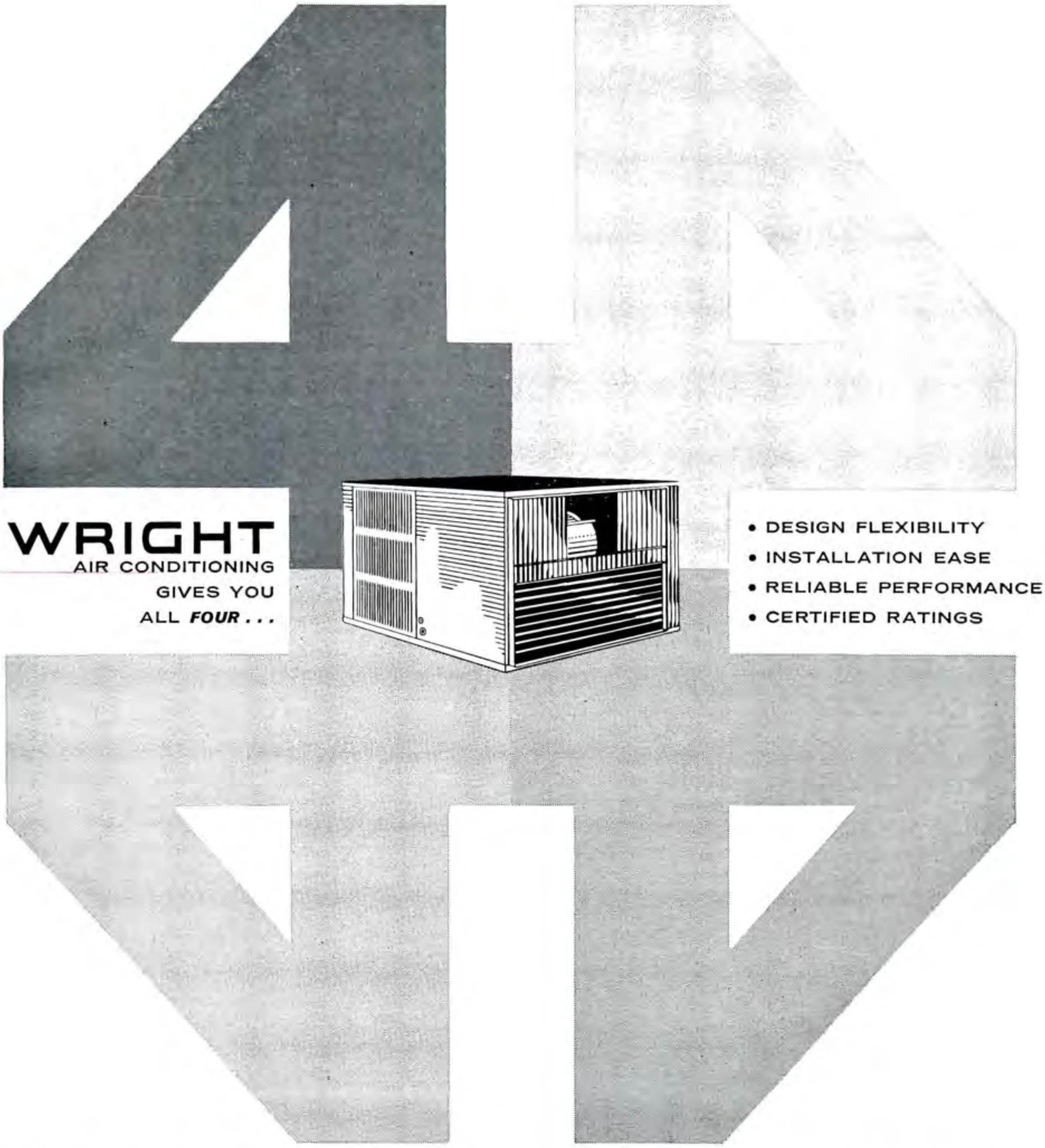
Scott Phillips

BRANCH OFFICE BUILDING: This Newport Beach, Calif., building specializes in rentals to offices which want branch locations, much in demand in that area. Local zoning codes require that one parking space be provided for each 250 sq ft of building area, so parking determined the building's size. Interior walls are non-load bearing to provide flexible interior space. Exterior is painted white; doors are painted burnt orange. *Architects: Richard R. Leitch; project architect: Sam Kiyotoki; structural engineer: William C. Taylor; landscape architects: Jones and Peterson*

LOW-RISE OFFICES: The four-story Peninsula Office Building at Redwood City, Calif., has the advantage of being located on a busy thoroughfare directly opposite to the proposed site for an expanded civic center. Set on a slightly raised base, the building has a light steel and wood frame. Cost of the 35,000 sq ft structure, including air conditioning, is $500,000. *Architects and Planning Consultants: Chan/Rader and Associates*

WRIGHT Air Conditioning, the complete line, gives you greater design flexibility because the wide choice of models* allows equipment selection best suited for any particular installation requirement. And, Wright distributors and dealers will work with you from initial planning to final sale, providing time-saving, trouble-saving, money-saving know-how on your installations.

Wright Air Conditioning is designed and built to meet the extreme demands of Western and Southwestern climates, with all units calorimeter tested and rated beyond ARI specifications. This extra design consideration assures that Wright Air Conditioning equipment will perform as rated under even the most adverse conditions . . . it's your assurance of complete client satisfaction.



*SUMMER AIR CONDITIONING and ALL-ELECTRIC HEAT PUMPS in 2, 2½, 3, 4, 5, 7½ and 10 Ton Packages; 2, 3, 4, 5, 7½ and 10 Ton Split Systems with horizontal or vertical air handlers.

GAS-FIRED FURNACE/COOLING COMBINATION PACKAGES, 2 and 3 Ton Sizes with refrigerated air conditioning and gas-fired furnace in one compact package.

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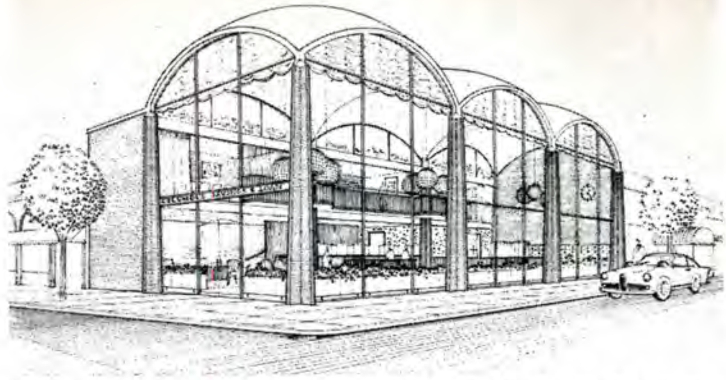
Western Buildings in the News



MAIN OFFICE: In the heart of San Francisco's North Beach district, this new main office for the Columbus Savings and Loan Association catches passerby's eye with its three cast-in-place concrete domes, glass curtain walls and handsome interior finishes. Frames for glass panels are anodized aluminum. *Floor of the* main banking room is marble; walls are Norman brick, marble paneling, or plaster with vinyl sheeting and frescos. *Architects: Hertzka and Knowles; structural engineer: Graham and Hayes; mechanical and electrical engineers: G. M. Simonson*

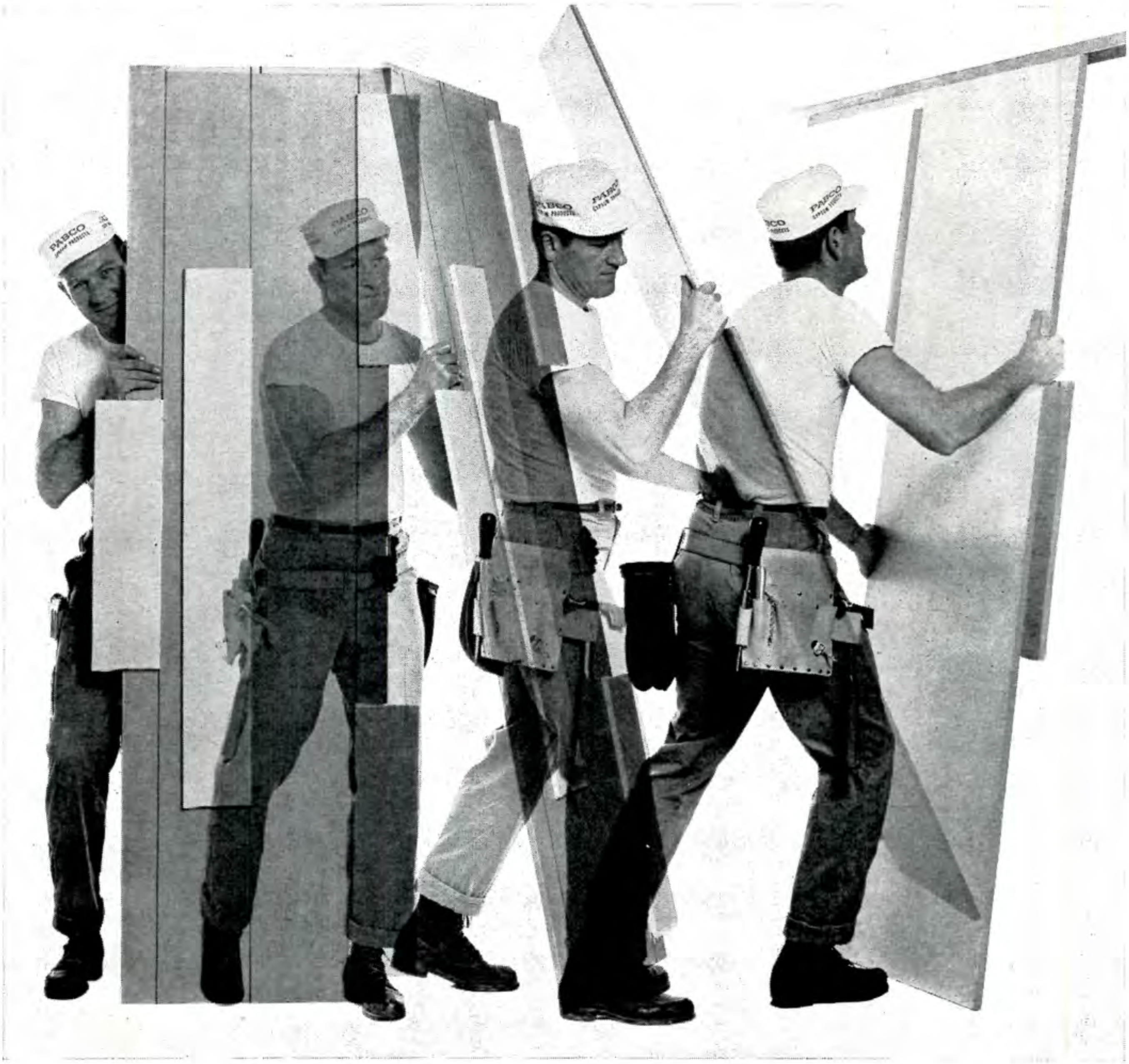
CALIFORNIA BANKS

BRANCH BANK: This two-story building for Prudential Savings and Loan Company in Alhambra, Calif., is of concrete and brick filler panels. Structural concrete columns, handsomely shaped, support a flat plate concrete roof; inside, the ceiling of the banking room is slightly vaulted, and is daylighted by a large central skylight. A mezzanine work area around three sides of the banking room provides public meeting facilities and office space. *Architects: Ladd & Kelsey*

BRANCH BANK: This Santa Monica building of brick and precast concrete panels, is Security First National Bank's newest branch. Besides its main banking room, it has two conference rooms and offices. *Architects: Hunter and Benedict*

DISTRICT HEADQUARTERS: Now under construction, this $3 million district headquarters for Wells Fargo Bank is part of a large commercial complex in Sacremento, California. The banking room includes 35 teller windows; in addition there are both walk-up and drive-up teller stations. The building has five floors above ground and a basement. *Architect: Harry Devine Sr.*

INDEPENDENT BANK: Largest independent bank in California's Central Valley is the Bank of Stockton which recently opened this new headquarters office in Stockton. The hot climate required protection from sun, glare and heat, so glass is used sparingly. Exterior walls are of panels precast of quartz-finish concrete aluminum. A low level of sound during working hours is achieved by screening accounting IBM machines with panels of sound-absorbing tile and by covering floors with cushioned rubber. Entrance from parking area is through a "doorless door" formed by a 15-mile per hour stream of air. *Architects: Mayo, DeWolf and Johnson*



Moving Picture

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Calendar of Western Events

- OCTOBER 4-8: National Trust for Historic Preservation, St. Francis Hotel, San Francisco.
- OCTOBER 5-7: Structural Engineers Association of California, annual convention, Hotel del Coronado, Coronado.
- OCTOBER 7-11: California Real Estate Association, annual convention, Fairmont and Mark Hopkins Hotels, San Francisco.
- OCTOBER 11-14: Northwest Region conference, Surftides Resort and Dorchester house, Oceanlake, Oregon.
- OCTOBER 14: Closing, The Heller Collection of paintings of the New York School, Los Angeles County Museum, Exposition, Park, Los Angeles.
- OCTOBER 15: Due date, School Fallout Shelter Competition entries.
- DECEMBER 1-3: Associated Quil Contractors of America, district meeting, Sheraton Palace.
- DECEMBER 3-6: California Association, School Administration annual conference and exhibition in cooperation with California Council, A.I.A., San Diego.

Professional News

New Firms

David L. Williams, architect, has opened an office for the practice of architecture and urban planning at 2545 Albion Street, Denver, Colo.

Rodney L. B. Smith, architect, has established offices at 312 Center Street, Chula Vista, Calif.

Bill R. Brown, architect, has opened an office at 290 Fillmore Street, Suite 202, Denver, Colo.

Vincent R. Bonfanti, architect, formerly of the firm of Kenneth Lind & Associates, has opened an office at 11959 Rivera Road, Santa Fe Springs, Calif.

James R. Borman, structural engineer, has opened an office as structural consultant to architects at 838 Grant Street, Denver, Colo.

New Addresses

O. H. Thormann, architect, has moved to 3101 Durazno Avenue, El Paso, Texas.

J. Roger Musick, architect, is now at 570 Detroit Street, Denver, Colo.

Victor Hornbein and *Edward D. White Jr.,* have moved to 5909 E. 38th Avenue, Denver, Colo.

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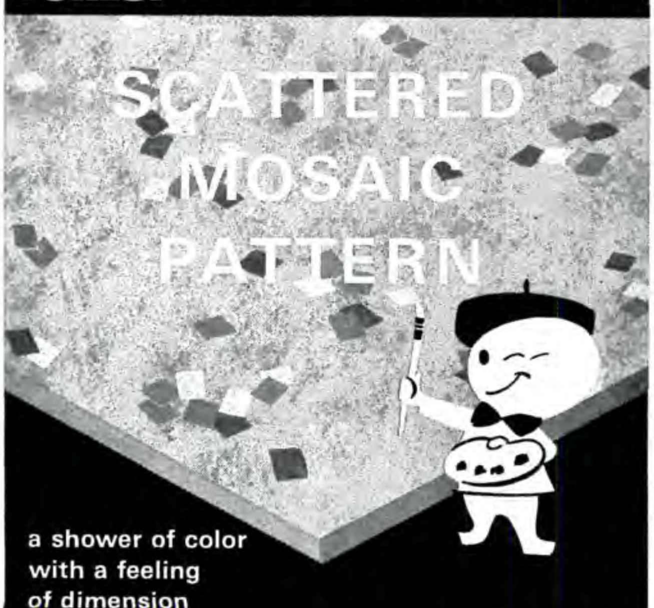

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Northwest Electronics, Inc.
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ST. JOSEPH'S HOSPITAL, Stockton, selected gas air conditioning for its new wing. The system uses present steam supply—gives quiet, low-cost cooling.

HILLSDALE SHOPPING CENTER, San Mateo, chose a gas system because of its long life, low maintenance cost, quick response and effective heavy load performance.

WELLS FARGO BANK Head Office, San Francisco, uses gas air conditioning to get efficient cooling even at low load levels, and to keep vibration at a minimum.

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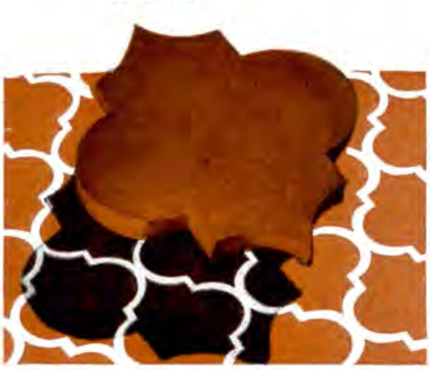

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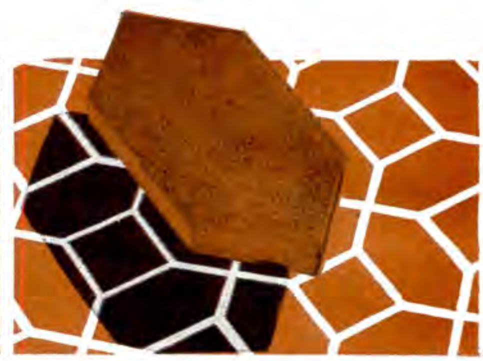

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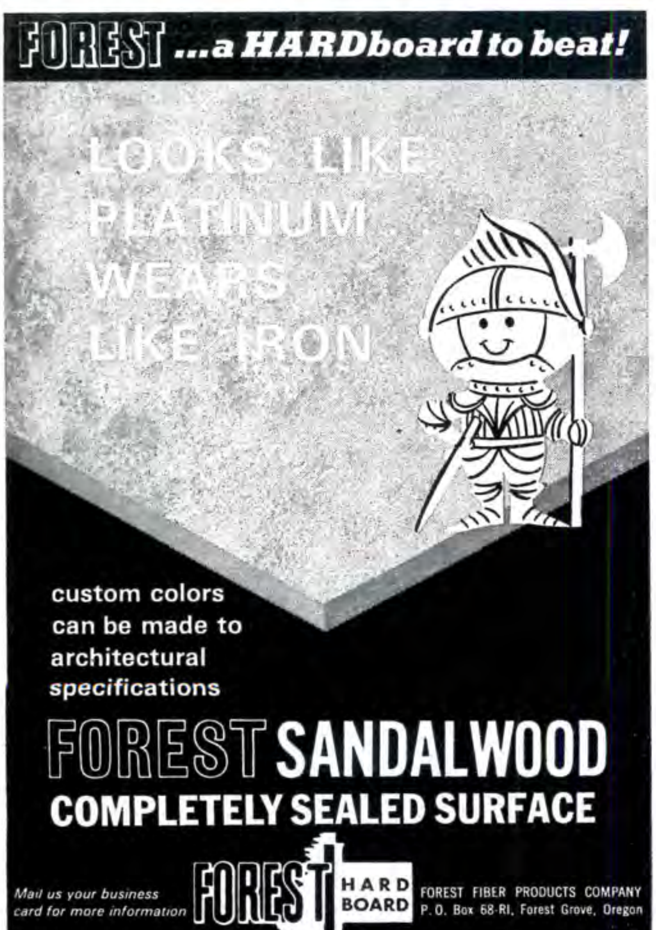

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WESTERN SECTION

Index To Advertising

Manufacturers' Pre-Filed Catalogs of the firms listed below are available in the 1961 Sweet's Catalog Files as follows:
a Architectural File (green)
ic Industrial Construction (blue)
lc Light Construction File (yellow)
Page numbers of manufacturers' advertising elsewhere in this issue shown in italics

Western advertising offices: LOS ANGELES, Robert L. Clark, 1709 West Eighth Street; SAN FRANCISCO, John I. Howell, 255 California Street

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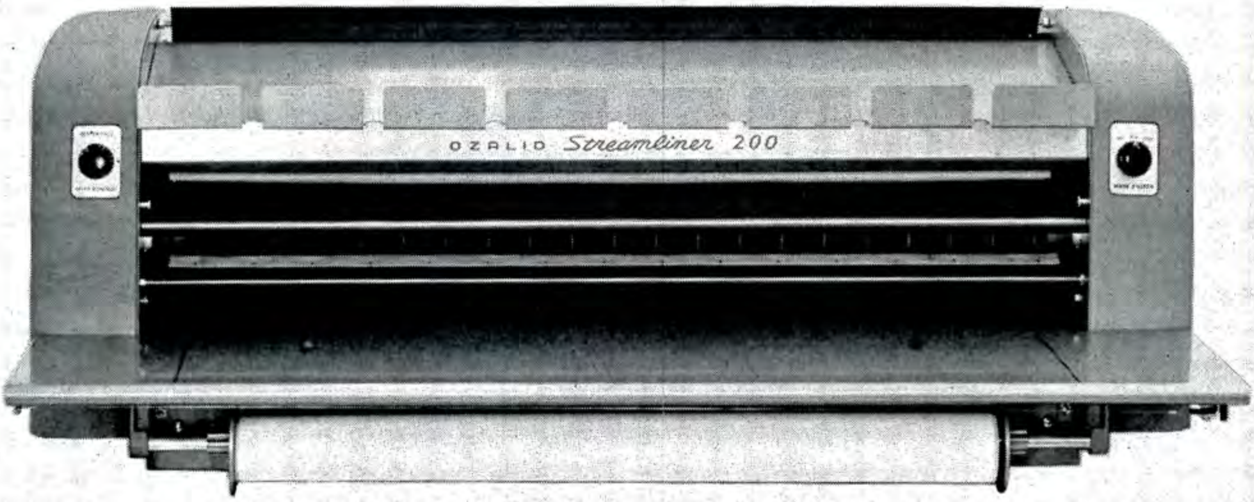

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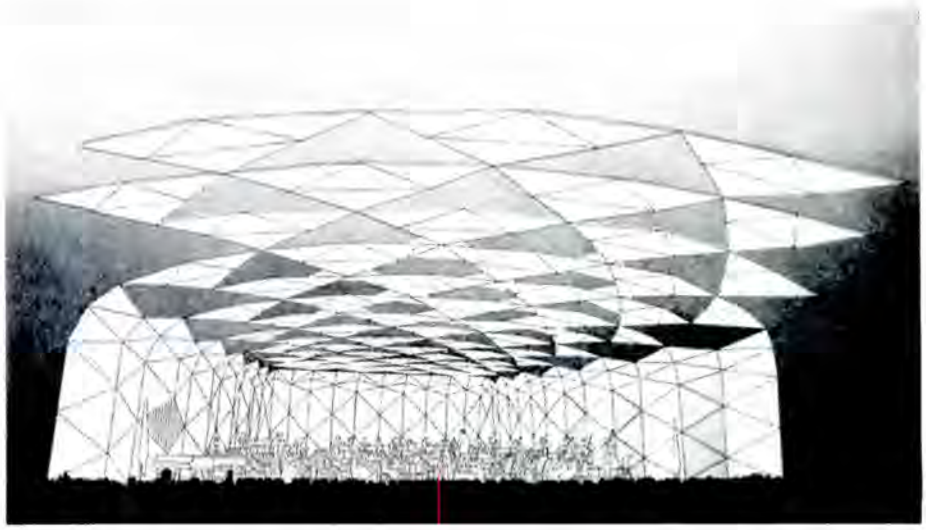

Sending end of Tanglewood Music Shed, Lenox, Mass. showing sound-reflecting panels

The Sounds of Music

MUSIC, ACOUSTICS & ARCHITECTURE. *By Leo L. Beranek. John Wiley & Sons, Inc., 440 Park Avenue South, New York 16, New York. 586 pp., illus. $15 before Christmas and $17.50 after Christmas.*

This book is required reading for certain. As readable as a detective story, which in a way it is, Dr. Beranek's book is first of all an analysis of those acoustical characteristics that have and will produce the best concert halls and opera houses. But yet it is more. Here is exemplified the kind of engineering knowledge (ideal in its approach) that the architect can have if he will ask for it and encourage it. The inescapable conclusion is that certain engineering disciplines are an integral part of architecture, and they cannot be denied if the functional, and, yes, the esthetic aspects are to be properly served. In the particular case of rooms for music, the esthetics are aural as well as visual.

Challenged by a 1955 magazine article critical of acoustical consultants' work on concert halls, Beranek "decided to visit the world's best halls and to listen to music in them, to collect architectural drawings and photographs, to take acoustical data, to interview conductors, musicians, music critics and experienced listeners—to begin the systematic correlation of acoustical data and musical assessment that was requisite to a real understanding of the applications of acoustics to the purpose of music in concert halls and opera houses."

Beranek listened to music in over 60 halls, and he has included photos, drawings, acoustical and architectural data on 54 halls.

From his own experience, his interviews and from acoustical measurements and architectural data, the author has isolated the attributes of acoustics that contribute most to musical quality, and has devised a new formulation for rating the acoustics of halls for music.

Right in the beginning Dr. Beranek exposes many myths that have surrounded acoustics for music, elements that have been thought to produce better sound—gold paint on walls and statues, broken wine bottles under the floor left by European workmen, wooden beams in attics, a dry well under the floor, interiors of wood, improvement of acoustics with age.

Next he shows how music is produced, and demonstrates why music sounds better in a closed volume than outdoors. For example, he points out that the Greek theater was fine for its time. The elevated seats precluded direct sound being absorbed by the audience. But there were no highways or airplanes nearby; and it is believed that the performers had megaphones behind their masks to project sound.

The three most important subjective attributes of music-acoustic quality, Beranek shows, are intimacy, liveness and warmth; following these come loudness of direct and reverberant sound, diffusion, balance and blend (sectional balance of the orchestra), ensemble (ability of the performers to hear each other), and then the negative factors of echo, noise, and tonal distortion.

Acousticians have usually paid attention to reverberation but not always correctly. Between 1920 and 1935 many of them believed that the auditorium should simulate the outdoors, and as a result many of these halls are considered by today's audiences to have a "dead" sound. It is known now that sufficient reverberation is necessary to produce a warm, live hall.

It turns out, however, that the most important factor in producing good acoustics for music is the one called "intimacy" which may have been present in halls of the past, but which was not designed for by the acousticians. A hall that is small has visual intimacy. A hall has acoustical intimacy if the music sounds as though it were being played in a small hall.

Every reader of ARCHITECTURAL RECORD can find something for him in this book. The process of isolating acoustical attributes is fascinating, the photographs and drawings of the 54 concert halls and opera houses are crisp and handsome, the technical information, while comprehensive, is not overpowering, the personal observations of concert halls the world round are intellectually rewarding.

continued on page 42

Floors and wall of this dramatic lobby in new Kentile Vinyl Travertine. Colors: Off White, Forum Grey, and Natural Beige, with contrasting Hot Canary feature strips. Black Wall Base is Vinyl KenCove®.

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SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY

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The offices and publishing facilities of the American Baptist Convention's new national center are combined in an enormous—yet graceful—circular building. *Architect*—Vincent G. Kling, FAIA; *Contractor*—Turner Construction Company. Windows by General Bronze have been skillfully detailed to enhance the design's serenity. GB has long been recognized for its ability to translate architectural needs into efficient, trouble-free window systems.

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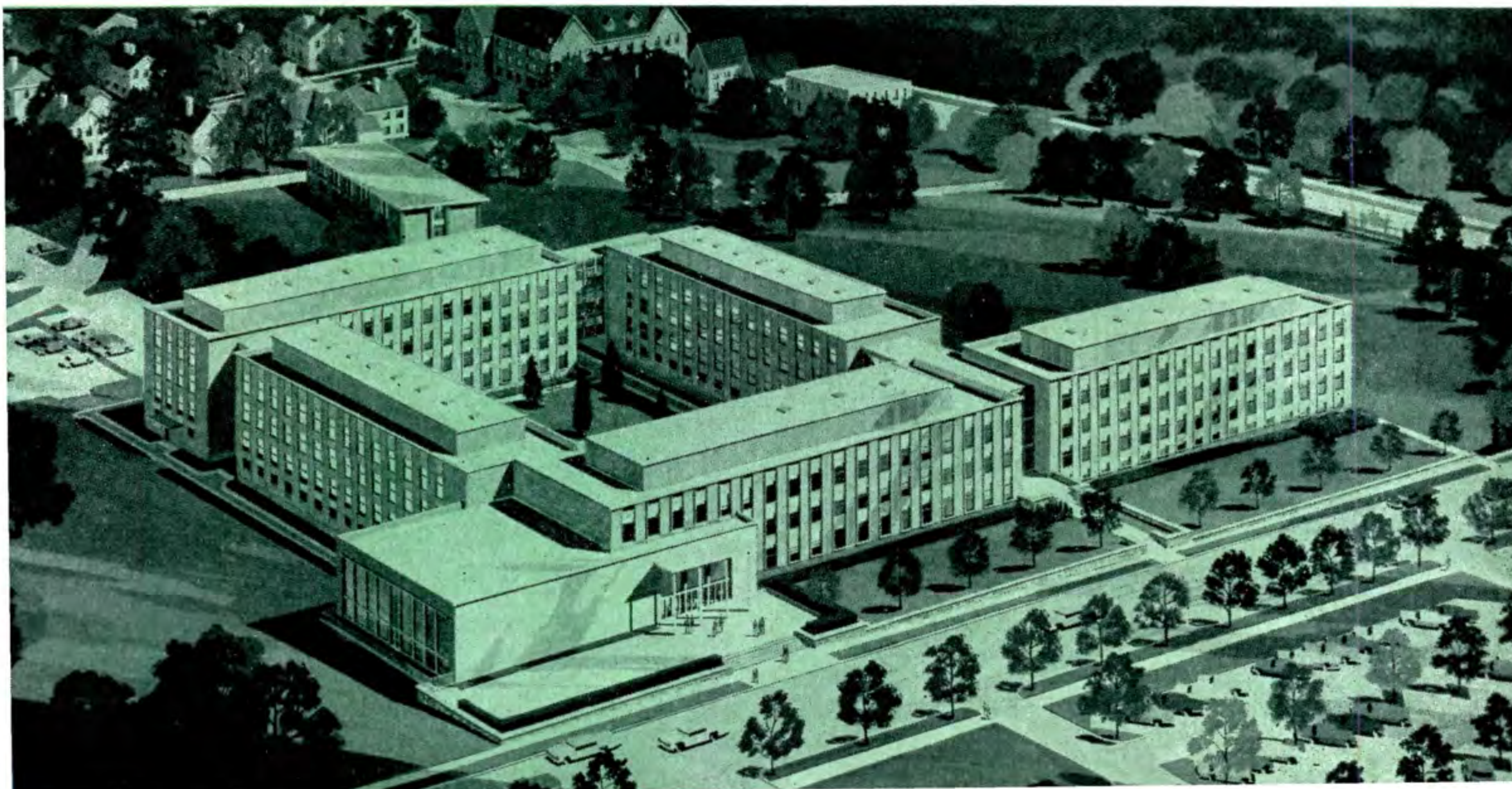
Princeton University's Engineering Quadrangle dictated an entirely different window architecture. Here, General Bronze worked with *Architects* Voorhees, Walker, Smith, Smith & Haines and *Contractor* William L. Crow Construction Company. For custom-engineered windows—and for curtain walls, architectural metal work, entrances, revolving doors, call on General Bronze Corporation, Garden City, N. Y. Sales Office: 100 Park Avenue, New York, N. Y.



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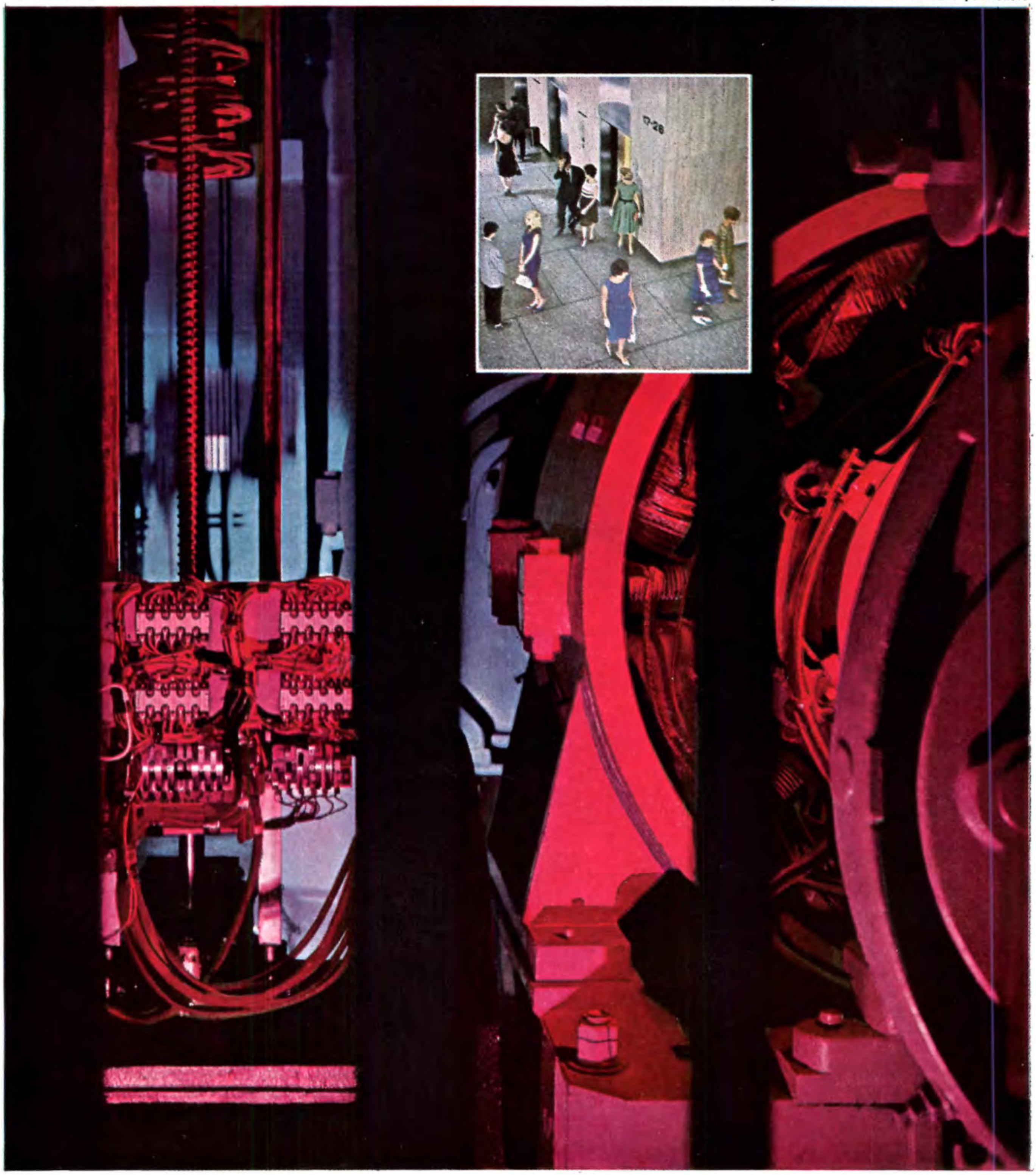

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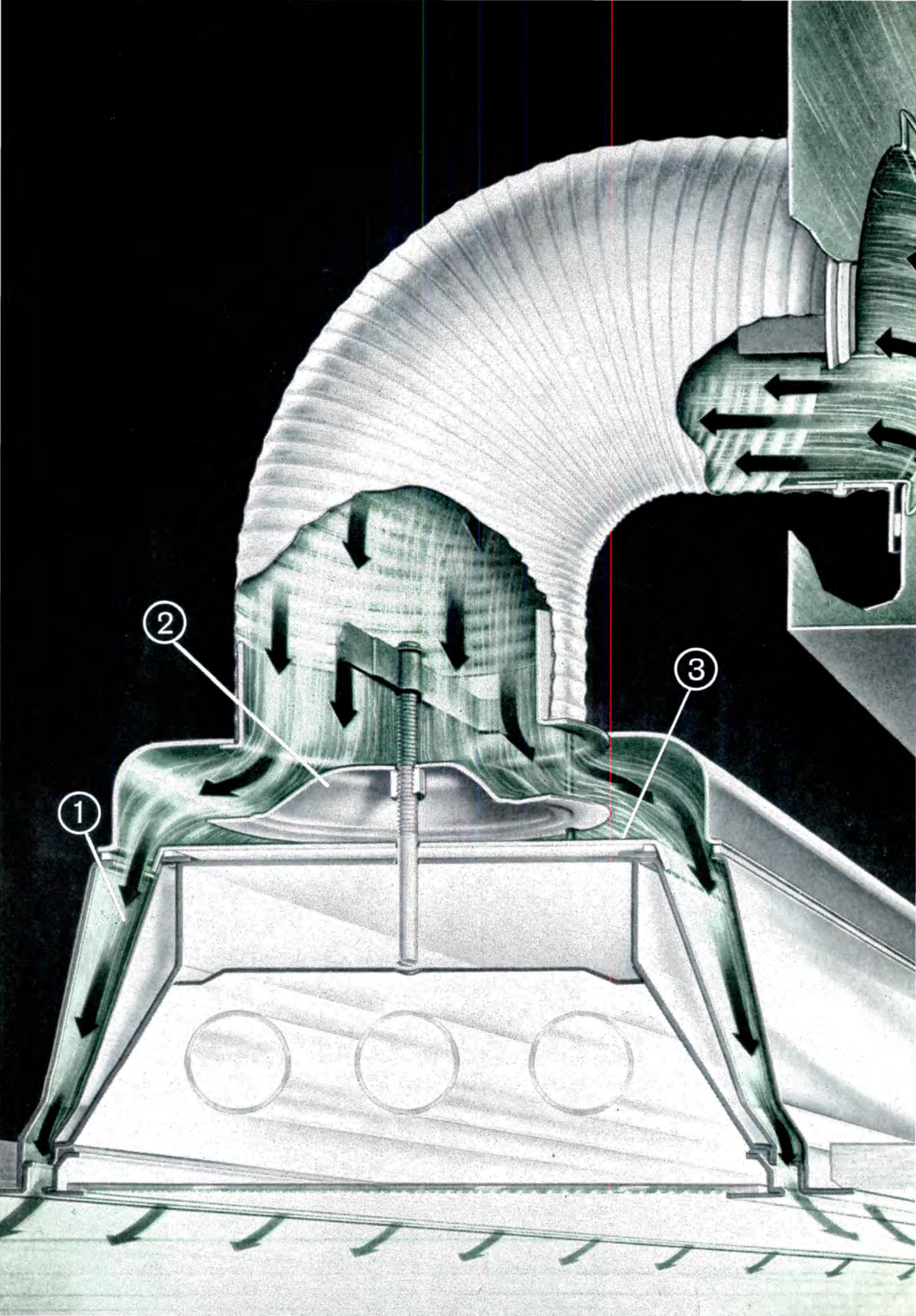
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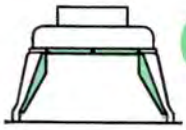
Before you specify any air-handling troffer

Take another look at Lumi-Flo advantages



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Required Reading

continued from page 34

Monograph Series

R. BUCKMINSTER FULLER. *By John McHale.* PHILIP JOHNSON. *By John M. Jacobus Jr.* LOUIS I. KAHN. *By Vincent Scully Jr.* EERO SAARINEN. *By Allan Temko.* KENZO TANGE. *By Robin Boyd. George Braziller, Inc., 215 Park Ave. South, New York 3. Each 128 pp., illus. Each $4.95.*

The issuance of a series of monographs (The Makers of Contemporary Architecture) all at one time inevitably tempts a reviewer to comparison. The temptation is reinforced, in this case, by each writer's tending to compare his subject to the others in the series—Saarinen to Johnson, Johnson to Kahn, Tange to Western architects in general—and to other architects—Kahn to early Wright, Johnson to late Wright. (Fuller is incomparable.) Comparisons of the architects, when buttressed by facts, are fair enough; it is of course impossible to compare writers apart from their subjects.

All of these texts are highly competent; Mr. Scully on Louis Kahn and Mr. Jacobus on Philip Johnson are more.

Mr. Scully views Kahn riding the crest of an architectural *nouvelle vague*—being rigorously intellectual, ruthlessly practical and, but last and only maybe, beautiful. He has managed—often by an expansive use of the dramatic force surrounding a new movement—to convey the reasons for this approach, and to describe Kahn's undoubted pre-eminence within the movement.

Mr. Jacobus, if more cautiously, has made similar claims for Johnson's recent work; this new wave, however, bears architecture's current problems with issues of rootlessness and lack of historical sense. This movement, too, is rigorously intellectual. Both Mr. Jacobus and Johnson concede that it is less dynamically creative, but still esthetically and humanly valid.

The tragic fact of Saarinen's recent death makes an objective appraisal nearly impossible, as does the incomplete state of his last designs. Mr. Temko's appreciative text is perhaps more eulogistic than it would

continued on page 48

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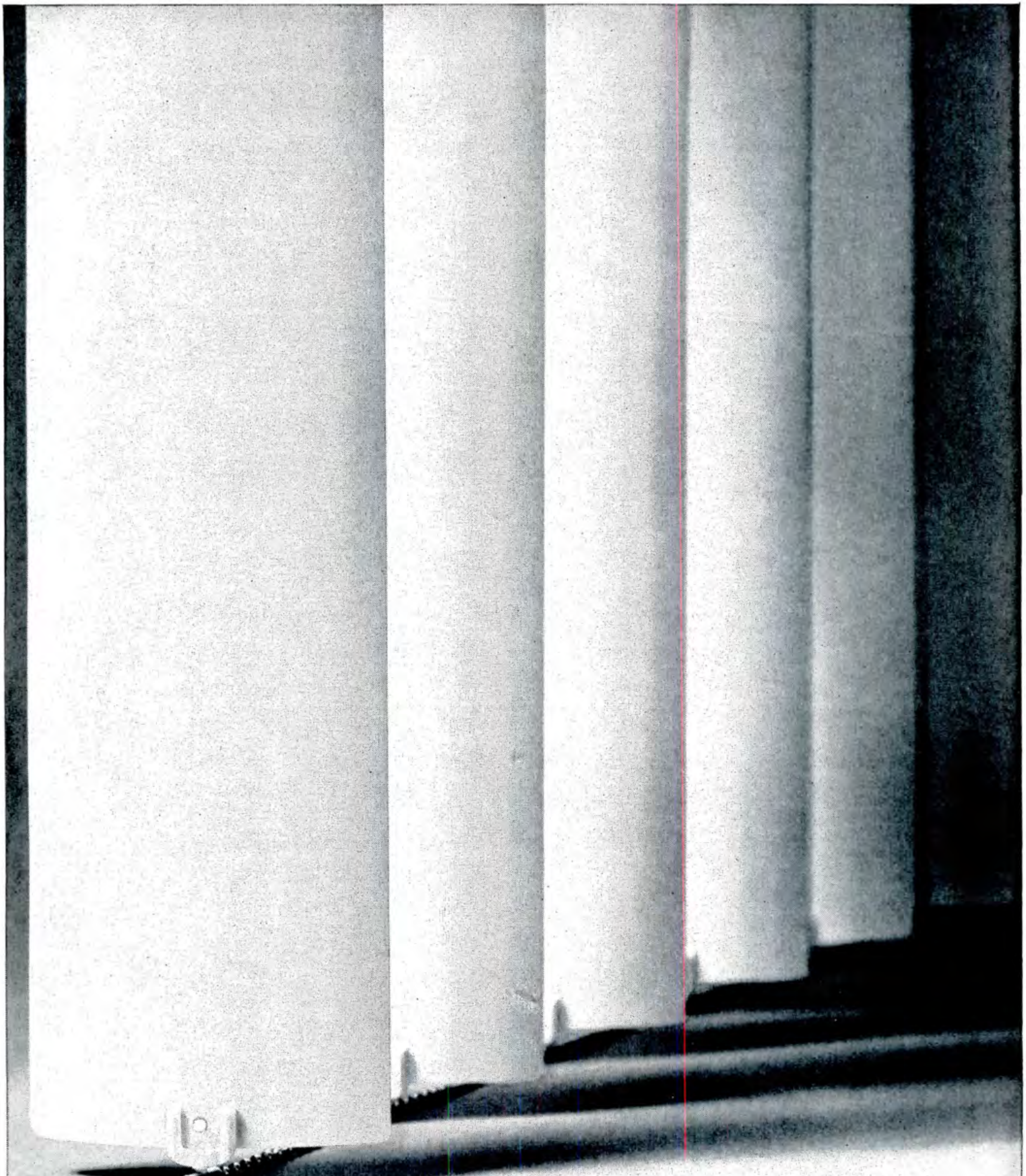

This is the new, wider, aluminum louvered vertical Flexalum's new, wider (3⅜") louvers are in perfect harmony with today's large glass areas. Because they have the reflective properties of aluminum, Flexalum Wide-Louver Verticals solve problems of sun and thermal control. As a year-round thermal curtain, they cut heating and air-conditioning costs. Closed, they assure privacy; open, they admit adjustable, glare-free light. Their baked enamel finish and perpendicular position make them practically dust-proof. Flexalum Verticals are available with both center or side pull. Completely integrated mechanism and hardware are guaranteed to give you years of maintenance-free service.

Flexalum® VERTICALS

Write to Bridgeport Brass Company, Hunter Douglas Division, 30 Grand Street, Bridgeport 2, Conn. for descriptive literature and specifications, engineering assistance or cost estimates. See our insert in Sweet's Architectural File.

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Beautiful Summitville quarry tile is stain and scratch-resistant, fire-proof and fade-proof and practically maintenance-free. Quarry tile never needs waxing, sealing or replacement due to dents caused by heavy furniture or "spike" heels. It is easy to clean and keep clean with simple "washing" techniques.

Summitville Quarry Tile is available in six 'earth' colors and a wide variety of textures and patterns.

See your local Ceramic Tile Contractor or write for the full story. **SUMMITVILLE TILES, INC.,** Summitville, Ohio.

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SUMMITVILLE QUARRY TILE

A CITY REBUILDS

A Bethlehem Steel Report

CONSTITUTION PLAZA

. . . a multi-million-dollar urban renewal project, this downtown area, short years ago a blighted slum, will soon be a sprightly and inviting urban center.

At left above is 20-story One Constitution Plaza, occupied largely by the Connecticut Bank & Trust Company, while at center is 18-story 100 Constitution Plaza, with the Hartford National Bank & Trust Company as a major tenant. Shown at right is One American Row, the new home office of the Phoenix Mutual Life Insurance Company, highlighted by an elliptical 12-story tower on top of a three-story rectangular base. All are steel-framed, fabricated and erected by Bethlehem.

But there's much more to Constitution Plaza. A luxury hotel is rising, along with prestige retail establishments. There's a radio and television broadcasting building and, under the landscaped mall, a 1,800-car parking garage.

Constitution Plaza is the most spectacular of a number of urban redevelopment projects and other civic improvements which early this year earned Hartford the accolade

Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM ST






of 1961 All-American City, awarded by the National Municipal League and LOOK Magazine.

As any effort of such magnitude must be, Constitution Plaza is the result of many civic-minded individuals and organizations working together. But two key decisions made it all possible. One was The Travelers Insurance Companies' investment of $35 million through a subsidiary corporation, Constitution Plaza, Inc. Another was Phoenix Mutual's choice of the Plaza rather than a suburban location for its new home office building.

Spurred by the example of Constitution Plaza, all Hartford has come alive. New expressways are being built . . . merchants are expanding and modernizing their midtown facilities . . . new housing is under way.

Hartford is a city on the move, united in a determination well expressed by these words of Daniel Webster:

Let us, in this our day and generation,
perform something worthy to be remembered.

BETHLEHEM STEEL

ONE CONSTITUTION PLAZA
Owner-developer: Constitution Plaza, Inc.
Major tenant: Connecticut Bank & Trust Company
Architects: Kahn and Jacobs
Architect for the Bank: Carson, Lundin & Shaw
Structural engineers: Weiskopf & Pickworth
Mechanical and electrical engineers: Jaros, Baum & Bolles
Contractor: F. H. McGraw & Co.
Steelwork: Bethlehem Steel Company
Coordinating architect for Constitution Plaza: Charles DuBose

100 CONSTITUTION PLAZA
Owner-developer: Constitution Plaza, Inc.
Major tenant: Hartford National Bank & Trust Company
Architects: Emery Roth & Sons
Architect for the Bank: Jeter & Cook
Structural engineers: James Ruderman
Mechanical and electrical engineers: Joseph R. Loring & Associates
Contractor: F. H. McGraw & Co.
Steelwork: Bethlehem Steel Company

ONE AMERICAN ROW—CONSTITUTION PLAZA
Owner: Phoenix Mutual Life Insurance Company
Architects: Harrison & Abramovitz
Structural engineers: Edwards & Hjorth
Mechanical engineers: Jaros, Baum & Bolles
Electrical engineers: Ebner Associates
General contractor: George A. Fuller Company
Steelwork: Bethlehem Steel Company

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Visit the spectacular Gas Pavilion at the Seattle World's Fair.

winning number at Suffolk Downs

166 Gas Surburban Novent-Dynavent Heaters *were installed in the grandstand, restaurant, box seats and grooms' quarters at Suffolk Downs Racetrack, Revere, Mass. And not a flue, chimney or pipe in sight! (You don't need any.) A compact Suburban Novent-Dynavent Gas Heater is adaptable to any location. Cuts installation costs...saves up to 30% on fuel costs. Big reasons: A powerful blower circulates heat from floor to ceiling . . . none is wasted. You use only economical, dependable gas. 20,000, 35,000, 45,000 BTU sizes. Largest unit measures only 16½" x 22¾". Have a hard-to-heat building? Call your Gas Company. Or write Suburban Appliance Co., Dept. AR-862, Morristown, N. J.* ***For heating . . . Gas is good business***

AMERICAN GAS ASSOCIATION

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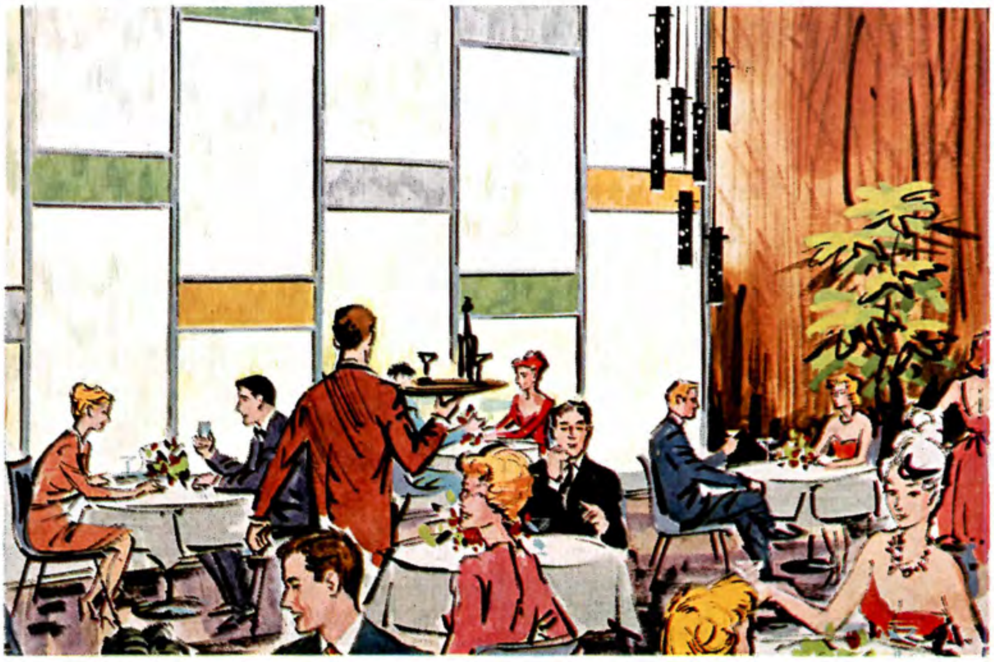

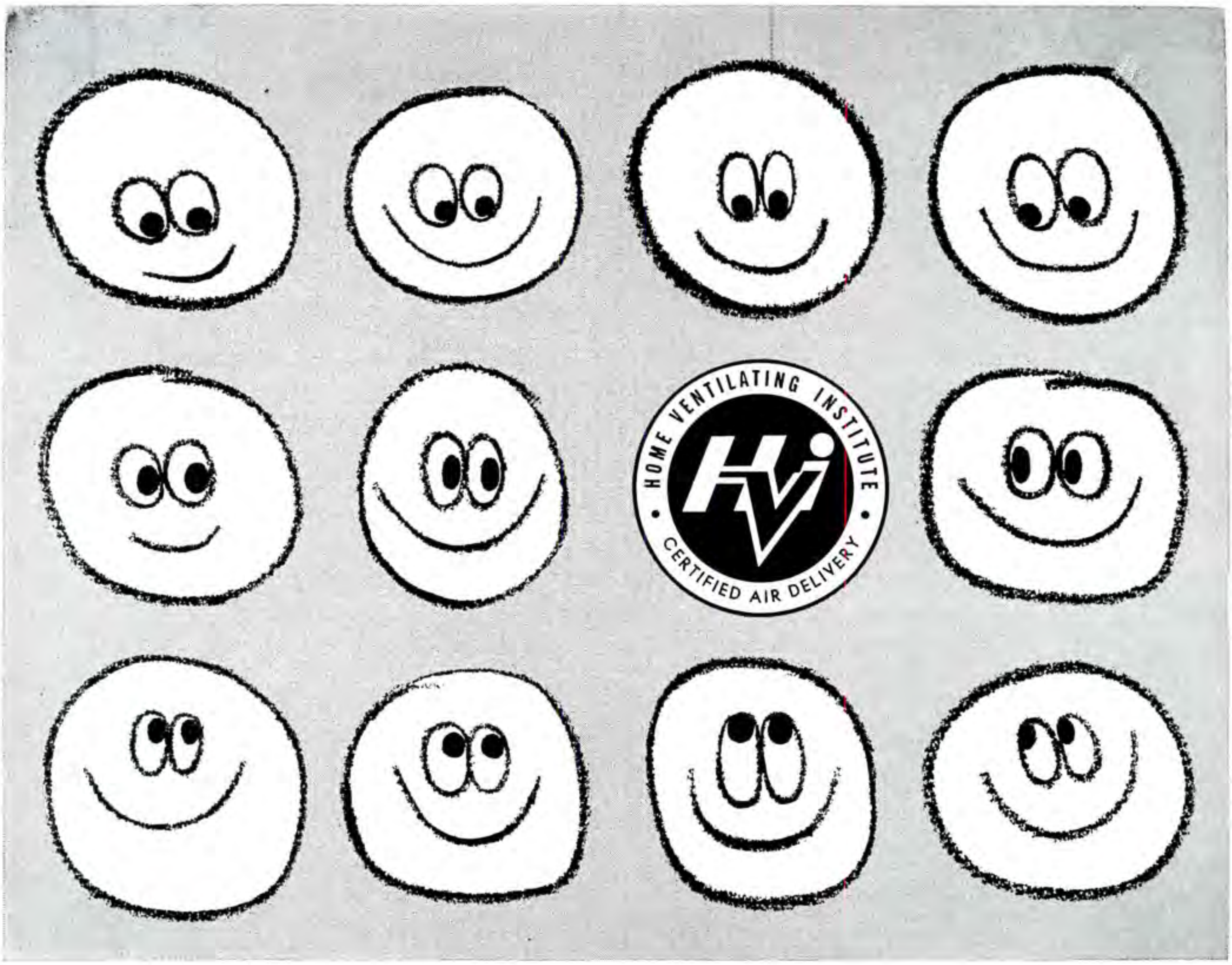

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The HVI label on range hoods and exhaust fans is your safeguard against unreliable "free air" claims. It is recognized by FHA, whose Minimum Property Standards (Para. 1002-2.2) require that fans carry the HVI label or prove equivalent performance. The label is awarded to fans that meet and exceed HVI standards in independent tests at Texas Engineering Experiment Station, Texas A. & M. It is displayed on the products of leading manufacturers who, as HVI members, produce only fans meeting HVI standards. For full details on HVI testing and rating procedures, write the Home Ventilating Institute or call the local office of a member company.

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HOME VENTILATING INSTITUTE

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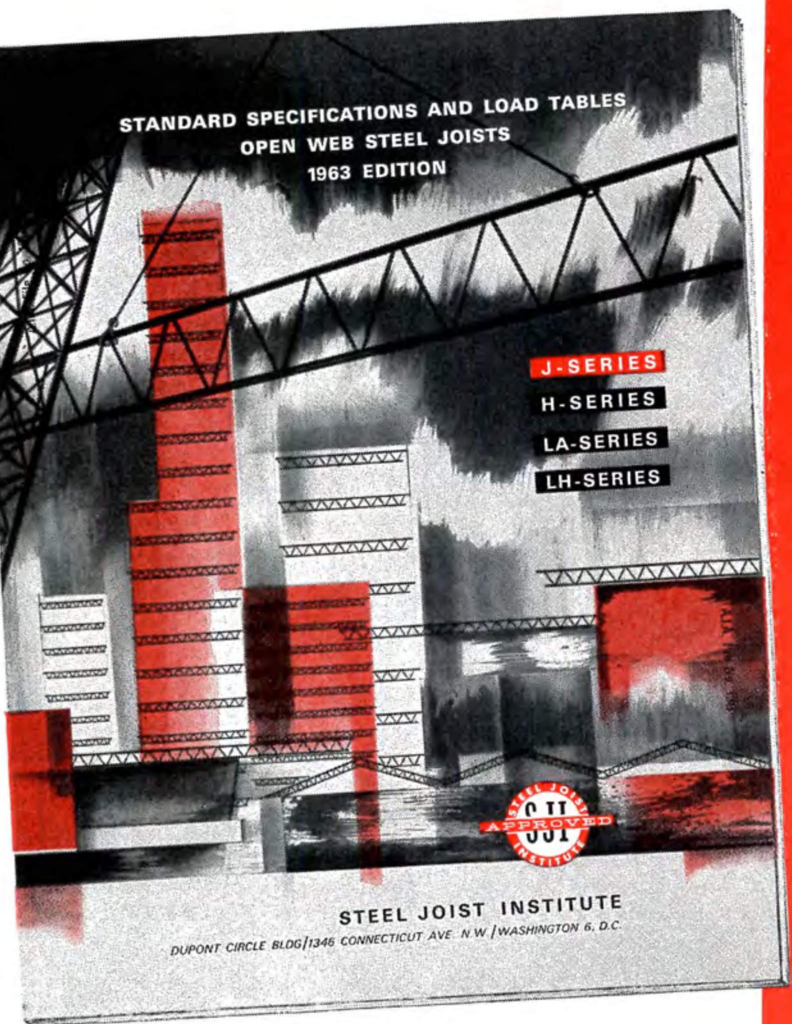

1963 EDITION

SPECIFICATIONS AND LOAD TABLES FOR HIGH STRENGTH OPEN WEB STEEL JOISTS

Covering Four Standard Series

J-SERIES based on a design stress in tension of 22,000 psi

LA-SERIES longspan joists compatible with the J-Series

H-SERIES high-strength joists made from 50,000 psi minimum yield strength steel

LH-SERIES a new series of longspan joists compatible with the H-Series

This 36-page handy reference manual from the Steel Joist Institute contains a wealth of practical information—everything you need for fast, easy, accurate specification of joists to carry uniform loads on spans up to 96 feet. Complimentary copies are available on request.

STEEL JOIST INSTITUTE

Washington 6, D.C.

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DuPont Circle Bldg.
Washington 6, D.C.

Please send me a complimentary copy of the 1963 edition of Specifications and Load Tables.

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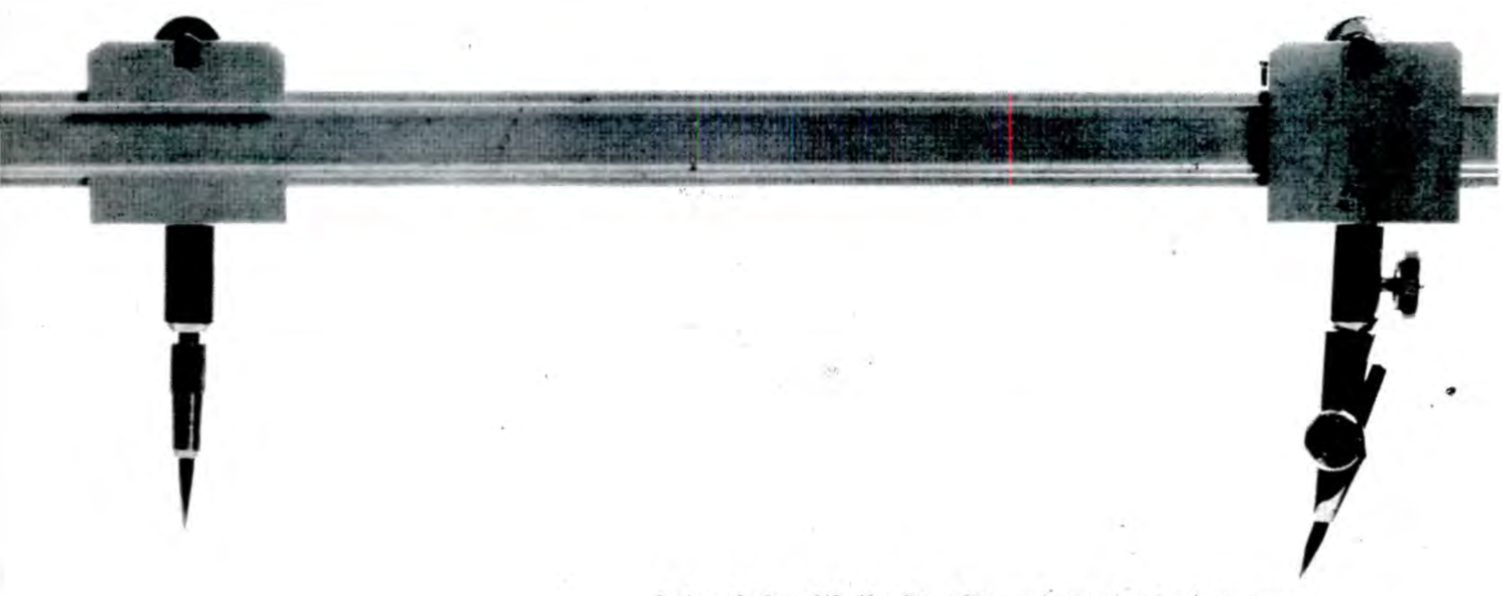

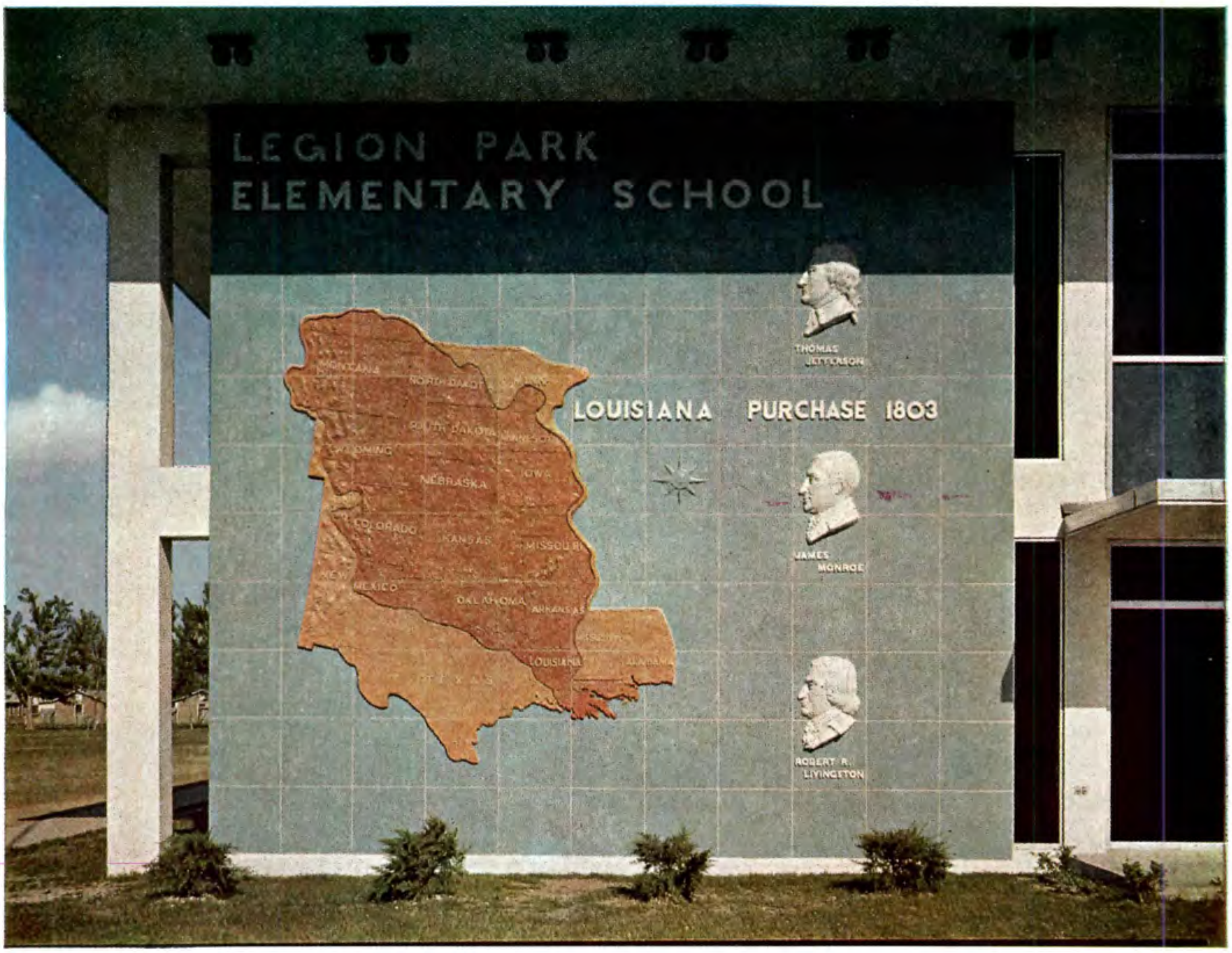

LEGION PARK ELEMENTARY SCHOOL, HOUMA, LOUISIANA. **Fernand Picou**—Architect. **J. B. Talley & Co.** —Builder. Students are reminded of the statesmen and land area involved in the Louisiana Purchase by the Ceramic Veneer polychrome map mural 23½′ wide x 21′9″ high. Unit size of Ceramic Veneer is 23¾″ x 25¼″.

To create polychrome panels that convey a message, consider Ceramic Veneer

Any subject that can be drawn or sculptured can be reproduced faithfully in Ceramic Veneer. Federal Seaboard craftsmen, using modern manufacturing techniques, custom-make every unit, large or small, to your precise specifications. There are virtually no restrictions as to color, form or texture, to curb your creative expression. In units large or small you can design plain surfaces, polychrome panels, or sculpture—for interiors or exteriors. You can be sure of permanent quality as well as lasting color, moderate price and utmost economy of maintenance. Write for complete information including new Ceramic Veneer solar screen and color guide brochures. For even lower initial cost, investigate the advantages of Federal Seaboard's new ⅜″ CV Durathin. Construction detail, data, advice and estimates on preliminary sketches, will be furnished promptly without charge.

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Acoustical Contractor today for samples, detailed information and a demonstration of PCP.

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Midland Engineering Co.

IOWA

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Topeka
Florence & Hartzell, Inc.
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Watkins Bros., Inc.
New Orleans
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Southern Acoustics

MAINE

Auburn
The Bader Company, Inc.

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Acoustical Contractors, Inc.
Pittsfield
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MICHIGAN

Detroit
Shelby Associates, Inc.
Grand Rapids
Bouma Tile & Acoustical Co.
Kalamazoo
Midwest Acoustic & Partition Co.
Marquette
Marquette Linoleum & Tile Company

MINNESOTA

Duluth
Flament-Hampshire, Inc.
Minneapolis
Dale Acoustics, Inc.
St. Cloud
Dale Tile Company

MISSOURI

Kansas City
Insulation & Acoustical Specialties Co., Inc.
Kelley Asbestos Products
St. Louis
R. B. Cleveland Co.
Springfield
Southwestern Insulation & Material Co.

MONTANA

Billings
Fiberglas Engineering & Supply

NEBRASKA

Lincoln
M and J Lathing Co.
Omaha
Kelley Asbestos Products Co.

NEVADA

Las Vegas
Nevada Building Specialties, Inc.
Reno
Tuck's Supply Co.

NEW HAMPSHIRE

Concord
The Bader Company, Inc.

NEW JERSEY

Clifton
Woolsulate Corp.

NEW MEXICO

Albuquerque
Fiberglas Engineering & Supply

NEW YORK

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Buffalo
Davis-Fetch & Co., Inc.
Ithaca
Rochester Davis-Fetch Corp.
Jamestown
Davis-Fetch & Co., Inc.
Lynbrook, L. I.
Robt. J. Harder, Inc.
Rochester
Rochester Davis-Fetch Corp.
Syracuse
Davis-Fetch Acoustical Corp.

NORTH CAROLINA

Asheville
The Bonitz Insulation Co.
Charlotte
Bost Building Equipment Co.
Goldsboro
The Bonitz Insulation Co.
Greensboro
The Bonitz Insulation Co.

NORTH DAKOTA

Fargo
Dale Tile Co.
Minot
Benton Lathing Co.

OHIO

Akron
Acoustical Contracting & Supply Corp.
R. E. Kramig & Co., Inc.
Cleveland
Acoustical Contracting & Supply Corp.
Columbus
Buckeye Acoustical Corp.
Springfield
Field & Associates
Toledo
Geo. P. Little Co., Inc.
Youngstown
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OKLAHOMA

Oklahoma City
The Denman Co.
Scovil & Sublett, Inc.
Tulsa
Oklahoma Ac. & Specialties Co.

OREGON

Eugene
Commercial Tile Co.
Portland
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PENNSYLVANIA

Kingston
Culp Brothers
Philadelphia
General Acoustics, Inc.
Pittsburgh
Davis-Fetch Corp. of Penn.
Standard Floor Co.
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Bonitz Insulation Co.
Greenville
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SOUTH DAKOTA

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Kingsport
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Jenkins Brick & Supply Co.
Corpus Christi
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Ken Turner Co. Inc.
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Schwarz-Jordan, Inc.
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West Texas Brick & Tile Co.
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General Supply Co., Inc.
Waco
Acoustical Specialties Company

UTAH

Salt Lake City
Components Co.

VIRGINIA

Alexandria
Anning-Johnson Co.
Charlottesville
Manson & Utley, Inc.
Norfolk
Manson & Utley, Inc.
Richmond
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VERMONT

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British Columbia

Vancouver
F. Drexel Co., Ltd.

PUERTO RICO

San Juan
Building Specialties Corporation

FREUND CREATES "MOVING MURAL" FOR SCHOOL LOBBY

Study for Freund's mural "Universal Dissemination of Knowledge"

New York City's Board of Education has commissioned Budapest-born architect and artist Tibor Freund to create a mural for the lobby of Pubilc School No. 111, now under construction. The school's architect, A. Gordon Lorimer, F.A.I.A., incorporated the mural into his early design.

The mural, 26 ft by 10 ft, has the title, "Universal Dissemination of Knowledge." It will portray in changing images and colors the dissemination of knowledge from the middle ages when knowledge was the exclusive property of a few through the present and into the future when all peoples of the world will share it.

The effect Mr. Freund achieves in his art is one of abstractions in motion, for as the viewer moves before the work of art, it changes in form and colors, with a resultant iridescence. Wood and metal are built up in three-dimensional forms, then paint applied so that light reflections vibrate from the various members.

The artist first made an "iridescent" in 1958, but he had been experimenting in illusions and the changeable years before, partly influenced by architect-artist Moholy-Nagy's book, *Vision in Motion*. This form appealed to him after he came to this country in 1953, for he felt it reflected the tempo, the movement he saw here.

A Fellow of the Royal Society of Arts, Mr. Freund worked as an artist and architect in Hungary and in 1940 went to Iran as architect of the Shah, built a sample town, was maintenance artist for the Golden Mosque. When the Shah was expelled from Iran, Mr. Freund went to Teheran where he opened a portrait studio and supervised the architecture of the Palace of Justice.

Sketch by A. Gordon Lorimer of the school lobby showing the mural

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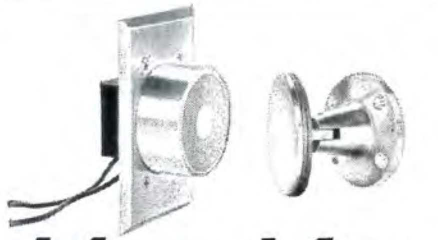

MAGNAMATIC
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A "fail-safe" holder
for self-closing fire and smoke barrier d
Self-contained and non-mechanical.

ıtomatically releases on interruption of current. sε
ir ɜpendently or with any fire or smoke detector system.

The MagnaMatic Door Holder represents an important breakthrough in the control of the spread of fire and smoke. It releases self-closing fire and smoke barrier doors from an open position, for simultaneous closing upon signal from any fire detector system or manual switch.

The MagnaMatic Door Holder is "fool-proof" and "fail-safe." That is, any interruption of the current, whether by detector, through power failure, or manual switch, deactivates the magnet and allows the doors to close. A signal from a fire or smoke detection device in any part of the building will release all doors simultaneously. Individual doors may be closed manually with ordinary effort, or released to close by an individual detector.

Fire Marshals state that the MagnaMatic Door Holder represents a major breakthrough in the saving of lives and property, by controlling the spread of fire and smoke. The National Fire Protection Association, The Fire Underwriters, Safety Officials and Code Officials have long wanted such a device. The MagnaMatic Door Holder complies with the description of the release device in the National Fire Codes, Volume 3, Section 101, paragraph 3209 (b), which requires an approved release device on barrier doors that are permitted to be held open.

The MagnaMatic Door Holder can completely remove the temptation to use "wedges" or other hazardous means to hold doors open.

The MagnaMatic Door Holder has no mov ing parts, is self-contained, requires n maintenance, is easily installed, and ca be used with 120 or 24 volt AC current Twenty of these devices can be operate for the kw cost of one 60 watt light.

Application for UL listing for Label Servic has been made.

For more information contact your loc Sargent Architectural Builders Hardwar supplier, fire detection system supplier c write: Sargent & Company, New Haven ς Connecticut.

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You can specify both AIR MOVING CAPACITY and EXHAUSTER SOUND LEVEL to fit your specific requirements

Jenn-Air's new power roof and wall exhauster Bulletin No. 2CE contains complete data to permit you to determine sound limitations desirable for every exhauster application . . . *and* to determine which exhauster you need . . . to move the amount of air necessary . . . at the desired sound level.

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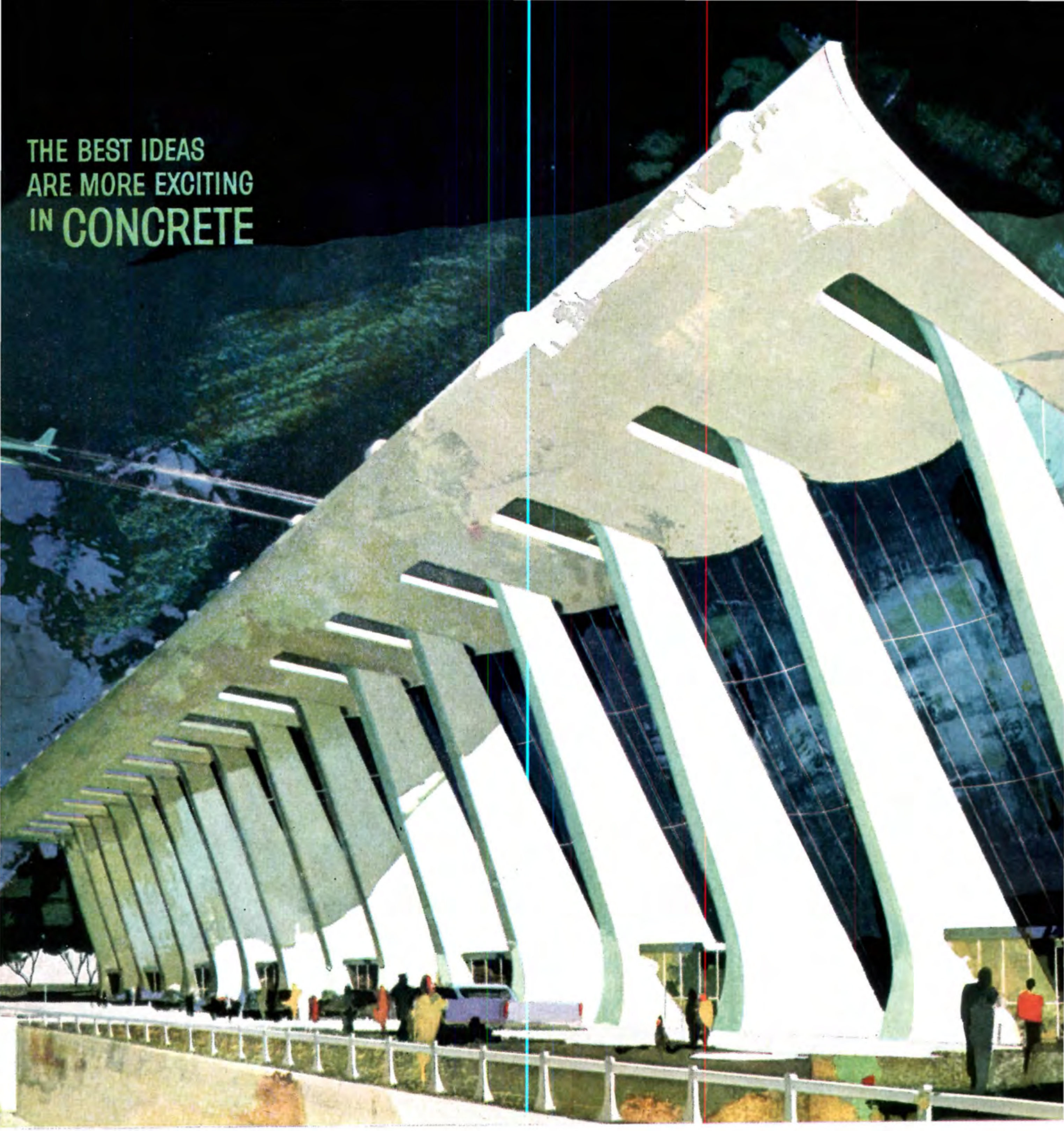
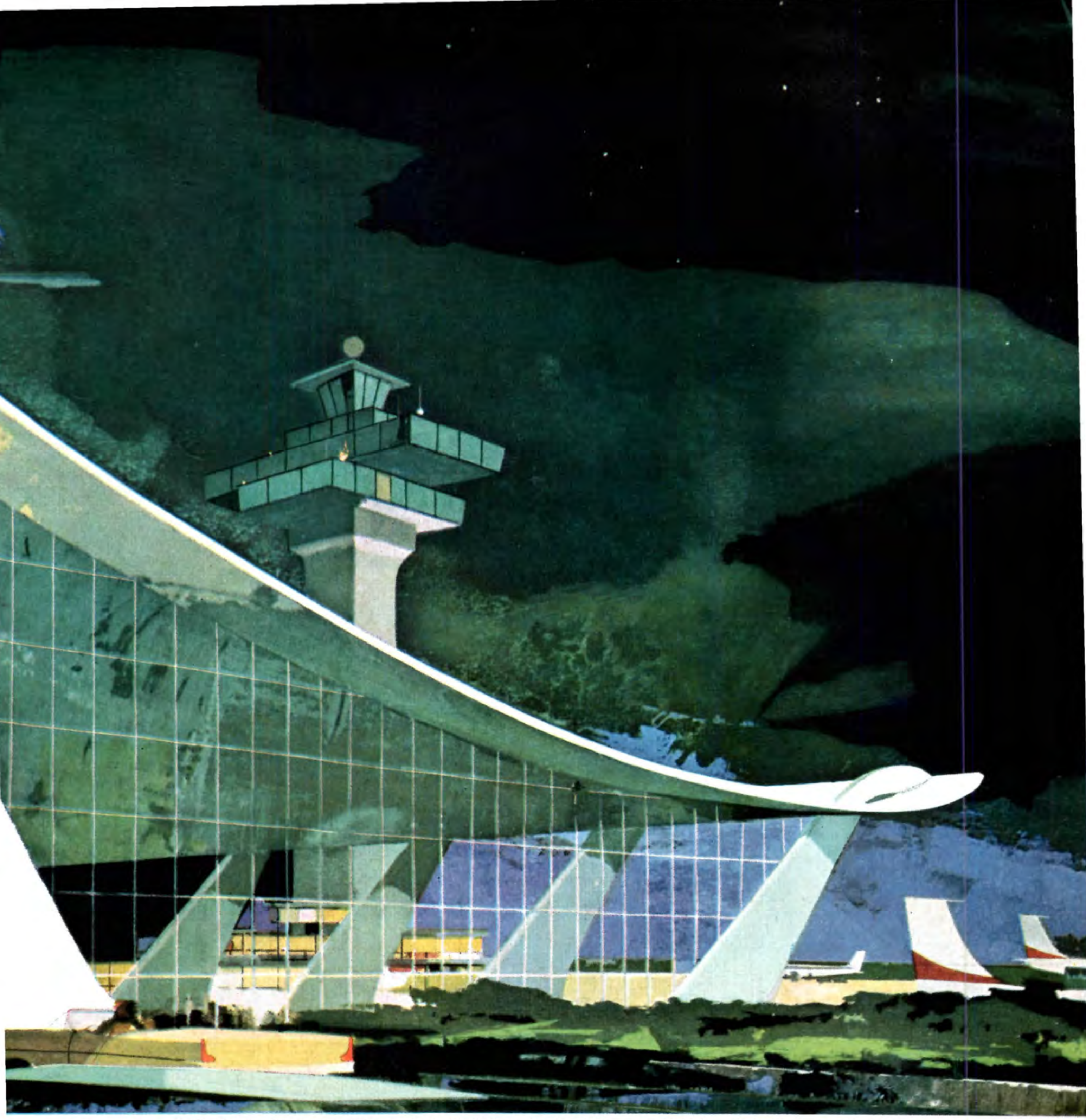


SOARING ROOF AND PYLONS OF CONCRETE EXPRESS THE SPIRIT OF JET-AGE FLIGHT



Dulles International Airport Terminal. For the Federal Aviation Agency: N. E. Halaby, Administrator; G. W. Hobbs, Director of Bureau of National Capital Airports; R. F. Date, Chief Engineer. Architects and Engineers: Ammann & Whitney, Eero Saarinen & Associates, Burns & McDonnell, and Ellery Husted. Architect for Terminal Building: Eero Saarinen & Associates.

ulles International Airport, new port of entry to the ıtion's capital, is being built from the ground up for jets. ·om the 2-mile-long runways to the magnificent termi- ıl building, concrete has been given a leading role.

The architect's bold concept for the terminal could only ıve been executed in concrete. No other material has e versatility to accommodate such striking departures ɔm traditional design.

The concrete roof, slung from pylons with cables, makes ɘ terminal a vast, single room, 150 feet wide by 600 feet long. The upswept design, that gives such drama to the exterior, provides improved acoustics for the interior. The elegance and classic simplicity of the towering pylon colonnades are accentuated by their textured surface that exposes the special white aggregates.

For freedom of expression in structures of all types, more and more architects are turning to modern concrete.

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

STRIPLINE
DISTINCTIVE AIR DIFFUSERS

Stripline extruded aluminum slot-type air diffusers are designed to blend in perfectly with the decor. They are made with separate plaster frames and removable diffusing cores. Stripline is easy to install in sections or as a continuous unit. **No mounting screws on face of unit . . . surface unmarred.**

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You should have the Stripline catalog. Write for your copy today.

AIR DEVICES INC.
185 Madison Avenue
New York, New York

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For more data, circle 44 on Inquiry Card →

PAPER HOUSE DEVELOPED BY NEW YORK FIRM

A paper house designed for markets in underdeveloped areas, such as may be found in Africa and Asia, and for this country's vacation house market has been developed by Parametrics Research & Development Corp., New York. A demonstration house, the "Weekender" model to sell for under $2,000, was erected this spring at Roosevelt Field, Long Island was on display for several months.

The two-bedroom house, 24 by 20 ft, has a 20- by 20-ft living, sleeping and dining area which includes kitchen, bathroom, closets and also a 10 by 24-ft porch.

Walls, roof and floor are made of processed paper panels consisting of two outer skins of paperboard treated to make them hard and durable sandwiching a paper honeycomb core. The panels have withstood tests which included driving a two-and-a half-ton truck across without damaging effects. Treated with impregnating resins and/or inorganic fillers to give it the durability necessary for its intended service and climate the paper house is fire-, moisture and termite-resistant.

Panels are joined by a patented steel spline system which eliminates the need for large panels, minimizes shipping problems and disposes of the need for a crane on the job site. The fastening system is reported to be "inexpensive, concealed and can be installed with ease and security."

Various types of foundation supports—cinder blocks, cement slabs or hollow stilts—can be adapted for use. In the indoor model at Roosevelt Field, 63 paper supports are staked to the ground with steel rods and filled with 16,000 pounds of sand or gravel. Each of the tubes can bear a weight of 2,000 pounds and their anchoring system enables the house to withstand a 125-mile-an-hour windload.

The house, all paper except for woodstripping and studding, steel rods and spline system, will be sold as a complete package (minimum wiring and plumbing is built into special panels) "that can be basically assembled by two people in a day."

Architect for this model and others to come is Peter Samton. Engineer is Harold L. Humes Jr., who conceived the idea of the use of paper when confronted with the problem of high costs in buying or building a summer home on the Caribbean island of St. Maartens.

WOOD
TWINLITE® AND MULTI-PURPOSE WINDOWS

PELLA ALSO MAKES QUALITY WOOD CASEMENT WINDOWS, WOOD FOLDING DOORS AND PARTITIONS, WOOD SLIDING GLASS DOORS AND ROLSCREENS

Offer awning window convenience plus traditional styling

Women will like the idea that these windows can be opened even when it is raining. They'll like their double-hung look, too . . . thanks to that narrow meeting rail. But, their appearance is the only thing conventional about these PELLA WOOD TWINLITE WINDOWS. Screens and storms are *self-storing*. Stainless steel weatherstripping contributes to the year 'round efficiency of heating and air conditioning. The sash locks in 10 positions with GLIDE-LOCK® underscreen operator (roto operators, too). Muntin bars snap in and out to speed painting and cleaning. PELLA WOOD TWINLITE WINDOWS can be set singly, stacked, in ribbons or as casements. For more details, consult SWEET'S or your PELLA distributor listed in the Yellow Pages.

2

of a series

ROLSCREEN COMPANY • PELLA, IOWA

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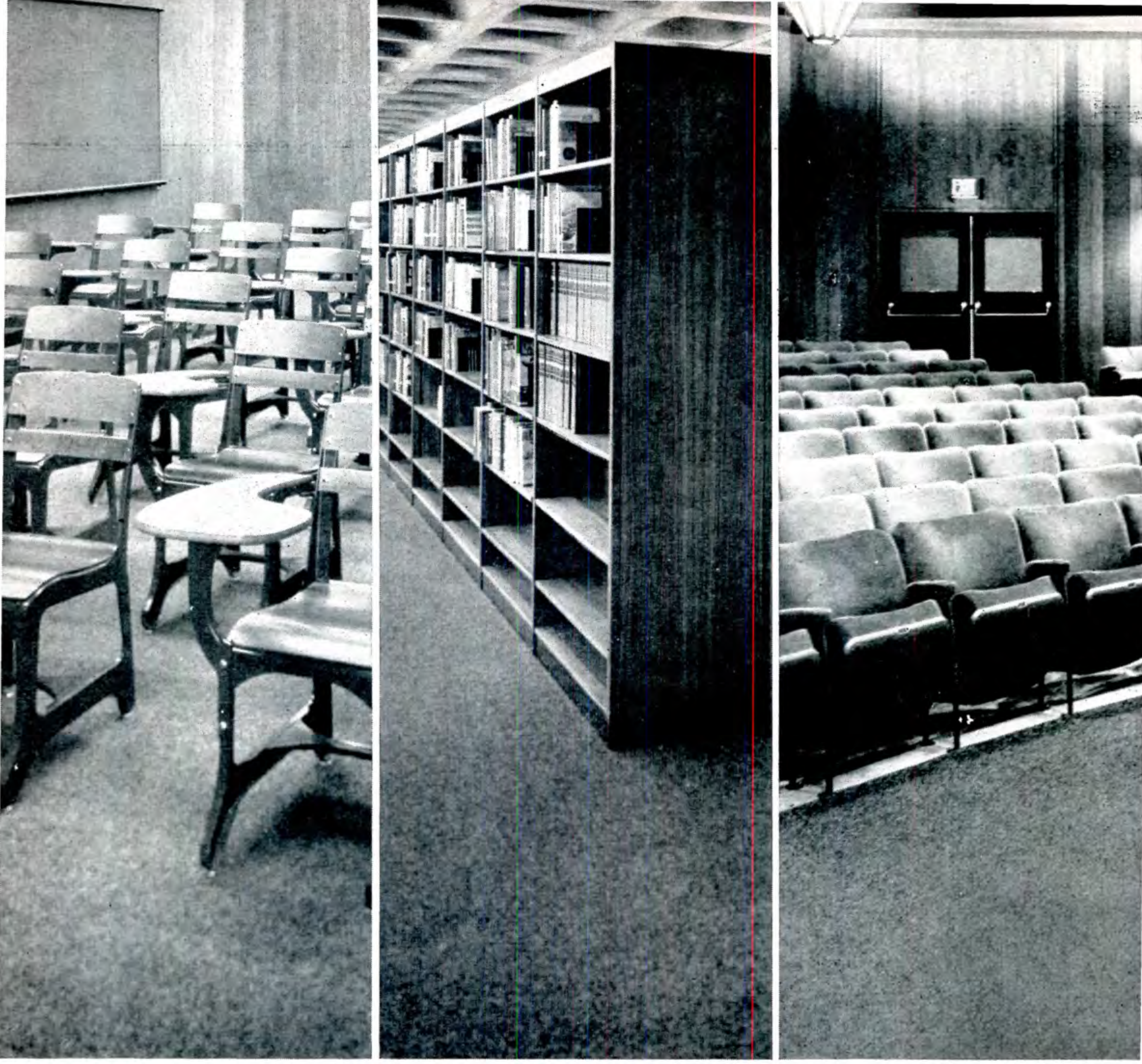

It's still this quiet when the students troop in.

The floors are covered with carpets made with Acrilan.® And the carpets keep it quiet. They take all the stomp and shuffle out of the classroom, music room and library. They make Foothill College* in Los Altos, Calif., a better place to concentrate and learn.

The 4000 square yards of carpeting on the floor were created by Cabin Crafts. And because this carpeting has the proper amount of Acrilan acrylic fiber in the pile, it is luxurious, like fine wool, but much longer-lasting, economical to maintain, and completely non-allergenic. Spots and stains clean right up, color stays clear, pile stays nice and high.

If you're thinking about carpeting a school, now or in the future, trust the big red "A." Specify carpets made with Acrilan for acoustical school flooring. They're a very sound investment. For additional information, contact School Carpet Department, Chemstrand, 350 Fifth Avenue, New York 1.

*FOOTHILL WON THE 1962 A.I.A. FIRST HONOR AWARD FOR DESIGN. ARCHITECTS, ERNEST J. KUMP AND MASTEN & HURD.

THIS CARPET PILE IS MADE WITH ACRILAN ACRYLIC FIBER

A ACRILAN acrylic fiber CHEMSTRAND

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THESE ARE AMONG THE MILLS NOW LICENSED BY CHEMSTRAND: BARWICK, CABIN CRAFTS, CORONET, DOWNS, MAGEE, MONARCH, ROXBURY. IN CANADA: HARDING CARPETS.

For more data, circle 53 on Inquiry Card

INTERIOR DECORATOR: ETHYL ALPER, A.I.D

Pella®

WOOD FOLDING DOORS

PELLA ALSO MAKES QUALITY WOOD FOLDING PARTITIONS, WOOD SLIDING GLASS DOORS, ROLSCREENS, WOOD CASEMENT, MP AND TWINLITE WINDOWS

What else here but a folding door of wood?

Wood "belongs" with other fine furnishings and materials. That's why PELLA WOOD FOLDING DOORS contribute so much to a decorative scheme. Specify PELLA DOORS factory-finished or unfinished from one of 6 genuine veneers: OAK, ASH, PINE, BIRCH, PHILIPPINE MAHOGANY or AMERICAN WALNUT. Patented "live-action" steel spring hinging assures years of trouble-free operation. Solid wood "Lamicor" construction prevents warping. Available in any width and in heights up to 12′1″. PELLA DOORS arrive factory-assembled, complete with all hardware to save installation time. Full specification in SWEET's or check the Yellow Pages for the name of the nearest U.S. or Canadian PELLA distributor.

3 *of a series*

ROLSCREEN COMPANY • PELLA, IOWA

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DESIGNER: EDWARD DON CO.

WOOD FOLDING PARTITIONS

PELLA ALSO MAKES QUALITY
WOOD FOLDING DOORS,
WOOD SLIDING GLASS DOORS,
WOOD CASEMENT AND MULTI-PURPOSE
WINDOWS AND ROLSCREENS

Rich wood stars in this dramatic "panel-show"

From rich veneer beauty to dramatic panel proportions, PELLA WOOD FOLDING PARTITIONS offer pleasing answers to problems of space division. You can specify from these 6 genuine wood veneers: PHILIPPINE MAHOGANY, AMERICAN WALNUT, OAK, PINE, BIRCH OR ASH. Ask us to do the finishing at the factory or have it done on the job. Stable wood core construction prevents warpage. Patented "live-action" steel spring hinging assures smooth, easy operation. Available for all widths and heights up to 20′1″. Full specification in SWEET's or call your PELLA distributor listed in the Yellow Pages.

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ROLSCREEN COMPANY • PELLA, IOWA

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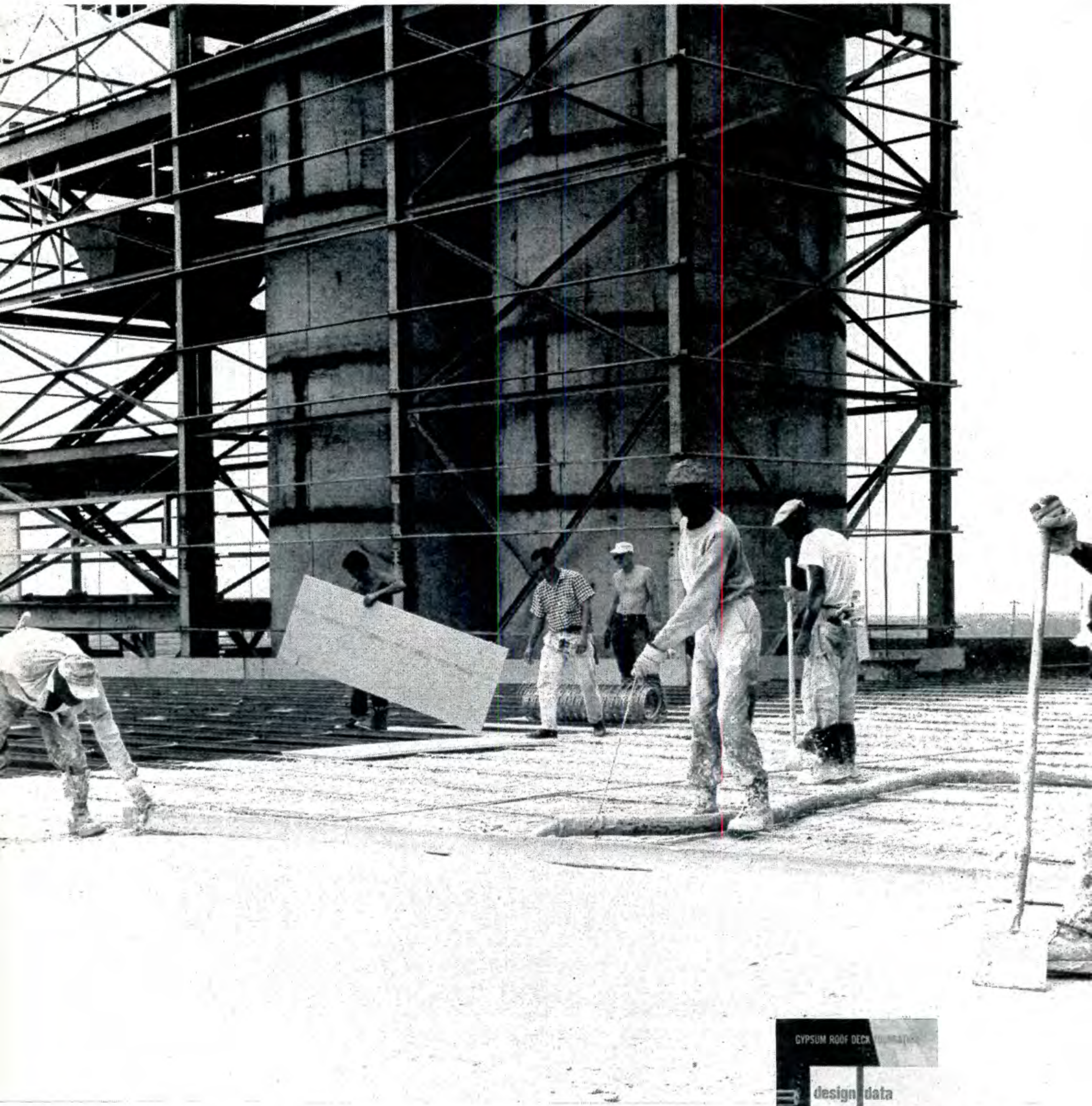
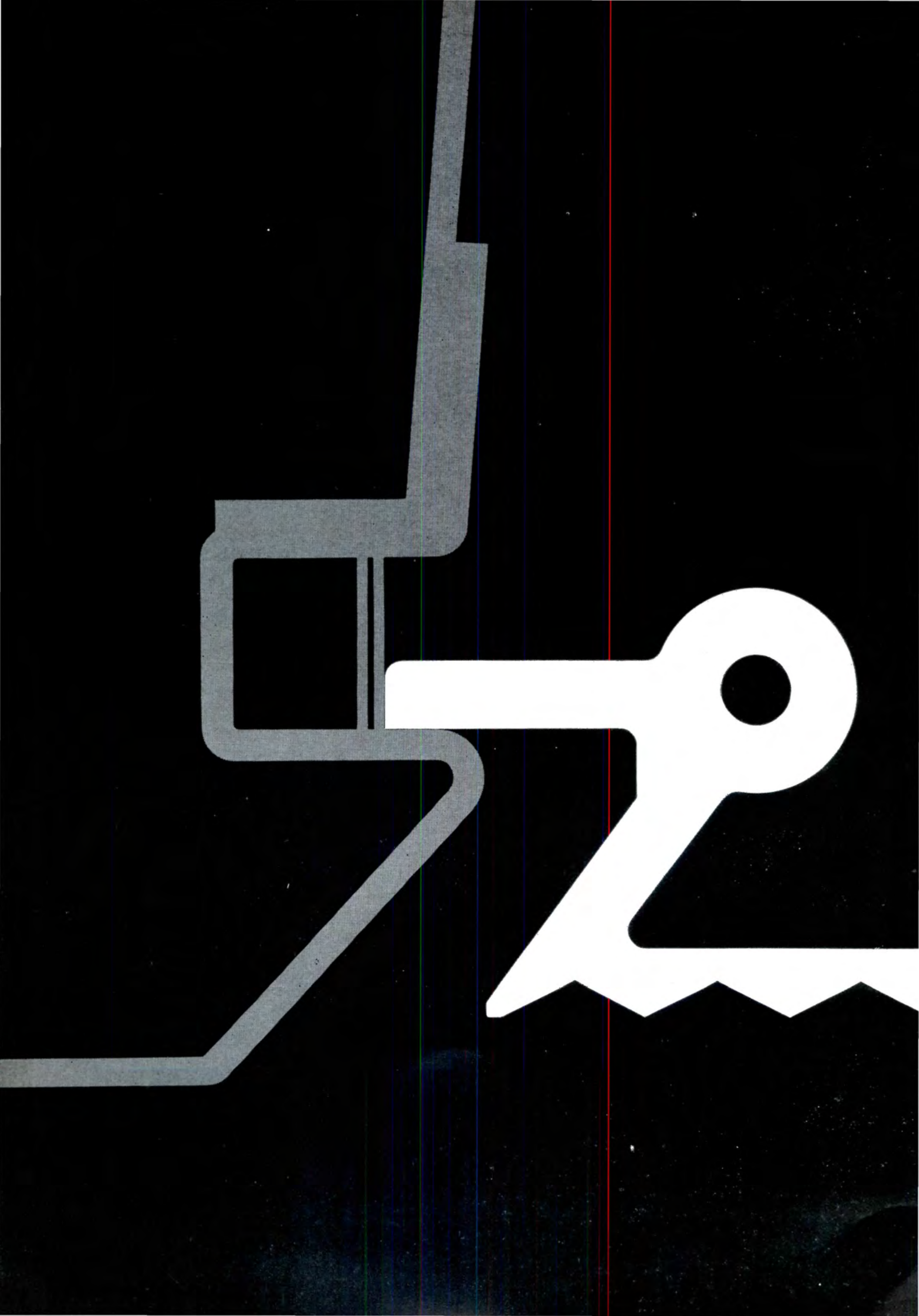
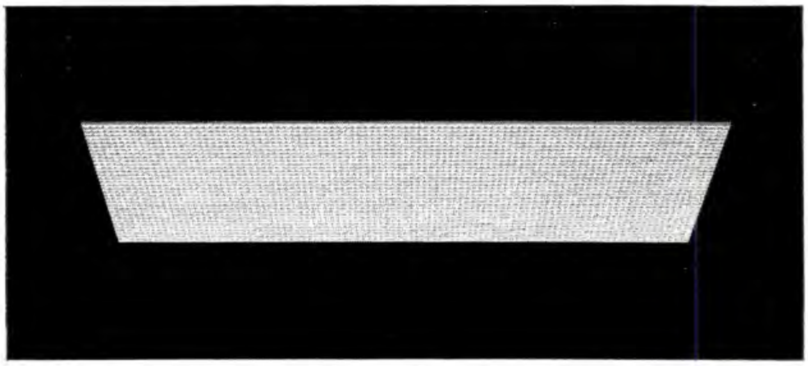
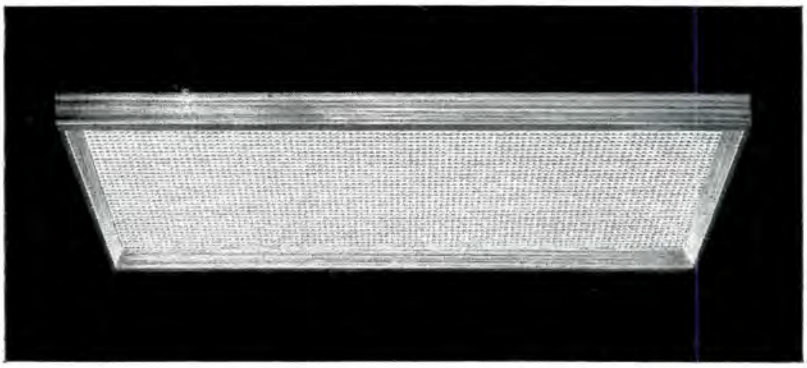



GYPSUM ROOF DECK
design data
STANDARD INSTALLATION PRACTICES for the GYPSUM ROOF DECK INDUSTRY
GRDF
GRDF



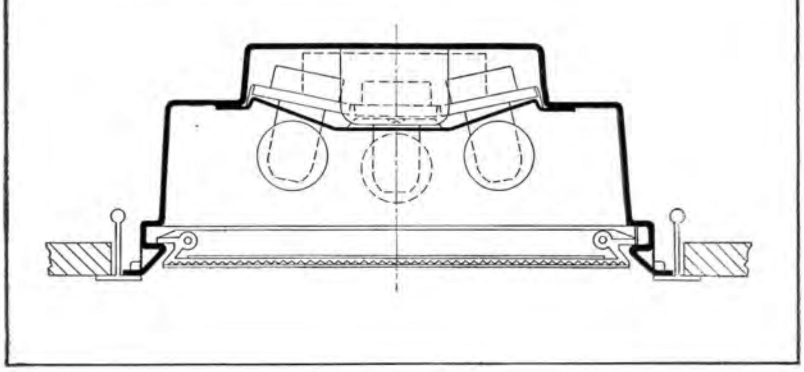
No visible means of suppo !





No hardware, no gaps, no "frame-within-a-frame." All that meets the eye is a clean, precise rectangle of light. The diagram on the left reveals the secret: ingenious self-supporting shieldings. These were devised by Lightolier engineers to eliminate the mechanical look of so many of today's recessed fixtures.

Lightolier's advanced recessed designs are also available with decorative walnut frames, so that important areas can be accented while over-all design continuity is maintained. Built to Lightolier's high standards of construction and efficiency, these fluorescents are available in 1′ x 4′, 2′ x 4′, and 2′ x 2′ sizes and in a range of wattages—with prismatic or diffuse shieldings—to meet virtually any performance, budget or ceiling requirement. For further information, write for Brochure 39, Lightolier, Jersey City 5, N. J., Dept. AF-9.



LIGHTOLIER®

New York, Chicago, Dallas, Los Angeles

See these new Lightoliers at any Distributor listed on page 100

LIGHTOLIER®

New York, Chicago, Dallas, Los Angeles fixtures are stocked and sold by the following Distributors:

ALABAMA
Birmingham: Mayer Elec. Sup. Co. **Mobile:** F. E. Smith Elec. Co.

ALASKA
Anchorage: Northern Sup. Co.

ARIZONA
Phoenix: Brown Wholesale Elec. **Tucson:** Beacon Ltg. Fix. Co.

ARKANSAS
Little Rock: Adcock Ltg. & Sup.

CALIFORNIA
Bakersfield: San Joaquin Whlse. Elec. Co. **Fresno:** Electrical Suppliers, Inc. **Los Angeles:** Gough Industries, Inc. **Palm Springs:** Tri-County Elec. Whlsrs. **Riverside:** Tri-County Elec. Whlsrs. **Sacramento:** Capital Whlse. Elec. Co. **San Bernardino:** Tri-County Elec. Whlsrs. **San Diego:** Sunlight Elec. Sup. Co. **San Francisco:** California Elec. Sup. Co.

COLORADO
Denver: Central Elec. Sup. Co.

CONNECTICUT
Bridgeport: B. M. Tower Co., Inc. **Hartford:** Beacon Light & Sup. Co. **New Haven:** Grand Light & Sup. Co. **New London:** United Elec. Sup. Co. **South Norwalk:** Klaff's Inc. **Stamford:** Marie Co. **Waterbury:** Starbuck Sprague Co., Suburban Supply Co.

DISTRICT OF COLUMBIA
Washington: Maurice Elec. Sup. Co., National Elec. Wholesalers

FLORIDA
Miami: Farrey's Whlse. Hdwe. Co.

GEORGIA
Atlanta: Atlanta Ltg. Fix. Co., Electrical Wholesalers, Noland Co. **Augusta:** Hart Elec. Sup. Co. **Columbus:** P. & W. Elec. Sup. Co. **Macon:** Noland Co.

HAWAII
Honolulu: Hawaiian Light & Sup. Co.

ILLINOIS
Champaign: Tepper Elec. Sup. Co. **Chicago:** Efengee Elec. Sup. Co., Englewood Elec. Sup. Co., Harlo Elec. Sup. Co., Hyland Elec. Sup. Co., Metropolitan Elec. Sup., Steiner Elec. Co., Wholesale Elec. Sup. Co. **Elgin:** Fox Elec. Sup. Co. **Joliet:** Joliet Elec. Sup. **Rockford:** Englewood Elec. Sup. Co. **Springfield:** Springfield Elec. Sup. Co.

INDIANA
Ft. Wayne: Mossman-Yarnelle Co. **Gary:** Englewood Elec. Sup. Co. **Indianapolis:** Farrell-Argast Elec. Co. **South Bend:** Englewood Elec. Sup. Co.

IOWA
Des Moines: Weston Lighting, Inc.

KANSAS
Kansas City: W. T. Foley Elec. Co. **Wichita:** Architectural Lighting, Inc.

KENTUCKY
Louisville: Henry J. Rueff Co.

LOUISIANA
Baton Rouge: Electrical Wholesalers, Inc. **New Orleans:** Interstate Elec. Co.

MAINE
Bangor: Standard Elec. Co. **Portland:** Holmes Elec. Supply Co.

MARYLAND
Baltimore: Baltimore Gas Light Co., Dominion Elec. Sup. Co. **Hagerstown:** Noland Co., Tristate Elec. Sup. Co. **Salisbury:** Artcraft Elec. Sup. Co.

MASSACHUSETTS
Boston: Boston Lamp Co., Mass. Gas & Elec. Light Co., Henry L. Wolfers, Inc. **Pittsfield:** Carr Supply Co. **Springfield:** M. W. Zimmerman, Inc. **Waltham:** Standard Elec. **Worcester:** Benjamin Elec. Sup. Co.

MICHIGAN
Benton Harbor: West Michigan Elec. Co. **Detroit:** Madison Elec. Co., Michigan Chandelier Co. **Flint:** Royalite Co. **Grand Rapids:** Purchase Elec. Sup. Co. **Jackson:** Electric Wholesale Sup. Co. **Kalamazoo:** West Michigan Elec. Co. **Lansing:** Michigan Elec. Sup. Co. **Muskegon:** Fitzpatrick Elec. Sup. Co. **Pontiac:** Standard Elec. Sup. Co. **Saginaw:** Schmerheim Elec. Co., Standard Elec. Sup. Co.

MINNESOTA
Duluth: Northern Elec. Sup. Co. **Minneapolis:** Freeman Elec. Sup. Co., North Central Elec. Distr. Co., Northland Elec. Sup. Co., Terminal Elec. Corp. **St. Paul:** Lax Elec. Co.

MISSISSIPPI
Jackson: Stuart C. Irby Co.

MISSOURI
Kansas City: Glasco Elec. Co., Rossner Elec. Sup. Co. **St. Louis:** M. K. Clark, Glasco Electric Co. **Springfield:** Southern Materials Co.

MONTANA
Great Falls: Glacier State Elec.

NEBRASKA
Lincoln: White Electric Supply Co. **Omaha:** Electric Fix. & Sup. Co.

NEVADA
Reno: Western Elec. Dists. Co.

NEW HAMPSHIRE
Portsmouth: Mass. Gas & Elec. Light Co.

NEW JERSEY
Atlantic City: Franklin Elec. Sup. Co. **Camden:** National Elec. Sup. Co. **Cherry Hill (Delaware Township):** Flynn's Camden Elec. Sup. Co.

NEW MEXICO
Albuquerque: The Lighting & Maint. Co.

NEW YORK
Binghamton: Freije Elec. Sup. Co. **Buffalo:** Buffalo Incand. Light Co. Inc. **Nanuet (Rockland Co.):** Rockland Lighting. **Niagara Falls:** Hysen Supplies Inc. **Poughkeepsie:** Electra Sup. Co. **Rochester:** Rowe Electric Sup. Co. **Schenectady:** American Elec. Sup. Co. **Syracuse:** Superior Elec. Corp. **White Plains:** Wolar Lighting Corp.

NORTH CAROLINA
Asheville: Electric Sup. Co. **Charlotte:** Independent Elec. Sup. Co. **Durham:** Noland Co. **Greensboro:** Elec. Sup. & Equip. Co. **High Point:** Electric Sup. Inc. **Kinston:** Kinston Elec. **Raleigh:** Electrical Equipment Co. **Winston-Salem:** Noland Co.

NORTH DAKOTA
Fargo: Border States Elec. Sup. Co., Northwest Elec. Sup. Inc.

OHIO
Akron: The Sacks Elec. Sup. Co. **Canton:** Electric Sales Co. **Cincinnati:** B. & B. Elec. Co., F. D. Lawrence Electric Co., Richards Elec. Sup. Co. **Cleveland:** The H. Leff Electric Co., Midland Elec. Co. **Columbus:** Elgee Elec. Co., The Loeb Elec. Co. **Dayton:** Duellman Elec. Co. **Lima:** State Elec. Sup. Corp. **Springfield:** The W. W. Elec. Co. **Toledo:** Gross Elec. Fix. Co. **Youngstown:** The Braff Ltg. Fix. Co.

OKLAHOMA
Oklahoma City: Elec. Sup. of Oklahoma, Hunzicker Bros.

OREGON
Portland: Baker-Barkon Co., Malloy Robinson Co.

PENNSYLVANIA
Allentown: Coleman Elec. Co. **Erie:** Kraus Elec. Co. **Harrisburg:** Fluorescent Sup. Co., Schaedler Bros. **Hazleton:** Power Elec. Co. Inc. **Lancaster:** Graybill's **New Castle:** Midwestern Elec. Co. **Norristown:** Norristown Elec. Sup. Co. **Philadelphia:** Gold Seal Elec. Sup. Co., Logan Elec. Sup. Co., Inc., Pyramid Elec. Sup. Co., Inc., Silver's Elec. Sup. Co., Sylvan Elec. Fix. Co., West Phila. Elec. Sup. Co. **Pittsburgh:** Allied Elec. Sup. Co., Argo Lite Studios, Brown & Green, Wally Elec. Sup. Co. **Reading:** Coleman Elec. Co. **Scranton:** Lewis & Reif, Inc. **Uniontown:** Pioneer Electric Dist. **West Chester:** West Chester Elec. Sup. Co. **Wilkes-Barre:** Anthracite Elec. **Williamsport:** Lowry Electric Co. **York:** Graybill's

RHODE ISLAND
Pawtucket: Major Elec. Sup. Co. **Providence:** Leavitt Colson Co., Tops Elec. Sup. Co.

SOUTH CAROLINA
Columbia: Capital Elec. Sup., Noland Co. **Greenville:** Sullivan Hdwe. Co.

SOUTH DAKOTA
Watertown: J. H. Larson Elec. Co.

TENNESSEE
Chattanooga: Mills & Lupton Sup. Co., Noland Co. **Knoxville:** The Keener Co. **Memphis:** Belvedere Lighting Co. **Nashville:** Nashville Elec. Sup. Co.

TEXAS
Brownsville: Electric Fix. Sup. Co. **Dallas:** Rogers Elec. Sup. Co. **Ft. Worth:** Anderson Fixture Co., Cummins Supply Co., General Industrial Sup. Corp. **Houston:** Anderson Lighting Co., Gulf Coast Elec. Sup. Co., Inc., Marlin Associates, Worth Elec. Sup. Co. **San Antonio:** Electrical Distrib. Co., Southern Equip. Co., Straus-Frank Co., Worth Elec. Sup. Co. **Waco:** Dealers Elec. Sup. Co.

UTAH
Salt Lake City: Artistic Lighting

VIRGINIA
Arlington: Dominion Elec. Sup. Co. Inc., Noland Co. **Lynchburg:** Mid-State Elec. Sup. Co., Inc. **Richmond:** Atlantic Elec. Sup. Co. **Roanoke:** Noland Co.

WASHINGTON
Seattle: Seattle Lighting Fix. Co.

WEST VIRGINIA
Bluefield: Bluefield Supply Co. **Charleston:** Capitol Light Co., Goldfarb Elec. Sup. Co. **Wheeling:** The Front Co.

WISCONSIN
Appleton: Moe Northern Co. **Eau Claire:** W. H. Hobbs Supply Co. **La Crosse:** W. A. Roosevelt Co. **Milwaukee:** Electri-Craft Lighting, Lappin Electric Co., Standard Elec. Sup. Co. **Racine:** Milch Elec. Sup. Co.

CANADA
Edmonton: Alberta Elec. Sup. Ltd. **Montreal:** L.D.G. Products, Inc., Gray Elec. Co., Union Elec. Sup. Co. Ltd. **Toronto:** Revere Elec. Dist., Toronto Ltg. Studios, Union Elec. Sup.

PUERTO RICO
San Juan: Sole Electric

See new solutions to current lighting problems at the Lightolier Architectural Displays, 11 E. 36, N. Y. 16. Come in anytime from 9-5.

For more data, circle 61 on Inquiry Card

DAVIDSON

Roof-Top Harmony

PC Pleasing Contour Model

Fiberglass Housings are available in 12 sealed-in colors (special colors to order).

Now you can harmonize your roof-top ventilating units with the overall structural colors and tones of the building itself. Example: Units can be a BOLD Chinese Red or "blend right into the roof" with Pearl Gray.

Davidson fiberglass housings are strong, durable, fire-resistant and maintenance-free. They deaden sound and withstand heat, cold, moisture and fumes.

Available for wide range of Hyduty Fans.

For complete data, write:

DAVIDSON FAN CO.

Dept. 4, 213 California St., Newton 58, Mass.

In Canada: Preston, Phipps Inc.,
940 Ogilvy Ave., Montreal

Please include name of your engineer when inquiring so we can send you both complete data.

The Original Manufacturer of Roof Fans — Founded 1915

Member AMCA

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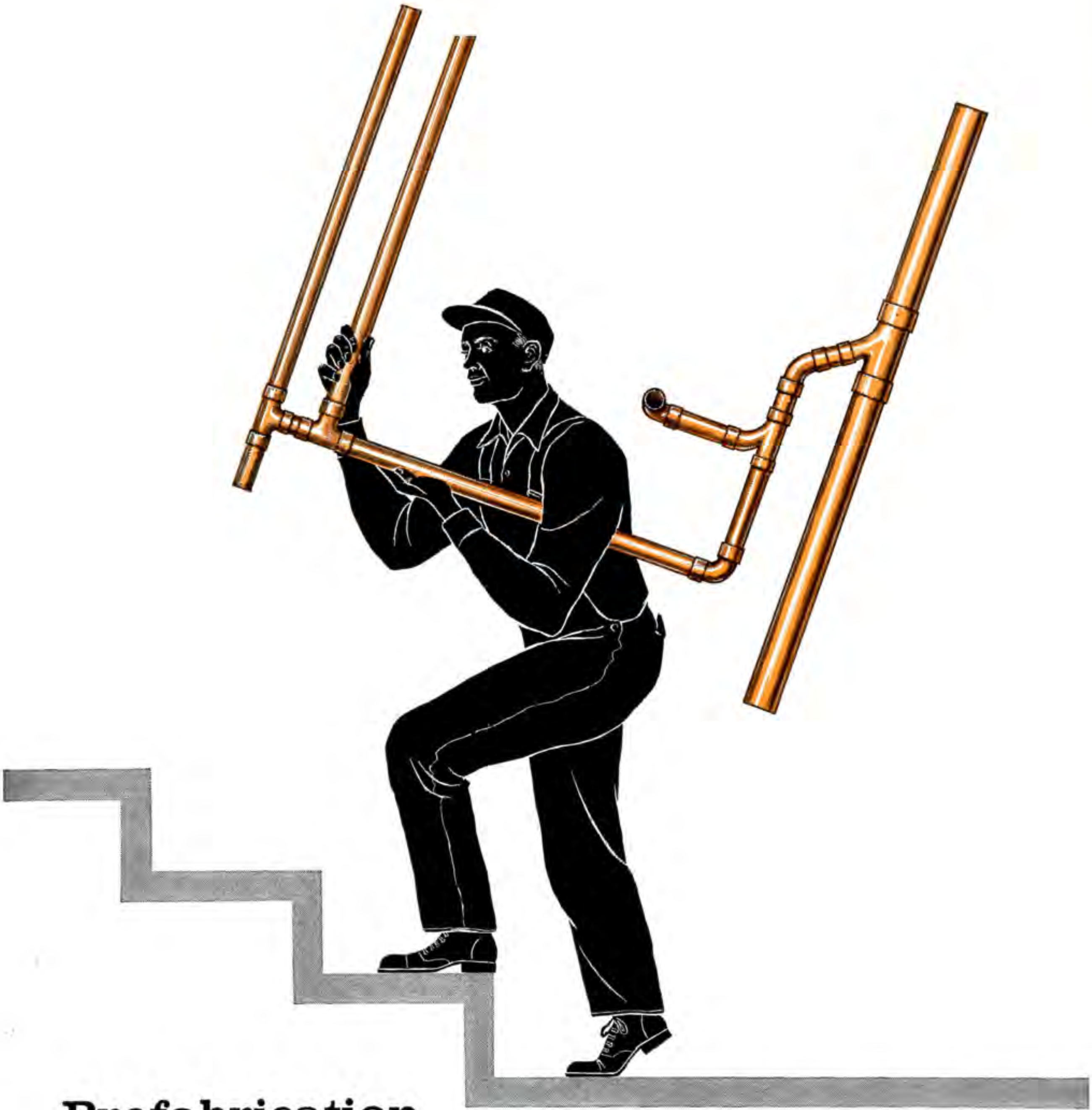

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MICHIGAN U. GETS RESEARCH GRANT TO STUDY PLASTICS FOR HOUSING

With the aim of exploring the feasibility of plastics—particularly foam plastics—for the construction of low-cost housing in the world's underdeveloped areas, the U.S. Department of State, Agency for International Development, has granted $29,400 to the University of Michigan Department of Architecture. The six-months project will be carried on by a University research team working closely with the U.S. plastics industry.

Members of the team are: Stephen C. A. Paraskevopoulos, associate professor of architecture, project director; C. Theodore Larson, professor of architecture, principal project consultant; and Harold J. Borkin, research associate.

Should results of this research bring recommendation that certain plastics are capable of being used advantageously in shelter construction, either alone or in combination of indigenous materials, the development of prototype house designs would follow. These designs could be offered to various countries as a guide for their own home-building programs.

"One of the project aims," said Prof. Paraskevopoulos, "will be to single out those countries in which the immediate introduction of any new plastics-using construction technology appears most promising, with basic materials and training provided through AID.

"With the assistance of the University's Research Center for Economic Development, an attempt will also be made to identify, in order of preference, the countries in which new facilities for the production of processing of plastics can be most readily established."

The University's Architecture Research Laboratory will conduct some preliminary design experimentation, the work being expressed largely through scale models and drawings showing how the prototype dwelling designs might look and how they might be constructed.

YOU SPECIFY THE FLOORING!

He'll make sure it lives up to your reputation

People will be walking on your reputation, beginning the day this building goes into use.

They'll be digging into it with their shoes. Dragging abrasive dirt and dust across it. Tracking moisture. For your reputation will rest on the flooring you specify as well as on the overall architectural design.

Yet, the flooring you specify can be drawing raves years from now with proper care and maintenance. Without any headaches or effort on your part. Just turn its maintenance over to our representative . . . the Man Behind the Huntington Drum.

Flooring care has been his province for an average of 19 years. Give him the green light—and he'll come up with a floor maintenance program covering every area and every flooring material.

Call in the Man Behind the Huntington Drum. Put the burden of floor maintenance on his shoulders right now.

HUNTINGTOI

. . . where research leads to better products

HUNTINGTON LABORATORIES
Huntington, Indiana
Philadelphia 35, Pennsylvania • *In Canada:* Toronto 2, Ontario

FILL OUT AND MAIL THIS COUPON

SEE OUR CATALOG S IN SWEET'S

Huntington Laboratories, Inc.
P. O. Box 710, Huntington, Indiana

Gentlemen: I would like a Man Behind the Huntington Drum to call on me to discuss floor maintenance.
(☐ Ask him to leave his drum outside.)

NAME ____________ TITLE ____________

FIRM ____________

ADDRESS ____________

CITY ____________ ZONE ______ STATE ____________

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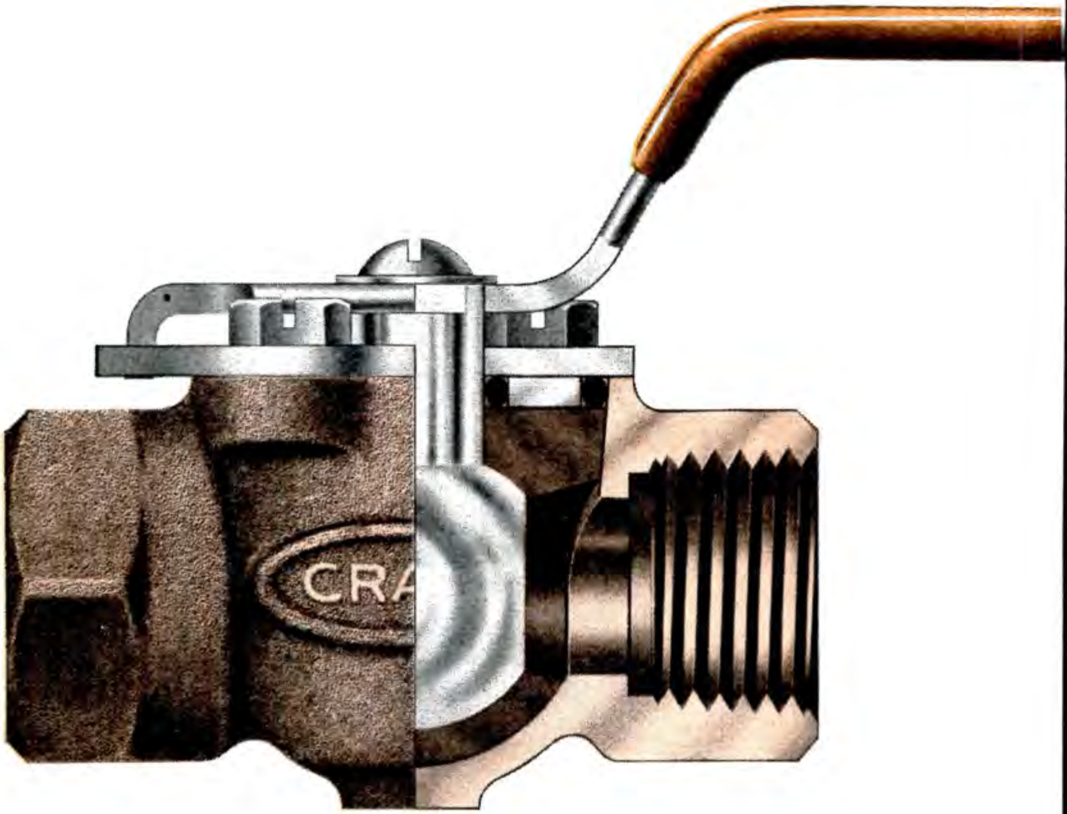

ere's the ball valve you've been waiting for!

Low initial cost. Many economies. Countless uses. These are what the newly developed Crane "Gem" Bronze Ball Valves offer you.

The "Gem"* has innumerable service applications: water, oil, gas, air, steam, etc. In addition to its domestic uses, it will handle a wide range of fluids in the process industries. It also has many applications in the O.E.M. market.

Note the ball. It's enclosed in Buna-N for long wear and positive protection.

You can replace the entire capsule almost as easily as a light bulb. Simply remove the two bonnet screws and lift up on the handle. No wrench needed. And the valve body stays in the line.

Just give the lever handle a ¼ turn to open or close the valve. The fluid flows straight through (no pockets!). The valve has only ten parts, and the only part that moves is the ball itself.

The screwed-end valve pictured above is No. 2180. Also available with solder-joint ends—No. 2182. Both come in ½" and ¾" sizes.

Pressure and temperature ratings for these valves are 200 p.s.i., cold water (non-shock); 150 p.s.i., water (non-shock) at 200°F max.; 15 p.s.i., saturated steam.

For specific rating and application details, contact your Crane distributor. Or write to Crane Co., Dept. AR, Industrial Products Group, 4100 So. Kedzie Ave., Chicago 32, Illinois.

*Pat. Pend.

CRANE

VALVES • PIPING • PUMPS • ELECTRONIC CONTROLS • FITTINGS
PLUMBING • HEATING • AIR CONDITIONING • WATER TREATMENT

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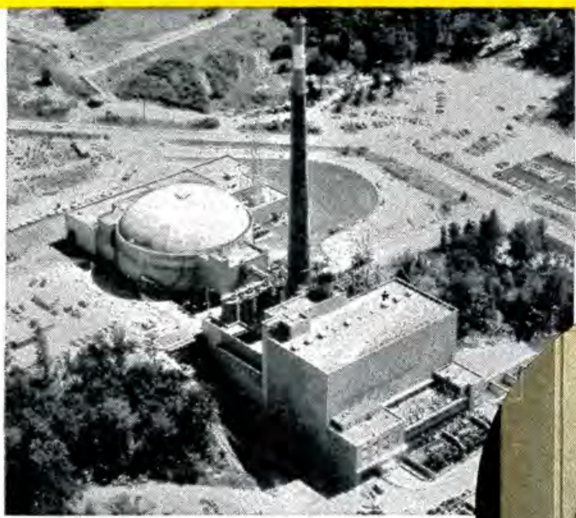
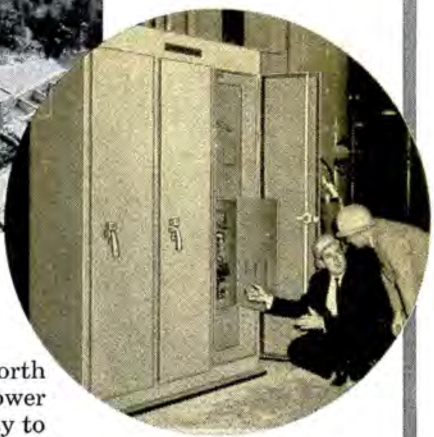
electricity is distributed and controlled





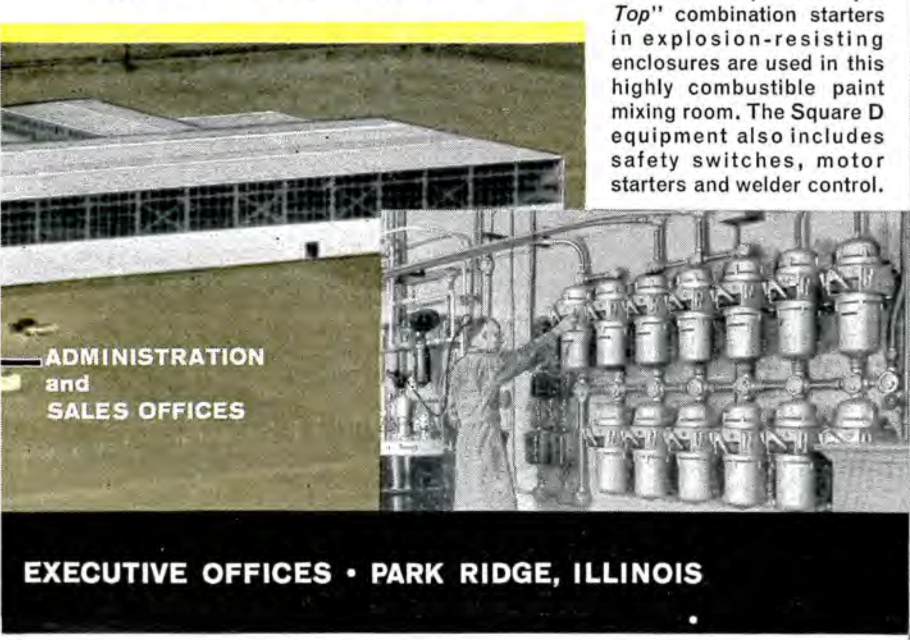
76 Control Centers serve Con Edison's Atomic Plant

Built on the Hudson River 35 miles north of Times Square, this new atomic power plant supplies 275,000 KW of electricity to New York City and Westchester.

The atomic reactor, located in a 160-foot-diameter steel sphere within a concrete containment shield, is fueled with thorium and uranium oxide. New equipment designs and safety techniques are used throughout in a pioneering step by Con Edison to help make atomic energy a practical, economical source of electric power. ***All 76 of the motor control centers used in the reactor sphere and the generating plant were supplied by Square D.***

These Square D control centers operate various auxiliary pump motors. Others control heating and ventilating equipment, battery-charging motors, fuel oil controls, steam valves.

BELOW • Square D "*Spin Top*" combination starters in explosion-resisting enclosures are used in this highly combustible paint mixing room. The Square D equipment also includes safety switches, motor starters and welder control.



A *Complete* LINE
OF ELECTRICAL DISTRIBUTION AND CONTROL EQUIPMENT

ADJUSTABLE SPEED DRIVES
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LIFTING MAGNETS
LIGHTING AND POWER PANELBOARDS
LIMIT AND FOOT SWITCHES
MACHINE TOOL CONTROL
MAGNETIC BRAKES
METERING EQUIPMENT
MOTOR STARTERS
PRESS CONTROL
PRESSURE, FLOAT, & VACUUM SWITCHES
PUSHBUTTONS
RELAYS AND CONTACTORS
RESISTORS
SAFETY SWITCHES
SERVICE ENTRANCE EQUIPMENT
STAGE DIMMERBOARDS
STATIC CONTROL
STEEL MILL CONTROL
SWITCHGEAR & UNIT SUBSTATIONS
SYNCHRONOUS MOTOR CONTROL
TERMINAL BLOCKS
TEXTILE MACHINE CONTROL
TIMERS
UNDERFLOOR DUCT
VOLTAGE TESTERS
WELDER CONTROL

For more data, circle 68 on Inquiry Card

Philadelphia Hospitality Center, owned and operated by the Philadelphia Convention and Visitors Bureau. Architect: Harbeson-Hough-Livingston & Larson. General Contractor: John McShain, Inc. Curtain Wall Contractor: J. G. Leise Metal Works, Inc.

The spirit of Philadelphia's urban renewal ...framed in Nickel Stainless Steel

A bright showplace not far from Independence Hall, Philadelphia's new Hospitality Center helps express this city's dynamic and tasteful approach to urban renewal.

A refreshing, round design, the building beckons to visitors through tall glass curtain walls in slender frames of Type 302 Nickel Stainless Steel. These frames will clean readily, need less maintenance than any other architectural metal, and look good as new for the life of the building.

Competitive in cost with less durable metals, Nickel Stainless Steel window frames are being produced by new roll-forming techniques. Initial costs are down, so the economy is immediate—and the value long-lasting.

If you're trying to reconcile costs with esthetics—in urban renewal or other construction—perhaps you'll find the solution in Nickel Stainless Steel. There's helpful information on this handsome, durable material in the new 24-page booklet *Architect's Guide to Nickel Stainless Steel Flashings*. A copy is yours for the asking.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

MAKES STAINLESS STEEL PERFORM BETTER LONGER

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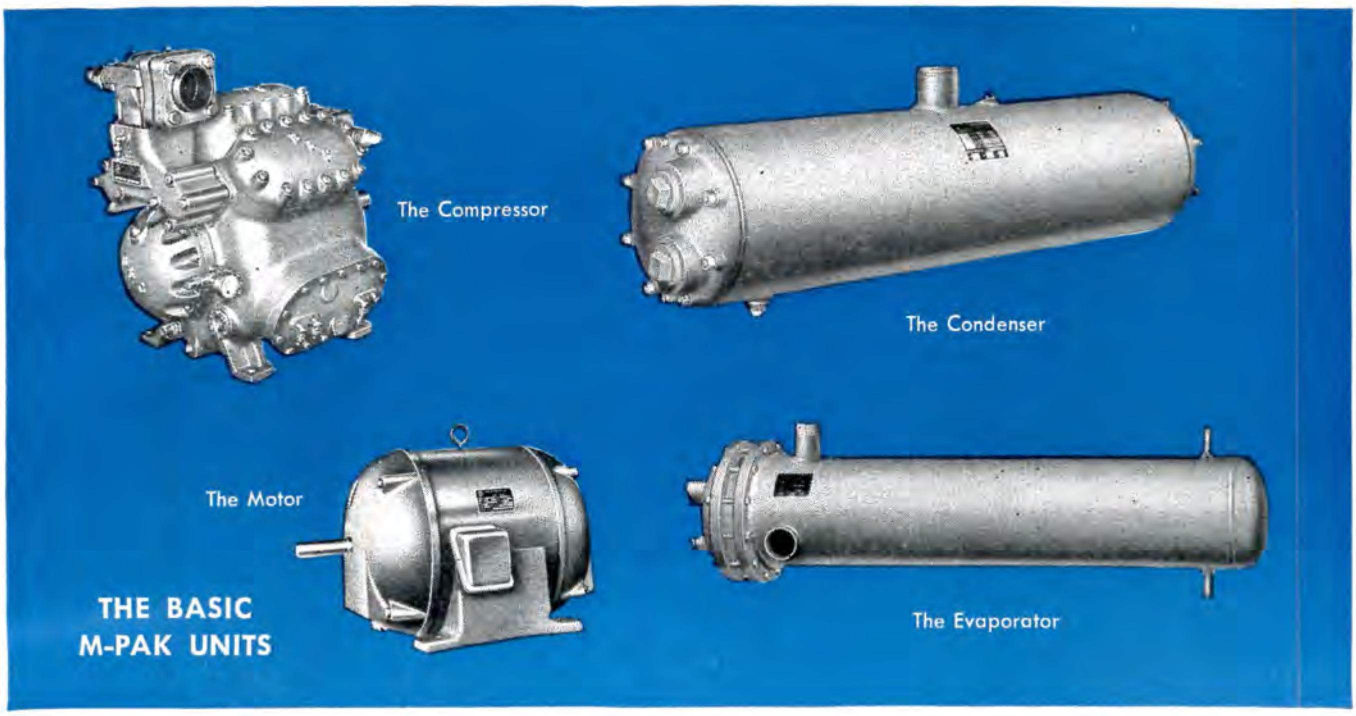
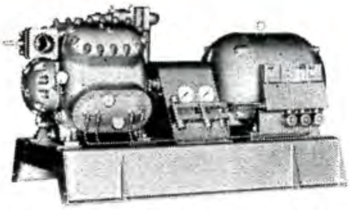
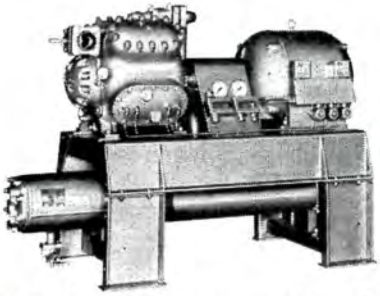
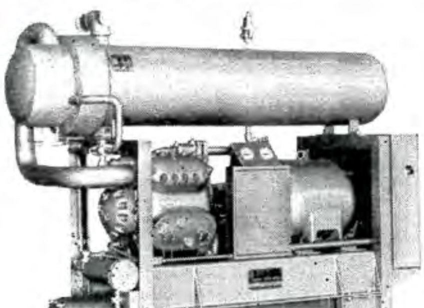




1 B&G Compressor plus B&G Motor becomes a B&G Motor Compressor



2 B&G Motor Compressor plus a B&G Condenser and base becomes a B&G Condensing Unit



3 B&G Condensing Unit plus a B&G Evaporator and Control System becomes a B&G Package Liquid Cooler

M-PAK

MODULAR PACKAGES

INCREASE AVAILABILITY . . . SPEED-UP DELIVERY . . . SIMPLIFY INSTALLATION

With four basic units in five sizes, B&G M-Pak Modular Packages enable you to satisfy air conditioning or refrigeration requirements from 7½ to 150 tons.

The basic units...motors, compressors, evaporators and condensers...are held in factory stock, ready for shipment in any combination desired. The ways in which these units can be assembled are illustrated at left...from a motor compressor to a complete package liquid cooler.

M-Pak units are top quality throughout—built to uncompromising B&G standards. Evaporators and condensers meet A.S.M.E. Code requirements and offer numerous plus values in efficiency and rugged construction.They are manufactured by methods which hold shell diameters exact and free of distortion. This permits tight fitting baffles with minimum liquid slippage, greater efficiency and easy replacement of tube bundles if ever necessary.

All major components of M-Pak units are designed, manufactured and guaranteed by B&G...*one* responsibility for the entire package.

Send today for complete engineering and selection data on Bell & Gossett M-Pak refrigeration and air conditioning units.

BELL & GOSSETT
C O M P A N Y
Dept. HH-32, Morton Grove, Illinois

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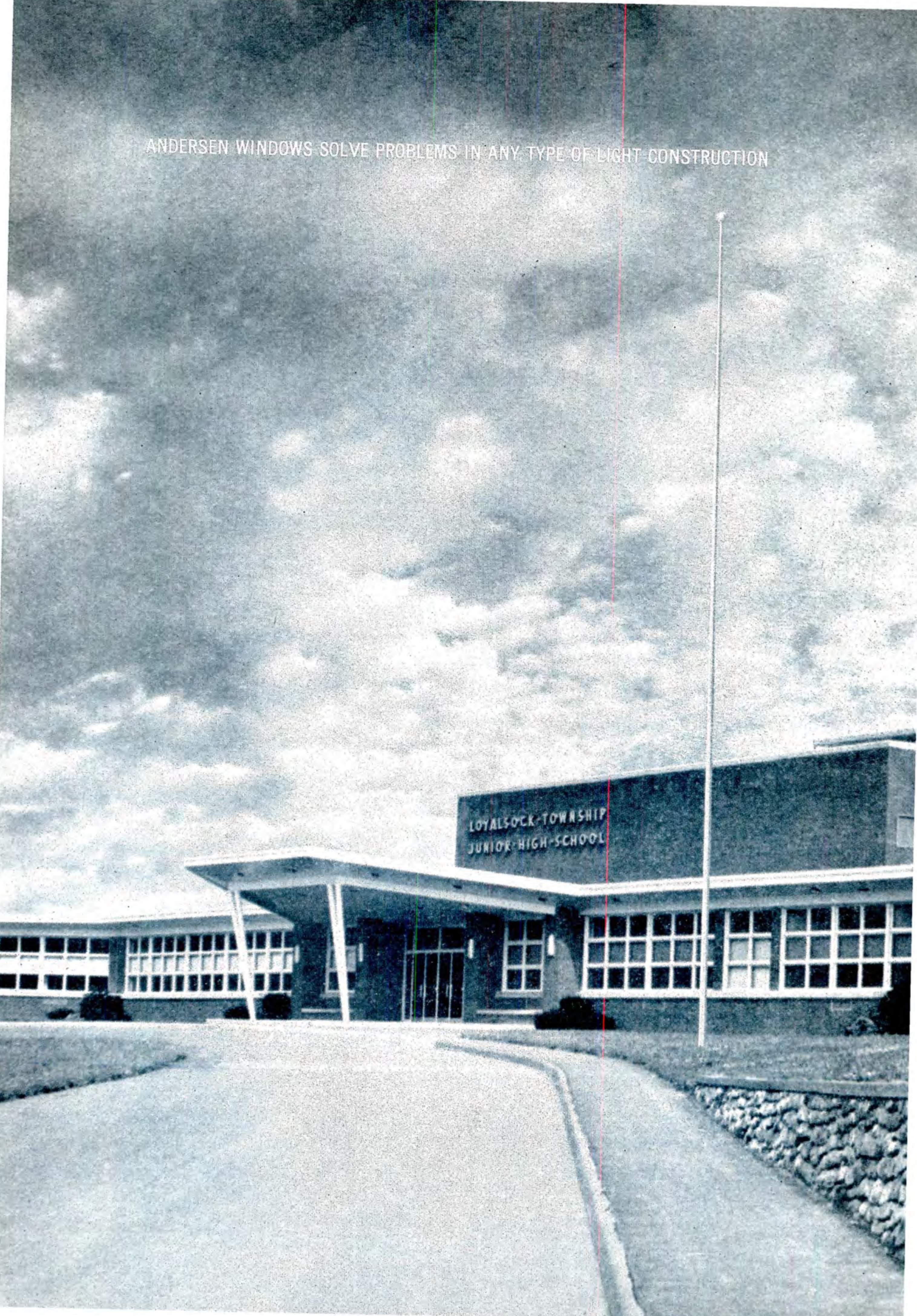
ANDERSEN WINDOWS SOLVE PROBLEMS IN ANY TYPE OF LIGHT CONSTRUCTION
LOYALSOCK TOWNSHIP
JUNIOR HIGH SCHOOL

Loyalsock Township Junior High School
Williamsport, Pennsylvania
Architect: John Boodon

Ribbons of windows develop exterior character for this new school

Architect John Boodon specified Andersen Flexivents® for adequate glass area, ease of ventilation, effective insulation

Extensive bands of Andersen Flexivents help Loyalsock Township Junior High School in Williamsport, Pennsylvania function as an efficient, versatile educational plant.

These Flexivents are stacked three high to provide all the natural illumination desired. They open to almost 90°—quickly and easily—to bring in desired ventilation, even in a rain storm.

On cold days Andersen Flexivents save on heating bills. They have the natural insulating qualities of wood—*plus* weathertightness that is 5 times industry standards. With the amount of glass area in a school this size, fuel savings can be substantial—more than enough to take care of maintenance.

Andersen Windows are available in seven different basic types: Casement, Glider, Pressure Seal, Beauty-Line, Strutwall*, Basement and Flexivent. And each of these types comes in sizes to suit any building need.

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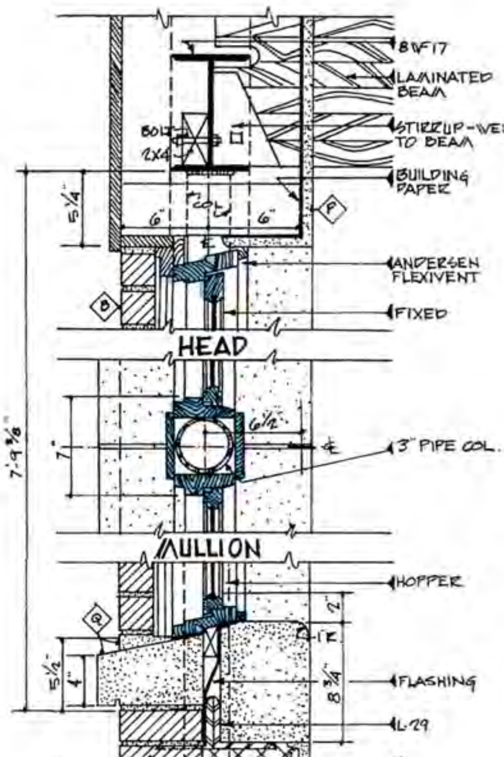
America's most wanted windows



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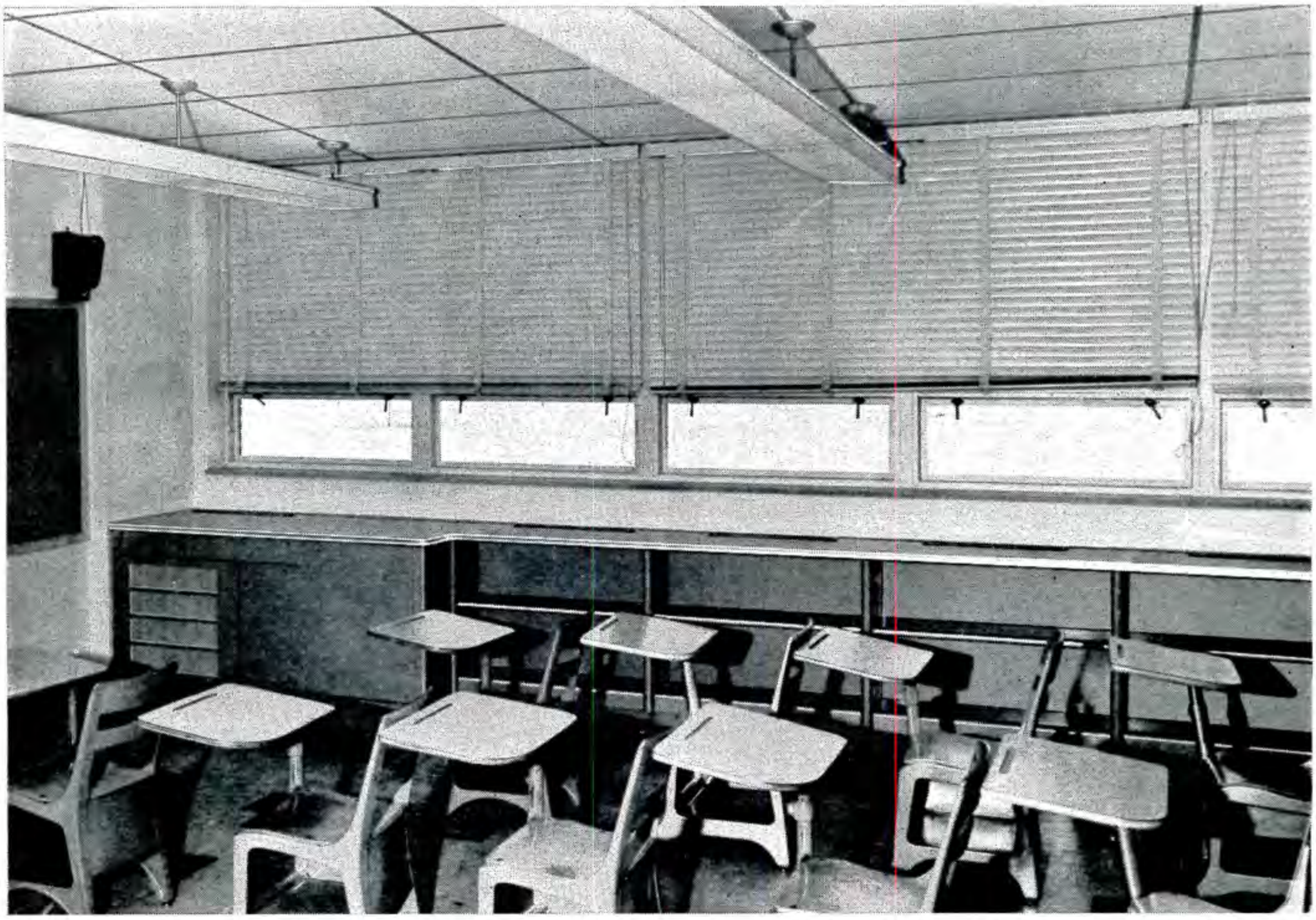
LOO.. ... _OTH LOW CO_TS

when planning heating & ventilating for a new school or addition



Herbert Hoover Elementary School, Lawton, Okla. ■ *Architects: Noftsger-Lawrence & Assoc., Oklahoma City, Okla.* ■ *Building Gross Area: 24,093 sq. ft.* ■ *Total Heating & Ventilating Cost $22,500 Completely Installed.*

Heating & Ventilating Cost
93¢ sq. ft.

Average Monthly Fuel Bill
$41.87

$2.99 PER CLASSROOM INCLUDING COOKING, HOT WATER

Here is another example of the DOUBLE SAVINGS with Norman Schoolroom Heating, Ventilating and Air Conditioning Systems.

The Herbert Hoover Elementary School total heating and ventilating cost was only 93¢ per square foot, with an individual Norman Schoolroom System installed in each of the 14 standard classrooms.

But the low first cost isn't the only savings with Norman Classroom Packages!

The average monthly fuel bill for the Herbert Hoover School from October through May was only $41.87 — *and this included gas for cooking and hot water.*

Norman Systems are installed in thousands or classrooms. Here is proof of Norman's double savings.

Write today for new descriptive folder illustrating typical Norman school installations and operating costs.

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Unique New Russwin Construction Key* System offers quick, easy way to insure building security!

No lock cylinders to change! Simply turn a key to introduce permanent key system

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John Quincy Adams High School, Tampa, Florida. Architect: Mark Hampton. Engineer: J. C. Russello

only monolithic reinforced concrete gives you these important design advantages

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HAVE YOU INVESTIGATED THE ECONOMIES OF NATURAL GAS POWERED HEAT PUMP AIR CONDITIONING?

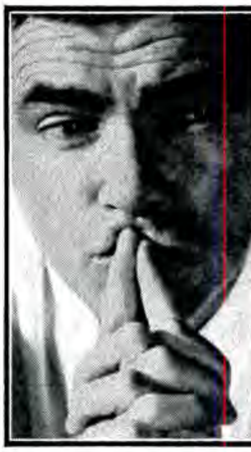
The proven efficiency and economy of this relatively new idea in air conditioning are still not widely known. But wherever a gas engine driven heat pump system has been used, the results have been significant. However, a number of basic questions remain:

What does this mean in actual dollar savings?

It translates into substantial savings for your customers. Based on an electric power rate of 1½ cents per KW and a gas rate of 6 cents per therm, the total estimated operating cost of the heat pump—including maintenance of the natural gas engines—is only 41 cents per million BTU compared to an estimated 99 cents for electrically driven. Better than a 50% saving.

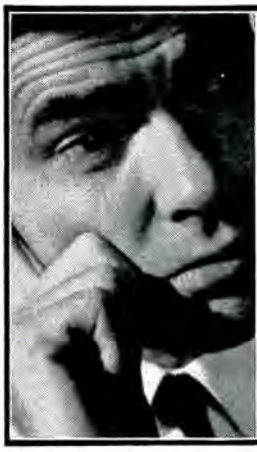
Where can this type of system be used?

In almost any area of the country where low-cost natural gas is plentiful and where either an appropriate supply of water is available, or in milder climates, where air can be efficiently used as a source of heat.



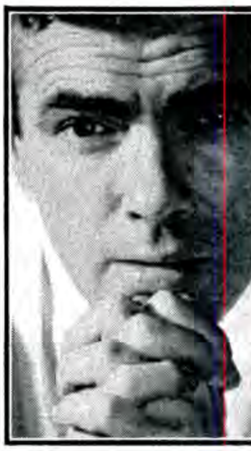
What about the cooling phase?

It's more efficient than the heating cycle as far as the compressor is concerned, since condenser water temperature is much lower in the summer. Horsepower output per ton at full load is less than one.



What is the heat pump's principal advantage?

A Caterpillar Natural Gas Engine powered heat pump will operate at a lower cost than any other air conditioning system.



Is initial cost prohibitive?

Just the opposite. The initial cost of a heat pump is low because it provides 12-months-a-year comfort, requires no supplementary equipment. The steam boiler, for example, would require a completely independent air conditioning system.

Just how efficient are these systems?

A graphic example of the heat pump's operating economy is contained in this engineering report on a water-to-water type system in a midwestern department store: *This natural gas engine driven heat pump will deliver 2.20 times the amount of useful heat produced by a steam boiler for the equivalent amount of fuel. And it will deliver 1.38 times the heat output of a comparable electrically driven system.*

What kind of buildings are heat pumps designed for?

Just about any kind of building which a conventional system will heat and cool . . . department stores, shopping centers, office buildings, manufacturing plants, hospitals and institutions.

If you have a project in the 100- to 1000-ton range, now is the time to investigate the advantages of a heat pump cooling and heating system powered by Caterpillar Natural Gas Engines. It could be the first in a long string of similar installations. Write for a copy of "Natural Gas Engine for Air Conditioning and Heat Pumps" or see your Caterpillar Dealer.

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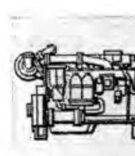

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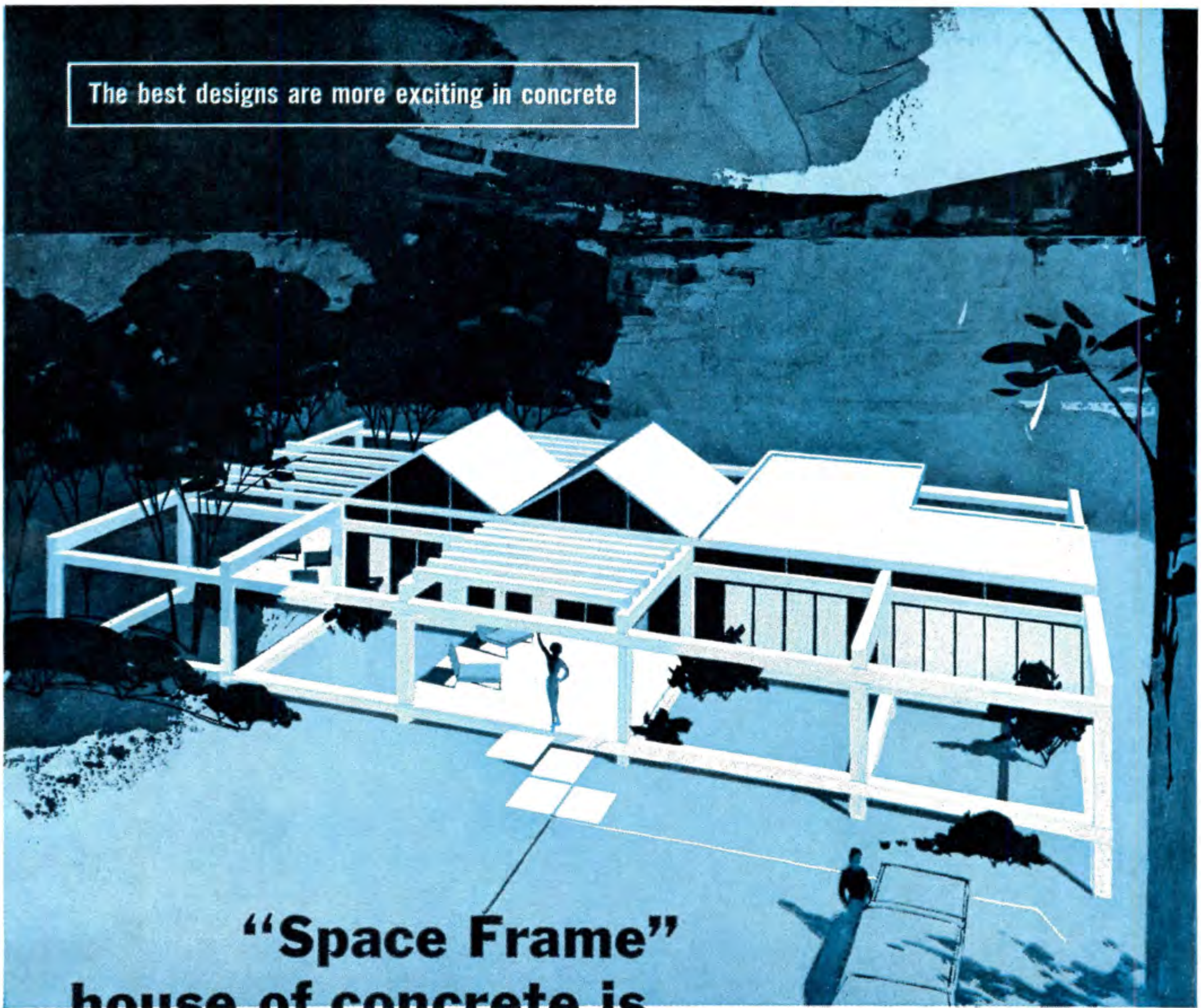

"Space Frame" house of concrete is assembled in 4 days from precast units

Award-winning house from Concrete Industries 1961 Horizon Homes Program. Architect: Robert Damora, Bedford Village, N.Y.

Out of the 1961 Horizon Homes Program comes this imaginative new design. The "Space Frame" house is all concrete. It is based on 16- x 16-foot modules that can be individually roofed, walled and floored. Only 6 standard sizes of precast concrete beams and panels are used.

Scores of floor plans are possible, with complete flexibility of living space. Modules can be grouped in any number, and in any arrangement of rooms, courts, terraces and gardens.

Each house can be distinctive, yet the ready-made concrete components permit fast construction schedules along with moderate over-all costs. Today, concrete offers architects unlimited opportunities for new concepts in home design. **Plan to enter the Concrete Industries Horizon Homes Program.**

Broad entrance terrace, formed by one of the basic "Space Frame" units. Floor is of 2' x 16' precast concrete panels.

PORTLAND CEMENT ASSOCIATION *A national organization to improve and extend the uses of concrete*

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gives distinctive, "custom-look" to

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Want your entrance doors to have a real "custom-look" without a custom price? Then specify Cupples "40 LINE" of stock entrance doors with this smart-looking, new hardware. While the special Duranodic hardcoat finish in medium black costs a few cents more, you can get the same beautiful styling in Alumilite natural finish without extra cost.

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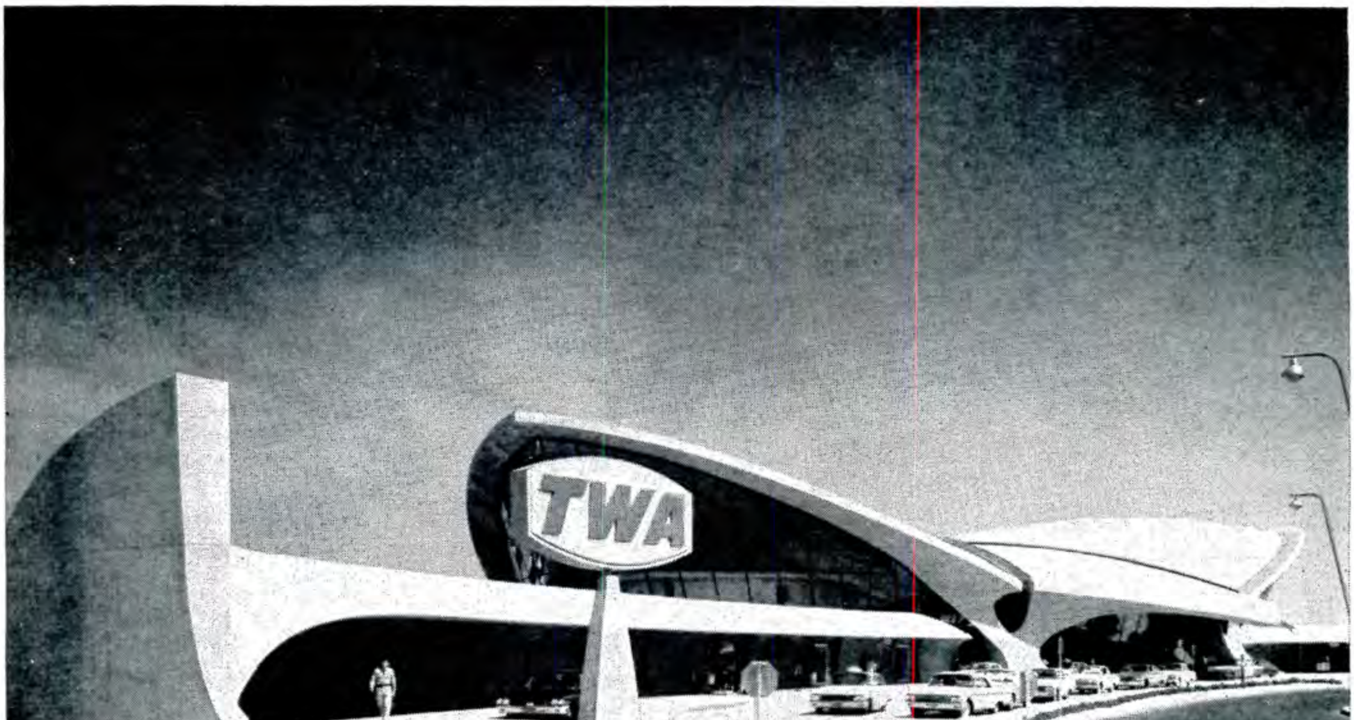
Selected for the
Trans World Flight Center at Idlewild

Ruberoid/Matico Vinyl Asbestos Floor Tile



The TWA Trans World Flight Center at New York International Airport.

Beautiful—and functional! This superb new airline terminal at Idlewild dynamically expresses the drama and efficiency of air travel. For the many work areas in the terminal where the style and performance characteristics of vinyl asbestos floor tile were required, Ruberoid/Matico was selected ■ The new improved Ruberoid/Matico line in vinyl asbestos is the most complete available. All the popular colors and styles, a total of 57, are included. We urge you to review this unexcelled line for all your vinyl asbestos requirements. Our architectural representative will be glad to serve you.

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THE FUTURE OF THE CITY

By LEWIS MUMFORD

PART I

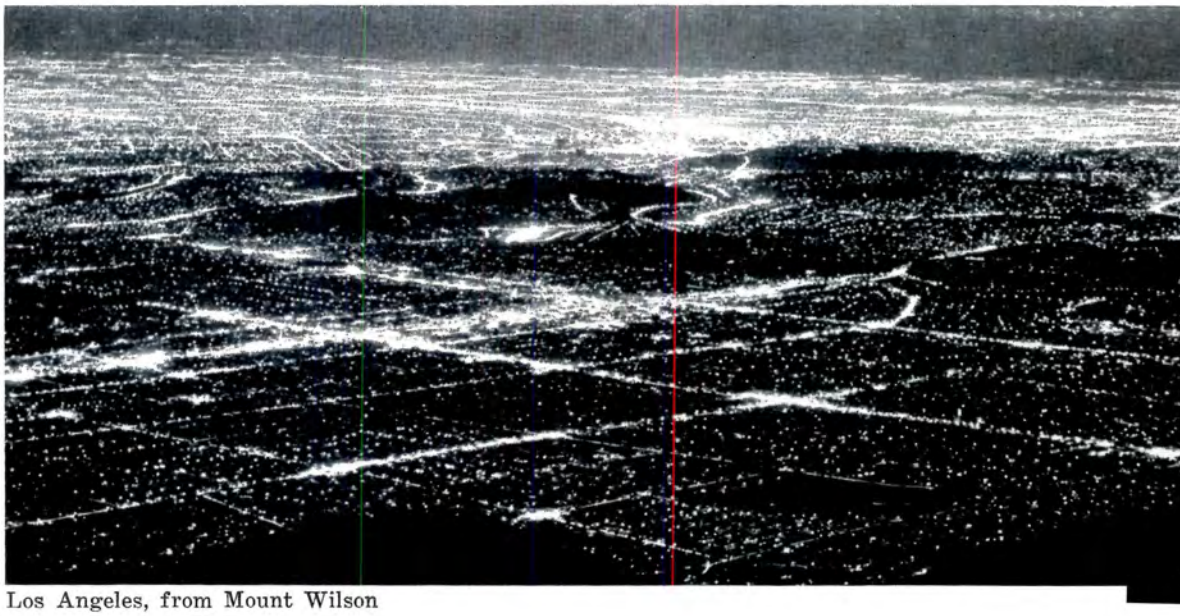
No one in our time has considered the city as seriously, as continuously, and as penetratingly as has Lewis Mumford. ARCHITECTURAL RECORD *is pleased to publish this series of articles in which Mr. Mumford will cap his great series of books on the city with some positive suggestions for architects and planners. First, he exposes the faulty thinking that has produced the "miscarriage of the city"; he goes on to show what is needed to "effect a synthesis . . . of the physical, biological, social, cultural and personal components."*

1. THE DISAPPEARING CITY

Nobody can be satisfied with the form of the city today. Neither as a working mechanism, as a social medium, nor as a work of art does the city fulfill the high hopes that modern civilization has called forth—or even meet our reasonable demands. Yet the mechanical processes of fabricating urban structures have never before been carried to a higher point: the energies even a small city now commands would have roused the envy of an Egyptian Pharaoh in the Pyramid Age. And there are moments in approaching New York, Philadelphia or San Francisco by car when, if the light is right and the distant masses of the buildings are sufficiently far away, a new form of urban splendor, more dazzling than that of Venice or Florence, seems to have been achieved.

Too soon one realizes that the city as a whole, when one approaches it closer, does not have more than a residue of this promised form in an occasional patch of good building. For the rest, the play of light and shade, of haze and color, has provided for the mobile eye a pleasure that will not bear closer architectural investigation. The illusion fades in the presence of the car-choked street, the blank glassy buildings, the glare of competitive architec-

New York City, Lower Manhattan *Ewing Galloway*



Los Angeles, from Mount Wilson

Venice, by J. M. W. Turner *The Bettmann Archive*

"There are moments, in approaching [our cities] by car when, if the light is right and the distant masses of buildings are sufficiently far away, a new form of urban splendor, more dazzling than that of Venice or Florence, seems to have been achieved."

Ewing Galloway

The Bettmann Archive

Florence

tural advertisements, the studied monotony of high-rise slabs in urban renewal projects: in short, new buildings and new quarters that lack any esthetic identity and any human appeal except that of superficial sanitary decency and bare mechanical order.

In all the big cities of America, the process of urban rebuilding is now proceeding at a rapid rate, as a result of putting both the financial and legal powers of the state at the service of the private investor and builder. But both architecturally and socially the resulting forms have been so devoid of character and individuality that the most sordid quarters, if they have been enriched over the years by human intercourse and human choice, suddenly seem precious even in their ugliness, even in their disorder.

Whatever people made of their cities in the past, they expressed a visible unity that bound together, in ever more complex form, the cumulative life of the community; the face and form of the city still recorded that which was desirable, memorable, admirable. Today a rigid mechanical order takes the place of social diversity, and endless assembly-line urban units automatically expand the physical structure of the city while destroying the contents and meaning of city life. The paradox of this period of rapid "urbanization" is that the city itself is being effaced. Minds still operating under an obsolete 19th century ideology of unremitting physical expansion oddly hail this outcome as "progress."

The time has come to reconsider the whole process of urban design. We must ask ourselves what changes are necessary if the city is again to become architecturally expressive, and economically workable, without our having to sacrifice its proper life to the mechanical means for keeping that life going. The architect's problem is again to make the city visually "imageable"—to use Kevin Lynch's term. Admittedly neither the architect nor the planner can produce, solely out of his professional skill, the conditions necessary for building and rebuilding adequate urban communities; but their own conscious reorientation on these matters is a necessary part of a wider transformation in which many other groups, professions and institutions must in the end participate.

FORMLESS URBANIZATION

The multiplication and expansion of cities which took place in the 19th century in all industrial countries occurred at a moment when the great city builders of the past—the kings and princes, the bishops and the guilds—were all stepping out of the picture; and the traditions that had guided them, instead of being modified and improved, were recklessly discarded by both municipal authorities and business enterprisers.

New York City, Wall Street *Ewing Galloway*

Los Angeles, Broadway *Ewing Galloway*

Venice, The Piazetta, by A. Canaletto *The Bettmann Archive*

If our skylines can bear comparison with those of older and equally famous cities, the street-level view cannot. "Too soon one realizes that the city as a whole does not have more than a residue of this promised form in an occasional patch of good building. . . . The illusion fades in the presence of car-choked streets, the glare of competitive architectural advertisements, the studied monotony of high-rise slabs. . . ."

Lazzar Donati, courtesy Spring Books, London

Florence, the Loggia dei Lanzi

Genuine improvements took place indeed in the internal organization of cities during the 19th century: the first substantial improvements since the introduction of drains, piped drinking water, and water closets into the cities and palaces of Sumer, Crete and Rome. But the new organs of sanitation, hygiene and communication had little effect on the visible city, while the improvements of transportation by railroad, elevated railroad and trolley car brought in visual disorder and noise and, in the case of railroad cuts and marshalling yards, disrupted urban space as recklessly as expressways and parking lots do today. In both the underground and the above-ground city, these new gains in mechanical efficiency were mainly formless, apart from occasional by-products like a handsome railroad station or a bridge.

In consequence, the great mass of metropolitan buildings since the 19th century has been disorganized and formless, even when it has professed to be mechanically efficient. Almost until today, dreams of improvement were either cast into archaic, medieval, classic or renascence molds, unchanged except in scale, or into purely industrial terms of mechanical innovations, collective "Crystal Palaces," such as H. G. Wells pictured in his scientific romances, and even Ebenezer Howard first proposed for a garden city shopping mall. In America, despite the City Beautiful movement of the Nineties, urban progress is still identified with high buildings, wide avenues, long vistas: the higher, the wider, the longer, the better.

Current suggestions for further urban improvement still tend to fall automatically into a purely mechanical mold: gouging new expressways into the city, multiplying skyscrapers, providing moving sidewalks, building garages and underground shelters, projecting linear Roadtowns, or covering the entire area with a metal and plastic dome to make possible total control of urban weather—on the glib theory that uniform conditions are "ideal" ones. So long as the main human functions and purposes of the city are ignored, these subsidiary processes tend to dominate the architect's imagination. All the more because the resulting fragments of urbanoid tissue can be produced anywhere, at a profit, in limitless quantities. We are now witnessing the climax of this process.

The great exception to the routine processes of 19th century urban expansion was the replanning of the center of Paris. Paris became in fact *the* model 19th century city. Here, in a consistent organic development that began under Colbert and was carried to a temporary climax under Baron Haussmann during the Second Empire, a new central structure was created—first in the handsome monumental masonry of the Seine embankment, and then in the great boulevards and new parks. By creating a new outlet for sociability and conversation in the tree-lined promenade and the sidewalk


New York City, Sixth Avenue, ca. 1909 *The Bettmann Archive*


Boston, Fitzgerald Expressway, 1959 *Ewing Galloway*

In the 19th century: ". . . the improvements of transportation by railroad, elevated railroad and trolley car brought in visual disorder and noise and disrupted urban space as recklessly as expressways and parking lots do today." In the 20th century: ". . . suggestions for further urban improvement still tend to fall automatically into a purely mechanical mold, as gouging new expressways into the city . . ."

Ewing Galloway


New York City, Queens, Martha Washington Homes

Levittown, Long Island

Ewing Galloway

New York City, Park Avenue

"What has passed for a fresh image of the city turns out to be two forms of anti-city. One of these is a multiplication of standard, de-individualized high-rise structures. . . . The other is the complementary but opposite image of urban scatter and romantic seclusion often called suburban."

Ewing Galloway

café, accessible even to older quarters that were still dismally congested and hygienically deplorable, the planners of Paris democratized and humanized the otherwise sterile Baroque plan. The beauty and order of this new frame, which at once preserved the complexities of the older neighborhoods and opened up new quarters threaded with broad public greens, attracted millions of visitors to Paris and—what was more important—helped increase the daily satisfaction of its inhabitants.

But while Paris improved its rich historic core, it lost out in form, as badly as London or Berlin, Philadelphia or Chicago, on its spreading periphery. The vitality and individuality that had been heightened by the boulevards, parks and parkways of Paris were dependent upon historic institutions and many-sided activities that the new quarters lacked. Left to themselves, these residential quarters were deserts of pretentious monotony. Today central Paris, too, is being annihilated by the same forces that produce the vast areas of urban nonentity that surround the living core of our own big cities. These forces are choking Paris today as they have choked cities in the United States, as new as Fort Worth and as old as Boston.

Not the weakest of these destructive forces are those that operate under the guise of "up-to-date planning," in extravagant engineering projects, like the new motorway along the Left Bank of the Seine—a self-negating improvement just as futile as the motorways that have deprived Boston and Cambridge of access to their most convenient and potentially most delightful recreation area along the Charles. This new order of planning makes the city more attractive temporarily to motor cars, and infinitely less attractive permanently to human beings. On the suburban outskirts of our cities everywhere in both Europe and America, high-rise apartments impudently counterfeit the urbanity they have actually left behind. Present-day building replaces the complex structure of the city with loose masses of "urbanoid" tissue.

This formless urbanization, which is both dynamic and destructive, has become almost universal. Though it utilizes one kind of structure in metropolitan renewal projects and a slightly different kind in suburbia, the two types have basically the same defect. They have been built by people who lack historical or sociological insight into the nature of the city, considered as anything but the largest number of consumers that can be brought together in the most accessible manufacturing and marketing area.

If this theory were an adequate one, it would be hard to account for the general exodus that has been taking place from the center of big cities for the last generation or more; and even harder to account for the fact that suburbs continue to spread relentlessly around every big metropolis, forming ever-widening belts of population at low residential density per acre, ever further removed from the jobs and cultural opportunities that big cities are by their bigness supposed to make more accessible. In both cases, cities, villages and countryside, once distinct entities with individuality and identity, have become homogenized masses. Therewith one of the main functions of architecture, to symbolize and express the social idea, has disappeared.

THE MISSING URBAN IDEA

During the last generation an immense amount of literature on cities has belatedly appeared, mostly economic and social analysis of a limited kind, dealing with the subsidiary and peripheral aspects of urban life. Most of these studies have been entirely lacking in concrete architectural understanding and historical perspective. Though they emphasize dynamic processes and technological change, they quaintly assume that the very processes of change now under observation are themselves unchanging; that is, that they may be neither retarded, halted nor redirected nor brought within a more complex pattern that would reflect more central human needs and would alter their seeming importance.

For the exponents of aimless dynamism, the only method of controlling the urban processes now visible is to hasten them and widen their province. Those who favor this automatic dynamism treat the resultant confusions and frustrations as the very essence of city life, and cheerfully write off the accompanying increase in nervous tensions, violence, crime and health-depleting sedatives, tranquillizers and atmospheric poisons.

The effect of this literature has been, no doubt, to clarify the economic and technical processes that are actually at work in Western urban society. But that clarification, though it may help the municipal administrator in performing his daily routines and making such plans as can be derived from five-year projections, has so far only served to reinforce and speed up the disruptive processes that are now in operation. From the standpoint of the architect and the city planning, such analysis would be useful only if it were attached to a formative idea of the city; and such an idea of the city is precisely what is lacking.

"Idea" comes from the original Greek term for "image." Current proposals for city improvement are so imageless that city planning schools in America, for the last half-generation, have been turning out mainly administrators, statisticians, economists, traffic experts. For lack of an image of the modern city, contemporary "experts" covertly fall back on already obsolete clichés, such as Le Corbusier's Voisin plan for Paris. Following the humanly functionless plans and the purposeless processes that are now producing total urban disintegration, they emerge, like the sociologist Jean Gottmann, with the abstract concept of "Megalopolis"—the last word in imageless urban amorphousness. And unfortunately, people who have no insight into the purposes of urban life have already begun to talk of this abstraction as the new "form" of the city.

The emptiness and sterility of so much that now goes under the rubric of modern city design is now being widely felt. Hence the interest that has been awakened by books like Jane Jacobs' *The Death and Life of Great American Cities,* with its keen appreciation of some of the more intimate aspects of urban life, and with its contrasting criticism, largely deserved, of radical human deficiencies in the standardized, high-rise, "urban renewal" projects.

But unfortunately Mrs. Jacobs, despite her healthy reaction against bad design, has, to match her phobia about open spaces, an almost pathological aversion to good urban design. In order to avoid officious municipal demolition and regulation, she would return to Victorian *laissez faire*; in order to overcome regimentation, she would invite chaos. Mrs. Jacobs has made a sentimental private utopia out of a very special case—a few streets in a little urban backwater—a special neighborhood of New York that happily retained its historical identity longer than any other area except Brooklyn Heights. In any large sense, she lacks an image of the modern city. Her new model is only the old muddle from which less whimsical planners are belatedly trying to escape.

The fact is that 20th century planning still lacks a fresh multi-dimensional image of the city, partly because we have not discussed and sorted out the true values, functions and purposes of modern culture from many pseudo-values and apparently automatic processes that promise power or profit to those who promote them.

What has passed for a fresh image of the city turns out to be two forms of anti-city. One of these is a multiplication of standard, de-individualized high-rise structures, almost identical in form, whether they enclose offices, factories, administrative headquarters or family apartments, set in the midst of a spaghetti tangle of traffic arteries, expressways, parking lots and garages. The other is the complementary but opposite image of urban scatter and romantic seclusion often called suburban, though it has in fact broken away from such order as the 19th century suburb had actually achieved, and even lacks such formal coherence as Frank Lloyd Wright proposed to give it in his plans for Broadacre City. As an agent of human interaction and cooperation, as a stage for the social drama, the city is rapidly sinking out of sight.

If either the architect or the planner is to do better in the future, he must understand the historical forces that produced the original miscarriage of the city, and the contemporary pressures that have brought about this retreat and revolt.

© Ezra Stoller

1. Office, Manufacturing and Warehouse Building for Yardley of London, Inc., Totowa, New Jersey

NEW WORK, SERENE AND CLASSIC, BY EDWARD DURELL STONE

Stone continues to be fond of certain basic forms: the colonnade, the dome, the screen, the reflecting pool. His latest buildings are gentle reinterpretations of his familiar, elegant, always relevant manner

View from colonnade toward plant

Office, Manufacturing and Warehouse Building, Totowa, New Jersey

OWNER: *Yardley of London, Inc.*

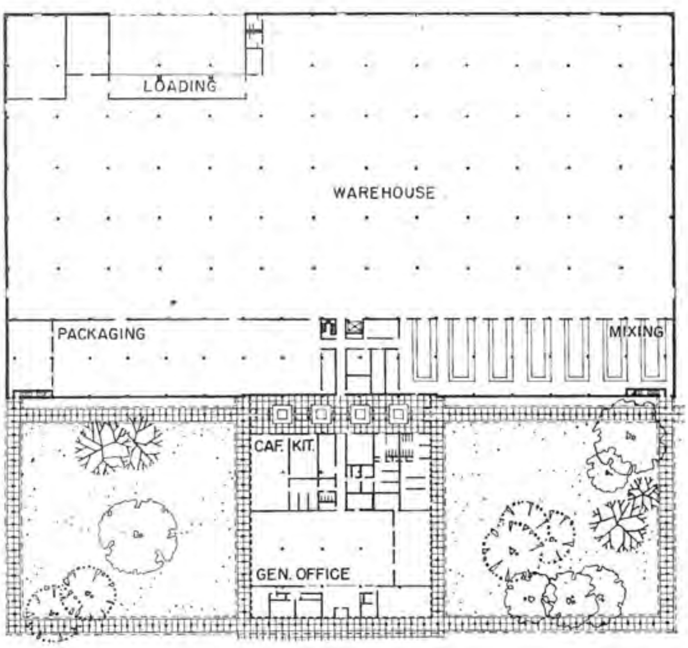
ARCHITECT: *Edward Durell Stone, F.A.I.A.*

CONSULTING AND DESIGN ENGINEERS: *Engineers Incorporated*

LANDSCAPE ARCHITECTS: *Clark and Rapuano*

YARDLEY OF LONDON, INC., PROJECT ENGINEER: *Herbert R. Pinepuks*

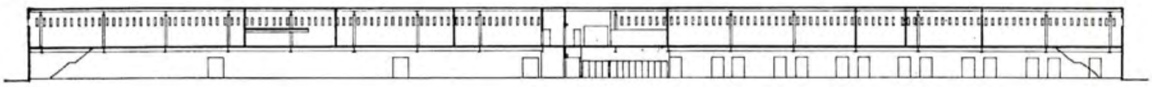
GENERAL CONTRACTOR: *Fred J. Brotherton, Inc.*



Cosmetic manufacturers, in the interest of spurring mankind in its quest for beauty, lean heavily upon "eye appeal" in the way they package, display and advertise their products. It is quite a leap from this level of sensibility to thoughts of beauty in architecture, but Yardley has managed it. More significant than this is the choice of Stone as architect. Who better than he can create a discreet and graceful pavilion where aids to charm and beauty are mysteriously prepared?

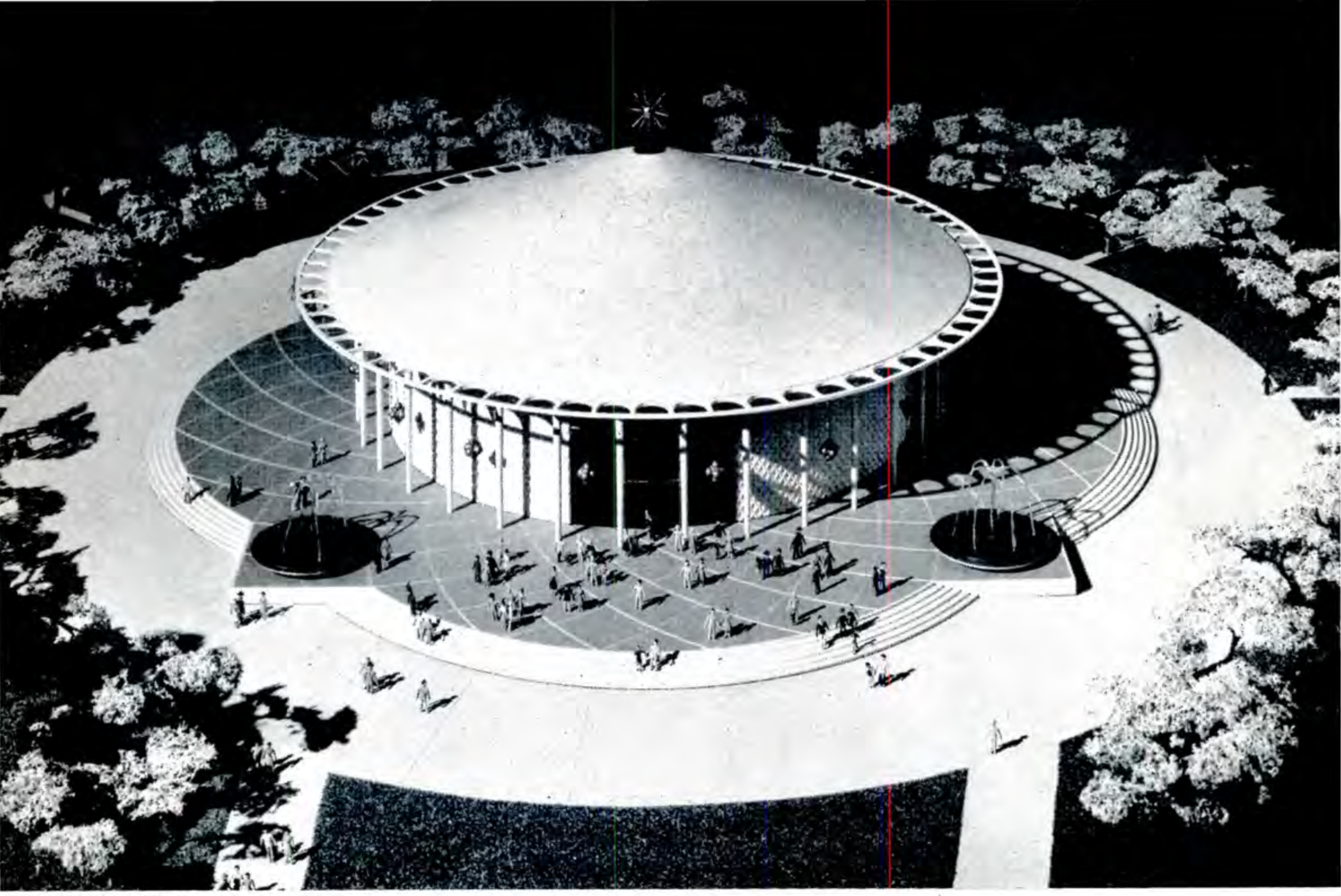
"Be thankful that factories are no longer tied into railroads; now they can have a country club air," says Stone. The Yardley building, served by trucks, is constructed on a generous site in a suburban setting. It presented a design problem for which Stone's classic, symmetrical scheme is a good solution. The large warehouse element (see plan) holds all the raw scents, chemicals and soaps which arrive from England in sacks and drums. From here they are moved to the mixing and packaging area, an operation which makes use of the forces of gravity in the transfer of materials, and requires a two-story structure. Since the administrative space required was no more than that needed by a branch office, it is a relatively small area. Stone has handled the two-story element as an impressive façade as wide as the warehouse, and has kept the office element as a low entrance wing tied to the warehouse by an elegant brick colonnade. The building is a structural steel frame covered with white brick veneer.

In Stone's new book *The Evolution of an Architect,* to be published in November of this year, he makes a point of saying that the Yardley plant "is a manifestation of the trend of corporations to recognize the value of good architecture and its influence on the morale and pride of personnel, and the prestige that architecture can give to a business enterprise. That businessmen are becoming aware of this prestige is demonstrated by the recent buildings in New York where plazas and gardens have created community amenities at great expense. Apparently the belief that 'good architecture is good business' is gaining ground."



© Ezra Stoller

Gallery separating the administration building from the plant. Foliage will become more luxuriant



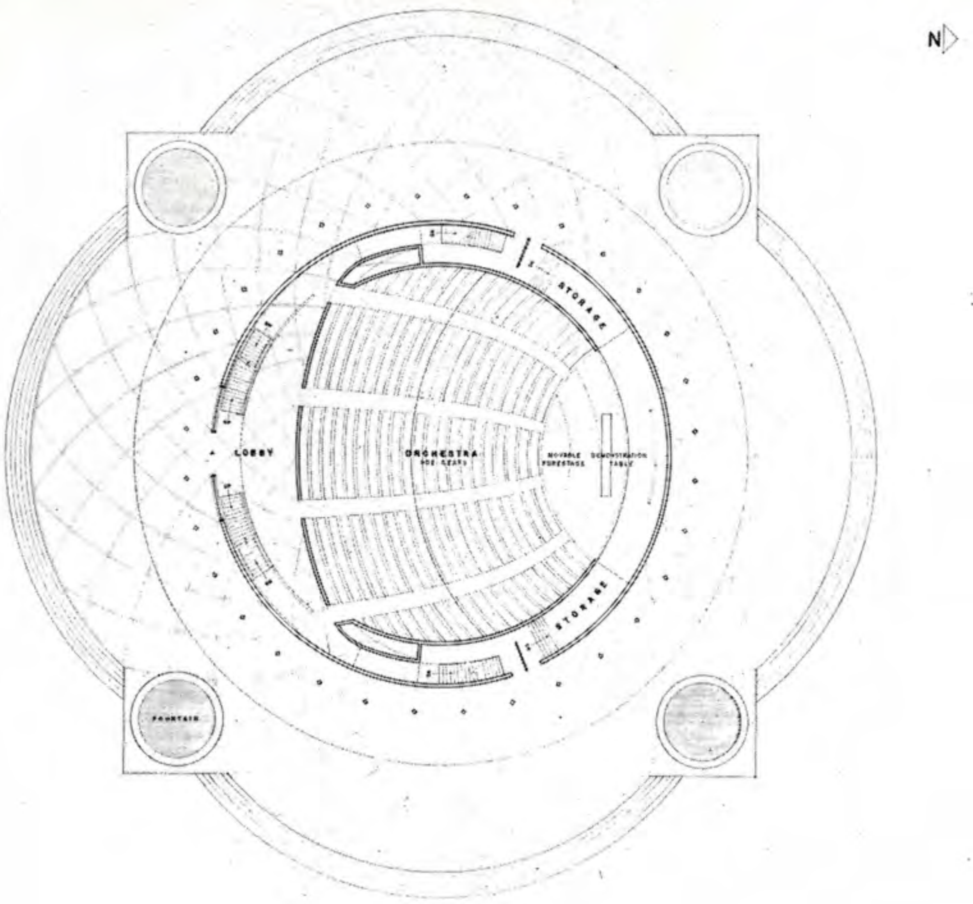
Louis Checkman

Edward Durell Stone

2. Beckman Auditorium, California Institute of Technology, Pasadena, California

A part of a new campus which is being planned adjacent to the Bertram Goodhue buildings at Cal Tech, this new auditorium will be located at the intersection of two major axes and can be approached from all sides. Stone feels that a circular design, lacking a front or back or sides, is the best expression of the principle of multiple access. In the ultimate plan for the new campus, certain streets adjacent to the auditorium structure will disappear or become pedestrian malls cutting across great lawns, auto access will be limited and general parking will be elsewhere. Stone was once quoted as saying: "Theoretically, idealistically, a college campus is a place for some repose and meditation, so transparently every student shouldn't come to school with an automobile and leave it parked in front of the library. . . . So when you think of the general idea of a college campus today . . . the first thing to do is get the automobile out of it and get all the parking around the periphery and then again you would have a traditional atmosphere, conducive to learning rather than dodging taxis."

The building, designed to be adaptable for the numerous uses to which multi-purpose college auditoriums are put, will seat 1,000 and be used primarily for lectures, but also for concerts and simple student theatricals.


N
LOBBY
ORCHESTRA
MOVABLE FORESTAGE
DEMONSTRATION TABLE
STORAGE
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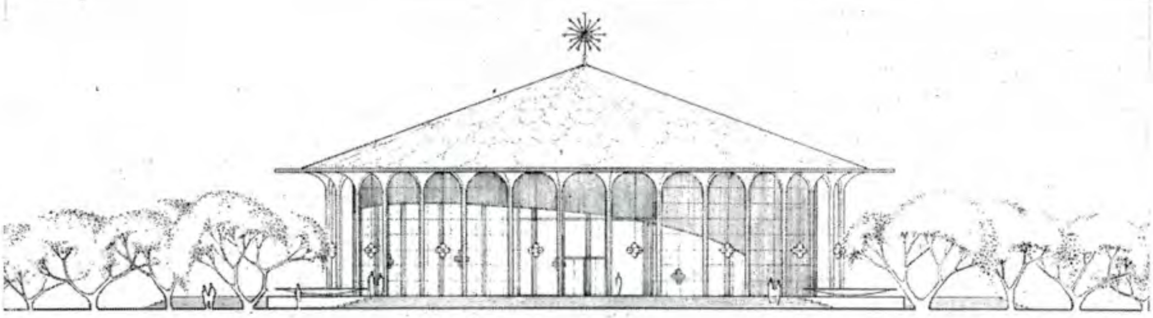
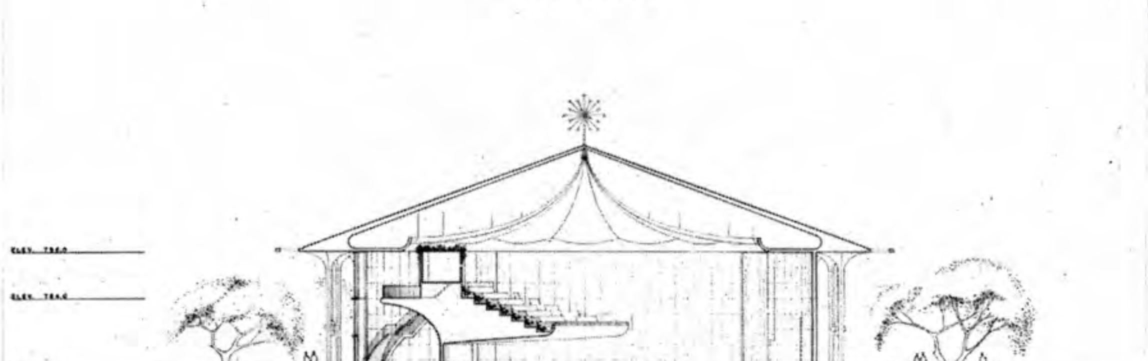
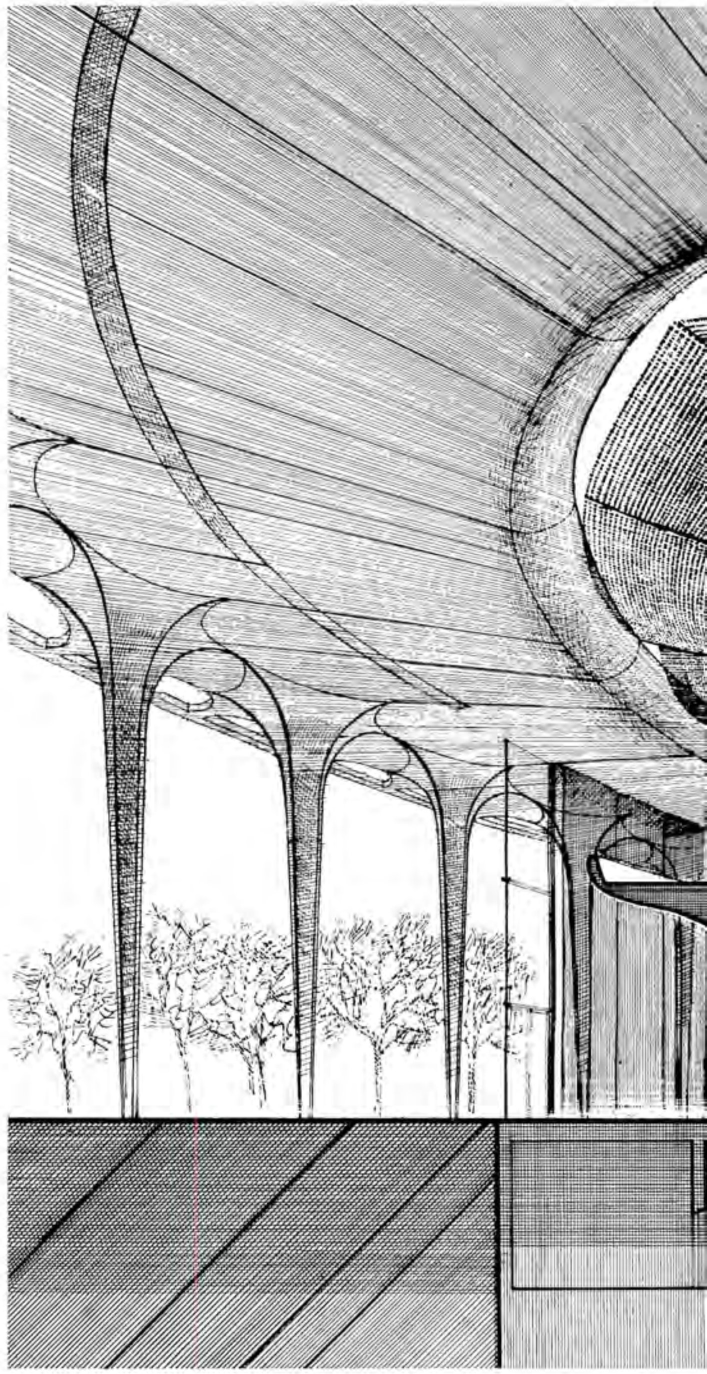
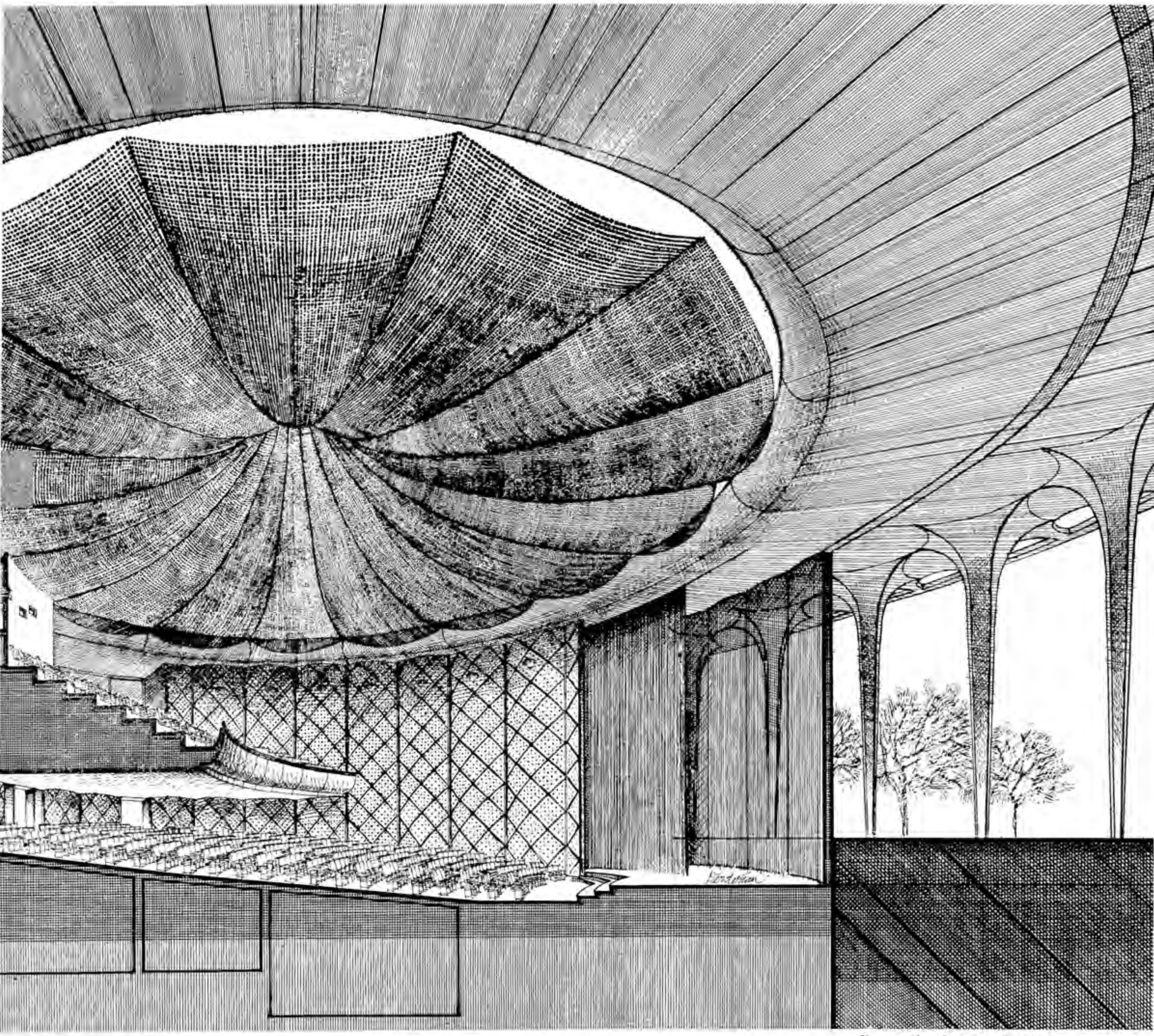


ELEVATION

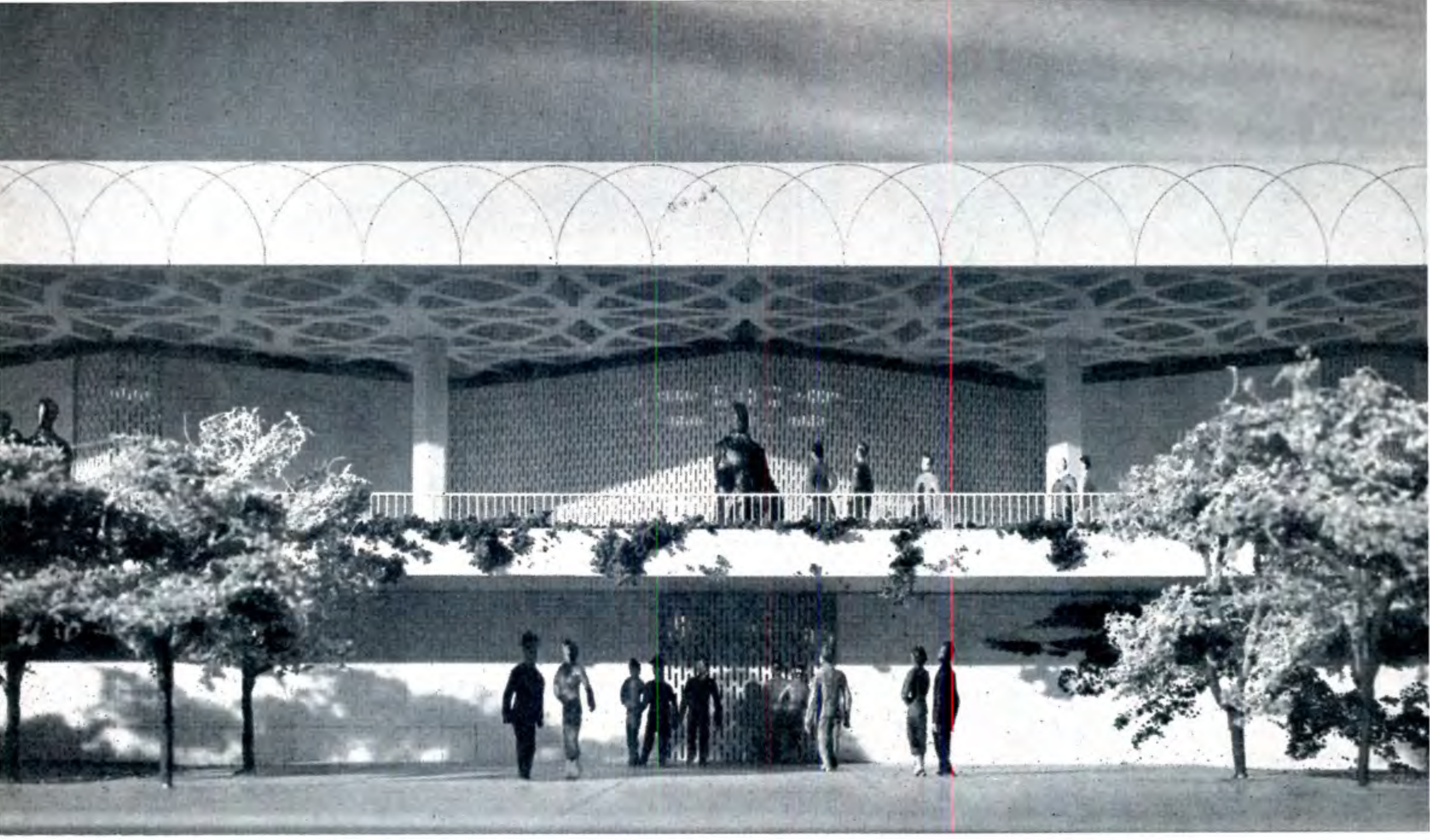




Diagrammatic interior perspective shows acoustically treated walls and suspended gold mesh "coat of mail" ceiling. Similar to the mesh ceiling which Stone found effective in the theater of the Brussels Pavilion, this one will function, he believes, "like a large scale acoustic tile." The cone shape above it will be illuminated by fixtures concealed in the broad circular light cove and will reflect light downward



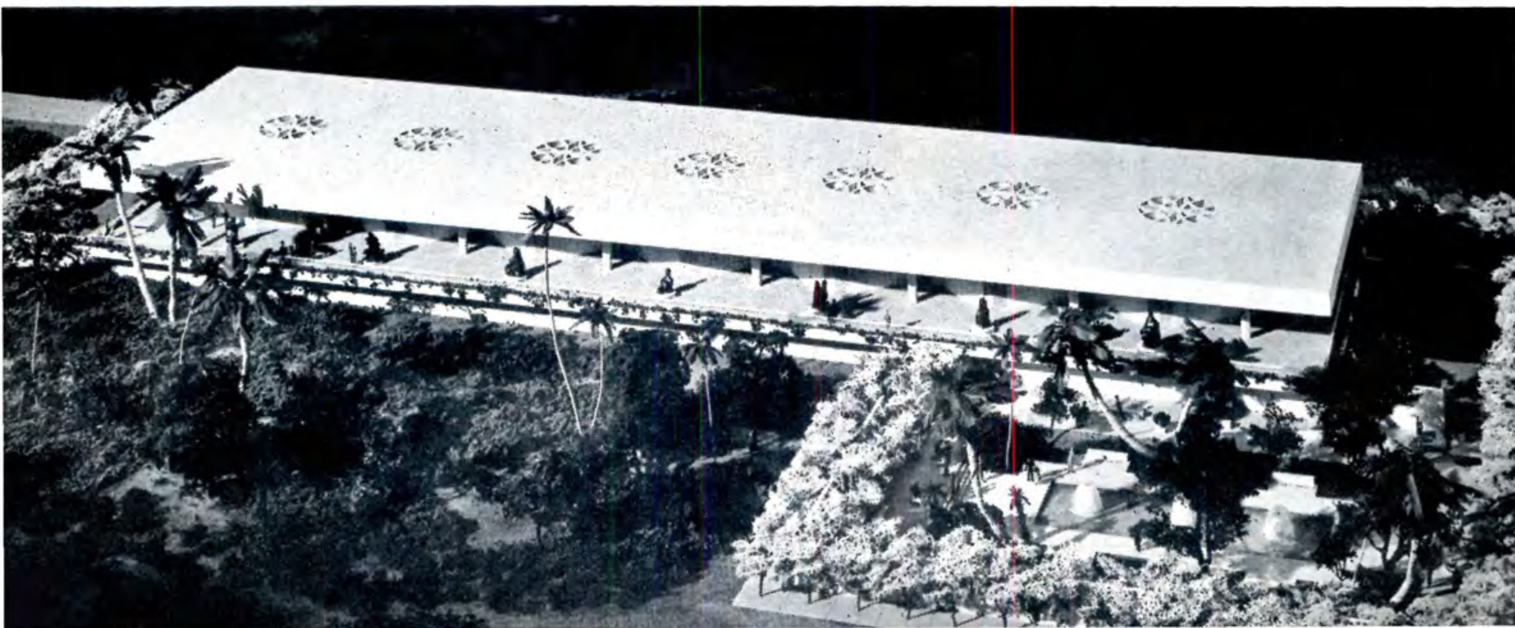
Perspective by Ara Derderian

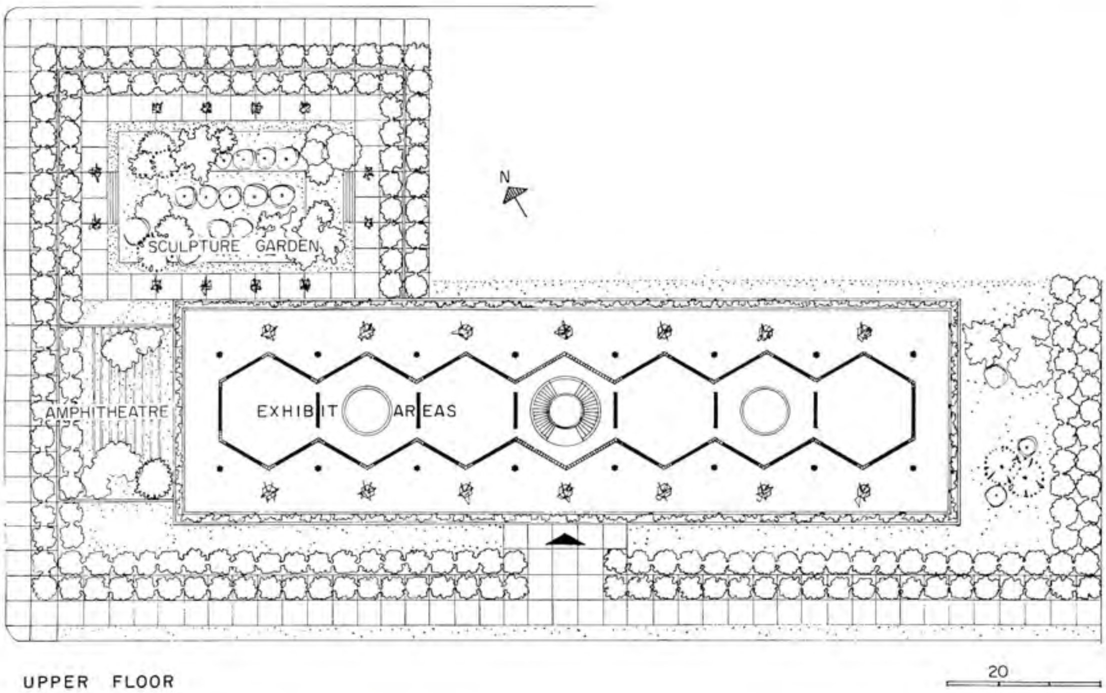


Roof is a concrete space frame with an intricate pattern. Columns are 40 ft on center and the overhang is 20 ft

3. Ponce Museum of Art, Ponce, Puerto Rico

Stone has described Ponce as a "beautiful town built by the Spanish when the island was first settled, with exquisite houses, porches, ironwork and courtyards in the Spanish Renaissance tradition." His client, the political leader Luis Ferre heads Puerto Rico's statehood party. Ferre wishes to build a museum which will house his fine group of paintings by old masters, as a permanent collection available to the people of Puerto Rico. These will be displayed in the hexagonal gallery shown in the model as photographed with the roof removed. (See model photo on opposite page). Galleries on the lower floors will be devoted to local artists and travelling exhibitors. The building includes a library and an auditorium which will open to gardens with outdoor sculpture and fountains.

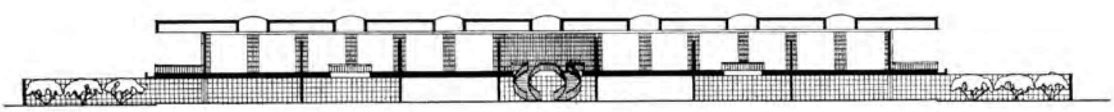




UPPER FLOOR

Louis Checkman

The climate is so mild in Ponce that air conditioning is not necessary. The galleries are all open to the air at each hexagonal point. In case of hurricane sliding mahogany panels will close in the area defined by hexagonals



SECTION

4. *Atrium Country House*

Residence for Mr. and Mrs. Carlo Paterno, North Salem, New York

ARCHITECT: *Edward Durell Stone*

STRUCTURAL ENGINEER: *Henry Gorlin*

MECHANICAL ENGINEER: *Harold Hecht*

GENERAL CONTRACTOR: *Theodore Hobbs*

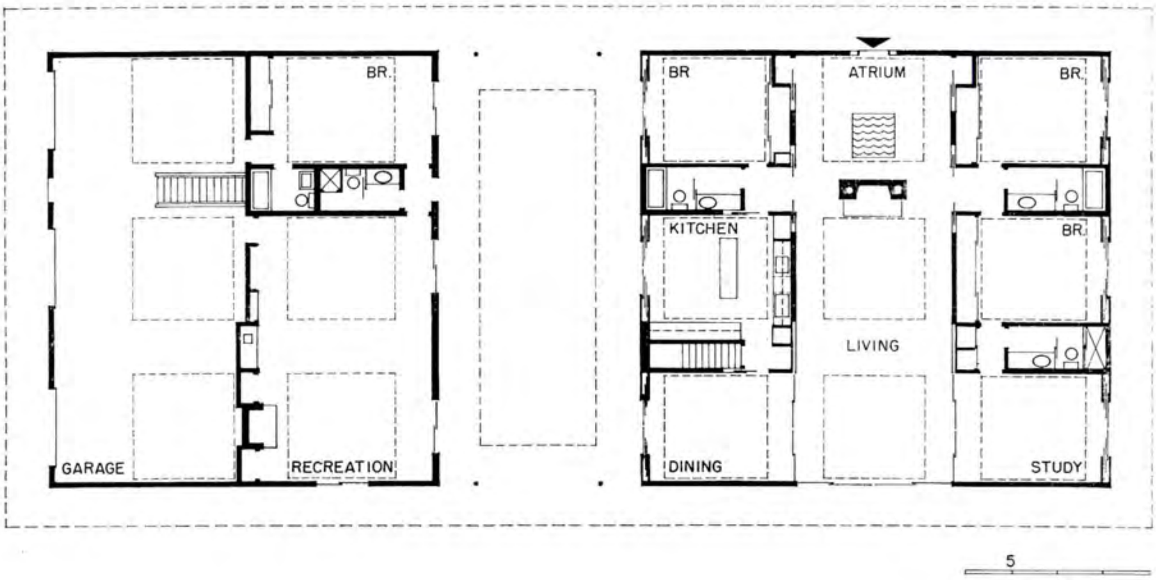
Stone was quoted recently as having said about houses in general: "We must give up the idea that we are English country squires and plan our houses compactly. Our countryside is being used up by these millions of little boxes. We should be inspired by the Mediterranean countries which have, as you know, compact villages, towns with houses built wall to wall and privacy obtained by cloistered walled gardens, courtyards and atriums. And in planning compactly this way we will save the open countryside. . . .

"Another current fad in these individual dwellings, which I decry, is the so-called ranch house. This rage for informality in American life, I believe, is a lame excuse for laziness. It's obviously easier to feed the children hamburgers in the back yard in the manner of ranch hands from a chuck wagon than it is to have them sit at a table where they might conceivably acquire some dignity, manners and grace."

In describing this atrium house he said, "When I did houses in the past, I used to have the living and dining and kitchen areas related to each other with the bedrooms in a wing along a gallery or a long hallway.

"In recent years certain distaff publications have 'sold' the idea that the front door should provide access to the bedroom, kitchen and living room and this has inevitably meant some sort of pat plan. It has negated our wistfulness over the open plan.

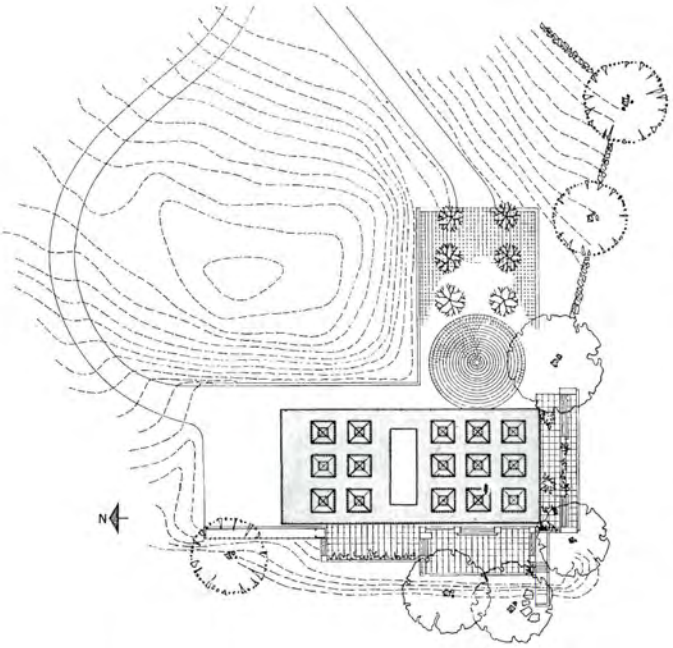
"The idea of a great open space through the house is an appealing one to me. A more spacious plan does away with all hallways, the bane of my existence.



Alexandre Georges

Garden room

Alexandre Georges



PLOT PLAN

"If you will notice the Paterno plan . . . you enter a nice atrium with the living room on one side. This house is done on a 15-sq-ft module—each square terminating in a top-lighted well with a hanging garden. All windows are floor to ceiling, and sliding. The jambs have sliding shoji screens—either translucent or opaque; thus there is no need for curtains. The kitchen side of the house opens into a garden room—an all weather outdoor area. That, in turn, is connected with a billiard room, servant's room and garage. There is a paved granite forecourt. The house is not a major piece of construction—just an orderly simple framing arrangement.

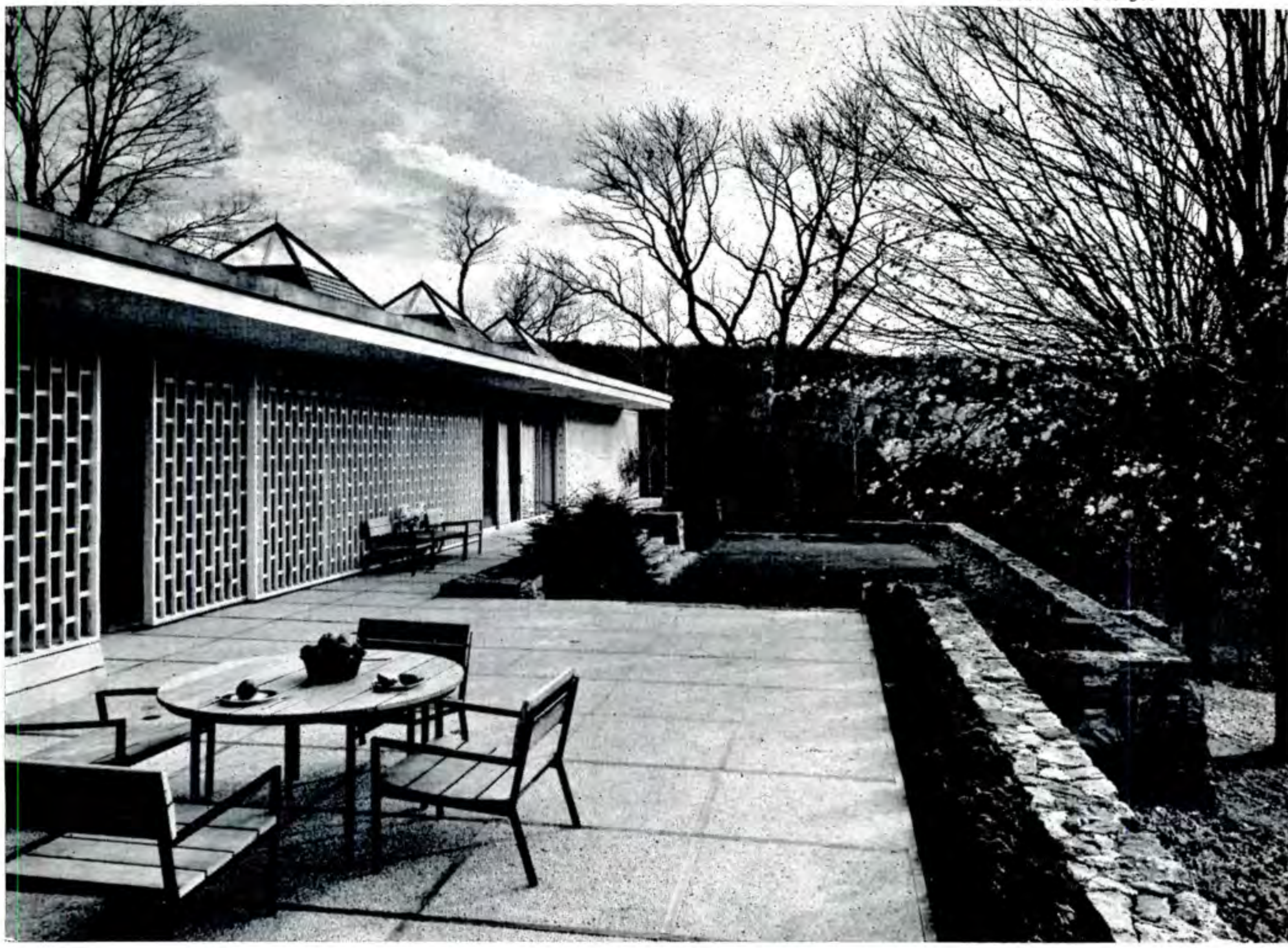
"An architect should be a humanitarian before he is an architect. He must not put his client in an arbitrary strait jacket. A home generally represents a man's life savings. The architect should single out those requirements of the client which are unique to him and must be met in a building. If the requirements and prejudices of each individual client are met, the architect should end up with a new solution rather than a preconceived idea.

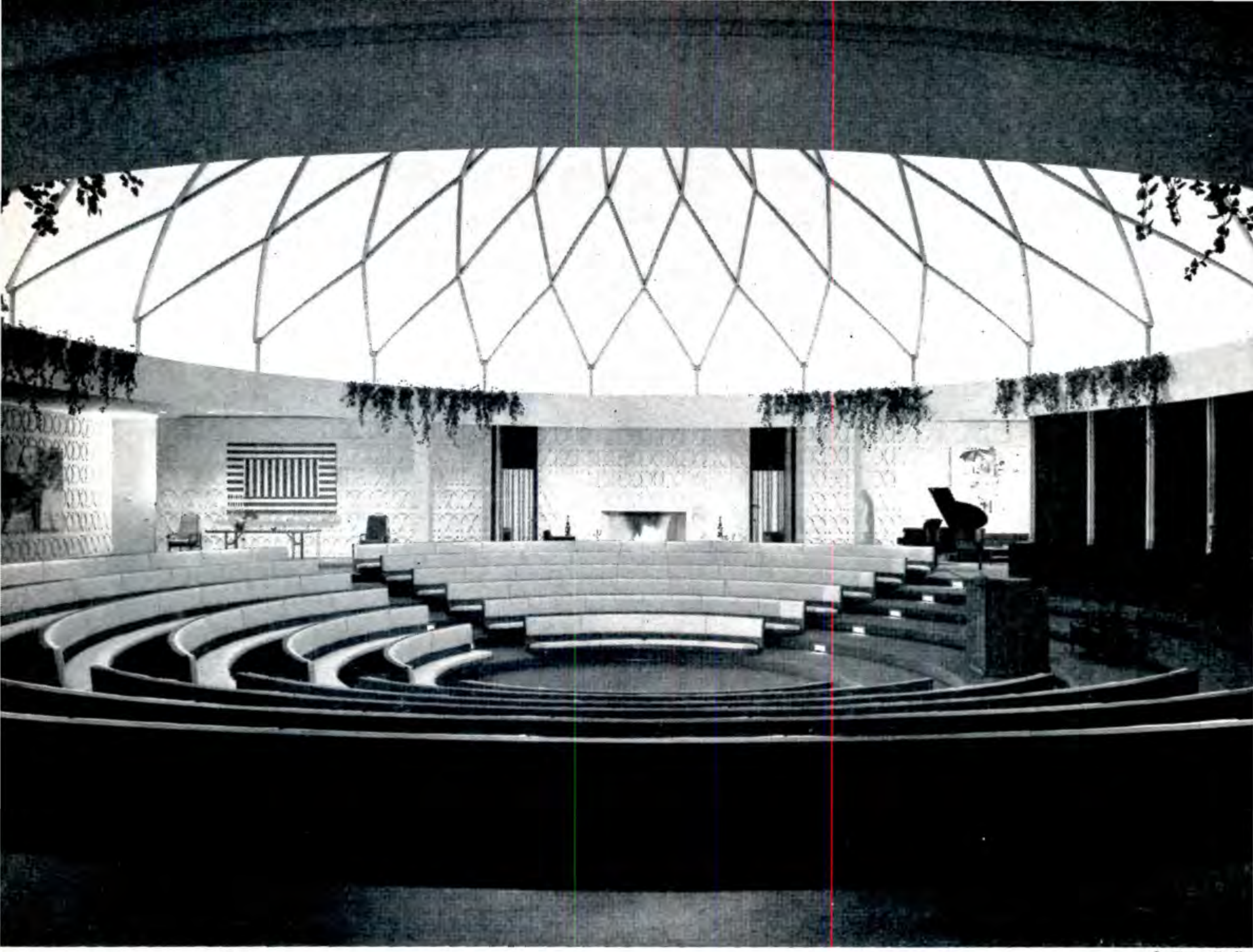
"The exterior of the Paterno house is gray wood shingle with white trim and white trellises—a bow to tradition, and compatible with the nearby countryside as are the fieldstone retaining walls. Floors are of white marble, in deference to Mr. Paterno and the Italian tradition."

Joseph W. Molitor

Tetrahedral skylight over planter, a detail used frequently by Stone

Alexandre Georges





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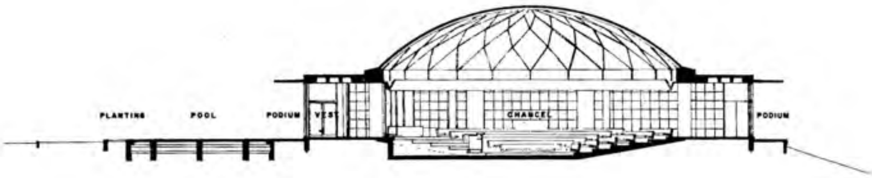
5. *All Souls Unitarian Church, Schenectady, New York*

OWNER: *First Unitarian Society of Schenectady*
ARCHITECT: *Edward Durell Stone*
MECHANICAL ENGINEER: *Harold Hecht*
STRUCTURAL ENGINEER: *Frank Harwood*
ACOUSTICAL ENGINEERS: *Bolt, Beranek and Newman, Inc.*
CONTRACTOR: *L. A. Swyer Co.*

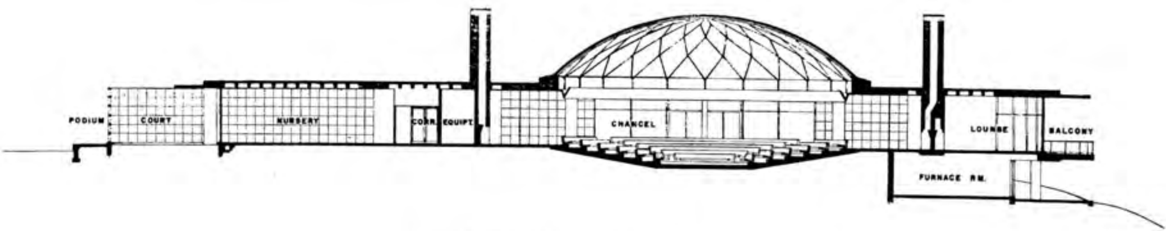
Stone in interpreting his plan said: "Social life is very important to the Unitarians." In this scheme a large lounge area with a fireplace where the congregation can assemble after services for coffee, envelops the 500-seat amphitheater where the service takes place. When occasion warrants, additional seats can be placed in the lounge around the perimeter of the amphitheater. The lounge will be periodically enlivened by exhibitions of abstract painting on loan from a New York gallery; as Stone points out, these can be considered twentieth century replacements for stained glass and mosaics.

The sunken circle is used for seasonal decorations or presentations, while the curved screen behind the pulpit is used for the projection of movies. The amphitheater itself brings the congregation close to the minister, thus creating the feeling of a unified family.

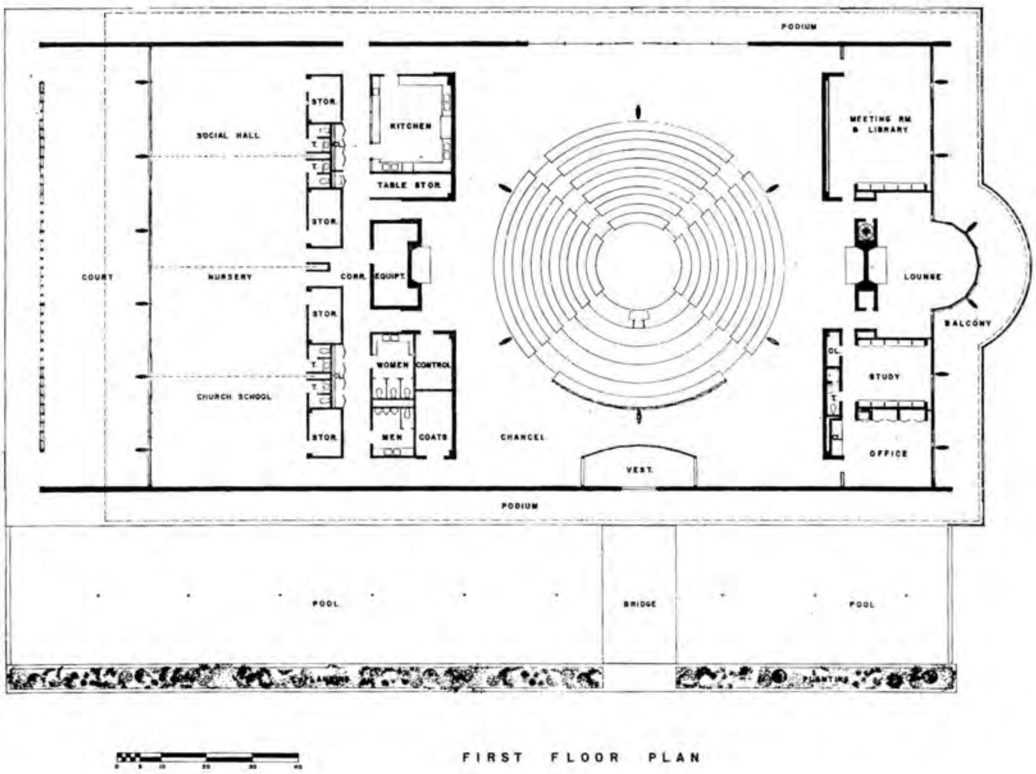
The dome is a lamella wooden roof with metal sheathing on the exterior. Indirect lighting is focused on the dome interior. Walls are of concrete units with an identical cast-in-mold pattern on the exterior and interior wall faces. The pattern was designed for this church. The church is entered by means of a bridge over a pool. "The lagoon is an inescapable detail with me," said Stone.



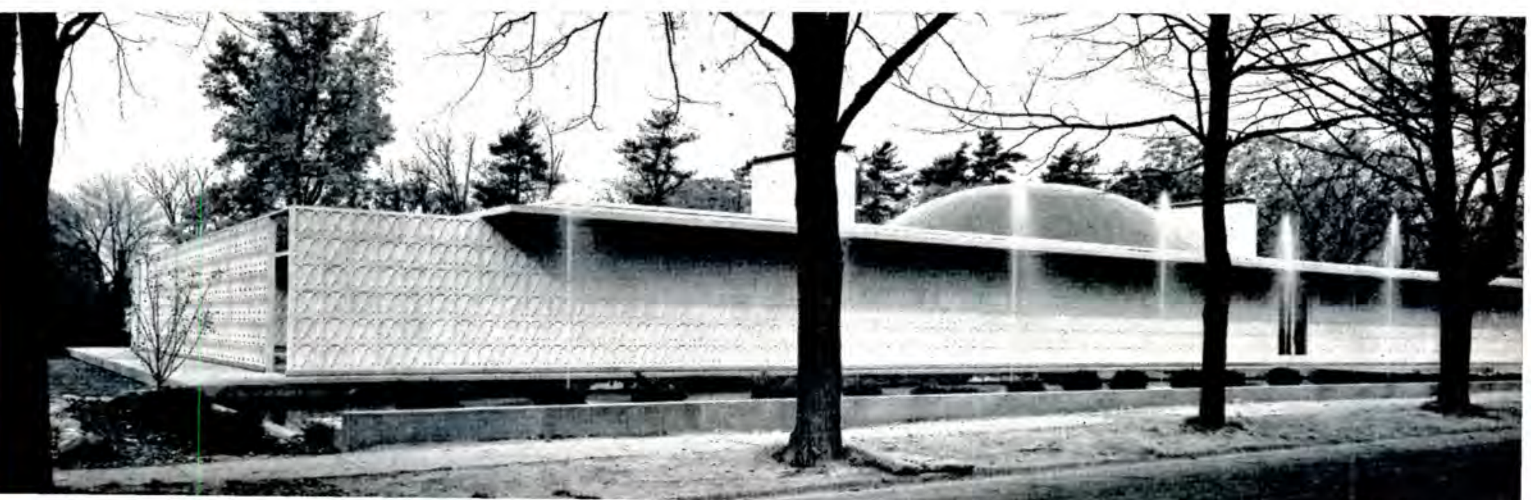
TRANSVERSE SECTION



LONGITUDINAL SECTION



FIRST FLOOR PLAN



WORKING WITH COMMERCIAL DEVELOPERS

How a 32-year-old architect, Frederick A. Stahl, initiated a $30 million office building to be constructed in Boston at 50 Pearl Street; and how, with the help of real estate agents, developers, lawyers, and contractors, the architect found investors to furnish the capital needed, guided the project through the negotiations, and brought it to realization. Architectural and engineering work is now being accomplished by an association composed of Stahl and Hugh Stubbins, architects, and William J. LeMessurier, structural engineer; the close integration of planning and engineering achieved in the design of the building is attributed by Stahl to the form of the association, in which the principals are equal partners

Architect Fredrick A. Stahl, on the extreme right, with (from left) John K. Dineen, attorney for the owners, Jay R. Schochet, independent developer, and Richard R. Wood, vice president of the real estate firm, Hunneman and Company

This is the story of how a young architect with a small office got a big job; and of how he learned to work, in a completely professional manner, with commercial developers in a world composed not only of architecture but of finance, real estate, and other business pursuits that are necessary and integral parts of the process of getting a building designed and built.

Inherent in this story are some all-important facts that might well be remembered by all young architects—and established architects too—who are seeking commissions.

The beginnings of the idea that was eventually to become a British-financed, 32-story, $30 million office building in Boston, were prosaic enough. In the spring of 1960, Frederick A. Stahl, an architect then 30 years old, decided to return to London for a vacation and to re-establish contacts made in that country during the period 1955-57 when he was attached to the Building Research Station and teaching at the Polytechnic School of Architecture.

During his two week stay in England, Stahl was impressed—as he had been earlier—with the amount of building capital that seemed to exist there. The big English building boom, which had begun in 1951 when the Conservative Party came back into power, had begun to fade for various reasons. It was at this time that it became generally known that Jack Cotton had invested in the Pan American Building in New York. Stahl spent some of his time in England with John Stephen, an estate agent (realtor), finally making the proposal that Stephen should look for British capital to finance a major office building development in downtown Boston. Stephen felt there might be some interest in such a project since development in Britain was rapidly becoming more fiercely competitive. Increasing site costs, along with governmental restrictions on site development had the effect of making the British picture much less attractive to investors. Accordingly, Stephen agreed to look around and Stahl returned to Boston.

Robert D. Harvey

In this schematic model of Boston, 50 Pearl is the tall white building on the left

Back in Boston, Stahl continued, over the next few months, having conversations on the subject of a British-financed Boston office building, with an attorney, John K. Dineen, and a private American developer, Jay R. Schochet. These three brought in Richard R. Wood, vice president of Hunneman and Company, Inc., a Boston real estate firm. Within a short time, the group had put together information on a possible site for an office building. This site was located in the center of the downtown financial district, and was unique in a number of ways. It was bounded by four major streets, included some 83,000 sq ft in area, was near a number of important buildings, and was original, rather than filled land. Nine owners were involved, including the Boston Parking Authority, which held something over half of the property.

As put by Stahl, "Most of the Englishmen I had met believed that Boston was a county town in Lincolnshire." To counter this, Stahl and his group put together a complete presentation on the site, starting with a map of New England showing Boston as a great regional center, followed by a series of charts that gradually enlarged the scale to that of the site. Aerial photographs of the site, digests of building and zoning ordinances, and a schedule of floor areas permitted by existing zoning variations were included in the presentation. Rough cost estimates were made; from these were prepared a series of operating statements based on the performance of the new rental properties that had been constructed in Boston. A tentative list of prospective tenants was also prepared, as was a digest of major firms doing business in the area of the site. Since property taxation had long been a major stumbling block in the path of large scale development in Boston, a complete statement on taxes was drawn up.

All of this material was then organized into a coherent presentation and sent on, in April 1960, to John Stephen in London.

During the ensuing weeks, Stephen asked for clarification of a number of points in the presentation and enlargement of others. It soon became apparent from the nature of these requests that Stephen, in his contacts with British financiers, was running up against obstacles in the form of doubts about Boston as an investment area and the future of the particular location of the site.

In spite of the obstacles, Stephen reported some progress. Accordingly, in May 1960, the architect Stahl, the attorney Dineen, and the American developer Schochet met with Boston Mayor John F. Collins and the newly appointed administrator of the Boston Redevelopment Authority, Edward C. Logue. At this time, the idea of British capital coming into Boston was discussed, and the mayor expressed his interest in such a project, in a letter which was immediately forwarded to London. The Boston mayor's letter made a strong impression in Great Britain, for no one there could imagine the Lord Mayor of London expressing such an interest in a commercial venture.

Later in 1960, it became apparent that E. Alec Colman of London was definitely interested in the project as an investment. Several months went by, but Stahl and his group were unable to get any farther. Finally, they reached the conclusion that some representative of Colman would have to visit Boston if the project were ever to get off dead center. After making the invitation, the group learned that Major Wolfe Lincoln, representing the Colman interests, would come to Boston to look over the situation.

Suspecting that some of the Boston banks or other interests might try to establish contact with Lincoln at the airport, Stahl and his group determined to meet Major Lincoln themselves, to establish from the outset their connection with the project. After scanning those waiting for the Major's plane for persons who might presumably be bank-

Some of the early schematic drawings and models of the 50 Pearl office building are shown on the right. In these can be seen early attempts at a medium-rise, free-standing office building with large and open floor areas. From the time of these early beginnings, the architects were searching for means of breaking up the building mass, of developing important building façades on all four sides, and of creating plazas on the ground level. As actual requirements for total floor areas and the structural, mechanical, and other considerations were more fully studied, studies were developed into final design

ers, the Stahl group introduced themselves to the one person who seemed likely to be a banker. They found that this gentleman was indeed meeting the Major; however, he was not a banker but Thomas F. Gilbane, president of a large contracting firm. Gilbane had had business dealings with Major Lincoln previously.

After meeting with Stahl, Mayor Collins, and others involved in the project, and looking over Boston and the site, Major Lincoln made a favorable report on the development to the Colman interests in London. About this time, it became apparent that another group was considering purchase of the site. A series of meetings were held by Stahl and his group with the prospective competitors, leading to an agreement that the Colman interests would be allowed to assemble the parcels of land into an office building site without competition from this quarter.

Soon after this, E. Alec Colman and Major Lincoln visited Boston and, after much discussion, definitely decided to go ahead with the project. In conformance with English law, Colman then filed an application with the Bank of England for the export of sterling for the project. At that time no one involved in the project had any intimation of the great length of time this process was to take.

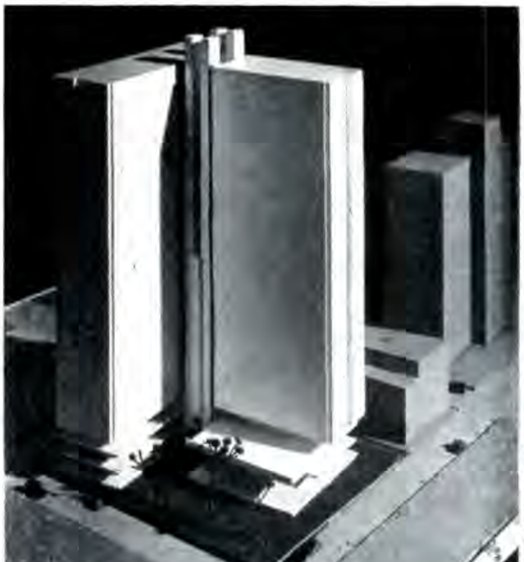
During his Boston visit, Colman formally recognized John Dineen as his attorney, Hunneman and Company as the real estate and rental agents, and Frederick A. Stahl as the architect of the project. Colman also instructed the realtors to begin assembly of the privately-held parcels of land. As time went by without approval of the export of sterling, it finally became necessary for the Gilbane Building Company, which would eventually become the contractor for the building, to advance the money required to pick up options on the various pieces of property.

As had been planned for a long time, Stahl formed, late in 1960, an association for the architectural and engineering work of the project with structural engineer William J. LeMessurier, and these two brought in Hugh Stubbins to complete the joint venture. From this point on, all decisions were participated in equally by these three principals.

Toward the end of February 1961, it became apparent that Gilbane could not continue advancing money for the land acquisition indefinitely. Also it seemed that Colman was somewhat reluctant to proceed with the project. Accordingly, Stahl, with Robert Livermore and Richard Wood of the real estate agency and William Gilbane, flew to London late in April 1961. The group was prepared to reduce the scope of the project if the present size proved unacceptable to Colman. A series of meetings finally brought out the fact that Colman wanted some other investor to take a share of the project. Stahl and his group then made a series of presentations to various investment groups, one of them Central and District Properties, Ltd., a publicly owned firm that already had investments in Canada. After some negotiation, this group agreed to take half of the investment, Colman holding the remaining half. Central and District soon transferred funds from Canada to buy the property.

A great climax in the history of the project came on November 15, 1961, when the investors, by now set up as Boston British Properties, Inc., successfully bid on the city-owned property that makes up over half the site. At the suggestion of Stahl and his group, the city had set the minimum bid at $600,000, with a $400,000 cash deposit, to discourage speculation. As it turned out, there were only two bidders; and Boston British bought the property for $800,000.

As of August 1962, the general preliminaries for what is a unique and well-planned office building are complete, a major tenant has been found, and working drawings are to begin soon.



Fred Stone, Inc.

Robert D. Harvey

The Architect IN PRACTICE

DESIGN FOR COMMERCIAL DEVELOPERS

Unlike many commercial office buildings erected as investments by developers, the 50 Pearl Building was designed in the best sense—and in every sense—of the word. Some of its important features are long-span concrete structure with cantilevered floors, eight corner offices per floor, elevators separated from the central core, large column-free office floor areas, four main ground floor entrances, landscaped plazas, and parking

50 Pearl Office Building, Boston, Massachusetts
OWNERS: *Boston British Properties, Inc.*
ARCHITECTS & ENGINEERS: *Pearl Street Associates*
(F. A. Stahl & Associates, Inc., Hugh Stubbins & Associates, Inc., Wm. J. LeMessurier & Associates, Inc.)
MECHANICAL & ELECTRICAL ENGINEERS: *Cosentini Associates*
SPACE PLANNING CONSULTANTS: *Freidin-Studley Associates*
ACOUSTICAL CONSULTANTS: *Bolt, Beranek & Newman, Inc.*
CONTRACTOR: *Gilbane Building Company*

But for the initiative of one of its architects, Frederick A. Stahl—and his efforts over an extended period of time to secure financing for it—this office building would never have come to be. Working with a team of real estate agents, lawyers, contractors, and developers for almost two years, Stahl finally succeeded in getting 100 per cent British financing for the development—a 32-story, $30 million office building.

Such efforts have paid off, not only in a commission for the building, but in an opportunity to design the building from scratch, without previous decisions made by others blocking the way. The result of this is an office building that has been designed to meet the real, long-term needs of tenants and of those who invest in it.

For example, the structure of the building is reinforced concrete with long spans that open up floors for tenant occupancies that require large areas. An added advantage is that the floors are easily adaptable to many types of occupancies. Preliminary estimates show that the concrete frame will be more economical than steel, for this particular building, because of the Boston location and the good bearing that exists on the site.

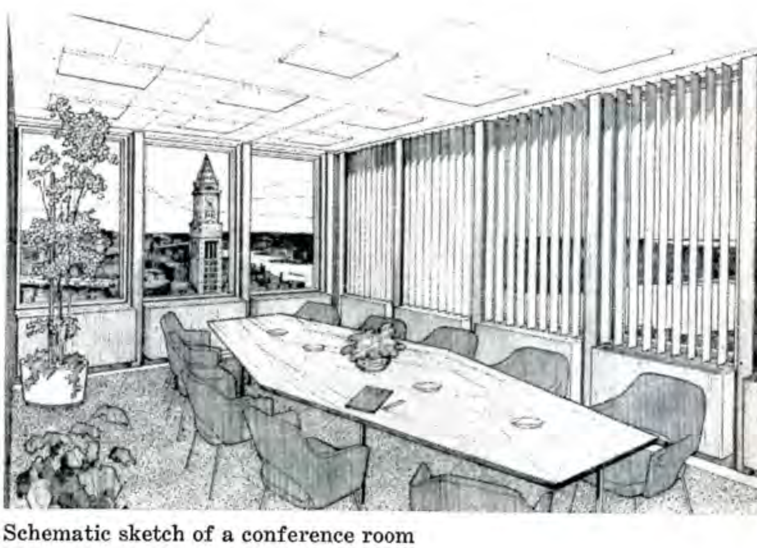
The central cores in most office buildings are surrounded by corridors that not only disrupt circulation to an extent, but are wasteful of space. In addition, stairways and toilets are elements common to all floors, but not elevator banks which drop off after they reach certain levels. Accordingly, the floor plans developed for this building place the common elements in a central core, but have the four separate elevator banks removed from the core, in what is ordinarily rental space.

At first glance, it would appear that this scheme would be wasteful of rental space; actually the opposite is true. As elevator banks drop off after they reach the uppermost floors they serve, the space gained on the floors above becomes an integral part of the rental areas.

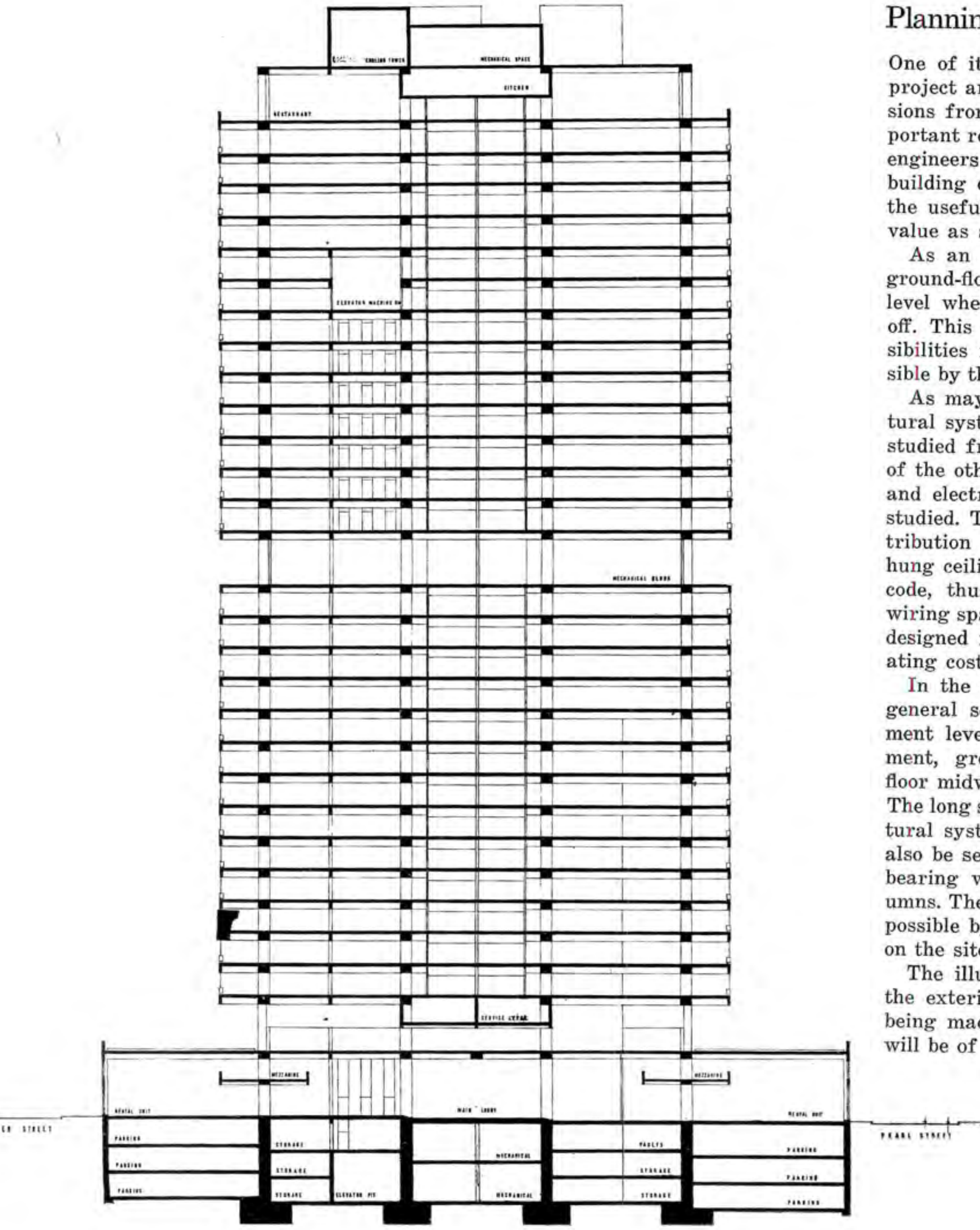
The building has been designed as a free-standing tower, with four fully developed and important façades. This has a number of advantages: the usefulness and flexibility of ground floor areas are enhanced, and zones served by the four elevator banks have their own entrances and semi-private lobbies.

Schematic sketch of main lobby

Schematic sketch of a bank area



Schematic sketch of a conference room



Planning and Structural Innovations

One of its architects originated this building project and has participated in all major decisions from the time of its inception. One important result of this is that the architects and engineers have been able to incorporate in the building design certain features that improve the usefulness of the building and add to its value as an investment.

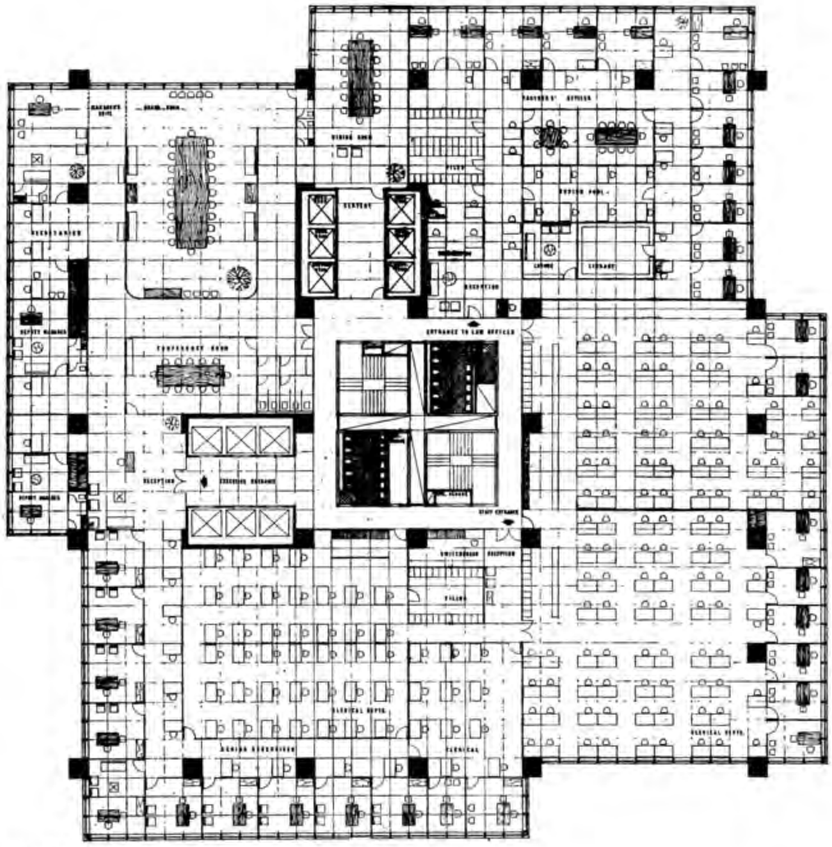
As an example, across-page are shown the ground-floor plan and a typical floor above the level where two elevator banks have dropped off. This plan demonstrates some of the possibilities for interior arrangement made possible by the unique elevator and core scheme.

As may be seen in the drawings, the structural system of this building has been closely studied from the beginning and related to all of the other design considerations. Mechanical and electrical systems have been equally well studied. This has resulted in an electrical distribution system that allows wiring beneath hung ceilings and also in floor fill required by code, thus eliminating the need for built-in wiring spaces. The air conditioning system was designed for lower than usual first and operating costs through the elimination of reheat.

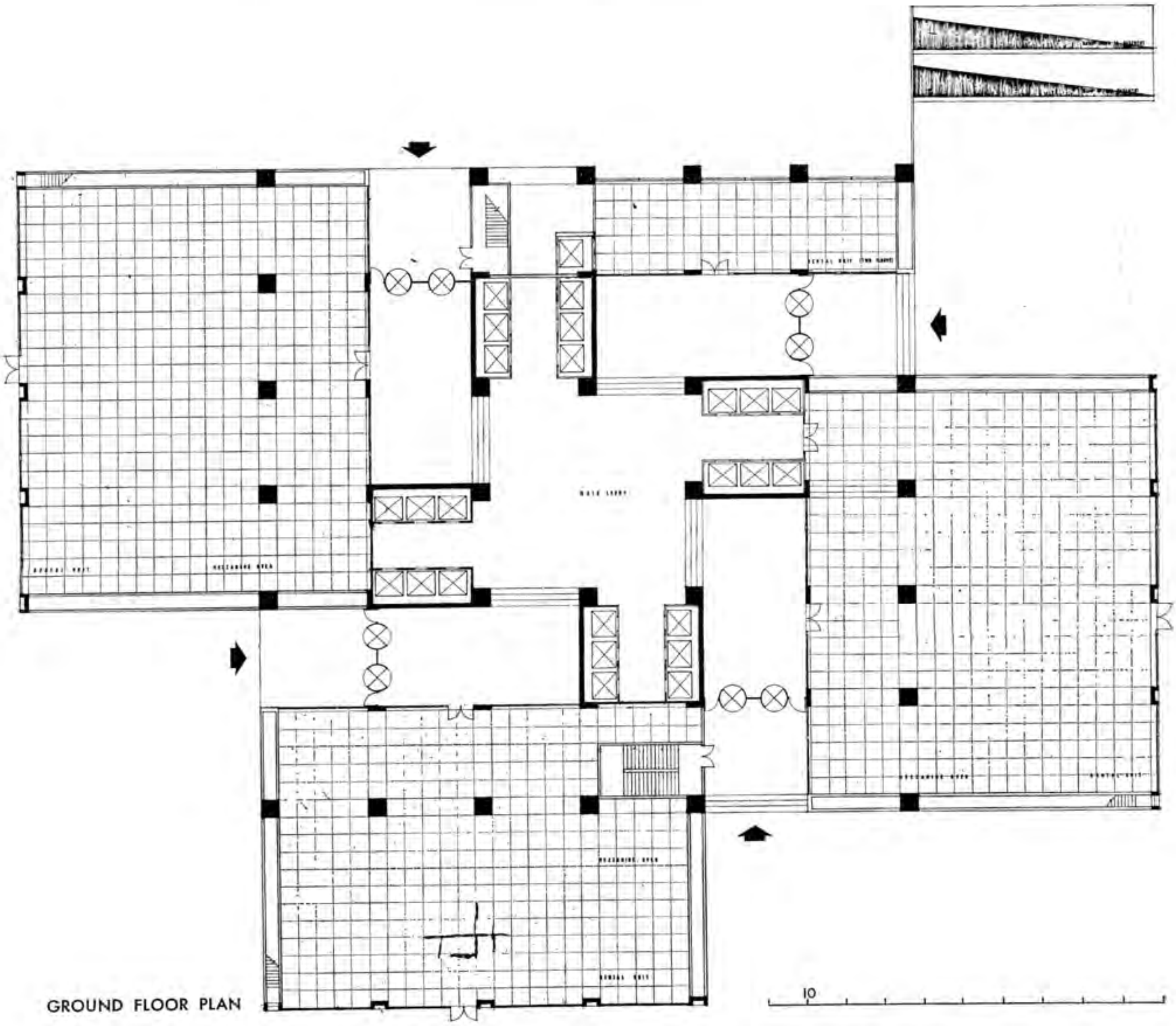
In the section on the left may be seen the general scheme of the building— three basement levels for parking, storage, and equipment, ground floor with mezzanine, second floor midway up the building, and penthouses. The long spans of the reinforced concrete structural system, along with the cantilevers, may also be seen in the section. Below grade, solid bearing walls are to be used instead of columns. These will bear on spread footings, made possible by the quality of bearing at this level on the site.

The illustration below shows the design of the exterior wall. Further refinement is now being made in the design of the wall, which will be of concrete with glare-reducing glass

Robert D. Harvey



TYPICAL FLOOR PLAN

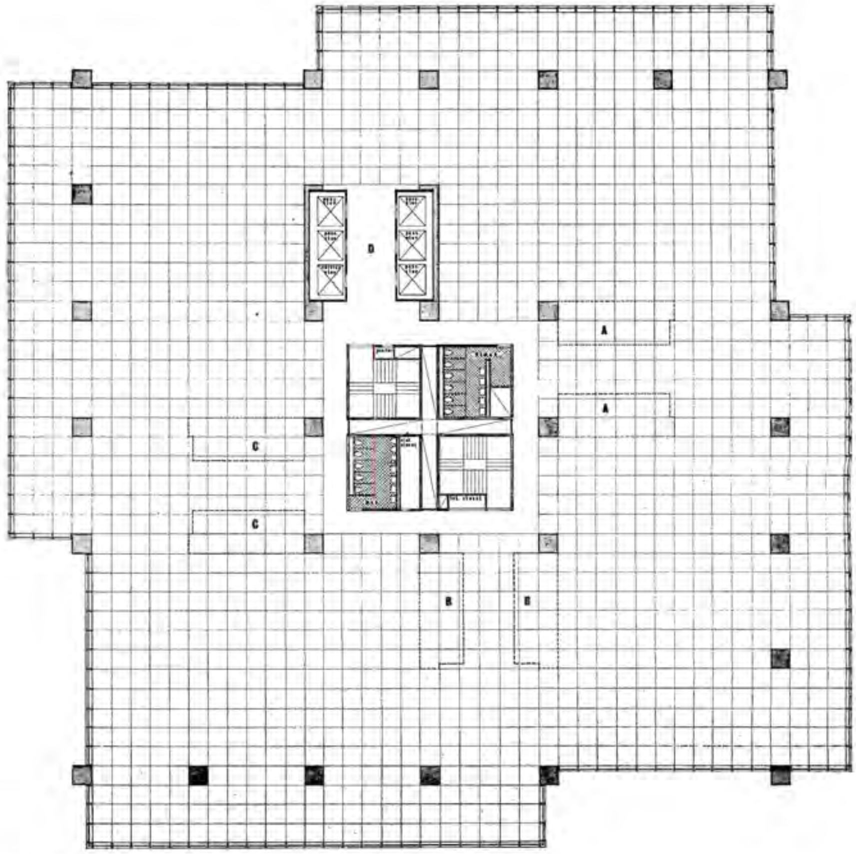


GROUND FLOOR PLAN

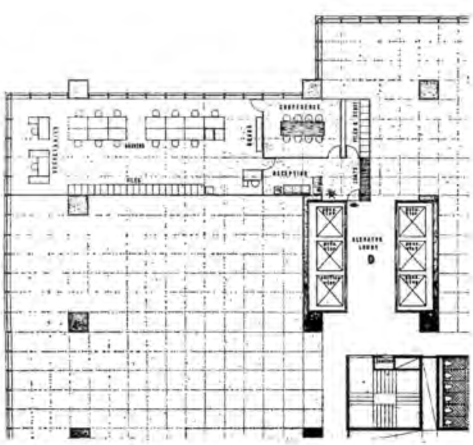
Space Planning for Tenants

The professional services for this building include surveying the needs of prospective tenants and the provision of initial layouts of their space. This work is done by the architect-engineer association in conjunction with a consulting space planning and interior design firm. Final layouts and interior design for tenant occupancies will be handled by firms chosen by the individual tenants.

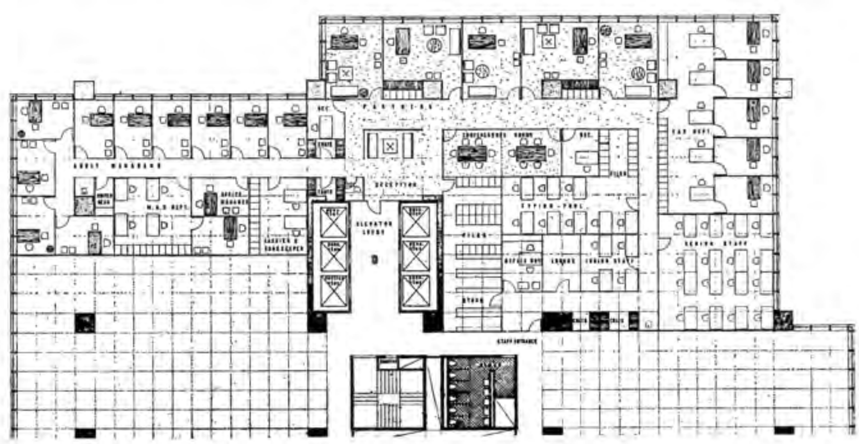
The complete plan on the right shows a typical floor in the uppermost zone of the building, above the point where three elevator banks have dropped off. Below this are four examples of initial tenant layouts for offices of various sizes and types. These give some indication of the way space in this office building can be utilized for various needs and purposes



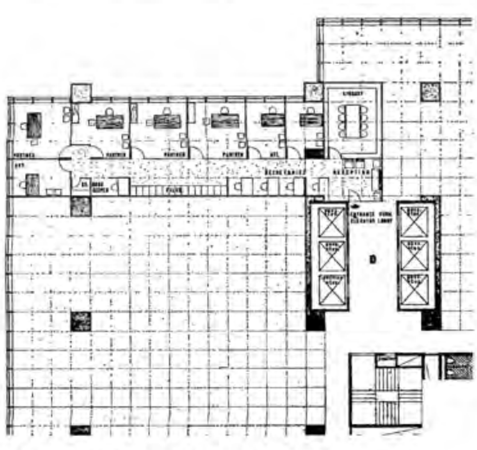
TYPICAL OFFICE FLOOR PLAN



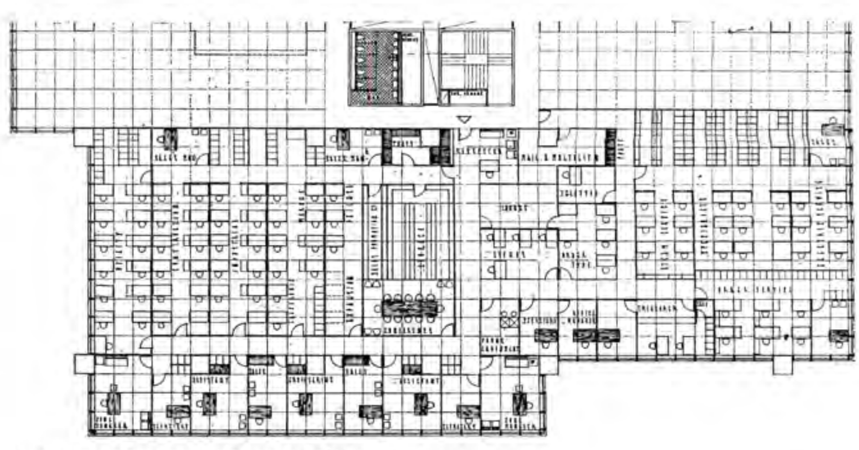
LAYOUT FOR A SMALL BROKERAGE



LAYOUT FOR LARGE LAW OFFICE



LAYOUT FOR SMALL LAW OFFICE



LAYOUT FOR LARGE GENERAL OFFICE

SCHOOLS

Intensive study is being given currently to the problem of school auditoriums. As the following articles point out, the auditorium is the largest, most expensive (and often least used, but much desired) space in a school. The cost-versus-use problem has been solved in the near past by a variety of multi-use combinations. A new direction is gaining ground, and is discussed in the following pages—the use of new ideas in planning and equipment for better use of auditoriums for instruction

SCHOOL AUDITORIUM PLANNING CONSIDERATIONS

By J. Stanley Sharp

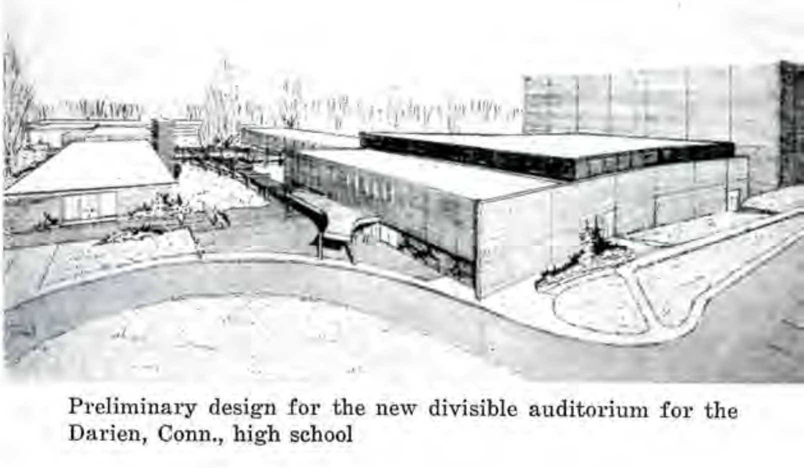
The biggest and costliest school space an architect designs is the auditorium.

Today as a result there's a lot of hard thinking on the auditorium in educational circles. Much of it boils down to this: unless a school system plans to use this facility as a real teaching device, its cost, whether it be large or small, can be questioned.

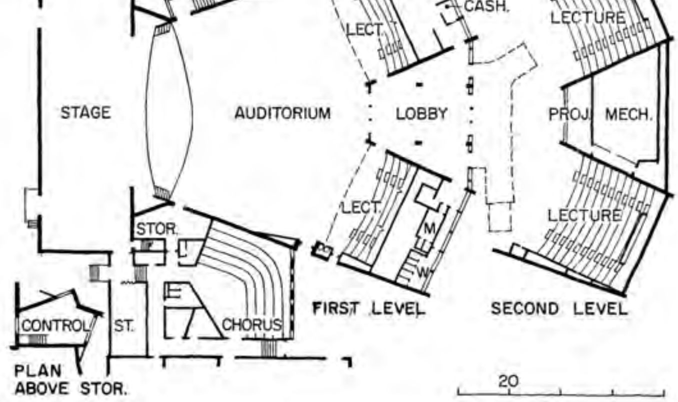
The employment of this special space for the traditional school auditorium function and occasional stage presentations is not enough. It sits idle, unemployed, all except a few hours a month. Even when a community wants a well-equipped auditorium for its use also—for such activities as those of drama groups, choir organizations, civic bodies and the like—the facility is still under-utilized.

A school auditorium, with its acoustical, lighting and ventilating requirements and its need for specialized equipment both on and off stage, runs, in our experience, over 50 per cent more in cost a sq ft than other school space. In an instance which we have just checked, the cost of a proposed auditorium was more than 19 per cent of the total cost of the school. This is a nice portion of the budget—and it could run higher!

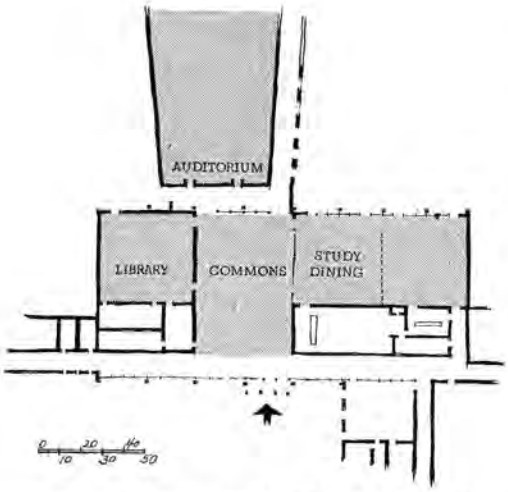
Yet the auditorium does have substantial educational uses, for orchestra, band and choral events, for training in dramatics, for assemblies. Because it is costly space—because the community nearly always wants it to serve other valuable needs—more and more stress is being put on fitting it also into the general educational program. Putting the auditorium to work as often as possible, in some cases every day, will, it seems to me, become increasingly the aim of architect, educator and school board.



Preliminary design for the new divisible auditorium for the Darien, Conn., high school

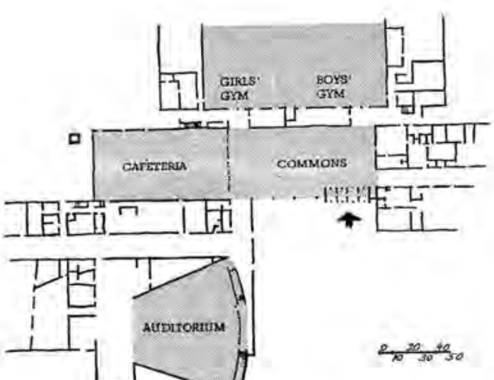


J. Stanley Sharp



Smithtown Central High School: the auditorium lobby serves as a commons and as the main school entrance

Smithtown Central High School: music and related spaces provide "backstage" areas for the auditorium stage



Baldwin High School: a big lobby, slightly separated from the auditorium, serves most school areas needing public space

Divide and Educate

Educational Facilities Laboratories, Inc., has done much to point out the possibilities of and to stimulate interest in both large-group teaching and the divisible auditorium. The two can go hand in hand; as a result, the auditorium, divided into sub-auditoriums, can get much more use and justify the investment in it.

In our own practice we are now planning such a divisible auditorium[1] for the Darien, Conn., high school.[2] In this instance the community wanted a 1,200-seat facility, large enough for the ultimate school population and also for community activities.

The auditorium is being so designed that it can be divided into three sub-auditoriums by means of rolling, soundproof partitions. Two of these areas will hold 200 students each, and the forward part of the building 800. Large-group teaching can be carried on regularly in the smaller spaces; and assemblies, lectures, or drama activities can be held simultaneously in the large sub-auditorium. Properly employed, the three spaces could eliminate the need for adding the six or eight classrooms which will be required for the ultimate student population.

Stepped risers are being used for the 200-student sub-auditoriums. Their ceilings will be high and the spaces can therefore be planned for large-screen television. A test tube experiment being done before the class or in another room can, with this system, be projected so that everyone in a large group has an even better view than the instructor.

Contrast these spaces with a room for large-group teaching. The floor of such a room is flat, so that the sight lines are poor. The ceiling is of normal height, so that a large-screen presentation cannot be made. Films and film strips obviously can't be seen by students in the rear area.

The divisible auditorium, it seems to me, can therefore make an important contribution to large-group teaching. The two are tailor-made to develop together: at the same time the school and the community have a sizable auditorium, plus appropriate-sized teaching spaces.

Combine or Postpone?

All types of school auditoriums present broadly the same planning considerations. Let's look at a few.

The question is often raised whether to combine this space with some other function. In elementary schools the requirements of assembly space are not as complex as in secondary ones, and a number of successful combinations with playroom, cafeteria or music room—sometimes of all these spaces—has worked out.

The auditorium and the gymnasium are sometimes combined in high schools, but because each is used intensively for its specific role, the result is not completely satisfactory for either function. Consequently when Darien's budget was too tight, we advised postponing the auditorium. On the completion of the high school[2] there in 1960, the gymnasium was employed as a temporary auditorium. The need for a real auditorium was always kept in mind, and two years later the community was ready to plan the structure with three sub-auditoriums.

How Big?

Experience indicates that the auditorium audience will seldom be the total population of the school. The usual size of the groups employing it should be the determining factor.

The Baldwin (L. I., N. Y.) High School,[3] for instance, has a student capacity of 1,500, while its auditorium seats 850. The Harborfields Central High School,[2] Greenlawn, L. I., N. Y., seats 710. It is planned for an eventual senior high school capacity of 1,500, and it also serves the 1,000 pupils of the adjacent junior high school.

There is much to be said for the small auditorium in a large school. When the small auditorium is used for plays, students can project their voices well enough in it to be heard at the rear. Furthermore, the dramatics class offering can be given several nights, rather than once or twice, so that students will gain more training. Occasional large assemblies might, perhaps, be held in the gym.

Multi-use Lobbies

Just outside its doors—with the lobby—is a good place to start a discussion of auditorium planning. A rule of thumb often used in calculating the area needed for this space is

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Architectural credits for the schools noted are:
[1] Stanley Sharp
[2] Ketchum and Sharp
[3] Ketchum, Giná and Sharp

slightly more than one sq ft per person. However, to insure more than enough space for it and at the same time make it as useful daily as classrooms are, the answer, it seems to us, is to plan it for multi-use. In fact a lobby is ideal for that purpose, with none of the drawbacks that arise in some other multi-use areas.

At the Baldwin High School, for example, we developed a lobby which serves not only the auditorium but also the gymnasium when games are scheduled there. It is also the main entrance to the school, and it is furnished so that students can use it as a commons. Finally, it is so related to the cafeteria that it can act as an extension of that space for occasional large dinners.

At Smithtown Central High School,[2] Smithtown, L. I., N. Y., the auditorium lobby serves both as a student commons and as the main entrance for the combination junior and senior high school facilities. It adjoins the cafeteria, so that students can use the commons after finishing their lunch.

Harborfields High School is planned differently. There the auditorium is adjacent to the cafeteria and has sliding glass doors so space can be opened to provide extra lobby space for large groups.

When the auditorium is divided into sub-auditoriums for large-group teaching, the function of the lobby as circulation to those spaces is a prime consideration. With this fairly constant use, its walls become valuable exhibit space; and we are designing the Darien High School auditorium for that purpose.

The Audience

The building may be large or small, but in either case the audience—students or townspeople—is the thing. The auditorium should have seats that are easily reached and comfortable, and that provide good sight lines. In the Harborfields auditorium we allowed a space of 34 in. between rows of seats, and feel this should be the minimum. In other such facilities and at Darien High School we have provided a full 3 ft.

Continental seating is excellent but makes for a larger auditorium because the space between rows must be greater. More exits are also required. Thus the cost is higher and the use of this type of seating can seldom be justified. Incidentally, the number, size and location of exits are specified in local codes. The National Fire Protection Association also offers valuable guidance.

Upholstered seats are obviously more comfortable than wooden and also improve the acoustics of an auditorium. The question is sometimes raised whether students will damage them, but in our experience they actually decrease maintenance problems. Pupils apparently respect upholstery more than wood!

A few years ago we hit on the plan of upholstering seats in different colors, in a random pattern. The design effect is good and there is the further advantage that a covering can be replaced without a long and often fruitless search to match colors.

The width of seats varies from 19 to 22 in., to permit staggering for good sight lines and to facilitate layout. The number of seats only 19 in. wide should be kept to a minimum.

The proposed width of aisles should be checked against local codes; every architect knows, however, that their requirements are often minimum ones. Wide aisles ease circulation and we specify a minimum width of 3 ft near the stage, increasing slightly from front to rear of the space.

Sight Lines

The slope of the floor is important for good sight lines. A rule of thumb is a 5-in. change of vertical dimensions for every three rows of seats, with the individual's focal point 8 in. above the stage floor and the curtain line. The slope is progressively increased to a maximum of one in ten at the rear of the auditorium.

Stepped risers provide ideal sight lines but can introduce a safety problem. If stepped aisles are major means of circulation, they are usually relegated to use in balconies or for special design arrangements, such as at Harborfields. There, the method of entry vomitoriums (similar to that of Yale Bowl) eliminates general circulation from that area.

Air Handling Equipment

The best location for air handling equipment, in our opinion, is in an area at the stage end of the auditorium, structurally separated from it to eliminate vibration and noise transmission problems. Locating the equipment there puts it near the greatest heat load (particularly if television is to be used), thus limiting long runs for the large ducts.

If for other design considerations air handling equipment is placed overhead in the rear of the auditorium, it is even more important that motors, conduits and ducts be isolated from the structure, so that those near it can hear what is happening on the stage, rather than a rumble of equipment. A location overhead in front of the proscenium is better, but careful design is again required to isolate troublesome sound.

Standards for ventilation are set by codes. However, mention should be made of the possibility of air conditioning the auditorium. Use of this space for large-group teaching and a trend to year-round employment of schools justify, in the opinion of many, the costs of air conditioning.

Acoustics

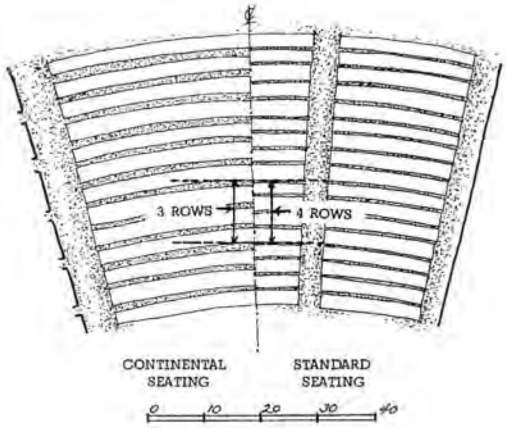
Every large space has its special acoustical problems, so that an acoustical engineer is needed, we feel, as a consultant on a school auditorium. His guidance is valuable in determining ceiling heights, working out the best shape for the structure, and deciding on the use of various materials for either their reflective or sound-absorbing qualities. (If even ten people can't hear in a school auditorium, money has been wasted.)

The wedge-shaped auditorium has proved better acoustically and is almost universally built today. The rectangular type used in the past needed an excessive amount of acoustical material on its walls, and directing sound to the rear was difficult.

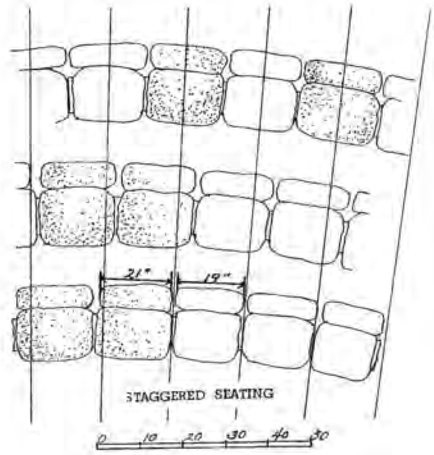
As just indicated, the matter of acoustics belongs to consultants in that field. On the subject of sound shells, however, we have not always followed their advice. A sound shell is needed primarily for the natural voice, the unamplified instrument or orchestra. But most school auditoriums have amplifying systems and everyone uses them. The quality of sound, as a result, is usually not affected enough to justify a sound shell, which is expensive and also difficult to set up and take down.

Stages

The proscenium stage meets the needs of the school auditorium very well. The expense of other types, in our experience, cannot usually be justified; and it is debatable whether many schools would use them well



A graphic comparison of the relative space required by continental and standard seating in auditoriums



Insertion of occasional narrower seats helps give a staggered seating pattern to preserve sight lines

enough and often enough. It is conceivable that with the use of a large forestage, extensive side stages and perhaps movable (manually operated) platforms which could be stored under the stage and extend it into the orchestra area, a degree of flexibility could be achieved consistent with the economics and educational program of the community.

The arena, it seems to us, is too difficult a type of staging for school productions. It is not well suited to lectures and talks.

How Wide?

With the proscenium opening, we like to make it as wide as possible; for talks and plays, it can always be framed down to give an intimate effect. It should have a minimum width of 24 ft; in the large Darien High School auditorium, we call for an opening of 60 ft. A minimum height of 14 ft is needed for the proscenium opening, more in a large auditorium.

A wide proscenium and a deep stage are necessary in secondary schools for band, orchestra and choral group use. The graduating class may sit on the stage; but if an overlarge one is needed for this function alone, the school does well to hold the exercises out-of-doors, in the gymnasium or in a large town center.

Stage Depth

The minimum stage depth is usually set at 25 ft. At Harborfields High School we made it 29 ft, and the stage at Darien will be 35 ft deep. The stage at Harborfields is 80 ft wide, while that at Darien is 110.

The stage should of course have an apron, for many community meetings, assembly programs, lectures and other events will be staged on it, in front of the curtain. A minimum of 6 ft, in addition to the stage depth itself, is required for it.

The program of the school always determines these various dimensions. This point is brought up because of possible requirements for orchestra or band space located next to the stage on a level floor. The size of this space is determined by the size of the orchestra or band, and is usually figured at 10 sq ft for each musician and instrument, with extra allowed for piano and tympani. Oversizing this area is regrettable—there is just so much extra space separating the audience from the stage.

A requirement of the stage is space for the storage of props and sets. Most high schools today are using movable flats. It is easy to overdo on storage space for flats; there is a real educational opportunity in having students design and construct new ones for various productions.

The use of movable flats calls for planning more space on the sides of the stage, to pull sets on and off, and for constructing sets, while the stage itself is being prepared for band practice or other activities.

Few Fly Galleries

Very few secondary schools in the East have a fly gallery. If one is planned it should be one and one half times the height of the proscenium, and for safety should have a gridiron for changing the rigging. A gridiron, however, is expensive, and for economy it may be preferable to let school custodians or professional riggers use a movable scaffold.

At Harborfields High School we provided a dressing room for girls and one for boys. Located between the stage and the music room, they also serve as a useful sound baffle. When the budget is very tight on a new auditorium, the dressing rooms are often eliminated and classrooms or other large adjoining spaces used.

Music Rooms

Music and band rooms should be located as near the auditorium as possible, so that students in those activities can reach the stage easily. When either of these spaces adjoins the stage, structural separation with walls of high sound reduction is very important in order to eliminate distracting sound transmission.

At Smithtown we planned the high school so that the band and the music rooms are adjacent to the stage but separated from it by a corridor. It is an effective sound barrier. Provision was made for reaching the stage easily from either of the spaces.

An educational materials center is an important consideration for a divisible auditorium; otherwise its large-group teaching sub-auditoriums may sit idle for periods of time while necessary teaching material is being assembled. The center needs films, film strips, books, posters, specially constructed exhibits and other aids. It may be located in the auditorium, or nearby, or in a large system, in a place central to all schools. The instructor then requisitions whatever he needs, discusses the best presentation with the audio-visual director and gets his material together the day before, so that there are no delays when class time comes.

This article has not touched on construction materials for the auditorium; here ease of maintenance, cost, esthetic qualities and durability play important roles, as they always do in the school field. Just as important is their use for good acoustics.

Another topic worthy of detailed discussion is the whole field of lighting. One aside here: the large-group teaching spaces of the divisible auditorium can't get along with the usual lighting of that structure. Lighting levels must be increased to approach those of regular classrooms.

Much is happening today in the planning of the school auditorium. Its design requirements are many and complex; above all, it has to be planned to fit the particular program needs of an individual school—may they always be forward-looking!

THE AUDITORIUM AS INSTRUCTIONAL SPACE

By Alan C. Green, Assistant Professor of Architecture, Rensselaer Polytechnic Institute, Troy, N. Y.

As in many things architectural and educational, there tends to be great confusion in the terminology of certain facilities. Particularly is this true when dealing with large group spaces such as lecture halls, auditoriums, large classrooms and assembly halls; and the confusion isn't readily clarified when we begin to consider gymatoriums, cafetoriums, gymaterias, multi-purpose rooms and commons.

For purposes of this discussion, let's talk about an auditorium as a large-capacity space—arbitrarily over 400 seats or so—designed primarily to allow its occupants to sit while hearing and seeing what takes place at a focal point. In some cases it may be called a lecture hall, or it may be a big classroom.

Essentially we want to examine this auditorium facility in terms of its use for instructional purposes.

Historically the auditorium was able to fulfill an instructional role quite adequately and with relatively uncomplicated design criteria, because the instructional requirements were basically simple. The desire was simply to make it possible to bring a large group of people into the "live presence" of the instructor, who could then talk about (but not discuss) his subject.

Seats were arranged in rows with bisecting aisles conforming to any existing building codes; the seats were usually a wooden theater-type with a *folding* seat, although eventually a folding tablet arm was introduced to provide a writing surface. With a relatively shallow slope in the floor, fairly good sight-lines were established. Lighting was simple — generally low-level, with higher intensity on the focal area. Access to the auditorium was from a lobby at the rear; some confusion arose during class breaks as the in-and-out traffic converged.

Even though the term hadn't been introduced at this time, such an auditorium facility was "multi-use" to a large extent. It could be used for instruction, assemblies, guest speakers, meetings, convocations, chapel services and a host of other large-group activities. Its utilization rate was not very high, probably ten hours a week maximum, but administrators weren't too concerned with utilization rates.

Two factors began to strain the function of the auditorium as an instructional space; one was the introduction of new instructional methods, and the other was the increasing concern with the rate of utilization. These factors began to spread doubt as to the auditorium's real value for instruction.

Consider first the development of new instructional methods. Gradually it became apparent that the teacher/professor could improve the quality of his instruction by introducing demonstration models and apparatus. Thus basic phenomena in the sciences could be illustrated and explained by apparatus manipulated by the teacher at significant points in his lecture. The demonstrations had to be large in scale, and relatively simple, to permit the entire group to see them; the consideration of adequate viewing resulted in the steeply-sloped demonstration-lecture hall.

In the auditorium, two problems developed: (1) the apparatus required very extensive storage and preparation areas not usually available and (2) not everything could be made large enough for all to see, as on chalkboards, charts, graphs.

Then came films and slides as teaching aids; large screens were put at the front of the auditorium and projection space at the rear.

But large expanses of windows needed covering to control natural light, and the overhead auditorium lights had to be turned off to permit a bright image on the screen; the instructor found himself teaching in a blackened hole. In turn, ventilation became a problem when the windows were covered, and in many cases the structure did not lend itself to air conditioning. With the expanded areas for student viewing, and the fact that the material viewed was for comprehension, the seating and sight-lines were often found inadequate. Acoustical considerations were a bare minimum, and the problem of storage and preparation areas became more acute.

To round out the available instructional devices, the overhead projector for enlarging writing and showing transparencies had to be accommodated with its screen; and closed circuit television, for magnifying demonstrations and introducing instruction from other points on the campus, required the spotting of monitors about the space. Thus we see the introduction of the instructional aids and media straining the instructional function of the original auditorium.

As enrollments at all levels of education soared, a new question began to be asked: how many hours is a facility used, and/or can we justify the programming and building of new facilities on the basis of their potential utilization?

Many schools have found by analysis that the use of an auditorium would be uneconomically low, with the result that auditorium functions have been combined with cafeterias, gymnasiums, commons areas, multi-purpose rooms and the like. Sometimes it's been decided that other facilities are far more important, and the auditorium is put near the bottom of a priority list.

If, however, an educational program indicates that an auditorium is desirable for conventional functions and as an educational facility, certain design criteria can help. To a large extent these criteria result from the extensive use of instructional aids. But when extensive use

The author has recently been involved in two related architectural research projects, both at Rensselaer, which deal with educational facilities. One was the DASFEE Project, sponsored by the Educational Facilities Laboratories, Inc., which culminated in the recently published report "New Spaces for Learning—— Designing College Facilities to Utilize Instructional Aids and Media." The other, "An Experimental Facility for College Teaching," is a full scale mock-up, built, equipped and used for instruction, and based on design criteria developed in the DASFEE study

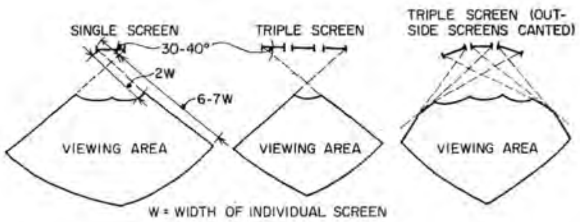


Figure 1. A viewing area is defined by a minimum and maximum viewing distance and a viewing angle. The number and arrangement of display surfaces (screens) modifies the shape of the viewing area and the potential capacity

Figure 2. This view indicates an attempt towards achieving an integrated design of the various display surfaces which may be found in the auditorium designed for instruction. From the left: TV monitor, tack-board, chalkboard, rear-projection/overhead projector screen, TV monitor, rear-projection screen, etc. Illustrated is the front of the "experimental classroom" designed and built as a mock-up by the School of Architecture, R. P. I.

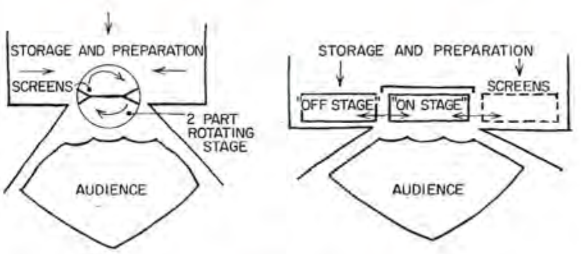


Figure 3. Two-part rotating and a slide-on stage schemes. In each case the demonstration is set up while the stage is out of position and is then rotated or slid-on during the class break. During the following class the old demonstration is dismantled and a new one is readied

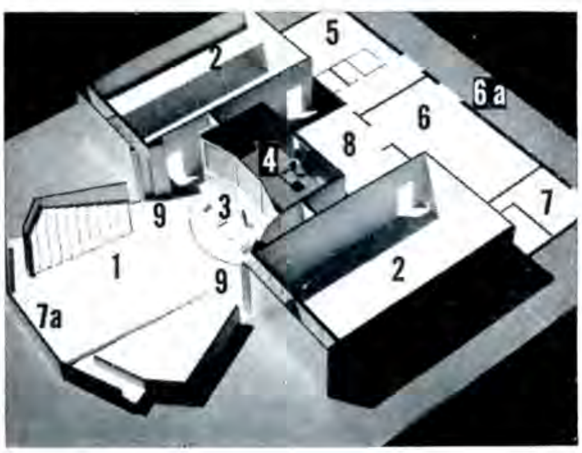


Figure 4. This auditorium-studio model shows the extensive adjunct facilities needed to give the highest degree of flexibility and versatility: 1. Audience area. 2. Storage and preparation areas. 3. Rotating stage with screens above. 4. Rear projection area. 5. Shop. 6. TV studio. 6a. Outdoor production area with large door to studio. 7. TV control room and engineering center. 8. "Ready area" for demonstrations being assembled prior to being set up on stage. 9. TV camera areas (also remote cameras overhead for complete coverage of the demonstration and lecture)

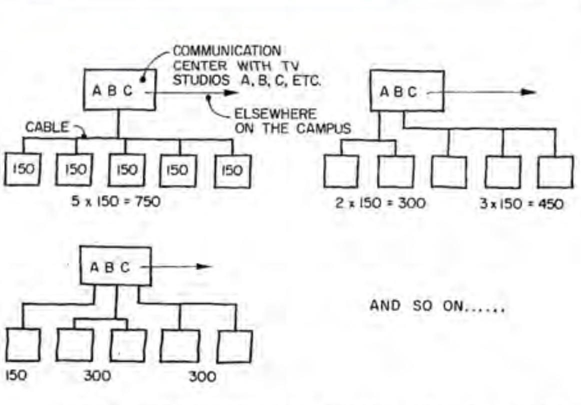


Figure 5. These diagrams illustrate the high degree of flexibility that may be achieved by various combinations of smaller spaces all inter-connected with a communication center containing TV studios

is made of slides, motion pictures, projected transparencies, audio tapes, kinescopes, demonstration apparatus, shadow projection, overhead projection and television, the auditorium for instruction cannot be designed as in the past; they require some new considerations:

Shape. The shape of the instructional auditorium becomes a function of a viewing area. Since it is probably desirable to permit excellent viewing conditions of two or three screen surfaces, in addition to secondary display surfaces, a viewing area for these multiple surfaces then becomes defined by a minimum viewing distance and a maximum viewing angle (Fig. 1).

Good sight-lines from all seats to permit unobstructed viewing of all display surfaces can be approached by stepped or sloped floors and off-set seating.

Seating. A whole new look needs to be taken at a seating type. The lack of adequate writing surfaces has always been a drawback in the conventional auditorium; continuous table tops with fixed pedestal seats may be one approach or a better designed, more extensive folding tablet-arm may be another. To avoid having the best viewing area chopped up by aisles, a modified continental seating with side aisles could be considered.

Lighting. All students should be able easily to see the instructor, demonstrations and displays, with enough illumination on writing surfaces to permit note-taking. This may be accomplished by ceiling downlights pre-set with various levels of illumination compatible with each projection technique. Wall surfaces should be washed with light to bring up the overall illumination of the room when no projection is being used, with accent lights for the center of interest. However the room lighting is arranged, it must not "wash-out" projected images. This requirement, in fact, constitutes the strong argument for rear projection. As natural light is distracting and tends to deteriorate a projected image, the auditorium should be windowless with adequate air conditioning.

Acoustics. Even in auditoriums with 600 or more students, acoustical design can permit the unaided instructor to be heard by all students; the instructor, wired for sound, is greatly handicapped when moving about and lecturing in an auditorium. All recorded sound from tapes, television and films should be directed through a single high-quality sound system.

Controls. All controls, both for lighting and the various instructional equipment, should be highly simplified and easily manipulated by the instructor from a central point. All equipment should be remotely controlled and compatible lighting levels coordinated with the equipment controls. Thus when the instructor flips the button to activate the pre-set movie projector, the lighting adjusts to the correct illumination level and arrangement. Projection equipment should be centrally located in either a front or rear projection area, sound isolated, and accessible from outside the auditorium to enable technicians to load and ready the equipment during the time a class is in session. All extraneous noises of air conditioning and other mechanical equipment should be carefully masked to avoid interference with the voice of the instructor and recorded narration. Inclusion of television poses a problem, as no one has yet devised a completely satisfactory method of providing the necessary number of monitors in a large space to give adequate coverage. Projected television may be the answer when it is technically refined to permit large images.

Integration. A coordinated color scheme and detailing system should provide direction and accent on the focal area. The display surfaces and various equipment should be visually as well as mechanically integrated; it is not enough simply to hang screens at the front and spot projectors at the rear of an auditorium (Fig. 2). Adjunct areas are of great importance: the preparation, storage and projection areas must be well thought out as to access, circulation and servicing.

As a very direct method for improving the utilization rate of auditoriums for instruction, institutions, particularly colleges, have considered the concept of the slide-on or rotating stage. With the increasing use of lecture-demonstrations, and the hours required to set up and take down demonstrations prior to and after class, the auditorium is often rendered unavailable for use for many hours of the day. By setting up the demonstration on an "out-of-position" sliding stage or section of a revolving stage, it is a simple matter to rotate or slide on the stage during the class break, thus placing the demonstration in position for the next class. Set-up, take-down and use of the auditorium for instruction can go on simultaneously (Fig. 3). The mechanical devices for moving the stage, and the necessary adjunct preparation and storage areas, make it an expensive solution; but use may be doubled or tripled.

One further development to consider is the auditorium-studio used for instruction and as the nucleus of a television production center. The front of the auditorium permits extensive lecture-demonstrations, and the televising and/or recording of them for instantaneous or "canned" instructional uses elsewhere on the campus. In addition studio and shop space, as well as the other adjunct facilities, are incorporated in the auditorium studio complex (Fig. 4).

Up to this point we have discussed design criteria for the auditorium when conventional use, plus instructional use, add up to economic feasibility. If, however, conventional auditorium facilities cannot be justified, or if they already exist, there are alternatives.

A large group can be brought together for instruction by inter-connecting a number of smaller spaces with closed circuit TV. The instructor in the studio lectures to all, and can still have all the aids and media at his disposal. In fact, the instructor in the TV studio is in a very enviable position, with the advantages of remote TV cameras, slide and film chains, taped materials, the selective eye of the TV camera, prompting devices and all the other developments in the art of television for instruction. All that is lacking is the "live presence," and many persons feel that this may well be offset by the versatility of a well-designed and coordinated TV system. In addition a series of small spaces (large classrooms) have the inherent advantage of permitting higher utilization, as many institutions have a critical shortage of classrooms in the 50 to 150 size. If existing facilities of desirable capacity are available, they can be remodeled and utilized as part of the interconnected classroom system. An institution may be farther ahead, economically and educationally, to inter-connect a series of classrooms, either new or converted, with a well-equipped, centralized communication center than to build one large, expensive auditorium with questionable utilization. The various capacities offered by different combinations of spaces provides a degree of flexibility and utilization impossible with a single large auditorium (Fig. 5).

Another alternative is the use of operable partitions to subdivide an auditorium into sections to accommodate smaller class groups. This idea has been much discussed, and at least one new facility in the country is based on such a concept. Probably in secondary schools, there is justification for such an approach; the key to even further experiments is reduction of the high cost of a completely satisfactory operable partition. In addition, it must be realized that when a space is to be so divided, both the large space and the subdivisions will fall somewhat short of fulfilling all the ultimate requirements.

The question of auditoriums thus holds a real dilemma for school and college administrators: "Can we justify building a large space, with problems of utilization, to house a single large group; or is it better to house the group in a series of small spaces interconnected by use of electronic devices permitting better utilization; or do we try to subdivide the auditorium to achieve both solutions in one?"

It may well be that the large auditorium for instructional purposes is a thing of the past, made obsolete by the changes in instructional methods and the problems of utilization. In turn, it is the development of the aids and media that permit an alternate solution of interconnected large classrooms. The auditorium designed and equipped to permit functioning as an excellent instructional facility is expensive; its potential utilization should be realistically calculated and balanced against the alternatives. Most institutions will want to avoid having a new, expensive, well-equipped *and vacant* auditorium in their plant, while classrooms remain overcrowded.

AUDIO-VISUAL SYSTEMS FOR LARGE GROUP INSTRUCTION

By Hubert Wilke, Director, Industrial and Educational Services, TelePrompTer Corp.

Five factors of urgency have recently been identified as creating the need for the development and application of modern technology if higher education is to meet the challenge.

"New Spaces for Learning," a report of a research project on instructional aids and media conducted by the School of Architecture of Rensselaer Polytechnic Institute and supported by the Educational Facilities Laboratories, Inc., lists these factors as follows: (1) rapidly expanding enrollments; (2) shortage of faculties and facilities; (3) need for a higher quality of education; (4) need for improving the organization and presentation of knowledge; (5) increased emphasis on education.

In reviewing aids and media, the R.P.I. report was concerned principally with those affecting space design, like projection devices, nonprojection devices and television. The report continued: "Many times, a system of devices is involved and their joint rather than individual functions may govern. Relatively little has yet been done to provide appropriate spaces in which to employ these techniques of instruction to their full advantage. . . ."

At the secondary level, there is equal urgency in such matters and I quote Doctors Trump and Baynham in their Guide to Better Schools: "Tomorrow's schools, with more flexible scheduling, will be able to arrange as many large classes as curriculum plans require. Combined, these purposes suggest that about 40 per cent of a student's time in school will be spent in large classes. The National Association of Secondary-School Principals' experimental studies found much success with large-group instruction. It also makes technological equipment more economically feasible. Many schools which can't afford these aids for five or six usual classes will be able to equip a single large one."

Although opinions regarding instruction may differ, there is little question that lecture halls or large-group areas of varying sizes are being built or remodeled at a rather startling rate. For this reason, the observations that follow are confined to requirements and solutions with regard to the integration of audio-visual systems to accommodate large-group instruction. In the interest of clarification, we will define "large group" as a lecture hall seating from 150 to 600 and/or an auditorium accommodating from 600 to 1,000. It should be made very clear that in any individual institution, the design of audio-visual systems must be based on the educational philosophies and curricula of that institution and must grow out of a clear statement of educational requirements and needs.

Most current design layouts reflect certain principles evolving from the thesis that "optimum use of instructional aids and media requires new concepts of space types and their design." Following is a brief statement of the 16 more important such principles as summarized in the conclusions of the R.P.I. study.

1. An optimum viewing area, as defined by the various images to be viewed, will determine the most effective room shape. The optimum area is not a fixed function of the screen or monitor size, but will vary with the type of material being viewed, the duration of the presentation, the quality of the equipment, and factors of environment.

2. Stepped or sloped floors will provide the best viewing conditions in all rooms; in the smaller rooms they may not be feasible. In the large rooms sloped floors are essential for good sight-lines; steep gradients in spaces designed for lecture-demonstrations do not appear justified, as they are wasteful of space and reduce the effectiveness of the space for other functions. Magnification of critical aspects of a demonstration can be accomplished by projection techniques or television. In smaller spaces, the need for rearrangement of seating may render stepped floors objectionable.

3. The actual capacity of a space, as defined by a viewing area, is a function of the seating type and arrangement, and applicable building codes. Adequate writing surfaces and stepped floors tend to imply fixed seats and continuous tables for the larger spaces. Building codes usually limit to 14 the length of a row of seats, although wider row spacing (continental seating) will permit longer rows. Center aisles are to be avoided, as they occupy the best viewing area. In the smaller spaces, a seminar arrangement of seats, as opposed to a focused arrangement, will probably reduce the capacity.

4. Windows in the learning spaces, whether the spaces be large or small, are a liability rather than an asset. Two of the major functions of windows are to introduce daylight and provide visual contact with the out-of-doors. Both detract from the most effective use of aids and media.

5. All learning spaces should be air conditioned. With the absence of windows, mechanical ventilation becomes a necessity. Cooling will generally be required, even in cold weather, not only to remove the heat generated by occupants and equipment, but also to provide a stimulating environment.

6. Proper acoustic treatment in all rooms and sound isolation between rooms are essential. These involve no unique problems as far as treatment of surfaces and use of material are concerned, but several important details do require particular attention. A means must be employed to isolate the noise of all projection equipment, and careful attention must be paid to preventing sound transmission through ductwork systems. In addition, a single, high-quality, carefully designed sound system should be provided for distributing the audio element of any of the aids.

7. Carefully planned, special lighting is a prime essential to the proper functioning of these spaces. Lighting levels for both the writing and surrounding surfaces should be carefully related to image brightness, and variable intensities, appropriate to each instructional device, should be provided. In addition, ample illumination for conventional lecture and discussion purposes is necessary. All controls should be preset and coordinated with the devices, and located for ready operation by the instructor.

8. From initial stages of design the mechanical, structural, acoustical and lighting elements must be considered together as coordinated systems. Design of one system without regard for the others may seriously impair their later accommodation.

9. A conscious effort toward carefully designed color schemes in the rooms, and between rooms, is desirable. Color, as a function of lighting is critical in these rooms, as there are no windows for visual relief and because lighting and surface reflectance must be carefully planned for optimum viewing.

10. In designing the spaces, aids and media should be considered with instructional methods as integrated systems, not just as pieces of equipment to be included in the spaces. As an example, a projector and its required screen are not independent items to be accommodated, but must be closely related.

11. The concept of a coordinated "display surface" or "teaching wall" should be encouraged. This is to integrate and coordinate within an appropriate area as far as possible all instructional materials.

12. Whenever feasible, projection equipment should be centrally located in a "projection center" or "area" and should be remotely controlled by the instructor. (The possible exceptions are the overhead, opaque, and shadow projectors.) In this way, the instructor remains at the front of the room, continuously in control of the presentation. Such an arrangement also permits one to ready equipment during a class.

13. There are no overriding advantages of either front or rear projection to the exclusion of the other. Particularly in the larger spaces, either one may be appropriate depending on the functions of the space, personal preferences, and the nature and amount of space provided. Some of the disadvantages of either may be overcome by indirect projection (using mirrors).

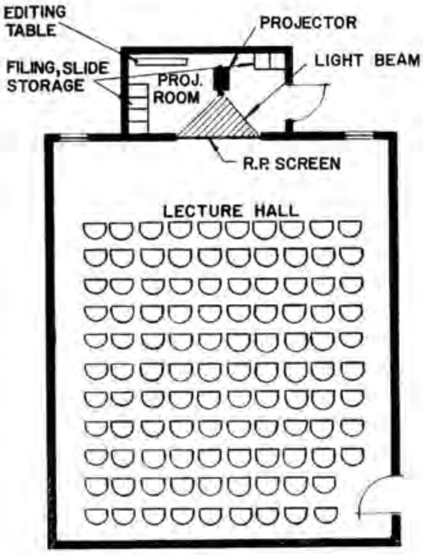


Figure 1. Rear screen projection with a single projector and room for storage of films, slides, tape, editing table

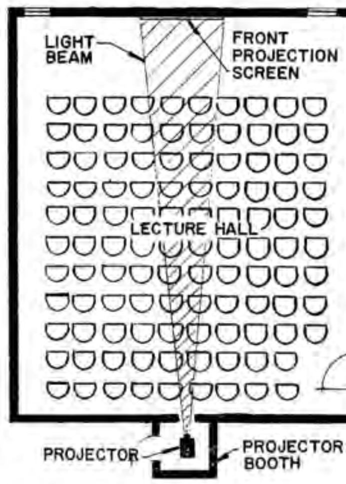


Figure 2. Conventional front screen installation

14. Particularly in larger spaces, a single, large, projected television image has definite advantages over a number of small monitor images scattered about the spaces. At the present time, economic and functional limitations of the equipment may require a number of monitors.

15. The adjunct service spaces which support the functioning of a learning space require careful consideration. These include preparation and storage areas. As a rule, they become more extensive, and their planning more critical, as the learning spaces become larger.

16. Flexibility, a term with multiple meanings and implications for design, should be carefully analyzed and evaluated for each situation. Flexibility of functions within a space may be achieved by designing for the use of a variety of instructional aids and media. In the large spaces, flexibility of function may be increased by use of multiple platforms, either slide-on or rotating. Flexibility between spaces by use of "flexible partitions" is possible, but not always feasible: a variety of spaces may give flexibility by scheduling of the spaces.

Perhaps the most important consideration, once the seating capacity has been determined, is front or rear projection, since this vitally affects the deployment of two major space areas, student seating and the projection room.

For such obvious reasons as available dollars and national emergency, most of the advances in the state of the audio-visual art have been an outgrowth of use and evaluation by our armed forces. And it is interesting to note that over the past several years, the nation's key military command posts have favored rear over front projection. Rear screen projection is simply the use of professional projection with a wide angle lens casting its transparency image on the rear surface of a translucent screen. In its simplest form, the set-up is as shown in Figure 1. Obviously, there are advantages and disadvantages to either approach; but for application in a lecture hall, our experience indicates that the following plus factors tend to tip the scales in favor of rear projection:

1. The distraction of projection noises and heat along with the presence of an operator are kept out of the lecture hall.

2. No shadows are cast on the screen by either the instructor pointing out visual information, large demonstration apparatus or the movement of students in the lecture hall.

3. None of the projection equipment is visible to the audience.

4. Higher room light level permits note-taking, etc.

5. Wide viewing angles permit

good sight-lines branching out from each side of the screen.

6. Slides and film can be loaded in the projectors ready for subsequent presentation during a class.

Figure 2 shows conventional front screen projection. Note that the viewers are subjected to the distraction of an operator and that no one may intrude on the light beam without casting a shadow on the screen. For best results, the room should be semi-dark and projection equipment and cables cannot be left to clutter the lecture room area.

Obviously, rear projection requires more space than projecting from the front, but the difference by no means constitutes waste space. On a cost-per-foot basis, the rear screen area is the most logical location to accommodate an editing table and storage for frequently used films, slides, tape, etc. The use of such space on both sides of the rear projection room provides a centrally located, highly flexible communications center. The following is a realistic guide of rear projection space dimensions for large-group-instruction areas seating:

Number of Students	Width	Depth
100	20 ft	14 ft
300	20 ft	17½ ft
650	20 ft	21 ft
1,000	20 ft	25 ft

With use of mirrors (Figure 4) approximately four feet can be eliminated from the above figures indicating depth requirements. Mirrors are recommended only when the required space is not available.

Advancements in the art of both screens and projectors lead this observer to believe that rear projection will, in the next decade, dominate all audio-visual space areas designed for 100 to 600 students.

Indicative, however, of the need to be flexible is the recent project worked out for the new Darien, Conn., high school auditorium; J. Stanley Sharp, architect. The Darien project constitutes a divisible auditorium seating 1,200 students, patterned after the Boulder, Nev., prototype. Unlike Boulder, however, the challenge at Darien was to deploy space so as to accommodate flexible audio-visual presentations in a combination of four possible space arrangements, three of which

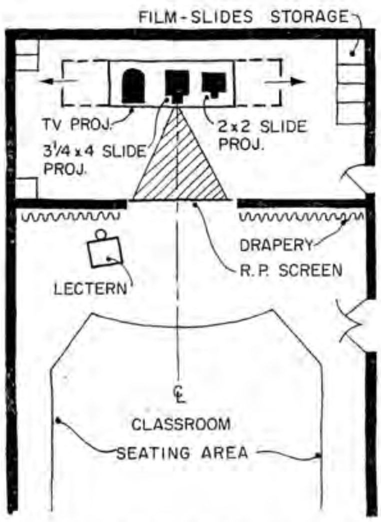


Figure 3. Horizontally rolling table moves to place any one of three projectors on a screen

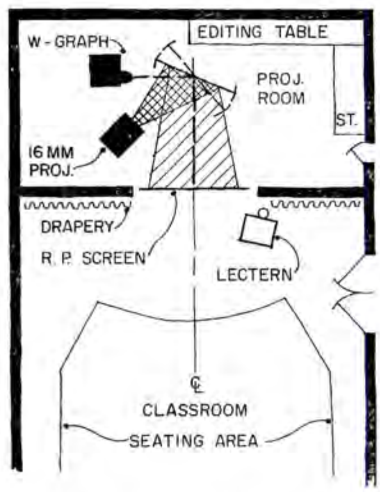


Figure 4. Pivoted mirror reflects image from one or the other projector

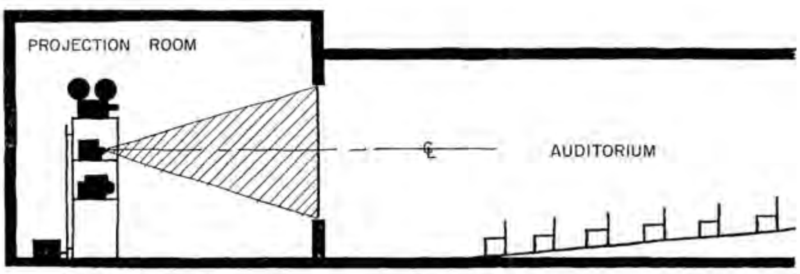


Figure 5. Vertical elevator table uses any of three projectors on optical centerline. Table weight is counter-balanced and operated by motorized lift mechanism

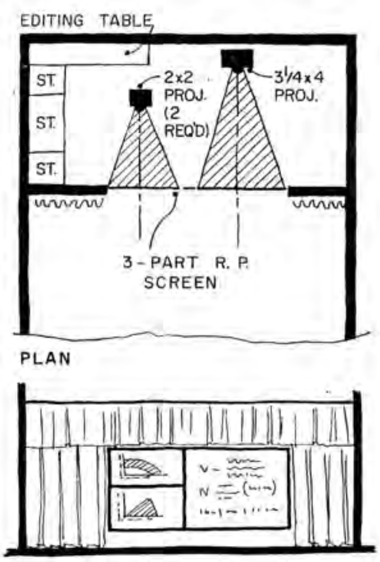


Figure 6. Three-part screen. Note: 2 by 2 projectors are placed one above the other

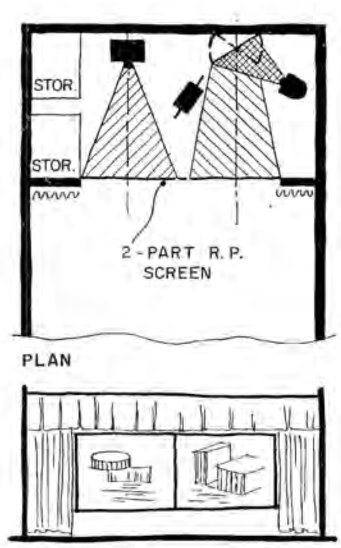


Figure 7. Two-part screen. Note use of multi-plexer to give a 3-projector capability

Figure 8. A typical three-part screen installation

Figure 9. A typical projection room with space-saving mirrors

may be in use simultaneously (see p. 165). As shown, a combination of rear and front screen projection was utilized to meet the rather complex and intriguing requirement of servicing three rooms simultaneously.

Concurrent with the decision of rear versus front projection, it is desirable to discuss the various projection devices and sound requirements for each individual installation. It is at this point that the architect often finds himself somewhat trapped. Very often, the owner may either not know specifically the broad range of equipment that may be necessary to meet the requirements of staff members, or he is unable to guarantee the amount of equipment that will be purchased for immediate installation.

The architect, obviously not wanting to be boxed in with his specifications should the owner desire to add equipment before the building is completed (or at a later date), finds it exceedingly difficult to tie down all the requirements for a maximum installation, thus assuming adequate protection for his client. Regardless of the initial equipment purchase, the experienced consultant will approach the problem with an eye toward what may conceivably be required well after construction is completed and the space area is in use. Space requirements, conduits, outlets, power, heat load requirements, etc., are incorporated in preliminary design layouts to accommodate maximum flexibility, thus protecting against costly reconstruction at a later date.

In a consultancy for the University of Texas, working with Colbert, Lowery, Hess and Bourdeaux of New Orleans and George Dahl of Dallas, we recently included in design layouts, provisions and specifications for a language translation system to each student's chair, as well as an individual student response and feedback capability. Although the latter type of system may not be economically practical for several years, the client has been protected and will not have to rip up the floor of a new building because ample conduits and allied provisions have been incorporated into the initial construction.

With the increasing requirement for integrated audio-visual systems, pre-planning and the submission of complete design layouts become vital and save untold dollars and frustration at a later date.

Today's state of the art also requires evaluation of the multi-screen concept and the various means of multi-plexing projectors for extended audio-visual flexibility. "Multi-plexing" (Figures 3, 4 and 5) refers to the capability of projecting images from any one of two or more preset projectors such as 16 mm film, 2- by 2-in. and 3½- by 4-in. slides, and projection television onto a single screen. The call-up of a particular projector is usually done automatically by remote finger-tip control by the lecturer.

The multi-screen concept (Figures 6 and 7) utilizes various rear projected visual devices, permitting the instructor to present sequential and related information visually, or to store visual information while retaining the central theme, as illustrated in the photograph of a multi-screen installation at the University of Wisconsin (Figure 8).

Thus in the systems approach, almost any kind of projection equipment from various manufacturers can be adapted for remote-controlled rear projection. It is mandatory to design space areas with the flexibility to accommodate configurations most suited to the requirements of a given room. To illustrate the point, one need only to glance at the design layout for the new Engineering Quadrangle at Princeton University. For here, working with Voorhees Walker Smith Smith and Haines, we deployed space to accommodate rigid requirements with a minimum budget, and to provide maximum audio-visual flexibility between two rooms. (Figure 9). Through the use of large front surface mirrors and motorized elevator tables, four projectors can be optically centered to any one of a total of six screen areas (three in each room).

By prior determination the central control room area fills the rear projection requirements of either of two rooms. The space design provides for the inclusion at a later date of duplicate equipment to allow simultaneous projection to each room from the central control area.

In addition, the innovation of large-screen, closed-circuit television utilizing a vidicon pick-up from an originating table next to the lectern successfully enables the professor to project miniature items such as a rare coin or pages of a book, or even to write equations which will appear behind him many times magnified for definitive viewing by each student in a class of 300. This technique is called visual amplification, and the instructor can just as easily project an off-the-air TV program (such as an orbital flight or Telstar) for viewing by the entire class on one large screen.

In a truly integrated audio-visual system (as now in operation at Wisconsin University, R.P.I., and Chicago Teachers College), all audio-visual devices may be pre-programmed to activate automatically on exact word cues as the speaker delivers his text; or all projection sound and lighting may be activated for a multi-screen installation completely by finger-tip remote control from the instructor's lectern.

The cost factors involved in the systems approach obviously vary, depending upon the extent of all the components and design requirements. A basic minimum system ranges from about $12,000 to about $22,000; a rather sophisticated system, including the full range of teaching aids and media, and the ability to pre-program the activation of all effects, costs approximately $30,000 to $35,000. The above figures all include: (1) design layout of space, stipulating conduits, terminals, heat load, etc.; (2) all equipment with required adaptations for an integrated system with remote control; (3) installation and operational training of those involved.

At this point, you may well ask: how is the architect to keep abreast of all the technical developments in the relatively small (by comparison) area of audio-visuals, in addition to the constantly changing requirements of a multitude of major building specifications? The obvious answer is that he can't, unless there is a specialist in the house or unless he accepts the need for an outside consultant specializing in the audio-visual art. Just as it has now become customary to consider lighting, acoustics, air conditioning and interior design in terms of improved work levels and attitudes, rather than as costly "frills," so, too, must equal consideration now be given to the art of group communications.

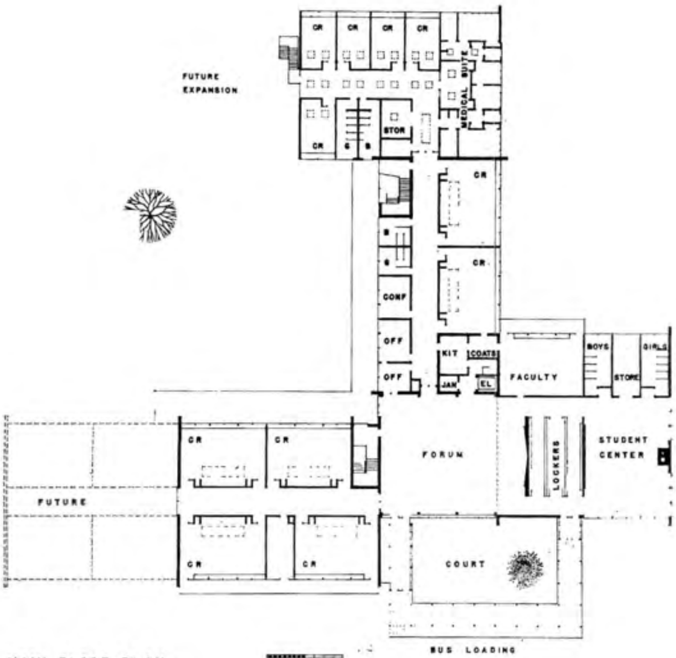
A SUPER-MULTI-PURPOSE AREA FOR A JUNIOR ƷH

Beekley Building, The Tatnall School Inc.
Wilmington, Delaware
ARCHITECTS: *Victorine & Samuel Homsey*
CONTRACTOR: *Rupert Construction Company*

Joseph W. Molitor photos

The Beekley Building, shown here, houses the junior high school section of a private school containing grades one through twelve. The hub of this building is a very "multi-purpose" room, which the school has called a "forum." On its functions, the architects state:"The space is available for many uses —entrance lobby, auditorium, ballroom, examination hall, exhibition hall, lounge, banquet hall, theater, concourse—and it is equipped and serviced for these uses; however, it has no obvious fixed facility or character which would define the area for any one use which would have to be overcome or overlooked if the area is to be used for some other purpose. In this way the space escapes the mélange of equipment and furniture characteristic of most multi-purpose rooms."

The structure is steel, with exterior walls of brick and porcelain enamel panels. Interiors are birch plywood. Floors are concrete slab, covered with resilient or ceramic tile. Ceilings are acoustic tile. A student center and locker area adjoins the "forum," and borrows its space for daily use.

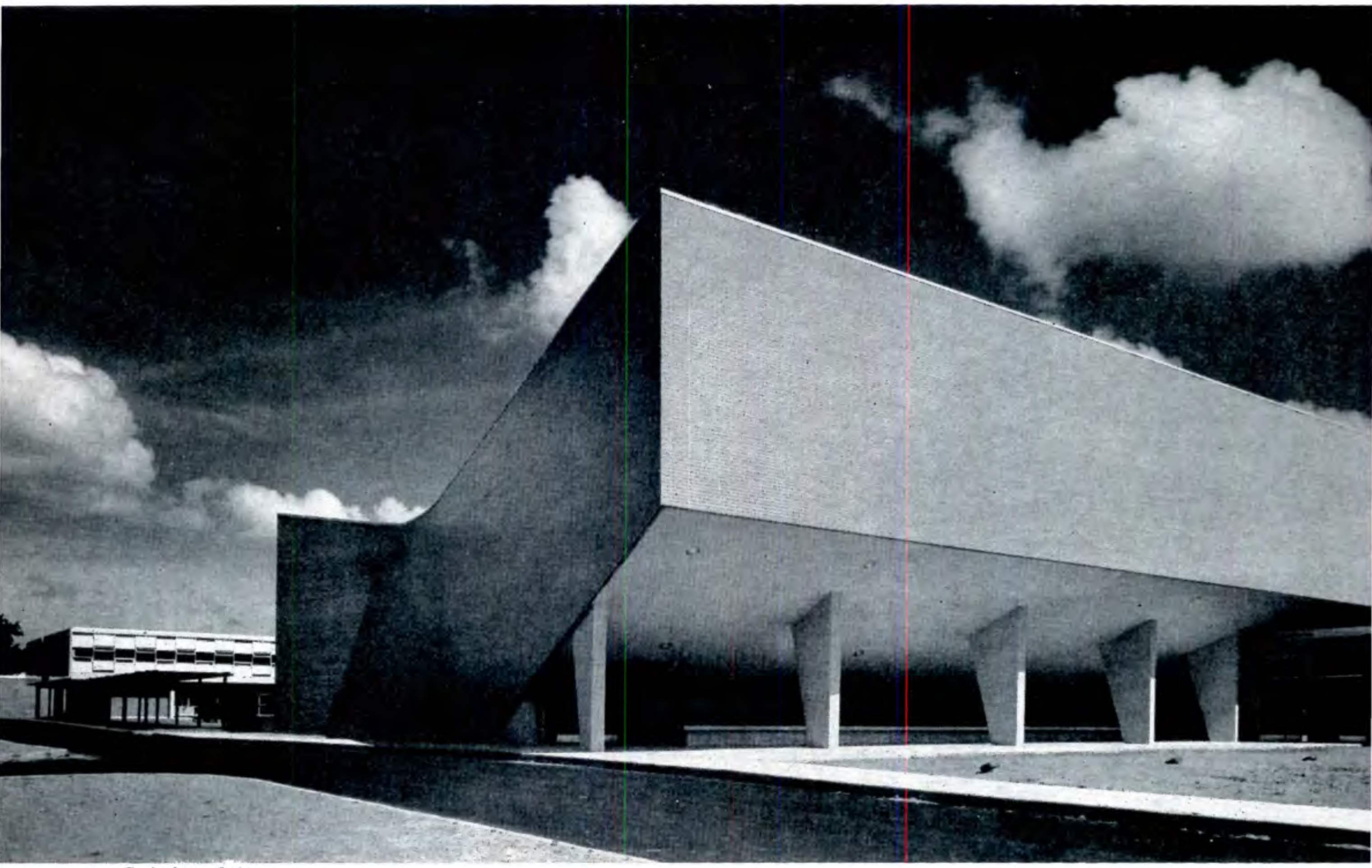


MAIN FLOOR PLAN

LONGITUDINAL SECTION

AUDITORIUM'S SHAPE REFLECTS INTERIOR FORM

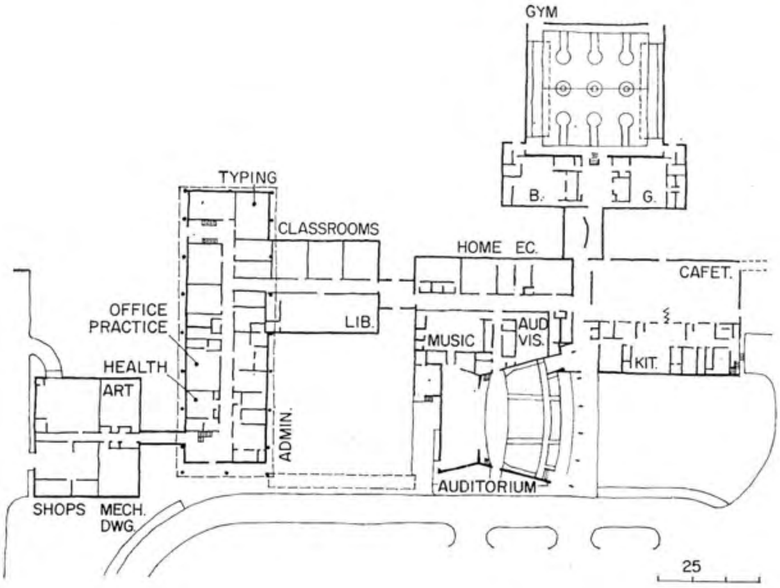
Harborfields Central High School
Greenlawn, L. I., N. Y.
ARCHITECTS: *Ketchum and Sharp*
MECHANICAL ENGINEERS: *Tectonic Associates*
STRUCTURAL ENGINEERS: *Severud-Elstad-Krueger-Associates*
SITE ENGINEERS: *Zion-Breen*
CONTRACTOR: *John Oechslin, Inc.*



G. Amiaga photos

The arresting form of this new auditorium forms a central feature for this high school addition. Ketchum and Sharp first designed an elementary and junior high school for the site, which was subsequently added to and converted entirely into a junior high facility. The first unit and the new high school shown here are linked by a covered walk, and are integrated as far as such major facilities as cafeteria, auditorium and gymnasium. As added enrollment is expected in the years to come, the two-story classroom wing was made compact to allow for additions. The joint facilities are sized for this expansion.

As can be seen from the section, the auditorium shape is directly derived from its interior form. The architects state that "the cantilevered auditorium was more economical and simpler to build than if the entire space had been enclosed." The exterior is blue glazed brick; the structure is steel and concrete; interiors are concrete block, tile and brick. The area under the cantilever of the auditorium serves as a spacious covered entrance to the joint facilities of both the junior high and the senior high schools.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CLASSROOMS
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SHOPS
MECH. DWG.
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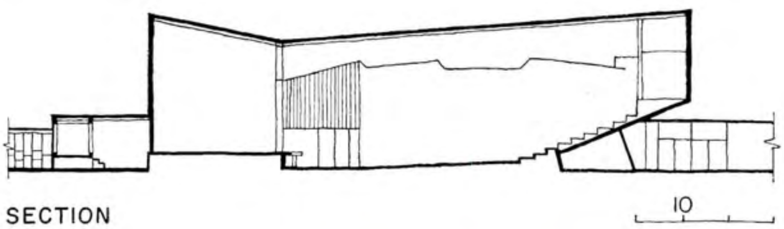
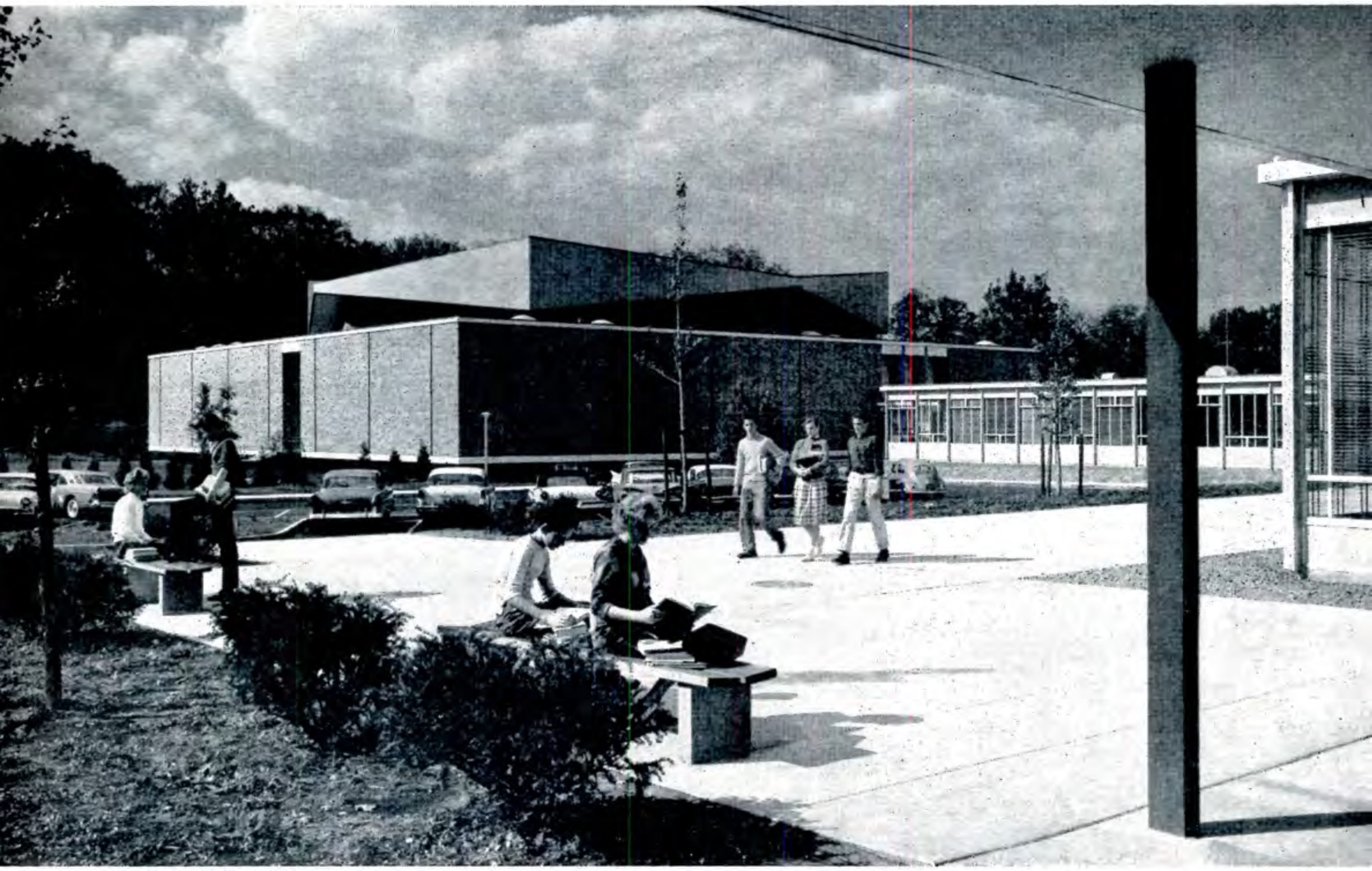

SECTION
10

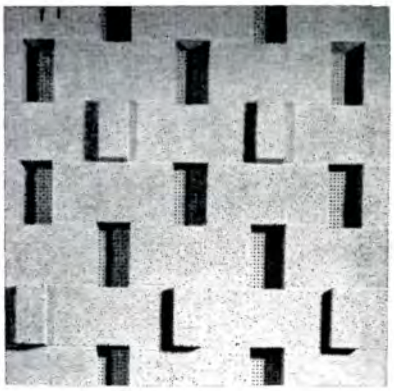
AUDITORIUM "ON THE BIAS" ADDS USEFUL AREAS

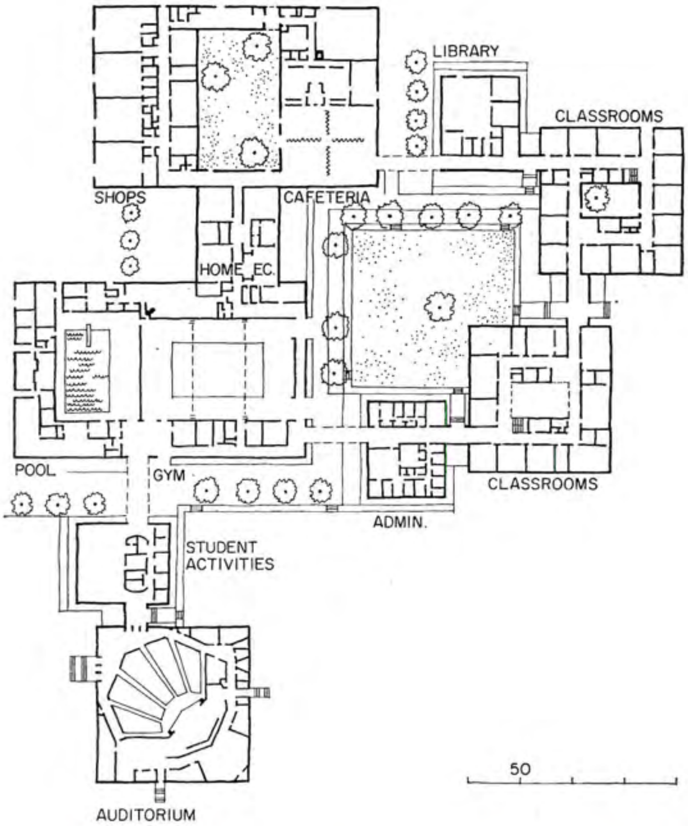
Ithaca Senior High School
Ithaca, New York
ARCHITECTS: *Perkins & Will*
STRUCTURAL ENGINEERS: *Garfinkel & Marenberg*
MECHANICAL ENGINEERS: *Segner & Dalton*
ACOUSTICAL ENGINEERS: *Bolt, Beranek and Newman, Inc.*
SOIL ENGINEER: *Bik Hough*


Joseph W. Molitor photos

This extremely pleasant campus-plan school has a three-year comprehensive program for grades 10, 11 and 12. All students follow a basic curriculum in English, history, health and physical education; specialties are offered in agriculture, art, business, languages, homemaking, industrial arts, mathematics, music and science. Facilities for these are housed in nine units connected by open and closed corridors. In addition, the facilities are planned to serve adult classes and community groups on evenings and weekends.

The auditorium is arranged with a hall for 1,000 placed on the bias to give room on the periphery for side work areas and the music department consisting of studios, practice rooms, and a choral and band room with accompanying instrument and uniform storage. The structure is of brick, with a steel frame roof. Interior walls (note detail photo) are concrete block, set in a perforated pattern for acoustical treatment. The ceiling is acoustical plaster, and floors are asphalt tile or vinyl asbestos tile in circulation areas. A student lounge adjoins the auditorium for extra lobby space.




LIBRARY
CLASSROOMS
SHOPS
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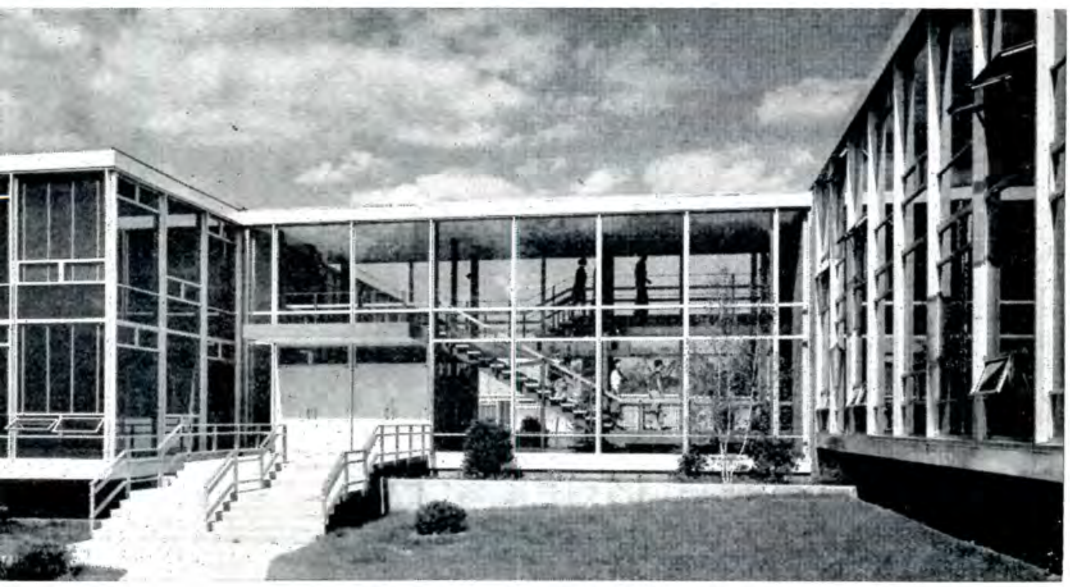
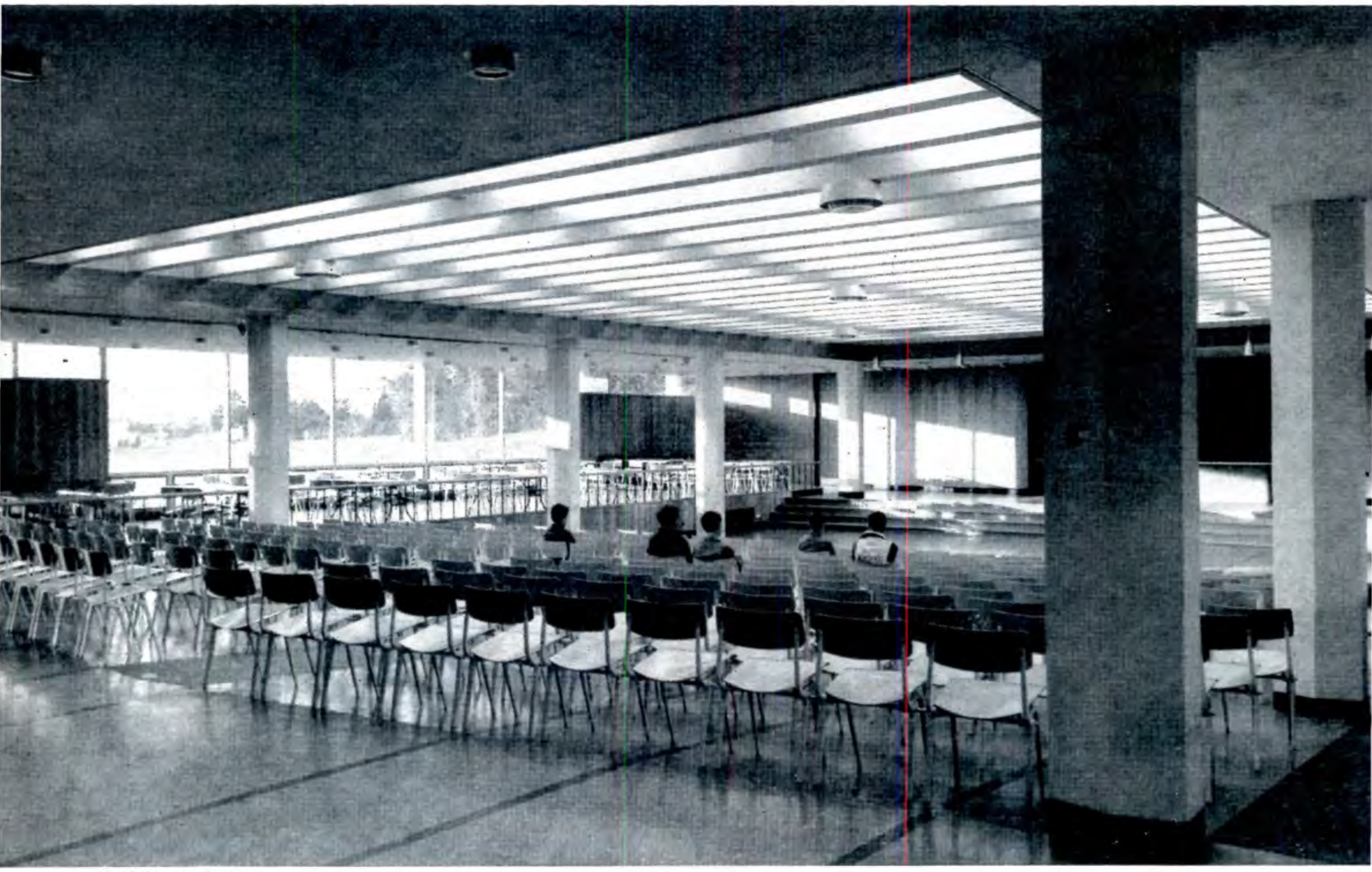
GYM
CLASSROOMS
ADMIN.
STUDENT ACTIVITIES
50
AUDITORIUM



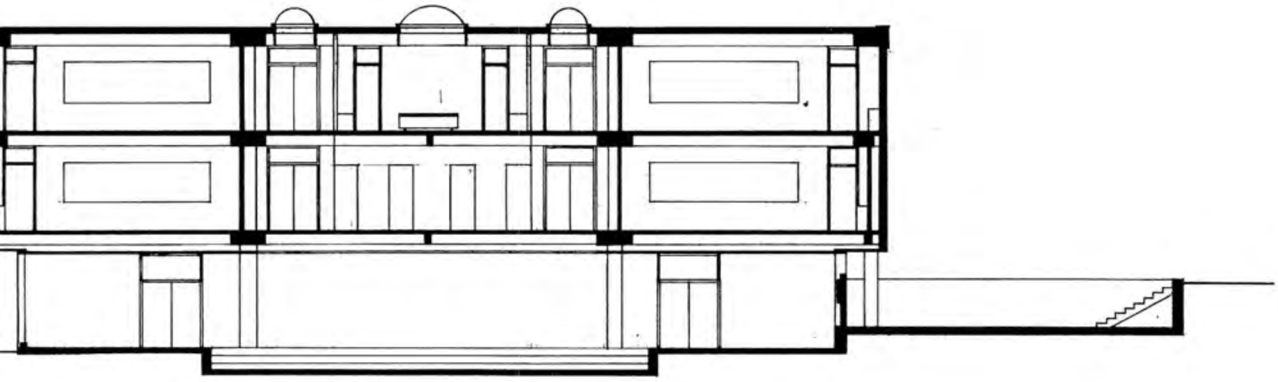
OPEN CORRIDORS AUGMENT SPACE IN CAFETORIUM

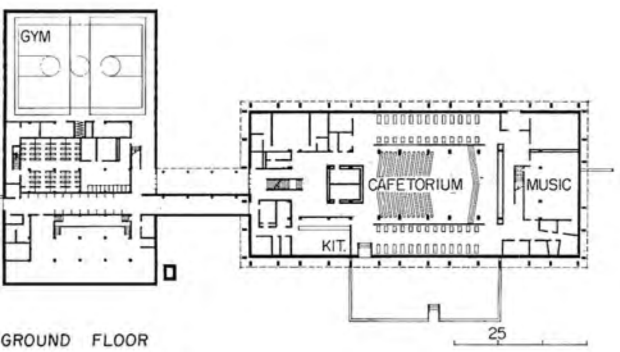
East Junior High School, Walpole, Massachusetts
ARCHITECTS: *Shepley, Bulfinch, Richardson and Abbott*
STRUCTURAL ENGINEERS: *Abraham Woolf & Associates, Inc.*
PLUMBING ENGINEER: *Daniel J. Sullivan*
HEATING ENGINEER: *Alfred Y. Christie*
ELECTRICAL ENGINEERS: *Cleverdon, Varney & Pike*
CONTRACTOR: *J. L. Marshall & Sons*



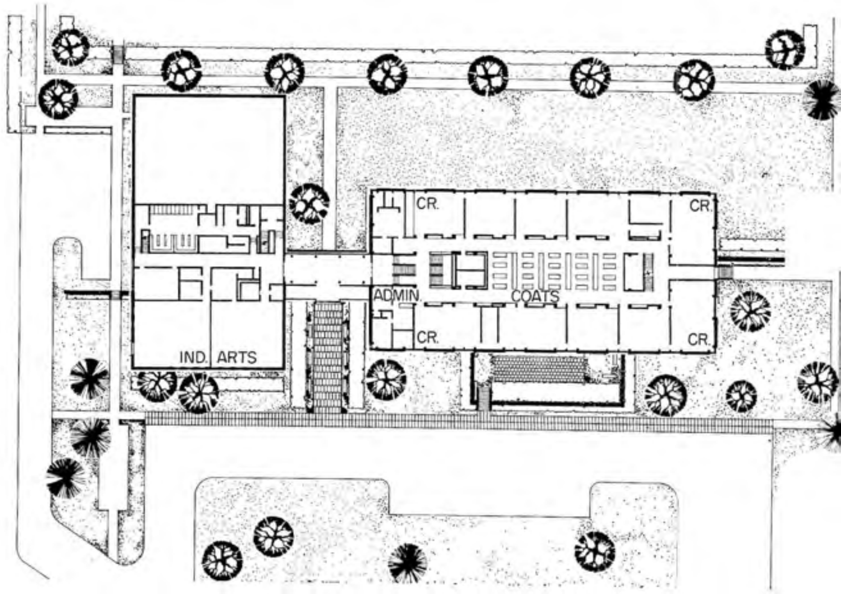
Louis Reens photos

A somewhat unusual solution for the auditorium problem was found for this junior high school. As the educational curriculum indicated that an auditorium would be required for student use only once a week, it was decided that (for this particular school) this facility could well be combined with the cafeter a. It was further decided that placement under the classroom block, with the auditorium seating between the center structural bay, permitted less ground coverage, and saved the cost of a separate wing. The central location is suitable for student activities, as well as having direct outside access for public use at night (note section and the exterior photo at right). The side aisles, at a slightly higher level, provide space for extra seating as a sort of balcony, and give a separated area for limited dining if the lower level is set up with seats for assembly use. The pit area slopes two feet towards the front for half the area, and has fixed seats; the other half is flat, with removable chairs. The stage is at the general floor grade and has steps for seating for "theater in the round" productions, or as access to the stage apron.

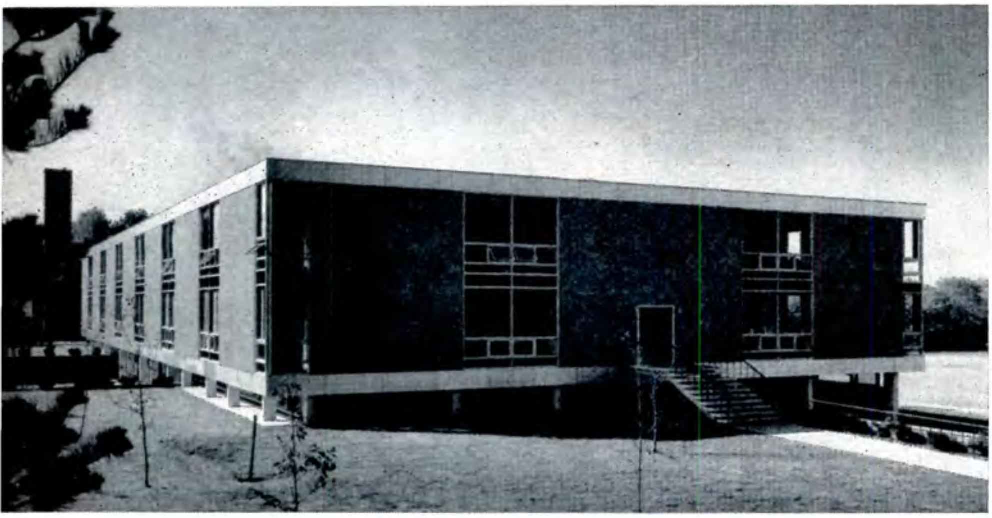




GROUND FLOOR

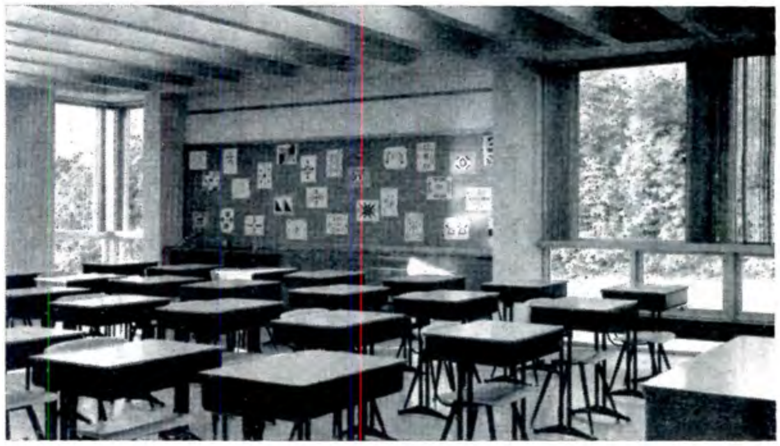


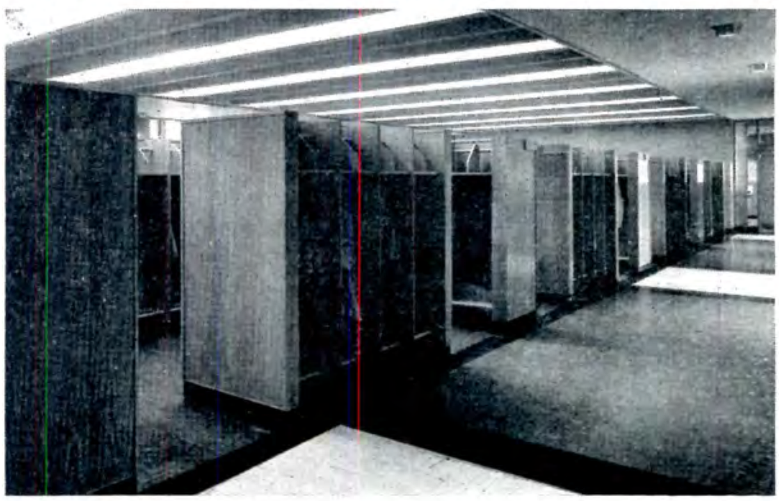
FIRST FLOOR

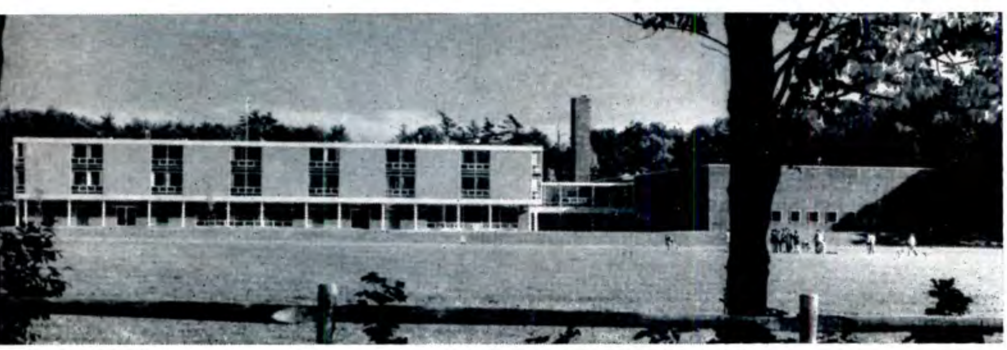


East Junior High School
Walpole, Massachusetts

The school has a concrete frame for the most part (steel for the gymnasium wing). The exterior of the main block is stucco on concrete block and metal lath, brick for the gym. All interior walls are painted cinder block, unglazed manganese block, or vertical oak boards. Floors are bluestone, vinyl asbestos or ceramic tile on concrete slabs. Ceilings in classrooms and cafetorium are exposed concrete joists, travertine acoustic tile in other areas







Architectural Engineering

On Engineering Education

Engineering students should be separated horizontally into a pyramid based on native talent and brain power, as well as vertically into branches of engineering, believes Rear Admiral Peter Corrandi, chief of the Navy's Bureau of Yards and Docks.

"Let us train each man to the extent necessary to fit him for the level of engineering work he can perform efficiently," said Corrandi, "And then let us encourage him to specialize [at that level].

"Why, in the face of increasing complexity in the practice of engineering," he asked, "do we persist in trying to steer all kinds of engineering prospects . . . along the same educational path? Like thoroughbred race horses, not all of them are bred to go the distance. What will it profit us to attempt to force them?"

Centennial of Electric Light

Commercial electric lighting was a hundred years old last month. On September 4, 1862, New York's Edison Electric Light Company turned on 400 incandescent lamps in the establishments of 59 customers which included Sweet's Restaurant on Fulton Street, *The New York Times, The New York Herald* and the banking house of Drexel, Morgan & Co. The biggest crowds that night, according to a hundredth anniversary story in *The New York Times,* were at Sweet's, where Thomas A. Edison's incandescent lamps sparkled in chandeliers.

Centennial of the Sidewalk

Incidental Information Dept.: Did you know the French invented the sidewalk? A friend of ours called our attention to a 1929 newspaper clipping announcing the centennial of Paris' sidewalks which they called the "trottoirs."

"Few anniversaries," said the *Petit Parisien,* "emphasize more pertinently the great contrast between the age when the Grand Boulevards were almost as safe for the pedestrian as country lanes, and this mechanical age of speed and time when even to cross from one "trottoir" to another is at the hazard of life or limb."

Ah, that was Paris in 1929. Been in New York City lately?

The Blunt Fact of Height

Acrophobia (morbid dread of high places) in one of the new Montreal skyscrapers has been mitigated by the "rushing" tactics of an operating engineer, according to a story issued by the Canadian Press news agency. Secretaries refused to walk near the windows of one lofty office space for fear they might trip and fall through the glass, the story said. Company officials had the engineer run the length of the office and hurl his "200-pound frame against the window. He bounced back with a thud, retrieved his [steel safety] hat and silently returned to his duties in the basement."

On Esthetics of Bridges

Some very quotable quotes came out of the festivities marking the opening of the second deck of the George Washington Bridge, relating specifically to its designer, octogenarian Othmar Hermann Ammann of Ammann and Whitney. Both quotes are from *The New York Times.* The first was in a profile of Mr. Ammann: "He enjoys art in all its forms and has said that 'an engineer is justified in making a more expensive design for beauty's sake alone'." (Take heed, other engineers!) The second comes from an editorial the following day: "Someone has said that it is impossible to make an ugly suspension bridge. The towers and the curves of the supporting cables solve a problem in esthetics as they do in engineering. But the George Washington Bridge is something special. . . . This bridge is not steel alone; it is not merely a machine or an engineering device for . . . crossing running water and feeding traffic into bottlenecks; no, it is as much a picture as any that hangs in any museum."

This Month's AE Section

PRECAST JOINERY: MANY LESSONS TO LEARN

By Laurence Cazaly, Cazaly Associates, Toronto

Grosvenor House in Winnipeg is one of the tallest precast structures in North America. On these grounds it may be thought by some to be newsworthy, and by others to contain some worthwhile ideas. The lessons to be learned from this structure, however, have little to do with statistics of this nature.

Lesson 1: *Classic and romantic schools have as much place in engineering as architecture*

Each building material has engineering characteristics which change the principles of design. For example, aluminum is used for light structures and is therefore usually present in the form of thin sections. Since it has also a low modulus of elasticity compared to its strength, the skill in designing aluminum lies in overcoming buckling, excessive deflections and fatigue. Thus a highly theoretical understanding of structural form is desirable.

In contrast, reinforced concrete is comparatively cheap and heavy, and since it is a composite material its behavior cannot be deduced directly from the theory of elasticity. Concrete is most likely to fail in ways which can be guessed but not analyzed. Concrete design, particularly precast concrete design, is therefore largely a matter of detail.

The emotional impact of a material on an engineer is therefore quite different from its impact on an architect.

Sizing the members of Grosvenor House took but a few hours. Connecting the pieces took weeks of grumbling, sweating and the highest professional discipline. The discipline lay in the necessity of working for greater and greater simplicity long after the problem became tedious. Of all aspects of structural engineering this is the least glamourous.

(There is a paradox here. Concrete

attracts glamour-seeking student engineers because of the striking forms in which the material can be cast. Only the most determined retain their ideals after a few years of practice.)

Lesson 2: *Never experiment with everything at once*

The main difference between the professional and the amateur is experience and discipline. The professional gradually acquires a library of solutions which work. The most original designers may be defined as those who keep building their library. The fact that original designs can be recognized as characteristic of their designers shows how much of the tried has been retained.

In Grosvenor House there were many new problems because of the size and shape of the building. The methods used were therefore old methods with which we were completely familiar. All connections are made of mild steel components, bolted and welded. As an example of this school, Grosvenor House is extremely sophisticated. The following details will show, however, that even the most complex connection can be described in terms of the simple basic components.

Lesson 3: *"Structure" is not a visual phenomenon akin to "form"*

The increasing use of exposed structural members for architectural effect has led to the practice of using structure to rationalize what is basically an architectural feature. It is quite common to read descriptions of buildings, which should be judged on their architectural merit alone, in which the designer has explained his creation in terms of structural "economy" and "logic." In many cases a qualified observer can detect immediately that the structure is neither economical nor logical. Some designs still possess architectural value but for reasons disassociated from engineering.

In the case of Grosvenor House it can be seen from the plan that the frame is made up of lapping rectangular pieces of constant cross section. While this is a natural way to build in wood it does not follow that precast concrete should be designed this way.

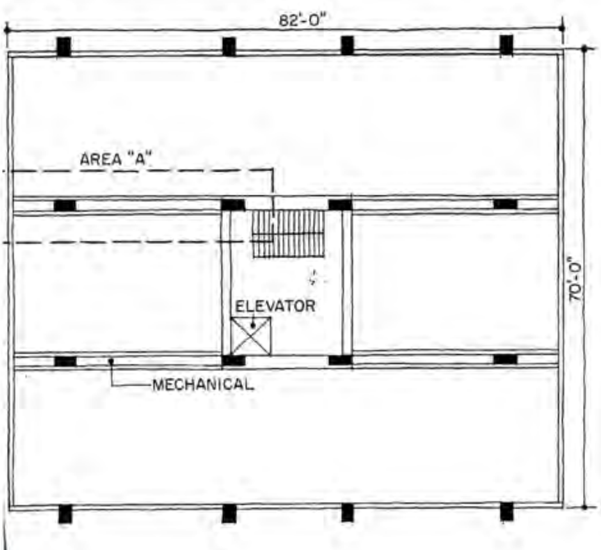
The architects, who selected the "seen" details of Grosvenor House, should not be criticized because these details generated awkward structural problems. An architect has the right to expect his engineer to solve such problems and to present him with an opinion for making a decision.

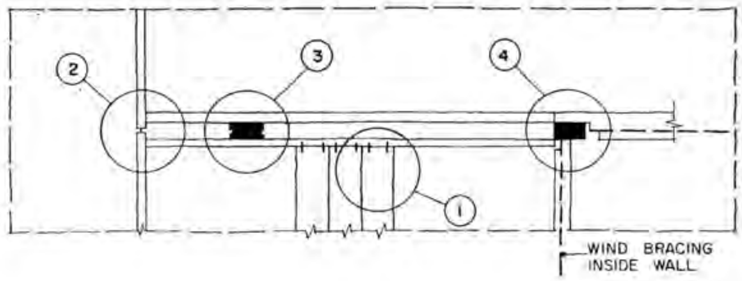
Lesson 4: *Building codes are a prop for the incompetent, a protection against the dishonest, but a restriction placed on good design*

The Grosvenor House structure is a classic example of one in which no significant feature is covered by a building code. This is because no code writing committee visualized the type of construction used and could therefore say nothing about it. There are, however, numerous regulations and formulas which must be satisfied even though the conditions under which they apply have been limited by special considerations of the design. In effect, a building code relates to three phases of knowledge. There is the part wherein it agrees with the designer's own decision and need not have been referred to; there is the part wherein general rules put unnecessary restrictions on the particular case the designer has in mind; and there is the part wherein nothing is said and yet design limits are necessary. Apart from the irritation and cost of complying with unnecessary restrictions there is also the danger that a designer may feel that having complied with the code he has made a safe design.

It should be appreciated that a building code is a list of instructions made by a committee. The instructions are limited to those which can be put in writing without becoming too long or too complicated and are limited also to those that the committee consider necessary. Since they are to be used by a man they have never met on a job of which they know none of the details, it is unlikely that the instructions will be wholly correct. At best they can be a reasonable approximation. On these grounds a competent design should always be preferred to a code-based design, except in cases of dispute when the code becomes a useful legal weapon to enforce minimum standards.

How the frame of Grosvenor House was put together



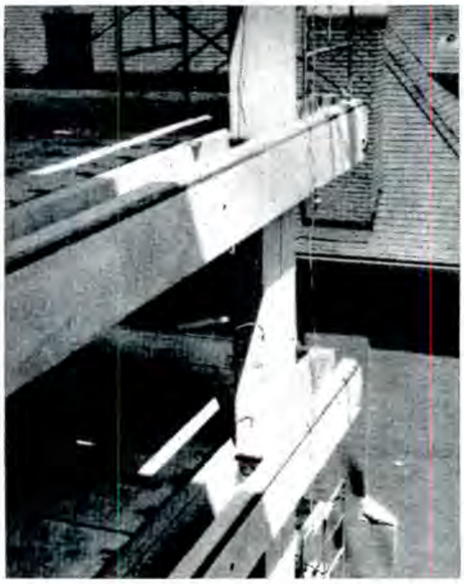


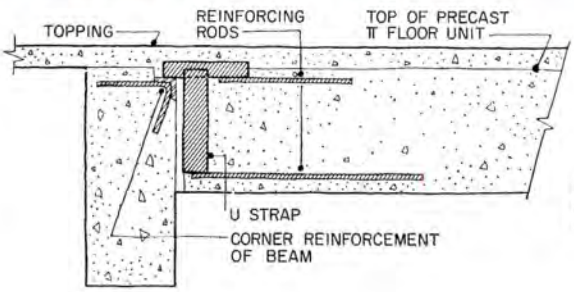
The four most important connection details, identified in the drawing above (Area "A"), are illustrated and discussed on the following two pages. Detail 1: precast double tees hung from main beams. Detail 2: edge beams hung from main beams. Detail 3: attachment of double-cantilevered main beams to columns. Detail 4: interior column connection and steel-strap cross-bracing system

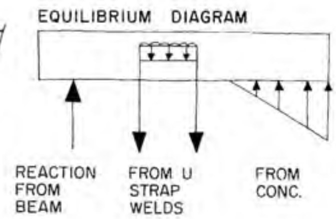
Detail 1: The hung floor slabs

The floors are made from standard double tees with topping and a suspended ceiling. To utilize the full available depth and width for the main beams, *these tees* are hung from the top of each web with a simple hanger. In its basic form this consists of a rectangular steel bar cantilevered from the end of the concrete to which is welded a vertical U strap. The U is used principally to carry the reaction to the bottom of the web, but serves a secondary purpose in containing bursting forces from the prestressing strands, and generally binding the end of the unit. The forces on the cantilevered bar are shown in the equilibrium diagram. We have made a practice of designing these hangers for ultimate load with a load factor of four. This figure allows abuse of the unit during manufacture and erection.

The horizontal reinforcing bars in the detail are simply to hold the hanger in the concrete. They should be more than nominal size if high shrinkage and temperature restraints are expected. The seat for the hanger is usually an isolated frame. However, in this application the small reaction per hanger and the close and varied spacing of the webs suggested a continuous angle as the best form of seat



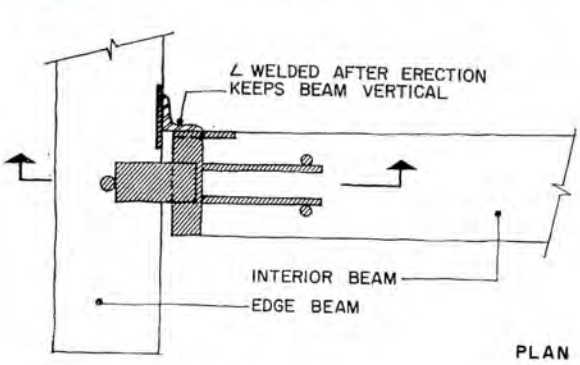


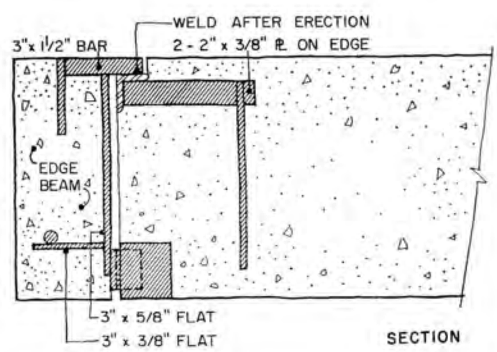


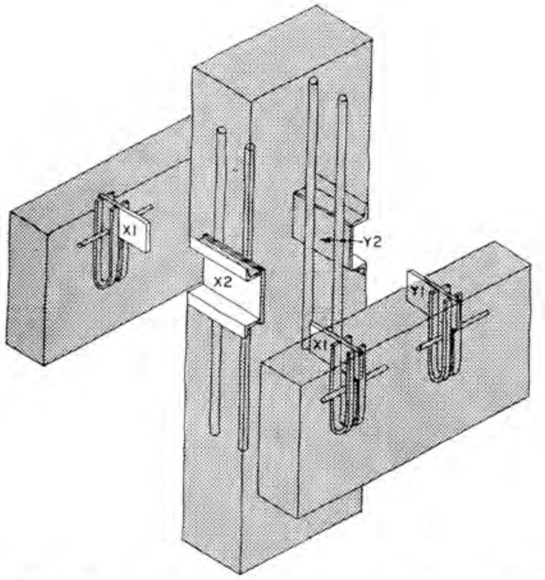
Detail 2: The edge beam

The edge beams of Grosvenor House form a continuous ribband on the exterior. These beams are also exposed (with plaster finish) on the front and back interior walls. They are required, therefore, to have the same depth as the interior beams supporting them, and must show an unbroken face with clean vertical joints. A hanger similar in principle to detail 1 is used but with certain variations. Since the edge beam is 7 ⅛ in. wide, a flat U strap would cut too deeply into the face, reducing the shear strength of the beam. This has been replaced by a 3- by ⅝-in. flat with a shelf at the bottom to transfer the reaction to the concrete. The hanger seat consists of an angle to distribute the bearing pressure and to reinforce the corner of the supporting beam. It is held in, and also prevented from rotating, by the 2- by ⅜-in. flats, which are in turn anchored by small reinforcing bars.

Since the hanger is side mounted, the bending moment created by the cantilevered bar cannot be taken by the unit itself (except by an undesirable degree of torsion). The edge beam is therefore clipped at the bottom



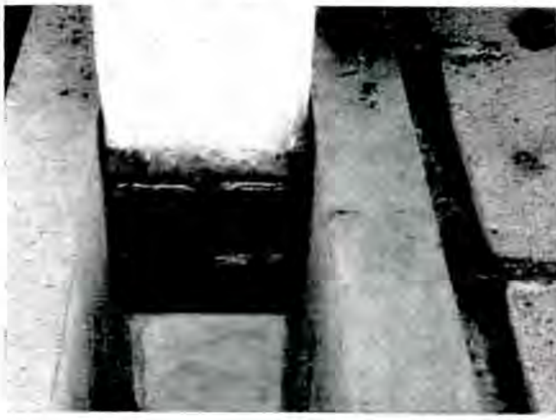




Detail 3: The double-cantilevered beams

In designing the connection of the double cantilevers to the column, a number of complications had to be allowed for: (1) the cantilever distance is short compared to the interior span, and under a fully fixed condition the interior fixed end moment would apply bending to the column. The column size, however, is such that under full vertical load no bending (other than wind) may exist. This bending was eliminated by shimming the exterior, X_1/X_2 connection only, for part of the dead load. When the right proportion of the structure was on, the interior connection Y_1/Y_2 was made and the connection then became fixed under the action of the couple, Y/X. The proportions are such that under full live load Y_1 and X_1 reactions are equal; (2) the size of the double cantilevers is such that the stresses are high in bending and shear at the section near the column. The connection had to be such that no excessive weakening was induced at this point; (3) the lower halves of these beams are exposed (with plaster finish) and no haunches or brackets could appear under them.

The solution again used side-mounted hangers. These were located below the negative reinforcement. The twin U straps present the maximum amount of length for welding to the cantilever plate, and also allow better compaction of the concrete than a single large plate. To help these straps distribute their load quickly, reinforcing dowels were welded to them. (All but one of these has been omitted from the diagram for clarity.) The fabricated channels in the column have heavy dowels welded to the back. These lie inside the main reinforcing cage and are capable of carrying all the load by bond if necessary. The angle ledge to the channels, however, will restrain the face concrete sufficiently to take the load in bearing unless it is removed by fire. In addition the channels also play a part in taking the connection load. After erection, both flanges of X_1 are welded to X_2 so that X_1 is able to take both negative moment induced by X_2 and positive moment induced by the U straps. The net result is an oversafe connection capable of yielding in several of its parts before collapse of the whole will result



Detail 4: Interior column connection

Most complex of all, this connection transfers the load from four concrete beams and four wind bracing ties to the column. The Area "A" drawing on the second page illustrates this situation. There is, in addition, a steel stair supporting beam (not shown).

Although it has many parts Detail 4 is still composed of basic plates, ties and angles which bear on the concrete in tried and tested ways. The method of carrying load is the same in principle as the basic hanger.

Our instructions for this job were that the complete structural frame was to be supplied by the precast concrete producer, and that erection would continue if necessary through 10 or 20 degrees below zero weather. This eliminated a slip-formed shaft for the central core as a possibility, and left as possibilities the cross-braced system actually used, or post-tensioned precast panels. These were eliminated because of the cold weather problem. The wind forces on the core are high due to the several openings and its general proportions.

The use of steel tension members was an inexpensive way of taking force, and since the owner-builder was accustomed to making 2-in. leaf block walls, everyone was happy with the solution to the esthetic, financial and technical variables that had been established before we started the design

Grosvenor House, Winnipeg, Manitoba
ARCHITECTS: *Libling, Michener and Associates*
STRUCTURAL ENGINEERS: *Cazaly Associates*
OWNER AND GENERAL CONTRACTOR: *G. Mida*
PRECAST CONCRETE CONTRACTOR: *Preco Ltd.*
ASSOCIATE STRUCTURAL ENGINEER: *John Glanville*

RESEARCH LOOKS INTO ROOFING FAILURES

By Foster C. Wilson and Miles E. Jacoby
Owens-Corning Fiberglas Corporation Technical Center, Granville, Ohio

Top, center and bottom glass-fiber felts taken from roof show nature of split

Cut-out sample from actual roof shows voids due to skips in mopping of asphalt

Another cut-out discloses both uneven mopping and inadequate amount of asphalt

This Instron testing machine records stress-strain relationship of built-up roofing samples over a temperature range of from +100 F down to a sub-zero −20F

An analysis of 1,000 bonded built-up roofs installed between 1957-1959 clearly indicated that many roofing problems were closely related to construction practices and deck types, and also that the roofing industry must apply research to its problems if it is to keep pace with changes and advances in construction.

We have employed research in two distinctive ways to reduce significantly the number of built-up roofing failures. First, cut-outs are taken from actual roofs and subjected to rigorous laboratory examination to be certain that the roofing contractor has done his job properly. Second, a laboratory and field research program was instituted to determine roofing failures due to splitting of built-up roofing.

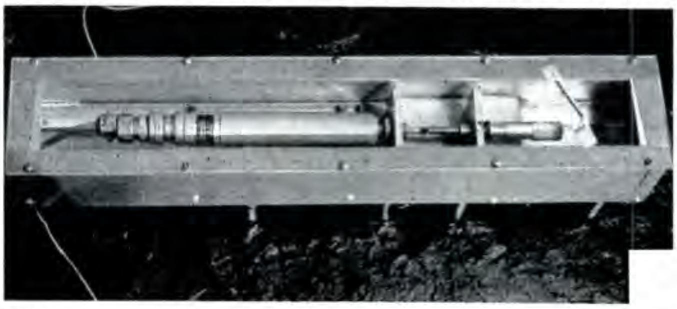
Starting in April 1958 we required that cuts had to be taken of installed roofs under the supervision of our representatives and submitted for laboratory analysis before bonds would be issued.

Prior to April, 1958, problems were encountered with 35 per cent of the roofs placed over insulated steel decks, and 20 to 50 per cent of roofs over lightweight poured or slab decks, the percentage depending on the particular type of deck and details of construction. Critical evaluation by job indicated that most of the problems were due to poor application practices by the roofer.

After 1958 when the inspection program was initiated along with sales of our materials only to approved trained roofers, problems over insulated steel decks dropped to less than 2 per cent of the jobs. Problems of roofs over lightweight poured-in-place decks or slabs decreased temporarily. But shortly, problems were occurring almost as frequently as before, and the nature of these was splitting of the roofing.

FOSTER C. WILSON is manager, Product Testing Laboratories and MILES E. JACOBY is senior scientist

Dry ice, 3 to 4 in. deep, dumped on top of the test speci..... drops the temperature of roofing all the way down to —100 F



Heat lamps are turned on to raise a test specimen of built-up roofing over deck structure to temperature around 150 F

A linear transducer and thermocouples indicate actual deck movements and crack openings due to temperature change

Checking Proper Application

Many instances of faulty application have been revealed in cuts taken from roofs (at least one cut is taken from all bonded roofs for laboratory analysis; practice is to take samples at random, one for each 100 squares).

Cuts 12-in. square are measured, weighed and recorded. Then the samples are bisected and the freshly-cut edges are examined for any evidence of non-uniformity of asphalt application, for voids in the asphalt application, for numbers of plies and for other defects.

A permanent file of roof cuts is maintained in a refrigerated room. Most cuts are inspected and filed within 24 hours after receipt. Occasionally, it is desirable to conduct more exhaustive tests. For example, the appearance of voids may indicate that wet materials were used. By testing for moisture, it may be established that the roofer used wet materials or worked over wet surfaces.

An extractor is used to remove the asphalt from a roof sample so that the condition of roofing felts may be determined. Gravel punctures, felts damaged during application and the presence of foreign material may be detected. The series of photos at the top of the previous page show pieces of glass-fiber felts with asphalt removed. The sample was taken at the visible end of a split in the roof. Pieces A, B and C are the top, center and bottom plies respectively. The fact that the rupture in the bottom ply, piece C, is wider than in the center or top plies indicates that the split started at the bottom.

The problems with glass-fiber felt roofing resulting from faulty application practices were largely eliminated by using information obtained from roof cuts, and by training the roofers and field inspectors accordingly. Problems which remained in roofs made with glass-fiber felts appeared to be confined principally to splits, these occurring primarily over non-insulated decks—such as poured-in-place precast slabs and structural fiber planks.

The Cause of Roof Splits

The initial investigations into roofing split problems revealed that roofers, architects, engineers, consultants, owners and others had an astonishing array of opinions as to their causes. There was an equally astonishing lack of fundamental data as to the behavior of materials and structures.

Little by little, factual data has been obtained to provide a better understanding of the stress-strain behavior in built-up roofs.

One of the early experiments conducted in this field was the measure of stress-strain characteristics of built-up roofing membranes of various constructions. The laboratory equipment used (shown on first page) consisted of an Instron testing machine capable of being operated over a wide range of loading speeds. An environmental test box capable of providing controlled temperatures from −20 to +100 F was mounted in the Instron.

Tests were made to obtain load-elongation curves of built-up roof constructions at various temperatures and rates of strain.

This equipment was also used to measure the thermal contraction force in built-up roofs.

These contraction forces appeared to result from the high coefficient of expansion of asphalt, and occurred in about the same magnitude regardless of the type of roofing felt involved.

These experiments pointed to an important conclusion: built-up roofs *can elongate* sufficiently to withstand internal contraction stresses, or the *uniform* contraction or expansion of the structure beneath. A concentrated force or movement in the structure itself must take place if a built-up roof is to split. Subsequent field investigations have consistently indicated that with roofs laid according to specifications, building movement is associated with the built-up roof split.

The next phase of laboratory investigation was to attempt to duplicate building movement which had been observed frequently on jobs. Following a series of miniature tests duplicating the opening and closing of a crack in a roof deck, large scale test equipment was constructed.

A series of 24 roofing structures have now been tested in this equipment. The results of these 24 tests may be summarized as follows:

1. Splits occurred in the built-up roofing whenever the base sheet was attached directly to the deck. Both paper and glass felts split at deck opening of less than ¼ in. under condition.
2. Thermal insulation materials having low shear strength and with joints taped between the insulation boards can prevent splitting of the built-up roofing, even with deck openings exceeding ½ in. Weakness at the insulation joint (no taping) still resulted in splitting.

The failure of built-up roofs attached directly to the deck was attributable to a variety of causes. Examples are: asphalt leaked under the lap in the base sheet which adhered the base sheet to the deck directly over the crack; water condensed from the deck on the underside of the built-up roof which then froze to the deck.

Splits of the built-up roofing could be avoided even with deck openings over ½ in. whenever the tensile strength of the waterproofing membrane exceeded the shear strength of its attachments to the deck.

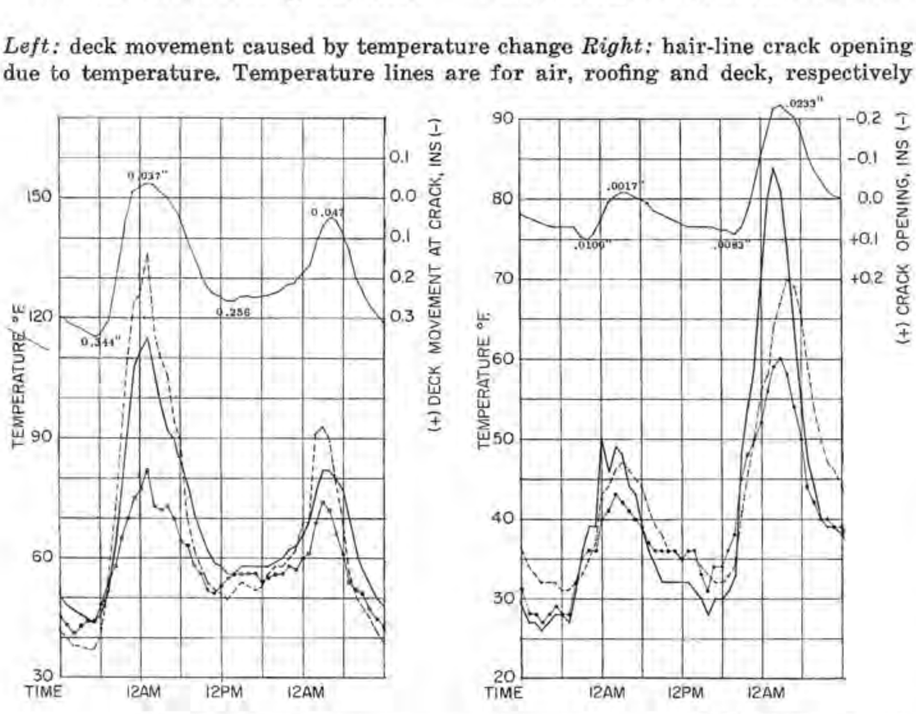
In the crack-opening tests, when the crack had opened to above ½ in., the roof insulation had either become detached from the deck or had sheared through the middle of the insulation board, a distance of one to two board widths back from the crack in the deck. In effect, the roofing system just described substitutes a localized stress-relieving type failure in the attachment of the roof to the deck, for a rupture in the waterproofing membrane itself.

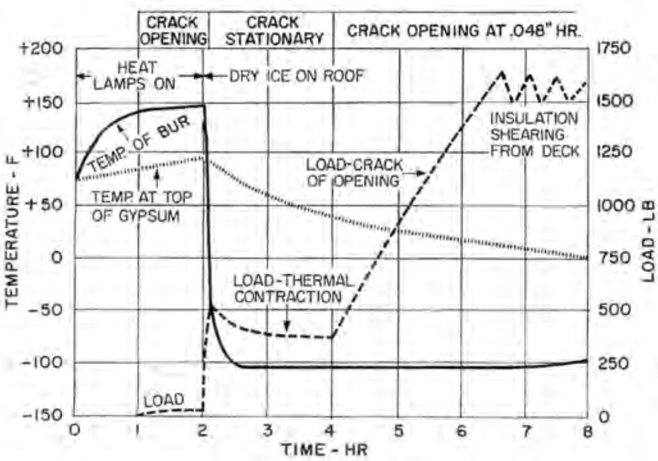
Concurrent with this research, equipment was built to measure temperature and building movement of actual roofs. The measuring instrument was a linear transducer shown in the photo across page. Data from the transducer and also from thermocouples are continuously recorded. Opposite are the graphs of two typical jobs. The left-hand graph shows major deck movement caused by temperature changes. The roofing split, and efforts to patch it have failed. The right-hand graph is a record of the opening and closing of a "hair-line crack," typical of that occuring in poured-in-place decks.

As a final test we exposed a roof construction to a combination of temperature shock and deck movement, more severe than would ever be experienced on an actual roof. Heat lamps were used to bring the built-up roof to a temperature of about 145 F. Then the lamps were turned off and dry ice was poured to a depth of 4 in. over the built-up roof. A complete record of this test is shown opposite.

Research into the causes of past roofing failures contributes to the development of new materials and systems. A thorough understanding of movements encountered in present-day structural roof deck systems is essential to the development of new materials such as liquid-applied roofing. Similarly, factory-finished roll-on roofings with pre-applied adhesive, or developments such as thermal insulation with a weather-resistant finish must also be able to withstand the stresses and strains of structural movement.

Left: deck movement caused by temperature change *Right:* hair-line crack opening due to temperature. Temperature lines are for air, roofing and deck, respectively





During the first 2 hr, heat lamps raised roofing to 150 F; 25 lb load was registered at the crack. Dry ice dropped the roofing to −100 F; crack opening was stationary; load due to thermal contraction was only 375 lb. Then crack was opened mechanically at .48 in./hr. Insulation did not shear until 1,500 lb tension

BORDEN ARCHITECTURAL DECOR PANELS: DECA-GR

Borden Architectural Decor Panels are highly adaptable for nearly unlimited application as facades, dividers, grilles, etc. in the field of modern architecture. The handsome, lightweight aluminum panels are both sturdy and practical, providing access for light and air in conjunction with safety and a long maintenance-free life.

Borden offers many types of Decor Panel—each type amenable to tremendous variation to fit most completely the architect's purpose, as seen in the use of Borden Deca-Grid for the new Miami, Florida elementary school illustrated above.

For complete information on Deca-Grid and the other Borden Architectural Decor Panels, including Deca-Gril, Deca-Ring, Decor Plank and their many variations and subtypes, write for our new eight-page catalog on Borden Architectural Decor Panels.

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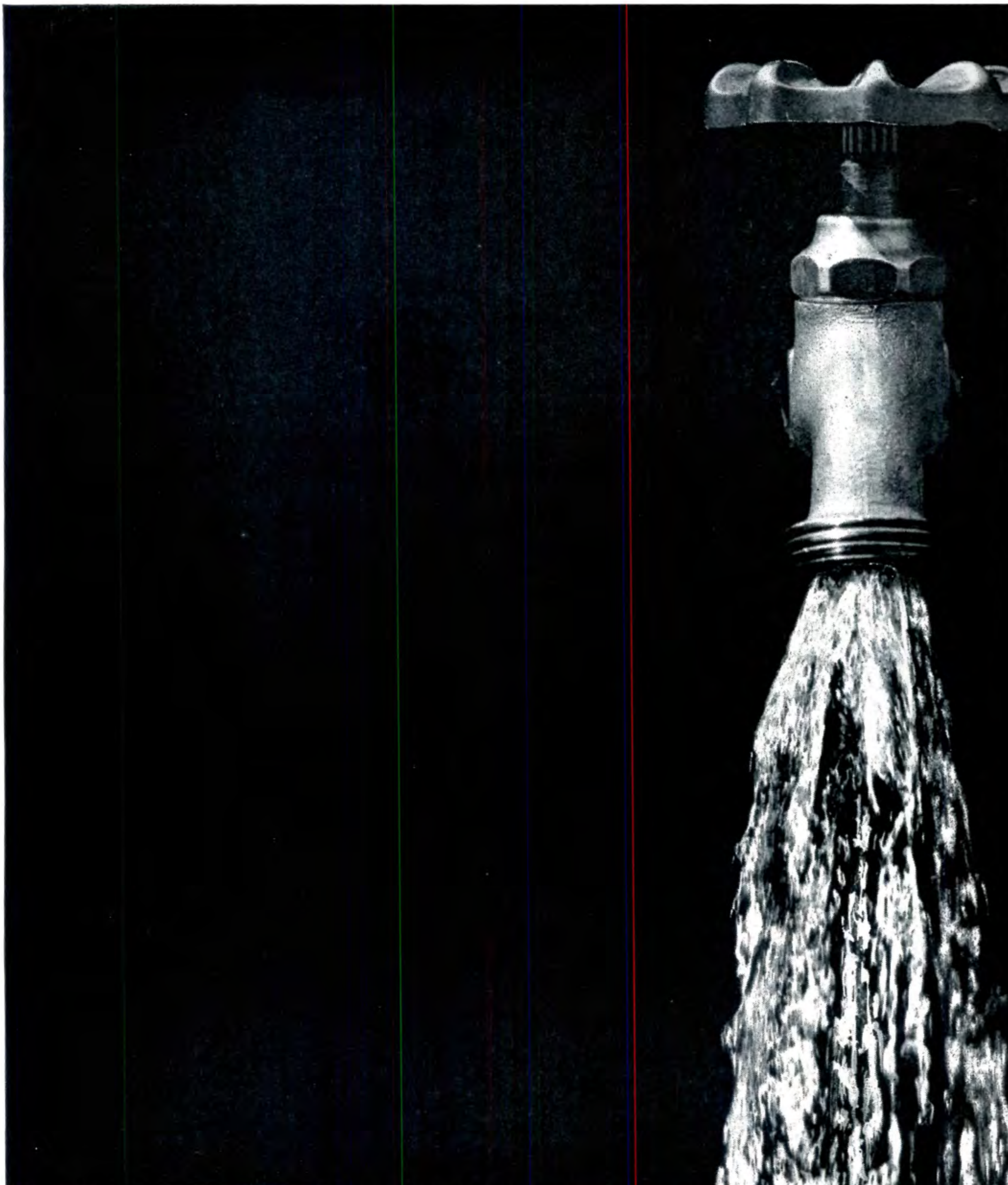

Consulting Engineer: Drake & Ford · Architect: Tibbals, Crumley & Musson · General Contractor. R. W. Setterlin & Sons Co. · Mechanical Contractor: The Limbach Company

This is the only refrigerant in a Gas-powered Carrier Air Conditioning System

Visit the spectacular Gas Pavilion at the Seattle World's Fair.

Just one reason why it's cutting costs in this new 12-story luxury apartment building in Columbus, Ohio. The others: (1) The 252-ton capacity Carrier Gas-powered absorption refrigeration unit is steam-powered by the same gas-fired boilers that supply heat and hot water. This cuts installation, equipment, operating costs to the bone. (2) Peak performance even at partial loads. (3) Whisper quiet, trouble-free . . . few moving parts. (4) Unbeatable economy and dependability of clean, low-cost gas. Good reasons why you should call your local Gas Company. Or write Carrier Air Conditioning Company, Syracuse 1, N.Y. ***For heating and cooling. . .Gas is good business***

AMERICAN GAS ASSOCIATION

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(Photo courtesy Unit Structures, Inc.)

Helicopter lowers structural section of laminated SPA Southern Pine into new roof system of large chemical plant. This efficient operation saved days of construction time, resulted in substantial savings.

Builders reach new heights of efficiency with *SPA SOUTHERN PINE

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STANDARD FOR WOOD LABORATORY EQUIPMENT

Questions and answers on the new minimum specifications developed by the Scientific Apparatus Makers Association

By L. N. Nelson

The design and arrangement of laboratory equipment is normally shown on the architectural drawings; however, the quality of the equipment depends largely on the written specifications. There has long been a need for a basic specification that would insure the quality of the laboratory equipment. To meet this need, the Laboratory Equipment Section of the Scientific Apparatus Makers Association has been working for approximately four years to develop a minimum specification for Scientific Wood Laboratory Equipment. This specification has now been completed in a tentative form, and is available from the Laboratory Equipment Section of the Scientific Apparatus Makers Association at 20 North Wacker Drive, Chicago 6, Illinois, or from many of the laboratory furniture manufacturers.

To acquaint you with this specification, the following question and answer information is given:

1. *Are these specifications intended to cover any particular type of laboratory?*

In general, these specifications will cover any type of laboratory where wood equipment is desired. These specifications are particularly suitable for use in high schools, colleges and universities where the laboratory equipment is usually made of wood.

2. *The title of the specifications says "minimum specifications." Can we assume from this that superior equipment can be specified and obtained if it is desired?*

Yes, it can be. The specification was written to provide only the minimum requirements necessary to provide quality laboratory equipment. Tops, finishes, materials, hardware, case and cabinet construction and other parts of the specification can be upgraded.

3. *Are the requirements of this specification of sufficient detail to tie down exactly the construction of the equipment furnished under the specifications?*

It is intended that these specifications should control the quality of the laboratory equipment which would be furnished under the specification. It should be noted, however, that, in general, this is done by a performance type of specification rather than by tying down each construction feature or requirement in exact detail. This specification, therefore, does not restrict the construction to any particular manufacturer, but allows the use of standard construction, procedures and materials as long as they meet the performance standard of the specification.

4. *Under this specification, there is a paragraph on the qualifications of a laboratory equipment contractor. If the specification is clear and complete in its detailed specifications on the furniture, why is such a paragraph necessary?*

As in the purchase of any equipment, the integrity, experience and ability of the manufacturer of the equipment should be considered. This is particularly true when the purchase is not of a stock nature and is one that will have to be engineered and fabricated in accordance with requirements of the particular job. Another important consideration is that the successful completion of the entire laboratory facility depends on the ability of the equipment manufacturer to coordinate his equipment with that of the other building trades and to furnish his equipment in accordance with specifications in adequate time.

5. *We have heard of installations where some of the equipment was either furnished twice under two different contracts or wound up with no one furnishing certain equipment. Is there anything in this specification that will prevent this?*

The specification contains a clear statement of the work that is included in the specification and that which is not. It also contains a paragraph setting forth the definitions of such terms as service fixtures, service lines and other items which are not in themselves of a clear definite nature. This should prevent any such occurrence of this type.

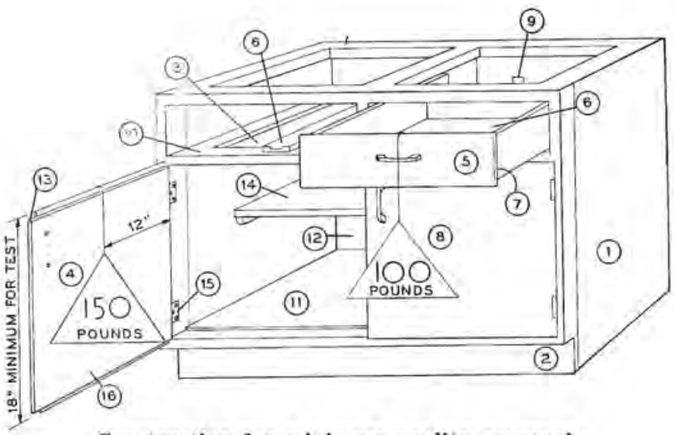
6. *What one item would you consider to be the most important with respect to the eventual use and durability of the equipment?*

While all of the equipment is important, probably the table tops could be considered the most important. It is on these that the actual work is performed and, as such, they receive the most chemical and mechanical abuse of any of the equipment in the laboratory.

7. *How does the specification cover table tops?*

The specification divides table tops into three classes, based on the requirements of the type of laboratory in which they are installed. Class 1 tops are those that are used in chemical research or other laboratories where the use of concentrated acid and other reagents are to be expected. Class 2 tops, which are intermediate tops, are for use in biology, entomology and other life science rooms where extensive use of concentrated acids are not expected. Class 3 tops are the special-duty or light-duty tops for use where there is little exposure to corrosive reagents, or where specific requirements make a special type of top necessary. The general requirements for all tops are first given and then separate specifications are given for each type of top. For example, the specification for a Class 1 top calls

L. N. NELSON is chairman of the S.A.M.A. Research and Development Committee, Laboratory Equipment Section, and head of the Engineering Department, Kewaunee Manufacturing Company



Construction for minimum quality casework

1. All units shall have cupboard section completely enclosed and separated from drawer sections.
2. Toe spaces 3½ by 2½ in. deep shall be provided on all cabinets beneath working counters, and shall be completely enclosed and a part of the case construction.
3. Lock panels shall be provided between drawers or between drawers and cupboards when they are locked and keyed differently.
4. Doors shall be capable of supporting 150 lb when tested as shown. (Hinge screws shall be tightened before test.)
5. Drawer fronts shall be not less than ¾-in. solid hardwood or lumber core plywood to match exterior of case. Sides and backs not less than ½-in. solid hardwood.
6. Drawer bottoms shall be completely enclosed, and grooves in drawer front, sides and backs, and shall be ¼-in. tempered hardwood or ⅛-in. tempered hardwood reinforced on not less than 24-in. centers.
7. Drawer fronts and backs shall be attached by dovetailed or tenon joints.
8. All drawers shall be capable of supporting a 100-lb weight when fully extended.
9. All drawers shall have a positive stop to prevent inadvertant removal of drawer. Stop shall be spring actuated and shall be easily accessible to allow removal of drawer without the use of tools.
10. All drawers shall be supported on full frames, which shall be grooved or tenoned into case ends or uprights.
11. Cupboard bottoms shall be either ½-in. interior-grade plywood, or ¼-in. tempered hardboard fully supported on bottom frame. Frame to have intermediate front to back supports on not more than 24-in. centers.
12. Case backs shall be ¼-in. tempered hardboard or ¼-in. interior-grade plywood. Cupboard units shall have full backs and shall have a section removable to provide access through the units to plumbing lines.
13. Left-hand door of a double-door unit shall be provided with an integral astragal, and right hand door shall overlap astragal to provide for dust protection.
14. Shelves shall be ¾-in. thick of either solid hardwood or plywood, with a hardwood edging at front of shelf. Shelves shall be a minimum of one-half depth and removable.
15. Hinges shall be 2½-in., 5-knuckle, institutional type of not less than 14-gauge material, and shall be attached to case and door with three screws in each leaf.
16. Doors shall be not less than ¾-in. thick for base cabinets, and shall have a hardwood framed core. Both exterior and interior of the door shall be considered exposed and shall conform to specification for exterior plywood.

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for 24-hour spot tests for various chemicals plus specifications for the physical properties and heat resistance.

8. *We notice that the list of chemical reagents used for the spot tests is rather small. What is the reason?*
The number of reagents was kept small to keep the test as simple as possible. Each of the reagents selected represent a type of reagent, for instance sulfuric acid is an oxidizing acid.

9. *Why was a 24-hour spot test selected as a method of testing chemical resistance?*
One of the principal causes of top failure from chemicals is when reagent is dribbled down the side of a bottle and then it is set on the table top and left for an extended period of time, perhaps until the next day or until the reagent evaporates. However, since the reagent is protected from evaporation by the bottle, it usually takes at least 24 hours.

10. *In looking over existing laboratory installations, I have noticed a wide variation in the detailed casework construction. Will this specification provide a uniform casework construction?*
The specification does not require the casework manufacturer to conform to any particular construction. The specification is written on the basis that it is not the details of the construction that are important, but whether the resultant cabinet conforms, in general, to good cabinet practice and is of adequate strength and rigidity to satisfactorily serve its function in the laboratory. Construction practices, minimum thickness of materials or type of materials are specified where it is felt necessary to insure the end product represents a quality item.

11. *Probably one of the most important items in a laboratory today is the fume hood. Are these covered in the specification?*
Fume hoods are definitely covered in the specification. Here again, the specification is one of performance, materials and safety, rather than of specific construction details of the fume hood.

12. *You mention the safety of the fume hood, which is a new term in our discussion. How do you cover this?*
The specification specifies that all superstructures should be made of noncombustible material, and that the hood interior should be corrosion resistant. Also, that where a sliding sash is used, the glass should be safety glass rather than ordinary window glass. Safety is further insured by specifying that services should be remotely controlled from outside the fume hood, and that electric outlets should not be used inside the hood unless protected by automatic circuit breakers. There is a further specification that sets up a performance test which the fume hood should pass when it is installed in accordance with standard laboratory conditions.

13. *What about the finish used on the laboratory cases and cabinets?*
The specification contains a complete specification covering the finishing of the cases and cabinets. Here again, the specification only covers the general procedures to be followed.

14. *What about the hardware, plumbing fixtures and other accessories that go to make up the complete laboratory installation?*
The specification covers such items as hinges, door pulls, locks door stops, number plates, etc. that are found on all laboratory casework. It also includes sinks, plumbing fixtures and drain lines.

PRIVATE AUTOMATIC DIAL TELEPHONE SYSTEMS

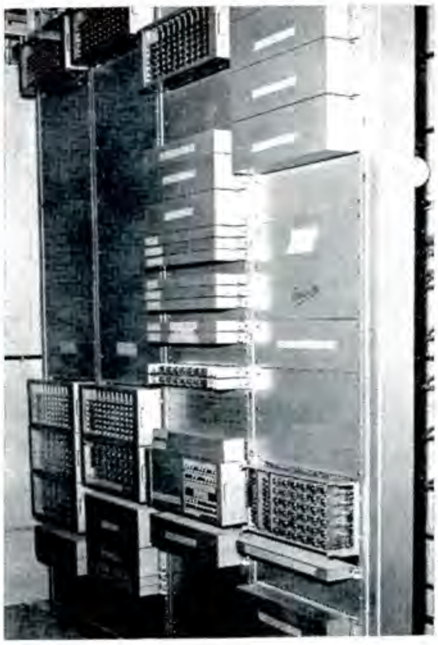
TRANSISTORIZED

A transistorized, private dial telephone switching system provides fast, reliable service with compact, lightweight equipment and without service of an operator. Normal maintenance can be done by simply replacing any malfunctioning printed circuit board with a spare.

The *Kelex* system uses less power than a home toaster and is safe for hazardous locations because it has no sparking contacts. The switchboard cabinet for a 100-line model weighs only 400 lbs.

The system uses four-layer diodes so connected that an electrical path between any two instruments is always found automatically. Even if a particular crosspoint fails, a suitable path is found by avoiding the defective diode. *ITT Kellogg, 320 Park Ave., New York 22, N. Y.*

CIRCLE 300 ON INQUIRY CARD



CROSSBAR SWITCHING

An automatic dial telephone intercom uses an electromechanical crossbar switching system which determines the quickest path for completing a call while a number is being dialed. In conventional systems, the switchboard equipment moves with each dial pull.

Because the system is electromechanical rather than mechanical, it is more compact and there are fewer moving parts. Longer unit life (an expected 25 years before overhaul) is achieved. The switching panel illustrated serves 400 phones in a New York apartment house. Pre-wired circuit modules plug in and out for simplified servicing. Blank panels provide space for about three-fold expansion as nearby stores and services subscribe to the system.

Included with the intercom are 15-oz plastic Ericofons—one-piece telephone receiver and speaker sets with dial on bottom. When phone is upended, it is ready for dialing. To hang up, the user sets it down. *The Ericsson Telephone Corp., 100 Park Ave., New York 17, N.Y.*

CIRCLE 301 ON INQUIRY CARD

EXTRUDED SHAPES MADE WITH REINFORCED PLASTICS

Extruded shapes are now available in reinforced plastic materials. Stock items include more than 240 standard structural shapes, such as I- and H-beams, hollow pipes, rods, moldings, ducts, hand rails, siding, etc.

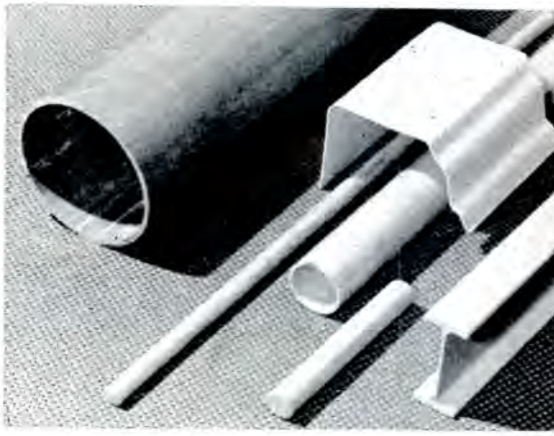
The new product, called *eXtren,* is manufactured by a continuous forming process which allows introduction of other materials. Almost any kind of reinforcement can be used—glass fiber, sisal, jute, even steel. Addition of 2 per cent steel increases stiffness 37 per cent. Polyester, acrylic and epoxy can be used.

Advantages include low thermal and sound conductivity, good resistance to corrosive attack and dimensional stability. The manufacturer reports that many shapes are lighter than aluminum and stronger than steel.

Other *eXtren* products include light, rigid sandwich panels with foam insulation and reinforcing members for use as load-bearing wall sections. *Universal Moulded Fiber Glass Corp., Bristol, Va.*

CIRCLE 302 ON INQUIRY CARD

more products on page 208



Office Literature

For more information circle selected item numbers on Reader Service Inquiry Card, pages 271-272

GYPSUM DRYWALLS

All phases of gypsum drywall construction, including framing and finish, are described and illustrated in a 214-page handbook with a plastic-laminated cover. Chapters on products, methods of installation, systems and technical data are all indexed with cross references. *United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.**

CIRCLE 400 ON INQUIRY CARD

PERFORATED METAL

Commercial and decorative designs in perforated steel and aluminum for room dividers, protective guards, etc. are pictured actual size. *National-Standard Co., Niles, Mich.*

CIRCLE 401 ON INQUIRY CARD

ROOFING SYSTEM

(A.I.A. 12A) Fluid-applied roofing system of elastomers can be used on roofs of normal and unusual shapes with substrate materials such as concrete, plywood and metal. *Miracle Adhesives Corp., 250 Pettit Ave., Bellmore, N.Y.*

CIRCLE 402 ON INQUIRY CARD

STEEL FLOOR HEADERDUCT

(A.I.A. 31-C-62) Headerducts for in-floor line transmission are approved by Underwriters Laboratories for installation in raceways of cellular steel floors by eight different manufacturers. The compact ducts lie flush with floor. Scale drawings of all parts, sample specifications and pictures of installation are included in a 32-page booklet. *Conduflor Corp., 21565 Lorain Rd., Cleveland 26, Ohio*

CIRCLE 403 ON INQUIRY CARD

ASBESTOS-CEMENT SHINGLES

Revisions for low-slope application of asbestos-cement roof shingles are included in a roofing application manual. *Asbestos-Cement Products Assoc., 509 Madison Ave., New York 22, N.Y.*

CIRCLE 404 ON INQUIRY CARD

CONTROLLED LAB ROOMS

Seamless environmental rooms of molded glass fiber are suited for incubators, "clean rooms," storage of biologicals, and other testing labs. Double walls have foamed-in-place insulation. *Lab-Line/Hudson Bay Co., 3070 W. Grand Ave., Chicago 22, Ill.*

CIRCLE 405 ON INQUIRY CARD

JOINT SEALANT

Compriband joint sealant is polyurethane foam impregnated with asphalt. When under compression to one-fourth of its original volume, it becomes waterproof and retains resiliance. Folder gives details. *Secoa, Inc., 8020 Monticello Ave., Skokie, Ill.*

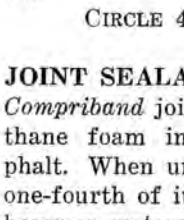
CIRCLE 406 ON INQUIRY CARD

DRAFTING EQUIPMENT

A 24-page buying guide gives features of drafting machines and drawing instruments. *V. & E. Mfg. Co., 766 S. Fair Oaks Ave., Pasadena, Calif.*

CIRCLE 407 ON INQUIRY CARD

SCULPTURED GRILLS



(A.I.A. 24-F) Architectural plastic grillwork for both interior and exterior use is available in a variety of patterns and a number of colors and finishes. *Harvey Design Workshop, Inc., Lynbrook, N.Y.**

CIRCLE 408 ON INQUIRY CARD

GLAZING BEAD

Advantages of glazing bead and analysis of the different kinds available are given in a 20-page report. *Pemko Mfg. Co., 5755 Landregan, Emeryville, Calif.*

CIRCLE 409 ON INQUIRY CARD

LIGHTING FIXTURES

Gratelite luminous ceilings are described in a 12-page catalog of fluorescent and incandescent lighting fixtures. *The Edwin F. Guth Co., Box 7079, St. Louis 77, Mo.*

CIRCLE 410 ON INQUIRY CARD

WOOD FRAME BUILDINGS

(A.I.A. 19-B-3) Design ideas for providing open floor areas in industrial and/or commercial buildings use structural framing of glued laminated timber arches, beams and trusses. *Timber Structures, Inc., P.O. Box 3782, Portland 8, Ore.**

CIRCLE 411 ON INQUIRY CARD

WALK-IN REFRIGERATORS

(A.I.A. 30-F-6) Sectional, metal-clad walk-in refrigerators with rigid urethane foam insulation are illustrated in this catalog, which has engineering data and dimensional drawings. *Bally Case & Cooler, Inc., Bally, Pa.**

CIRCLE 412 ON INQUIRY CARD

METAL SCREENS

Karvalum metal screens are adaptations of designs originally used by Louis Sullivan in some of his famous buildings. *Morris Kurtzon, Inc., 1420 S. Talman, Chicago 8, Ill.*

CIRCLE 413 ON INQUIRY CARD

SWING DOORS

Automatic and safety balanced doors are described in two folders. Balanced doors have vinyl guards to prevent finger injury. *Roto Swing Door Co., 3110 N. Walker, Oklahoma City, Okla.**

CIRCLE 414 ON INQUIRY CARD

NOISE CONTROL

Modular panels for industrial noise control. Bulletin lists performance data and construction features. *Engineered Products Co., Inc., 3649 Keswick Rd., Baltimore 11, Md.**

CIRCLE 415 ON INQUIRY CARD

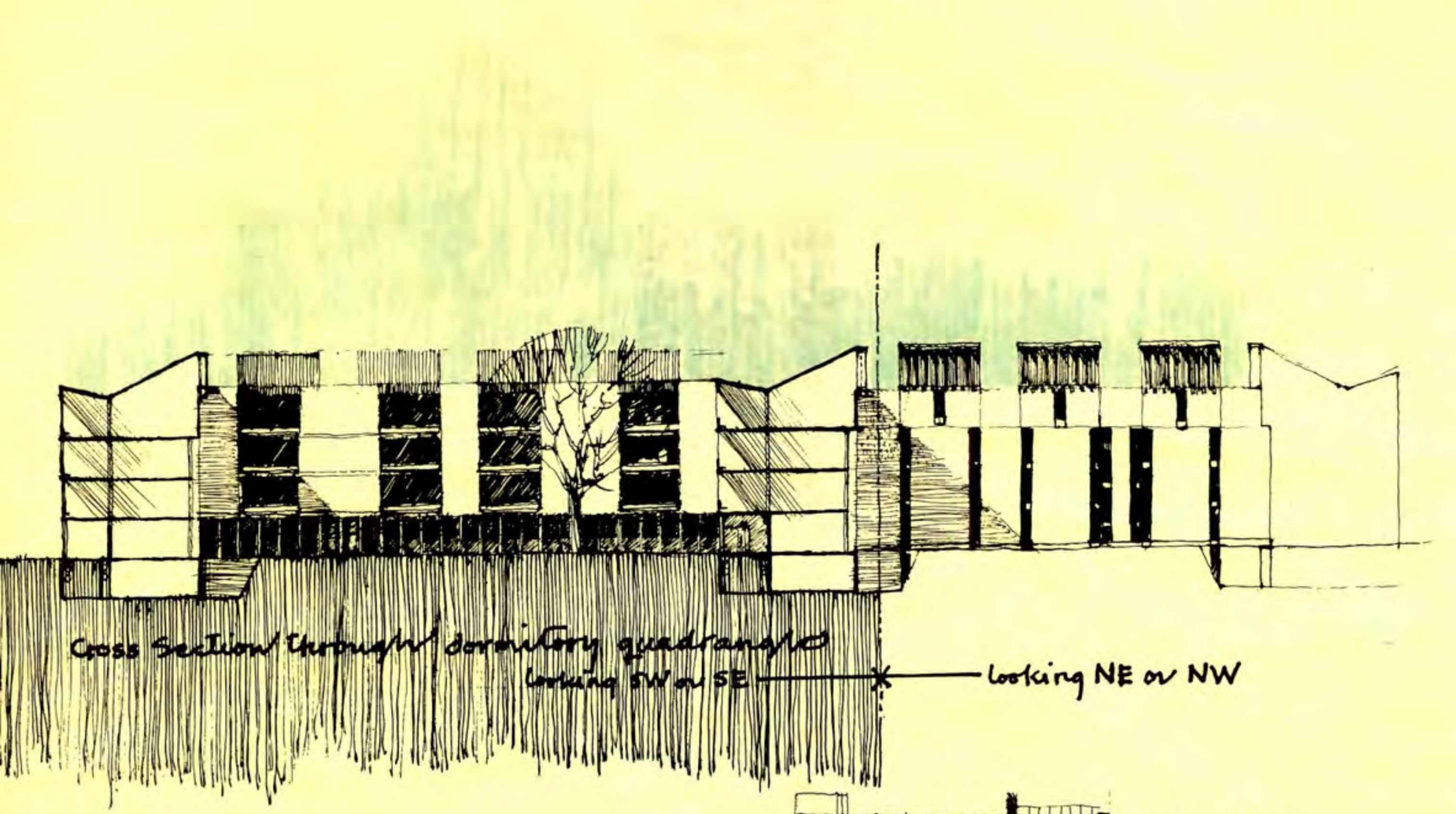
CONCRETE CONSTRUCTION

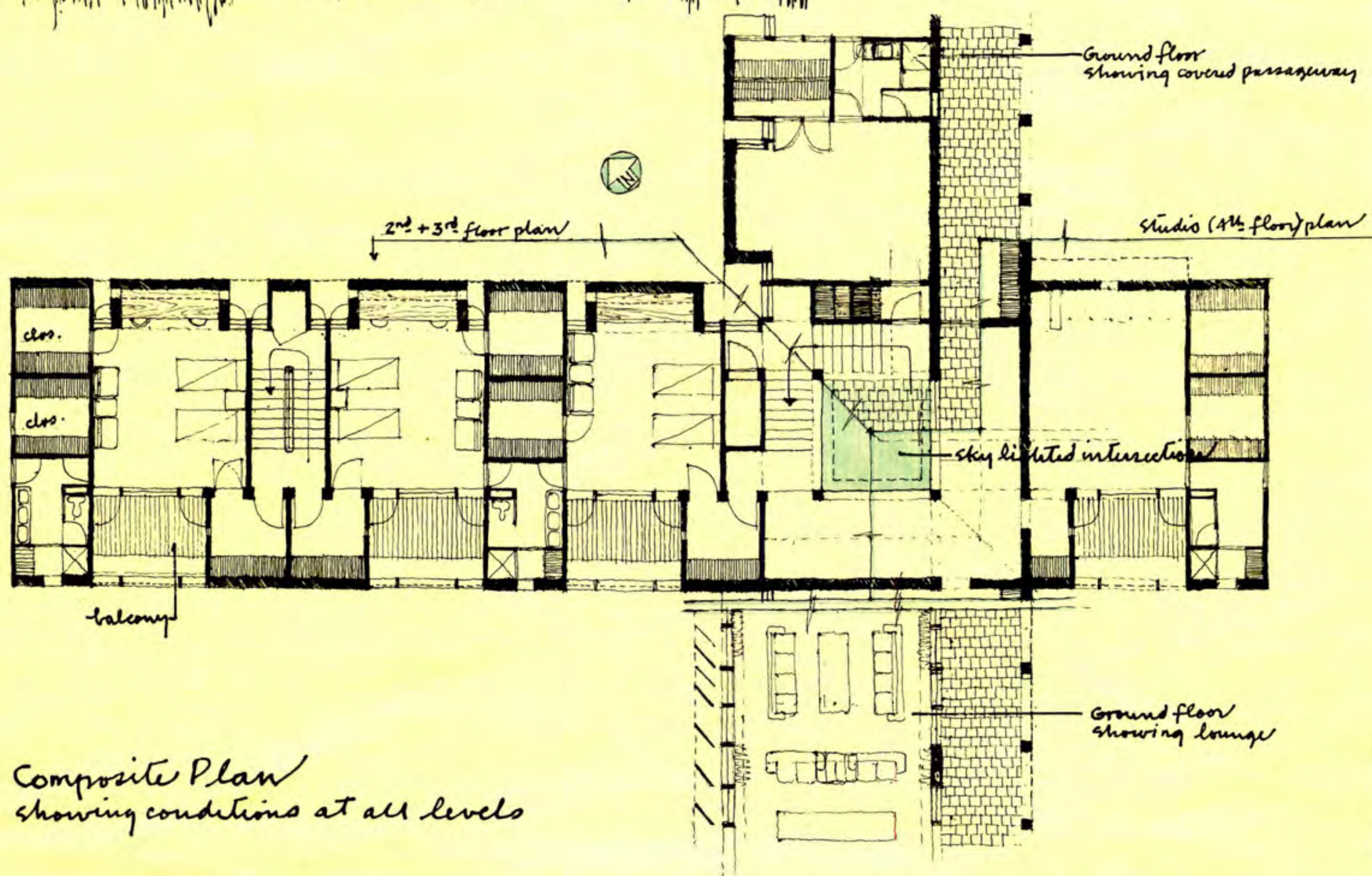
Planning and concreting details for recent buildings are given in Booklet C-62-1. *The Master Builders Co., Cleveland 18, Ohio**

CIRCLE 416 ON INQUIRY CARD

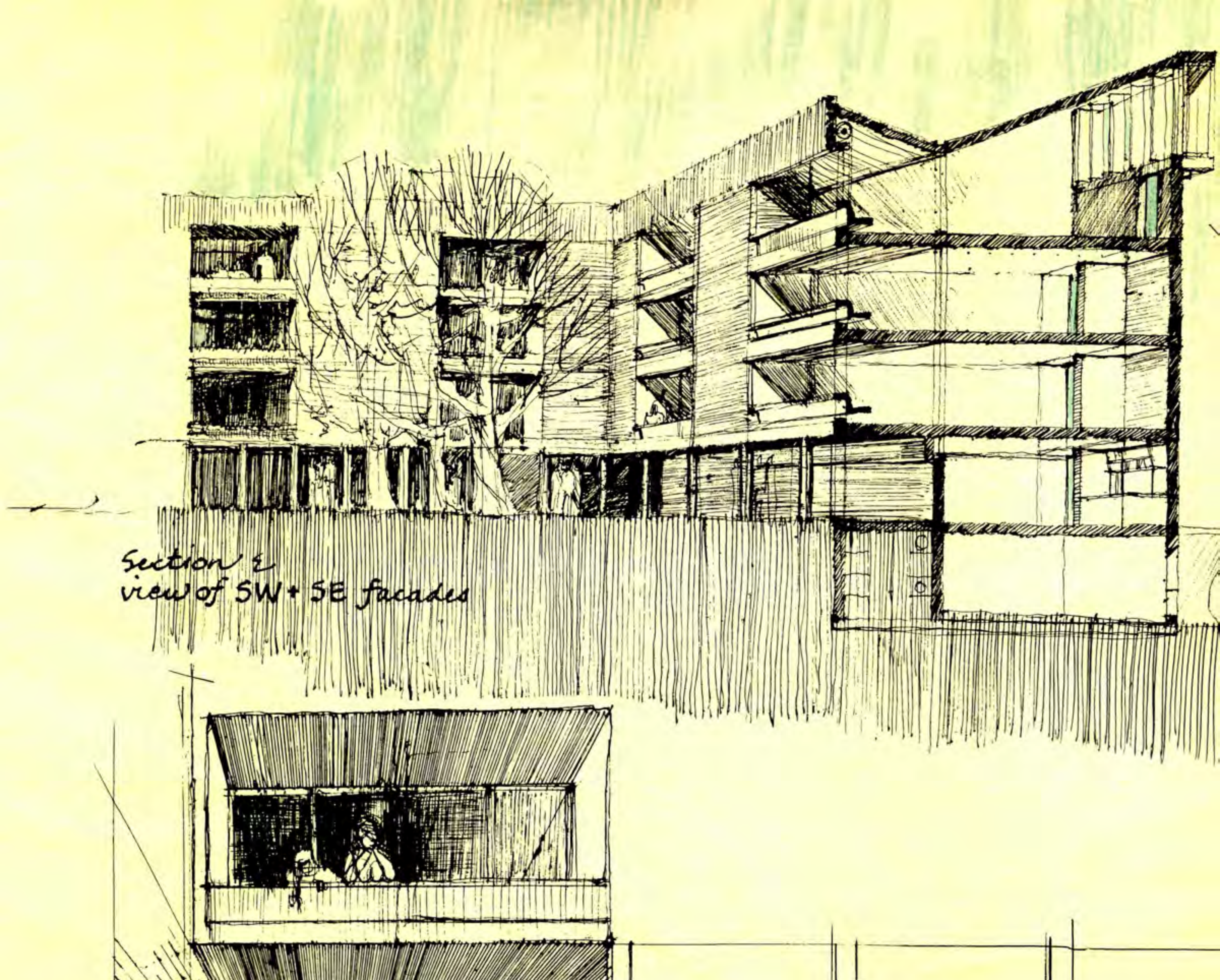
**Additional product information in Sweet's Architectural File*

more literature on page 248





College living units in tightly organized quadrangles make maximum efficient use of available land . . . provide intimate group living. Cross section through typical dormitory quadrangle shows elevations of both sides of building (balcony side at left—street side at right). Floor plan of room arrangement shows how Architect Pekruhn has avoided long barracks-like corridors.



Perspective of dormitory unit shows sheltered walkways on ground level with *Parallel-O-Plate®* glass walls, also top-floor studio units. *Thermopane®* insulating glass is planned for all window areas for heating and air-conditioning economies. Perspective view of lounge under dormitory unit (between two quadrangles) shows how plate glass walls visually join the two spaces together.

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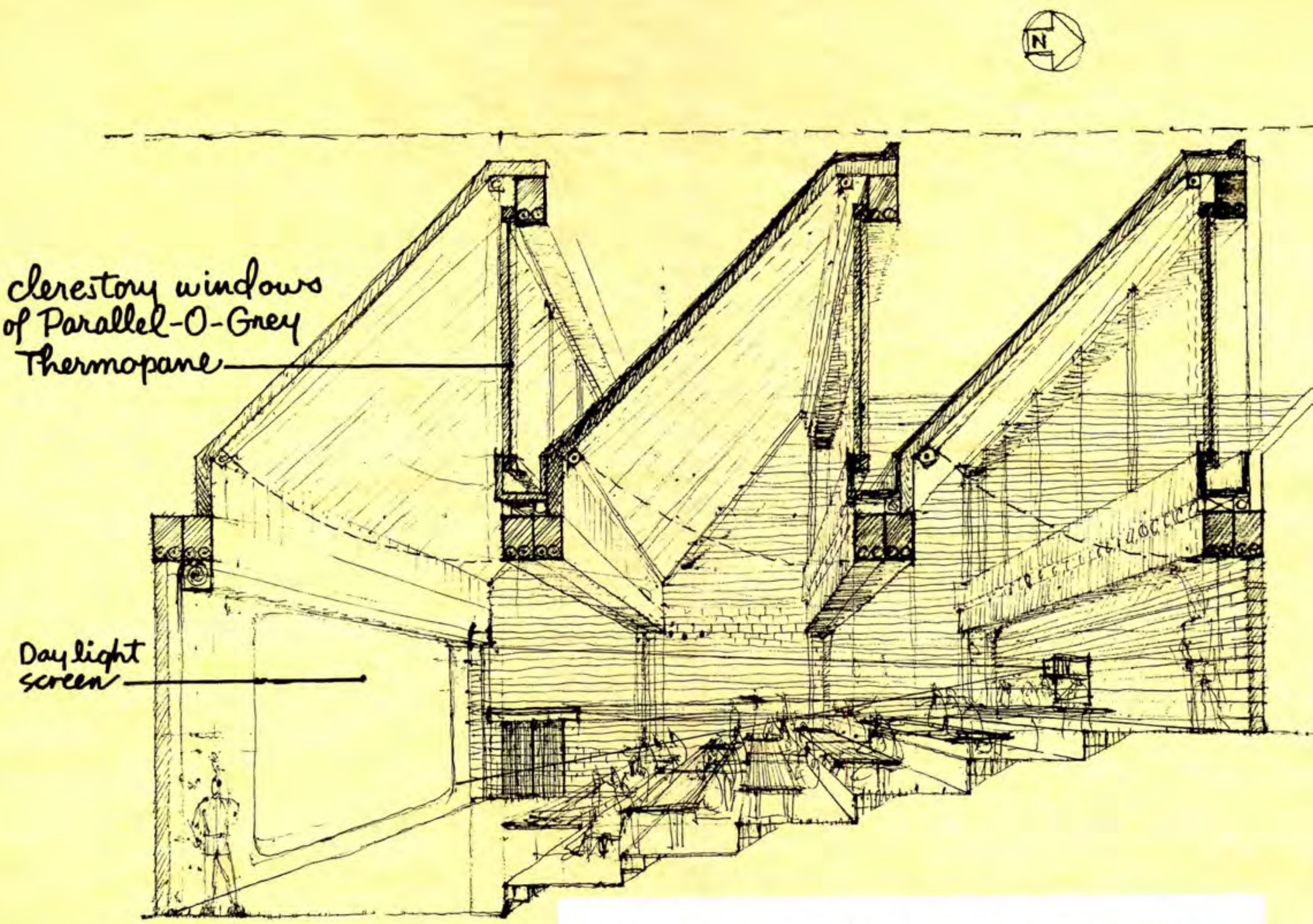
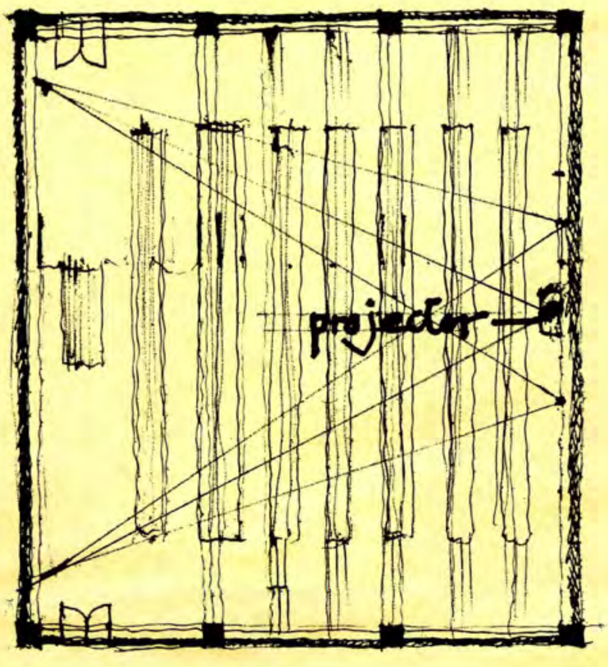
LOF GLASS





Typical college classroom (for lecture and projection of visual material) has stepped arrangement for seating students at continuous long counters in comfortable chairs. Uniform daylight (from the north) passes through grey plate glass to subdue glare and provide even lighting. Natural light focuses on lecturer. Radiant screen permits projection of slides and films without shading devices. Room can be darkened, however, with top-hung, mechanically operated flaps.

Litho in U

The Brown rink during construction. The steel pipe was laid on 4-in. centers, tested out at 100 psi, then buried in 1⅝-in. of concrete. Henry J. Coupe & Son, Inc., did the refrigeration and piping work. The Bethlehem steel pipe was supplied by United Supply Co.

The Brown Bears Will Fight Here

It's the new George V. Meehan Auditorium, an impressive, steel-domed structure now gracing the campus of Brown University. Home of the varsity hockey team—the Bears—it features a 200 x 85 ft oval ice rink which constitutes the entire floor of the building.

Steel piping holds down costs

The Brown rink was built with some 10 miles of Bethlehem 1¼-in. Ammonoduct steel refrigeration pipe. Supplied in double-random lengths, it saved the contractor many welds. It saved him time, too, since steel pipe can be bent cold without danger of fracture. And steel pipe costs less than any other ferrous piping material. What's more, well-designed rinks piped in steel give long, trouble-free service.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

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Send the coupon below for the full story on steel pipe in ice rinks. The booklet contains many good reasons why you should consider piping your next rink with steel—steel pipe Made in U.S.A.

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AMERICAN IRON AND STEEL INSTITUTE
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Gentlemen: Please send me your new booklet: Steel Pipe in Ice Skating —A New Approach to an Old Sport.

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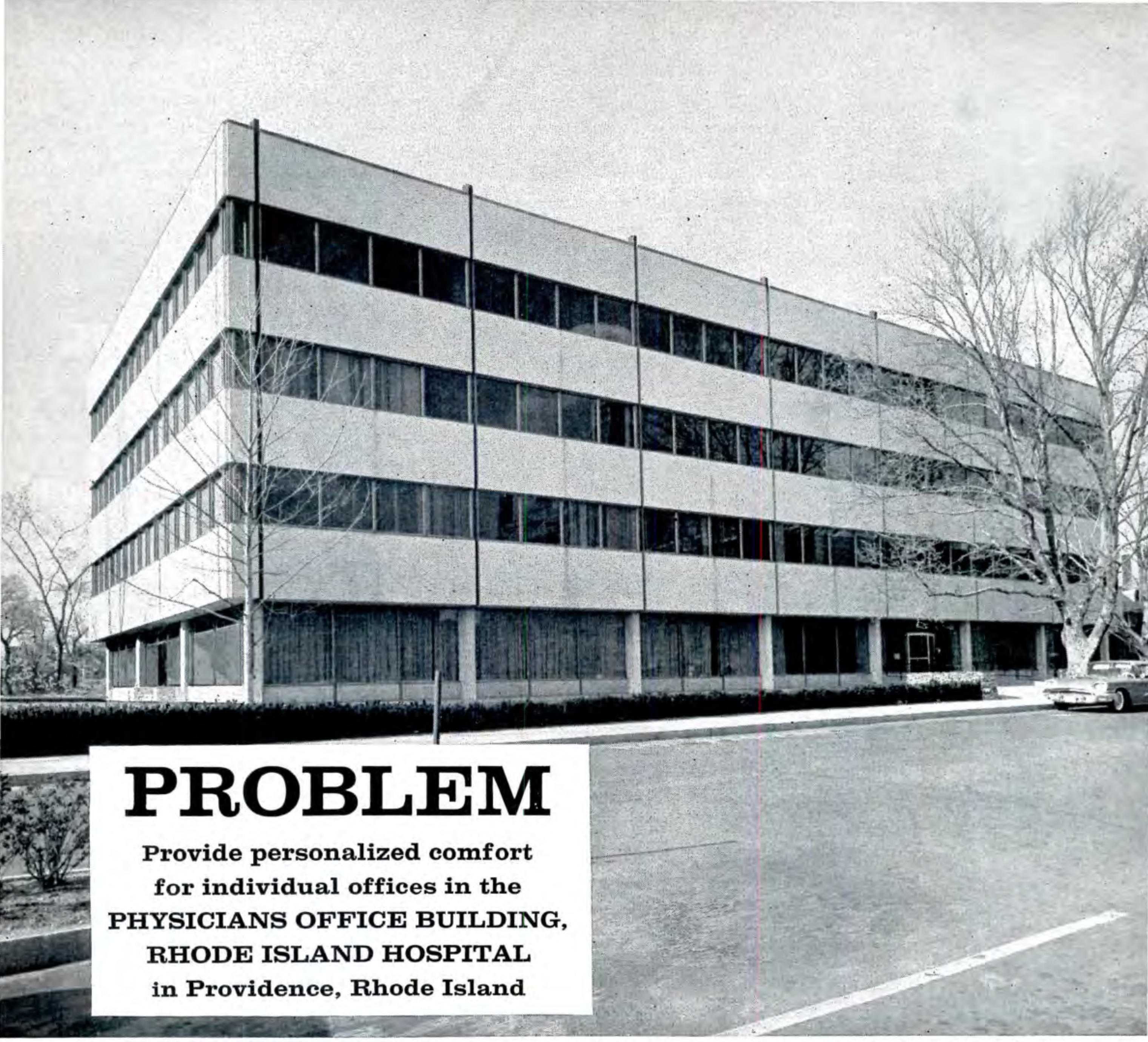


PROBLEM

Provide personalized comfort for individual offices in the PHYSICIANS OFFICE BUILDING, RHODE ISLAND HOSPITAL in Providence, Rhode Island

Architect, Sheply, Bulfinch, Richardson & Abbott, Boston, Mass; Mechanical Engineer, Merrill Associates, Boston, Mass; General Contractor, E. Turgeon Construction Co., Inc., Providence, R. I.; Mechanical Contractor, Hartwell Co., East Providence, R. I.; Administrative Engineer of Rhode Island Hospital, Mr. Edwin Chaffee.

SOLUTION...YORKAIRE THREE

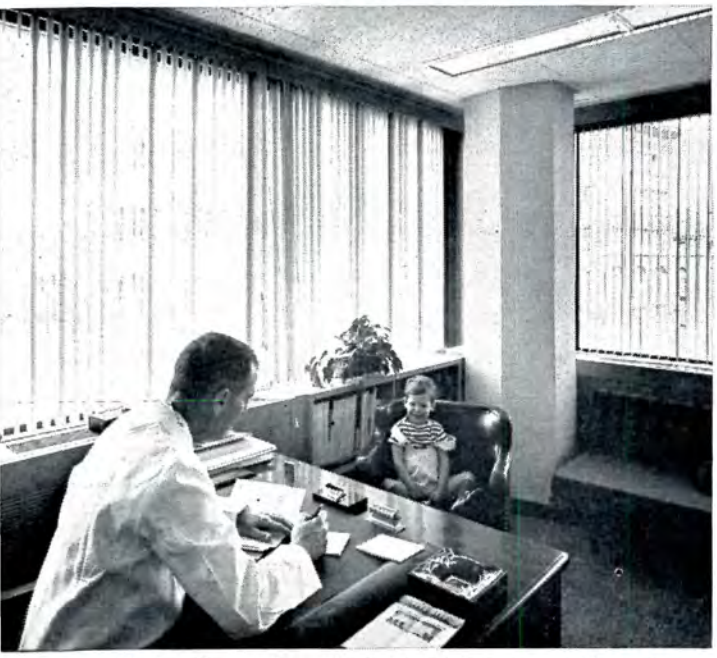
some offices, cools others,

Each Doctor may "prescribe" the climate he wants in this modern Physicians Office Building—part of the Rhode Island Hospital—thanks to a new type of air conditioning from York.

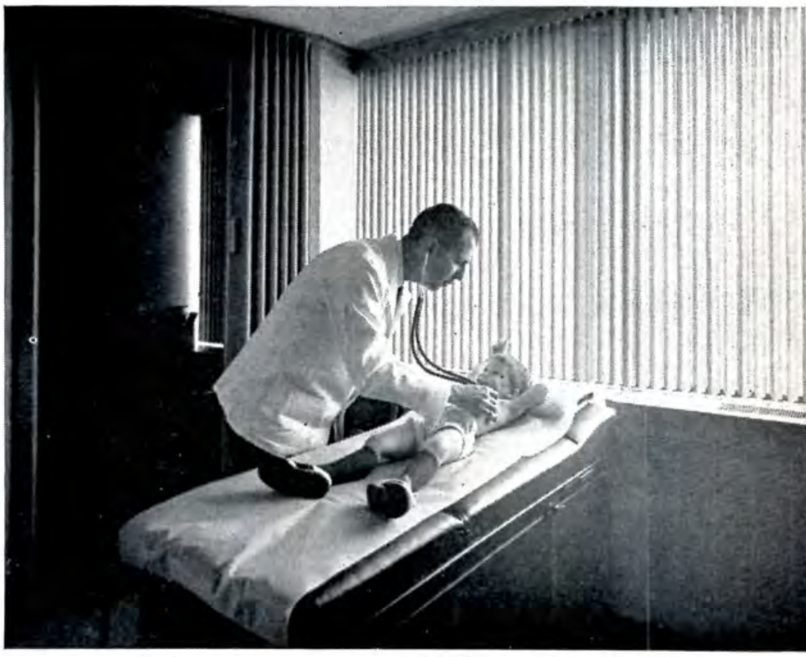
The individual temperature needs of this medical building may vary widely from room to room. Where patients are being examined, for example, it may be desirable to provide heating—even when other rooms are being cooled. The YORKAIRE Three Pipe Induction System* allows each occupant to select the temperature he wants, without affecting the temperature in other rooms.

This advanced air conditioning system was pioneered by York. It provides a variable source of both chilled water and hot water to each room terminal. Unlike ordinary systems that can only heat or cool at a given time, the YORKAIRE method can heat some rooms, cool others, at the same time. This advanced feature allows for solar and occupancy factors, as well as personal preferences: in the difficult "between season" period, shaded rooms may need heating, while sunny rooms will require cooling.

Cost is low! The YORKAIRE Three Pipe Air Conditioning System cuts heating-cooling costs. Because it never mixes the hot and cold water supply, there is no wasted heating or cooling energy, ever. Initial costs are often lower, too, because there is no costly zoning or extra ductwork.



York units are furred-in under windows to provide a custom, built-in appearance that blends with the decor of the building.



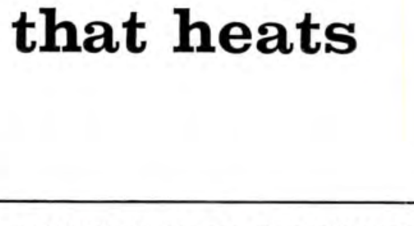
Individual rooms may be heated or cooled, to meet individual temperature needs—in any season of the year.

I E AIR CONDITIONING that heats at the same time!

Plan ahead with York when you plan air conditioning for any type of building. For over 75 years, York has pioneered many of the major advances in air conditioning . . . has set the pace in raising comfort standards for home, business and industry. Ask your nearby York Representative for complete information and specification data on the YORKAIRE THREE PIPE AIR CONDITIONING SYSTEM; he'll be glad to furnish you with a list of buildings in your area where it has been installed. Or write directly to York Corporation, York, Pennsylvania.

**Patents Pending*

ANOTHER YORK SOLUTION!



York Refrigeration System at Food Fair Stores, Inc. Distribution Center in Philadelphia uses unique "heat pump" principle to cool food storage areas.

YORK ®

CORPORATION
Subsidiary of Borg-Warner Corp.
YORK, PENNSYLVANIA

York ® B-W

THE QUALITY NAME IN AIR CONDITIONING AND REFRIGERATION

For more data, circle 84 on Inquiry Card

Product Reports

continued from page 199

FOOT STOOL, CUSHION ADDED TO "EGG" CHAIR

Arne Jacobsen's "Egg" chair now has a matching foot stool of the same

baked plastic and a removable cushion in the chair itself. Both are covered in the same material used for the chair. *Fritz Hansen, Inc., 305 East 63rd St., New York 22, N.Y.*

CIRCLE 303 ON INQUIRY CARD

MERCURY LUMINAIRE WITH BUILT-IN BALLAST

Prismpack mercury lighting fixture with built-in ballast is wired at the factory for immediate installation at the site. Installation costs are thus cut up to 50 per cent, according to the manufacturer. The color-corrected fixture has a glass reflector with optical prisms molded in its outer surfaces. These prisms direct the light downward into the work area and prevent it from being dissipated at wide angles and from shining directly into eyes. The low brightness and deep cup of the low-bay reflector make it adaptable for mounting heights as low as 10 ft. *Holophane Co., Inc., 1120 Ave. of the Americas, New York 36, N.Y.*

CIRCLE 304 ON INQUIRY CARD

CLASSROOM PHONOGRAPH HAS MULTIPLE USES

Trio-phonic listening center, designed especially for elementary

classroom use, has monaural and stereo four speed turntables and a tape recorder. There are three circuits each with twelve headphone jacks for individual listening. The equipment can be used for public address, and the teacher can record on tape without being heard by students. The table is 32 by 92 in. *The Perry Co., Box 7187, Waco, Tex.*

CIRCLE 305 ON INQUIRY CARD

ALUMINUM COATING

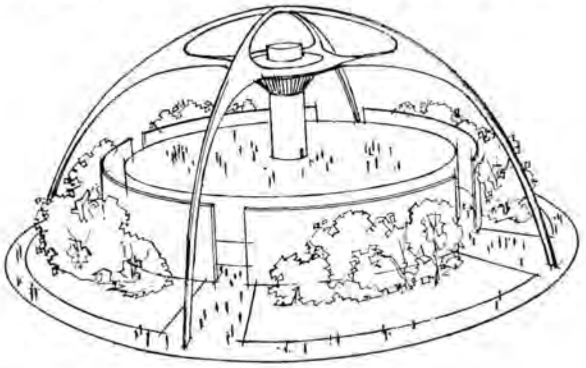
Protectalume clear plastic spray coating protects aluminum surfaces against pitting, corrosion, salt spray, etc., while retaining original appearance of the metal. It can be used on existing installations as well as new ones. *O'Keefe's, Inc., 75 Williams Ave., San Francisco, Calif.*

CIRCLE 306 ON INQUIRY CARD

more products on page 216


Donald F. Burr, A. I. A. & Associates, Architects
Modern Door Control by LCN "SMOOTHEE®" Door Closers
LAKE LOUISE ELEMENTARY SCHOOL
CLOVER PARK SCHOOL DISTRICT, TACOMA, WASHINGTON
LCN CLOSERS, PRINCETON, ILLINOIS
Installation Details on Opposite Page

"Theme" Building—highly distinctive focal point of the new air terminal at Los Angeles International Airport.

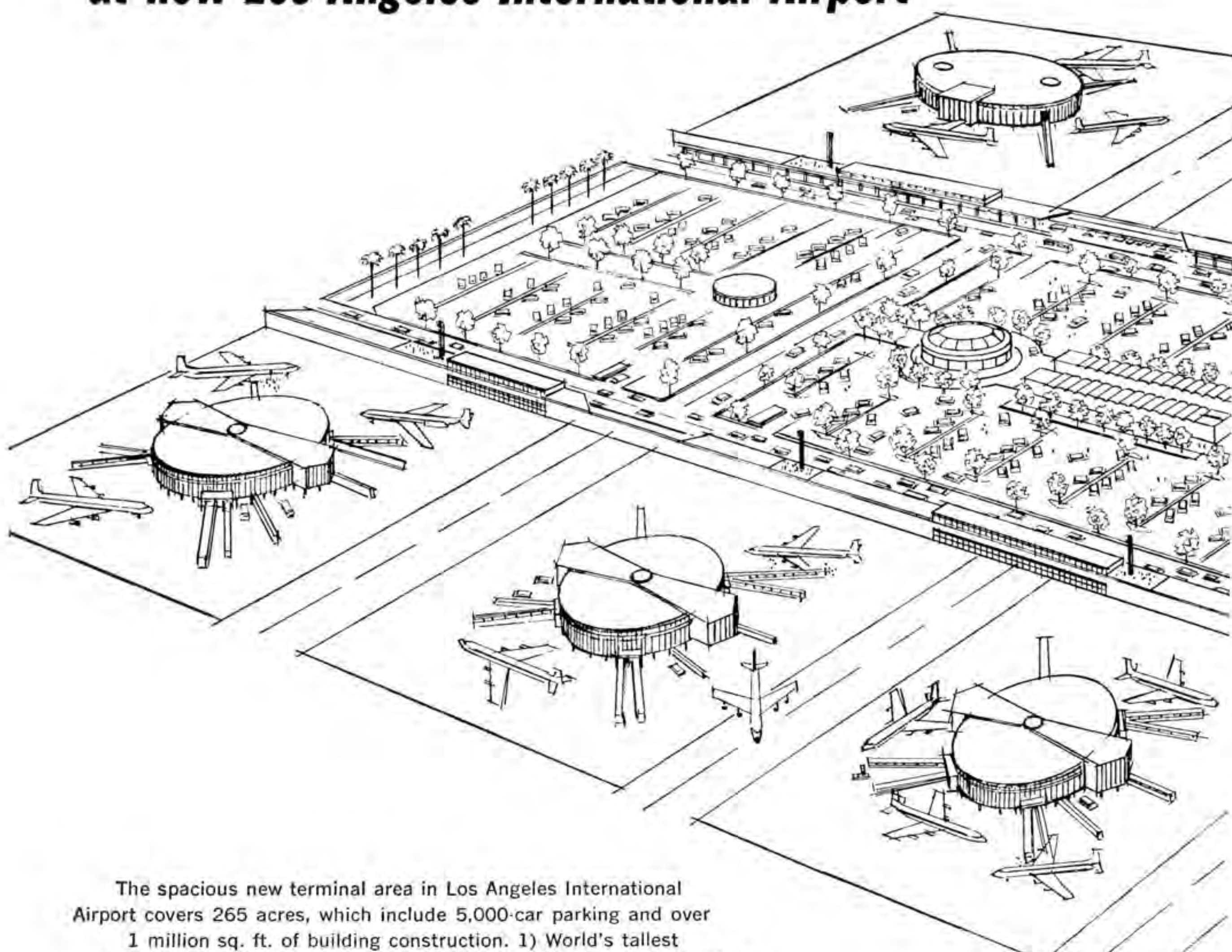


Executone sound chosen by all 17 Airlines at new Los Angeles International Airport

Every square foot of public area in terminal buildings at huge Los Angeles International Airport is within reach of clear crisp sound by Executone.

Although known as the world's first totally designed airport, the choice of sound systems was left to the individual airline tenants. And all 17 tenants chose Executone for installations designed to their own requirements!

Providing sound facilities for such a vast and



The spacious new terminal area in Los Angeles International Airport covers 265 acres, which include 5,000-car parking and over 1 million sq. ft. of building construction. 1) World's tallest control tower (172 ft.) also serves as airport administration building; 2) "Theme" building features restaurant-in-the-sky, observation decks, and shops; 3) Satellite buildings, where passengers board planes, are connected by underground passageways to the ticketing buildings; 4) Ticketing buildings have, in addition to streamlined ticket and baggage handling facilities, fine restaurants, shops, and a host of other comforts and services.

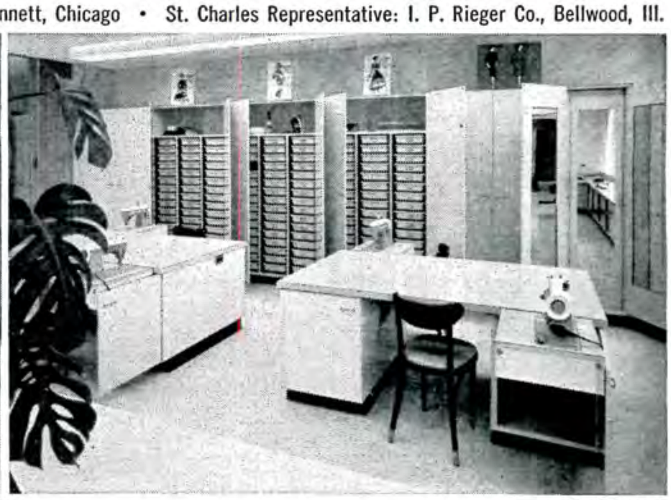
teaching
is easier...
learning
is fun

FOODS

in custom-designed classrooms by St. Charles

Deerfield High School, Deerfield, Ill. • Architects: Loebl, Schlossman & Bennett, Chicago • St. Charles Representative: I. P. Rieger Co., Bellwood, Ill.

CLOTHING



CLOTHING

Both teacher and pupils work so much better in a St. Charles *custom-designed* school installation. That's because beauty and durability are built into every piece of St. Charles equipment along with the quality that brings long-range economy. And, of course, St. Charles *flexibility* means that each installation meets the individual teaching need. If you're planning new classrooms — or remodeling old ones, check to see how much more you get with St. Charles — the ultimate in quality school equipment.

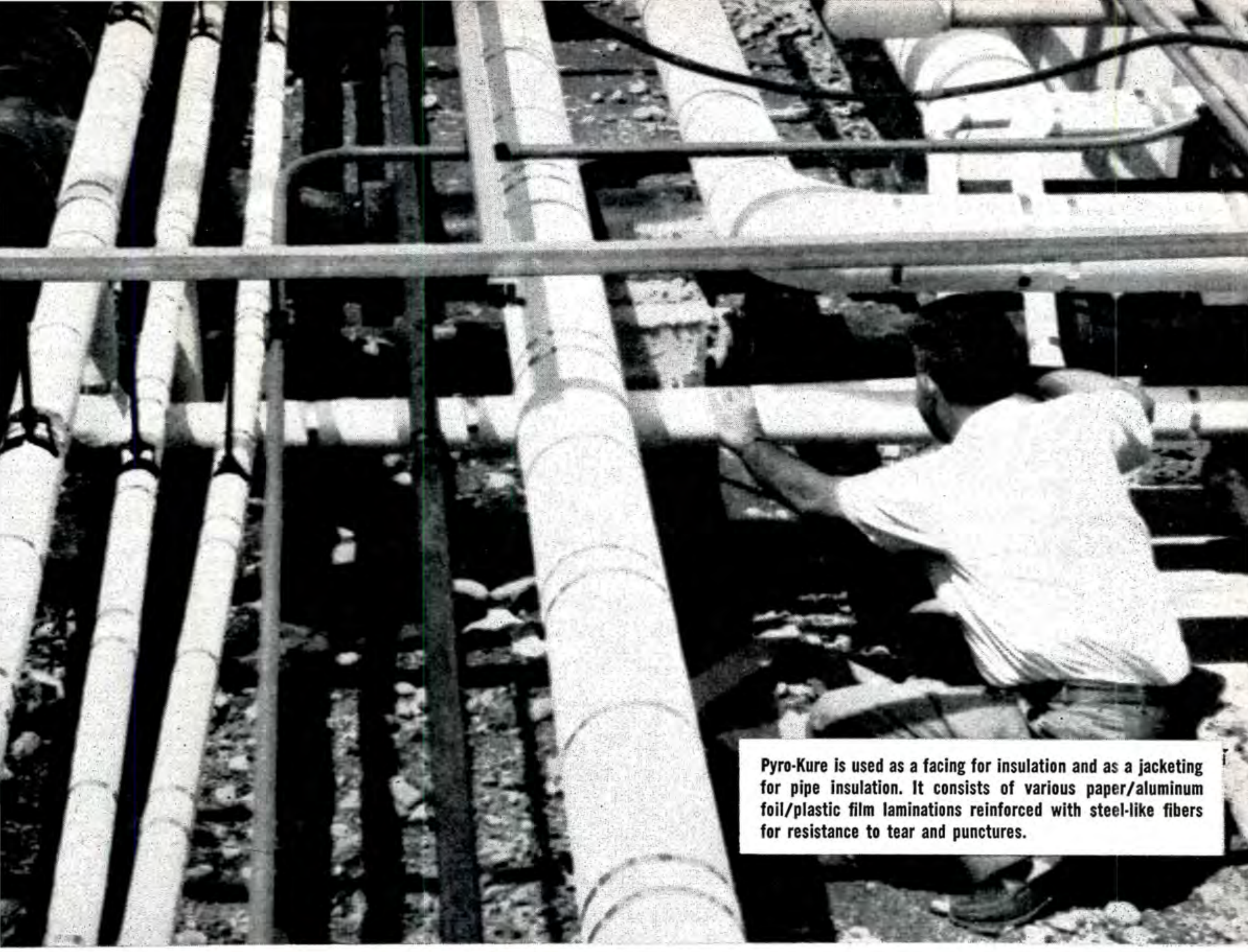
Write for free catalog: "St. Charles Custom School Storage Furniture." Available at request on your letterhead, St. Charles Manufacturing Co., Dept. ARS-10, St. Charles, Ill.

St. Charles

CUSTOM SCHOOL STORAGE FURNITURE

School Storage Furniture for Food, Clothing, Science Labs • Arts & Crafts • Elementary Classrooms

For more data, circle 87 on Inquiry Card



Pyro-Kure is used as a facing for insulation and as a jacketing for pipe insulation. It consists of various paper/aluminum foil/plastic film laminations reinforced with steel-like fibers for resistance to tear and punctures.

PYRO-KURE Vapor Barriers are permanently non-combustible

Pyro-Kure vapor barriers will never support combustion because flame-smothering gases are given off at the material's combustion point. This protection is permanent. It will not be lost by age or on contact with moisture.

Pyro-Kure has a permeance of 0.02 or below, depending on grade. Its U/L flame spread ratings are 5 for the foil side of foil-faced grades and 25 for the kraft side of kraft-surfaced grades.

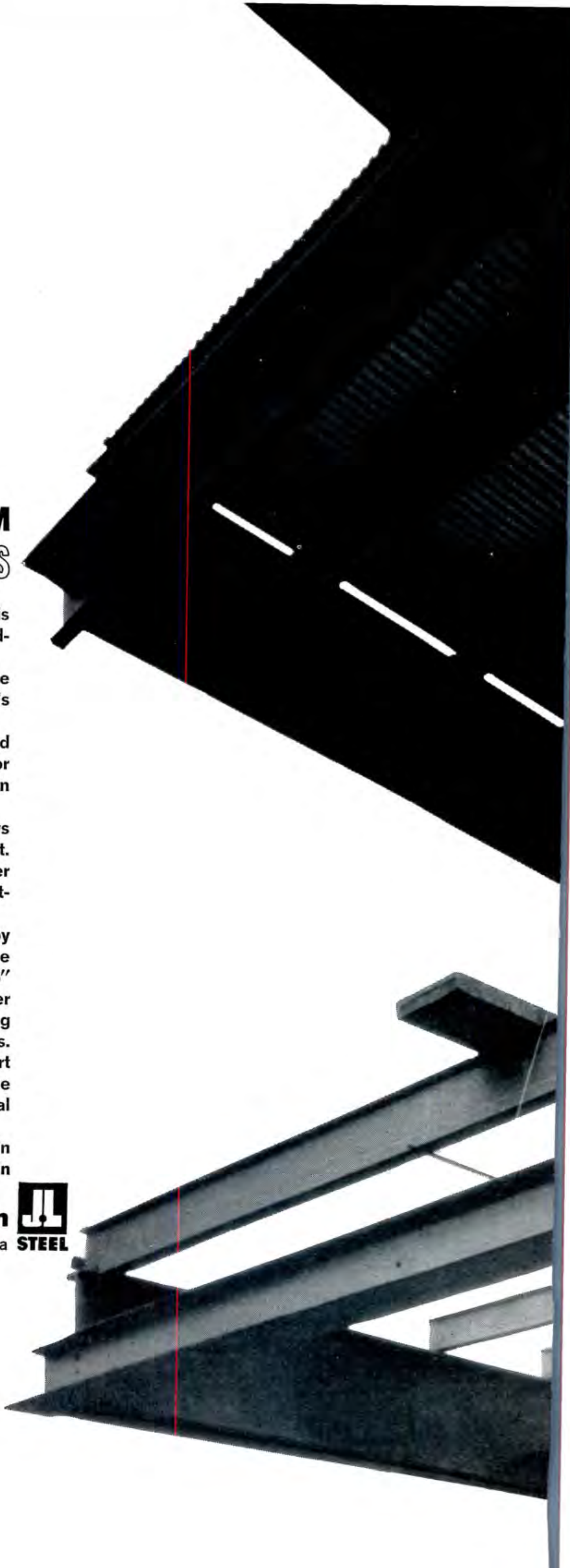
You can now provide this new degree of permanent fire protection by making sure Pyro-Kure is used on every job. All leading insulation manufacturers offer Pyro-Kure facing and jacketing under various trade names, or Pyro-Kure may be applied locally by insulation contractors. Send for complete details, today. Write: American Sisalkraft Company, Attleboro, Mass.

PYRO-KURE® NON-COMBUSTIBLE VAPOR BARRIERS FOR INSULATION FACING AND JACKI IG

a development of AMERICAN SISALKRAFT COMPANY/DIVISION OF ST. REGIS PAPER COMPANY.

For more data, circle 88 on Inquiry Card

Steel's Symbol of strength, long life, and economy.



STEEL DESIGN SOLVES PROBLEM
FOR MEMPHIS APARTMENTS

Owners planning a new 5-story apartment in Memphis were faced with the problem of utilizing a limited building site to the best advantage. Their solution?

They designed with steel to save space and provide a light modern appearance, a requirement for today's luxury dwellings.

Ellers & Reaves, Structural Engineers, recommended this approach to Jay Realty Company of Memphis for their interesting new Park Terrace Apartments and won enthusiastic approval from the owners.

The all-welded steel frame is supported on two rows of first floor reinforced concrete columns spaced 42 ft. on center. Floor girders span the columns and cantilever 11′-6″ on each side to provide balconies for each apartment and shelter for off-street parking.

Economy in floor construction was accomplished by welding Junior Beams as continuous members to the top of girders. Bay lengths varied from 12′-6″ to 16′-6″ and since 8″ Junior Beams were used on the longer spans, it was necessary to notch their ends 2″ to bring the top flange to the same height as the 6″ Junior Beams. Metal deck was welded to the Junior Beams to support the $2^1/_2$″ concrete floor slab. The 6″ space between the deck and the girders provided room for mechanical lines along the entire length of building.

For more complete information on Jones & Laughlin Junior Beams and Junior Channels, see our catalog in Sweet's File or call our local sales office.

Jones & Laughlin Steel Corporation

3 Gateway Center, Pittsburgh 30, Pennsylvania

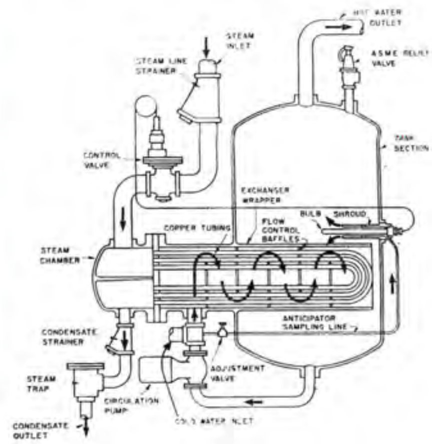
JL STEEL

Product Reports

continued from page 208

COMPACT WATER HEATER

Compact packaged steam water heater offers high capacity as well as small size; for example, a model with recovery capacity of 10,500 gal per hour measures $56\frac{1}{2}$ by 53 by $46\frac{1}{2}$ in. Incoming cold water enters through the heat exchanger and flows over the steam tubes in a zig-zag path

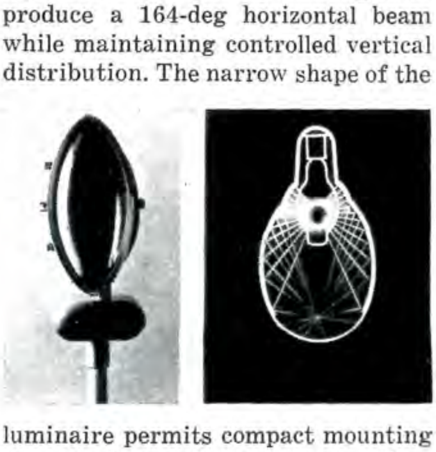


around baffles. To prevent rust, copper and copper alloys are the only materials which come in contact with the water. A remote temperature bulb anticipates need before temperature change can occur at the hot water outlet, so temperature is kept stable within 5 F. *Patterson-Kelley Co., Inc., East Stroudsburg, Pa.*

CIRCLE 307 ON INQUIRY CARD

WIDE BEAM FLOODLIGHT

A combination of elliptical and parabolic reflectors is used in the *Cat's-Eye* 400-watt mercury floodlight to produce a 164-deg horizontal beam while maintaining controlled vertical distribution. The narrow shape of the



luminaire permits compact mounting in multiple installations. *Revere Electric Mfg. Co., 7420 Lehigh Ave., Chicago 48 (Niles), Ill.*

CIRCLE 308 ON INQUIRY CARD

more products on page 222

From today's first family of construction adhesives:

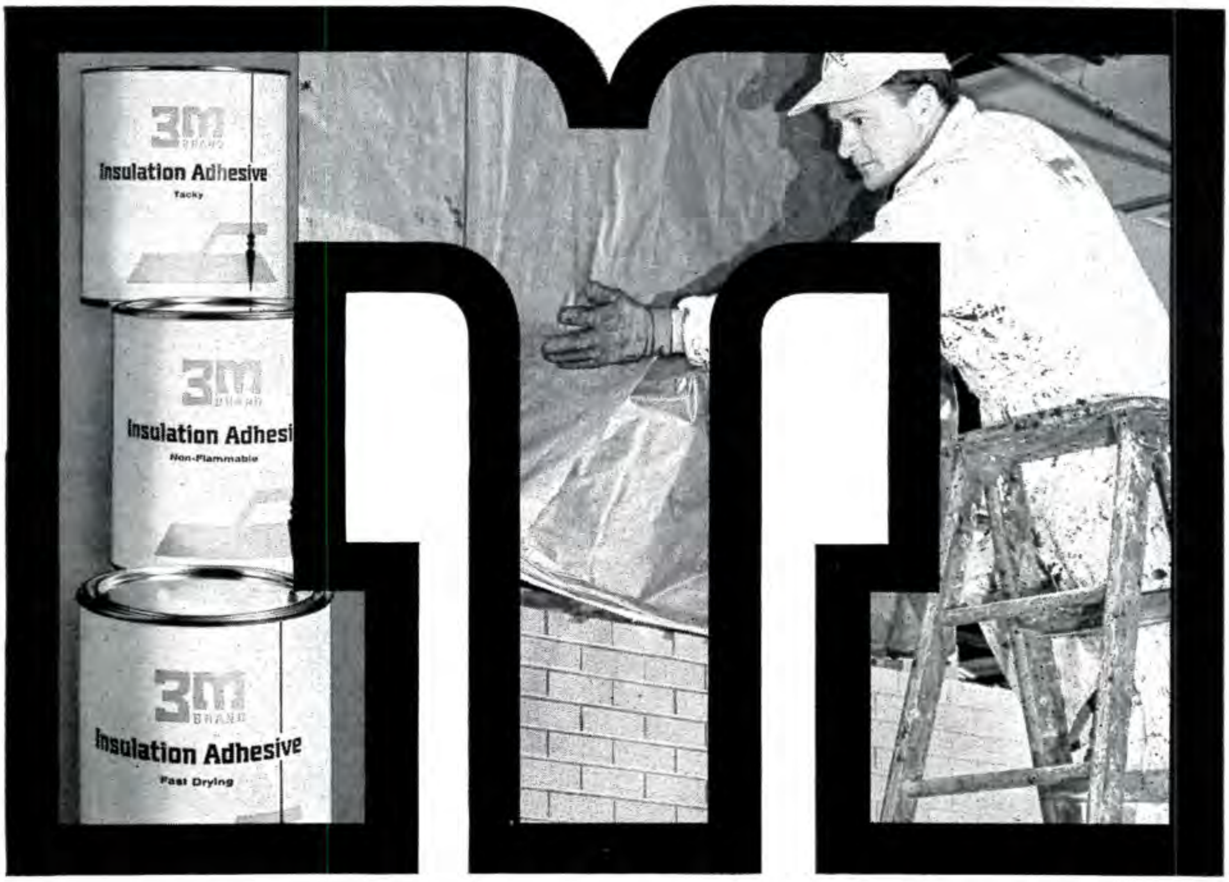
Duct Sealers and Insulation Adhesives for systems of all sizes, temperatures and velocities!

Duct Sealers that hold . . . from −65°F to 200°F!

Whether the velocity is high, low or medium, there's a 3M BRAND DUCT SEALER to meet the pressure and other problems in every heating or air conditioning system you are called on to install. 3M BRAND DUCT SEALERS set up so firmly yet flexibly at joints that duct work actually gains structural strength. You have a choice of two grades . . .

3M BRAND DUCT SEALER 800 PREMIUM GRADE is made for lasting, trouble-free seals on high velocity systems. It has excellent resistance to water, oil and fuel. Films of ⅛″ thickness have the ability to withstand bending over a 6″ mandrel at −65°F. Won't "blow-out" of joints at 200°F operating temperatures or even at intermittent temperature of 250°F. Surface "skins over" about 5 minutes after application. 1 to 3 days are required for full hardness, but only one hour setting time for tack-free resistance to dust and dirt. Apply with brush, caulking gun or pressure extruding equipment.

3M BRAND DUCT SEALER STANDARD GRADE assures you of tough, flexible, trouble-free seals on medium to high velocity systems. It meets critical established specification requirements at a competitive price. This sealer has excellent resistance to water and oil. Films of ⅛″ thickness remain flexible, even over a 1″ mandrel at −20°F, and withstand continuous heat exposure as high as 200°F. Duct Sealer Standard Grade may be applied with brush, caulking gun or pressure extruding equipment. Surface skins in 5 to 10 minutes, becomes tack-free in an hour to avoid collecting dirt. Ultimate hardness is obtained in 1 to 3 days.



BRAND

Insulation Adhesives that withstand 250°F heat!

Even if your system specifies heat up to a torrid 250°F or cold air at sub-zero temperatures, 3M has insulation adhesives that take it (help reduce vibration noise, too).

For ordinary jobs: **3M BRAND INSULATION ADHESIVE FAST-DRYING** is budget priced, yet formulated to withstand temperatures ranging from −20°F to 180°F. Brushed on, a gallon covers 200 square feet.

For high heat systems: **3M BRAND INSULATION ADHESIVE TACKY** is made to take temperatures up to 250°F. Bond is highly resistant to steam and water.

For fire hazard conditions: **3M BRAND INSULATION ADHESIVE NON-FLAMMABLE** offers worry-free application under hazardous conditions resulting from welding, sparks or open flames. When dry, the bond from this water dispersed adhesive is flexible and highly resistant to water.

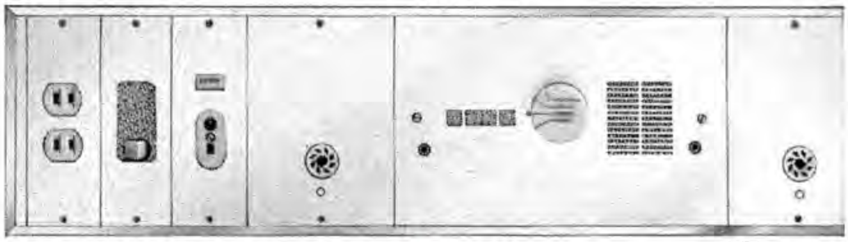
The complete line of quality 3M Adhesives and Sealers fits every construction need. There are 3M adhesive products that bond ceramic and clay tile, resilient and wood flooring, decorative plastic laminates and other building materials. For more information see Sweet's Catalog, your distributor, or send for FREE literature. Write AC&S Division, Dept. SBHM-102, 900 Bush Avenue, St. Paul 1, Minnesota.

Adhesives, Coatings and Sealers Division 3M COMPANY

For more data, circle 105 on Inquiry Card

FOR FORWARD-THINKING HOSPITALS–

The New Auth Series 4000 Nurses' Call Systems



The First Nurses' Call System to Offer All Three...

1. GREATEST NUMBER OF VALUABLE NEW FEATURES. Included are: "Remote Supervision" which permits nurse to go to a patient's room without fear of missing other incoming signals to her station —"Priority" by which nurse can single out calls from critically ill patients for instant attention—"Dialset" by which nurse controls the functions of each bedside station—and many others.

2. WIDEST SELECTION OF SERVICE FACILITIES FOR PATIENTS. These range from nurses' call only to provision for connection of additional facilities, as selected, at each patient's bedside—in modular form and in one enclosure. These facilities are: 110 volt receptacle, TV, radio, oxygen, vacuum, telephone, etc.

3. FINEST QUALITY AT COMPETITIVE PRICES. Designed by experts. Utilizes only the best—transistorized amplifiers, recessed visual signals, dustproof relays, anodized and vinyl finishes, etc.—yet is also designed to lower production cost.

Write today for New Brochure 4000S and name of nearest representative.

Auth Electric Company, Inc.

Long Island City 1, New York • Specialists in Hospital Signaling and Communication Systems

For more data, circle 106 on Inquiry Card

Before January 1, 1963 ... $12.50
After January 1, 1963 ... $15.00

One of the twentieth century's foremost architects tells what he believed and felt about architecture, including sixteen of his major projects. Forty-six outstanding photographs, including eleven double-page spreads, taken by Ezra Stoller, Balthasar Korab, Herbert Matter, and others, plus twenty-seven plans and drawings. Edited by Aline B. Saarinen.

In a book of major significance, the authors examine the problem of design in the American landscape, with particular emphasis on the vast rural-urban fringe areas and propose dramatic yet reasonable solutions. More than 530 new photographs, drawings, plans, maps and diagrams. Publication on November 21.

Before January 1, 1963 ... $15.00
After January 1, 1963 ... $17.50

YA
LE

Yale University Press, New Haven and London

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For "Start-to-Finish" responsibility, specify

AUTOMATIC TUBE SYSTEMS

BY

Standard Conveyor

Standard Conveyor takes full responsibility for your automatic tube system from start to finish. Standard Conveyor has over 40 years of experience in the pneumatic tube business.

Call your local Standard Conveyor representative . . . he's listed in the Yellow Pages of major cities under PNEUMATIC TUBES. Or, call our main office listed below for information.

Standard Conveyor
COMPANY

312-K Second St., North St. Paul 9, Minn., Telephone: SPring 7-1355

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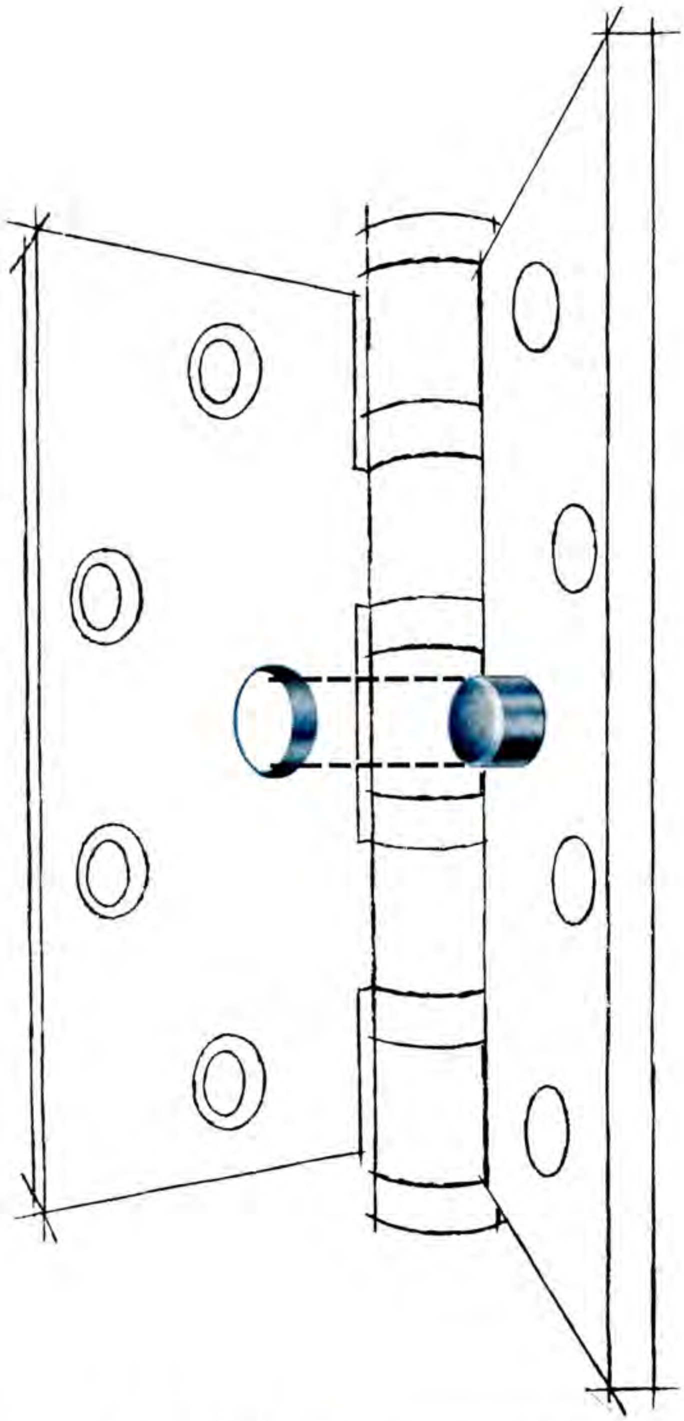
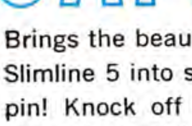
now available on the new slimline 5



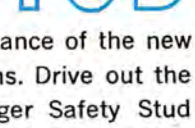
HAGER'S SYNCRETIZED

SAFETY STUD

Brings the beauty and flawless performance of the new Slimline 5 into security job specifications. Drive out the pin! Knock off the knuckles! The Hager Safety Stud stays "buried" beyond the prowler's reach . . . holds fast. The hinge leaves never part until the door is unlocked.



1. Door open. Stud is unnoticed.
2. Door closed. Leaves interlock. Metal stud prevents door movement in *any* direction.



NEW SLIMLINE 5
WITH 4 BALL BEARINGS

Five knuckles (greater strength both vertical and lateral) . . . Four ball bearings (doubles the bearing surface in either hinge position) . . . Slimline barrel dimension (design preference in today's architecture)

Write Hager, or contact your Hager representative

C. HAGER & SONS HINGE MFG. CO.
ST. LOUIS 4, MISSOURI
HAGER HINGE CANADA, LIMITED
61 Laurel Street East • Waterloo, Ontario

Everything hinges on Hager®

Hager

For more data, circle 109 on Inquiry Card

A wooded background naturally suits the extensive use of wood in this home's siding, overhanging roof, and exposed framing. See, too, how different forms of wood attractively complement one another, as in the solid stair-railing and open-rail entranceway.

For infinite applications in any home design

use WOOD . . . and your imagination

A room of fine wood furniture finds the narrow-planked flooring, tongue-and-groove ceiling, and laminated beams all in excellent taste. Floor-to-ceiling glass welcomes daylight as well as wood's variety of tones.

There are always new ways to work wood into the homes you plan. Its versatility is evident everywhere . . . in laminated beams, random-width floors, paneled walls, or beveled siding. Its inherent strength is present in each member for solid support . . . its compatibility with other materials is apparent, too, in all of its many grains, textures and tones.

However you treat wood—with paint, stain, or weather—it has the capacity to make a house at home on its site, ready a room for living. Insulation comes naturally with wood. Sound control is made easier . . . and its warm beauty is a virtue that endures. Wood's economy allows superior standards at lower costs . . . its familiarity helps achieve quicker acceptance for even the most unusual designs. For more information on designing with wood, write:

NATIONAL LUMBER MANUFACTURERS ASSOCIATION
Wood Information Center, 1619 Massachusetts Ave., N.W., Washington 6, D.C.

nlma

find the better way with **wood**

Wood bests any level, as demonstrated in this modern home topped with twin oriental-flared roofs gracefully supported by full-length laminated beams, double-posts bolted together, and siding solidly planked from corner to corner. This structure of striking simplicity was designed by Jay Fleishman, architect.

For more data, circle 110 on Inquiry Card

continued from page 230

CEILING SYSTEM

Colamar Mark-50 integrated ceiling system controls light, sound and air diffusion from one modular source. Each module has a combination luminaire and air diffuser, acoustical tile, ceiling joinery and provisions for movable partitions. Since each module is self-contained, the lighting equipment need not be moved when wall partitions are changed. *Westinghouse Lighting Div., Edgewater Park, Cleveland, Ohio*

CIRCLE 315 ON INQUIRY CARD

LANGUAGE LABS USE TRANSISTORS

Transistorized language laboratory equipment saves space and electricity, while providing long service life. In booths with acoustical panels, students may listen, respond and hear themselves; or listen, respond and record, then compare. Annunciator

lights enable students to signal teacher in control station. *Rheem Califone Corp., 5922 Bowcroft St., Los Angeles 16, Calif.*

CIRCLE 316 ON INQUIRY CARD

PRODUCT BRIEFS

Galvanized steel now is available with a decorative surface of colorful polyvinyl fluoride film. *National Steel Corp., Grant Bldg., Pittsburgh 19, Pa.*

CIRCLE 317 ON INQUIRY CARD

Fluorescent dimming system can control up to 1,200 fluorescent lamps from one central control. *Thomas Industries Inc., 207 E. Broadway, Louisville 2, Ky.*

CIRCLE 318 ON INQUIRY CARD

Dry pressure treatment prevents rot and termite attack in exterior fir plywood without altering weight or appearance. *Georgia-Pacific Corp., Equitable Bldg., Portland, Ore.*

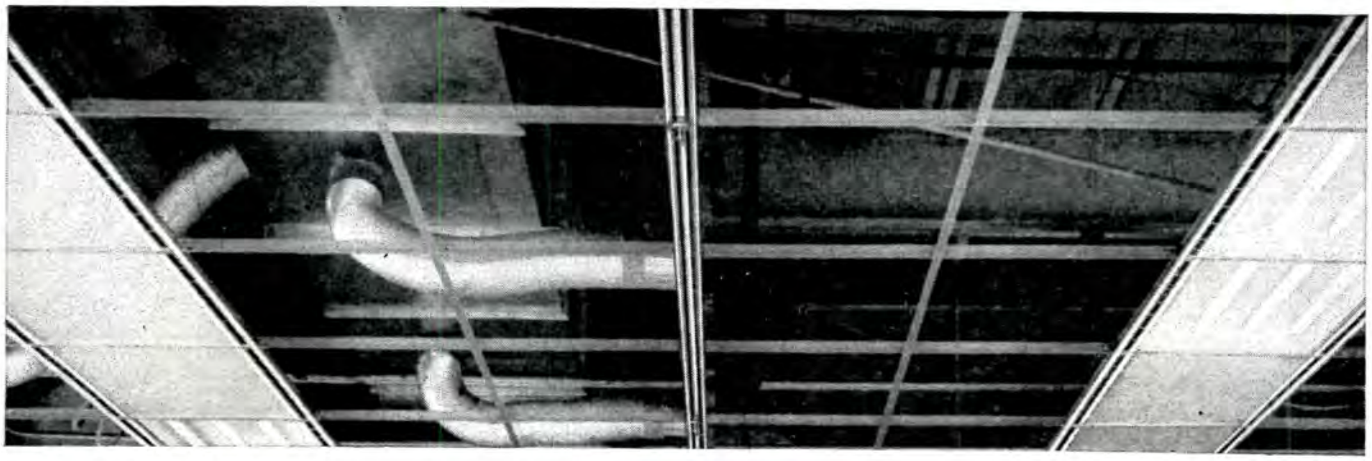
CIRCLE 319 ON INQUIRY CARD

Corrugated asbestos-cement sheet has a heavy polyvinyl chloride finish, available in six colors. *National Gypsum Co., Buffalo 2, N.Y.*

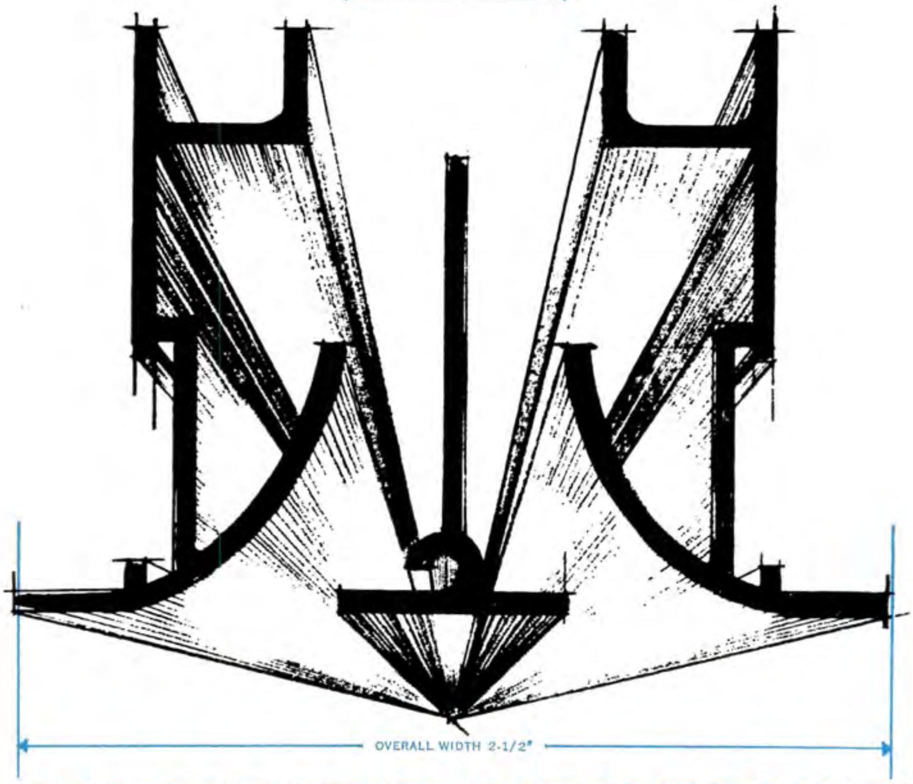
CIRCLE 320 ON INQUIRY CARD

Polyester tile of American Cyanamid's *Laminac* is available in opaque or transparent resin with decorative aggregate, either satin or dull surfaces. *Advanced Resin Products Inc., South Norwalk, Conn.*

CIRCLE 321 ON INQUIRY CARD



LINEARITY UNLIMITED

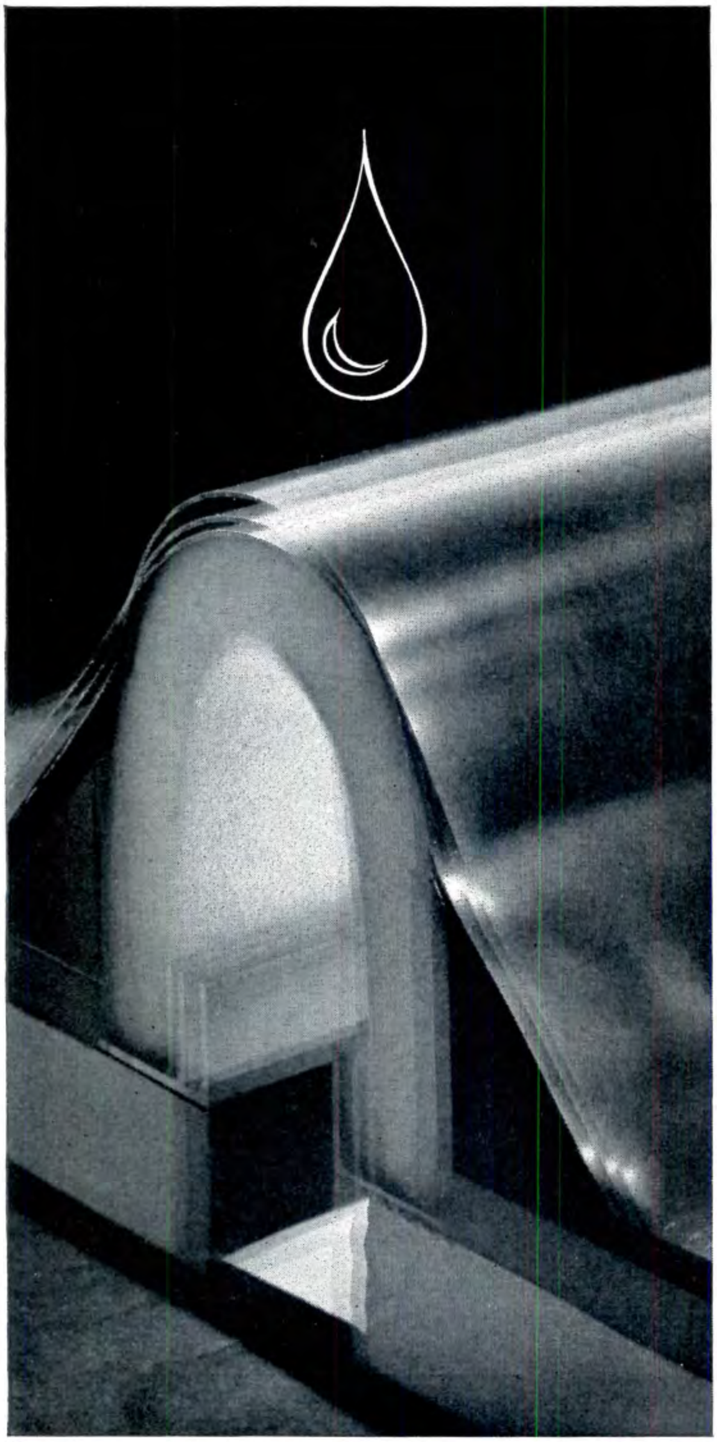


ANEMOSTAT AIRMODULE™

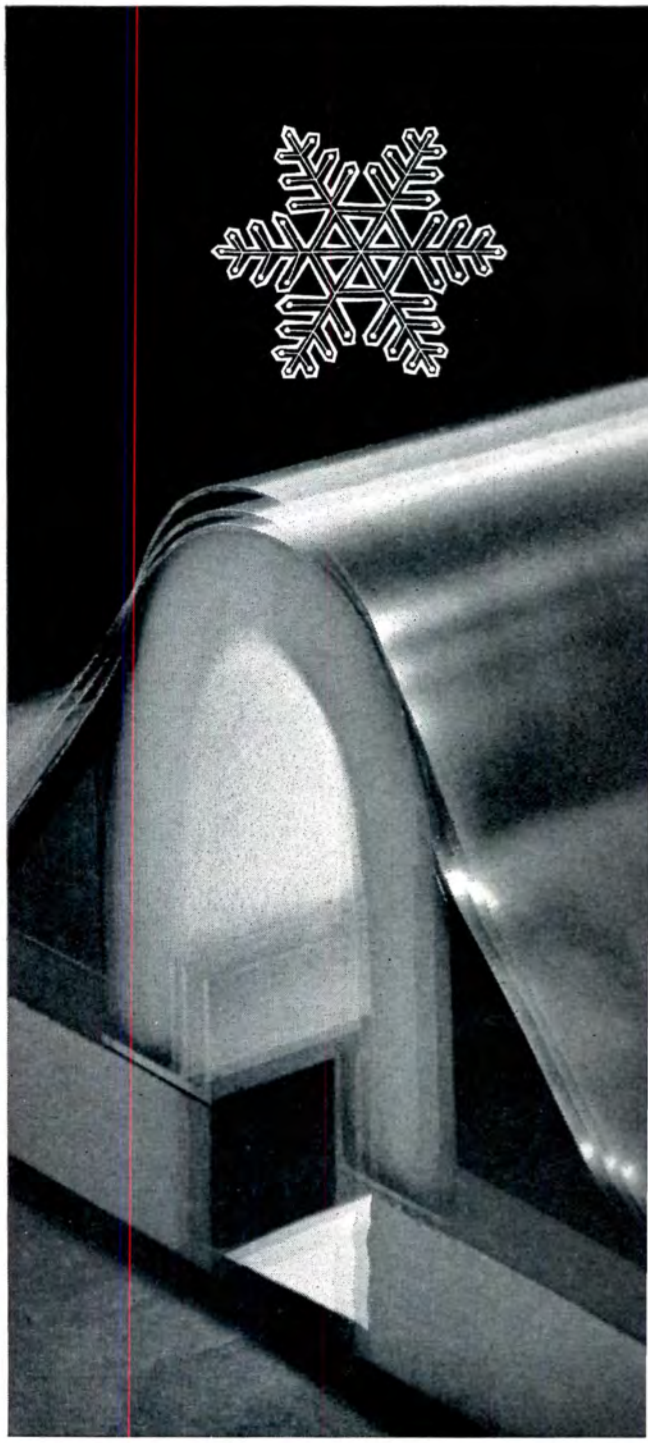
Support your ceilings in style with this new modular diffuser.

First, this modern modular unit *works* — and works with proved Anemostat efficiency. It distributes air horizontally — 60 draft-free cfm per linear foot. And it helps support the ceiling. Study its cross section: those angular side channels hold ceiling panels in a dozen different ways — an *Airmodule* unit can be combined with almost any ceiling system. Its flat underside blends smoothly with the ceiling architecture. Special linking devices enable you to combine active and inactive units for uninterrupted linearity. Centered in the photograph is a row of Anemostat® *Airmodule* units flanked by inverted T-bar structural members and CLD lighting troffer diffusers. And note the sprinkler heads: you see air, light, ceiling support and fire protection systems — all superbly integrated. (This is an actual installation shown before ceiling panels were installed.) And that's only one way to do it. You'll have your own *Airmodule* ideas. There's a new Anemostat bulletin ready — with performance data, installation information, and dimensions. For your copy, call your Anemostat representative or write for Bulletin AM-862 to: Anemostat Corporation of America, Scranton, Pa. (A Subsidiary of Dynamics Corporation of America).

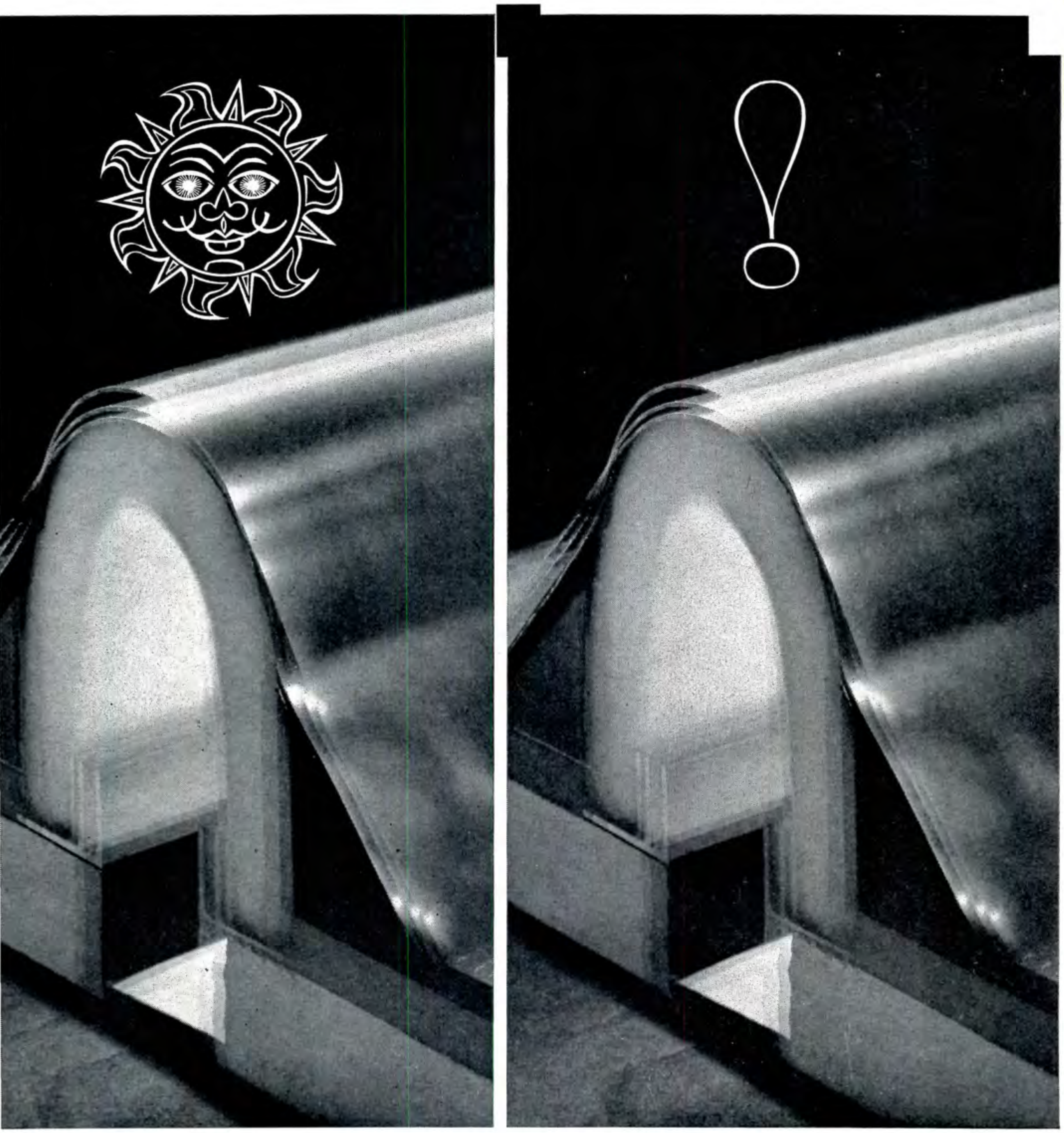
For more data, circle 112 on Inquiry Card



Flex!



Flex!



Flex! It's Saraloy 400 and Ethafoam!

This insulated expansion joint handles the tough ones without leaking—even continuous large movements between building sections. It's field-fabricated quickly, economically, with Saraloy® 400 elastic flashing and Ethafoam® polyethylene foam.

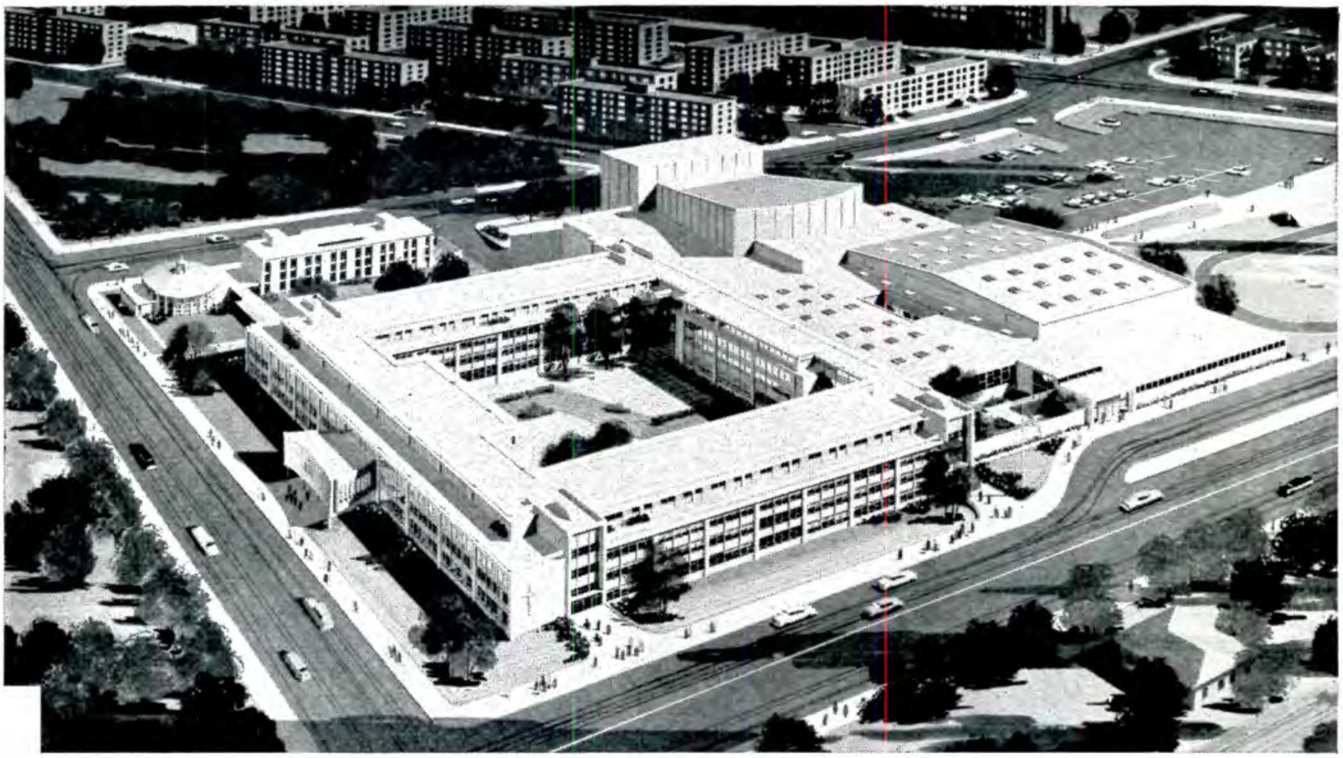
Saraloy 400 flashing conforms to any contour, adheres or fastens to most building materials—metal, glass, masonry, wood. It flexes year after year without failing; won't crack, peel, chip or check. And Saraloy 400 flashing is workable. It's cut with a roofing knife or scissors, fitted and installed in minutes. No preforming!

Insulating the joint is Ethafoam closed-cell expanded polyethylene. It's flexible over a wide temperature range, nonabsorbent and an excellent vapor barrier. Lightweight Ethafoam is easy to handle, cut and use. Virtually inert, it's long-lasting.

You no longer need adapt your design to the limitations of conventional flashings. Whatever the contour or the building components, Saraloy 400 tailors flashing performance to design—by itself or used with other materials. For technical Data Sheet 7-2 on roof expansion joints, or details about Saraloy 400, write us in Midland, c/o Plastics Sales Department 1303NI0.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

For more data, circle 113 on Inquiry Card



Even light for large areas with Toplite Roof Panels

Cardinal Spellman High School
Bronx, New York
Architects: Eggers and Higgins
Installation by: Abbott-Redmont Thinlite Corp., New York, New York

Soft uniform day lighting, free from glare or shadows plus the elimination of excessive heat build up, were prime requirements for the cafeteria and two gymnasia at the new Cardinal Spellman High School. To accomplish these objectives, architects Eggers and Higgins specified PRC Toplight Roof Panels.

Toplight Panels utilize hollow, prismatic glass units which transmit a high percentage of the light from the north sky and the low winter sun, but reject the intense light and heat from the high summer sun. (They transmit about one-third as much heat in summer as conventional skylights). In this way they provide controlled daylight that is ideal for gymnasia, cafeterias, classrooms, corridors—in fact all types of building structure.

Low silhouette Toplite Roof Panels are available in a variety of sizes for easy installation on most roofs. Panels are furnished with light controlling prisms at 45° or 90° to the perimeter, for complete flexibility in any building orientation. 12 page catalog containing architectural detail and design data available on request.

PRC®

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410 Jersey Ave., Gloucester City, N.J., GLenview 6-5700

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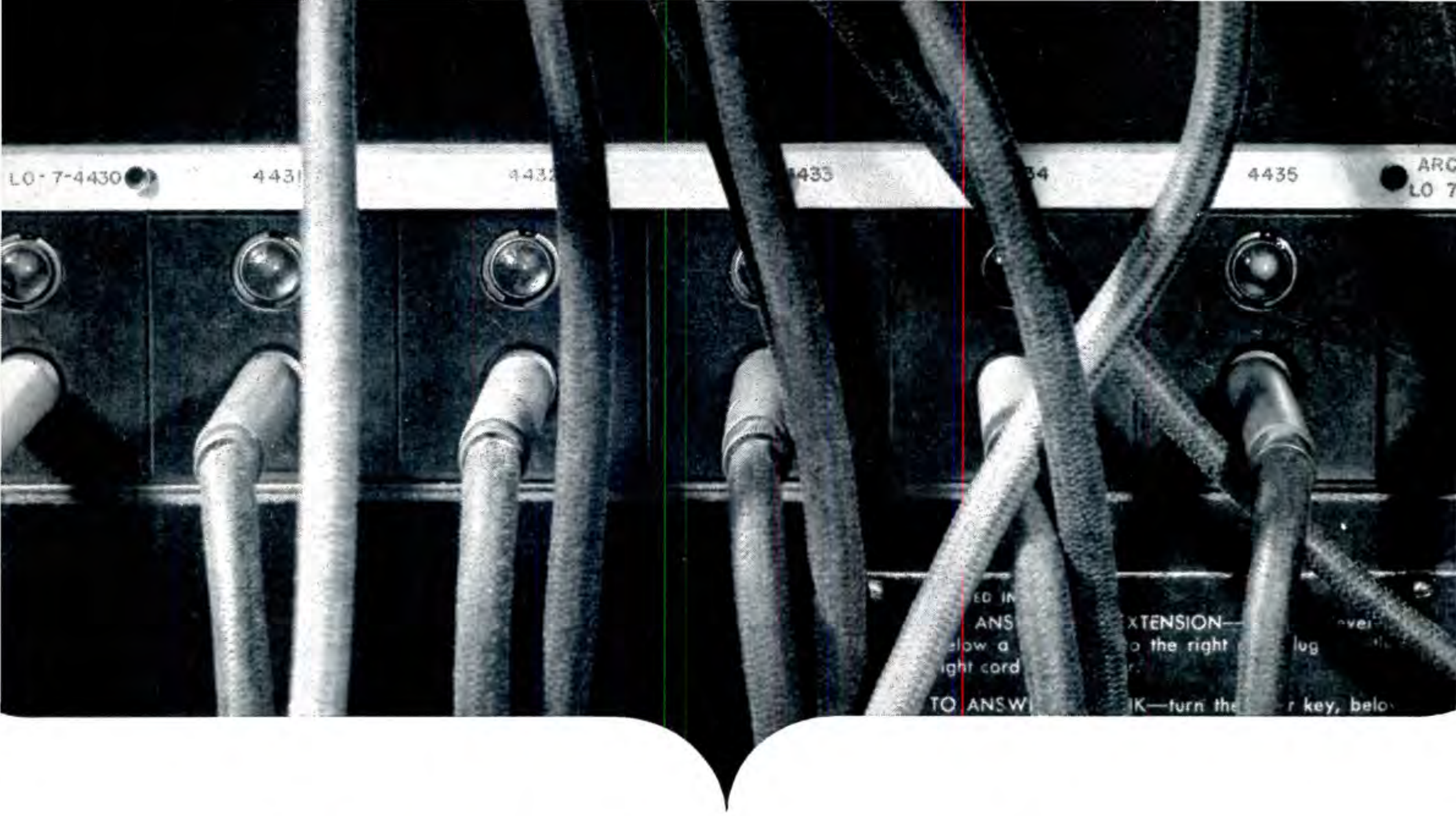
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4431
4433
4435

"Our Toledo Dishwasher gets tableware hygienically clean, and saves us money on water and detergent, too"

This Toledo R3T-20-R Rackless Dishwasher is on duty seven days a week in the beautiful new Floyd M. McDowell Commons on the campus of Graceland College. Architect: Dave Morgan and Associates.

"We *know* that our Toledo Rackless Dishwasher does a remarkable job in maintaining highest sanitation standards", says Lillian Flanders, Food Service Director of Graceland College, Lamoni, Iowa. "Our State Health Inspector reports that our dishes show bacteria count of four or less, and the allowable maximum is 100. Our Toledo is also three times faster than the rack type machine we were using, and takes less labor to operate. It has reduced our breakage, and uses less water, detergent and drying agent".

For Kitchens that will reward your clients with worthwhile savings in time, money and manpower, and are easily maintained to the highest level of sanitation, specify Toledo equipment. The complete Toledo Kitchen Machines line provides design and cost flexibility to meet the particular requirements of any commercial or institutional kitchen.

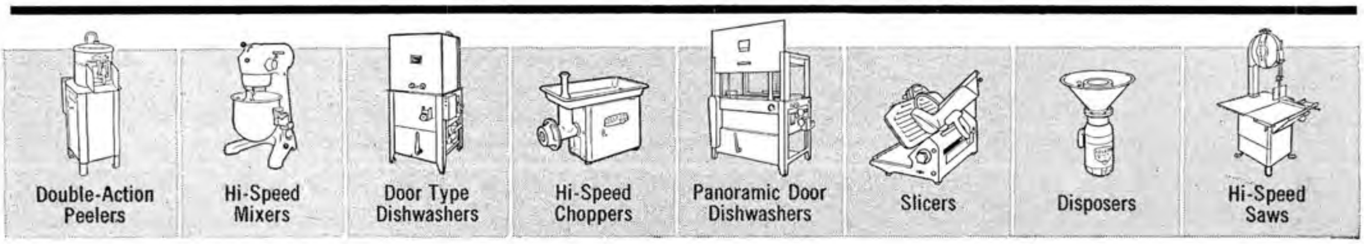
These Toledo heavy-duty waste disposers do away completely with food waste cans, eliminate offensive odors and garbage toting. Only one container is needed, to take care of paper waste.

For full information and assistance on specifications and plans, see your Toledo Kitchen Machines Dealer, or write to us. (See our Catalog in Sweet's)

TOLEDO® *Kitchen Machines*

SERVICE Factory-Trained 240 Cities

Division of Toledo Scale Corporation, 245 Hollenbeck Street
Rochester 21, New York



For more data, circle 116 on Inquiry Card

Office Literature

continued from page 200

AIR DIFFUSER
(A.I.A. 30-J) Bulletin AM-862 gives details on a modular air diffuser which functions both as an element in ceiling design and a structural component of the ceiling system. *Anemostat Corp. of America, 25 W. 43rd St., New York 36, N. Y.*
CIRCLE 417 ON INQUIRY CARD

INDUSTRIAL LIGHTING
A 20-page technical booklet on industrial lighting discusses the importance of considering the total environment and the integration of lighting and heating. A selection guide analyzes 12 typical lighting systems and applications in various types of industry. *Inquiry Bureau, General Electric Co., Nela Park, Cleveland 12, Ohio*
CIRCLE 418 ON INQUIRY CARD

CHURCH SOUND SYSTEMS
Planning complete church sound systems and evaluating existing systems are discussed in a new brochure, with emphasis on components. *Executone, Inc., 47-37 Austell Place, Long Island City 1, N. Y.*
CIRCLE 419 ON INQUIRY CARD

POLYSULFIDE SEALANTS
Polysulfide sealants for precast concrete curtain wall panels are discussed in a five-page paper. *Portland Cement Assoc., 250 Park Ave., New York 17, N. Y.**
CIRCLE 420 ON INQUIRY CARD

AIR CONDITIONERS
A 12-page "buyers' guide" to air conditioners for business, industrial and residential use has details on packaged water chillers, cooling towers, air handlers, and equipment components. *Acme Industries, Inc., 600 N. Mechanic St., Jackson, Mich.*
CIRCLE 421 ON INQUIRY CARD

COLOR IN GLASS
Transpan tempered safety glass has patterns of ceramic color permanently fused to the polished plate glass surface. More than 250 possible combinations give control of light and solar heat. *Virginia Glass Products Corp., Martinsville, Va.*
CIRCLE 422 ON INQUIRY CARD

PLYWOOD PANELING
(A.I.A. 19-F) Architectural plywoods for paneling and doors are described in a four-page folder. *Technoply Corp., 182-20 Liberty Ave., Jamaica 33, N. Y.**
CIRCLE 423 ON INQUIRY CARD

FLOODLIGHTING
Architectural floodlighting for schools and specialty businesses to give both safety and beauty is described in two bulletins. *Floodlighting Institute, 55 Public Sq., Cleveland 13, Ohio*
CIRCLE 424 ON INQUIRY CARD

STEEL CASEWORK
Steel casework for laboratories, test kitchens, hospitals, religious institutions, etc. are illustrated in a 12-page booklet. *Geneva Casework, Geneva, Ill.**
CIRCLE 425 ON INQUIRY CARD

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

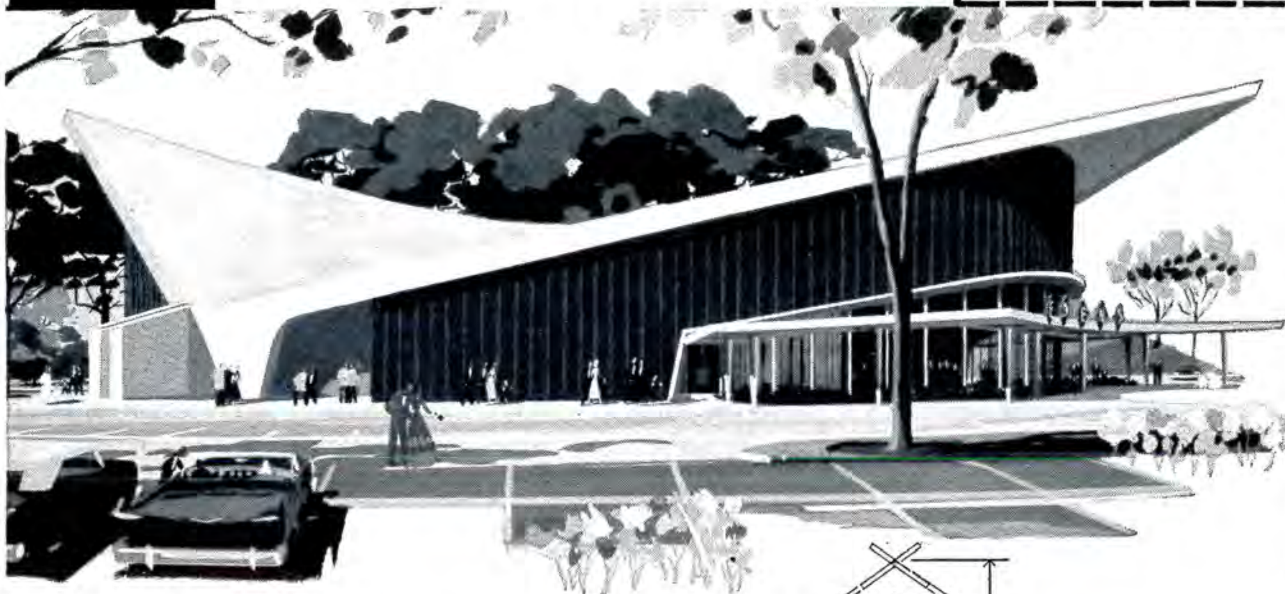
more literature on page 256

NO. 6 hyperbolic paraboloids

a.i.a. file: 4-a

Prepared as a service to architects by Portland Cement Association

Clip along dotted line



Curves from straight lines. The hyperbolic paraboloid shell roof is, in effect, a three-dimensional "sheet" of concrete in which strength and rigidity are accomplished not by increasing the thickness of the sheet, but by curving it in space. Despite its double curvature, this shape can be formed entirely of straight pieces—as can be seen in the side elevation at left.

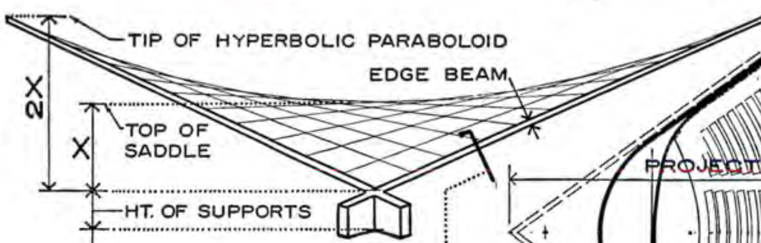
The concrete roof shown will be the largest single hyperbolic paraboloid of its type in the United States. The building it will cover is being constructed to house the 1,350-seat Edens Theatre in Northbrook, Illinois.

This saddle shell roof will measure 159 ft. between working points at the abutments and 221 ft. from tip to tip. The shell will be only four inches thick.

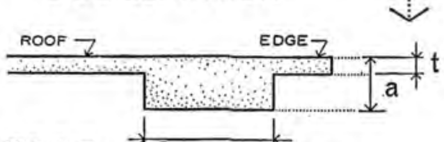
H/P's, as they are called for short, are exceptionally adaptable to churches, auditoriums and, as shown here, for theatres.

Get complete technical literature on hyperbolic paraboloids. (Free in U.S. and Canada only.) Send a request on your letterhead.

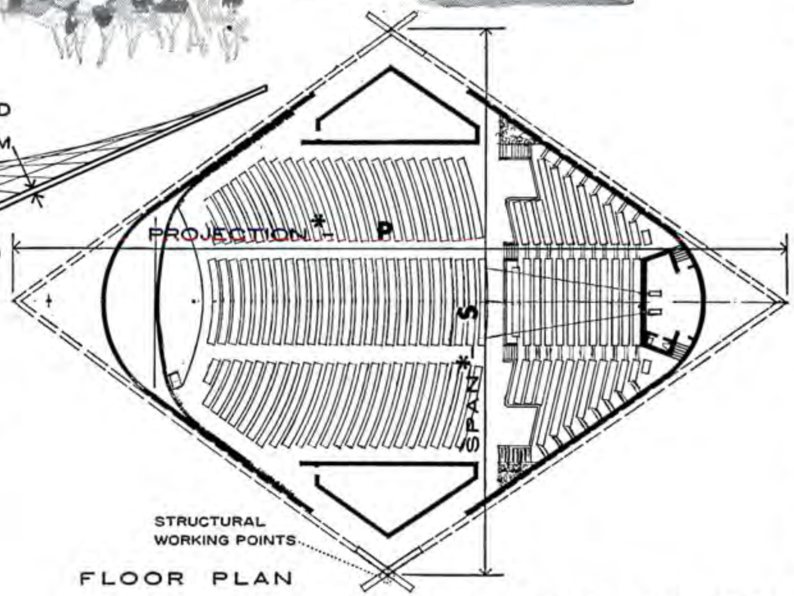
Architect: Perkins and Will, AIA, Chicago, Illinois
Engineer: The Engineers Collaborative, Chicago



SIDE ELEVATION



EDGE BEAM



FLOOR PLAN

HYPERBOLIC PARABOLOID SPAN DATA

SPAN	PROJECTION min.-max.	X (1) min.-max.	a (2)	t (3)	REINFORCING (4)
50′	50 – 70′	3 – 5′	1′	2¾″	2 – 3 lb.
60′	60 – 85′	4 – 6′	1′	2¾″	2 – 3 lb.
75′	75 – 105′	6 – 9′	1½′	3″	3 – 4 lb.
100′	100 – 140′	9 – 13′	2′	3¼″	3 – 4 lb.
125′	125 – 175′	13 – 20′	2½′	3½″	4 – 5 lb.
150′	150 – 210′	17 – 25′	3′	4″	5 – 7 lb.

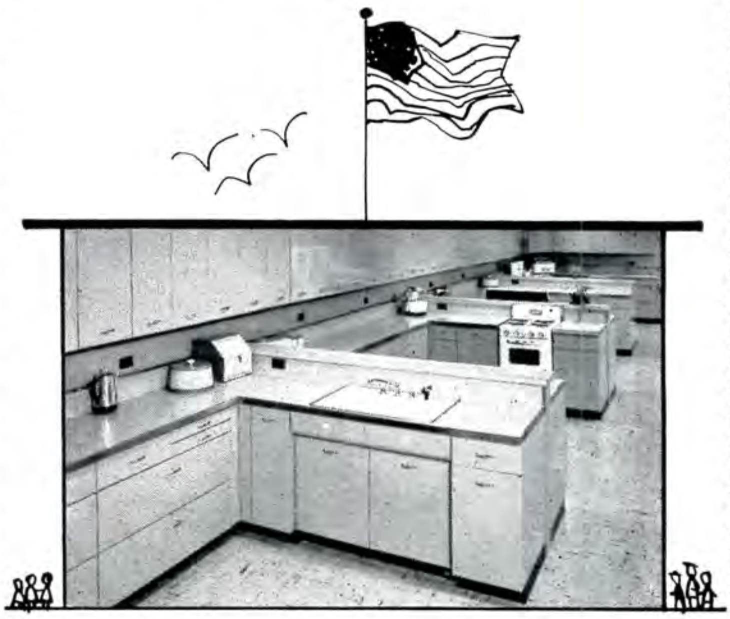
(1) figures given are recommended lower limits; maximum feasible limit = S/5. (2) average depth of edge beams. (3) average shell thickness in inches. (4) average reinforcing steel of hyperbolic paraboloids in pounds per square foot of surface.

PORTLAND CEMENT ASSOCIATION Dept. 10-8, 33 West Grand Ave., Chicago 10, Illinois

A national organization to improve and extend the uses of concrete

APARTMENTS

SCHOOLS



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SPECIFY GENEVA QUALITY

APARTMENTS . . . Owners and managers find Geneva kitchens mean better rents, lower maintenance, lasting beauty.

SCHOOLS . . . Geneva's line of cabinets for Home Arts, Food Laboratories and Arts and Crafts departments permit greater latitude in layout, offer the most advanced design ideas.

CHURCHES . . . A kitchen is basic to the needs of the modern church and Geneva cabinets receive high preference.

COMMERCIAL . . . Test kitchens, laboratories, executive kitchens, efficiency kitchens for the "coffee break" are only a few of the growing applications for Geneva cabinets in business.

For sound counsel on problems of casework layout and installation, consult your Geneva distributor or write the factory.

Geneva KITCHENS

GENEVA MODERN KITCHENS
DIVISION OF ACME STEEL CO.
Geneva, Illinois

For more data, circle 119 on Inquiry Card

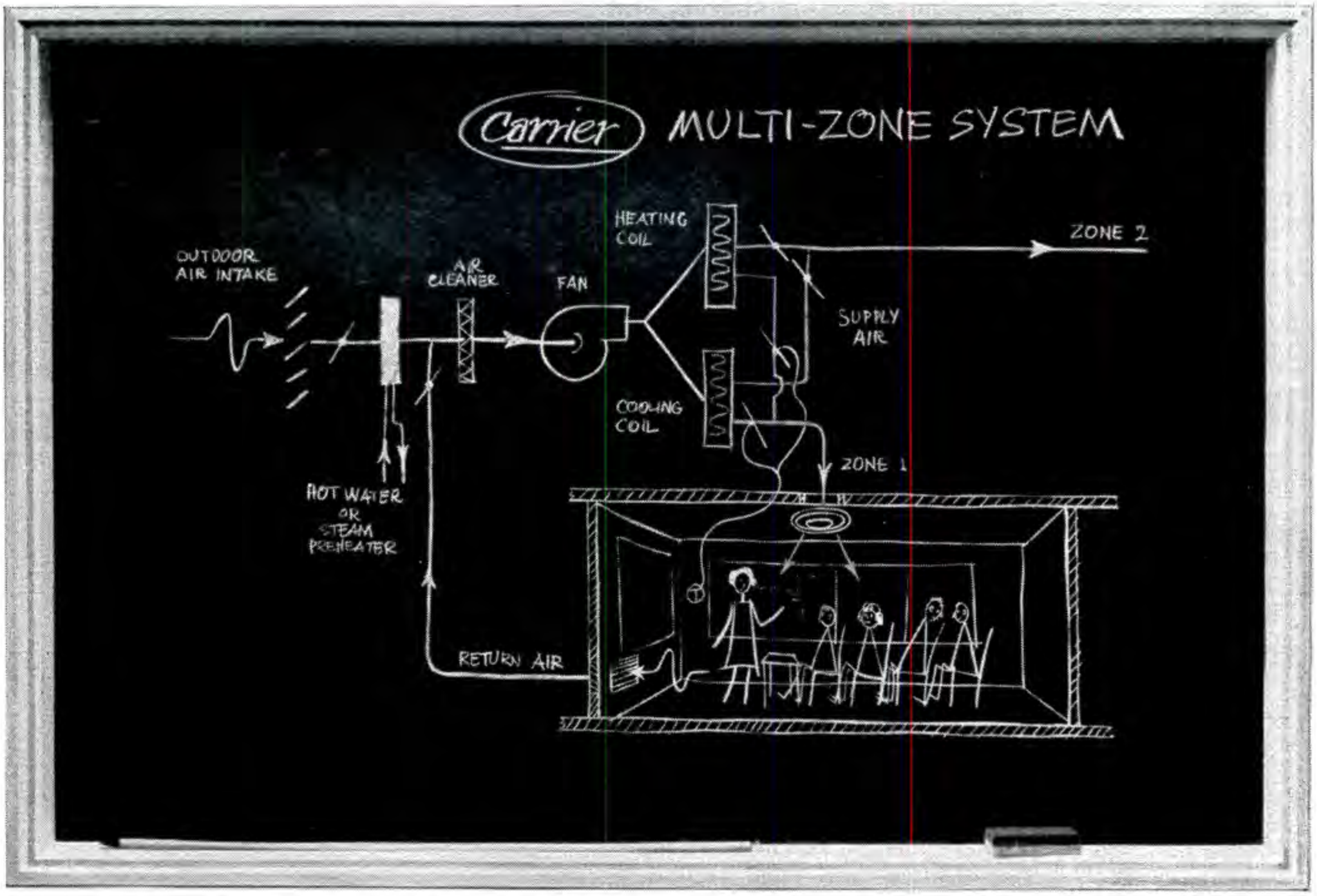
GENEVA MODERN KITCHENS
Dept. AR-10-62, Geneva, Illinois

Please send Geneva literature, including specifications covering the following:

☐Apartments ☐Schools ☐Churches ☐Commercia

Name__________

Address__________



This approach to heating and cooling of compact schools has much to commend it

Multi-zone system performance equals that of double duct system, yet it requires only one supply air duct per room and simple outlets

This system is long on quality and simplicity and short on cost. It particularly satisfies the special characteristics and requirements of compact schools with interior rooms. It is also worthy of full consideration for small elementary schools and schools of the campus type.

Among its many virtues, the multi-zone system assures that the desired temperature will be maintained in each classroom under all conditions and without use of room units or complex controls. Supply air volume is virtually constant. And high-pressure air distribution, with consequent high fan horsepower, is unnecessary.

Carrier Multi-Zone Weathermaker* Units are ideal for this service. They are extra compact to permit easy location. In large schools, several units may be used to reduce duct runs and length of control lines. The units are available in eight sizes, from 2400 cfm to 40,750 cfm, with up to 28 zones.

Additional information is available in Carrier Bulletin 39W68. Write for it today. Carrier Air Conditioning Company, Syracuse 1, New York.

Reg. U. S. Pat. Off.

Carrier Air Conditioning Company

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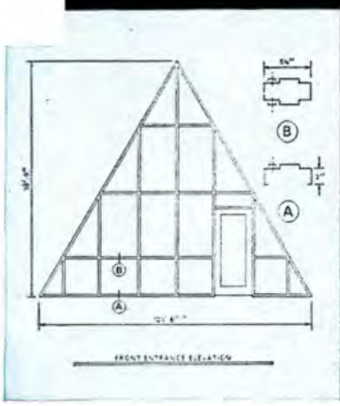
STEELCRAFT

The finest name in...

METAL DOORS and FRAMES

Another suggestion from the Steelcraft Architectural Detail File.



Honeycomb core—A Steelcraft development that provides new strength! A honeycomb core is permanently bonded to two layers of steel . . . deadens sound, adds ruggedness.

Steelcraft's Dallas distributor, Samuel A. Ellsberry Co. fabricates locally this unusual job using standard sections for a lodge owned by Owens Country Sausage, Inc.; Richardson, Texas; architect, Billy R. Keller.

Steelcraft offers unmatched versatility in unusual frames for doors and glass lights through a system of stock sections called sticks. These stick sections are stocked locally by authorized Steelcraft distributors. All Steelcraft doors can be used interchangeably on any Steelcraft frame. Call a Steelcraft distributor for professional assistance in coordinating hardware and approval drawings. Save time—cut costs.

THE STEELCRAFT MANUFACTURING COMPANY
9017 Blue Ash Road, Cincinnati 42, Ohio

STEEL Craft — METAL DOORS AND FRAMES

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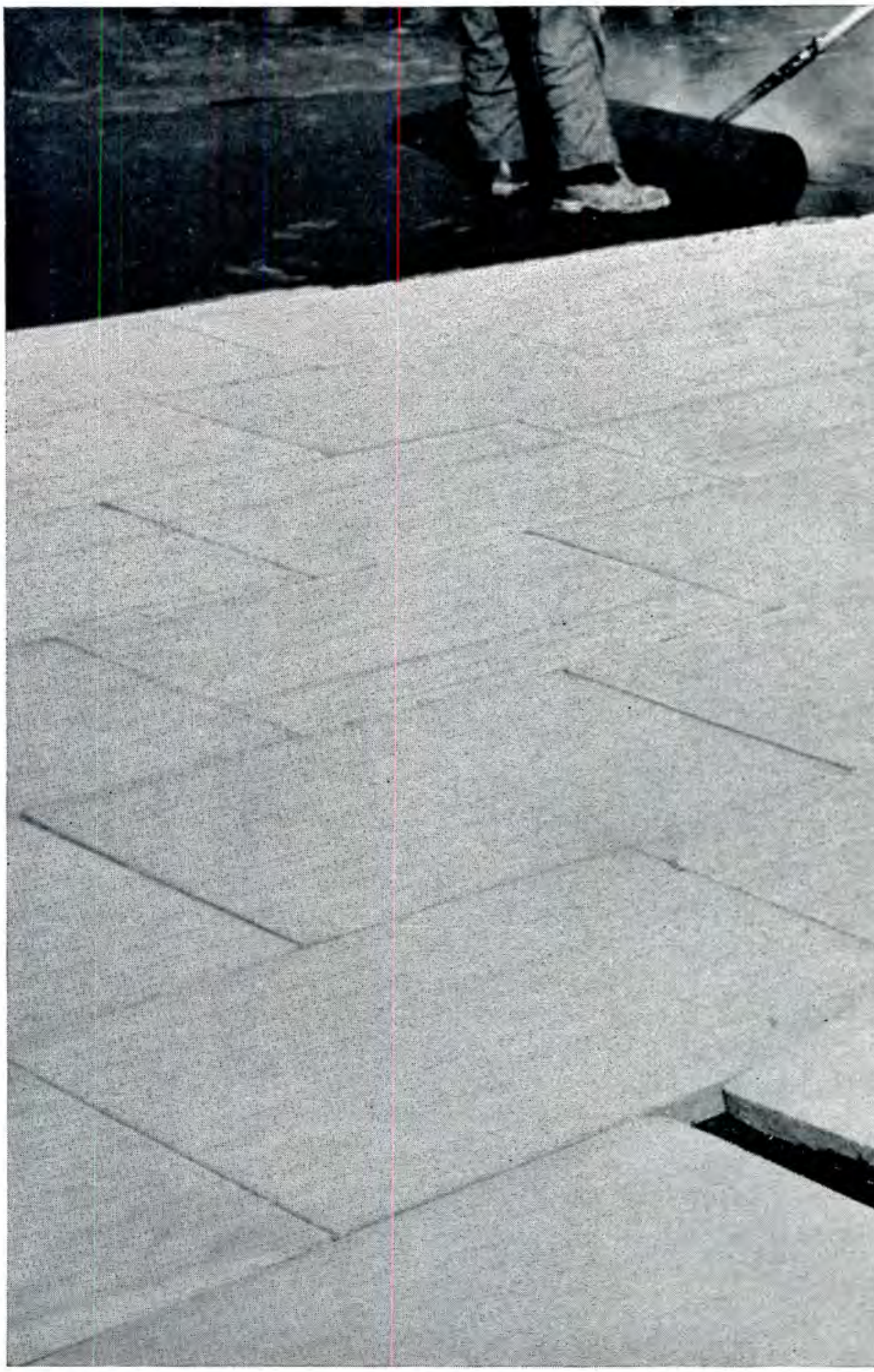
EASY TO CUT
(on the average job 30% of insulation must be cut)

EASY TO FIT
around any roof opening

EASY TO SHAPE
around drains to assure smooth run-off of water



JOHNS-MANVILLE

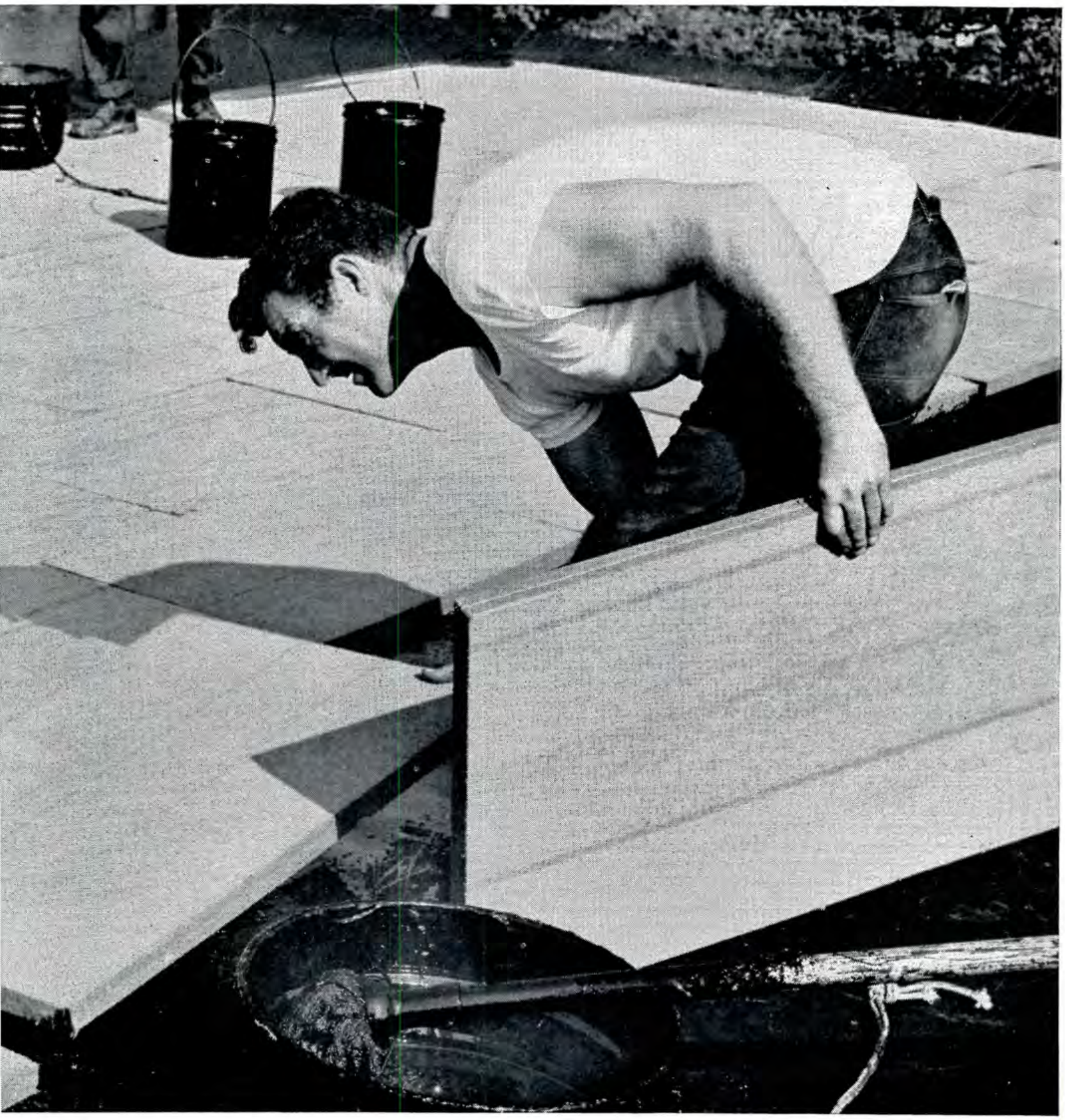
FESCO BOARD

ROOF INSULATION

MOISTURE-RESISTANT . . . INCOMBUSTIBLE . . . DURABLE (YET LIGHTWEIGHT AND EASY TO APPLY) . . .

J-M Fesco® Board combines to a unique degree many special advantages. This is largely due to its basic component, perlite — a volcanic ore. When exposed to tremendous heat, the carefully graded perlite expands to form tiny glass-like beads. Each bead is a honeycomb of dead air cells, giving Fesco Board its excellent thermal coefficient.

In addition to its insulating value, Fesco Board offers these important advantages:



Office Literature

continued from page 248

SPACE DIVIDERS

WorkPol structural members for functional shelving and decorative space division. Poles are anodized aluminum with spring tension, which accept any decorative panel up to ¼ in. thick. *Workwall Div., L. A. Darling Co., Bronson, Mich.**

CIRCLE 426 ON INQUIRY CARD

SAFETY TREADS

(A.I.A. 14-D-1) Safety treads for steps and platforms are made of heat-treated extruded aluminum and filled with aluminum oxide abrasive. *Wooster Products, Inc., Spruce St., Wooster, Ohio**

CIRCLE 427 ON INQUIRY CARD

COPPER AND ALLOYS

"Specifications Index for Copper and Copper Alloys" lists alloys used in various shapes and gives applicable numbers used by A.S.T.M., S.A.E., Military, etc. *Anaconda American Brass Co., 414 Meadow St., Waterbury, Conn.**

CIRCLE 428 ON INQUIRY CARD

USING CONCRETE

Features and advantages of *Welded Concrete* construction are given in an 8-page booklet. *Welded Concrete Construction, 435 Old Country Rd., Westbury, N. Y.*

CIRCLE 429 ON INQUIRY CARD

GARAGE DOORS

Residential garage doors of wood and glass fiber and accessories are illustrated in Catalog 305. *Frantz Mfg. Co., Sterling, Ill.**

CIRCLE 430 ON INQUIRY CARD

RANGE HOOD-FANS

(A.I.A. 30-D-1) Foldaway ventilating hood-fans for ranges and ovens fit flush with cabinets when closed. Insert panels match cabinets or appliances. *NuTone, Inc., Madison & Red Bank, Cincinnati 27, Ohio**

CIRCLE 431 ON INQUIRY CARD

ELECTRICAL CODE

The 1962 revised National Electrical Code, which was adopted by the American Standards Association, is now available in a 528-page pocket-size book. All new and revised material is noted in the margins. Cost is $1.00 a copy. *National Fire Protection Assoc., 60 Batterymarch St., Boston 10, Mass.*

PAINTING STEEL

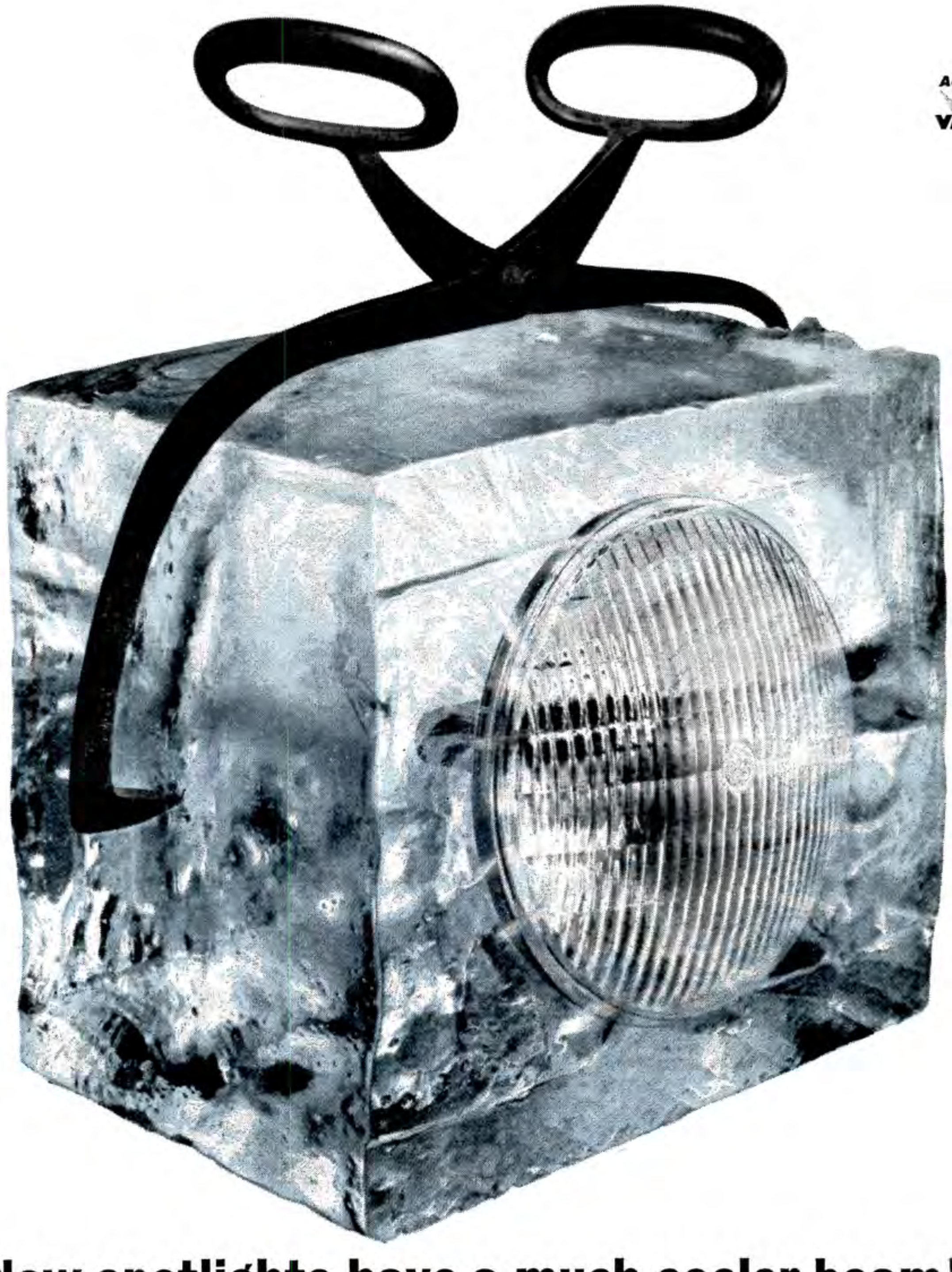
"Painting of Hand Cleaned Steel" is a 58-page, illustrated report giving results of three years of paint and exposure testing on steel surfaces ranging from zero to 100 per cent rust. $3.00. *Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh 13, Pa.*

COMMERCIAL CARPET

"The Selection and Maintenance of Commercial Carpet" discusses methods for judging carpet quality, advantages and limitations of different fibers, suggested specifications for different wear conditions and detailed maintenance recommendations. $2.00. *The Cornell Hotel and Restaurant Administration Quarterly, Cornell University, Ithaca, N. Y.*

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

Accent on VALUE



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Too hot! That's been the problem with spotlighting — even though incandescent beams often provide just the illumination people like best. Now General Electric engineers have solved the problem by designing a "Cool-Beam" spotlight that gives light with two-thirds less radiant heat in the beam.

Now almost three times as much light can be directed on displays, foods, perishables, anywhere — without raising heat levels. Two-thirds of the heat goes out the rear of the lamp.

G-E takes lamp leadership seriously. That's why you can often find a newer, better solution to a lighting problem by calling your Large Lamp distributor. Information on the "Cool-Beam" lamp can also be obtained by writing General Electric, Large Lamp Department C-226, Nela Park, Cleveland 12, Ohio.

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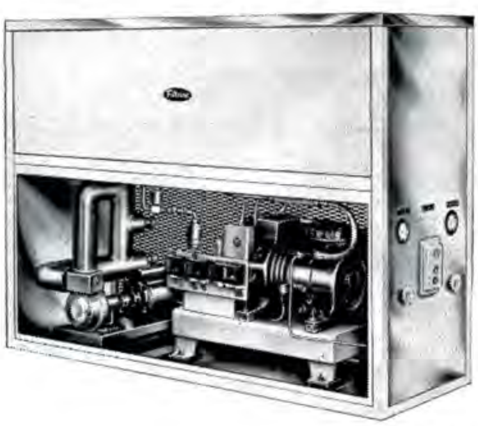
designed to outlast

the class of '95

STUDENT-PROOF WALL FOUNTAINS BY AMERICAN-STANDARD HELP SOLVE JR HALL TRAFFIC AND MAINTENANCE PROBLEMS

New from American-Standard! Three drinking fountains you tuck on the wall, out of harm's way. Nothing on the floor to impede student traffic... nothing for the custodian to sweep around or behind. They're made of sturdy vitreous china, easiest of all materials to keep sparkling clean. Fittings—including an anti-squirt bubbler that is *really* anti-squirt—are non-corrosive solid brass, with a heavy plating of finest chrome. *Want chilled water?* A single refrigeration unit located at any convenient point can take care of as many as 25 fountains. Maintenance, if any, takes place here and not in the busy corridors. (See details below.) ■ Call your American-Standard sales office for the low prices on the new Saratoga fountain (pictured), the Sharon and the Calistoga. Or write American-Standard, Plumbing and Heating Division, 40 West 40th Street, New York 18, N.Y.



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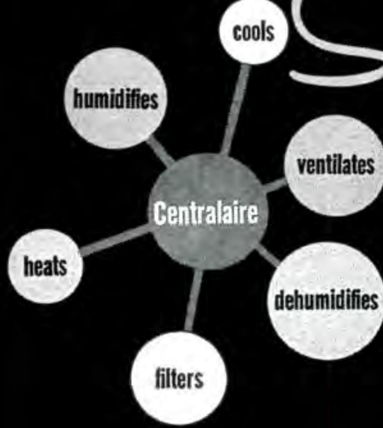

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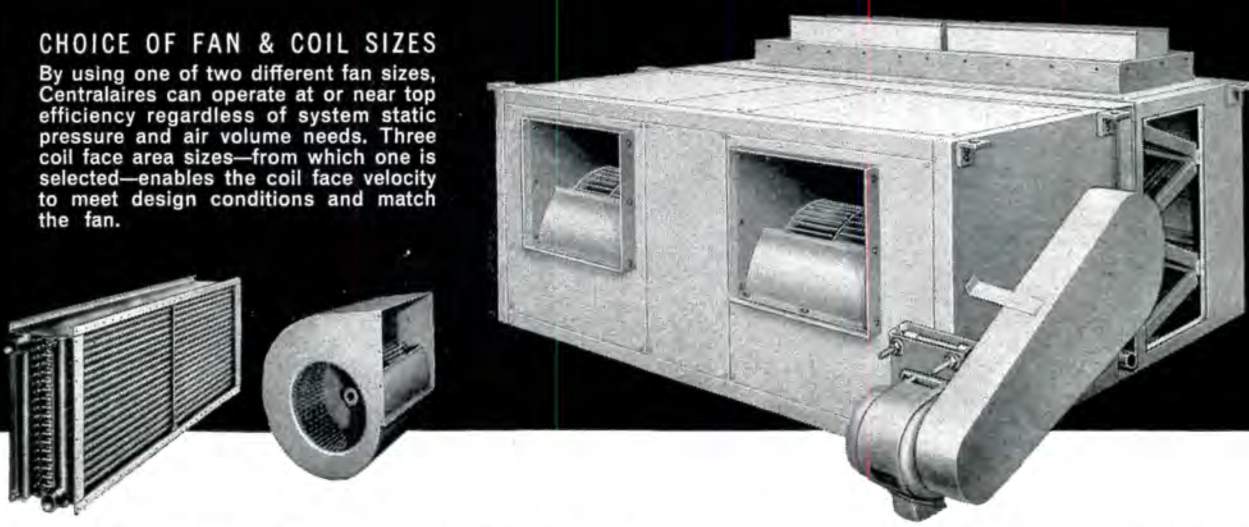

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Cabinets are handsomely finished in mar-resistant metallic bronze... flush-mounted enclosure panels provide a trim, clean appearance.

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CABINET UNIT HEATERS • CABINET AIR CONDITIONING UNITS • VERTICAL & HORIZONTAL UNIT HEATERS • CONVECTORS

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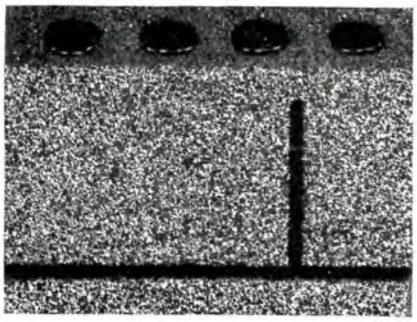

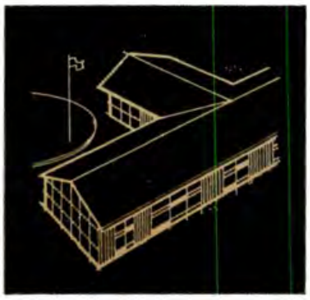

L–I–S–T–E–N *to the solid, silent sound of Ceco's new "Regent" Commercial Door of steel—full flush, 1¾" thick and "custom" in appearance. Your client will also like its beauty, strength, rigidity and easy-care design.*

- *Inside the door is a strong fiber honeycomb core, one piece, full size, resin-impregnated. The core gives the door unusual strength and flatness.*
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- *Regent doors are supplied as separate units—or in complete "packages" with frames and hardware.*

Similar in design and appearance is the new Ceco "Legionnaire" Door, 1 3/8" thick, for use in openings of average traffic. Ceco's full line includes the 1 3/4" "Medallion" Custom Door for monumental use; and the Recessed Panel and Flush Panel stile-and-rail Doors for industrial and commercial buildings.

This coupon brings you full information.

Please send Bulletin No. 2040-J containing details on Ceco's 1 3/4" "Regent" Commercial Doors and others.

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For more data, circle 128 on Inquiry Card

On the Calendar

October

3-7 17th annual convention, California Council, American Institute of Architects, including the fourth annual conference of the California Region, A.I.A., and 12th annual meeting of the California Council, Women's Architectural League—Monterey County Fairgrounds, Monterey, Calif.

4-7 16th annual meeting, National Trust for Historic Preservation—St. Francis Hotel, San Francisco

8-12 National Transportation Engineering Conference, American Society of Civil Engineers—Statler-Hilton Hotel, Detroit

8-12 National Council Schoolhouse Construction—Denver

11-13 Central States Regional Convention, American Institute of Architects—Omaha

11-14 Northwest A.I.A. Regional Conference—Ocean Lake, Ore.

12-18 Second Pacific Rim Architectural Conference, sponsored by the California Council of the American Institute of Architects—Mexico City

12-23 Decoration & Design 1963, Interior Furnishings Show, sponsored by the New York Chapter, American Institute of Decorators, Resources Council and *New York Herald Tribune*—7th Regiment Armory, New York City

16-18 National Conference on Standards, American Standards Association—Biltmore Hotel, New York

18-20 Pennsylvania A.I.A. Regional Conference—Hotel Hershey, Hershey, Pa.

19-20 First Regional Conference, Illinois Region, American Institute of Architects—Springfield

23-25 Program evaluation and review technique and critical path method seminar, sponsored by International Telephone and Telegraph Corp. Processing Center—Rt. 17, Garden State Parkway, Paramus, N. J.

25-27 South Atlantic Regional Conference, American Institute of Architects; theme: "Form and Space"—Atlanta

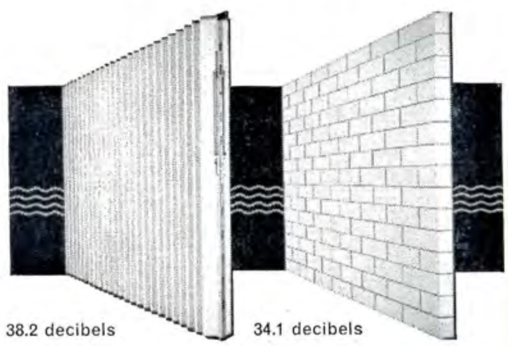
29-31 National Fire Protection Association Fall Conference—Hotel Leamington, Minneapolis

29ff 1962 National Safety Congress, sponsored by National Safety Council; through Nov. 2—Chicago

continued on page 278

...each with better sound privacy* than you'd get from walls of 4" cinder block

● At a cost any school can afford, Soundmaster 240 operable walls can put to work the high-cost space that stands idle half the day. These expensive areas—auditorium, cafeteria, gymnasium and library—may be subdivided by Soundmasters in seconds to provide extra classrooms . . . each enjoying better sound privacy than a room closed off by permanent masonry walls of four-inch cinder block. Yet, the investment for Soundmaster 240 is only a fraction of the cost for building additional instruction space. And the original specialized areas remain intact. The stacked Modernfolds take only a few feet of wall space (or disappear entirely into pockets). Write for details on creating these extra classrooms, plus the many other ways that Modernfolds can stretch your building budget . . . by making space do double duty. Just fill out the coupon below.



*Geiger and Hamme Laboratory Tests (full scale) show that in a 14' x 9' opening under simulated field conditions, the average sound reduction of a Soundmaster 240 operable wall is 38.2 decibels, compared with 34.1 decibels for a 4" cinder block wall painted on both sides.

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Like a power-rated engine gives predicted performance, LAB-FLO science service fixtures provide new vitality and greater service effectiveness for all types of laboratories. Leading school and industrial architects and specifiers recognize LAB-FLO as the ultimate in quality and reliability. That is why LAB-FLO has become the standard for most specifications and comparisons... and "or equal" finds practically nothing to challenge it. Complete, integrated LAB-FLO science service fixture lines and nationwide coverage offer distinct advantages to the laboratory planner. Write or call for Catalog No. 26BL.

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This dynamic LAB-FLO planning guide provides all of the newest drawings and data for roughing-in or specifying a complete laboratory service fixture system, or any part of it. Write or call today for your personal, registered copy.

THOSE IN THE KNOW SPECIFY Lab-Flo

Refer to 1962 Sweet's Catalog, Code: $\frac{26b}{Ta}$

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Black Kalcolor® aluminum gives distinction to Holmdel Laboratories, designed by Eero Saarinen and Associates for Western Electric Company.

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Lake Forest College, Lake Forest, Illinois
Architect: Perkins & Will, AIA
General Contractor: Hansen & Werhane, Inc.
Curtain wall fabricator and Kalcolor licensee: Modu-Wall, Inc., Parchment, Michigan

Kalcolor components: Aluminum curtain wall mullions, framing, doors, windows, trim of Kalcolor No. 6345 Amber extrusions; spandrel panels of Kalcolor No. 5245 Amber sheet.

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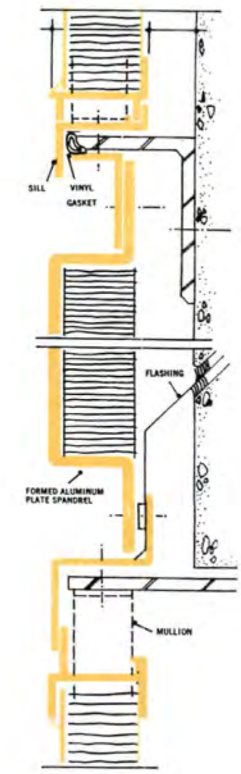
■ Amber finished aluminum on the exterior of Lake Forest College will remain colorful and uniform for years to come. Because the curtain wall system—by Modu-Wall, Inc.—is in Kaiser Aluminum's fade-resisting Kalcolor®. ■ Kalcolor finishes are produced by the only aluminum integral-color anodizing process — offering a range of colors — proven in scores of architectural applications. It uses no organic dyes. Rather, the color is derived from the alloy itself—with resistance to sun, abrasion and atmospheric corrosion unsurpassed by any other architectural anodic finish. ■ To see the lasting Kalcolor hues—from gold through olive and greys to black — see your Sweet's Architectural File catalog 6a/Ka. For information contact your Kalcolor licensee or write: Kaiser Aluminum, Department 843, Kaiser Center, Oakland 12, California.

KAISER ALUMINUM

Watch "Kaiser Presents the Lloyd Bridges Show" weekly on the CBS-TV Network



TYPICAL SPANDREL DETAIL

TYPICAL MULLION DETAIL

SCALE: 3" = 1'0"

A WEALTH OF DESIGN IN LASTING EXTERIORS— BY MODU-WALL, INC.

New freedom in curtain wall design, because of new colors and textures, is provided by Modu-Wall aluminum systems. Extrusions are offered in clear anodized finishes or Kalcolor hues. Panels may be precast aggregate; porcelain enameled; plain or patterned Kalcolor aluminum.

On the Calendar

continued from page 264

November

1-3 1962 meeting, American Society of Industrial Designers; theme: "Relationship of Industrial Design to the Arts"—Waldorf-Astoria and National Design Center, New York City

2-3 Sixth annual conference, the Organization of Cornell Planners; theme: "The Heart of the City"—Statler Hall, Cornell University, Ithaca, N.Y.

5-9 National Metal Exposition—Chicago

7-9 1962 convention, National Warm Air Heating and Air Conditioning Association—Hotel Robert Meyer, Jacksonville, Fla.

8-10 Annual convention, Florida Association of Architects—Hotel Soreno, St. Petersburg, Fla.

11-15 Annual meeting, Air-conditioning and Refrigeration Institute —Hollywood Beach Hotel, Hollywood Beach, Fla.

12-16 47th National Hotel Exposition—The Coliseum, New York

25-30 American Society of Mechanical Engineers winter annual meeting—Statler-Hilton Hotel, New York

26-29 Atomic Industrial Forum conference and American Nuclear Society conference and Atom Fair—Washington, D.C.

27-29 Building Research Institute 1962 Fall Conferences—Mayflower Hotel, Washington, D.C.

Office Notes

Offices Opened

Raymond Irrera Associates, Architects-Engineers, Long Island City, New York, have opened additional offices at 150 E. 35th St., New York 16.

Burke, Kober & Nicolais, Los Angeles architectural and engineering firm, has opened a new office at 1823 E. 17th St., Suite 117, Hillview Bldg., Santa Ana, Calif. in association with Hawthorne Engineering.

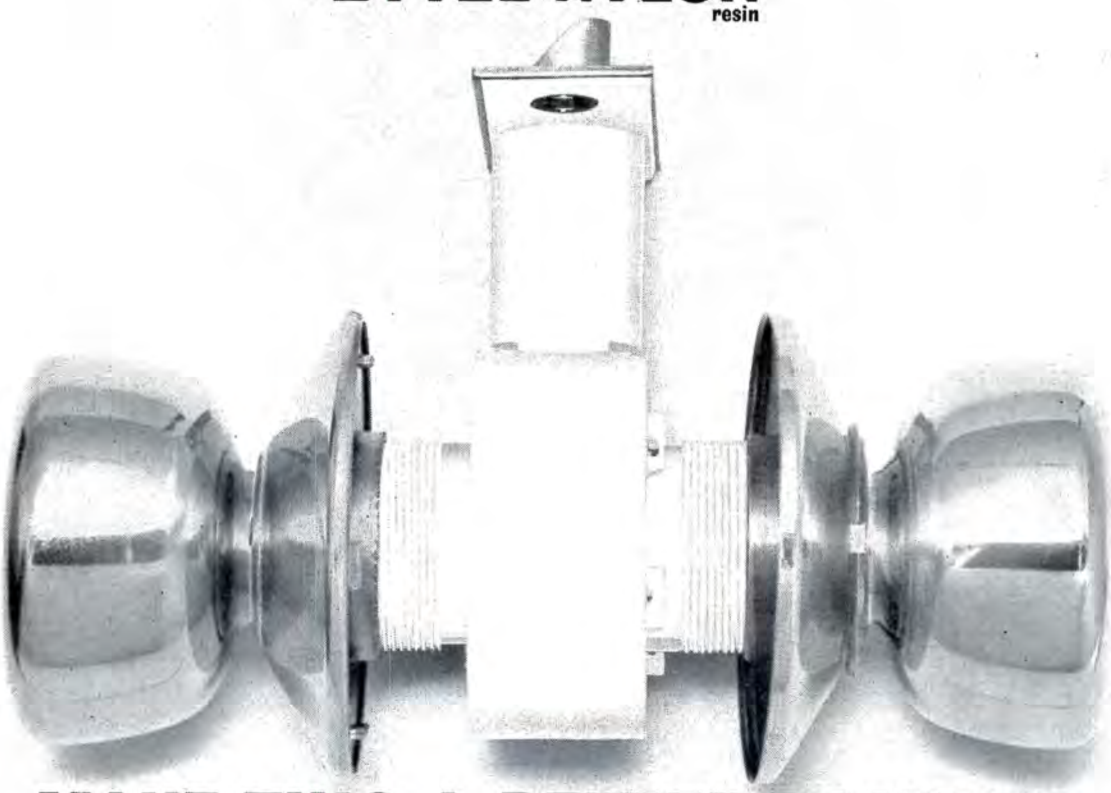
An architectural office has been opened by **George Rene Mathey** at 123 Newbury St., Boston 16, Mass.

John W. Briggs has announced the opening of a new office at 901 Midtown Tower, Rochester, N.Y.

Kump Associates, Architects and

continued on page 286

LOW-FRICTION CORROSION-PROOF PARTS OF DU PONT DELRIN® acetal resin AND ZYTEL® NYLON resin



MAKE THIS A BETTER LOCKSET

Lockwood's new standard duty cylindrical lockset uses *two* of Du Pont's engineering materials to build in long-lasting quality and improved performance. The two-piece chassis is made of tough, durable DELRIN acetal resin. The retractor shoe and latch case are molded of abrasion-resistant ZYTEL nylon resin. In non-locking sets the latchbolt is also ZYTEL.

The extremely low coefficient of friction of ZYTEL on DELRIN gives this lockset exceptional resistance to wear. The customer receives smooth performance, quiet operation and long life. In a laboratory test, the *lockset with no lubrication* showed no visible signs of wear after 1,500,000 cycles of operation. In addition, parts of DELRIN and ZYTEL are corrosion-proof; they are unaffected by extremes of humidity, natural temperatures and corrosive atmospheres—even salt air.

Designed specifically for commercial uses, these locksets are molded by Master Molders, Inc., for the Lockwood Hardware Manufacturing Co., both of Fitchburg, Massachusetts.

Look to Du Pont ZYTEL and DELRIN as signposts of quality in builders' hardware. For more information write: E. I. du Pont de Nemours & Co. (Inc.), Dept. AR-10, Room 2527DZ, Nemours Building, Wilmington 98, Delaware.

In Canada: Du Pont of Canada Limited, P.O. Box 660, Montreal, Quebec.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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DECEMBER 19, 1960

FEBRUARY 10, 1961

Architects: Anshen & Allen Contractors: Dinwiddie Construction Co. Photograph: Moulin Stu

Mo-Sai® GOES INTERNATIONAL

The 22-story free-standing tower of the International Building in the heart of San Francisco's financial district, has light and air space on all four sides. It also has Mo-Sai precast concrete curtain wall on all four sides. Even the corners are cast in one piece in Mo-Sai.

MO-SAI CONCRETE CURTAIN WALL PANELS ARE THREE-DIMENSIONA shaped like an inverted hip roof. This sculptured design creates changi patterns of light and shadow at different times of day.

MO-SAI ERECTION WAS FAST – averaging 20 panels per day and sometimes as high as 32 panels per day. Photos taken less than two months apart show the majority of Mo-Sai panels installed during this period. Lightweight Mo-Sai curtain wall panels, factory-made under the franchised Mo-Sai process, were anchored directly to the steel framework.

MO-SAI INSTITUTE, INC. HEADQUARTERS, 15 EAST FRANKLIN STREET, RICHMOND 7, VIRGINIA

BADGER CONCRETE CO., OSHKOSH, WISCONSIN • BUEHNER & CO., INC., MESA, ARIZONA • BUEHNER CONCRETE PRODUCTS CO., DENVER 16, COLORADO • CAMBRIDGE CEMENT STONE CO., ALLSTON 34, MASSACHUSETTS • ECONOMY CAST STONE CO., RICHMOND 7, VIRGINIA • FORMIGLI SALES CO., PHILADELPHIA 3, PENNSYLVANIA • GEORGE RACKLE & SONS CO., CLEVELAND 5, OHIO • GOODSTONE MFG. CO., ROCHESTER 21, NEW YORK • HARTER MARBLECRETE STONE CO., OKLAHOMA CITY, OKLAHOMA • OLYMPIAN STONE CO., INC., SEATTLE 7, WASHINGTON • OTTO BUEHNER & CO., SALT LAKE CITY 6, UTAH • P. GRASSI-AMERICAN TERRAZZO CO., SOUTH SAN FRANCISCO, CALIFORNIA • SOUTHERN CAST STONE, INC., KNOXVILLE, TENNESSEE • SUPERCRETE, LIMITED, WINNIPEG, MANITOBA, CANADA • SUPERCRETE (SASK.) LTD., REGINA, SASK., CANADA • TEXAS INDUSTRIES, INC., ARLINGTON, TEXAS • THE DEXTONE CO., INC., NEW HAVEN 3, CONNECTICUT • THE MABIE-BELL CO., GREENSBORO, N.C. – MIAMI 47, FLORIDA – PEACH TREE CITY, GEORGIA • THE RACKLE CO., HOUSTON 20, TEXAS • TORONTO CAST STONE CO., LTD., TORONTO, ONTARIO • WAILES PRECAST CONCRETE CORP., LOS ANGELES, CALIFORNIA • WILSON CONCRETE CO., OMAHA 7, NEBRASKA


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Installations throughout Lutheran Hospital and Medical Center, Wheat Ridge, Colorado, show clearly how casework by St. Charles can help to provide the utmost in "progressive patient care." To learn more about the many advantages of custom-created casework systems, write on your letterhead to:

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Patient line storage wall.


"Multi-care" unit for semi-private room.


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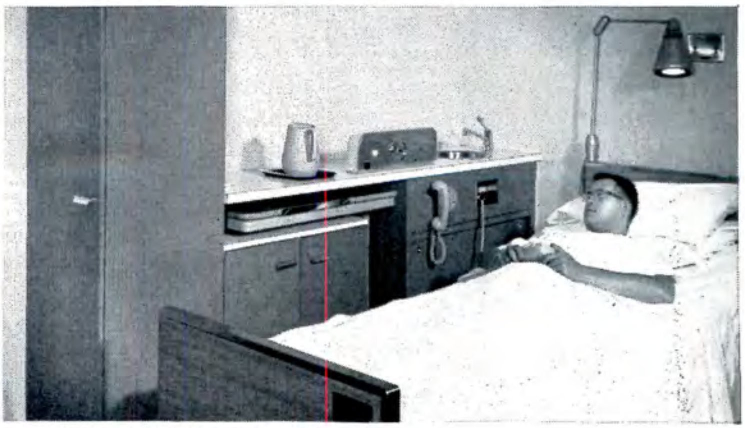
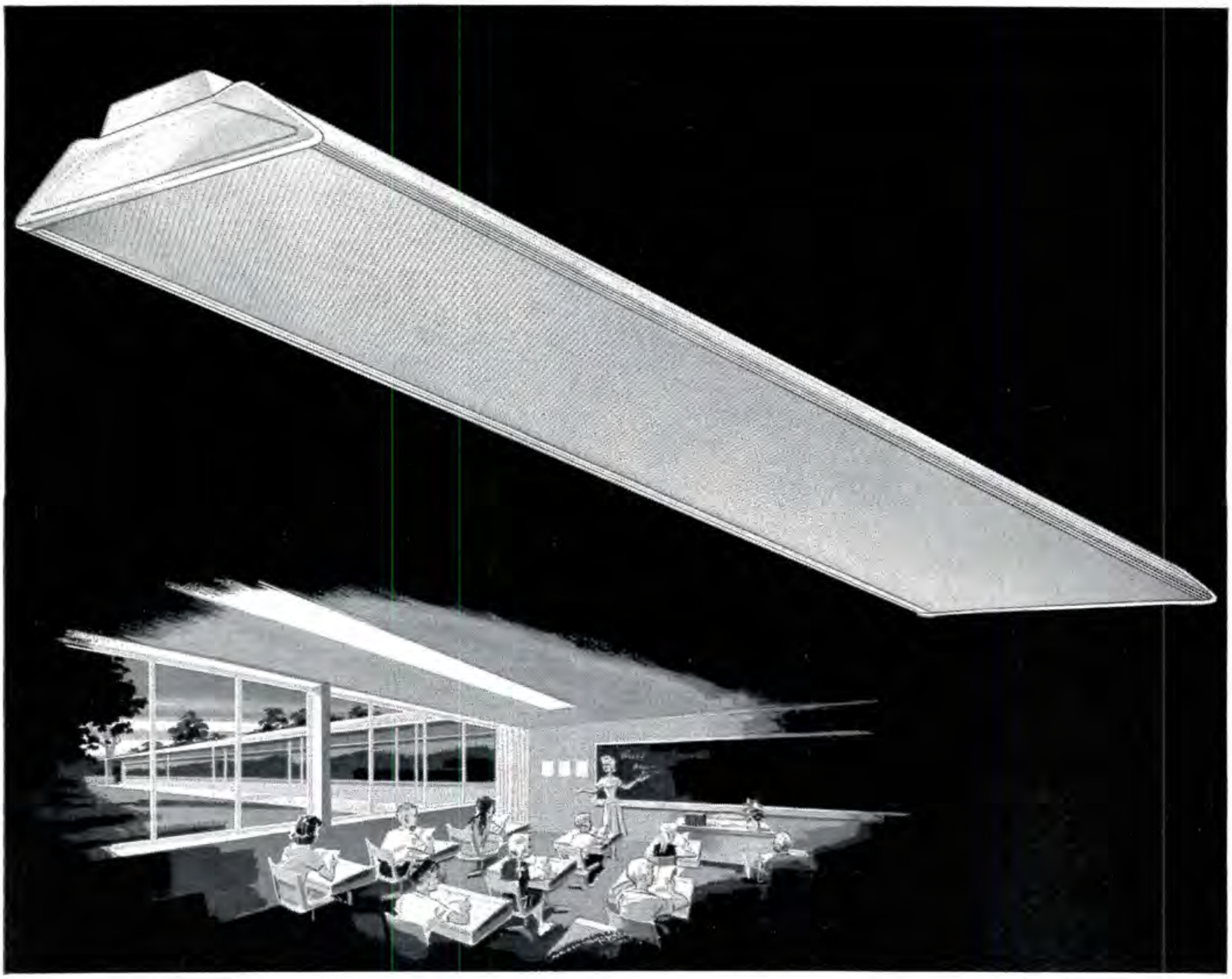

"Multi-care" unit for private room.

For more data, circle 147 on Inquiry Card



Litecontrol's New, Modern Design
"Jamaica"
Gives High Efficiency – Good Brightness Control

The new Litecontrol "Jamaica" — series 5000 — fixture is designed to give you rugged construction and flexibility in use, whether in schools or in commercial applications.

Put these important advantages to work for you:

"JAMAICA" FLEXIBILITY

— Features the Holophane #6150 acrylic Controlens® as an integral part of its plastic enclosure. Also available with Litecontrol's Stylux panel, made either of polystyrene or acrylic plastic, in place of the lens

— Available in 3 lamp or 2 lamp models — either 4′ or 8′ long. Areas can be designed with great accuracy for almost any footcandle requirements

"JAMAICA" CONSTRUCTION

— A plastic enclosed fixture with contemporary styling

— Lens is fitted in the extruded acrylic side panels to make a one-piece enclosure that can be installed to hinge from either side

— Two spring catches easily release enclosure for cleaning and relamping, hold it securely so it can't be knocked off accidentally

— Prismatic side panels are designed to illuminate the ceiling and combine with the lens to provide high efficiency, excellent brightness control, and widespread distribution, thus requiring fewer rows of fixtures

— Fixtures are die-formed and welded of zinc-coated steel for rust prevention and long life. The finish is 90% reflectance baked white enamel

— Can be pendant or surface mounted, singly or in rows

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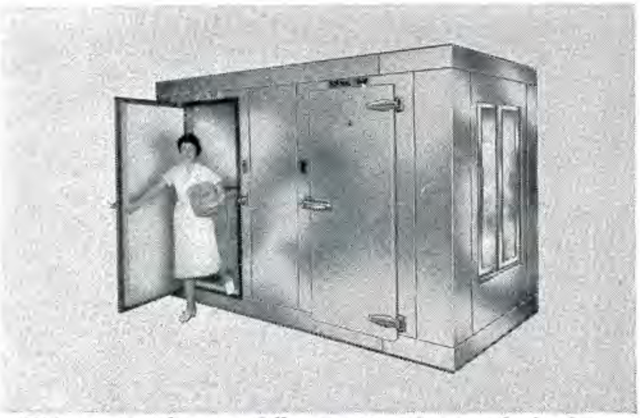

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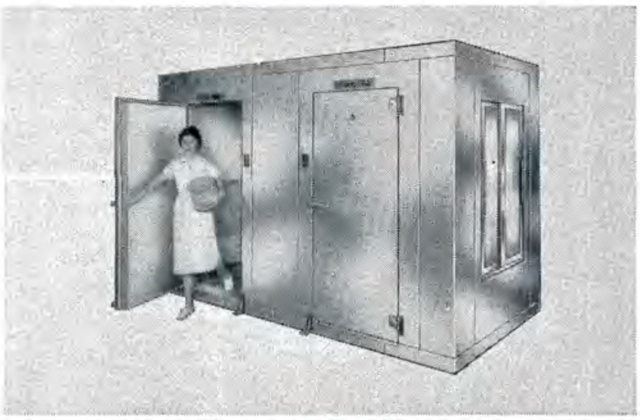

Until we made this one.

Bally Walk-In Coolers and Freezers are now made with science's wonder insulation...Urethane "foamed-in-place"

The advantages of this new insulation represent a major design achievement that obsoletes all conventional insulated Walk-Ins ♦ With 97% closed cells it cannot absorb moisture . . . maintains peak efficiency, indoors or outdoors ♦ Insulating value is double . . . Bally 4″ urethane equals 8½″ of conventional insulation. Standard models ideal for use as minus 30° freezers ♦ Urethane, poured as a liquid, foams in place and binds tenaciously to the metal for great strength. Eliminates need for structural members. Replaces that space with insulation ♦ Lightweight urethane reduces weight to one-third for big freight savings . . . makes erection fast and easy ♦ Foamed door is extremely light in weight to open and close with little effort. Magnetic gasket provides positive seal ♦ Thinner walls increase usable space.

Your choice of Aluminum or Galvanized as standard finishes. Sections have Bally's Speed-Lok for quick and accurate assembly. Easy to add sections to increase size . . . easy to disassemble for relocation. Hermetically sealed refrigeration systems eliminate installation problems . . . reduce service costs.

Write for free Architect's Fact File, complete with new Specification Guide, descriptive literature and technical booklet. Also see Sweet's Architect File 25a/Ba.

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Bally, Pennsylvania
Write Department A.R.

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Speakman EASY-PUSH® fittings are thrifty. Push the button—and they meter out just enough water to do the job right. Then they shut off—*automatically*. EASY-PUSH showers and fittings are easy to install, simple to set to precise water flow. Non-hammering, non-dripping. And the entire operating unit is easily removed for repair if necessary. Available in a wide range of tamperproof showers and fittings for all public and semi-public buildings. Speakman **helps** you specify. Write for Bulletin S-94.

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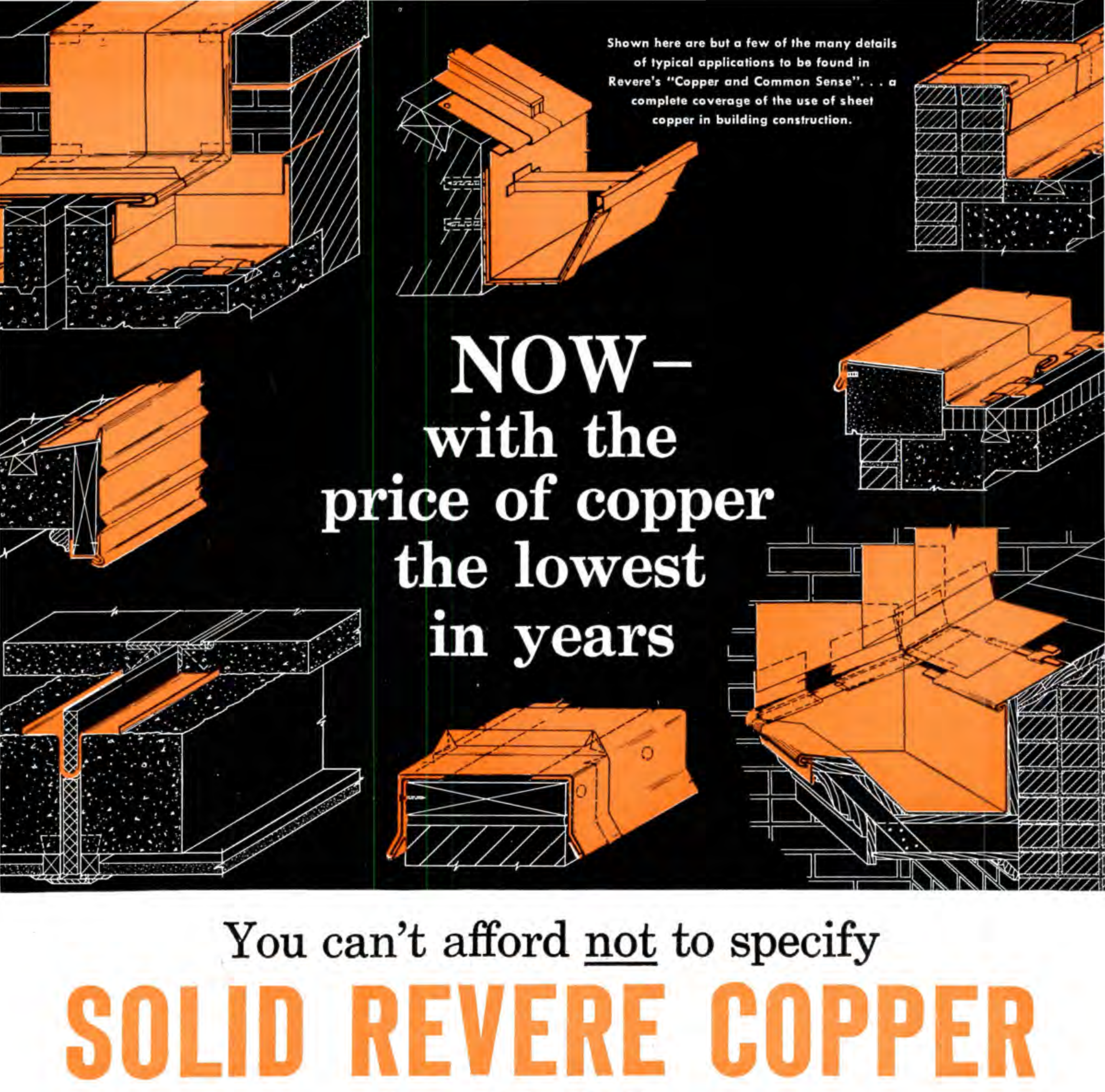

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Distributors Everywhere

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Office Notes

continued from page 278

Planning Consultants of Palo Alto, Calif., have opened an office at 121 East 54th St., New York.

New Firms, Firm Changes

A new consulting engineering firm has been opened by Dick W. Ebeling under the name of **Dick W. Ebeling, Consulting Structural Engineer.** The address is 711 Dekum Bldg., Portland 4, Ore.

William B. Marquis of Olmsted Associates, Brookline, Mass., has retired from partnership and will continue with the firm as consultant. Remaining partners Artemas P. Richardson and Joseph G. Hudak continue the firm's practice from the established address of 99 Warren St., Brookline.

A. Whitney Murphy, partner in the architectural firm of Perkins & Will, has become head of the Washington office in its new quarters in the Mercury Bldg.

Alvin B. Harrison, project architect with John Graham and Company, Seattle and New York, has been named a partner of the firm.

Philip M. Grennan has become a partner of the architectural firm of Office of Alfred Easton Poor, New York and Washington, D.C. **George E. Via Jr.** has been advanced to an associate.

James R. Livingston and **Adolf H. Roessling** have been elected to membership on the board of directors and to vice presidencies in Smith, Hinchman and Grylls Associates, Inc., Detroit architectural and engineering firm.

New Addresses

Bell, McCulloch, Spotowski & Associates, Architects & Consulting Engineers, 10975- 124th St., Edmonton, Alberta, Canada

Herbert R. Kameon, A.I.A.-Architect, 1054 S. Robertson Blvd., Los Angeles 35

Katzman Associates, 147 East 50th St., New York 22

Albert A. Klose & Associates, Architect, 1325 West Dorothy Lane, Dayton, Ohio

Francis Palms Jr., A.I.A., Architect, 526 Pierce St., Monterey, Calif.

Philip Pearlman, Architect, 1190 Building, 1190 Northeast 163rd St., North Miami Beach, Fla.

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Electrically Heated Where Heat's Critical

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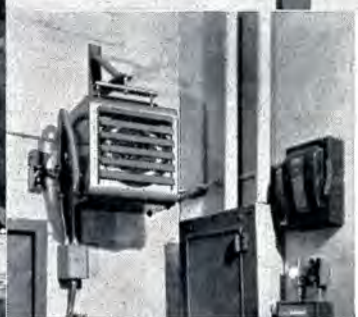
®***Electromode*** heat, an integral part of the remodeling of the Murray Corporation buildings, is helping to make them a valuable property again. Abandoned and inactive when the Murray Corporation moved out, 60 per cent of the two million square foot complex is now leased—bustling and busy, as the Russell Industrial Center. The unmatched comfort of electric heat used in the Center increases employee productivity. This, and the advantages of low maintenance, reduced space requirements and high safety have made electric heat a key sales point in bringing the buildings back to life. The illustrations show Electromode is installed from the roof (14 elevator penthouses) to the basement, and in much of the space between. The present large and growing occupancy of the Center proves it was a wise decision.

To prevent elevator machinery from freezing up, yet without wasting heat on unused space, the Russell Industrial Center's 14 elevator penthouses are equipped with Electromode Quartz-one Tube Heaters, as illustrated.

Office of the Gates Rubber Company, a Russell Industrial Center tenant. Note trim, space-saving design of Electromode Low-Level Baseboard Units.



Stairwells and corridors throughout the Russell Industrial Center are heated with Electromode Suspension Heaters, for Completely uniform heat distribution.

Another Russell Industrial Center tenant, the Feetwing Corporation, receives fan-circulated comfort from Electromode surface mounted Down-Flo Wall Units.

The photo shows an Electromode thermostat as it appears on an Electromode Baseboard Unit installation in the Russell Industrial Center. These precision controls are also available

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The natural, lustrous appearance imparts a quality of beauty, dignity and richness to buildings and homes. Ideal for coastal installations and commercial applications, the Carmel Stainless Sliding Door resists corrosive atmospheres, requires no special surface treatment. The exceptionally high strength-weight ratio permits the use of neat slim sections even under extreme wind loads.

If you are interested in the finest sliding glass door available, write Carmel Steel Products, Inc., 9738 E. Firestone Blvd., Downey, Calif.

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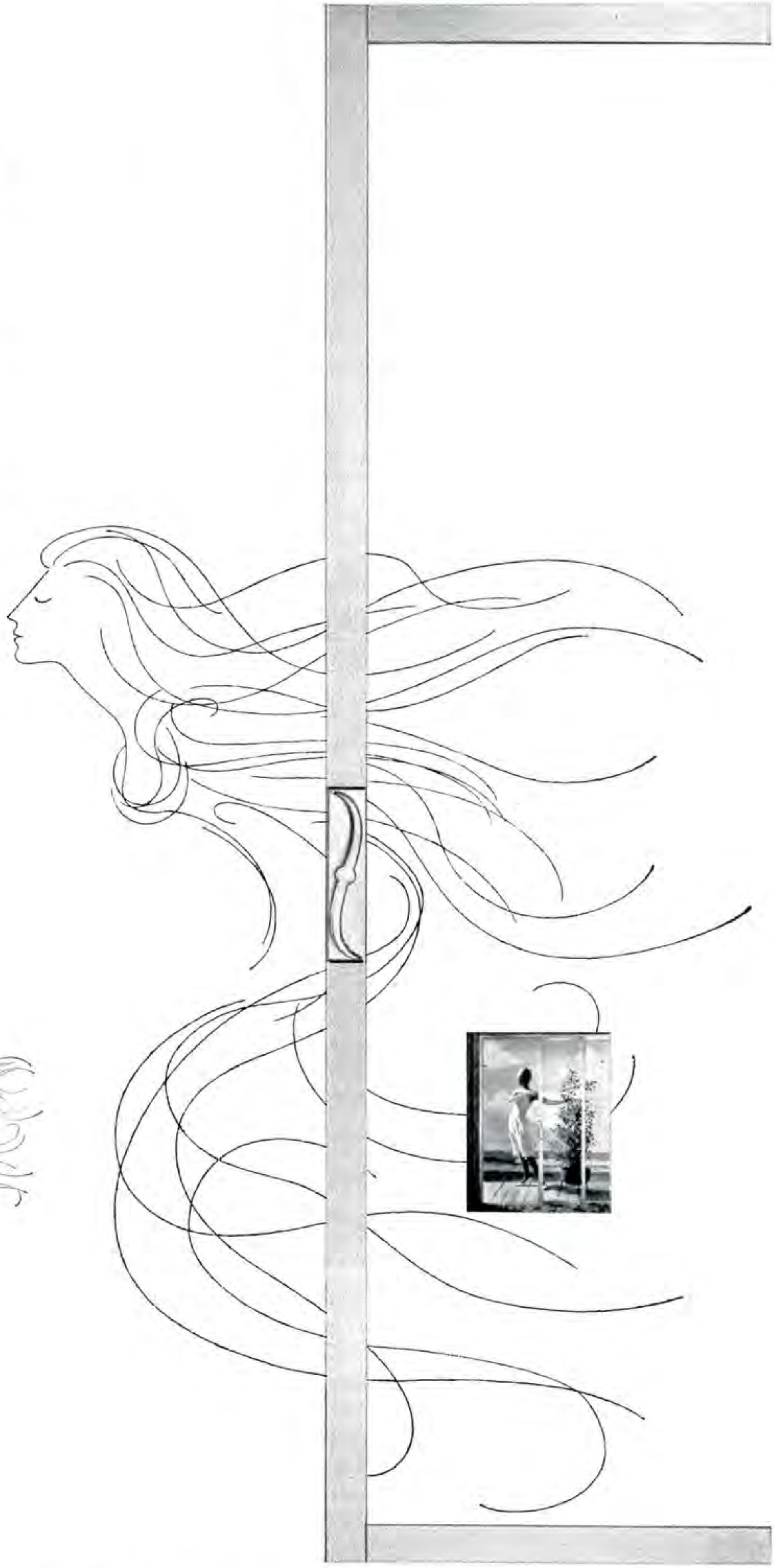

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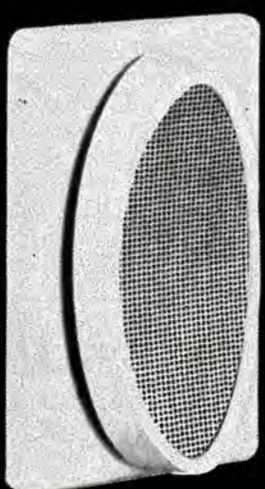
Fischbach and Moore makes possible the ultimate . . .

the *CYBERTRONIC concept

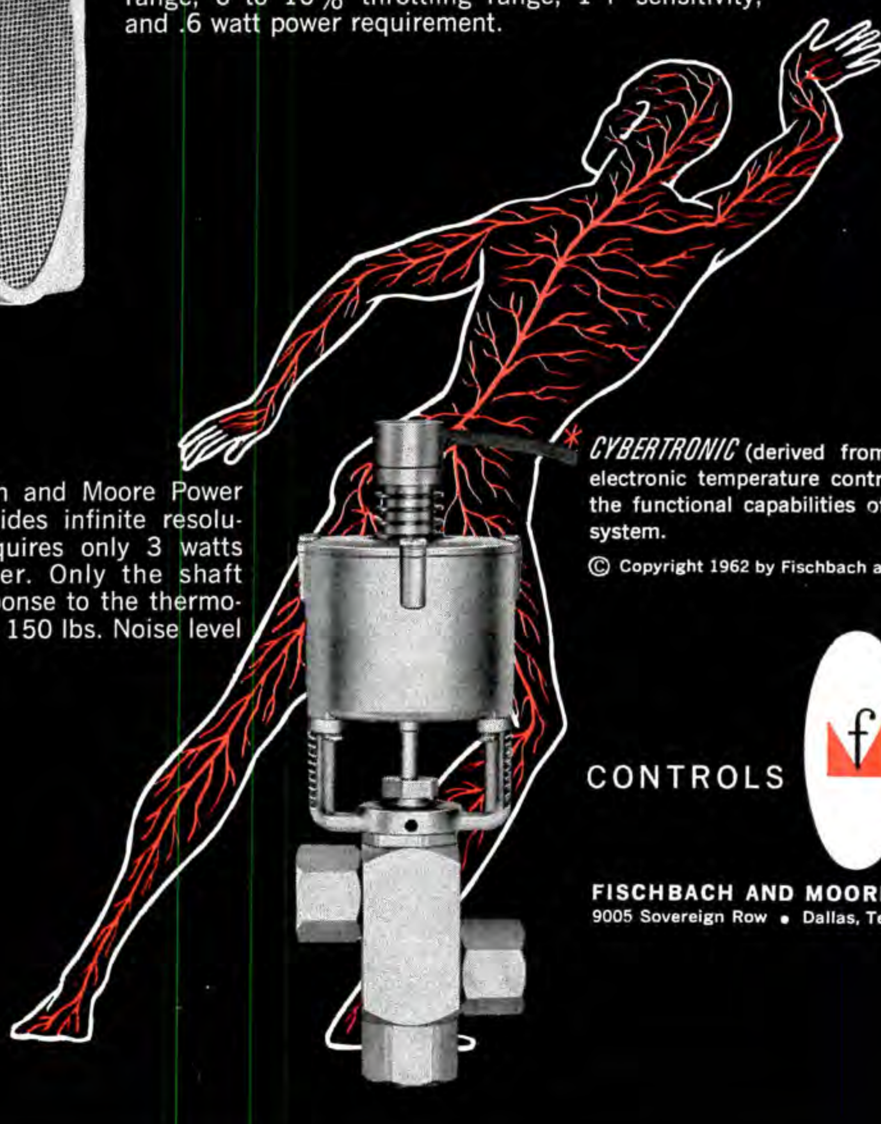
. . . for the first time the simplicity, reliability and reduced maintenance looked for in solid-state temperature control systems.

In making this contribution to more efficient and economical temperature control systems, Fischbach and Moore engineers have succeeded in bringing you these long sought advantages of the CYBERTRONIC System:

- A system that incorporates the recognized efficiency of solid-state electronics with a minimum of maintenance.
- A system with a unique actuator . . . only the shaft moves in response to the thermostat . . . provides infinite resolutions . . . requires 3 watts power.
- A system that offers maximum proven reliability, simplicity and top performance at reasonable cost.



One of the components of the CYBERTRONIC System is the Fischbach and Moore ET Series Thermostat . . . a completely self contained solid-state bridge amplifier providing the advantages of: single or two stage proportional controller; 55-85° (F) standard control range; 0 to 10% throttling range; 1°F sensitivity; and .6 watt power requirement.



The Fischbach and Moore Power Actuator provides infinite resolutions and requires only 3 watts nominal power. Only the shaft moves in response to the thermostat. Thrust is 150 lbs. Noise level is zero db.

*CYBERTRONIC (derived from cybernetics) . . . an electronic temperature control system simulating the functional capabilities of the human nervous system.

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SOME RECENT INSTALLATIONS	ARCHITECTS
Academy of the Visitation St. Louis, Missouri	Bernard McMahon
Andover Hall Library, Harvard Divinity School Cambridge, Mass.	Shepley-Bulfinch-Richardson & Abbott
Boston University, Biology & Science Bldg. Boston, Mass.	Edwin T. Steffian
College of Idaho Dormitory Caldwell, Idaho	Hummell-Hummell & Jones
Divinity School, Library Building Philadelphia, Pa.	Borie & Smith and Carroll-Grisdale & Van Alen
Emerson Junior-Senior High School Emerson, New Jersey	Knappe & Johnson
North Texas State College Women's Dormitory Denton, Texas	Wilson, Patterson, Sowden, Dunlap & Epperly
Pennsville Junior High School Salem City, New Jersey	Micklewright & Mountford
St. Scholastica Academy Canon City, Colorado	Langhart & McGuire
Sheppard Elementary School Santa Rosa, California	C. A. Caulkins, Jr.
South Salem & Manorhaven Schools Port Washington, New York	Eggers & Higgins
Temple College Library Chattanooga, Tenn.	Harrison, Gill & Associates
University of Nevada, Womens' Dormitory Reno, Nevada	David Vhay & Raymond Hellmann
University of Delaware Dormitories, Kitchen & Dining Room Newark, Delaware	Howell Lewis Shay & Assoc.
Waieakea Intermediate School Hilo, Hawaii	Hawaii County Dept. of Public Works

See **SWEETS 22b/GL** and send for large sized detail and specification sheets.

REPRESENTATIVES: Some choice territories still open. Representatives in most states of the Nation including Hawaii.

GLOBAL STEEL PRODUCTS CORP.
80 SMITH STREET • FARMINGDALE, N. Y.

For more data, circle 162 on Inquiry Card

IN DESIGNING ONE-STORY BUILDINGS

You Can Lower the Roof — and Yet Not Affect Ceiling Height

The Atmos-Pak roof-mounted heating and/or cooling system makes it possible to dispense with dropped ceilings — the only interior fitting is an inconspicuous although good-looking diffuser.

Atmos-Pak is a roof-mounted, low-silhouette, pre-fabricated heating and/or cooling system specifically engineered for large one-story buildings. It has innumerable advantages for shopping centers, supermarkets, discount houses, bowling alleys, schools, post offices, churches, and industrial buildings. The only interior fitting is an inconspicuous, although good-looking, diffuser, integral with the unit. The one-piece apparatus can be delivered and in operation the same day. Optional colors and housing designs.

Dispensing with boiler and apparatus rooms, Atmos-Pak saves space. Pre-fabrications reduces on-site installation to three quick connections. The supply and return air distribution chambers do away with duct-work. Air-cooling makes water-towers, evaporative condensers, miles of pipe, and other appurtenances unnecessary.

The 50 standard Atmos-Pak models range in individual cooling capacity from 5 to 35 tons. As many units as are needed to add up to the total requirements, are installed. Heating capacity provided as required.

Specify Atmos-Pak for the assurance of problem-free comfort. Write for additional information.

ATMOS-PAK, INC., 88 North Highland Avenue, Ossining, N. Y. Pioneer, Designer, and Manufacturer of Roof-Mounted Heating and/or Cooling Systems.

There's always room on top for the original low silhouette

the atmos-pak ®

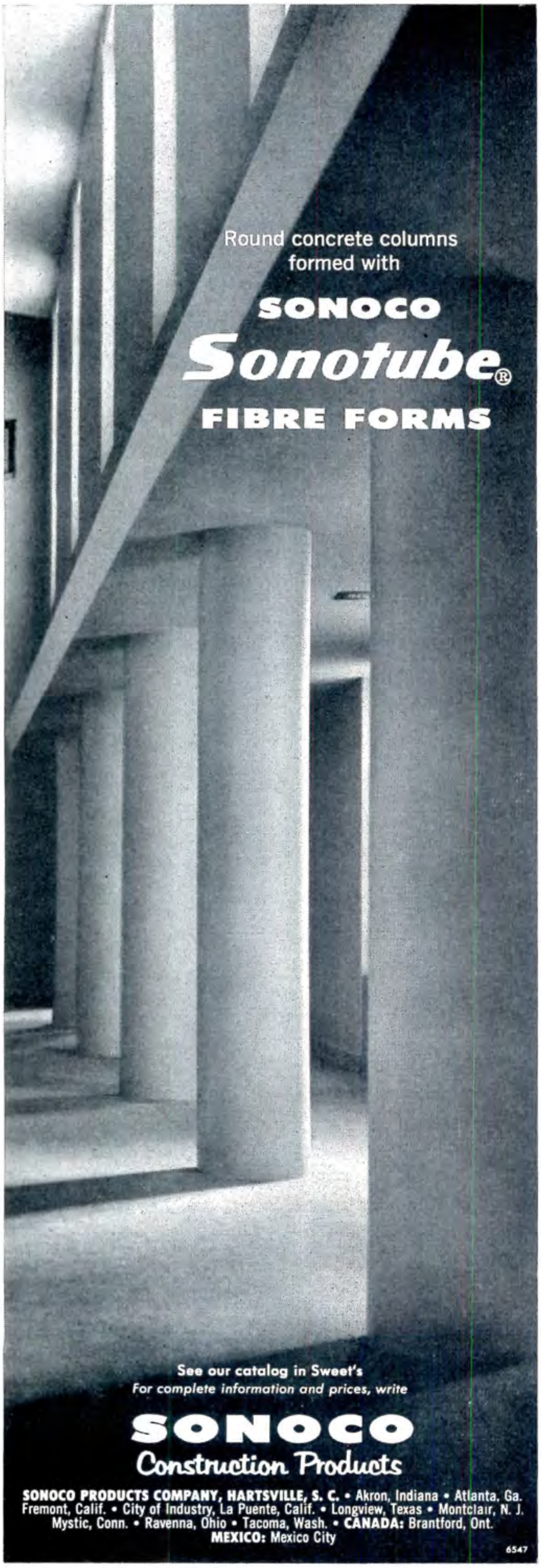
Patent No. 2886955

ATMOS-PAK, Inc.
88 North Highland Avenue
Ossining, N.Y.

Pioneer, Designer, and Manufacturer of Roof-Mounted Heating and/or Cooling Systems

For more data, circle 163 on Inquiry Card

For more data, circle 164 on Inquiry Card →



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ELECTRIC
HOT WATER HEA

TO 2,500,000 B.T. OUT.

PRECISION

ELECTRIC HOT WATER HEATING BOILER

COMPLETE UNIT READY FOR INSTALLATION
with circulation hot water system and water chiller for year-round air conditioning.

CONVERSION EASILY ACCOMPLISHED
where other type fuels now used. Suited for home, churches, motels, apartments, hotels, hospitals, commercial buildings, swimming pools, snow melting and domestic hot water for large users. Temperature range — 60 to 250 degrees. Equipped with Sequence and Proportional Controls when desired.

- **Every unit tested and inspected 40,948 to 2,500,000 B.T.U. Output.**
- **All Boilers meet the requirements of the ASME Boiler and Pressure Vessel Code. Natl. Board approved.**

No chimney! No odors! No flame! No ducts! No noise!

Write for complete specifications and prices

PRECISION parts corporation
400-AR NORTH FIRST STREET
NASHVILLE 7, TENNESSEE

For more data, circle 166 on Inquiry Card

the price of comfort is $\$2^{82}$

Indiana State Office Building
816,000 sq. ft. • $2.95 per sq. ft.

City County Building
1,047,000 sq. ft. • $2.86 per sq. ft.

Employment Security Building
110,000 sq. ft. • $2.82 per sq. ft.

Federal Post Office Building
405,000 sq. ft. • $2.47 per sq. ft.

2,378,000 square feet of space were comfort conditioned by Buensod mixing units at an average gross cost of $2.82 per square foot. It happened in Indianapolis, Indiana. Four government buildings—three new ones and a renovation—wanted sealed bids for air conditioning. High velocity Dual Duct with Buensod-Stacey air handling units won—hands down. And it figures! Buensod, who pioneered the Dual Duct method, has constantly worked to refine the art. Today it ranks as a highly economical and efficient, year-'round air conditioning system. And Buensod's exclusive, patented Automatic Volume Control maintains constant air volume, regardless of changes in static pressure. Consider Dual Duct for your next installation, whether a new structure or a renovation. Check your local Buensod rep. for more information or write for illustrated brochure #DD-6/11.

BUENSOD-STACEY CORPORATION, Manufactured Products Division
Subsidiary of Aeronca Manufacturing Corp., 45 West 18th Street, New York 11, N. Y.

BUENSOD-STACEY

For more data, circle 167 on Inquiry Card

ANNOUNCING

G LD BOND PRE-DECORATED ASBESTONE PANELS

new, lower cost, maintenance-free building components

Colorful panels designed for exterior walls or interior partitions.

New Gold Bond 1⁹⁄₁₆″ Asbestone *exterior* panels have prefinished, Ripple-Tone textured, asbestos-cement facings on both sides, laminated to a dense, wood fiber insulating core. The Plasti-Clad surface is an oven-baked, polyvinyl chloride coating that requires absolutely no maintenance and it carries a ten-year guarantee against peeling, blistering or crazing. Six beautiful, tasteful colors.

The new Gold Bond 1⁹⁄₁₆″ Asbestone *interior* panels come with your choice of three different cores: Spiral-Core, made with rigid, featherlight, hardwood curls; a noncombustible core; a standard wood fiber core. The handsome pebbled Plasticrylic finish is maintenance free, washes easily. (See the Gold Bond No. 100 Demountable Partition System, inset picture above.) Six decorator colors.

Get samples of both kinds of Gold Bond Pre-decorated Asbestone Panels—exterior and interior. They're yours for the asking. Call your Gold Bond® Representative, or write Department AR-102, National Gypsum Company, Buffalo 13, New York.

Gold Bond
ASBESTONE PANELS

For more data, circle 169 on Inquiry Card

All the features you've wanted in a recessed fixture

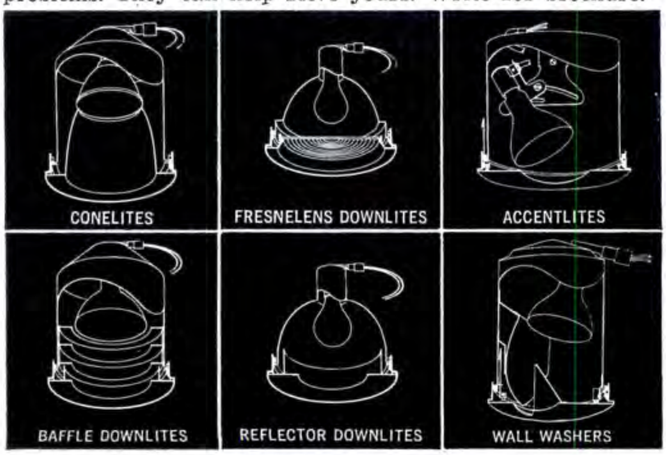
- ☐ Optimum lighting performance
- ☐ Interchangeable units
- ☐ Reduced trim size
- ☐ Aluminum mounting rings
- ☐ Quality reflectors and lenses
- ☐ Snap-in construction

you'll find in Instalite®.

Instalite fixtures were designed to make life easier for you, your electrical contractor and your clients. Instalite units are interchangeable — install fresnelens downlites, for example, months later if lighting requirements change replace them quickly and easily with another Instalite fixture designed to meet the new requirements.

Instalite can be installed faster, and with less effort, than any other recessed fixture. Aluminum and stainless steel parts eliminate the possibility of rust. A disposable plaster cover, and the push pins to keep it in place, comes with each mounting ring to speed cleanup time. Reduced fixture trim size gives ceilings a clean, open look. The fixture body or reflector snaps into place with the twist of a screwdriver.

Instalite fixtures were designed to help solve recessed lighting problems. They can help solve yours. Write for brochure.



CENTURY ARCHITECTURAL LIGHTING

New York: 521 West 43rd Street, N. Y. 36
Calif: 1820 Berkeley Street, Santa Monica

For more data, circle 170 on Inquiry Card

WON'T WARP, WEAR OR CORRODE

New, Improved
Clark DURADO
Outlasts ordinary rubber doors because it's reinforced with steel

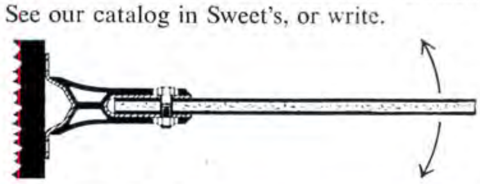
Combine the resiliency of rubber, the rigidity of steel, the ruggedness of plywood. That's the new DURADOR. It takes all the punishment your fork truck jockeys can dish out without wobbling, warping, splintering or misaligning.

Full sized sheets of steel increase structural strength of door panel. Permanently bonded between plywood core and rubber surface on both sides. Full length rubber hinges function flawlessly even in below-freezing temperatures. No hardware to corrode. Never any maintenance, not even lubrication. Easily applied at new or existing doorways.

No Increase in Price!

Before you specify any door, investigate DURADOR. All stock and intermediate sizes. See our catalog in Sweet's, or write.

Unique full-length Rubber Hinge returns DURADOR to draft-free closure.



CLARK DOOR CO., INC., (SINCE 1878)
522 Hunterdon St. Newark 8, N. J.

For more data, circle 171 on Inquiry Card

FOR A NEW GIANT STORE . . .
T E GIANT STRENGTH OF LACLEDE STEEL

It's a tradition to do things big in Texas, and this new store in the Giant Food chain is no exception. Under construction in Beaumont at a cost of $2,000,000, the mammoth structure requires high tonnages of Laclede reinforcing and structural steels. About 119,000 square feet of sheet mesh, 120 tons of steel joists and 15 tons of reinforcing bars for the project have been shipped from Laclede's Alton Works, Madison Works, and the Beaumont Fabricating Plant of Laclede subsidiary Southern States Steel Company.

LACLEDE STEEL COMPANY ®

SAINT LOUIS 1, MISSOURI

Producers of Quality Steel for Industry and Construction.

Steel

6249

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Index to Advertising

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STOCKHOLM