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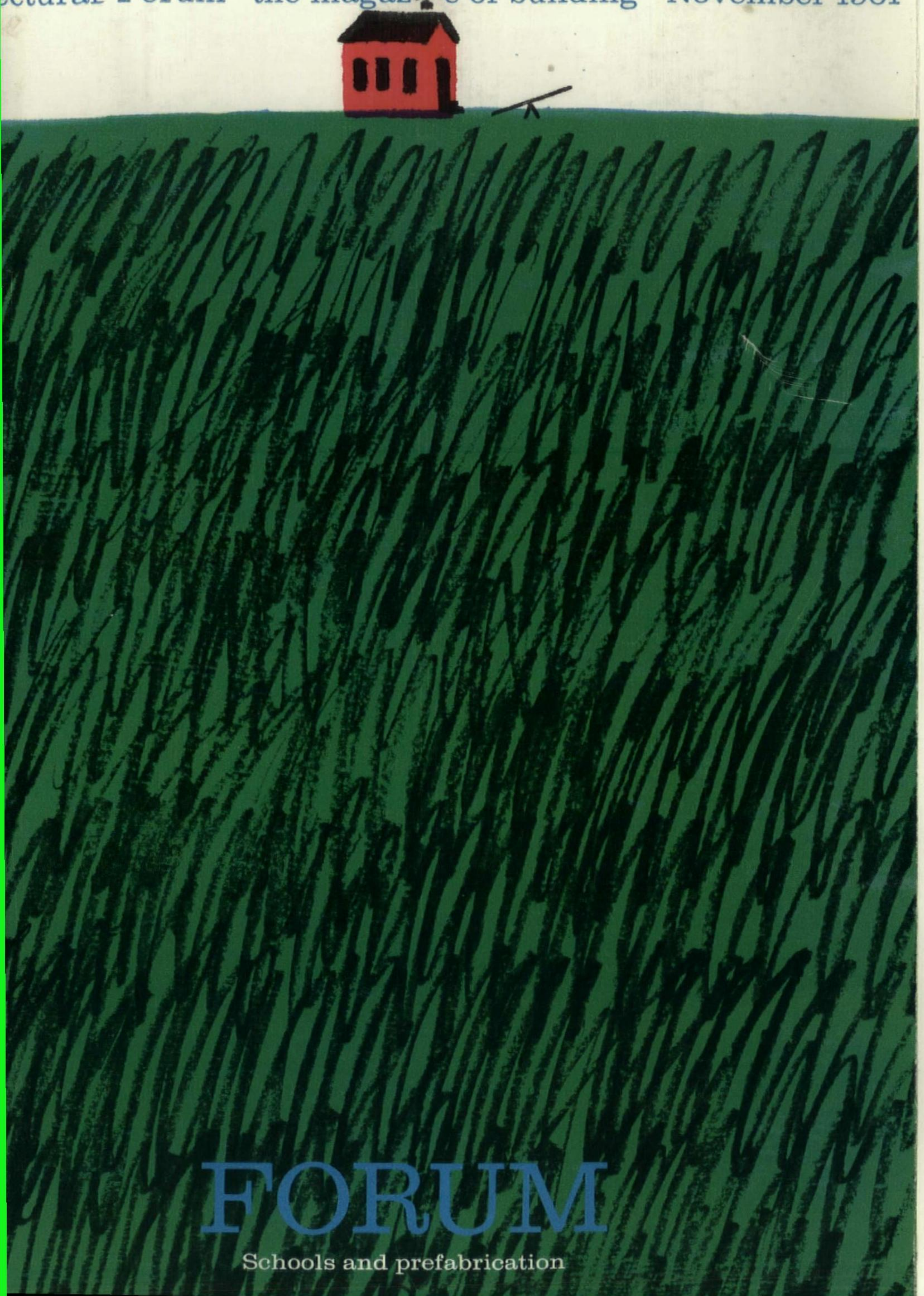

FORUM

Schools and prefabrication

VOLUME 115, NUMBER 5

SCHOOLS:

DEPARTMENTS

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Publisher's note

For a long time FORUM's editors have recognized that America's continually mounting classroom requirements cannot be met through increased spending alone, that more intelligent spending is also mandatory. This has been the theme of most of FORUM's annual school issues—as it is this month.

Looking back, FORUM's editors can take pride in their contributions toward stretching the schoolhouse dollar and improving the design of America's educational plant—contributions which have been recognized by award juries and have been quickly accepted by school architects and educators (FORUM's 62,000 circulation includes 9,400 subscribers in the educational classification). For example:

In 1935, schools specially designed by leading architects for FORUM's November issue got the modern movement off dead center. Within two years modern schools began to appear in force.

In 1949, "FORUM's school for 1950," programmed by the editors and designed by the brilliant Matthew Nowicki, broke the monopoly that had accrued to the spreadout "finger-plan" school by setting up the counter-ideal of compact multi-use space. (This issue was judged by *Industrial Marketing* to be the best among all industry magazines for the year 1949.)

In 1953, the editors introduced a new approach to school costs which lifted the discussion above the usual narrow range of construction economics and placed it in the broader context of school policies, programming, and financing.

In 1957, FORUM commanded the attention of hundreds of newspapers with its sharp reply to "That *Readers Digest* article" which, wrongly accusing school boards and architects of building "palaces," was discouraging voters from passing school-bond issues. (FORUM's article earned an Award of Merit from *Industrial Marketing* and prompted requests for 19,302 reprints.)

In 1959, the editors gave the first rounded analysis of the efforts of the Ford Foundation to encourage school planning and equipment that could expand the effectiveness of teachers. And, FORUM's editorial on "Schools for an age of confusion" won an award from the National Education Association.

In this issue, FORUM's editors explore in depth the economics and techniques of schoolhouse prefabrication. The significance of this effort will be seen in the shape and structure of tomorrow's schools and, hopefully, in the further stretching of the school building dollar.—J.C.H. JR.

Santa Monica shows how NOT to run an urban renewal competition

Santa Monica, Calif. finally decided on an urban renewal project last month, but not until it had done just about everything wrong: The city's Redevelopment Agency had no professional evaluation panel for its competition, and even then ignored a citizens committee's first choice until it could attempt to squeeze higher land bids from other prospective redevelopers. Four months after a winner was to have been announced, the Redevelopment Agency finally selected for its 26.3-acre Ocean Park renewal site a design by Welton Becket & Associates, sponsored by Kern County Land Co. and the Del E. Webb Corp.

The outcome of the city's protracted deliberations makes sense, as the specially impaneled, though unwieldy, committee of 100 citizens (including seven architects) had evaluated all the 11 entries (FORUM, Apr. '61) and placed the Becket plan first, according to a rather imperfect and unprofessional rating system. However, the Redevelopment Agency, through its executive director, Russell F. Priebe, had already indicated that a high standard of architectural excellence would not necessarily carry the day. Priebe had refused to set up a special panel of professionals to evaluate design aspects of the entries and had, indeed, indicated the direction of the Agency's thinking with this peculiar piece of rhetoric: "The agency will not promiscuously disregard the high bid."

Not only did the RA not "promiscuously disregard the high bid" but it brazenly attempted to blackjack four of the 11 prospective redevelopers into raising their bids for the land.

Wanted: a no-cost project

When the 11 proposals were first received, the RA was happily surprised, for three of the entries promised such a high land price that there would be no need for a Title I federal capital grant, nor would there be any cost—or very little—to the city itself. The city wanted to get about 2,000 apartments built on the site, as well as some commercial development (e.g., parking, motel, stores, professional offices). Top bid came from Kern-Webb, which offered \$5.8 million for the residential area, and a lease arrangement whereby it would pay \$103,000 annually for 40 years, for an over-all total of \$9,920,000. When, several months later, the citizens committee placed Kern-Webb at the top of the heap, the Becket plan seemed assured of an ultimate victory.

But instead of naming Kern-Webb the winner, the RA amazingly picked four of the 11 entrants (Kern-Webb, Reynolds Aluminum Service Corp., Perini Corp., and Deane Associates) and asked them to submit new land bids. One reason given was to re-evaluate parking proposals in light of a new city ordinance, but it was fairly obvious to the competitors that the city wanted to see if anyone would top Kern-Webb's bid if given the chance. Also, the RA was reportedly somewhat put off by Kern-Webb's lengthy list of conditions attached to its proposal.

The opportunity was seized by Reynolds, which was intent upon making the Santa Monica project something of a premier attraction in its showcase of urban renewal projects (FORUM, May '61). Reynolds had always been a powerful contender in the competition, although it ranked only fifth in the opinion of the citizens' committee. (Perini's proposal, with a design by DeMars & Reay and Charles Eames and Pietro Belluschi as consultants, ranked even lower, but was generally believed to have been among the "semifinalists" because of the sponsor's strong economic position. The Deane proposal, a design by Daniel, Mann, Johnson & Mendenhall, was rated third by the citizens committee.) Reynolds brought into play a powerful battery of forces once it was in contention. It had already hired Victor Gruen to put together a scheme following closely the lines Gruen himself had laid out for RA's original land-use studies. Thus Gruen was already well-known and esteemed by RA even before Reynolds' proposal was evolved.

When Reynolds came up with a new land bid that also promised the city a no-cost project, rumors were thick that Reynolds would get the project. Reynolds changed its bid so that it totaled around \$9.3 million, based on a long-term lease deal aggregating \$467,297 annually. But Reynolds would also have packed nearly 200 more apartments into its project as well as upping parking from 2,560 stalls to 3,806.

Kern-Webb, still regarded as a chief contender, adamantly refused to alter its bid for land, saying simply "our proposal was the result of careful study and represents our estimate of the best offer that can be made on a sound business basis," and Reynolds,

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WELTON BECKET PLAN FOR SANTA MONICA'S OCEAN PARK RENEWAL SITE

Becket's competition-winning design features 2,000 dwelling units, most of them in four 21-story and four 13-story apartment buildings. The \$55 million scheme would develop four self-contained residential areas within the eight oceanfront blocks, as well as a central park with a 200-seat restaurant. At the southern end of the project (to the right, above) will be a six-story office building, an eight-story, 280-unit motel and a 856-car parking garage. Some garden apartments are arrayed in the greenbelt areas winding through the project, and a 147-unit project for the elderly is adjacent to the commercial development.

at this juncture, appeared the favorite.

With Reynolds assuring the press it had the Santa Monica project in its hip pocket, the RA suddenly reversed field again, baffling everyone. Two weeks before the final selection was to be made, the RA discovered that the parent company, Reynolds Metals Co., would not throw its fiscal weight behind its wholly owned subsidiary, which it said would have to be treated as a separate corporation. The RA suddenly became wary of the long-term lease provision Reynolds proposed, and wavered. Reynolds assured the city that the parent company was morally behind its subsidiary, but the RA, uninterested in moral positions, wanted more iron-clad proof of fiscal soundness and stability.

Sensing that Reynolds was on the ropes, Kern-Webb jumped into action, and offered to renegotiate some phases of its bid. It refused to pay more for the residential parcel, but offered to make a longer lease on the commercial portion and also donate land to be used for special units of housing for the elderly (see plan, page 5). Despite Priebe's staunch backing of Reynolds, the RA, swayed both by the parent corporation's unwillingness to back its subsidiary's arrangements with its own fiscal strength and by Kern-Webb's new offer, gave the job to Kern-Webb, presumably with the understanding that renegotiation would have to result in a no-cost project to the city, even if that meant cramming more apartments into the plan. Kern-Webb tentatively agreed to a scheme that would have a total capitalized value of about $9.8 million, indicating no cost to Santa Monica.

The Santa Monica competition is over, but its scars will remain. The city has a superior project, perhaps the best it could have gotten anyway and it should do nicely without either federal grants or any strain on the city treasury. However, Reynolds and other developers who entered the competition, spending $50,000 apiece and more, may think twice before they get themselves into another situation where they can be whipsawed by a renewal agency.

Santa Monica, as well as other U. S. cities, could do well to heed the words of John Searles, who is leaving Washington, D. C. after ten years as that city's renewal chief (FORUM, Oct. '61). Searles said that perhaps the biggest mistake the city had made was putting too much stress on land price, and not enough on architectural factors. Two months ago, Washington had a successful, smoothly run competition for a renewal site, with the land price fixed for all developers, thus avoiding the temptations that ensnared Santa Monica.

NEW CONSTRUCTION EXPENDITURES, FIRST NINE MONTHS 1961
(in millions)

	1st nine months, 1961 Private	Public	Total	1st nine months 1960 Total	% Change in totals
BUILDING CONSTRUCTION					
Industrial	$ 2,096	$ 334	$ 2,430	$ 2,372	2.4
Offices and warehouses	1,758	...	1,758	1,527	15.1
Stores, restaurants, and garages	1,658	...	1,658	1,478	12.2
Religious	720	...	720	743	—3.1
Educational	430	2,294	2,724	2,492	9.3
Hospitals and institutions	573	273	846	738	14.6
Social and recreational	518	99	617	618	—0.2
Public administrative and service	...	503	503	446	12.8
Apartments	2,045	284	2,329	2,122	9.8
Hotels, motels, and dormitories	1,118	90	1,208	955	26.5
All other building construction	617	996	1,613	1,517	6.3
TOTAL BUILDING CONSTRUCTION	$11,533	$ 4,873	$16,406	$15,008	9.3
TOTAL HOUSE CONSTRUCTION	13,404	230	13,634	14,571	—6.4
TOTAL OTHER CONSTRUCTION	4,895	7,383	12,278	11,708	4.9
TOTAL CONSTRUCTION	$29,832	$12,486	$42,318	$41,287	2.5

Source: Miles L. Colean estimates based on Bureau of Census data. For components of each category see FORUM, *Oct. '61, page 110.*

Building strong, costs steady for nine months

Building construction is making the big advance in 1961, while home building continues to lag behind 1960 levels. For the first nine months of this year, total building construction was 9.3 per cent ahead of 1960, hitting a mark of $16,406 million. Home building, meanwhile, dropped 6.4 per cent.

Building costs, at the same time, have remained quite steady.

Brightest spots in the generally bright building picture came in hotel-motel construction (up 26.5 per cent in the first nine months) and office building (up 15 per cent). The fast-generating hotel-motel boom is currently getting as much lift from the construction of large center-city hotels (especially in New York City which has two new hotels finished this year and at least four more on the way) as from the continuing boom in motor hotel facilities. And even motels are heading toward the city's core, as evidenced by new motor hotels in downtown areas of New York, Baltimore and elsewhere.

The office-building boom has continued handsomely, despite recurring stories of incipient anemia. As the boom is expected to slack off next year (FORUM last month predicted a 4 per-cent decline), 1961 could well be the high-water mark for the greatest office-building splurge in history. For the nine months, office construction totaled $1,758 million.

Another boom that is still hearty, although slowing down, is the building of stores, restaurants, and garages, which rose 12.2 per cent in the first nine months of this year, totaling $1,658 million for the three quarters. While store building, particularly of large shopping centers, is expected to remain steady through 1962, this year should set a new record for that category.

Hospital construction has also been booming so far this year, both in the private and public areas, and is now 14.6 per cent ahead of 1960's first three quarters. Private hospital construction has been putting much of the steam behind this surge, and will continue strong into 1962.

School building, even in the face of Congressional failure to provide some sort of federal support, was up 9.3 per cent of 1960 through the first nine

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U.S.-BUILT UMBRELLAS FOR SUN-SHY REDS

Plastic umbrellas, designed by George Nelson for the 1959 American National Exhibition in Moscow's Sokolniki Park, have been transplanted to Yalta's seaside Park of Culture and Rest. The umbrellas (with buildings housing the exhibition) were sold to the USSR and now are a popular spot for sun-shy comrades at the Black Sea resort.

A beauty to behold is the Ebco On-A-Wall Water Cooler. Rich vinyl clad steel is mar-resistant for beauty that lasts . . . stunning Silver Spice color adds warmth to surroundings. Brilliant anodized aluminum grille imparts new elegance.

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months, with public school construction totaling $2,294 million and private school building $430 million.

Along with office buildings, stores, and hospitals, one of the brightest spots all year has been apartment building, which continues a dramatic upswing after a disappointing 1960 record. In the first nine months, apartment construction rose 9.8 per cent, totaling $2,329 million, and continuing strength should put it in a fine position for the 16 per cent rise expected in 1962.

Accompanying the generally strong trend of building construction has been a relatively steady cost picture. In the 12 months ending last August, construction costs over all, as measured by the Department of Commerce index, rose only 1.4 per cent, and E. H. Boeckh's index of costs for commercial and factory buildings showed the same increase. Boeckh's apartment, hotel, and office building index rose only slightly more, by 1.8 per cent in that period. Costs in heavy construction seem to be rising much faster, according to most indexes, than are costs for buildings.

Costs of building materials are also showing reassuring stability through August. Structural steel shapes, for instance, showed no price rise at all for the year, and plumbing equipment costs, which had been rising faster than average costs, gained ony 1.5 per cent.

High rise, yes—low, no

Although there has been much enthusiasm for the high quality of Mies van der Rohe's design for Detroit's Lafayette Park urban renewal apartments (FORUM, May '60), the project has weathered severe economic storms since it opened less than two years ago. While the 22-story apartment tower is fully rented, and has been almost from the start, the town houses have been faring badly. By last month only 48 of the 186 town houses had been sold, another 48 were vacant, and the owners of the project were renting out the remaining 90 houses.

Detroit observers believe the project's economic ills stem from problems of the total neighborhood rather than the project's own design. Schools are still a key problem and this makes it especially difficult to attract families with young children.

Actually, the owners were forced to rent as many town houses as possible to keep their FHA mortgage from falling into jeopardy. But now a local FHA official says: "After a shaky start, they seem to be rolling along well. I see no immediate danger of FHA getting in there. If we do get in, it will be because they asked us. . . . At the moment, we are doing everything we can to help make it a success. We have offered to grant them a mortgage increase but so far they haven't asked for one."

While the town houses languish, rents are being upped ($3 to $5 per month) in the high-rise apartments, where rentals were initially relatively low to lure new tenants into the striking glass-walled tower. And plans are underway for two more Mies-designed towers.

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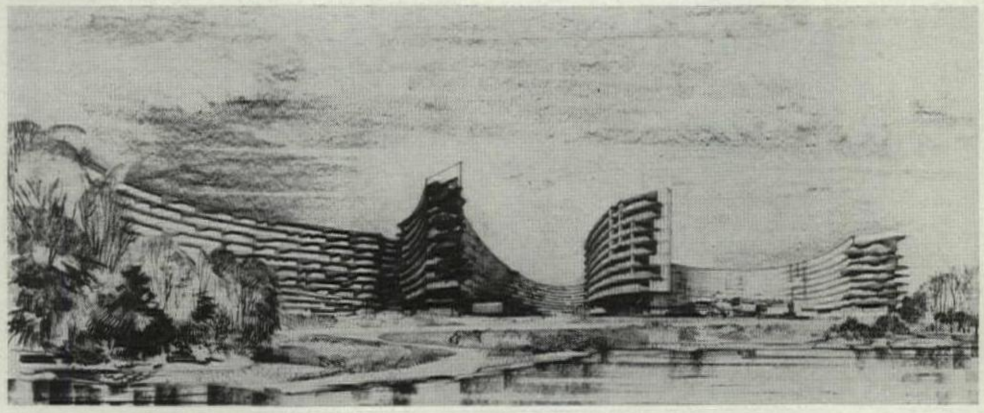


Antipasto on the Potomac

A startling, free-form design by Rome Architect Luigi Moretti was unveiled last month for a huge $45 million residential-commercial project to be built in Washington, D. C., next to the projected U. S. Cultural Center (by Architect Edward Durell Stone) on the banks of the Potomac River. The project, called the Watergate Development, will be completely privately financed. Its 10-acre site is already owned by a group headed by the *Società Generale Immobiliare di Roma*, a leading Italian investment corporation, which has developed projects in Montreal and is building a new hotel in Rome to be leased to Hilton Hotels.

The project will have three apartment buildings, with a total of 1,400 units. The first apartment building will be the C-shaped one nearest the Cultural Center (picture below). There will also be a residential hotel with 350 units (building at center of project) which is connected in a rough V-form to an office building with 200,000 square feet fronting on Virginia Avenue. The third building, nearest the intersection of Virginia and New Hampshire Avenues will also be an apartment building.

Three levels of underground parking will provide space for 1,250 cars and there will also be community shopping facilities including a restaurant located in the hotel. A limited number of villas will be scattered about through the heavily landscaped site. The high-rise buildings have been designed to conform to the triangular site and to the gentle undulations of the Potomac shore. The curved façades will be broken by irregularly shaped balconies and loggias. Professor Moretti's associate architect on the project is Milton Fischer of Corning, Moore, Elmore & Fischer of Washington.

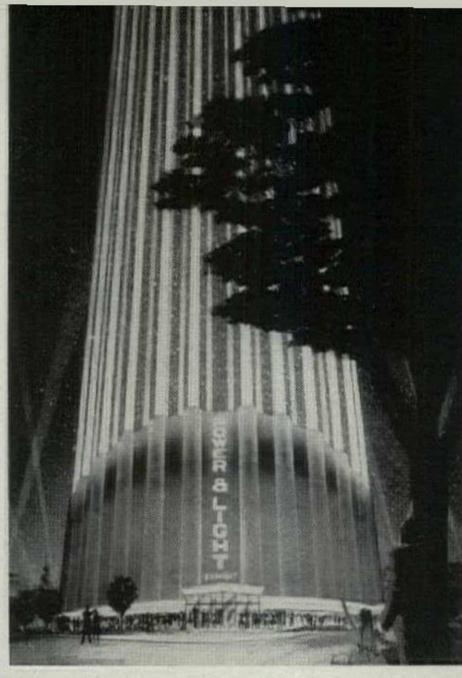
The most immediate obstacle to the project is zoning, which presently would not permit an office structure on the site. A variance will also have to be granted to permit closing off two streets, and to permit the buildings to rise to 130 feet, some 40 feet higher than present zoning allows.

PHOTOS: DEL ANKERS

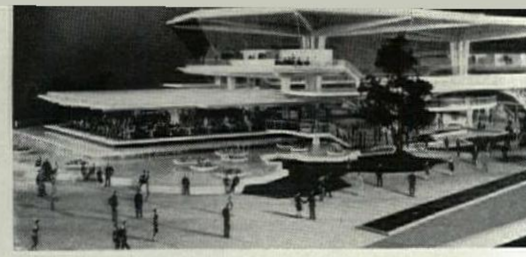
News contd.

Shown here is a representative sampling of exhibit structures for the New York World's Fair 1964-65. Others are on the way.

Port of New York Authority *building, a heliport on four massive stilts, with a restaurant hung beneath landing platform.*



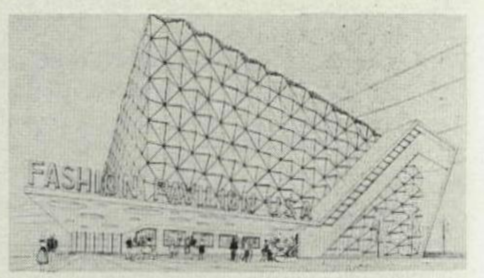
Power & Light exhibit *will throw 24 billion candle power worth of searchlight into the sky from an 80-foot-high birthday cake. Below are the theme structures, the* **Astral Fountain** *and (right) the massive steel* **Unisphere** *to be built by U.S. Steel Corp.*



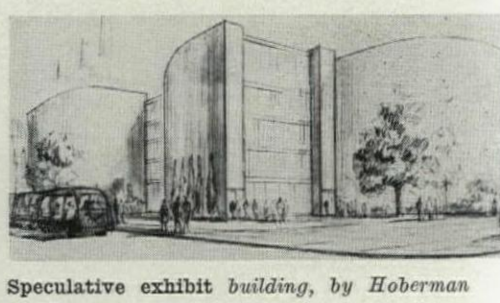
Gas industry pavilion, *by Designer Walter Dorwin Teague & Assocs., is an airy arrangement of planes, around a glass walled exhibit area. Included is a ground-floor restaurant.*

Better Living pavilion, *by John LoPinto & Assocs., will lease space for hobby, home furnishings, recreation and food exhibitors.*

American Interiors pavilion, *by Architect Thomas H. Yardley, will feature sporting goods, health foods.* **Graphic Arts pavilion** *(below), shaped like books between book-ends, is work of Designer Raymond Barger, will lease space for arts exhibits.*

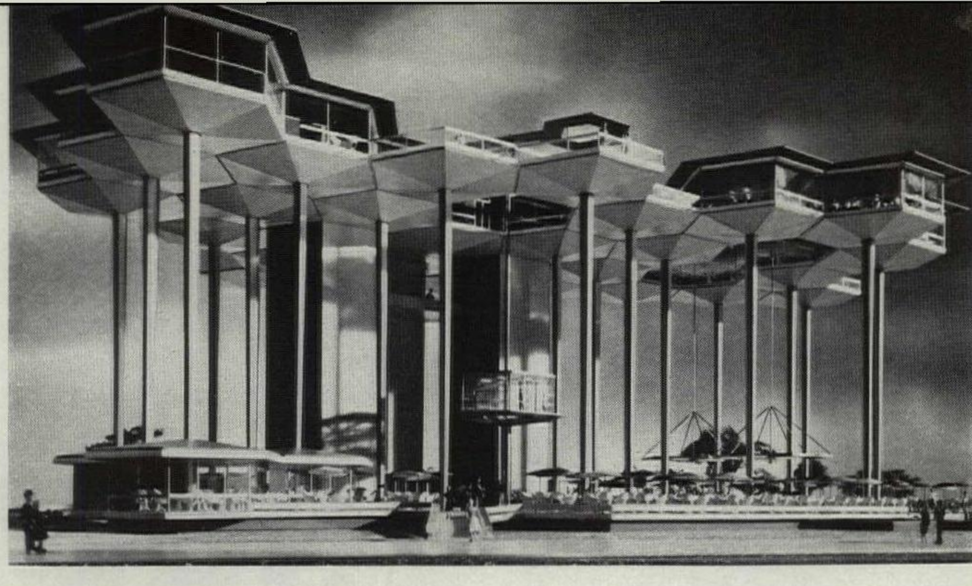


Fashion pavilion, *by Architect Caleb Hornbostel, will change colors with the seasons.*



Speculative exhibit *building, by Hoberman & Wasserman, will lease space to 15 "compatible" companies.*

New York World's Fair: fantasies in Flushing



Liebmann Breweries' $2-million Rheingold *"Oasis" by Kahn & Jacobs features a 60-foot-high beer garden atop concrete stilts and platforms supported by cantilevered aluminum trusses. Beer guzzlers and sightseers will gain access via a glass-walled elevator (center).*

"We want no tame, shopworn stereotypes, no dead collections of historical relics, no woozy, nostalgic sentimentalities, no frantic boasts and foolish words."

Thus spoke Robert Moses, chief barker for the New York World's Fair of 1964-65. At the time, Moses was trying, with characteristic restraint, to whip the federal government into action on a $200,000 study for a projected $30 million exhibit building at the fair.

Like a long list of other would-be exhibitors, however, Uncle Sam has shown marked hesitancy about participating in the Fair. Last month, after Senate opponents of federal participation in the Fair had killed any Congressional action at the recent session, President Kennedy was prevailed upon by New York Democrats to enunciate continued federal interest. But he did little more than that, writing to Moses that "you can be certain of my continued interest and the support of the Administration." But only Congress can approve the appropriation and such action now looks doubtful.

Moses' problems with the U.S. Senate are only a few of the difficulties plaguing the New York Fair. For instance:

Financing has been ragged. Only $28 million of a total $40 million of notes has been sold to the public, and last July the Fair barely made its deadline of $25 million in public participation. If it had not hit that total (it made it precisely) it would have had to refund all the monies lent to that point. New York City was persuaded to purchase another $24 million of notes, and thus will make up the rest of the ultimate $64 million needed for fixing up the Flushing Meadows site, where many of the same facilities of the old 1939-40 Fair will be used.

Participation has been uncertain. While a handful of large industrial exhibitors (e.g., General Motors, Chrysler, Ford, Eastman Kodak, General Electric, U.S. Steel) are already in the fold, others have either not come forward at all, or have already dropped out. In the latter category are Borden's which has scrapped plans for its own building, but will rent some space in a multi-exhibitor Fair building, and Westinghouse Electric, which said flatly that the Fair was too great an expense "in terms of the number of people who would visit the exhibit." Westinghouse would have built an $8 million pavilion, had it participated. Other prospective exhibitors have balked at what they consider too-high land rents ($8 per square foot).

The upshot of industry caution and outright refusal to join the Fair has been a discomfiting surplus of exhibit space: only about 26 per cent of the total 3,595,000 square feet available for industrial exhibitors is rented.

Many of the same problems plague the international section. To start with, the New York Fair failed to win the endorsement of the powerful Bureau of International Expositions, which counts among its 30 members most of the great Western European powers. Without these nations participating, the Fair has busily tried to corral the new African nations, the League of Arab States and a rather disparate group of independents, including Nationalist China, Russia, Spain, India, and the Holy See. But so far, only China and Indonesia have definitely signed leases with the Fair.

The overwhelming problem

As difficult as these snarls seem, they are puny compared with what already looms as the Fair's overwhelming problem—it will, by and large, look like the biggest honky-tonk East of Las Vegas.

The first batch of designs that has been announced and approved by the Fair is shown on the opposite page. They are a weird collection, but thoroughly in keeping with Moses' own pronouncement that "the Fair administration belongs to no architectural clique, subscribes to no esthetic creed, favors no period or school and worships at no artistic shrine." It was clear that Moses would "subscribe to no esthetic creed" when the Fair's Design Committee (Architects Edward Durell Stone, Gordon Bunshaft, and Wallace Harrison as well as Designer Henry Dreyfuss and Engineer Emil Praeger) resigned in the early stages of the Fair game. Bunshaft led the way out, after seeing the committee's recommendations get knocked down. Said he at the time: "We were trying to design a plan that would be an expression of our times. Mr. Moses wanted a repeat of the old World's Fair plan of 1939. Why should architects hang around for four years beating an old cat?" Harrison is still on the heavily populated Board of Directors, but he has no influence in over-all Fair planning or design.

Many designs have not been announced yet, and some of these promise much better results, although others are rumored to be even wilder than those already in the fold (e.g., the Coca-Cola pavilion will be capped by a giant Coke bottle, according to some reports). Harrison & Abramovitz have two of the largest single exhibits, the mammoth (304,920 square feet) General Motors pavilion and the American Telephone & Telegraph exhibit. Kahn & Jacobs, whose Rheingold oasis (above) is one of the best of the buildings announced so far, is also doing an exhibit for Travelers Insurance.

Trite, and also recognizable

Moses had to rush to the defense of the Fair's theme structures—the 120-foot-diameter steel globe called Unisphere and the so-called Astral Fountain—even before critics began shooting. Granting that the Unisphere is perhaps "trite," Moses alibied it as "easily recognizable by the average visitor. . . ." Just what anyone could recognize in the global orb was not indicated. Still, U.S. Steel is donating the Unisphere at no cost.

With potential bright spots still to be seen, the New York World's Fair shapes up as the worst, architecturally, produced in this country in some time. It certainly will not be as good as the 1939 Fair, or the competing, much smaller Seattle Fair (due next year). And the Columbian Exposition of 1893, which Moses has continually derided, nevertheless had unity—as well as a great building by Louis Sullivan.

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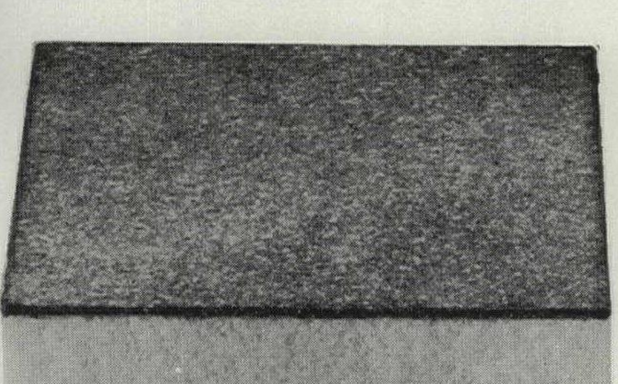

with a walk-on, work-on surface (also, helps the urethane retain its insulating value). 4. The only urethane designed for roof insulation. 5. Does not absorb water. 6. Won't bend, buckle, or melt when mopped with hot pitch or asphalt. 7. Acceptable as a base for Barrett bonded roofs! If interested in free samples and more information, write in today!

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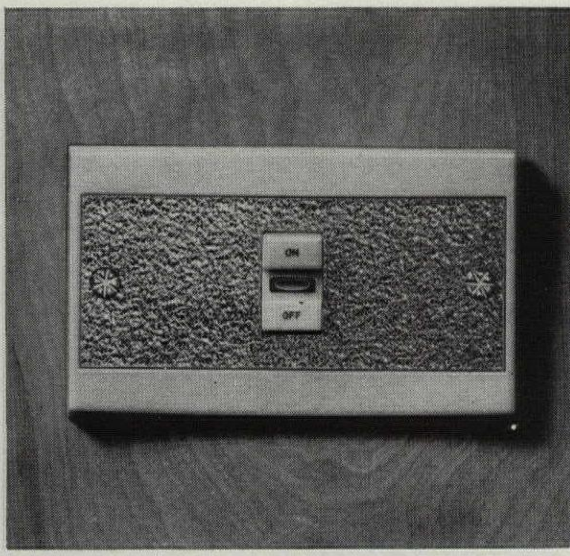
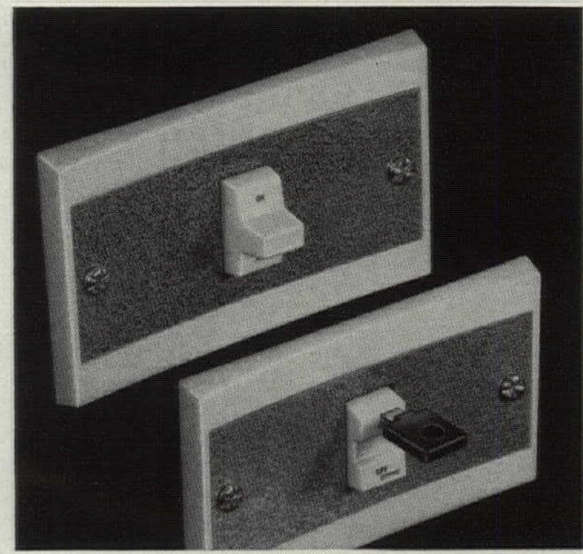
NEW! Switches that are easy to find in the dark. Now G-E Remote-Control wall switches are available with or without built-in locator lights.



NEW! Switches with built-in red pilot light. This new type of G-E Remote-Control switch is just the thing for controlling "hidden" lights.



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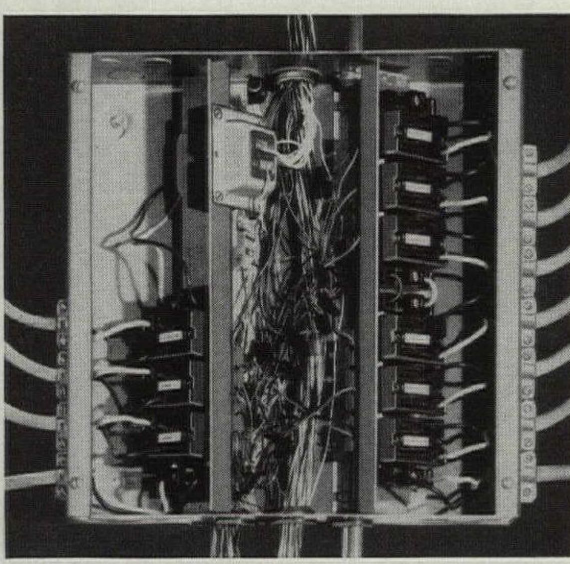

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Control Wiring Switches

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ype. And each is available *non-lighted, locator-*ighted, or *pilot*-lighted.

In addition, there's the new pilot-lighted Master Selector Switch — extension switches — plus an nterchangeable line.

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People

MAN DEFEATS SKYSCRAPER

If anyone doubts the power of a determined individual in an increasingly regimented world, there is a lesson to be learned in the sun-washed Italian village of Rimini, on the shores of the blue Adriatic. There, a retired semi-invalid named *Agostino Vanoni* went into battle against a $1.2 million skyscraper—and won.

Vanoni, in his sixties, was living in retirement in a modest Rimini villa which he had built from his savings, and was watching the world go by when Signora Vittorina Carloni Salvioni suddenly moved to block his view. The Signora applied for a building permit in 1957 to construct a 28-story apartment building—between Vanoni and the sea. Vanoni immediately complained to the mayor who was, like himself, a Communist, reminding him of his staunch party record. The mayor, however, realizing that ideology must sometimes give way to practical considerations, decided that Rimini could hardly afford to stand still when neighboring resort cities were building competing apartments. Vanoni, for his part, tore up his Party card on the spot and sought solace in the courts.

Vanoni charged that the skyscraper, by this time well under way, violated a section of Rimini's building code

UNITED PRESS INTERNATIONAL PHOTO

Rimini's embattled skyscraper

which says that space between two buildings must be at least half the total of their combined height. Vanoni's villa is about 20 feet high, the skyscraper over 300 feet, and thus the space between should be at least 160 feet; it is actually less than one-fifth of that.

After some deliberation, Italy's Council of State—to which the courts had referred the case—agreed that the building did indeed violate Rimini's code; and last month Italian President Giovanni Gronchi, acting at the direction of the Council, decreed that the permit issued in 1958 be revoked. Theoretically, this meant that the local building office must adjust the violation—that is, tear down the building.

Opponents of progress and others who liked the Adriatic town as it always had been were jubilant at Vanoni's victory, but even they seemed to feel it was obviously impossible to destroy the new apartment building. But Vanoni has the Signora over a barrel, and now she must buy him out—on his terms—or he will demand that the building be demolished.

ARCHITECTS WEED, GARDEN DIE

Robert Law Weed, 64, died last month in Miami. Best known for his design of the University of Miami campus, Weed was an early practitioner in the modern movement. His firm, Weed-Johnson Associates, designed such major Miami buildings as the Miami News building, Miami First National Bank and the $15 million Dadeland shopping center in South Miami.

Hugh M. C. Garden died last month at 88. Garden, a senior partner in Schmidt, Garden & Erikson, was once a draftsman for Louis Sullivan and Frank Lloyd Wright before opening his own office. Perhaps his best-known building is Chicago's huge Montgomery Ward warehouse built in 1907, one of the first large reinforced concrete skeleton structures built in the U.S. END

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A roundup of recent and significant proposals

A NEW UNIVERSITY TAKES SHAPE IN CHICAGO

A campus for 20,000 students by 1970 will be built by the University of Illinois at Congress Circle in Chicago. The over-all campus plan is shown above. Close-up photos at right and below indicate some of the first units, to be ready for the onslaught of 9,000 students in September 1964. These units are (below) the great court at the heart of the campus and (right) a 28-story skyscraper for staff and administrative offices. In the initial phase, during which 16 buildings are scheduled, at a cost of $50 million, Architects Skidmore, Owings & Merrill give top priority to a nucleus of classrooms and offices for the College of Liberal Arts and Sciences and the College of Commerce and Business Administration and to an outlying utility plant which will serve the whole campus. The university's focal point, the great court, is actually the roof of a lecture center including four large lecture rooms, expressed by four circles in the paving. SOM chose to concentrate the lower buildings in the center and high-rise structures on the outer rim, emphasizing the campus as an entity separate from the community and marking it an urban institution.

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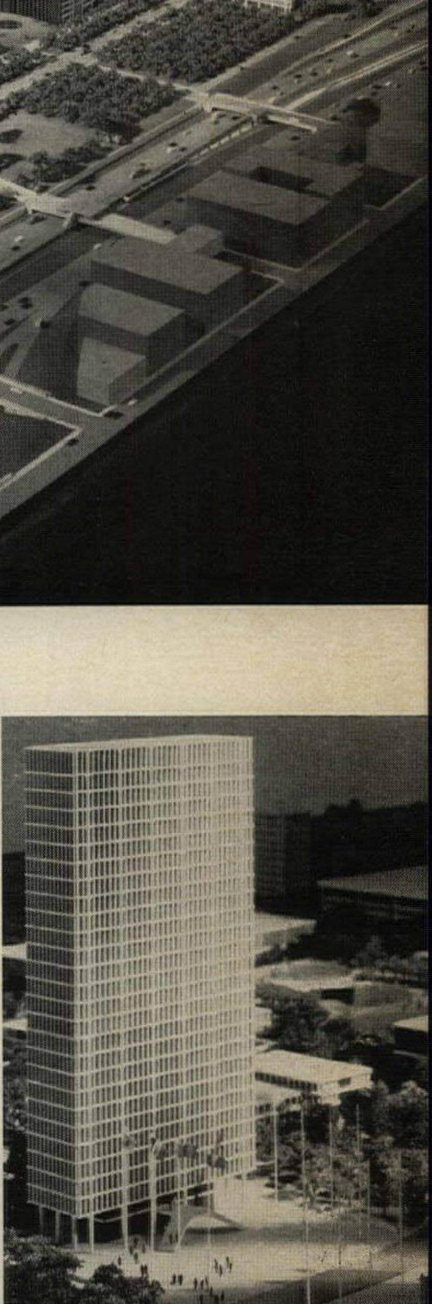
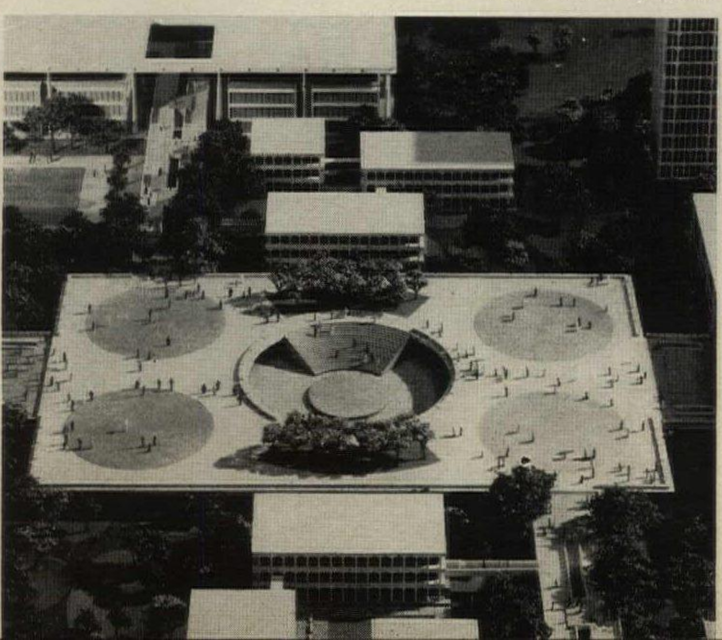


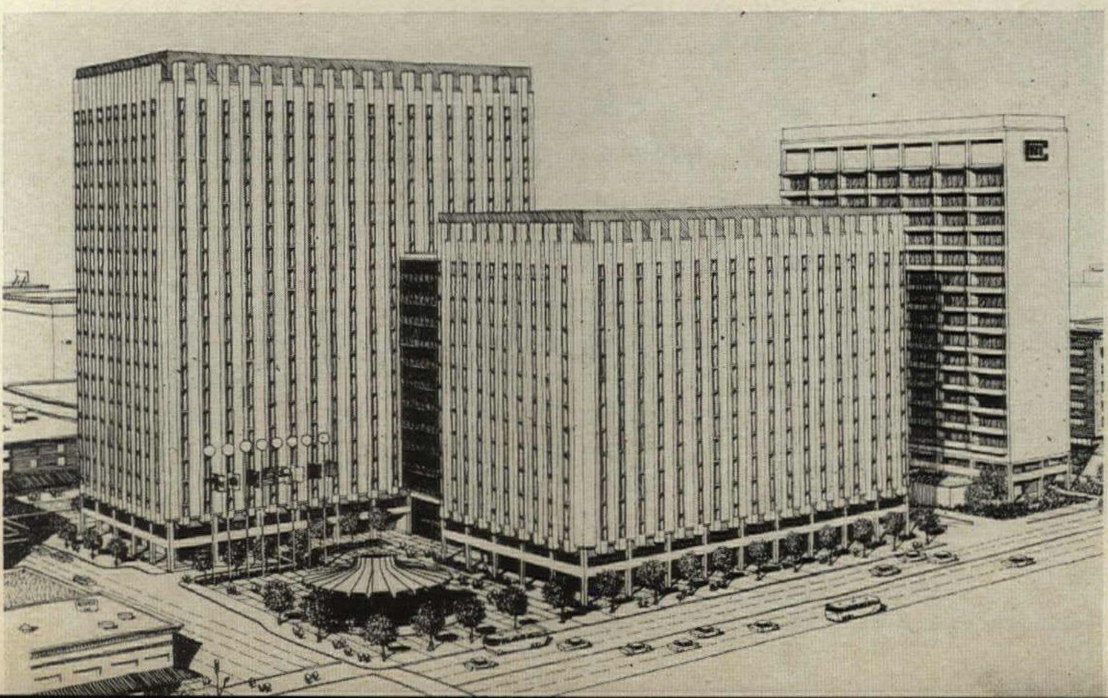


TOWERS AND TOWN HOUSES FOR SOCIETY HILL

Long plagued by delays in getting started, the Society Hill-Washington Square East redevelopment project in Philadelphia is at last under way, and the town houses in the foreground of the model will become realities late next year. To follow on the construction schedule are three 31-story apartment buildings, separated in plan to avoid overwhelming the town houses, and built at the outer edge of the site, as far away from Independence Hall as possible to preserve the eighteenth-century scale. I. M. Pei & Associates are Webb & Knapp's architects for both town houses and towers, which will total five when two more towers are added to the west. The first three, built over a subterranean garage, will contain 720 apartments, the brick town-house group, 37 units. Cost for initial development shown: $40 million.

THE UTMOST IN LUXURY FOR PHILADELPHIA

"The quintessence of elegance . . . the utmost in luxury, comfort, and convenience" are the phrases introducing Architect Edward Durell Stone's luxury apartment house on South Rittenhouse Square, Philadelphia, in which 65 cooperative apartments will be loosely packed into 30 stories. Not only is Stone designing the exterior, but Developer Norman Denny, president of the Sutton Terrace Corp., promises that individual apartments will be personally laid out by him to give tenants the last word in luxury and custom tailoring. Some will be duplexes in plan; others will be split levels. Regardless of plan, every apartment will have a terrace stretched across one end of the living room. "In the comfort zone," says Denny, "we are going all out! Each 'apartment home' will have its own separate air-conditioning plant." Other amenities for tenants and their guests include two clubs: the Penthouse Club on the roof, and a sidewalk café —not on the sidewalk, as one might expect, but on the fifth floor, where indoor or outdoor dining will be made refreshing and luxurious by landscaping and bubbling water fountains. "Sleep-in help is passing from our way of life," laments Denny. To make up for this deplorable state, the restaurant will serve convenient "meals on wheels" to apartment dwellers too tired to cope with cooking in their own kitchens. A basement garage will have separate in and out ramps at both sides of the building.



CALIFORNIA MARKET

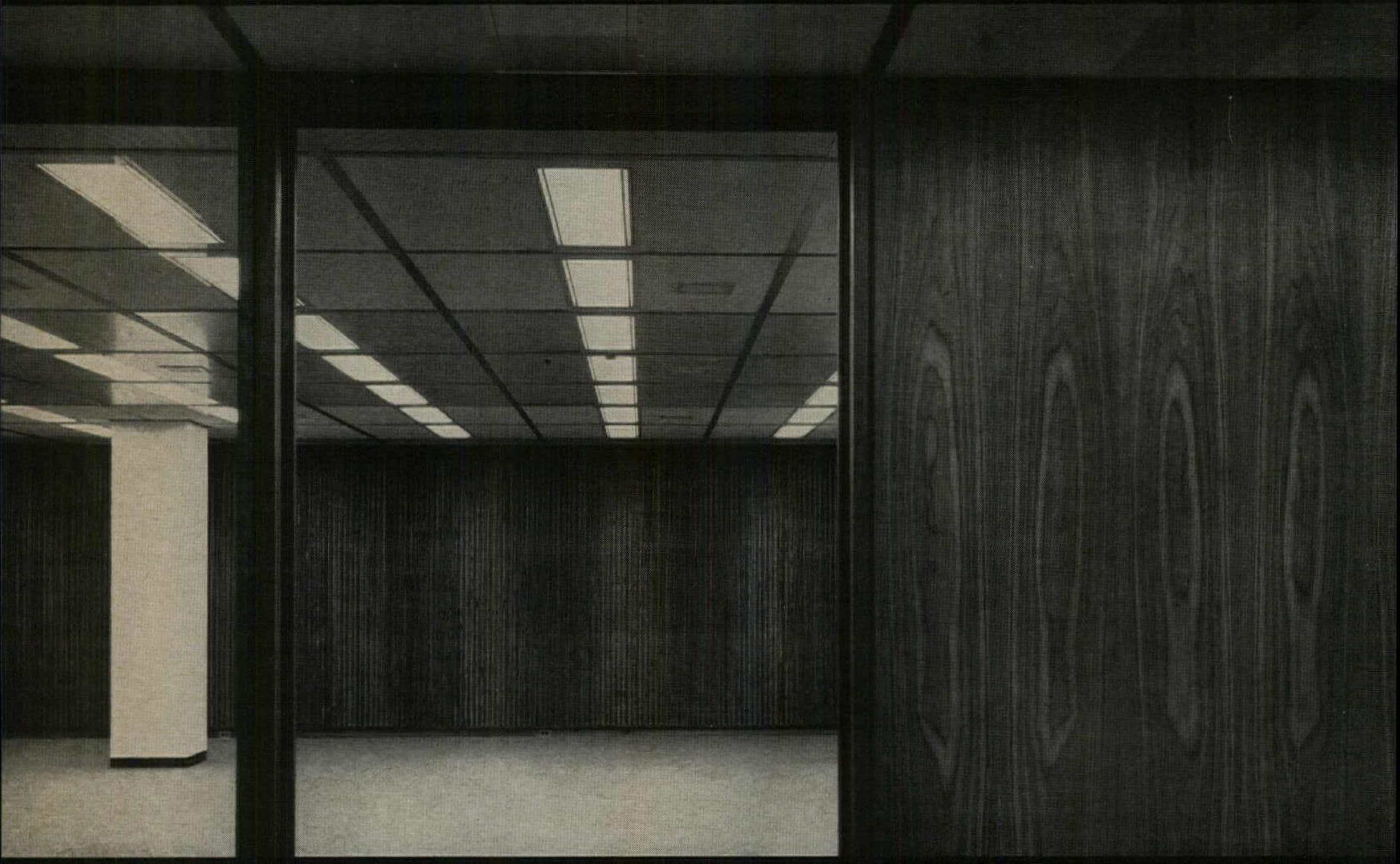
In line with Los Angeles' importance as a marketing center, particularly for the fashion trades, Manufacturers Harvey and Barney Morse propose this $50 million "merchandise city," officially called California Mart. Victor Gruen Associates' plan for the site, a four-acre block, mixes high- and low-rise buildings, plazas, pools, and courts, with a 1,600-car garage buried underground. Visible here: a 16-story hotel, two office buildings of 13 and 20 stories, a circular bank under a frilled roof, and part of the plaza.

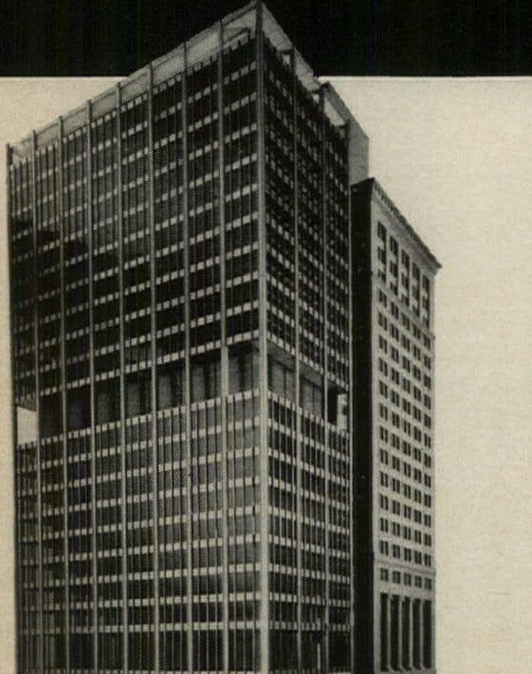
continued on page 43

Genuine

WALNUT

selected by Skidmore, Owings & Merrill for the **Award Winning*** Harris Trust and Savings Bank





Another Award Winning Building Utilizing WALNUT . . . the Aristocrat of Architectural Woods

Genuine Walnut — in plywood panels or in solids —in walls, floors, doors or millwork—offers an infinite range of grains and figures providing a uniquely creative medium for striking architectural installations. The 1961 edition of "Walnut Veneer Types", standard guide for specifying walnut, and Walnut A.I.A. File No. 19-F are available on request. The Association welcomes further inquiries whenever it may be of assistance.

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WASHINGTON HILTON

Three high-powered names—Hilton, Uris, and Tabler—are associated in this new hotel for Washington, D.C., to be owned jointly by Hilton Hotels and Uris Buildings Corp., holding separate contracts to operate and build it. Hotel Specialist William B. Tabler is the architect. When completed in 1963, it will be Washington's biggest hotel: 1,200 rooms, a ballroom seating 4,000, 15 private function rooms, and a range of restaurants and other public rooms. Tabler's design swings in two wide arcs from a central service core. The main entrance will be on Connecticut Ave.; the ballroom will have its own driveway and entrance.

BEHAVIOR AT HARVARD

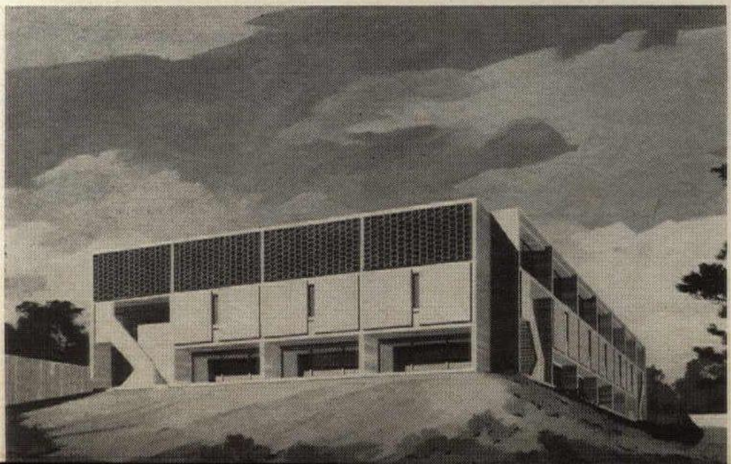
Man—his society and his culture—will be the theme guiding all research and teaching in Harvard's new behavioral sciences building (left). In 14 stories of offices, laboratories, classrooms, libraries, shops, animal quarters, and computer rooms, researchers will probe man's behavior as child, adolescent, and adult. Minoru Yamasaki & Associates' design will wrap all this activity in a tall concrete envelope of precast panels set between slender poured-in-place columns. Cost is estimated at $5.5 million.

BECKET AND BORAX

Reinforced concrete surrounds the U. S. Borax & Chemical Corp. headquarters in Los Angeles (right), designed by Welton Becket & Associates. The upper half of each precast unit will be filled with glass; the lower half, with porcelain enamel panels. Of the nine floors (not counting a basement and parking underneath), U. S. Borax will occupy five, lease three, and rent the ground floor to a bank and a restaurant. U. S. Borax, in turn, will lease the structure from the builder, Carter Co.

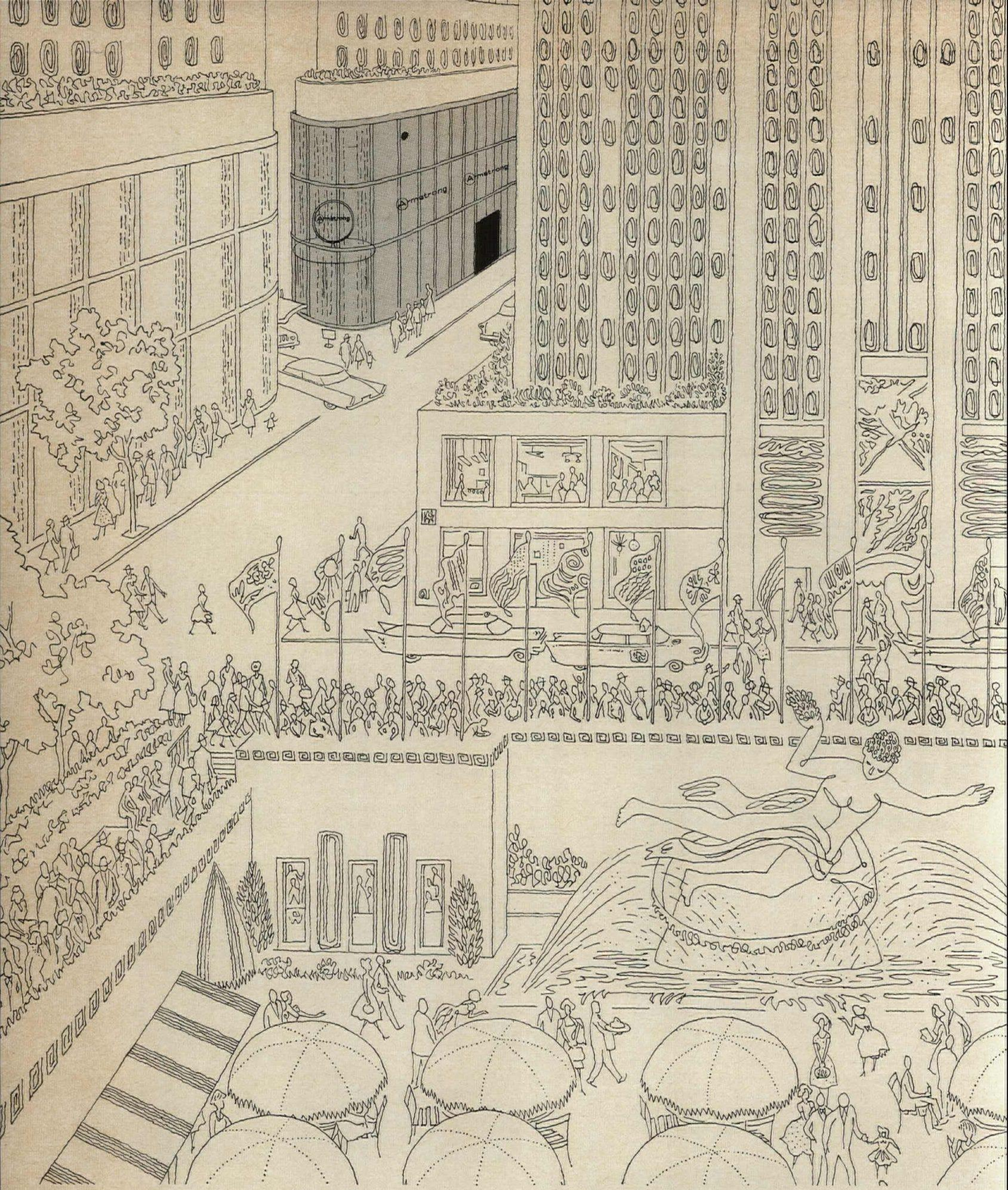
MONASTERY LIBRARY IN MINNESOTA

Another part of Marcel Breuer & Associates' plan for St. John's Abbey, Collegeville, Minn. (see page 150), is the library below, now in working drawings. Contributing to its look of solidity and strength are the rugged exterior materials: exposed concrete structure, large granite wall panels, and clay flue tile sun screens. Between the panels, which are thin slices of granite backed with concrete, there are slit casement windows. Unseen from the exterior but powerful visual elements inside are two enormous columns on the upper level: these break out in 12 segments about a third of the way up, reaching out to the points where normal multiple columns would support the roof. On this project Hamilton Smith is Breuer's associate in charge of design.

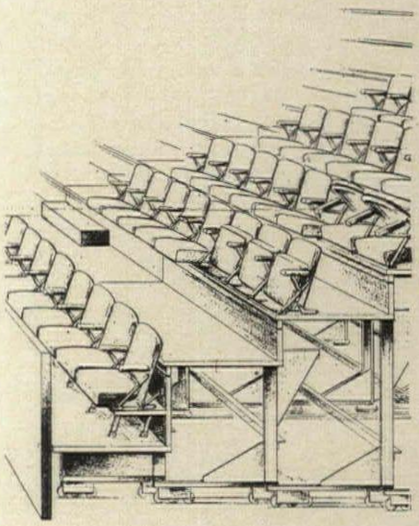


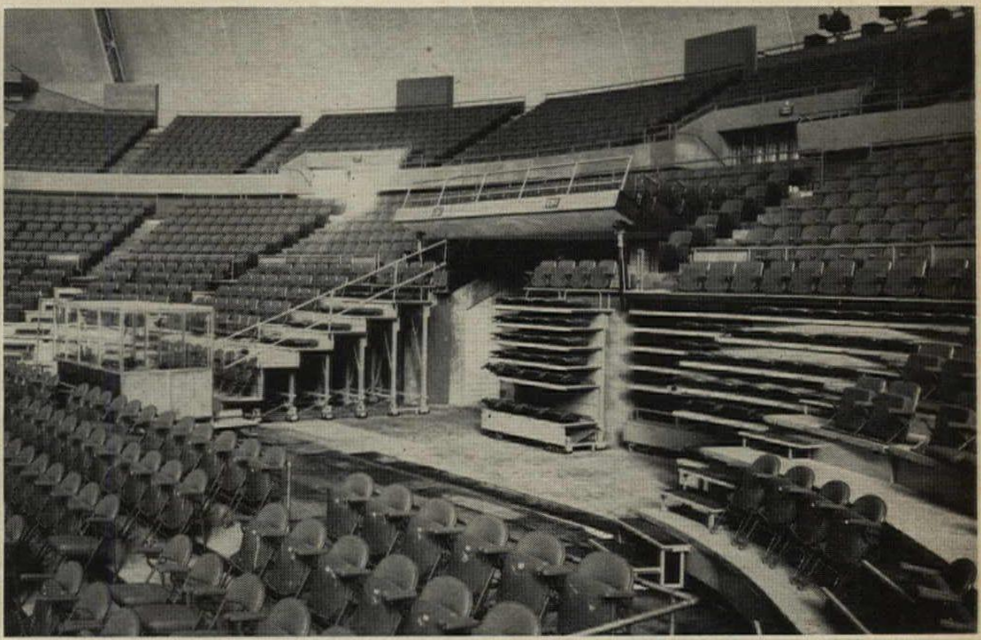
STUDENT UNION AND CHAPEL AT WISCONSIN COLLEGE

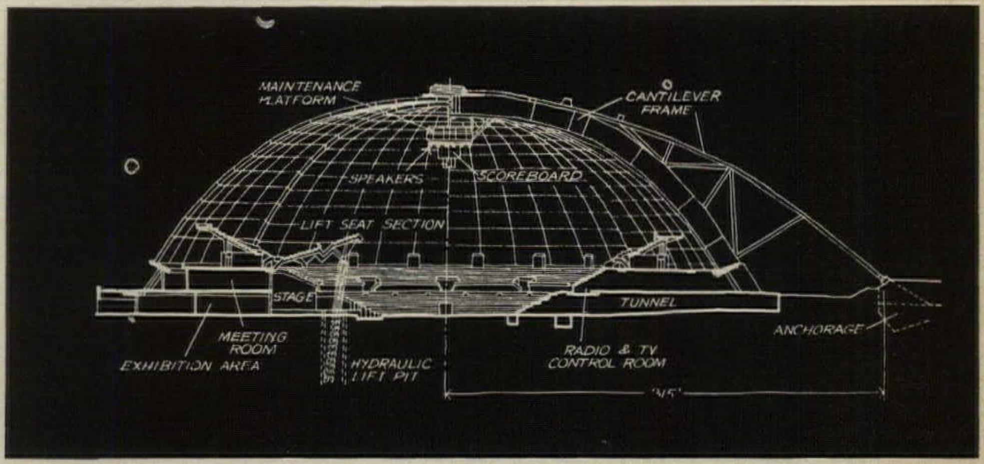
The dominant structure in this group of buildings for Lakeland College in Sheboygan, Wis. is the chapel, taller than any other building on campus or any contemplated in the master plan. The group is scheduled for construction in stages: the dining hall portion (left) will go up first, followed by the two segments under folded plate concrete roofs, one a student union, the other a fine arts building, and the chapel itself, covered with cedar shakes. Architects: Schutte-Phillips-Mochon of Milwaukee. END



Collapsible seats . . . plastic bolsters . . . translucent sandwich







COLLAPSIBLE SEATS

Under the retractable dome of Pittsburgh's Civic Auditorium (FORUM, March '61) lies another mechanical marvel: the seats, about half of which have been made movable through various devices, either nested in rows, hydraulically lifted in blocks, or hauled away by fork-lift trucks. This sort of flexibility means that the auditorium's seating capacity expands or contracts from spectator sports to theatrical productions to full-scale conventions, and back, with relative ease and speed. Maneuverable, yet comfortable, chairs for all these events were supplied by the American Seating Co. to its own designs.

The chair developed for the nesting operation—in which the first six rows around the arena slide inside each other and stack up like shelves—is the first auditorium chair that is both upholstered and completely collapsible, says American Seating. The drawing above shows how it sits on risers and how it jackknifes (both arms and back move), ready to be pushed out of sight. After the seats have been stacked and each row is flush with the ones above and below it, the whole section is shielded by a curtain.

In other parts of the auditorium, noncollapsible chairs are moved in whole sections. The biggest is a 2,800-seat block covering the stage. When a theatrical performance is scheduled, these seats are lifted hydraulically on their platforms, locked in an up position, and left suspended over the stage. The undersides of these sections, in fact, become the top of the stage (see drawing above), and only the stagehands see the seats on the other side. Similar but smaller hydraulic lifts holding 68 seats each are located over the exits on the north and south sides of the building (photo above); these units can be lifted out of the way to widen the passage for heavy equipment entering the arena. Still other sections, used to fill the arena floor for convention meetings, are removed on pallets by fork-lift trucks.

All the chairs, regardless of whether or how they move, look alike: a steel frame, wooden back and arms, and brilliant red Naugahyde upholstery. The total of 12,900 seats includes 9,200 fixed seats (counting those hydraulically lifted in sections), 1,300 telescoping seats on retractable platforms, and 2,400 seats moved by fork-lift truck.

Manufacturer: American Seating Co., Grand Rapids 2, Mich.

PLASTIC BOLSTERS

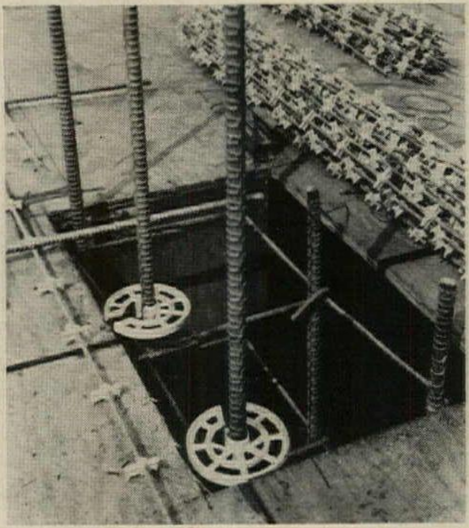
To prevent rust from bleeding through concrete slabs, Universal Builders Supply has come up with a whole family of plastic accessories with which to replace steel bolsters. Substituting plastic for steel in reinforced concrete avoids the electrolytic action sometimes caused by tying steel to steel in the slab, and plastic also keeps the slab's surface free of rust stains. Otherwise, plastic bumpers function just like their steel counterparts: they hold reinforcing rods in position and keep them the proper distance away from the form face. The plastic used here is high-density polyethylene of a gray cast which resembles the color of natural concrete. It is injection-molded in several sizes and forms for various purposes. Two shapes are shown, next page: plastic doughnuts which snap around the rods in columns or con-

continued on page 46

crete pipe, and continuous slab or beam bolsters spaced on wire supports. Two other bolsters, not shown, are individual units which hold rods or mesh in place. All four are lightweight and easy to handle and ship.

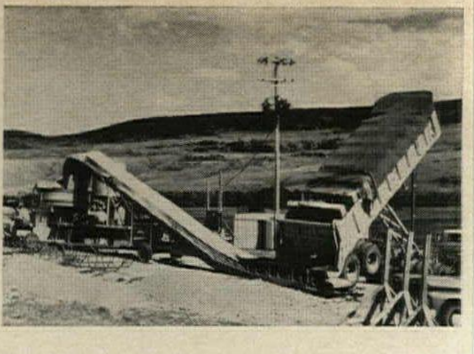
Sample prices in the New York area range from 5 to 11 cents each for doughnuts, depending on size, and $60 to $74 per thousand feet for the continuous slab bolsters (wire-strung).

Manufacturer: Universal Builders Supply Co., Inc., 41 E. 42nd St., New York 17.



COMPACT PLANT

Distance and terrain posed a couple of obstacles in getting concrete to the remote parts of Montana where ICBM Minuteman bases are being built: concrete mixers would have had to make their way from plants some 50 miles away, traveling over nearly impassable roads. For the Western Concrete Co., the concrete subcontractor for the bases, the T. L. Smith Co. of Milwaukee developed a compact, portable mixing plant. Now a series of eight plants churn out enough concrete to build 150 launching silos and 15 launch control centers, scattered over 20,000 square miles. Aptly named for this job—the one minute it takes to mix, and the one man needed to operate it—the *Minuteman* plant assembles standard equipment in a new combination. In addition to this very special use, the Minuteman makes sense for other jobs beyond an economical hauling distance for commercial concrete. Portability could be very important in other types of construction, too: highways, bridges, tunnels, or dam sites are likely prospects, since many of these are outside normal concrete de-



livery areas. With minor adaptations, the manufacturer claims, the same plant can perform virtually any concrete-pouring task.

The photograph above shows the Minuteman at work in Montana. Dry cement and aggregate, trucked to the site in compartmentalized semitrailers, are dumped onto a conveyor belt set flat on the ground below the truck and equipped with a built-in charging hopper. When the dry mixture hits the belt, it releases a measured amount of water from a storage tank, moves the mix along the belt and up into the mixer.

The Minuteman is a turbine mixer mounted on a flat-bed truck. After the mixing cycle, an operator discharges the wet concrete from a doughnut-shaped trough in any of four directions. Capacity is about 180 cubic yards an hour. The mixer costs under $25,000, not including the truck.

Manufacturer: T. L. Smith Co., 2835 N. 32nd St., Milwaukee.

URETHANE SEALER

After nine years of manufacture in Canada, a sealer and coating for glue-laminated beams will be produced in the U.S. as well, starting next month, by an American subsidiary of Canadian Elastileum Ltd. According to its makers, *Elastileum 100* prevents water staining and shrinking, common problems in glue-lam construction, and also resists abrasion, salt water, solvents, alcohols, acids, alkalies, oils, greases, and inks. It is a two-part polyurethane formula which seals and finishes in one clear coat.

Brush or spray application is recommended: one coat in the shop for protection en route to the site, and one more on site, with a light sanding between the two to insure a good bond. If the beam is to be exposed to weather, two field coats are recommended, with a sanding between them. Elastileum 100 may be applied directly to natural wood, or to already stained woods. Special stains and colors to be incorporated into the mixture are sold by the manufacturer: available are 16 different wood stains and eight colors. The two parts are mixed in equal quantities. One gallon of the mix covers about 500 square feet on the first coat and up to 750 square feet in successive coats. U.S. costs have not yet been set.

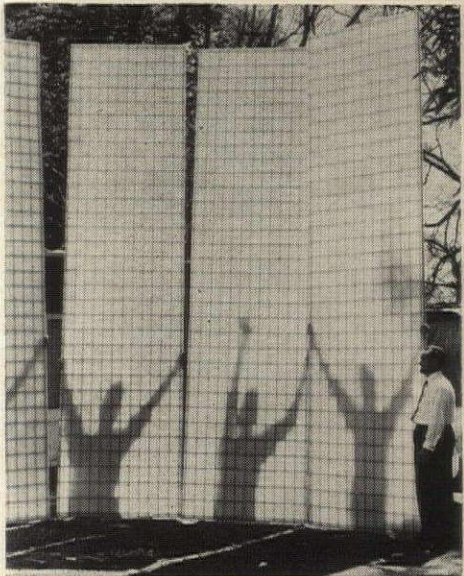
Manufacturer: Canadian Elastileum, Ltd., 846 River Rd., Vancouver, B.C.

TRANSLUCENT SANDWICH

The shadowy figures discernible behind these wall panels illustrate the translucency of Architectural Plastics' new high-strength sandwich panel, *Arborgrid*. Arborgrid's facings are sheets of glass fiber, and the core is a grid of plastic-fiber strips set on edge. The complete absence of metal in the sandwich, combined with the large grid (4 by 6 inches), accounts for the panel's overall insulation value of .35(U).

Rectangular and custom shapes in sizes up to 4 by 20 feet and thicknesses from ½ to 3 inches cost around $3 per square foot in standard sizes and in quantities exceeding 1,000 square feet.

Manufacturer: Architectural Plastics Corp., 1355 River Rd., Eugene, Ore.



ROOF FINISH

The shaggy panels shown here on the ground, when smoothed down, will form the steep slopes of Victor Christ-Janer's and Robert Damora's angular United Church in West Norwalk, Conn. This is but an intermediate stage in the coating process for these plywood sandwich panels, the first application of a multi-coat preparation called *Ply-O-Glas*. Successive layers of neoprene, chopped glass fiber roving, and Hypalon build up to the desired thickness, 75 mils in this case. The next step for these panels, shown in the second photo, is rolling neoprene over the glass fibers to flatten them down before applying more neoprene and two finishing coats, both white in this instance.

In addition to plywood, Ply-O-Glas gives a waterproof finish to such other materials as metals, concrete, and insulating materials. Costs average between 50 cents and $1 per square foot, depending on the complexity of the roof design, the cost of labor, and the number of coats needed.

Manufacturer: Ply-O-Glas Co. of America, 50 Cutter Mill Rd., Great Neck, N. Y.

OAK TILES

Sliver-thin floor tiles of real oak went on the market last month in several sections of the country and will be available nationally before the end of this year. Georgia-Pacific calls them *Flexible Oak* because of a special preflexing operation they go through at the factory. Preflexing insures that they will stay pliant permanently in order to cover up minor imperfections in slab or plywood subfloors; without it, they would be likely to crack. The tiles are all oak, except for a water-resistant adhesive which bonds two plies together under heat and pressure, and a baked-on top finish to withstand wear. Finished tiles are ⅛-inch thick.

Part of the package is a new adhesive developed to dry quickly but still allow a little leeway in drying time in case some tiles are unevenly laid. This one-coat adhesive may be poured directly on the floor from a self-sealing can; the patented pouring handle doubles as a can opener. Flexible oak tiles are sold in 9 by 9 squares for about 22 cents apiece.

Manufacturer: Georgia-Pacific Corp., Equitable Building, Portland 4, Ore. END

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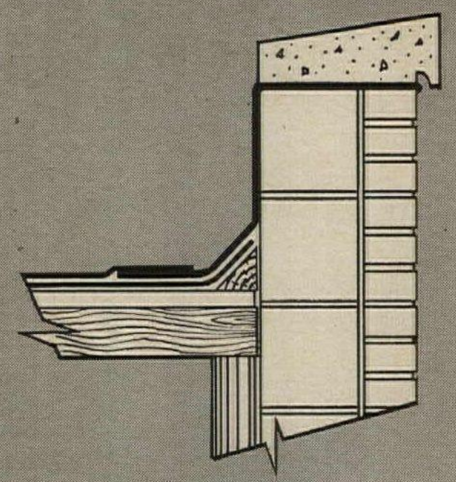
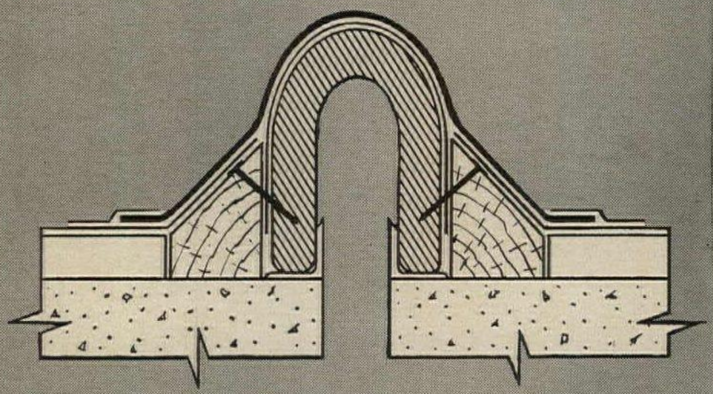
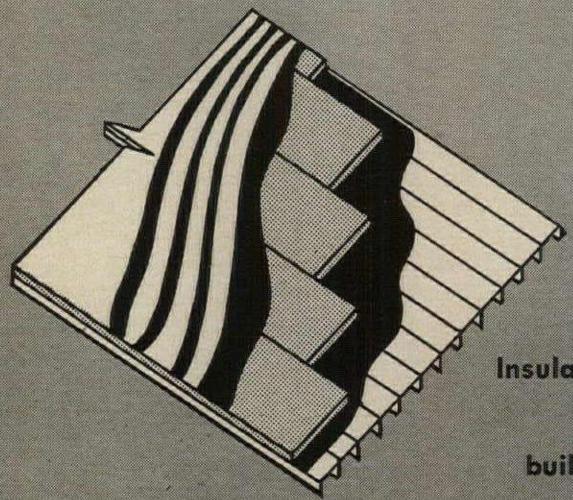


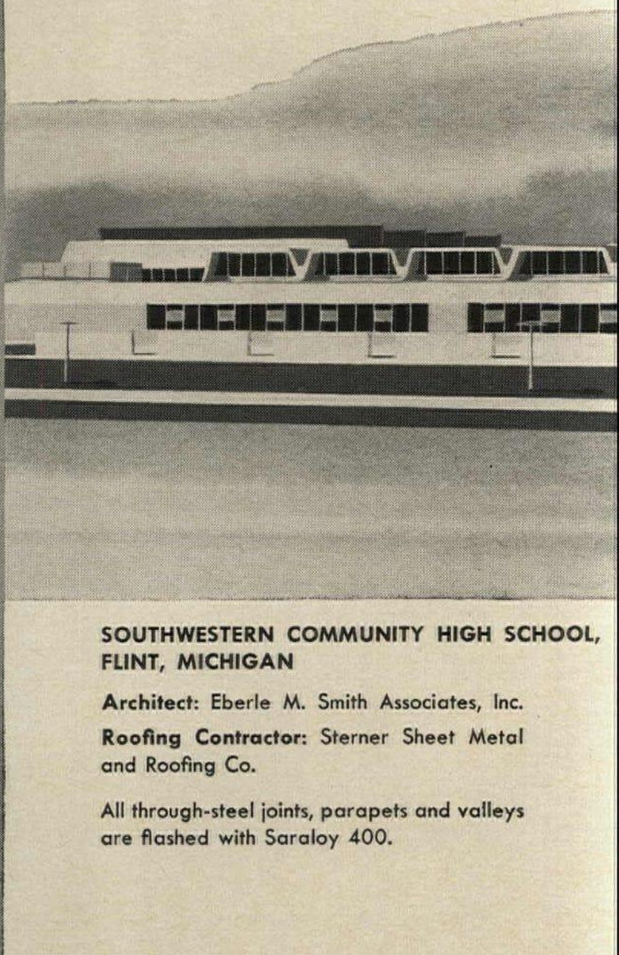
Permanent parapet flashing.



Insulated expansion joint.



Insulation for built-up roofs.



SOUTHWESTERN COMMUNITY HIGH SCHOOL, FLINT, MICHIGAN

Architect: Eberle M. Smith Associates, Inc.

Roofing Contractor: Sterner Sheet Metal and Roofing Co.

All through-steel joints, parapets and valleys are flashed with Saraloy 400.

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Dow roofing materials and other building products not only ease designers' problems, but their cost of installation is low . . . even for unconventional designs. For information and data on Dow Building Products, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 1503LH11.

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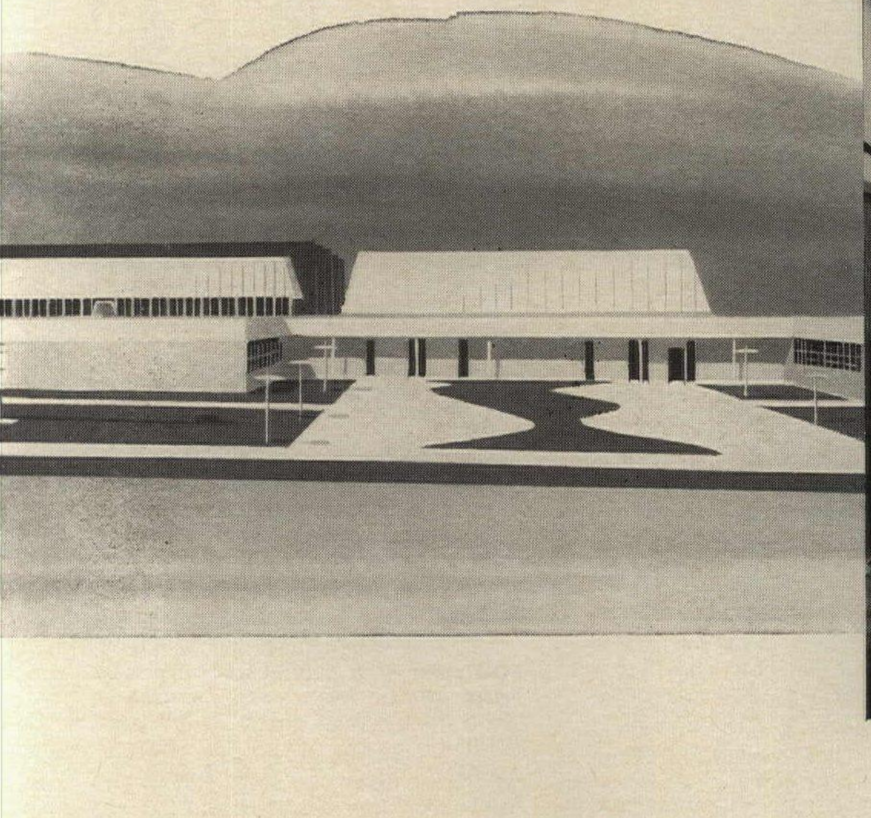
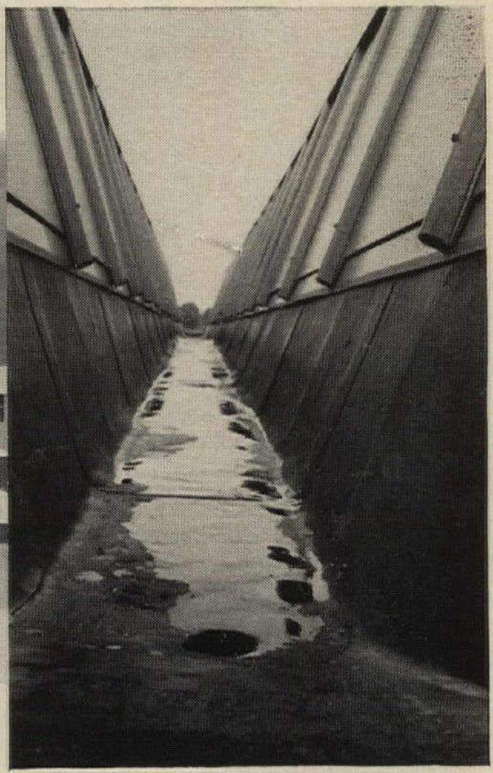
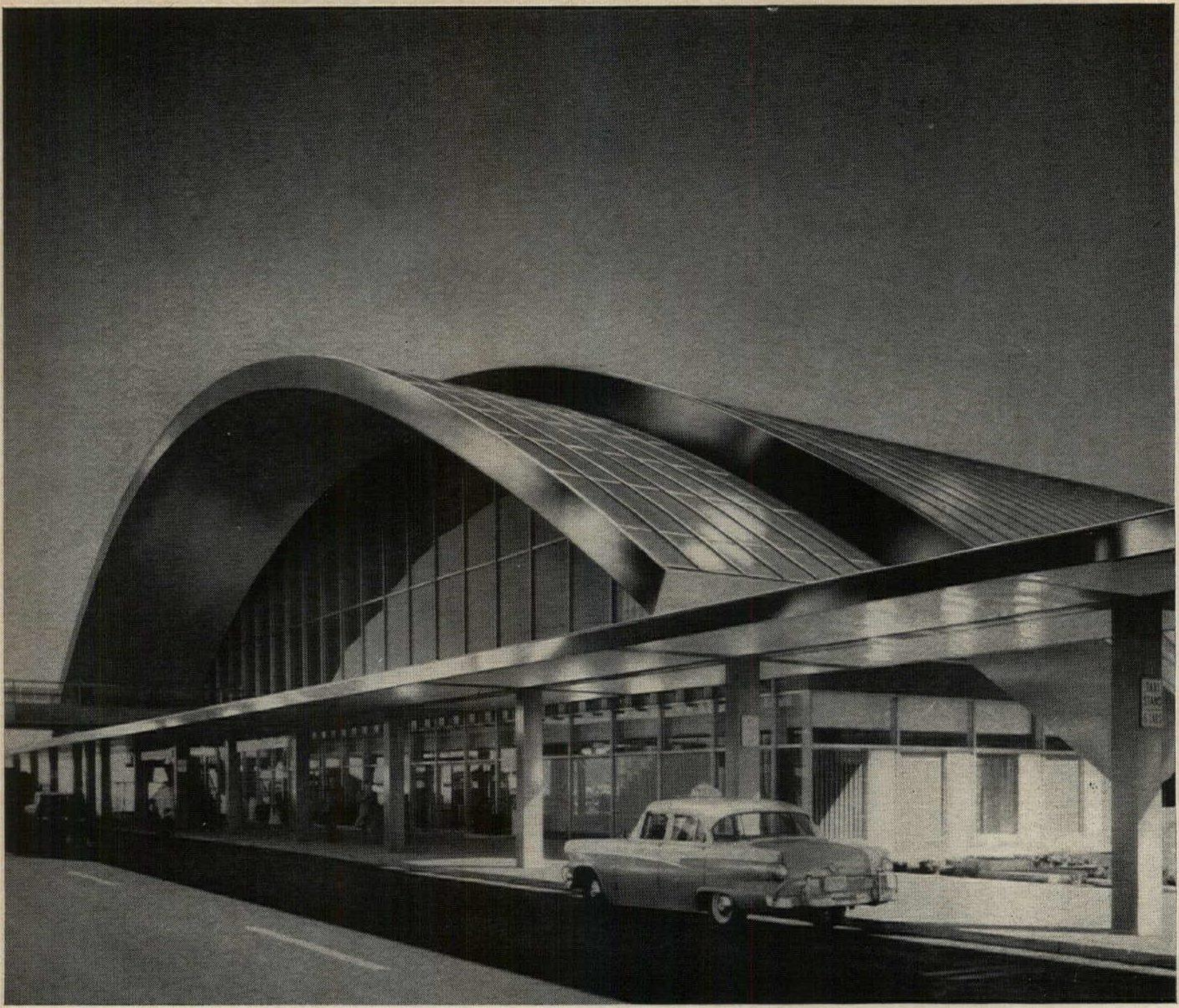




Saraloy 400 seals valleys permanently, at low installation cost.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan



International Arrival Building of New York International Airport. Arch is sheathed with 24-gauge, No. 2D special finish, Type 302 Nickel Stainless Steel. Architects: Skidmore, Owings and Merrill; General Contractor: Cauldwell Wingate Company; Roofing Contractor: Overly Manufacturing Company; Owner: Port of New York Authority.

New Front Door To America

Nickel Stainless Steel arch at New York International Airport makes a first impression last.

In they come to Idlewild...tourists, businessmen, royalty and refugees.

One of the first sights to catch their eye is this gleaming parabola of Nickel Stainless Steel.

To the visitor, this majestic structure is an outstanding foretaste of U. S. architecture. To the businessman it suggests the exciting things being done today with Nickel Stainless Steel in modern construction.

What's more, with every re-entry through the International Arrival Building, their favorable first impressions will be reinforced...for years to come.

Perhaps this is the most important fact to remember about architectural forms of Nickel Stainless Steel. Their beauty, their utility are lasting...almost everlasting.

Take the 26,000 square feet of Nickel Stainless Steel sheet that roofs this arch. Ten, twenty, fifty...who knows how many...years from now it will still look beautiful, still defy all that the elements and industrial atmospheres can do to corrode it.

And hardly a moment will pass during all those years that the properties of this Nickel Stainless Steel roofing will not contribute to the beauty and protection of the building. It has the strength to resist wet snow loads and high wind stresses. It has a coefficient of expansion that keeps it well adjusted to contiguous materials, brick, stone, cement. It stands up against corrosion by leaching mortars. It's virtually self-cleaning in rain. Never needs painting, lacquer, varnish, wax, cleaning nor maintaining, and never shows white corrosion products.

All this with a material so strong, and with such a favorable modulus of elasticity that it may be used in light gauges with safety at low cost!

What are the architectural forms of Nickel Stainless Steels? How can you make the most of them? Get the answers in our new booklet "Architectural Uses of the Stainless Steels."

THE INTERNATIONAL NICKEL COMPANY, INC.

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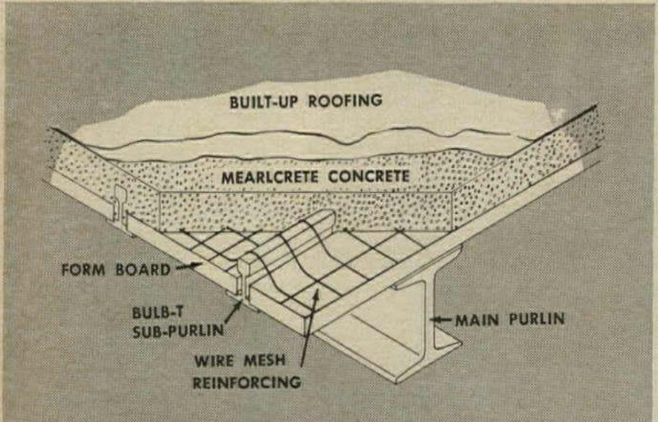
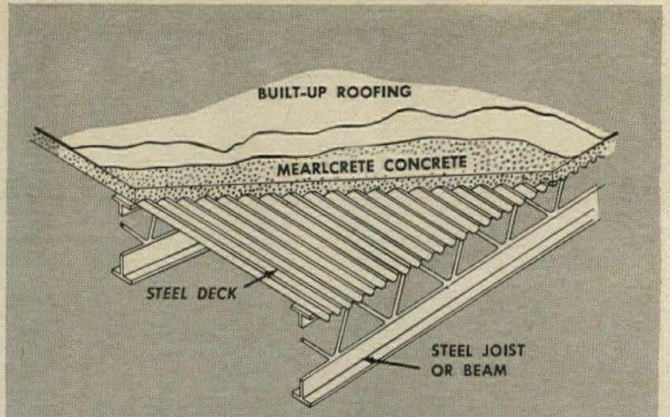
INCO NICKEL

NICKEL MAKES STAINLESS STEEL PERFORM BETTER LONGER



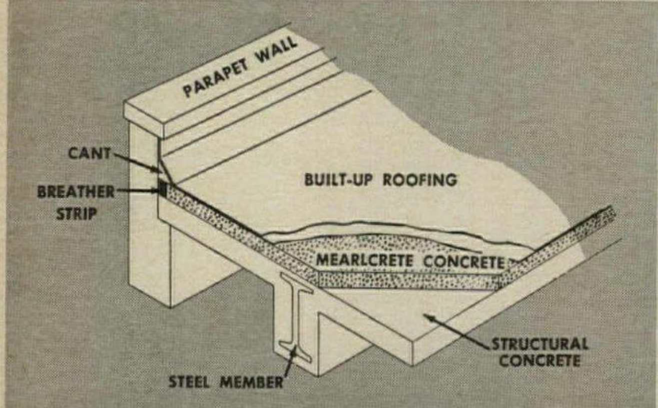
MEARLCRETE INSULATING ROOF DECKS ON RAIL AND FORM BOARDS. Widely used in school construction. A wide choice of form boards offer a variety of acoustical and decorative treatments for a finished ceiling. A separate suspended ceiling may also be used with this system.



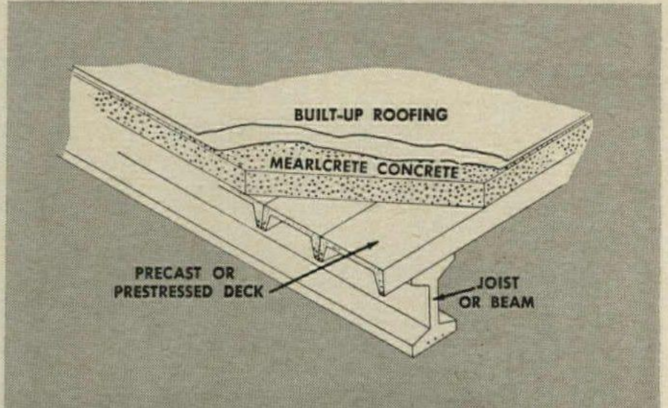
MEARLCRETE ROOF INSULATION ON CORRUGATED STEEL CENTERING. An economical system for lightweight steel frame school construction. Separate acoustical treatments, such as hung ceilings or sprayed-on acoustical ceilings, may be used.

MEARLCRETE INSULATING ROOF DECKS

Time-Tested! Ideal for School Construction!



MEARLCRETE ROOF INSULATION ON POURED CONCRETE. The most economical method for insulating poured concrete school decks. The low water content makes it possible to proceed with roofing quickly. Mearlcrete concrete may also be sloped to provide proper drainage on flat decks.



MEARLCRETE ROOF INSULATION ON PRECAST AND PRESTRESSED DECKS. The ideal method for insulating precast and prestressed school decks economically. Mearlcrete Concrete is also recommended for use as a fill to level camber on prestressed concrete decks.

Illustrated are a few of the roof deck types in which the use of Mearlcrete Concrete provides particular advantages for school construction. In all applications, the required insulating values are achieved by proper choice of density and thickness of the Mearlcrete Concrete. In addition, Mearlcrete Concrete makes a firm base for built-up roofing.

In nationwide use for schools, warehouses, shopping centers, industrial buildings and other types of construction, Mearlcrete has proven itself on-the-job in installations totaling many millions of square feet. For complete information, write for your copy of Technical Data Bulletin R-411A.

MEARLCRETE ROOF DECKS OFFER THESE ADVANTAGES

LIGHTWEIGHT—Mearlcrete Foam Concrete permits savings in structural steel.

FAST INSTALLATION—Up to 40,000 sq. ft. a day pumped continuously—up to 250 feet vertical lift . . . 1,000 feet horizontally.

LOW COST—Competitive with all other deck systems.

HIGH INSULATING VALUE—Reduces both initial cost and operating cost of heating and cooling equipment.

FIRE RESISTANT—Rated incombustible, made from Portland cement, insulates against heat flow and reduces flame spread.

FAST DRYING—The low mixing water requirement is much less than for other poured decks . . . permits shorter completion schedules.

CONTROLLED QUALITY—Mearlcrete is installed **only by trained franchised contractors** in accord with established standards.

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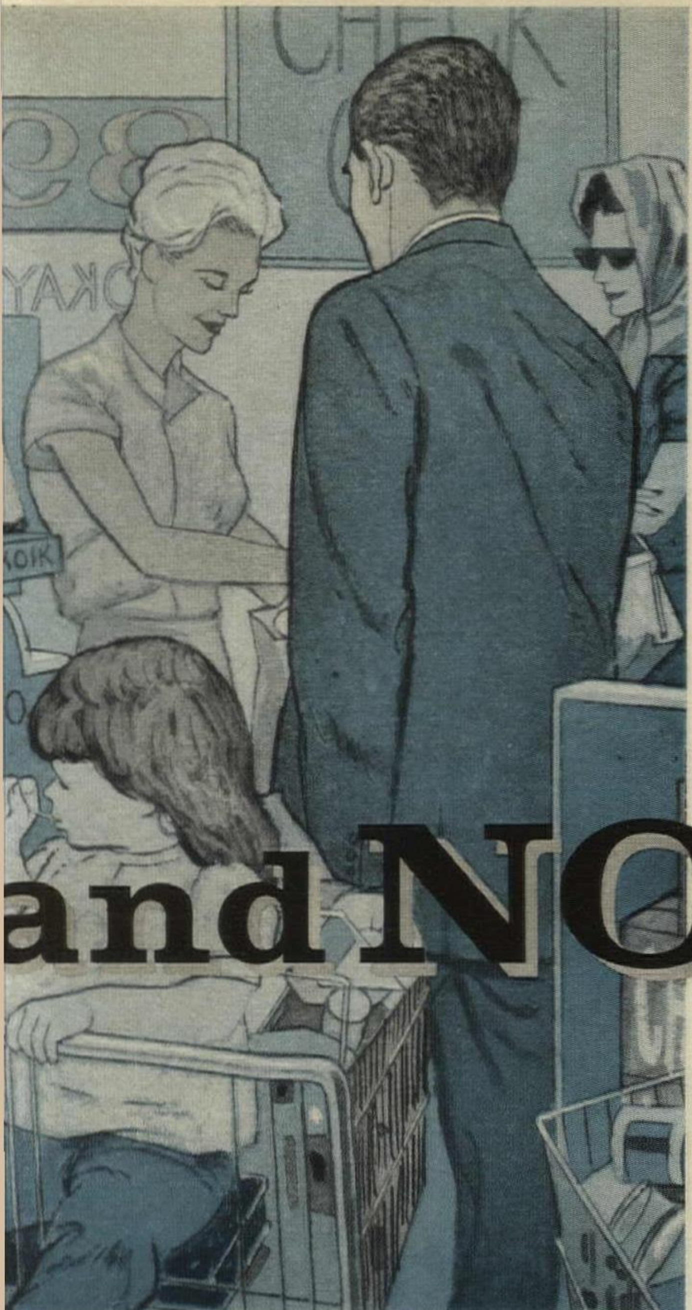
SPECIFICATIONS FOR ATMOSPHERE MUSIC BY MUZAK®

1. **The Music** shall be soft and relaxing. It shall be arranged and recorded specifically for the purpose, avoiding all attention-getting musical devices, as well as extreme highs or lows.
2. **The Musical Program** shall be such that it anticipates and adjusts to the changing mood patterns of the audience. It shall be planned by qualified musicologists to offset "static environment" by creating the appropriate atmosphere hour-by-hour.
3. **The Music Source** shall include selections sufficient in number to minimize repetition. With exception of highly popular current favorites, no selection shall be repeated in an eight-hour program sequence within twelve days.
4. **Currency of Music** shall be maintained through regular additions of recordings of latest popular tunes and modern renditions of standard favorites. All additions shall meet requirement number one, above.
5. **Objectivity in Programming** shall be maintained by avoiding individual preferences and requests. All selections shall be incorporated into an objective pattern which meets specification number two, above.
6. **Continous Music** shall be avoided to prevent development of its own monotony. A silent recess of not more than 1½ minutes shall be provided at the end of each 13½ minutes of music.
7. **The Sound System** shall be capable of faithful reproduction of 40 to 10,000 c.p.s. It shall



Wherever there are people there will be noise. In restaurants, motels and hotels, stores, terminals, lobbies and reception areas, school cafeterias, lounges and study areas.

Today an architect can tame this noise—modify it to work *with* his buildings. Specifying Music by Muzak is one important way.

Don't confuse Muzak with its imitators. Muzak is scientifically arranged and

and NOISE

recorded to offset distracting noise, to ease tension, anxiety and fatigue, to create a pleasing atmosphere—important sales points for your prospective clients.

For your convenience, Specifications for Atmosphere Music by Muzak are listed here. A.I.A. File No. 31-I-7. For further information contact your local Muzak franchised distributor, or Muzak headquarters.

include provision for paging or signalling and zone control of volume.

8. **Equipment Maintenance** shall be the responsibility of the music supplier.
9. **The Music Player** shall not be located on the subscriber's premises. The subscriber shall not be responsible for operation or maintenance of any music-playing source.
10. **A Signed Warranty** shall be provided by the music supplier. It shall specify that the service is provided subject to the above mentioned requirements. The music supplier shall provide proof that his service and equipment have been tested and proven under conditions similar to those under consideration.
11. **Performance Licenses** shall be obtained by the music supplier. The subscriber assumes no liability in connection with performance or mechanical license obligations.

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Muzak Corporation
229 Park Avenue South
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an International Subsidiary of Wrather Corporation

never before...TYPE 1* FLAME SPREAD SAFETY WITH WOODFIBER ECONOMY...

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Acoustical Products now available with

PCP

PYRO-CHEM PROTECTION

*To be listed as Class 1 in the Acoustical Materials Association bulletin XX11-1962 indicating 0-25 flame spread.

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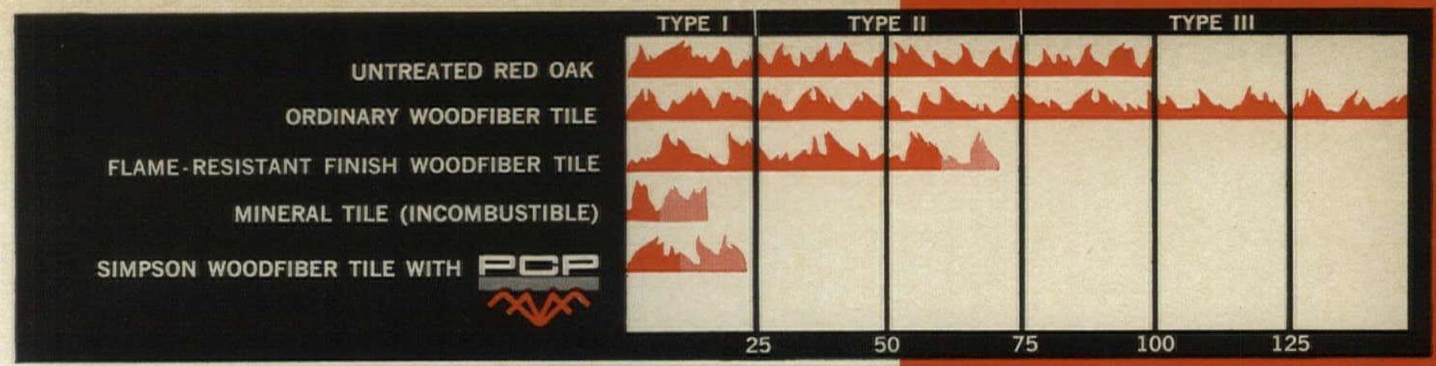

PCP acoustical tile certified as 0-25 Flame Spread, ASTM E84-60T

	Pyro-Chem Protected woodfiber tile	Flame-resistant finish woodfiber tile*	Mineral tile (incombustible)
Flame Spread	3 - 23	60 - 70	5 - 15
Fuel Contributed	15 - 27	42 - 44	25 - 29

*Simpson FRF rating—other cellulose tiles rate up to 100 and over

Untreated red oak—rated at 100 Asbestos rated at—0
Type I 0 - 25 Type II 26 - 75 Type III 76 - 200
Note: PCP Tile was tested by a leading independent research institute. Name of laboratory and complete test results upon request.

The label shown below appears on every carton of PCP acoustical material. It is your assurance that PCP is produced under the label and inspection service of Underwriters' Laboratories, Inc.

Simpson PYRO-CHEM PROTECTED Simpson

PCP ACOUSTICAL PRODUCTS PCP

SIMPSON TIMBER CO. • SEATTLE, WASHINGTON

Underwriters' Laboratories, Inc. ®

INSPECTED

ACOUSTICAL MATERIAL

NOT OVER 100 SQ. FT. ISSUE NO. G-918

FIRE HAZARD CLASSIFICATION

(BASED ON 100 FOR UNTREATED RED OAK)

ATTACHED TO OR SUSPENDED FROM NONCOMBUSTIBLE SURFACES WITH NONCOMBUSTIBLE ATTACHMENTS.

SPECIMEN

PCP TREATMENT*	COATED FACE	BACK FACE
FLAME SPREAD	20	25
FUEL CONTRIBUTED	25 - 35	25
SMOKE DEVELOPED	15 - 25	10

*CHEMICALS USED IN TREATING PCP PRODUCTS ARE WATER SOLUBLE.

Now, on your very next job, you can specify Simpson woodfiber tile containing amazing PCP—and get Type 1 flame spread safety with up to ⅓ savings on material cost. PCP (Pyro-Chem Protection)—another revolutionary new product from the Simpson research laboratories—is a unique process that gives Simpson woodfiber tile a flame spread rating equal to that of far more costly, highest quality *mineral* tile.

PCP performance was confirmed in the Flame Tunnel Test, results of which are shown above. Note the almost indistinguishable difference between Forestone with PCP (bottom line) and mineral tile (second from bottom).

The Simpson Certified Acoustical Contractors listed here will be pleased to show you samples and demonstrate the efficiency of the complete line of Simpson acoustical products with amazing PCP. Before your next job call the one nearest you. All are listed in the Yellow Pages under "Acoustical."

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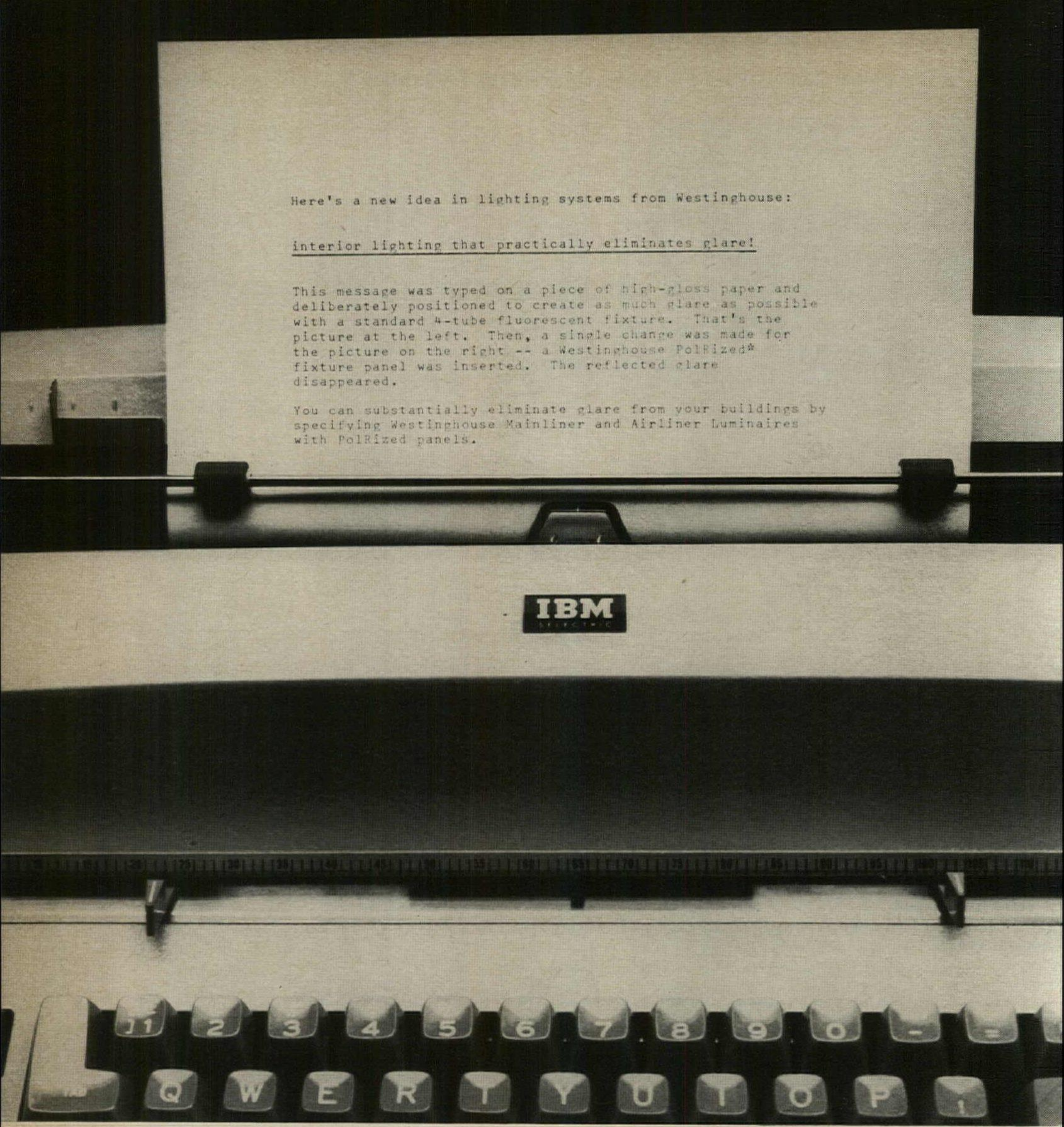


INTERIOR LIGHTING THAT PRACTICALLY ELIMINATES GLARE!

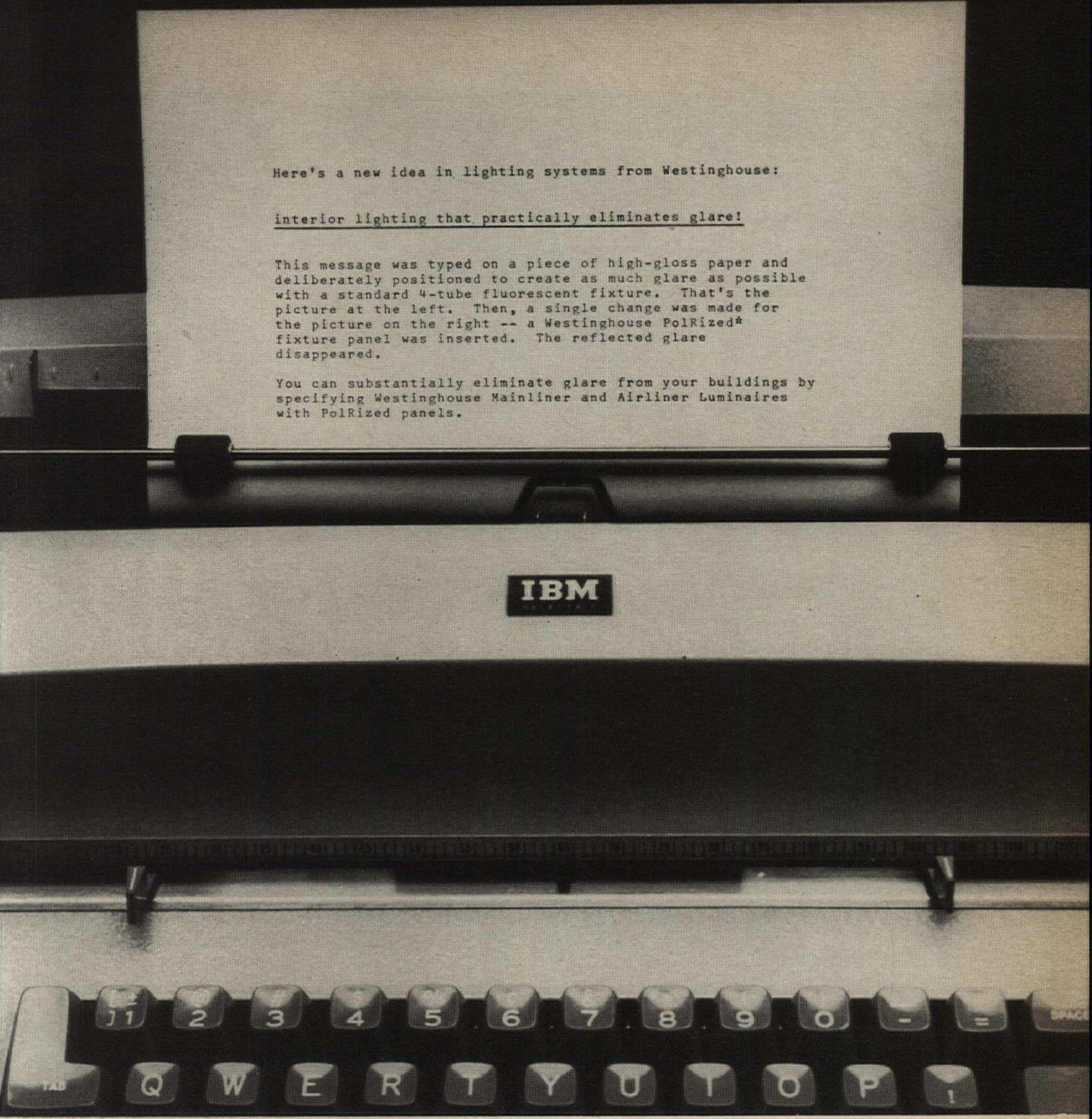
The demonstration above proves that Westinghouse PolRized Mainliner and Airliner Luminaires can substantially eliminate glare and improve your lighting environment. Here's how it will help your clients:

They'll see better in offices -- where glare now bounces off papers, desk tops, typewriter keys or polished floors.

They'll work better in factories or laboratories -- where glare now results from extra-high illumination required for precision work.

They'll save vision in schools -- where glare from desks, paper, etc. disturbs the eyes of students and staff.

Wherever Westinghouse PolRized fixtures are used, they improve the visual environment an average of 100% Dr. H. Richard Blackwell indicated the effectiveness of PolRized panels in studies conducted by the Institute for Research in Vision at Ohio State


Here's a new idea in lighting systems from Westinghouse:
interior lighting that practically eliminates glare!
This message was typed on a piece of high-gloss paper and deliberately positioned to create as much glare as possible with a standard 4-tube fluorescent fixture. That's the picture at the left. Then, a single change was made for the picture on the right -- a Westinghouse PolRized* fixture panel was inserted. The reflected glare disappeared.
You can substantially eliminate glare from your buildings by specifying Westinghouse Mainliner and Airliner Luminaires with PolRized panels.
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Gain the extra benefits which this policy assures you, by calling Bayley in the early stages of your next project.

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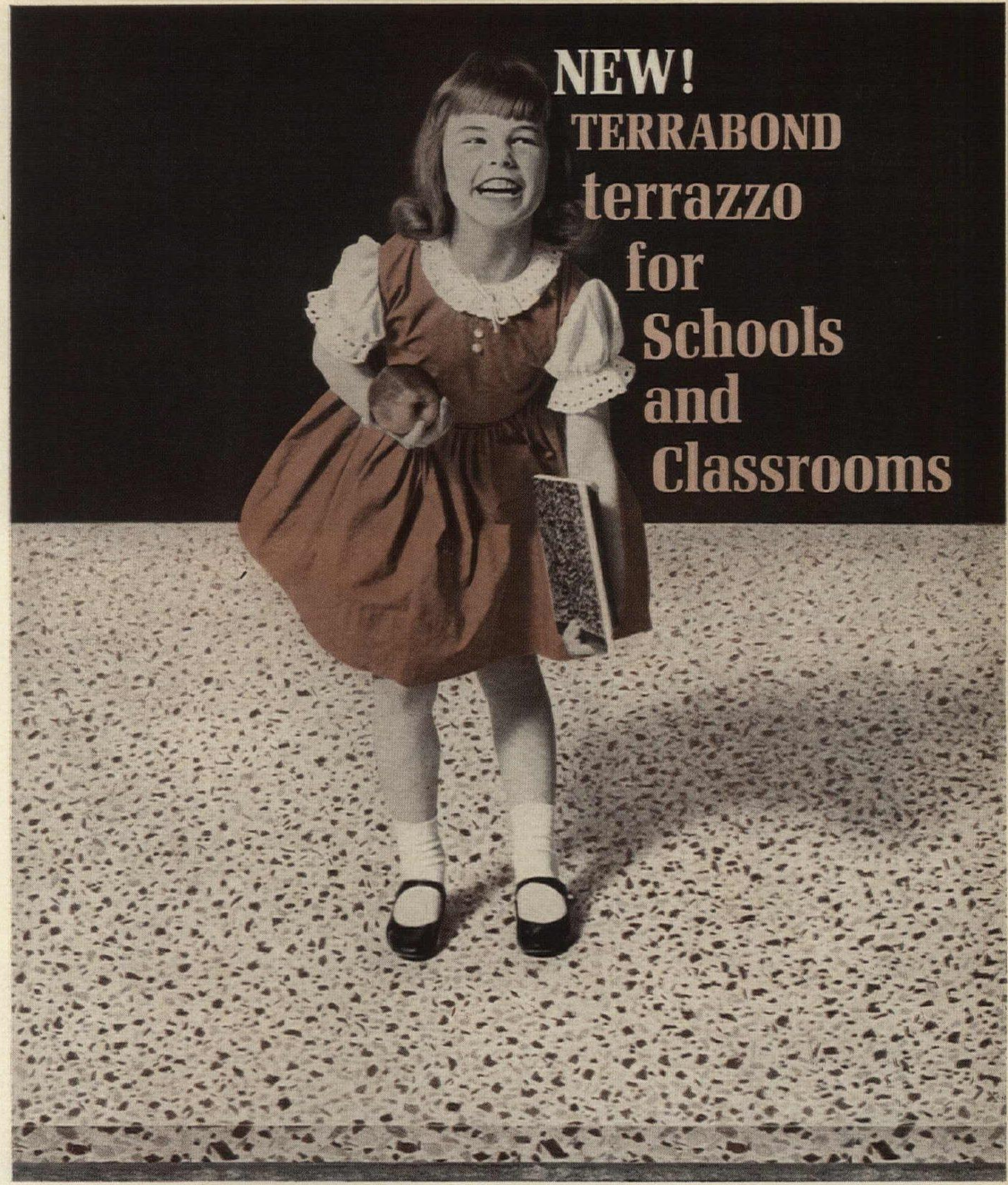

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Costs no more to install than resilient flooring.

A truly sensible innovation for schools and classroom design, genuine terrazzo by the TERRABOND process for floors brings with it the infinite beauty, long life and low maintenance cost of portland cement terrazzo—coupled with low installation cost. TERRABOND terrazzo can be installed at ⅜th inches. Grade levels are not raised appreciably. Deadweight, floor thickness, installation time, and material costs come down. TERRABOND terrazzo can be installed anytime, anywhere—even in place of existing worn-out resilient floors. In classroms, it stands up beautifully to abusive traffic, cleans up with the whisk of a damp mop. Maintenance of TERRABOND flooring costs 15c to 20c per square foot per year compared to 65c to 95c for resilient flooring. For complete information write Thiokol or use coupon.

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Only new Lumi-Flo air handling Troffers offer all these advantages

Now...one fixture handles school lighting, heating, and air conditioning

CLEAN CEILINGS WITH COMPLETE FLEXIBILITY

With Lumi-Flo you can be assured of ceilings which are esthetically clean without any visible ceiling obstructions. All you see is an attractive, well illuminated ceiling. With the new Benjamin Triple-Shell Lumi-Flo, you can light, cool, heat and ventilate interior areas through the same concealed troffer. When it comes to flexibility, Lumi-Flo can't be topped—you can design your building so that every 25 or 250 sq. ft. of floor area has its own air conditioning and ventilating. Better yet, when your requirements vary, you can have both in the same installation.

OFFERS MAXIMUM LIGHT EFFICIENCY

With Triple-Shell Lumi-Flo, the air supply is separated from the lamp chamber by an insulating air gap. Used on cooling or heating cycle, Triple-Shell construction permits heat dissipation to the plenum, yet prevents lamp chamber from over-cooling (which causes "pink-light") or over-heating (which reduces lamp efficiency).

Lumi-Flo offers the highest average operating efficiency possible through the normal cooling and heating ranges.

Lamp flicker and color variation caused by over-cooling are things of the past with Triple-Shell Lumi-Flo.

AN AIR CAPACITY TO MEET EVERY JOB CONDITION

With Triple-Shell Lumi-Flo, you can meet the exact requirements of any job, large or small. Two types of dampers engineered by Tuttle & Bailey give air-handling capacities from zero to over 200 CFM and combine with two basic air patterns to offer the best possible combination of capacity and distribution for your specific application.

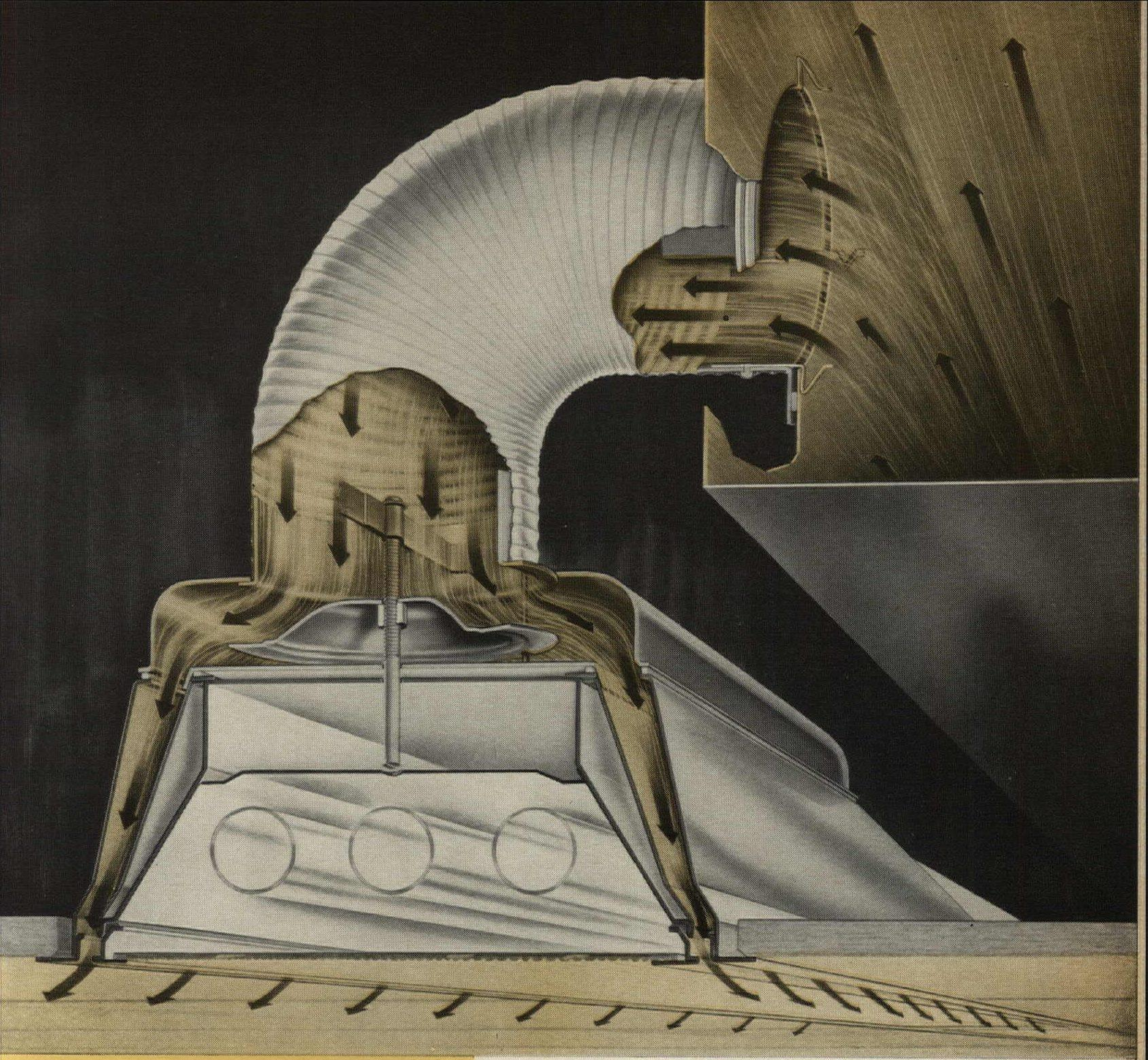
FASTER, MORE ECONOMICAL INSTALLATION

No cumbersome yokes—a swivel bar hanging device cuts installation time as much as 50%. Damper installation is simple and quick—one snap and a special locking device makes the damper a permanent part of the troffer. Special neoprene gasketing eliminates the possibility of air leaks.

DAMPERS ARE QUIET, EASILY ADJUSTABLE

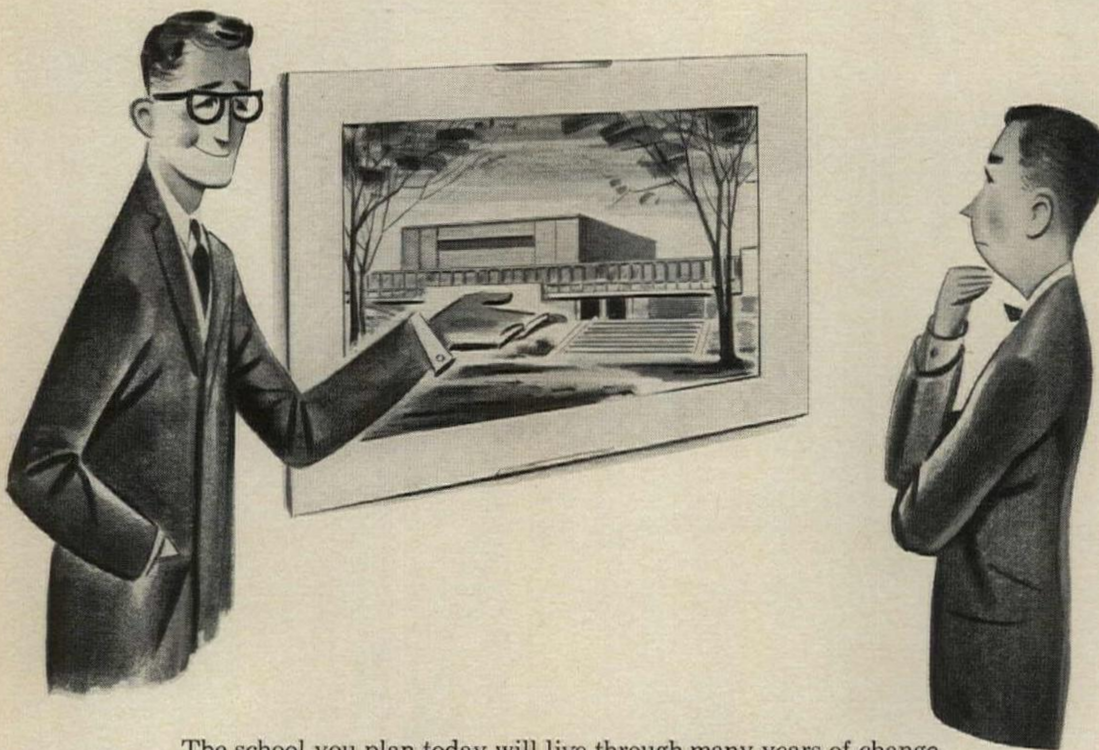
Dampers are engineered by Tuttle & Bailey for quiet operation at all capacities. The dampers adjust quickly, easily—give precise adjustment over wide pressure ranges. Balancing is simplified.

Lumi-Flo is the only complete line listed by Underwriters' Laboratories for lighting, cooling and heating.



Will your school design stand the test of time?

Changing educational patterns demand flexible schools with learning spaces equipped for year-round air conditioning under unitary control— as an economic necessity based upon educational productivity for the life of the building.

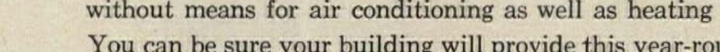


The school you plan today will live through many years of change.
How well will it *serve* in these dramatic days ahead?
Education is already in revolution. Some of the demands for flexibility in schoolhouse design and facilities can be seen and dealt with now.
What requirements may yet be imposed by the swift march of progress cannot, unfortunately, be wholly anticipated. But this much is sure:
Maximum learning depends upon a controlled thermal environment in every space.
And with the definite trend toward the greater use of a school's facilities, it is little short of planned obsolescence to build a school today without means for air conditioning as well as heating and ventilating.
You can be sure your building will provide this year-round comfort with economy by giving thoughtful consideration to it in the designing stage.
Nesbitt—with long experience in the school field—offers a slide film presentation, case studies, cost data, and many other services to help you and your clients appraise the importance of air conditioning for your next school.

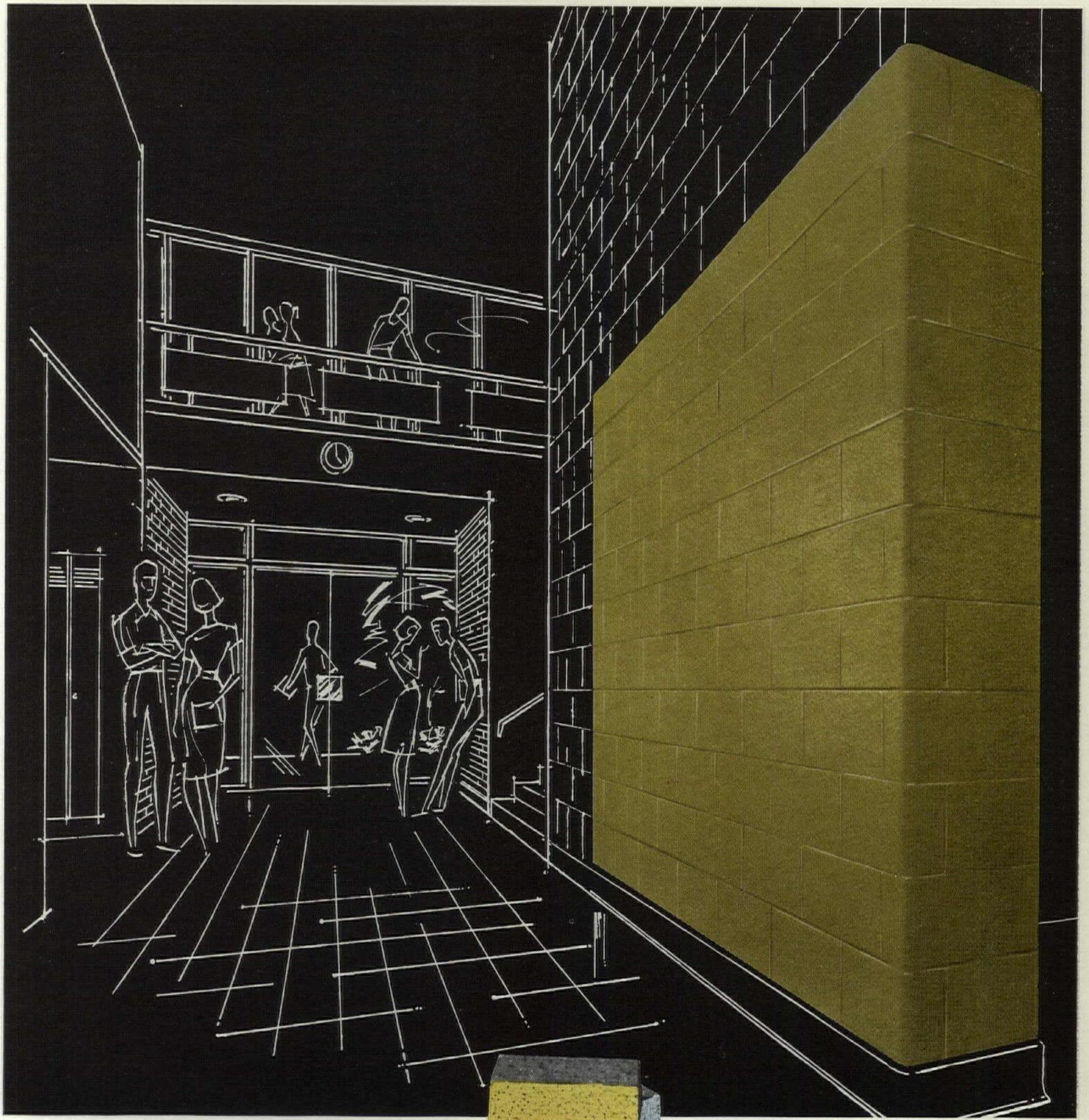
MORE LEARNING PER SCHOOL DOLLAR

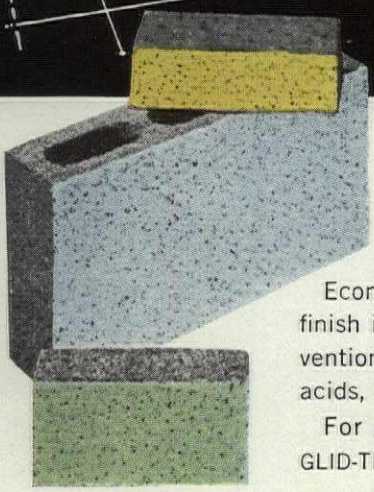
Nesbitt AIR CONDITIONING FOR SCHOOLS

BASIC INGREDIENT Excellence Nesbitt Heating Ventilating Air Conditioning

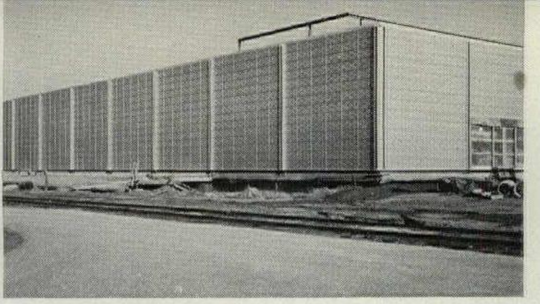


Year-Round Unit Ventilator and Storage Cabinets • Made and sold by John J. Nesbitt, Inc., Philadelphia 36, Pa.

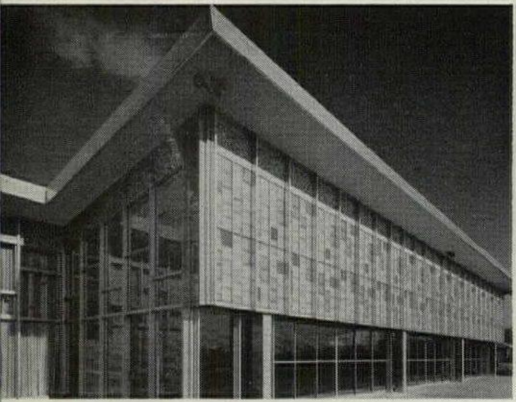




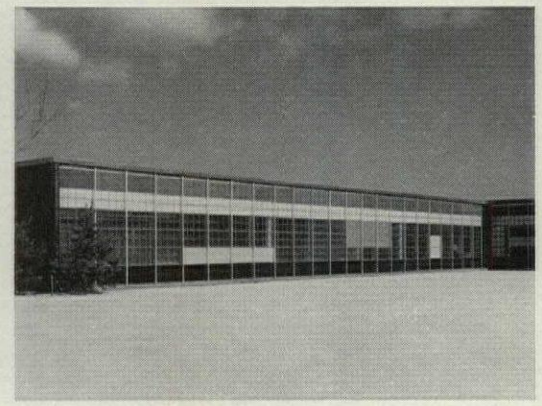
Light-controlling Thinlite panels provide excellent natural light, help reduce heating and cooling costs for the new $20-million Intelex Systems Post Office in Providence, R. I. Charles A. Maguire & Assoc., Providence, supervised design and construction.



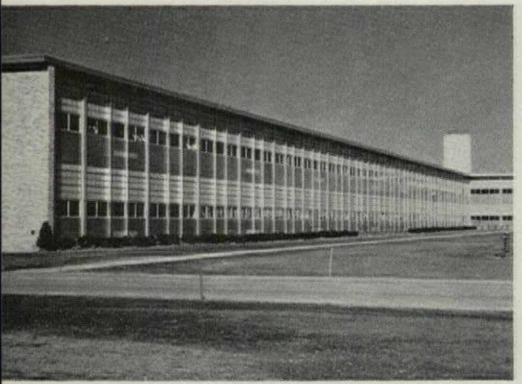
All exterior walls of the new research facility of Miles Laboratory at Elkhart, Indiana, designed by A. M. Kinney & Assoc., Cincinnati, will utilize the light-controlling features of colored Thinlite panels. The ground-to-roof installation will provide a more pleasant controlled environment for modern research.



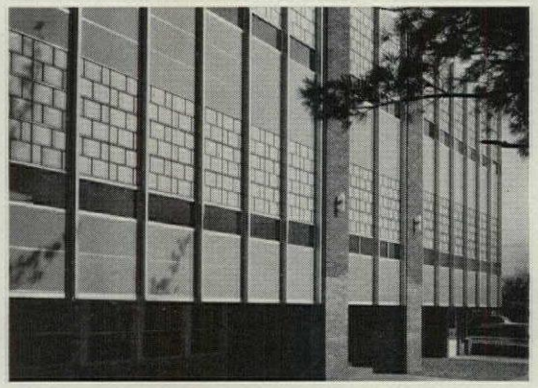
Northwest Suburban Y.M.C.A., Des Plaines, Illinois, is one of a series of new Y.M.C.A. buildings in the Chicago area in which Thinlite is used. Y.M.C.A. architect Eugene White commissioned Eckroth, Martorana & Eckroth, Chicago, to design Des Plaines Y.M.C.A.



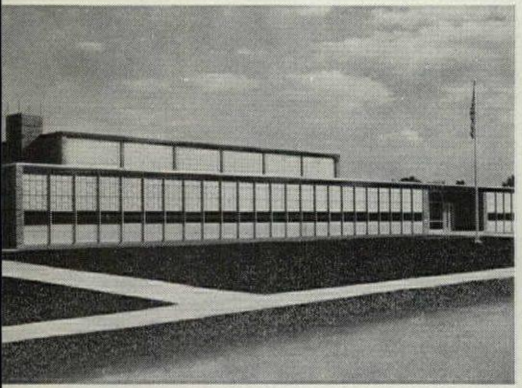
Severe New England winters called for a weather-control exterior at the Split Ball Bearing plant in Lebanon, N. H., so C. M. Koelb Associates, Weston, Mass. specified Thinlite curtain wall with vista panels and ceramic accent panels.



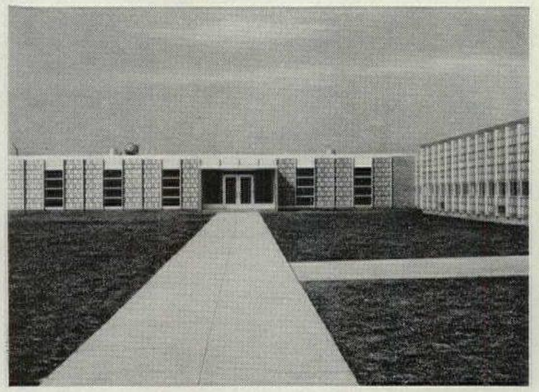
Architect Enos Cooke, New Kensington, Pa., used Thinlite in a major way at Stewart Junior High School, Lower Burrell Township, Pa., blending light-controlling panels with windows and aluminum-faced insulating panels.



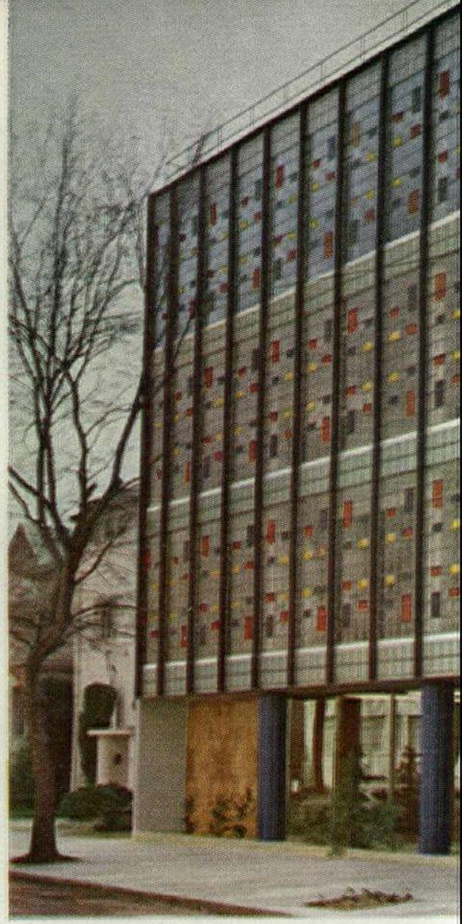
Lee Center School, Lee Center, Ill., used Thinlite Curtain Wall for this new addition that has taken years off the appearance of the school. Samuelson & Sandquist, Chicago, architect.

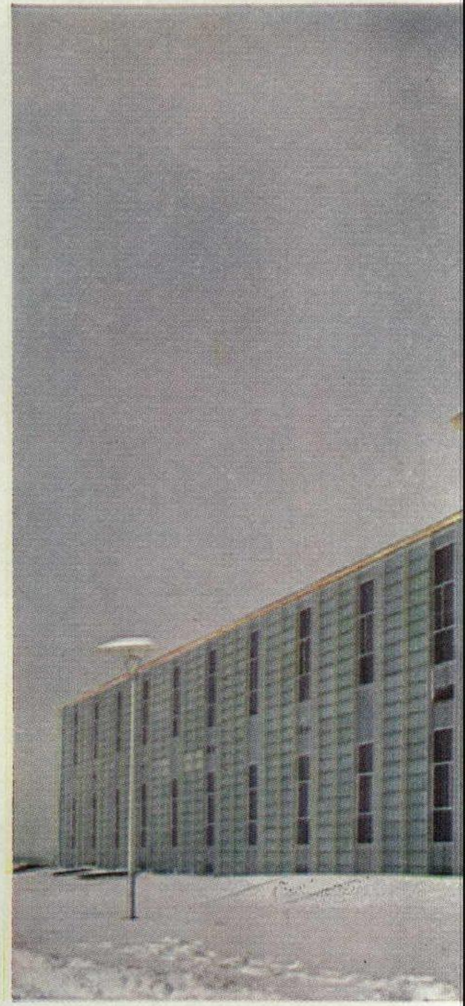


Extensive use of Thinlite prismatic panels, in combination with gray glass and porcelain enamel panels, controls harsh sunlight and severe weather in John Quincy Adams School, West Allis, Wisconsin. Architect, Schutte, Phillips & Mochon, Inc.

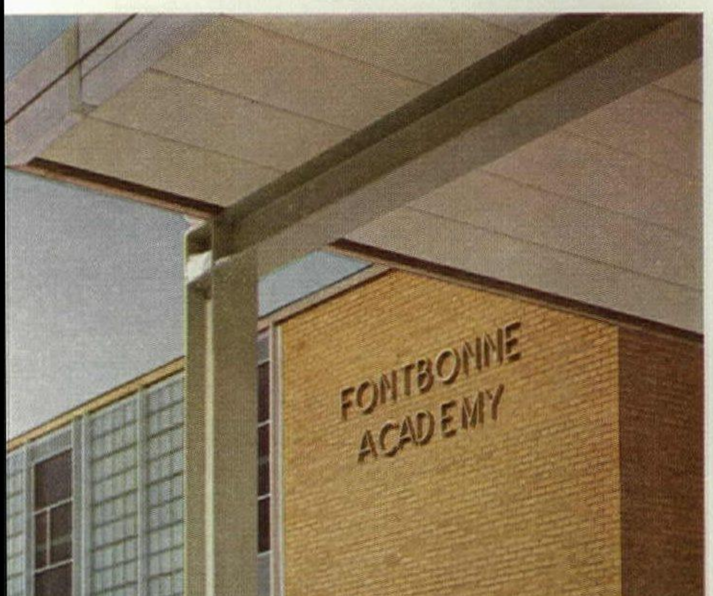


West Carrollton (Ohio) Senior High School (Architects—Outcalt, Guenther & Assoc.) features extensive use of prismatic and window panels to protect occupants from sun and weather in classrooms, corridors and cafeteria.

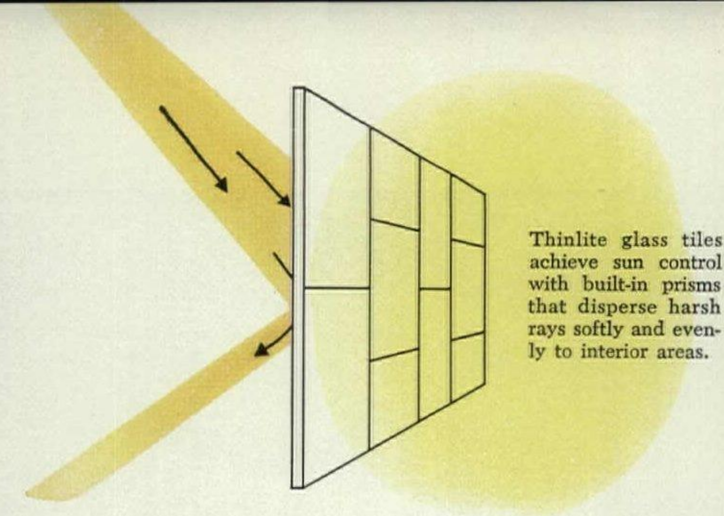




Thinlite panels of Clear Vista accented with ceramic colors, admit maximum light with low heat transmission in the new office building of the State Employees Building Corporation, Sacramento, Calif. West America Engineering Company, Inc., San Francisco, designed the structure.



At Fontbonne Academy, Allegheny County, Pa., architects Celli-Flynn, McKeesport, combined light-controlling panels of green Thinlite with window and metal panels to achieve this unusual effect in the classroom wing.



THINLITE curtain walls enclose buildings across the nation

Unique system offers many practical advantages for wide variety of structures:

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  Wide selection of panel materials, colors and arrangements permits unlimited design possibilities.
- **SUN CONTROL**
  Thinlite solar-selecting tiles diffuse sunlight on all exposures. Distribution of light is excellent and brightness is well controlled.
- **SOLAR HEAT CONTROL**
  Tests show Thinlite tiles transmit less solar heat than any other light-transmitting medium.
- **SAVINGS IN HEATING AND AIR CONDITIONING**
  Significant savings in heat and air-conditioning can be achieved with Thinlite curtain walls. Tiles transmit less solar heat while the double-glazed construction guards against heat loss. Through-metal is kept to a minimum.
- **FACTORY-CONTROLLED PRE-FABRICATION**
  All possible fabrication is performed at factory under controlled conditions. Field cutting and fitting is reduced to the barest minimum. Field caulking is unnecessary except at wall perimeters.
- **LOW MAINTENANCE COST**
  Thinlite glass tiles are self-washing. Colors are permanent and metalwork is durable anodized aluminum.
- **COMPLETE CURTAIN WALL SYSTEM**
  The Thinlite system includes all necessary framing metal and parts, as well as glass or metal panels in 2′ x 4′ or 2′ x 5′ sizes.

For complete information including details, see Thinlite catalog in 1961 Sweet's Architectural Files —Curtain Wall Section.

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LUSTREX® PERMA TONE

Heartland Office Building, National Commercial Bank & Trust Co. of Albany, N.Y. Electrical Design Engineer: Walter S. Stewman, Albany, N.Y. General Contractor: Rosch Bros. Electrical Contractor: H. A. Collman Electrical Co., Inc.

Luminous ceilings, luminaires, louvers, refractors, diffusers and modules made with Monsanto Lustrex Perma Tone Styrene have given years of service as a dramatic and effective source of light in hundreds of buildings of all types—both new and old.

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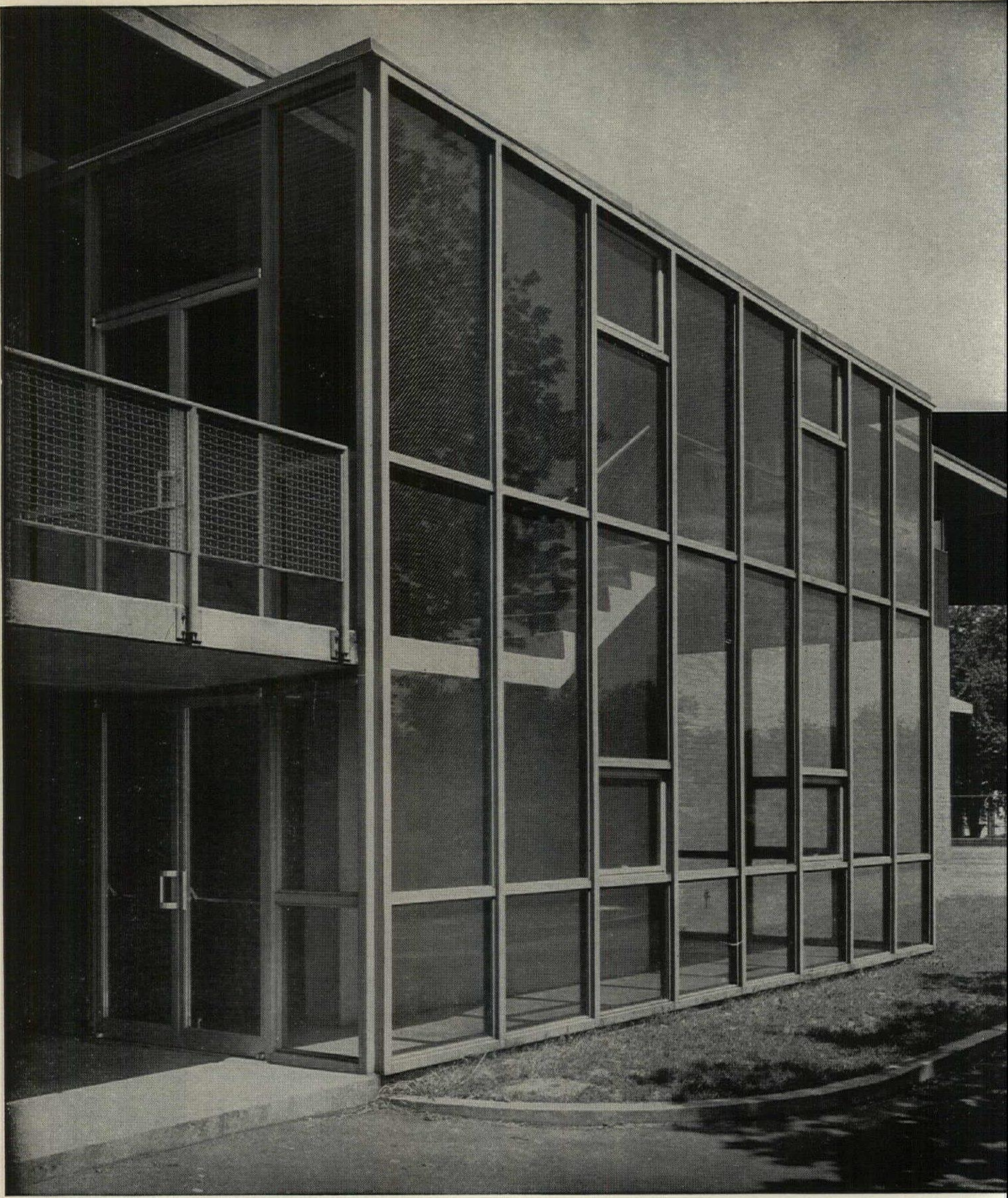

Stairwell of Polished Misco Wire Glass contributes to overall appearance as well as safety in the Fort Saunders Elementary School, Knoxville, Tenn.
Architect—Painter, Weeks & McCarty, Knoxville, Tenn.

For details, see your nearby distributor of quality glass or write for latest catalog. Address Department 6.

WORLD'S LARGE

Impact and fire resistance are twin features of this Polished Misco Wire Glass installation in Tennessee School for the Deaf, Knoxville, Tenn. *Architect*—Painter, Weeks & McCarty, Knoxville, Tenn.

MISSISSIPPI GLASS . . .

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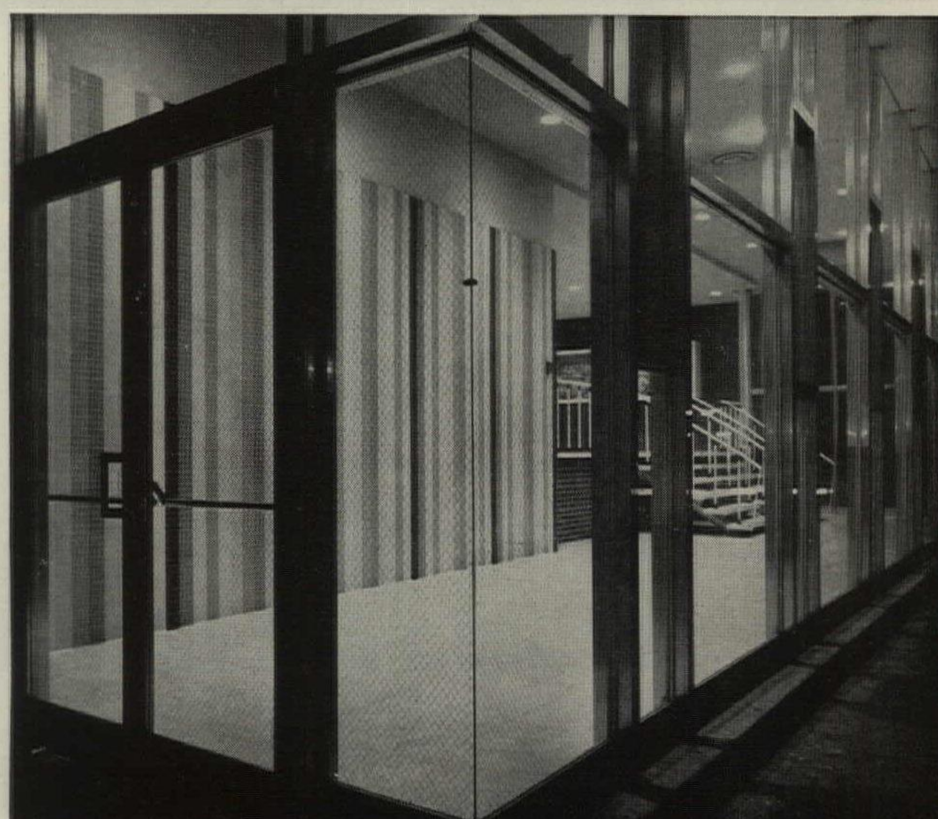
ıbining beauty, utility, and economy, sissippi leads the way by making ilable an extensive selection of trans- nt glass patterns that do wonderful gs with daylight. In addition, rugged issippi Wire Glass, whether for obscu- or clear vision, affords effective but nspicuous fire protection while enhanc- the appearance of any structure . . . n installed in partitions, skylights, wells, windows, doors, or wherever fire and breakage protection is uired. The versatility of Mississippi s provides architects and engineers a practical solution to virtually every lighting problem, including safety decoration, with heat absorption and light diffusion and direction.



Polished Misco Wire Glass glazed in main entrance of Hellertown High School, Hellertown, Pa. *Architect*—Heyl, Bond & Miller, Allentown, Pa. *Contractor*—Gottlieb-Schneider, Bethlehem, Pa. *Glazing Contractor*—Penn Allen Glass Company, Allentown, Pa.

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For further information contact The Murray Corporation of America, Eljer Plumbingware Division, 3 Gateway Center, Pittsburgh 22, Pennsylvania.

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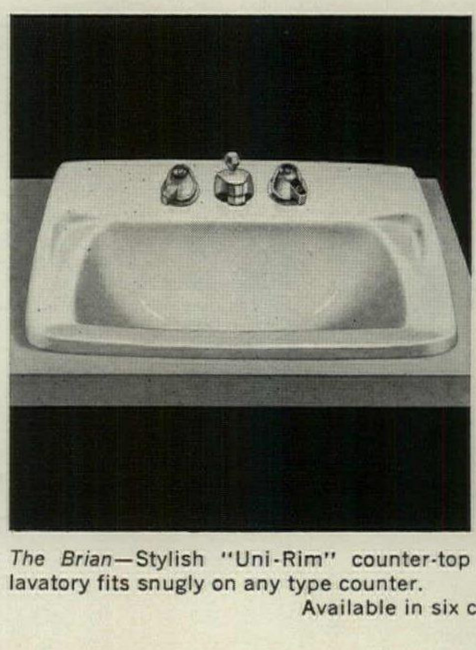
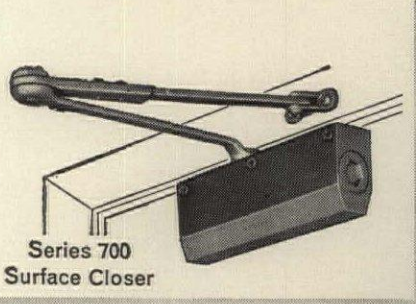


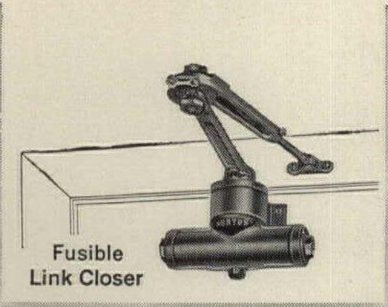
The Brian—Stylish "Uni-Rim" counter-top lavatory fits snugly on any type counter.

The Easton—"Off-the-floor" for easy cleaning, smart appearance.

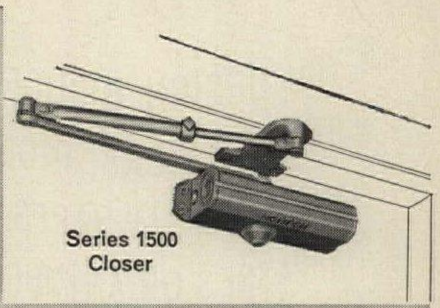
Available in six colors plus snowy white.



Series 700 Surface Closer



Fusible Link Closer



Series 1500 Closer

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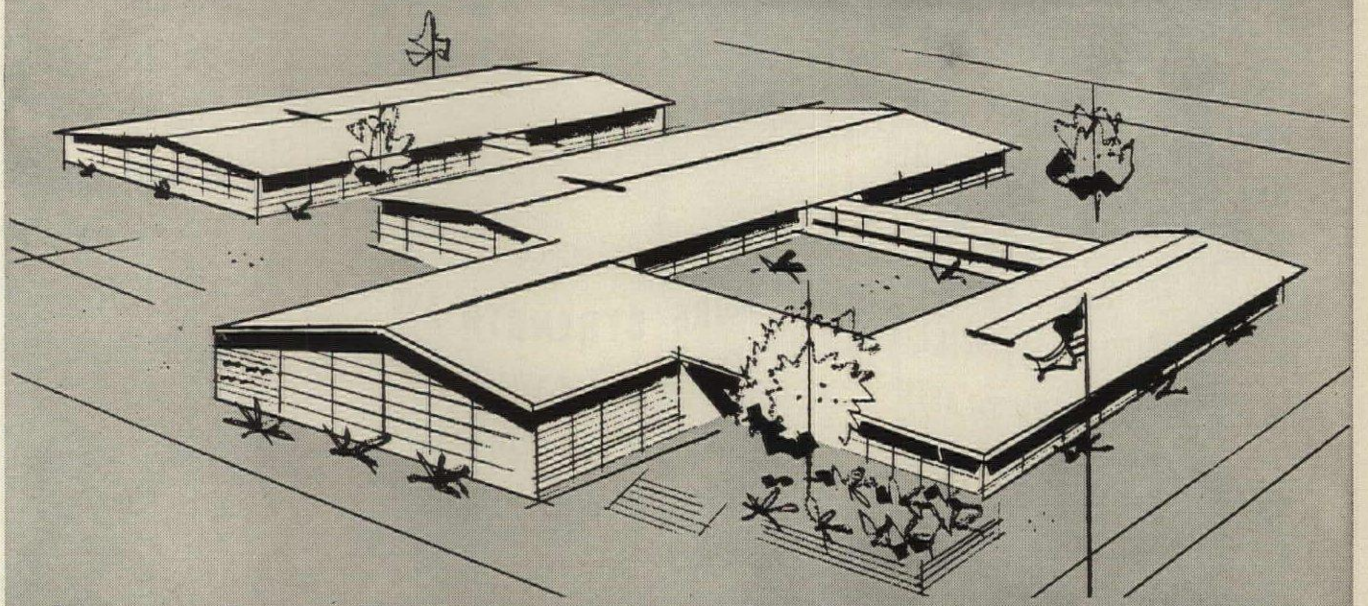

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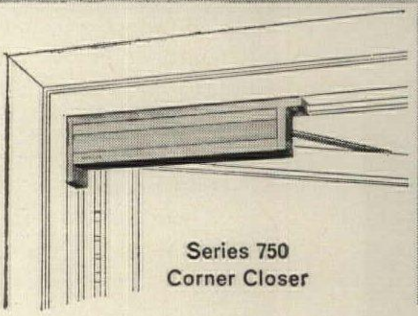
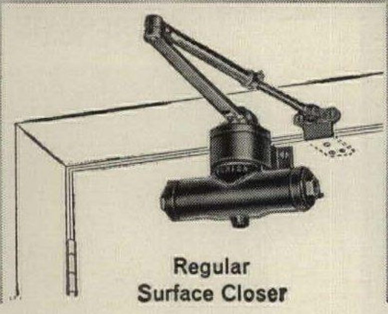


Series 750 Corner Closer



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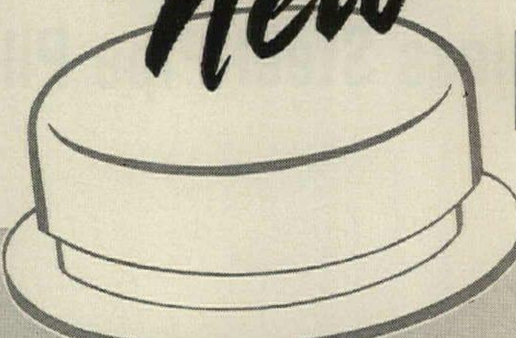

Illustrated is Haws Model 2284, 16″ x 24″ stainless receptor with new push-button valves for shielded fountain head and extra-heavy duty pantry gooseneck.

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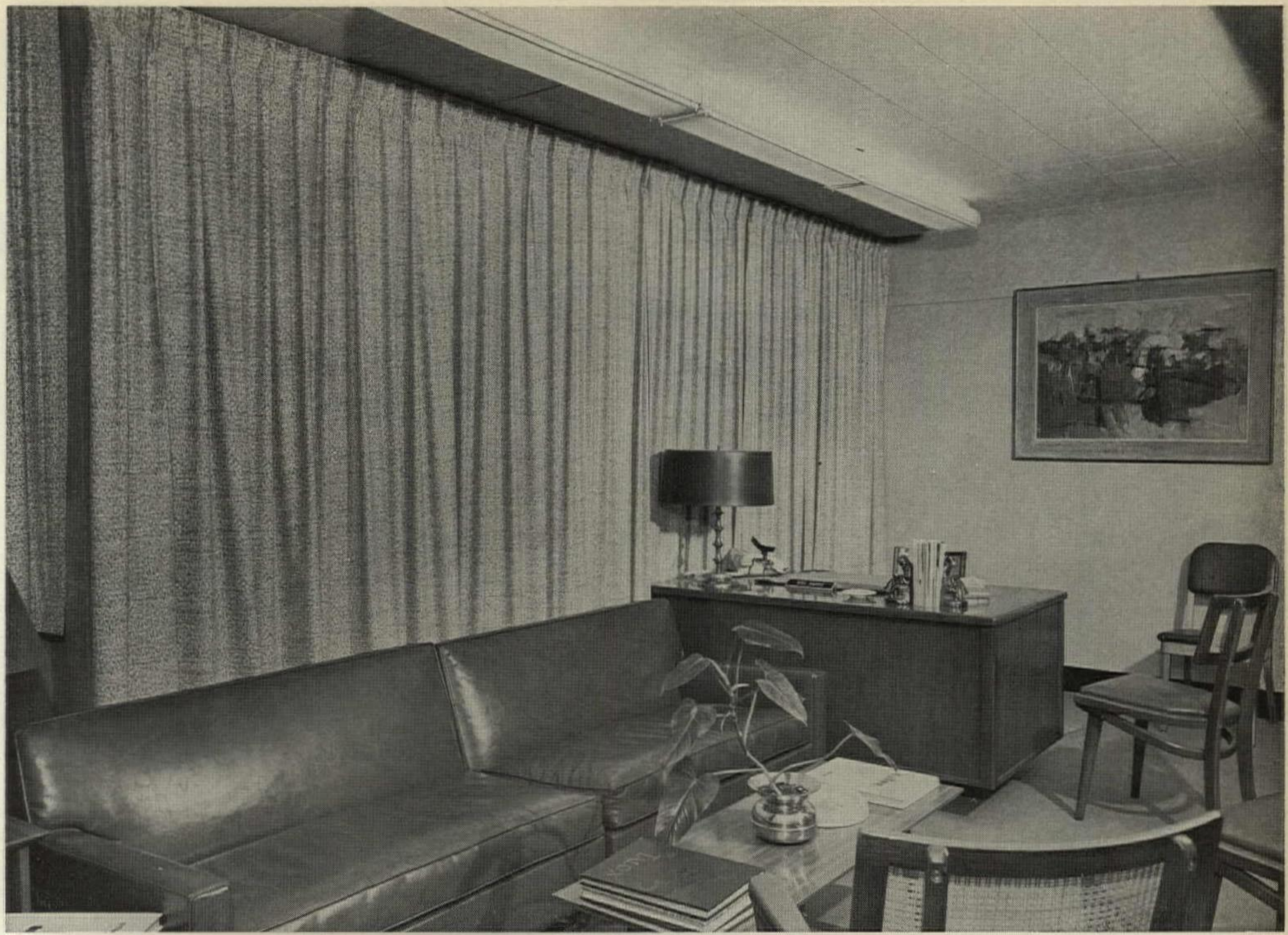

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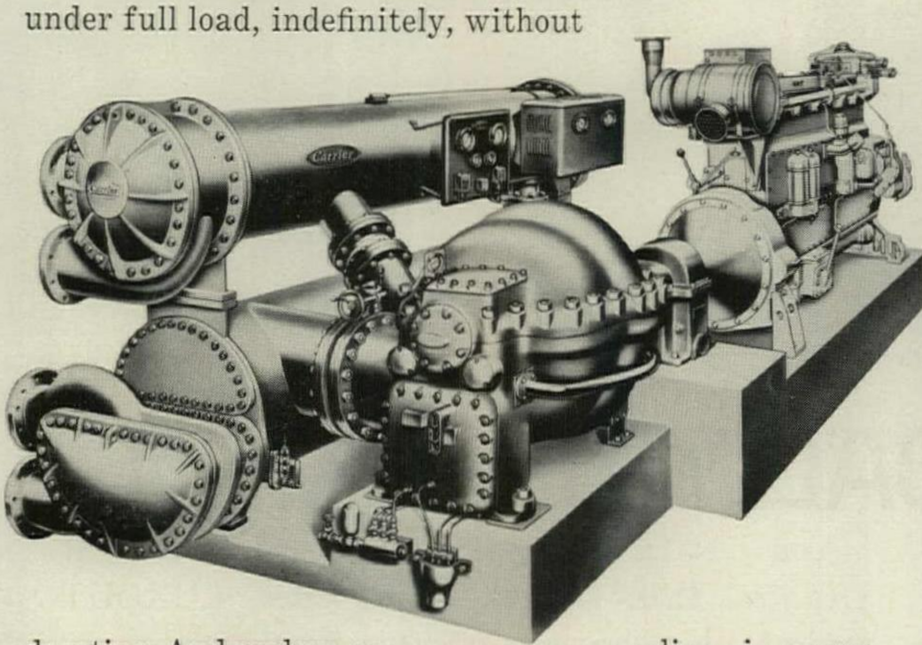

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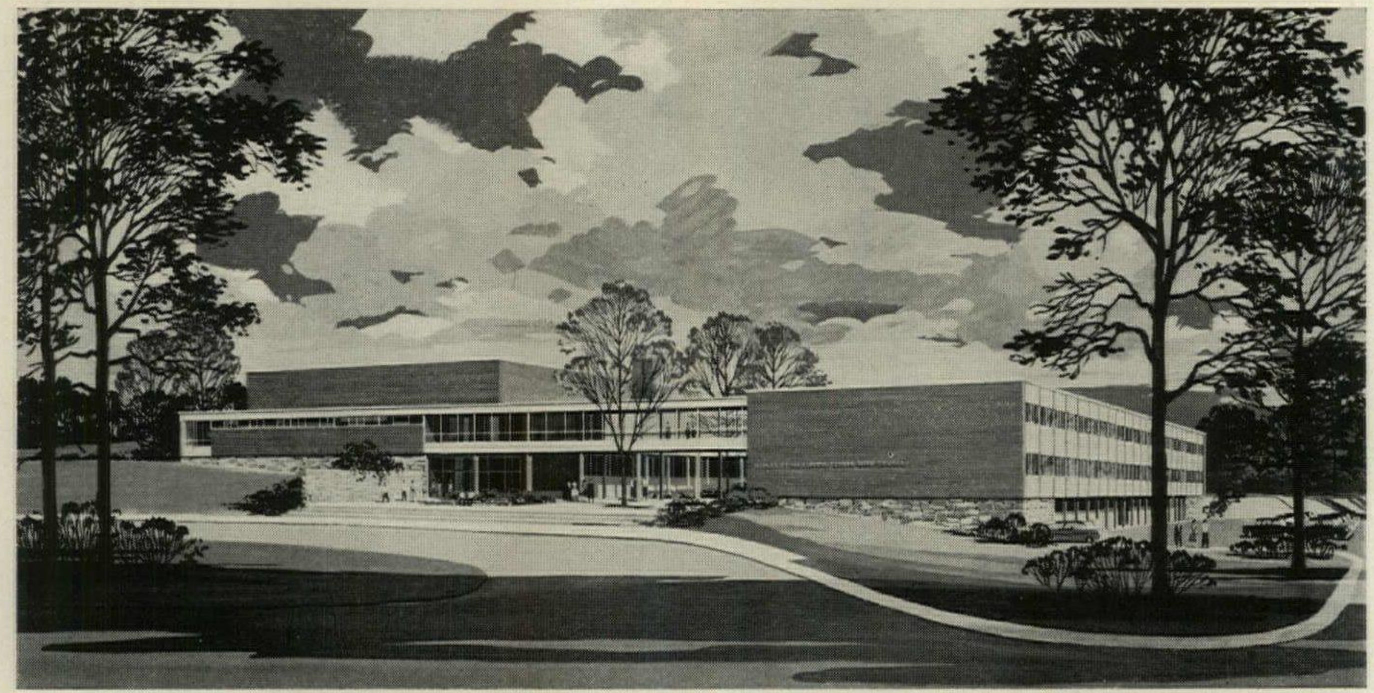


HURLBUT W. SMITH JUNIOR HIGH SCHOOL, SYRACUSE, NEW YORK

Designed for 800 students, this school consists of 39 classrooms, including science rooms, art rooms, home economics classrooms and laboratories, music rooms and shops. Each classroom has a separate workroom space. Also provided is a library, administrative office, health and guidance facilities, two cafeterias, a large gymnasium and separate locker rooms for boys and girls. The auditorium seats 830. Service areas include a kitchen, boiler room and general storage. Dimensions: area—123,908 sq. ft.; cubage—1,792,762 cu. ft. ***Architects and Engineers:* Sargent, Webster, Crenshaw & Folley, A.I.A., Syracuse, New York**

Another new school selects...

NEW CARRIER HEATING AND VENTILATING SYSTEM THAT PROVIDES 8 ADVANTAGES YET COSTS LESS

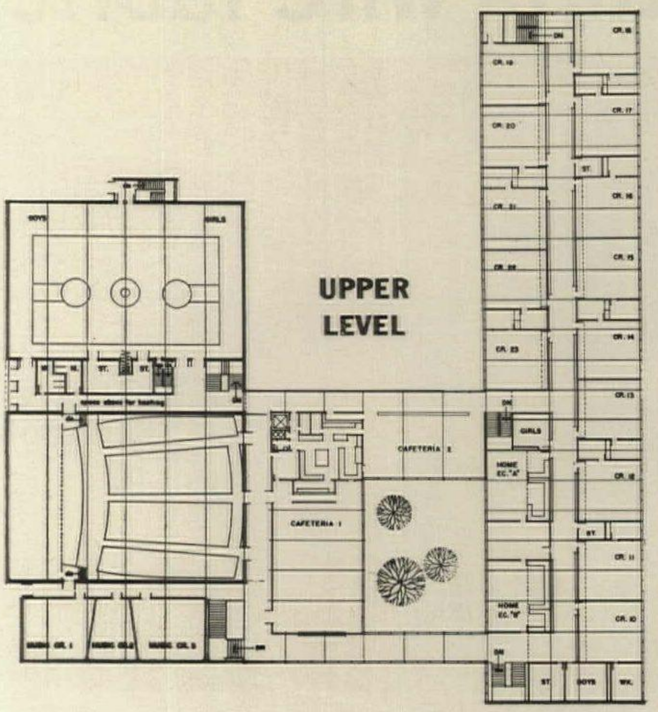
This modern junior high school provides another excellent example of how any new school can enjoy a superior heating and ventilating system at less than the cost of ordinary unit ventilators. And this new kind of system is ready for immediate conversion to year-round air conditioning with the simple addition of packaged refrigeration equipment in the machine room.

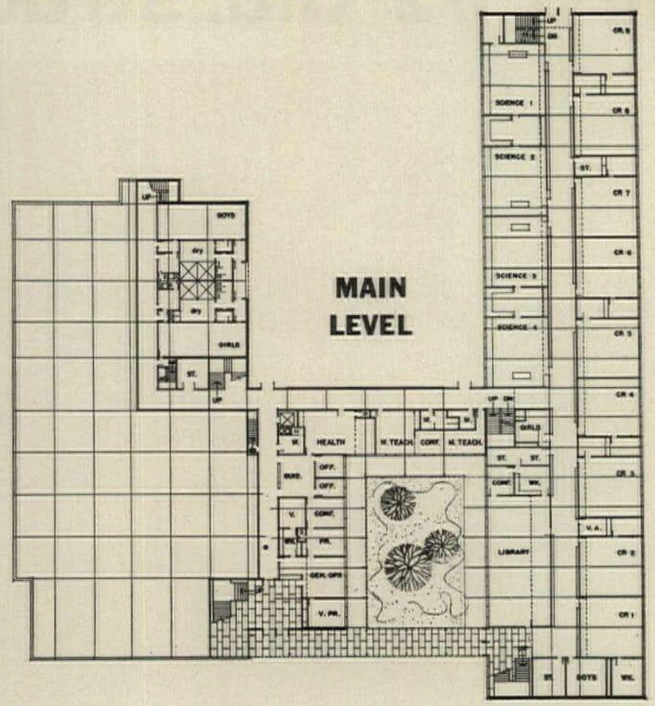
In their recent planning of new schools the architects considered unit ventilators and several popular central station systems. They carefully compared the performance characteristics, maintenance requirements, first cost and operating cost of each method. Their conclusion: The new Carrier Reheat Weathermaster* System provides the highest quality automatic heating and ventilation currently available to schools. It is the easiest to convert to complete year-round air conditioning. It costs 10% less, installed, than the next best method. And it costs less to operate and to maintain than other automatic systems.

The eight important advantages of the Reheat Weathermaster System which led to these conclusions are listed on the opposite page. They are unique because these Carrier units are the only room terminals which combine the performance benefits of the induction principle with either high or low velocity air distribution and the superiorities inherent in all central station systems.

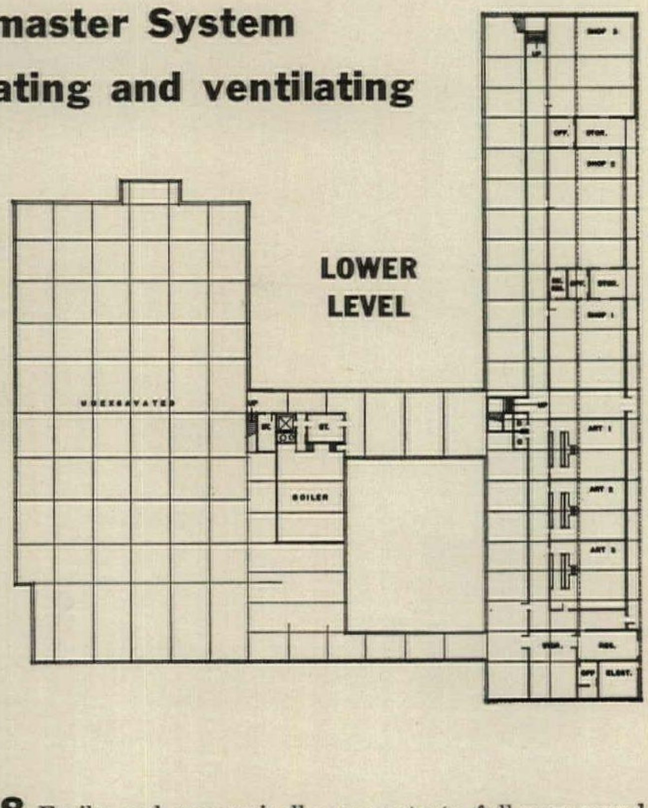
If you are designing a new school, it should be well worth your while to look into the Carrier Reheat Weathermaster System—either for heating and ventilation only, or with an eye to future air conditioning. The nearby Carrier office will be glad to give you complete facts on this advanced system. Or write to Carrier Air Conditioning Company, Syracuse 1, N.Y.

*Reg. U.S. Pat. Off.





Only the Carrier Reheat Weathermaster System offers these 8 advantages for heating and ventilating



1 Positive ventilation and air circulation under all conditions and seasons for improved odor dilution. Constant air volume from units.

2 Quieter operation—no fans or other moving equipment in classrooms, with all powered equipment located in machine room for easy servicing.

3 Superior air filtering at central station—minimum filter maintenance.

4 No costly wall openings, subject to rain and wind leakage, required in classrooms for ventilation air.

5 No operation of fans required for night and week-end heating, with gravity heating handling the load.

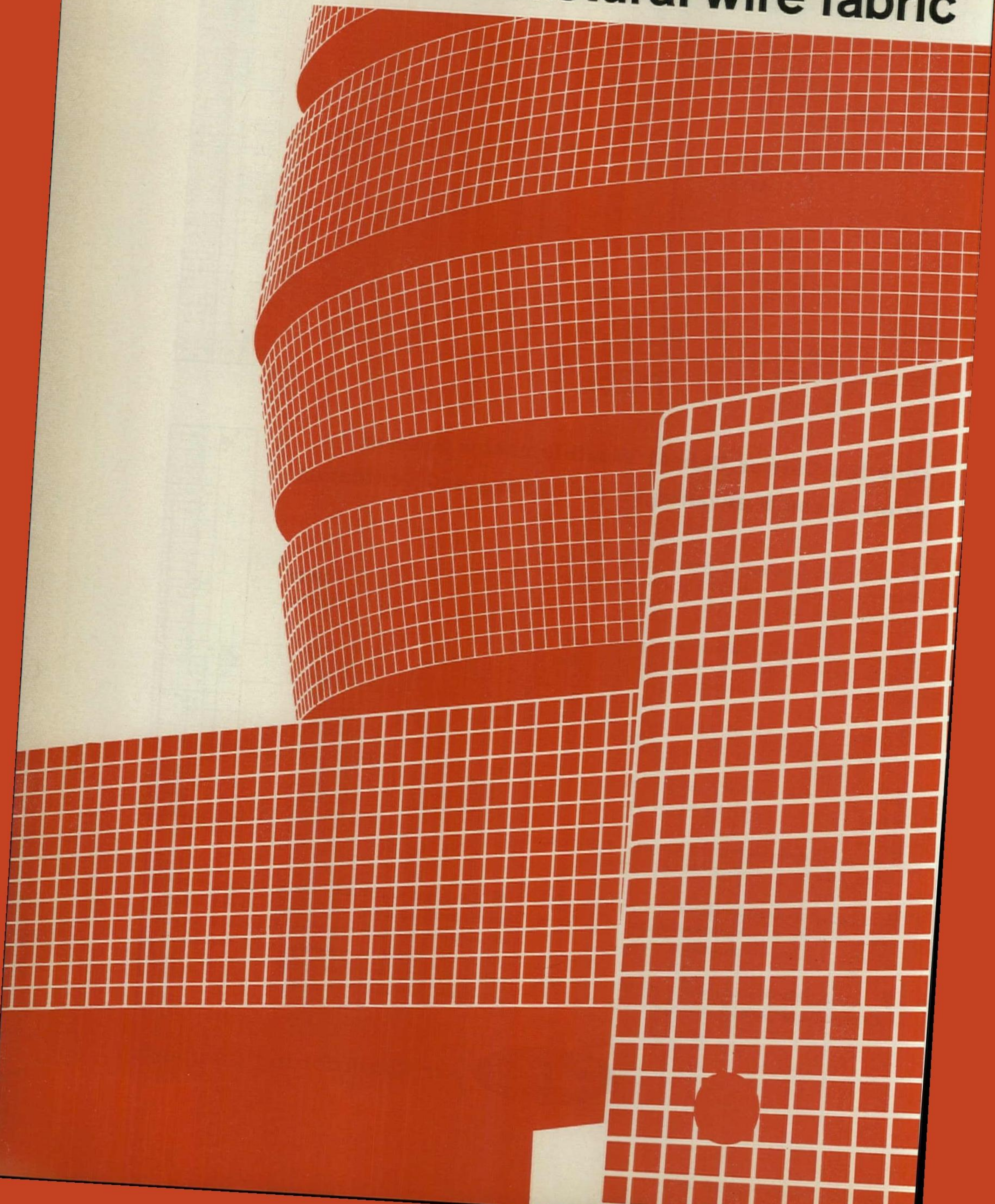
6 Individual temperature control in every room solves zoning problems; air damper assures easy initial system balancing, requires no adjustments thereafter.

7 Valuable classroom floor and wall space is saved by the compact units; cabinet only eight inches deep.

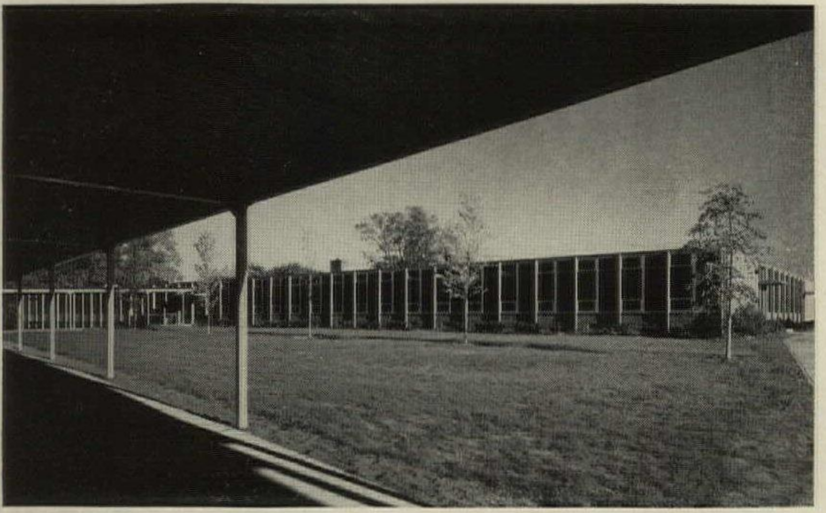
8 Easily and economically converts to full-year-round air conditioning at any future date with simple addition of packaged water chilling machine in central apparatus room. No revision of classroom units, controls or air ducts required. Condensate drains not needed. Nominal conversion cost about 65c per sq. ft., or less.

Carrier Air Conditioning Company

for innovators in reinforced
new 1/2"dia. structural wire fabric



Finneytown High School, Finneytown, Ohio
Architect: Woodie Garber & Associates, Cincinnati, Ohio
Contractor: Holt & Reichard, Norwood, Ohio



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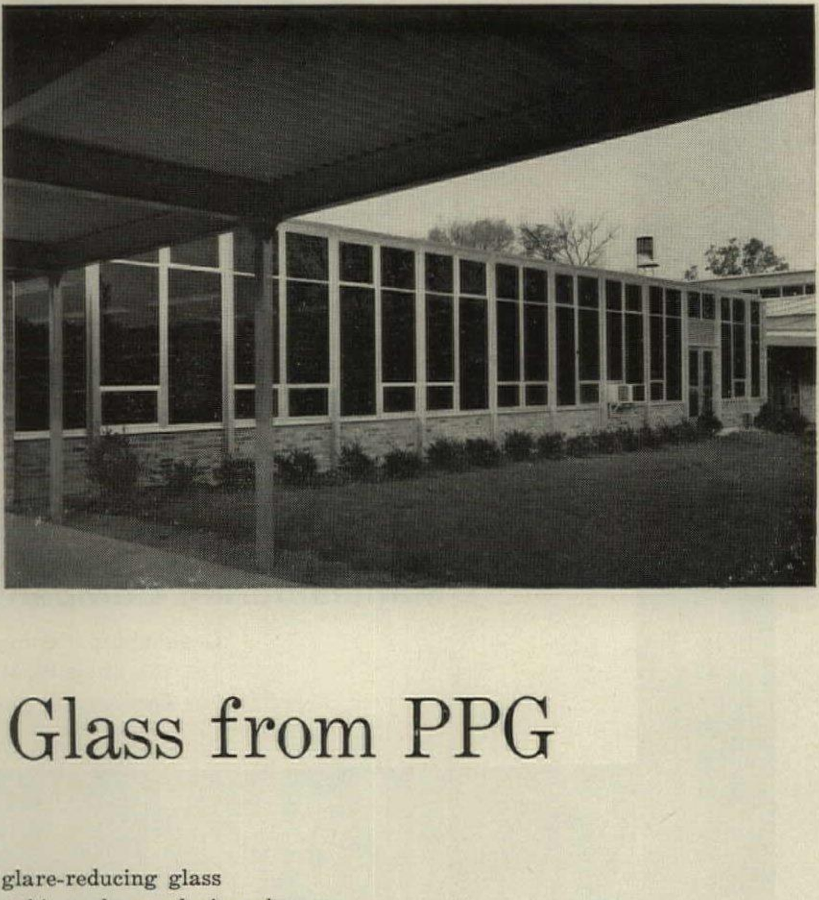

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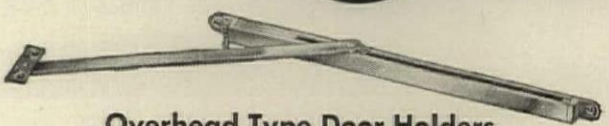

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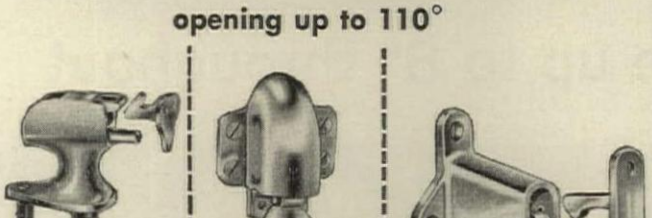

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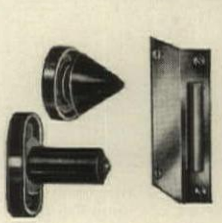

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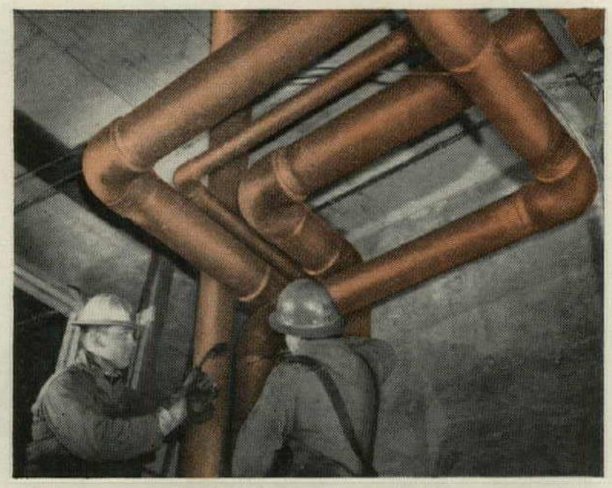

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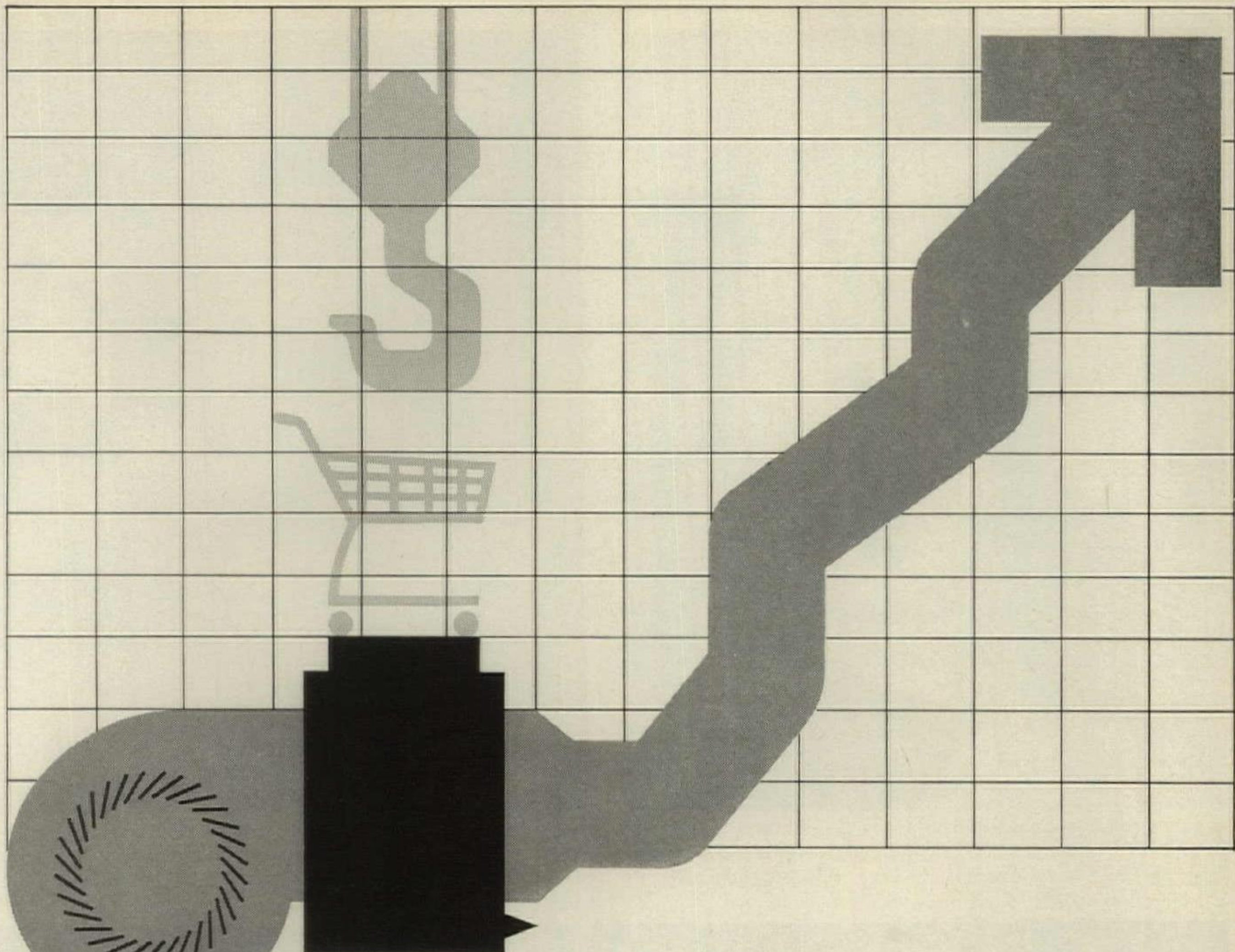

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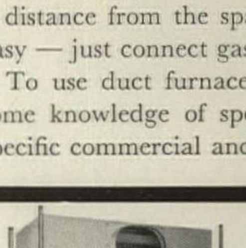

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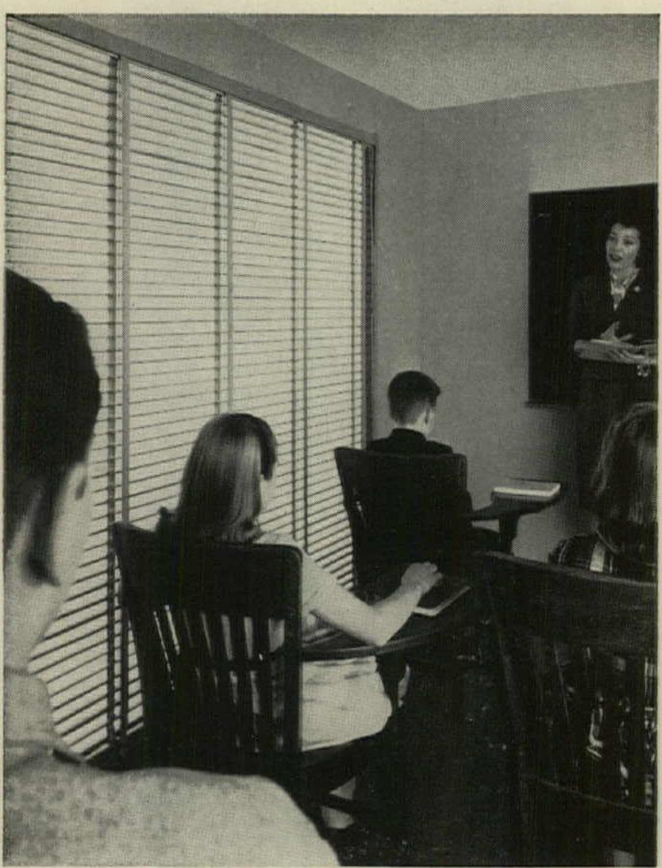

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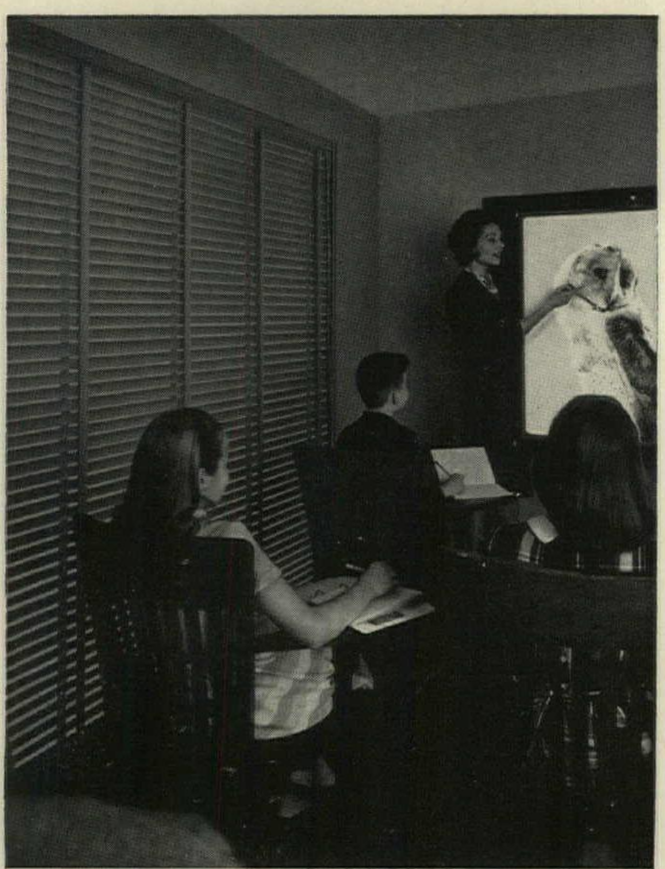

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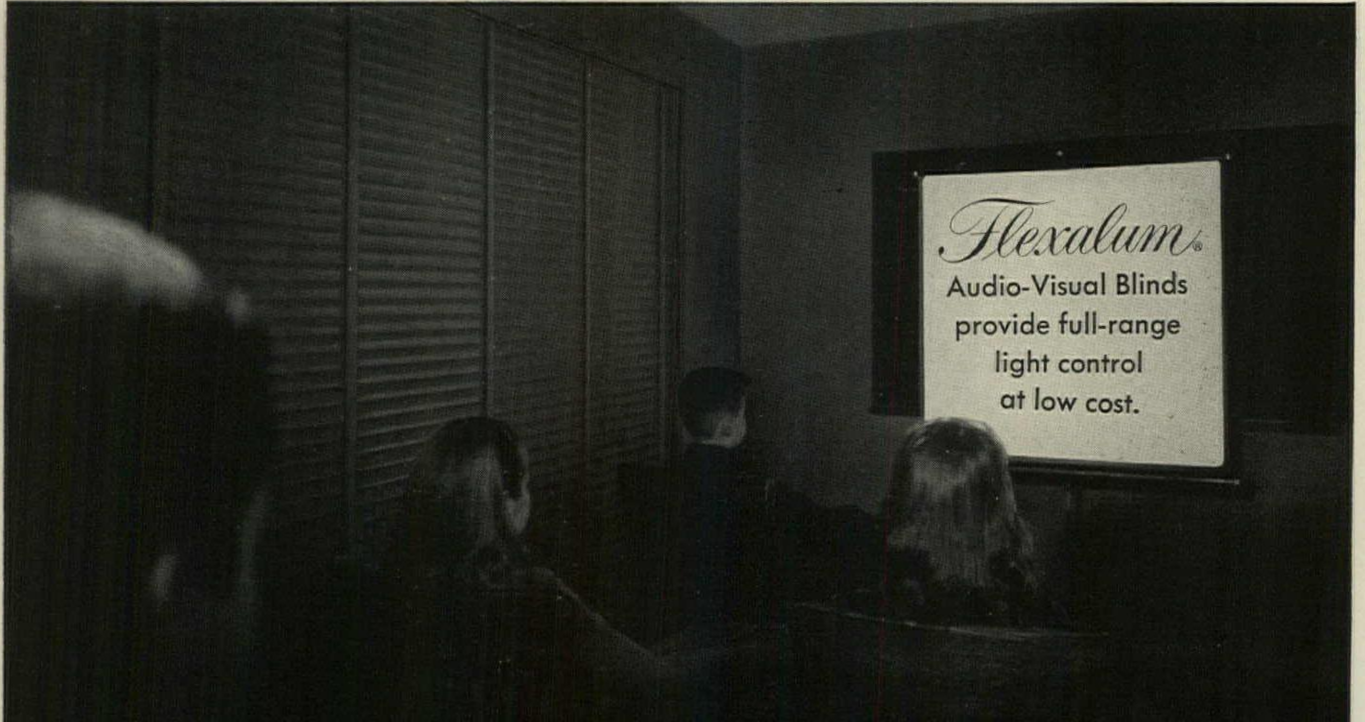

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Down with the 20th century!

This is to introduce Mr. Richard Wagner, president of the Chamber of Commerce of the United States. Like the rest of us, Mr. Wagner favors private enterprise; and like some of us, Mr. Wagner is dead set against Big Government. Last month, Mr. Wagner came out swinging against one particular activity of Big Government—urban renewal. Said Mr. Wagner: "The faults already apparent in the federal urban renewal subsidy program should persuade us that there is no newly discovered theory here . . . men and women dedicated to the private enterprise system cannot support the subsidy approach." There was a good deal more along the same lines.

Now, there are several things that should be said about this:

First, it is quite true that the urban-renewal program—like all big, relatively untried, relatively experimental programs—is still full of flaws. But these flaws call for reform—not abolition.

Second, it is quite true that all of us, as taxpayers, would be delighted to have the entire slum-clearance and urban-rehabilitation problem solved by private enterprise on a local level—with not a nickel of public subsidy. Alas, every intelligent private entrepreneur knows that the problem is far too big to be handled by private enterprise alone.

Third, Mr. Wagner ought to realize that several of his best friends—e.g., the local Chambers of Commerce throughout the U.S.—have given all-out support to urban renewal, because they have found it to be in their own, best, economic interest. For example: in Boston, the local Chamber of Commerce has been sponsoring a vast water-front redevelopment study; in Hartford, Conn., the local Chamber has been tremendously influential in all urban renewal and city planning, even hired a professional planner for its own staff and to assist the city; in Philadelphia, the local Chamber has backed all phases of urban renewal through the establishment of the Philadelphia Industrial Development Corp.; and corporations like Reynolds Metals and Republic Steel have been similarly active in support of federally subsidized urban renewal all over the country.

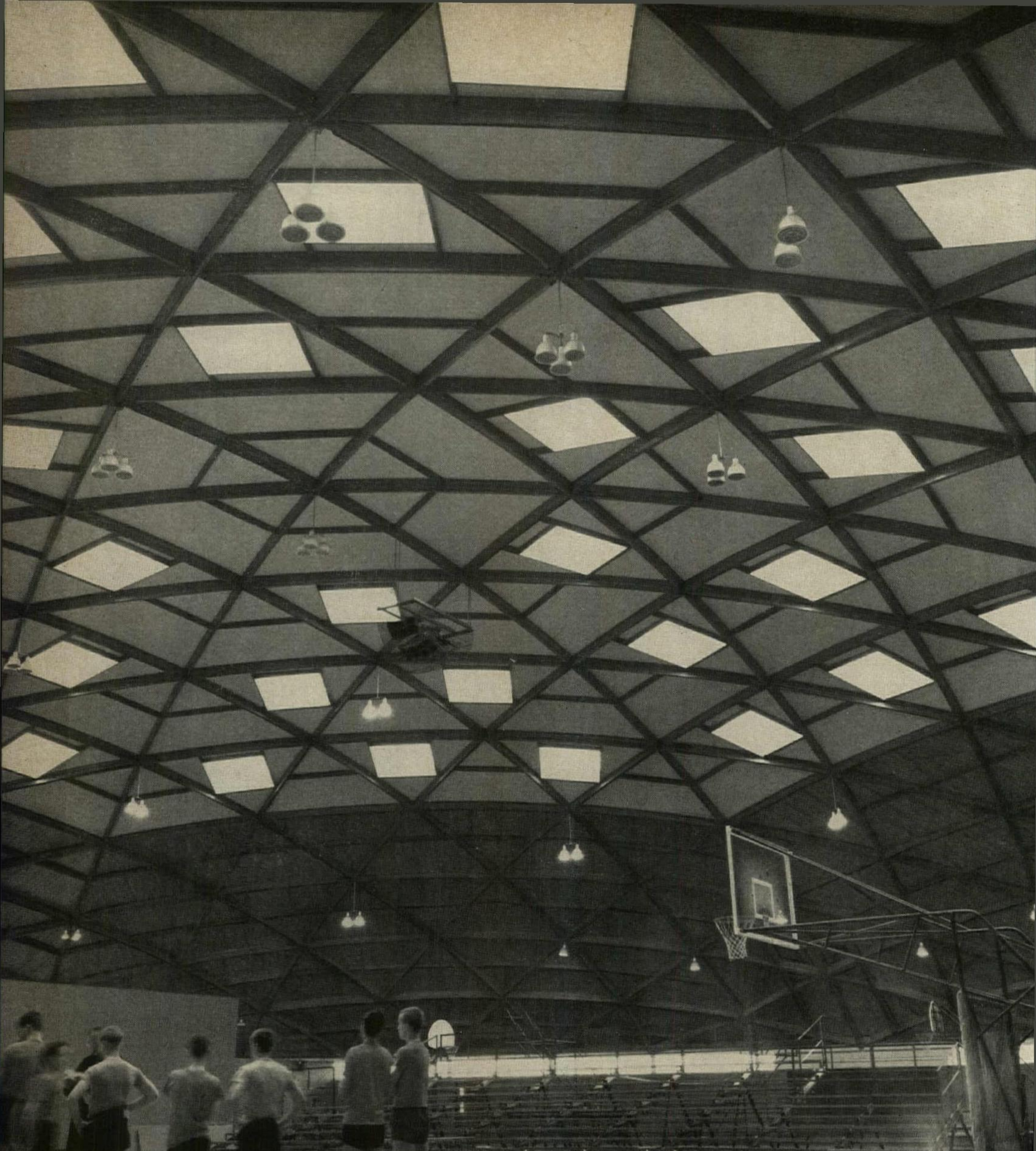
And why not? In their recent book, *Capital Requirements for Urban Renewal*, Authors Dyckman and Isaacs suggest that the U.S. might, conceivably, spend as much as $800 billion on urban renewal over the next dozen years. If the U.S. were to follow that suggestion even in part, many of Mr. Wagner's best friends would stand to gain. After all, since the federal government is not in the brick-baking business, someone other than Washington bureaucrats is likely to benefit from this vast expenditure.

There is plenty of room for improvement in urban renewal. But going back to the city-building practices of the nineteenth century will simply bankrupt the building industry and bankrupt our cities.

20-20 vision

There are some memorable dates in everybody's life; one of ours is April 11, 1955. That day the New York *Daily News*, a paper with the most reliable horoscopes in the U.S., ran an editorial commending *News* reader William H. Bender Jr. for some remarkable suggestions on how to solve the city's fiscal problems. The main building of the New York Public Library, by Carrère & Hastings, stands on some really valuable real estate, Bender

continued on page 109



The Architects Collaborative, Cambridge, Ma

Editorial
continued

had pointed out in a letter to the *News*. So why not cap the library with a "giant office building" and put the city back into the black with the revenues?

The *News'* editorial writer thought that was a very hot idea. "It does stir our imaginations no little," he wrote. The trouble was, however, that very little else got stirred: Only ten lines farther down, the *News* got equally excited about "easing the Midtown Manhattan traffic congestion problem"—a problem which Reader Bender was about to turn into a catastrophe. Evidently Reader Bender had given this matter some thought also: his suggestion was to drill a few tunnels through the rock bottom of Manhattan, so that pedestrians wishing to get from Grand Central to Penn Station could use these new "subwalks" (moving belts to whisk pedestrians along before they succumbed to caisson disease).

For our part, we preferred another suggestion made on that same memorable editorial page by a "Voice of the People" contributor from Queens, who signed himself, exasperatedly, "Overtaxed." Said Mr., Mrs., or Miss Overtaxed: "These city fathers make me sick, raising fares, taxes, and so forth in order to get money. They should chop down the Central Park trees, sell the wood, and then pave the place over. Set up a race track in the northern part, a Coney Island at the south end, and a mambo dance palace in the center. The remaining space could be rented for parking."

All this was only half a dozen years ago. The latest "giant office building" is going up a block and a half east of the library, over the New York Central tracks, ready to plug up midtown traffic for good; something that looks rather like a giant "mambo palace" is planned to replace McKim, Mead & White's fine old Pennsylvania Station; the trees are still in Central Park, but the park commissioner has warned the citizens to stay out of the place at night; and two dozen acres of land around City Hall are in the process of being paved over to make the biggest highway spaghetti in town. And we had thought the *News* was pulling our leg!

Quote . . . unquote

"New York is a city where they leave up the temporary buildings and tear down the permanent ones."—*Architect Sir Hugh Casson.*

"We ought to cease degrading our municipal government. The assumption [of] too many people is that municipal government is composed of . . . ward heelers and time-serving politicians." —*Chicago Planner Julian H. Levi.*

"Two thirds is greater than the whole in real estate, if you improve the third that's left. Set the third aside for gardens and playgrounds. You can enhance the value of any property that way, and it won't become a slum in 30 years."—*Realtor William Zeckendorf.*

"The strongest argument for the unmaterialistic character of American life is the fact that we tolerate conditions that are, from a materialistic point of view, intolerable. . . . American life, in large cities, at any rate, is a perpetual assault on the senses and the nerves; it is out of asceticism, out of unworldiness, precisely, that we bear it."—*Author Mary McCarthy.*

"Even a holy priest, unless his humility is directed toward a deep respect for competence, may perpetrate monstrous churches."—*Father C. J. McNaspy, S.J.*

"In an epoch in which we have achieved speed records by jet planes and rockets —when Commander Shepard reaches outer space and comes back again within 17 minutes—it still takes us over an hour, on the New Haven Railroad, to get from Grand Central Station to Stamford, Conn."—*Architect-planner Victor Gruen.*

"If we are not careful, we shall leave our children a legacy of billion-dollar roads leading nowhere except to other congested places like those they left behind."—*General Omar Bradley.*

New proposals to cut school costs

A joint inquiry of FORUM and the Ford Foundation's Educational Facilities Laboratories, Inc., into the best ideas here and abroad for construction savings.

GOVERNMENT

CHARLES D. GIBSON, *Chief, Bureau of School Planning, State Department of Education, Sacramento, Calif.*

ANTONY PART, *Deputy Secretary, Ministry of Education, United Kingdom.*

(Mr. Part acted as a consultant to the Inquiry, not as a member.)

WARREN SCHMIDT, *Assistant Commissioner, New York State Education Department.*

RUFUS PUTNAM, *Superintendent of Schools, Minneapolis, Minn.*

ARCHITECTS

WILLIAM PENA, *Partner, Caudill, Rowlett & Scott, Houston.*

EZRA EHRENKRANTZ, *engaged in research on development programs for manufacturers and on modular coordination studies; San Francisco.*

J. STANLEY SHARP, *Partner, Ketchum & Sharp, New York City.*

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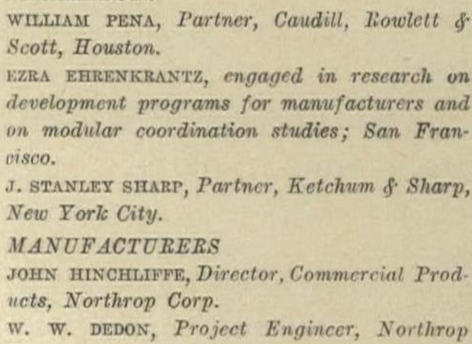
DOUGLAS HASKELL, *Editor*

WALTER MCQUADE, *Senior Editor*

PHOTOS: (LEFT) GEORGE ZIMBEL; (BELOW) WALTER DARAN



With all the science, skill, and organizational ability available in the world's most advanced free-enterprise industrial community, should it not be possible to lift the whole discussion of schoolhouse economy to a new plateau? Should there not be a technical break-through?

These thoughts were stimulated when New York State's progressive Governor Rockefeller recently pushed through the legislature an appropriation of $1 million to promote school economy through the familiar old "stock" plan idea. His action set off a flurry in other states, and stirred the American Institute of Architects to reiterate its undeviating opposition. Quite frankly, FORUM's editors, battle-scarred from fights for better value out of the school dollar, were bored, not stimulated. Here was "the same old new stuff," dusted off for a predictable stalemate.

Should Governor Rockefeller's best legitimate hopes be met, FORUM believed that the results would still be tiny in proportion to the effort. On the other hand, it was felt that the reply by AIA, declaring that stock plans would actually cost more and would result in lessening quality rather increasing it, was less than blood-stirring to the American people, however sound it might be.

What might be done? Underlying the Governor's approach was a great fund of good will and a hunch that was sound in its direction if not in its program. Was not the real purpose to make available to all school boards the skill of the best professionals? Was not the real purpose to get industrial efficiency applied to operations that were routine, so that the big effort could be made at the creative, educational level?

Looking at other recent developments, the editors were struck by the phenomenal progress made in schools in Great Britain. Facing a school crisis after the war, certain "counties" (the equivalent of U.S. states) had begun what looked like a stop-gap prefabrication effort. Yet, instead of tapering off during the last decade, this effort had blossomed, grown more comprehensive, solid, and permanent. It had not only created economies of its own that are specific and provable, but it had stimulated the nonprefab school architects to compete with it on the basis of its own advances. It had dominated international competition, as at the Triennale in Milan last year where a British CLASP school ran off with the highest honors. Might the U.S. get from this effort at least a direction?

At this point the editors found an enthusiastic ally: the Ford Foundation's Educational Facilities Laboratories, Inc. Dismayed by the repeated failure of stock plans to deliver on their promise, this organization concluded that a very different approach was needed. E.F.L. too had felt challenged by the British success and already had begun one experimental project of a parallel kind.

Proposed E.F.L.: "Let us set up an 'Inquiry' among some of the best minds on the subject both here and abroad: school men, government officials, progressive manufacturers, imaginative architects."

FORUM happily agreed. Those who accepted and gathered in New York for a two-day session are listed at the left. On the following 18 pages are some of their most constructive ideas, and a statement of their recommendations.

Testimony:

DRAWING BY GRAHAM RUST

First answer: "stock plans," as proposed in New York State—patterns for complete schools, available to all school districts, to save cost and time in planning.

The Governor's hope: the community can choose to pick up complete a set of plans by expert architects, then adapt cheaply. The Inquiry's conclusion: There will be no savings worth noting, because of unexpected costs of adaptation to particular sites and programs. Educational costs may even rise, and educational progress will be inhibited. Might there be a better way to spend New York's million dollars?

WARREN SCHMIDT: We have nine sets of stock plans under way. Three for elementary, one for junior high school, two for senior high schools, and three for junior-senior high schools. They vary in size. Also each plan is supposed to be designed so that it can be expanded to increase its capacity. We expect the final plans to be available early next year—that is, shortly after January.

The architects who were selected are familiar with the state standards and requirements, and I think that everyone who has reviewed the list has agreed that it was an excellent choice. The state architect also invited an advisory committee of school people, an architect, and a builder primarily to help in the programming and reviewing the preliminary plans. Obviously, the plans cannot be complete, because sites vary, so that the standard plan will begin about a foot below the first-floor level. Any school district wanting to use the stock plans will need to employ engineering or architectural consultants to prepare the necessary foundation plans and to make any alterations in the plans that the local school district may feel are needed to meet their own particular local situation.

It is hoped that the time lag between the need for a school building and its completion can be shortened substantially by the use of standard plans. In other words, the study time that it takes in developing the efficient plans will already have been contributed. So from that point on, it is only a matter of adaptation to local conditions.

I would say that these are not going to be cheap buildings in the usual sense of the word "cheap." They will be economical, but they will be good buildings. We have an appropriation of about a million dollars to develop these plans, and we may need more if we are going to expand the program.

ANTONY PART: I was wondering if we could get closer to the scale of the expected saving.

SCHMIDT: Well, I would say it would be on the order of 4 per cent of the cost of the building, roughly.

PART: Then you are hoping to get this building at 2 per cent in architectural fee?

SCHMIDT: I am just guessing at that. We have no experience whatsoever as to what an architect will charge to adapt a stock plan to its site, but we assume he would charge roughly 2 per cent and perhaps 1 per cent, or a half per cent, depending on the amount of adaptation that is necessary to prepare the foundation.

RUFUS PUTNAM: In Minneapolis, we don't use stock plans, but we have built two similar junior high schools of about the same size, one thousand capacity. We paid 6 per cent for the first plans and specifications. The same architectural firm did the second building for just half that: 3 per cent. These structures ran about 2 million dollars, so we did save $60 thousand by using the second set of plans.

Chairman DOUGLAS HASKELL: Is that 3 per cent a significant saving?

SCHMIDT: Well, the taxpayers think so.

HASKELL: I have a point in this. In 1953, at a round-table meeting, we made up a list of 50 ways to save on schoolhouse construction. Again and again we found magnitudes involved which were so vastly beyond an architect's or engineer's fee that it seemed like an awful waste of time to see where you could cut off a couple of per cent from fees.

For instance, the programming by the superintendent could make differences in a range of 10 or 20 per cent.

PUTNAM: That is right.

HASKELL: And the financing could make differences of 20 or 25 per cent, and the question of when the contracts were let could make a difference of 10 per cent. The question whether a school district should consolidate half a dozen high schools into a larger unit could make savings that would make 2 or 4 per cent look like peanuts.

But in the public mind the one thing that seems to register is that architect's fee—what's he good for? And cutting fees hurts quality, I think, worse than anything.

Alterations you speak of only as alterations in foundations. Are those the only alterations there will be?

SCHMIDT: I didn't mean to give that impression. The architect may make other changes in the plans.

HASKELL: You think you can get all that for one-half of one per cent?

SCHMIDT: Well, I am guessing at it. I don't know.

WILLIAM PENA: I don't think that is proven. The history of stock plans shows that they have been discarded. One of the reasons is that changes are so numerous that you might as well start from scratch.

[Discussion brought out that the stock plans, intended primarily for use by less prosperous communities, might instead actually be embraced by the prosperous as an easy solution. Said Harold Gores: "It might work out that only the most economically able could afford the stock plans, and the community that is hard-pressed must invent its way out of its dilemma by going into forms of design and construction that you could not expect to find in a stock plan."]

SCHMIDT: To try something new and different invariably is likely to cost money and there are very few school districts that have the kind of money to experiment with, unfortunately. Now, the state, being a large agency, can afford to spend a million dollars on a project, or an idea, to see whether it will work or not.

GIBSON: In stock plans, there is plenty of hindsight to be had. Many, many states in this country have tried this over the long years. Our own experience in California stretches back 33 years. We have over 150 school districts in our school system that have used stock plans. We could have told you in a hurry what happened to them. Every cliché that we have been talking about has actually been tried. We sum up by saying: "Stock plans represent the lazy, inefficient, and expensive way to provide school housing." The facts are as plain as the nose on my face. It never has worked in the fashion in which we have tried to make it work. It is not less expensive. Nobody has ever recovered his original investment in the preparation of these things at the governmental level—*nobody.*

This big fuss in New York, of course, has stimulated stock planning generally all over the country, and Utah and Washington particularly are catching it. Yet the accumulation of experience from all over the U.S. as presented in a report we made for the California Senate [see review, right] is uniformly discouraging.

Of course, Gibson's law is that government is more by attitude than statute, anyway: the attitude of the head man. Everybody knows how narrowly this squeaked through in New York. The governor had to put his full weight behind this legislation. But history is opposed.

HASKELL: But here are a million dollars going into this very wonderful expression of the desire of the state. Could that size money be better spent in another direction of school development?

Evidence:

STOCK PLANS FOR SCHOOL BUILDINGS. Prepared for the Senate Fact Finding Committee on Education by the California State Department of Education, Bureau of School Planning; Charles D. Gibson, chief; Sacramento, Calif. 8½" x 11".

The stock-plan siren song, holding out hope for lower costs and quicker construction, perhaps sounds most alluring in California, where population growth creates a staggering need for schools. It has pushed Charles Gibson, chief of California's Bureau of School Planning, into preparing for his state Senate a report that has become perhaps the ablest examination of stock-plan thinking extant—and the most damning. A measure of the effectiveness of Gibson's report is the fact that for the first time in 25 years, no stock-plan bill was even introduced in the recent session of the California legislature.

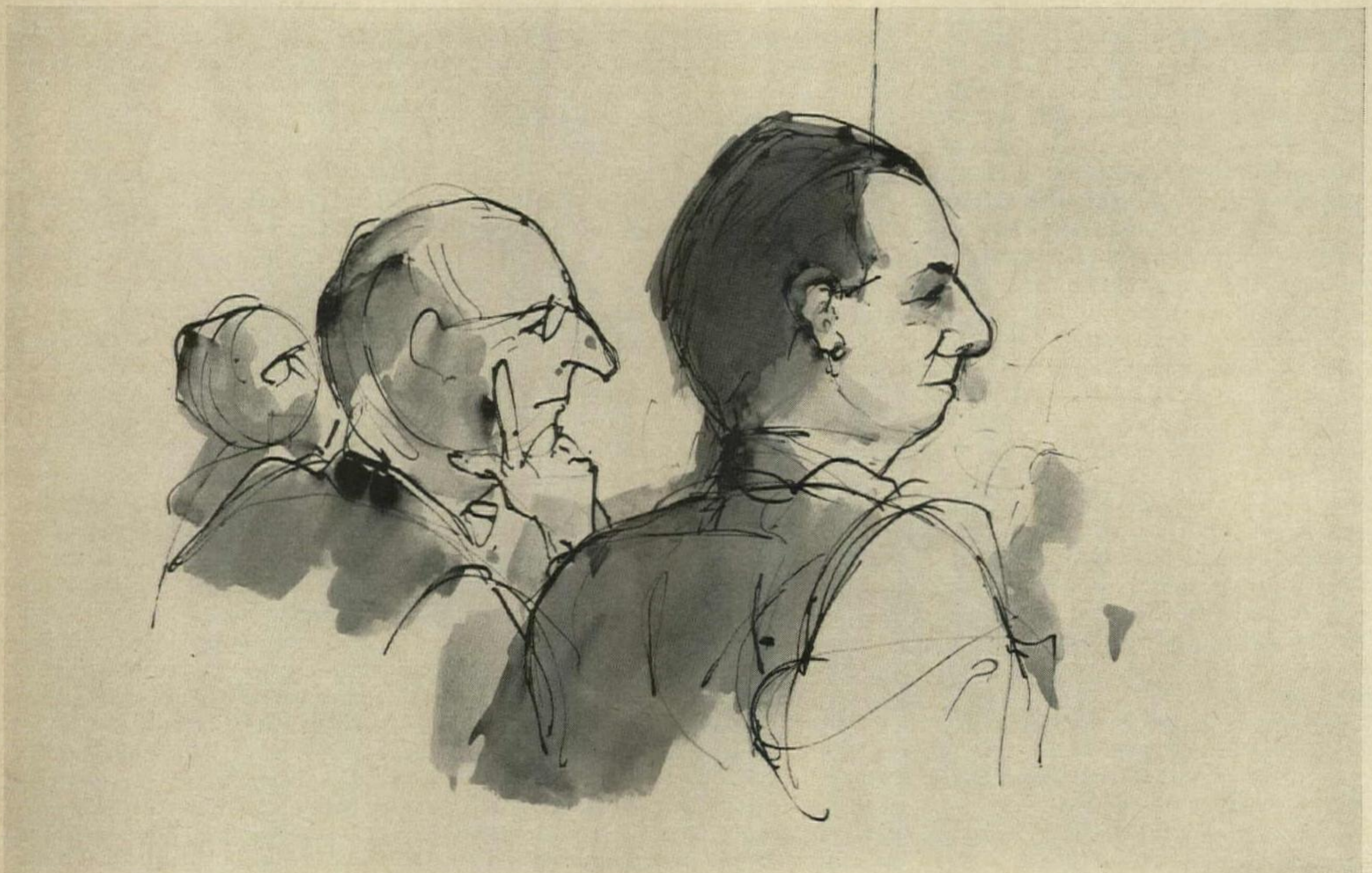
Even if schools are considered just another kind of building, Gibson demonstrates that claims for stock-plan economy and speed fall apart. But when schools are considered as schools, i.e., as educational instruments, the claims become irrelevant: "The capital cost of a school building represents only 8 to 10 per cent of the total cost of education. The instructional program represents approximately 70 per cent. If the building is not planned to meet the specific *needs of the instructional program, the value of the instructional dollar—70 per cent of the total—is materially reduced."*

A dated but significant survey shows that, more often than not, those states which have experimented with stock plans have since abandoned them. Stock plans are little used in states where they are available. There is nothing in the record of stock plans in actual use to justify much optimism on the part of supporters.

The report also points out how stock plans can inhibit the improvement of schoolhouse construction. To demonstrate this, Gibson lists no fewer than 48 improvements in building techniques, from plastic piping to high-strength steel bolts, which took place in the 1950s. Anyone limited to a slightly dusty stock plan would have had to pass all these improvements by—or, rather, be by-passed by them.

Gibson's report is high-caliber ammunition for opponents of stock plans; for proponents, it is a sobering presentation of the arguments they must overcome and the facts they must explain if they are to survive.

Testimony:



DRAWING BY GRAHAM RUST

Second answer: Britain's Erector set of prefabricated components, economically factory-made, adaptable to almost any plan a school architect comes up with.

The big trick: to guarantee a market big enough to repay manufacturers for the really ardent development work and the high tooling costs demanded by a system which has genuine adaptability of parts to a wide range of community schoolhouse needs. To do it, the British ingeniously organized groups of guaranteed buyers. They also obtained the special type of architectural skill evidenced in their "CLASP" system.

ANTONY PART: After World War II we had a lot of war damage to make good and we had a great increase in the birth rate: in 1945 we had 5 million school children and we knew that by about 1960 we would have 7 million, and there was going to be a good deal of shift of population, so that we would have to provide well over 2 million additional new school places in 15 years.

It was also clear that we were going to be short of site labor . . . for many of the building craftsmen who would have been available to us before the war had during the war gone into light engineering. Therefore, it made sense to transfer as much labor as we could from the site to the factory.

For the first four years after the war we were pretty lax on financial controls simply in order to get a post-war building program started at all. In 1949 we discovered that to cope with our continually growing commitments we had to make an economy of about 25 per cent per student place. We did this in two years largely as a result, I think, of a fairly sophisticated system of cost control.

In Britain it is quite practicable to set a maximum cost of any individual school by combining the allowance of square footage per child with the allowance of the cost per square foot, multiplying the two together and thus getting a total permitted net cost for the building. (There are certain additional items connected with sitework, of course, which we treat separately.)

As long as minimum space requirements are satisfied and the building does not cost more than the single figure of total net cost, then the architect knows that his plans will be approved. This gives him a great incentive to make the best possible use of the money available, and it also enables him to put in sculpture and murals or, indeed, more teaching space if he wants to, and can find a way.

It is this method of cost control which was, in the first instance, responsible for the fact that between 1949 and 1951 we cut the cost of school space by 25 per cent over the country as a whole, and we have since been able, without sacrificing quality, to keep the increases in the cost of educational building well below the increases in building costs generally. The system is described in Ministry of Education Building Bulletin 4 on Cost Control. [See page 118 for availability—ED.]

Meanwhile, the prefabrication story was developing. In 1946 we were able to begin going in for a component approach—I believe the American term would be the Erector set approach—of sets of standard building parts which could be put together in any way that anybody wanted, up to four stories high.

If you are very keen on having a brick school, then you don't like using one of these Erector sets. But subject to that very important point, I think we can quite firmly claim that any condition which any architect or educator has desired to have, in terms of space, can be satisfied by any of these Erector sets.

There is absolutely no compulsion on anybody to use these Erector sets, but in point of fact, they have been used over the years for something like 20 per cent of the school building program in Britain.

For some of the manufacturers who are here, I should say that we firmly refused to let any development contracts whatever on the ground that they could count on getting a pretty good share of a national building program worth at least $150 million a year. The latest development has been the formation of a consortium of local educational authorities, a consortium of school boards. These people together have created a development group from among their own architects, and do ally themselves closely with the manufacturers, designing a set of components which all parties concerned undertake to use for a minimum of three years for all of their schools.

It does appear that by working directly with the manufacturers it has been possible to get some quite spectacular savings on the cost of items which one would have supposed—because these are announced by the manufacturers as standard items—to be pretty cheap anyway. In the case of windows, they got a saving of 23 per cent, which seems to me fantastic when I think how cheap standard windows are supposed to be.

It is of course essential to this particular system that there should be in one way or another an assurance of sufficiently substantial orders to make it worth the manufacturer's while. But even more essential is that you have got to have the best available architects you can lay your hands on to design the Erector set, because it is a terribly difficult and skillful thing to do. You need the best mathematicians, the best designers—you really have to have a very highly talented group.

When it comes to designing the individual school, broadly speaking, any architect can do that because he has got available this box of tricks, just as he has when he is designing a traditional school, and it is a very easy box of tricks to understand.

There are a number of standard drawings—I believe it is 130—and then, of course, the preparation of the drawings for an individual school is quite quick, and certainly quite simple in terms of numbers of drawings.

You are in effect just doing a sketch design coupled with a sort of numbered indication of the various bits and pieces that are used when it comes to working drawings.

So when you get to the planning of individual schools you do in fact economize on architects' time and, therefore, you get your school earlier. The question of cutting architects' fees did not arise because the architects are salaried employees of the local education authorities. Components ordered throughout the consortium amount to about half the cost of the schools concerned. They are ordered for a year's program at a time, and a good number of items are put out to competitive tender.

CHARLES GIBSON: This consortium actually would compare to a group of school districts in this country.

PART: That is right.

GIBSON: They employ private architects representing each of the districts.

PART: They could, but they do not. They use their own staff of architects. They are like the city of Los Angeles, or something like that, but they have their own architectural staff.

GIBSON: How many of them would you have operating at a time? How many different groups of these local agencies?

PART: I should make it clear. First of all, the original Erector set was designed by a single group at Hertfordshire. We then thought it was highly desirable that that should be no monopoly even though that Erector set was technically in competition with traditional manufacturing.

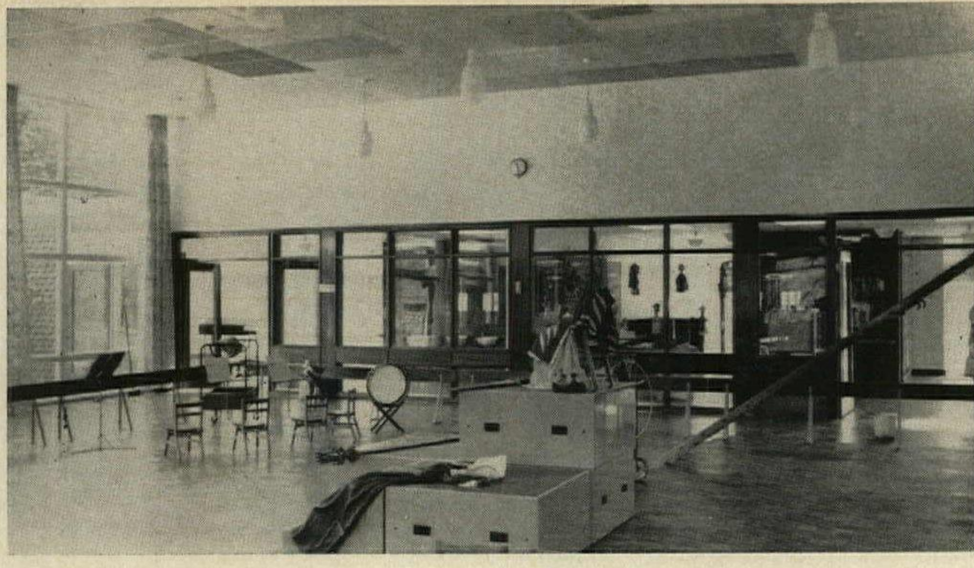
Therefore, the Ministry of Education set up a research and development group. We pinched some of Hertfordshire's best architectural talent and asked them, with their colleagues, to design five or six Erector sets, which they did.

Then we came on to the consortium approach. There is at the moment only one consortium in the country (although I think there is going to be a second soon), and that consortium employs its own group of architects, selected from the staffs of the local educational authorities, the school boards concerned.

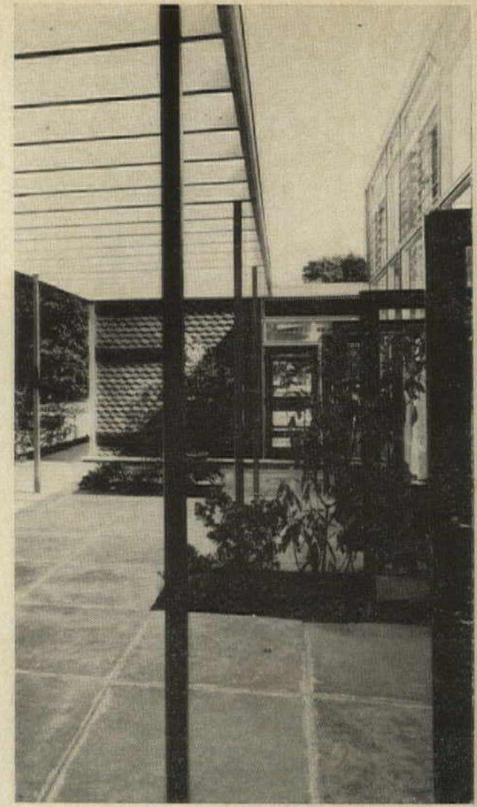
I don't think there is anything particularly magical about the architectural make-up of a consortium. It would presumably be perfectly possible, if you wished, to get a private architect, or private architects, to do this work. The consortium approach just happens to suit our circumstances better because the staffs are there anyway.

HASKELL: Are there American ways of producing Erector sets?

It might be through an American consortium—or something else.



Evidence:
Britain's CLASP system
proves it can be done.



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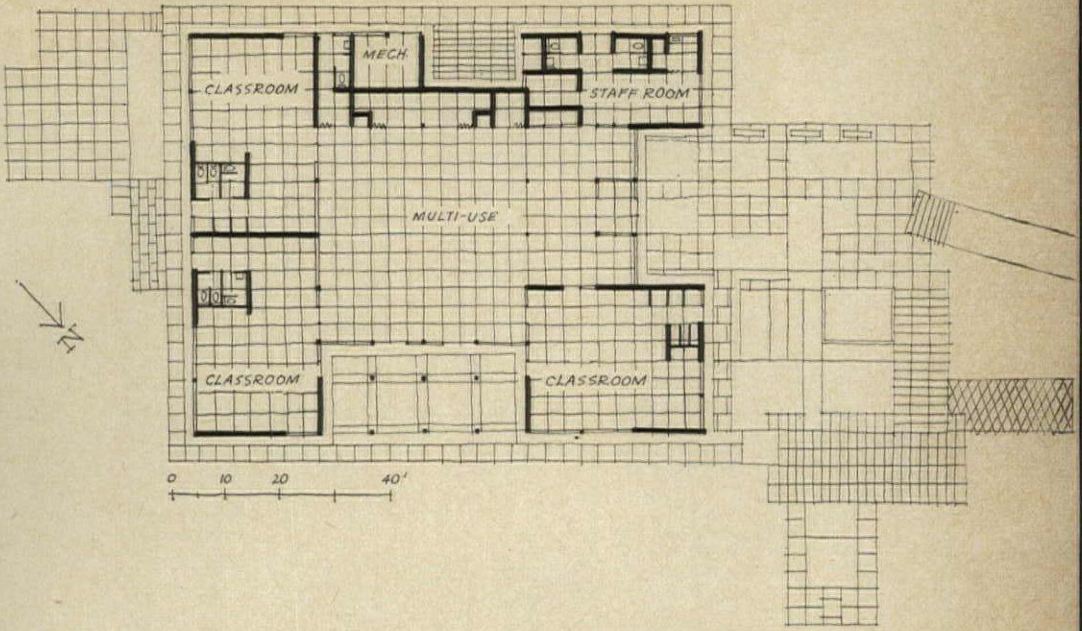
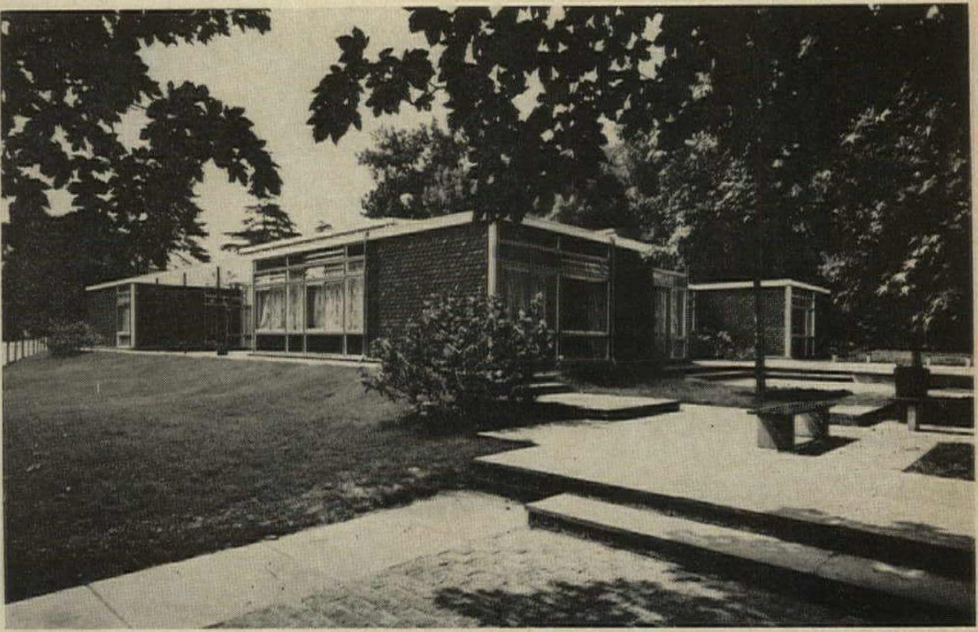


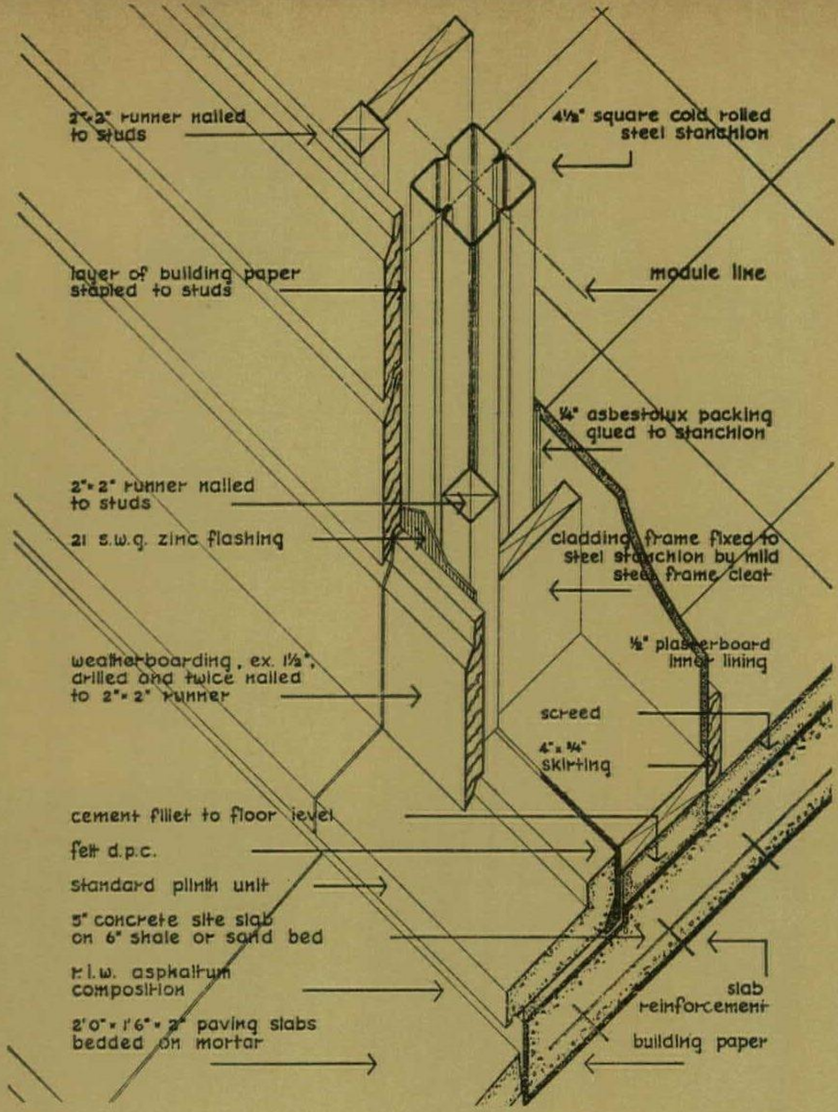


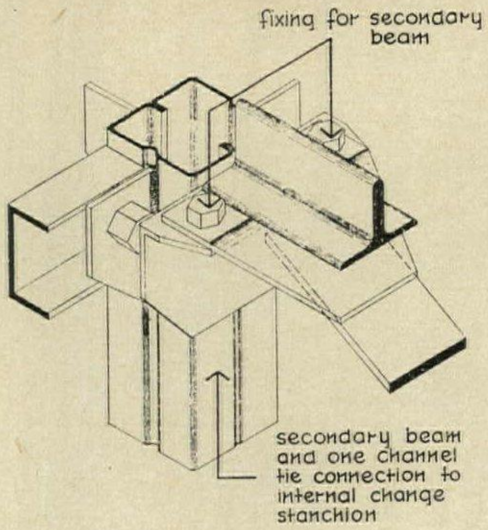
Latest model of English component *prefab school is called CLASP, for the "Consortium of Local Authorities, Special Programme" which sponsored its design beginning in 1957. It is based on other pioneering prefab schools developed in England since World War II. Shown is the typical CLASP school erected at the 12th Milan Triennale in Italy in 1960.*

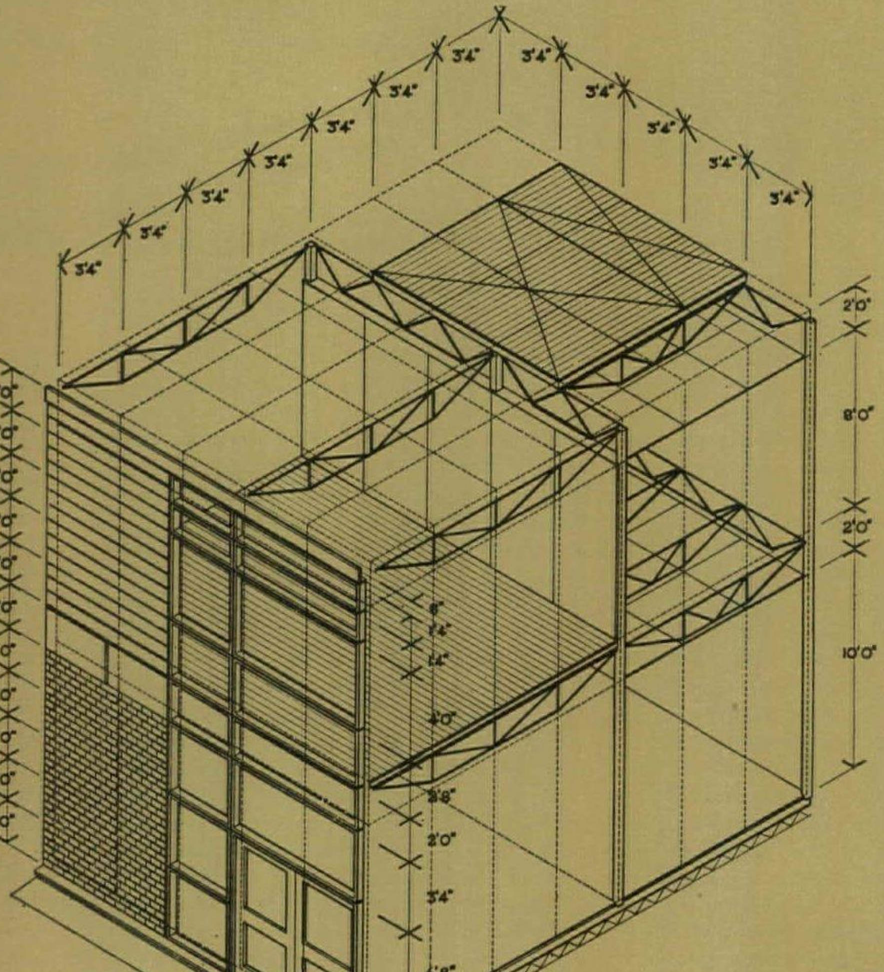
Components of CLASP schools are to a substantial degree factory-produced on a 3-foot, 4-inch module which permits local architects wide latitude in the actual design. The panel walls of the Italian exhibit model (later presented as a gift to the city of Milan) were tile, but other wall alternates, ranging from wood boards to aluminum panels, can be used. The CLASP system is designed to cut sitework and speed erection, and has succeeded: currently CLASP schools go up in about half the time needed to build conventional schools; site labor is about three man-hours per square foot of floor area. Beginning with costs for pilot models higher than standard schools, CLASP costs have decreased steadily as production runs of components have lengthened, and are now well below conventional construction. Midway in 1960 one county's CLASP schools were running almost 8 per cent below conventional school costs. The consortium continues to invest one-fourth of one per cent of its gross yearly construction expenditure in research and development, further to improve the system.

Earlier English prefabricated schools had worked on modules as big as 8 feet, 3 inches, and as small as 2 feet, 8 inches. The developers of CLASP reasoned that the 3 foot, 4 inch module could adequately meet the wide range of different requirements in educational buildings, yet not become so small as to present immense complications in manufacture or assembly. Their program called for external walls which could change direction at intervals of 6 feet, 8 inches and 10 feet—or any combination of these two dimensions. Steel columns can be located at any intersection of the 3 foot, 4 inch square grid; partitions—built dry—are centered on grid lines, with their faces 4 inches to either side, and changes in partition direction can be made at 3 foot, 4 inch intervals. Window sills are either 2 feet off the finished floor, 2 feet, 8 inches, or 3 feet, 4 inches. Transoms and door heads are at 6 feet, 8 inches; floor-to-ceiling heights can be 8 feet, 10 feet, 12 feet, 14 feet, or 16 feet.

Factory-made components in the CLASP system include steel frame units, parts for the heating system, precast concrete panels, window frames, aluminum sliding windows and ventilating louvers, finished rubber floor, eaves units, roof lights, light-gauge steel vitreous enameled panels, internal doors, prefabricated partitions, and sanitary fittings—no startling industrialization of building components. But the key to savings is the fact that contracts for these are let on the basis of the estimated quantities required for all the buildings in the annual program—and these have grown to become substantial quantities. The manufacturer can run the complete quantity ordered all at once or produce in times of slack, and stockpile.







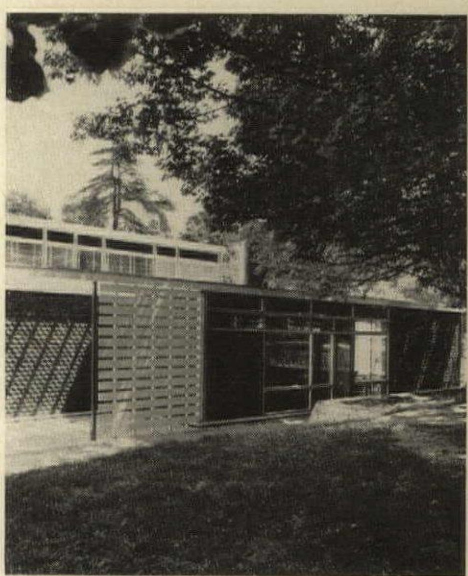
isometric projection of typical building showing the relationship between the various components and the module lines, both vertical and horizontal.

CLASP schools *are set on concrete slabs varying from 5 to 8 inches thick. One requirement in their design was to accommodate some ground movement because many must be erected in old mining areas. For this reason the vertical columns are pin-jointed, and are stabilized by spring-loaded diagonal wind braces. Also for this reason, window frames are wood (Swedish redwood) although sash are aluminum. At left is a diagram showing typical column and slab meeting; above, the typical column head. All columns are square. All components are kept comparatively small and light to avoid the necessity for large machinery to handle them on site.*

Diagram at lower left indicates the vertical flexibility of the system, and typical details are shown at the top of the facing page. (Eaves gutter is drained through a prefabricated rain-water head fixed to the fascia.) Below, opposite, is the window schedule for the CLASP system, totaling 50 sizes, with a vast possibility of combinations by the local school architect. About 130 standard drawings are issued to show the components and assembly details of the CLASP system, so architects need spend only half as much time on production of drawings.

CLASP can be built to a height of four floors, and has been used for other building types besides schools. The British War Office Computer Building in Winchester (right) was assembled from these same components. Drawings here are from British Ministry of Education Building Bulletin 19, The Story of Clasp, *obtainable (price 95 cents) from Sales Section, British Information Services, 45 Rockefeller Plaza, New York 20, N. Y. Other British building bulletins may be secured from the same source.*

JOHN R. PANTLIN



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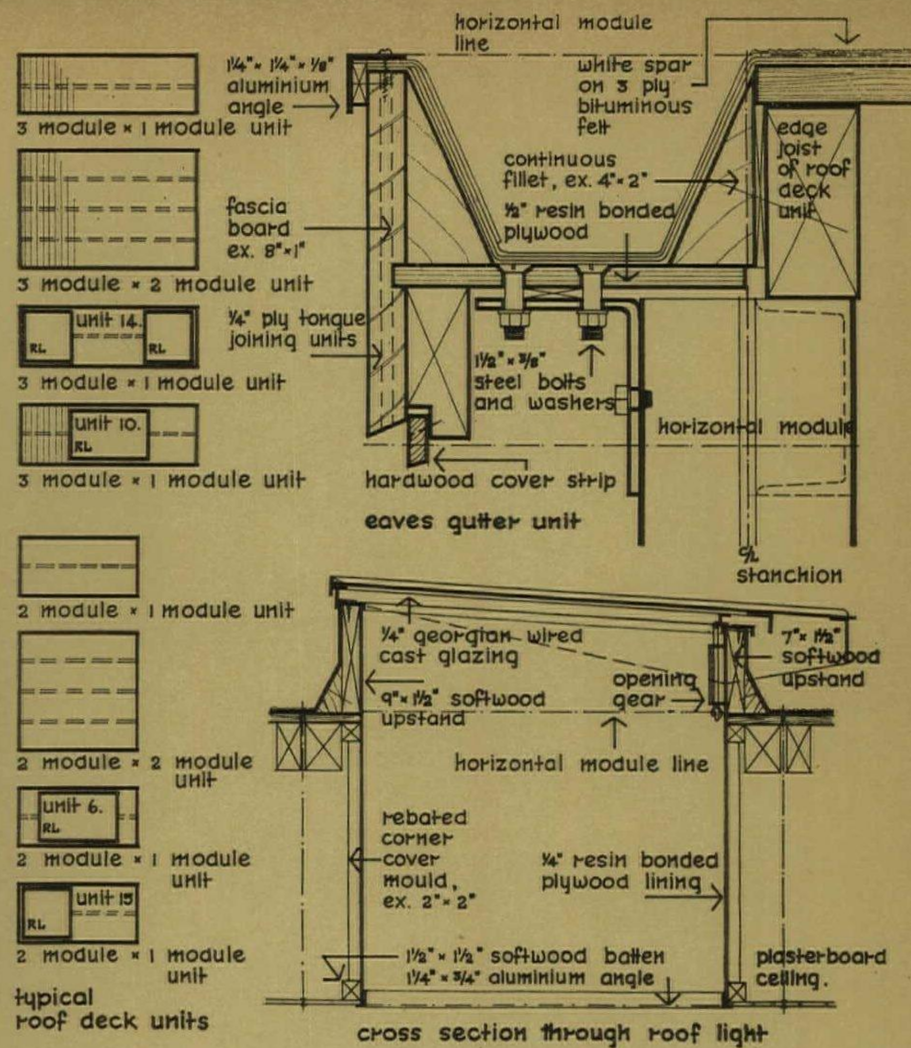
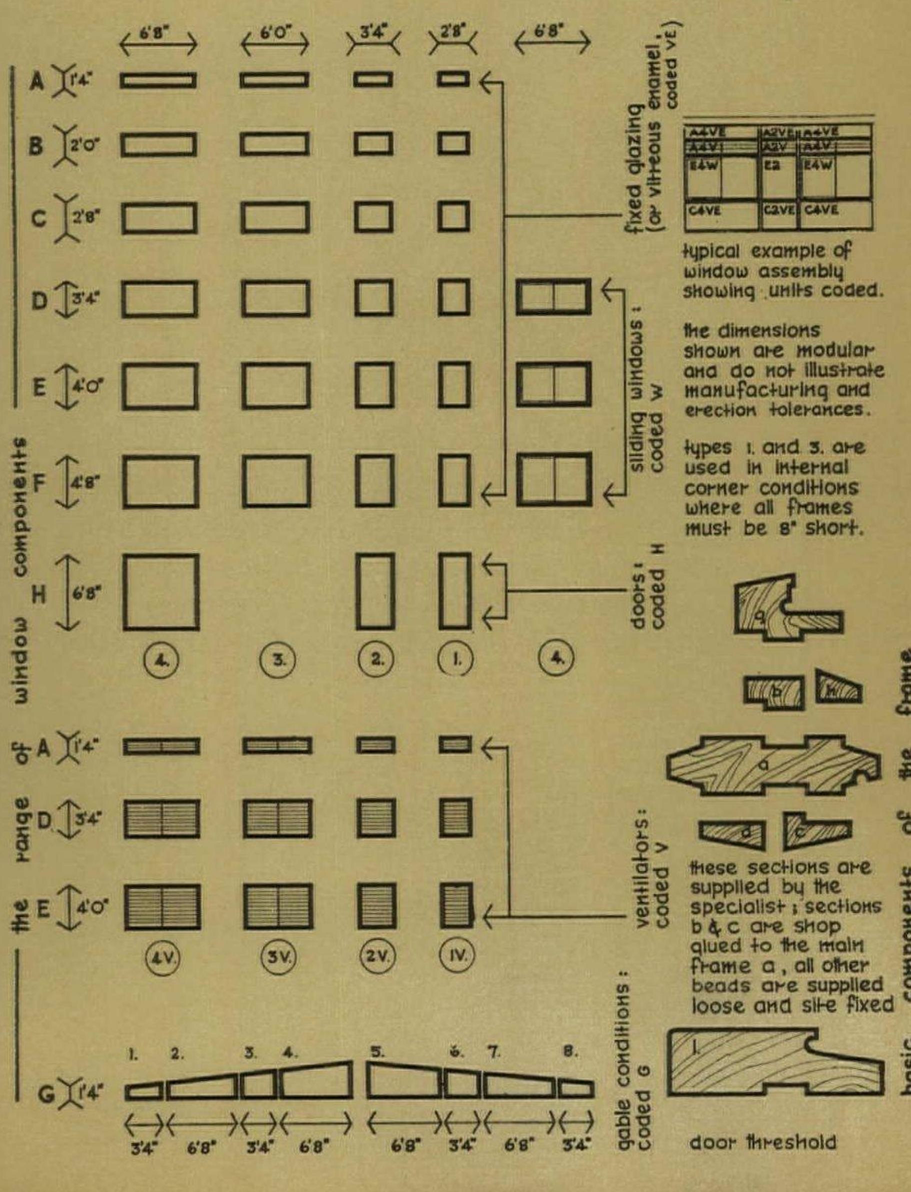




Testimony:

DRAWING BY GRAHAM RUST

Third answer: factory-built classrooms for sale—a line of proprietary school "packages" initiated by manufacturers to meet existing boom-area markets.

This U. S. enterprise of progressive manufacturers is based on markets already on hand in "population explosion" areas. The Inquiry preferred instances when the commodity offered was educational space, not a specific building material. The Inquiry debated the flexibility of such proprietary "packages" compared with generalized systems, and questioned the design of rooms as the basic unit, compared with components suited to creating any space.

J. W. HINCHLIFFE: There is another alternative to the consortium approach: for industry to take the ball and produce something that Mr. Pena and Mr. Sharp will use and the school boards will want. Northrop has been working two years, and we have probably invested a half million dollars, and we are not through yet. A large portion of this time and money is in the manufacturer's necessity to do detailed design and work out production problems to satisfy the architect's requirements.

We have built two classrooms, one square, one hexagonal. All our work to date has been based on these two shapes [see page 123]. We firmly believe that we are producing a component, not a classroom. We are producing several components.

However, which comes first, the chicken or the egg? If you produce a component, how is it going to be used in any kind of construction, unless it can be put together with something else to come up with a complete unit? So, we have engineered wall and roof components which, together with a joining system, can be arranged by the architect to meet the requirements of the school district. We have tried to incorporate a higher degree of flexibility and a higher degree of quality through the use of modern techniques and materials than has been possible in the past. Further advances along this line remain to be accomplished, and it is our belief that industry can do this.

Also, there is one significant thing that has not been mentioned here, at least not in terms of hard dollars, and this is that the market, if we want to get crass and commercial here—

HASKELL: We do.

HINCHLIFFE: —the market for school construction in the 1960 decade is fantastic by any measure that you want to make.

Just in the state of California, I think the latest figures are 15,000 classrooms a year. This is one hell of a volume of business. In Los Angeles County alone in the 1960s there will probably be 4,000 classrooms per year built in that one county.

GIBSON: Out in San Jose we have projected at least 50 high-school sites in one school district. You can't get a much bigger market than that. That could support the development of a complete component development in a single school district.

GORES: Can I say a word with respect to what I think the difference of Northrop's approach is and the approach of a good many others who have attempted to get into this field?

Northrop started with the first question, which was: How do we create good educational space?

Many of the others who have moved into this field started with a much different question: How do we sell a certain metal that we manufacture, that can be put into educational space? Northrop started with the *space*, without regard to what might turn out to be made of it. They regarded the materials as being secondary; isn't this correct?

HINCHLIFFE: Right. We don't make materials.

EHRENKRANTZ: But this system actually has been developed to meet a very specific need. The whole use of it is predicated on possible clusters of buildings under 5 thousand square feet total, fitting into certain code requirements within the state of California. The classroom sizes are based obviously on the California code requirements, and all the parts are related to this so completely, I believe, that it can only be considered in terms of special purpose. Although units can be grouped together and form clusters in other ways, this approach, as I see it, will be second best for other things, for which it was not really designed.

MCQUADE: Beyond that there is something less tangible in favor of a more adaptable component system.

The only one of these British schools I have seen was in Italy, erected at a fair. One of its great qualities was that it did not have an entirely industrial look. Sure, it was a sleek industrial wall frame, but the frame was filled in with a very old and charming material: roof tile. Although the market is immense for classrooms, I wonder if the resistance to an industrial classroom isn't also immense, and whether this is not a mighty factor in favor of component prefab as opposed to prefab classrooms.

HINCHLIFFE: You are exactly right. There will be resistance. Everyone is fearful that it will turn out to look like a factory building, or a tin can. It is up to the people who go into this field, whether it is us or someone else, to overcome this by providing the proper esthetic treatment to make the building esthetically pleasing.

GEORGE MARTIN: Kawneer has been active in the development of components rather than entire buildings or rooms. We believe it is important for the architect and educator to express the processes and functions of an individual school and hence we shy away from the concept that there is an "ideal building" or an "ideal classroom."

We and others could produce prefabricated structures. There have been a number of good ones on the market for several years. We believe that the lack of widespread acceptance is due primarily to the lack of flexibility both in function and appearance design.

However, I do think that further development of components will be accelerated and will lead to continually improving schools rather than the "consortium of buyers" approach which has been so ably administered by Mr. Part in England.

It would appear that in the U. S. we can benefit greater from the activities of a group of manufacturers. I doubt at this point if we have any single manufacturing concern which could muster the many skills and the many areas of knowledge that are required to fabricate the complete set of components—building envelopes, mechanical, equipment, and the many other groups of products and specialties that go into a school. Nevertheless, in a group of manufacturers we do have opportunity for substantial progress. The advantages of this approach are numerous, but particularly important would be a wide range or assortment of "large" manufactured components. This would provide economy and just as important would allow great design freedom to fit a variety of educational and community needs.

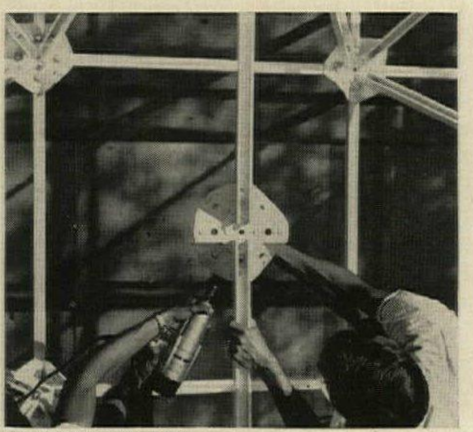
PART: It seems to me you have to have a team which includes a progressive group of manufacturers, some very good educators, and some really first-class architects with rather special talents. This has to be a small group. It has to be a working group, not a committee. It may have a steering committee, but the actual working group has to be quite small.

The most important thing is to get something started somewhere on a really first-class basis. If you start this thing on a second-class basis, I believe it will kill it, because you will come up with a slightly substandard, not very satisfactory, not very acceptable solution, and that will be the end of Erector sets in the U.S.

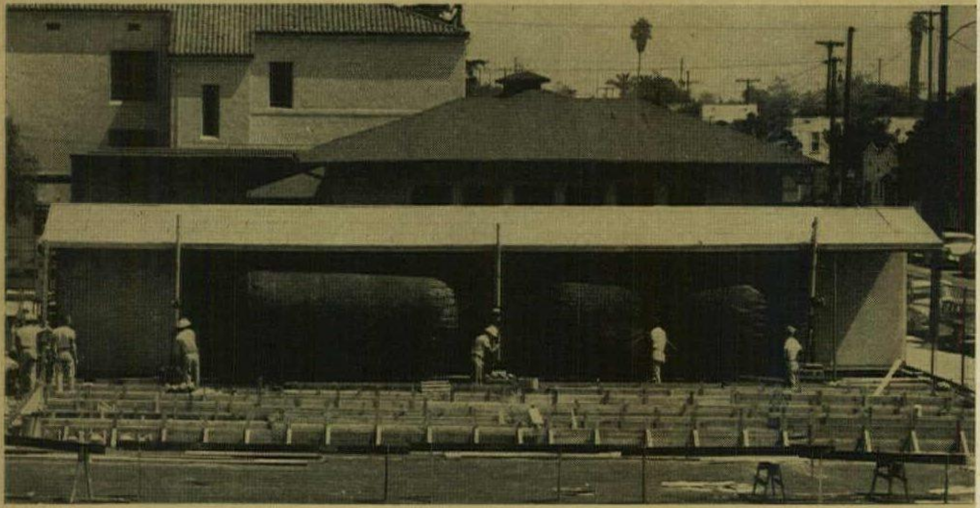
JOHN ZIMMERMAN—LIFE

Evidence: American prefabs make a beginning.

Network of short metal connectors *framed a test school at the University of Michigan in Ann Arbor in 1951, and was further developed in a research building erected there in 1953 (left, and below). The framing is a proprietary system, Unistrut, widely used elsewhere in construction, but the manufacturers have not pushed it in the school market. (Wayne, Mich. does boast three Unistrut schools.) A big advantage of the three-way framing is the small size and easily handling of the struts; a disadvantage may lie in the extensive jointing.*



JOHN ZIMMERMAN—LIFE

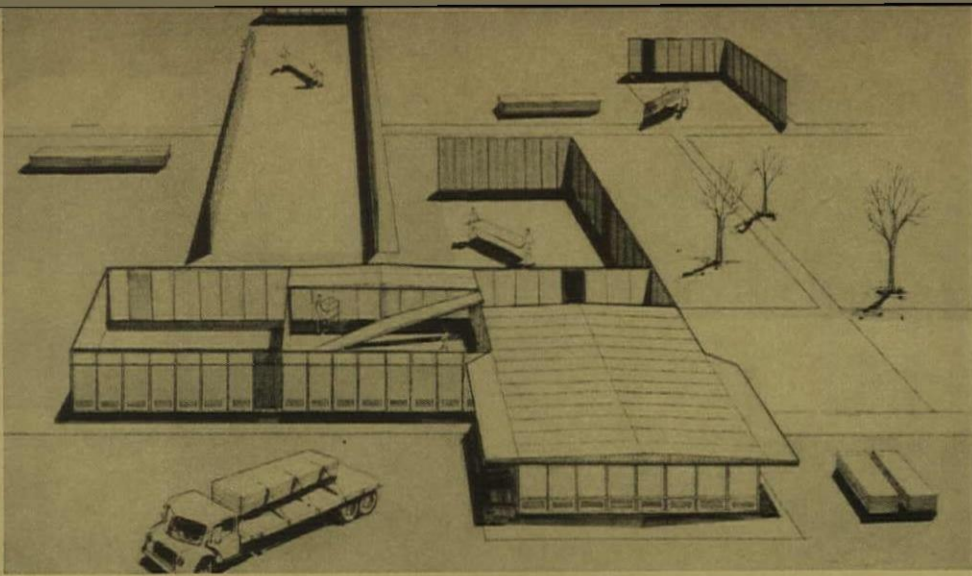


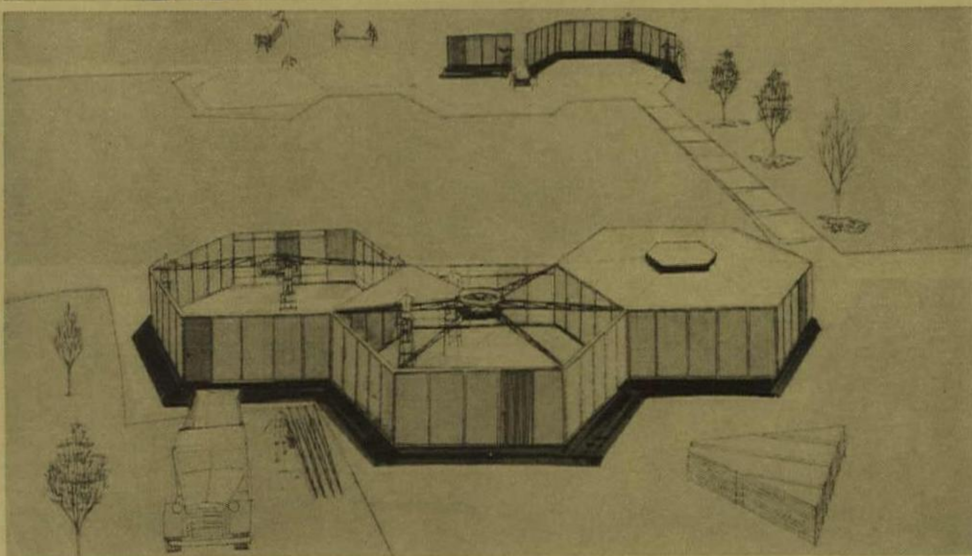
R. BOULWARE

Portable double classroom, *complete except for its foundation, is made by Transa Structures, Inc. of Fullerton, Calif. The system of erection is guaranteed to fascinate a class of children, as well as house it. The classroom is folded into a trailer and rolled to its site; a pair of gigantic balloons are inflated in the unpacked assembly to raise the roof into place; as the balloons are deflated, the floor, which had been perpendicular, moves down into place. The final wall then is lifted into place. The school is designed to move on to other neighborhoods when the demand becomes less urgent on its first site.*

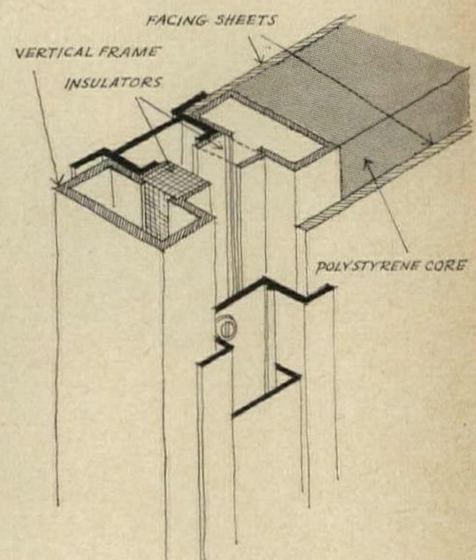
COURTESY "DEPT. OF ARCH., MIT"

Plastic parasol *can be planted in groups to shelter schools. Developed by Architect Marvin Goody under a grant to MIT by the Educational Facilities Laboratories of the Ford Foundation, it is made of 8-foot-square sandwiches of reinforced plastic facings and foamed polyurethane cores bolted to steel stems, which also are the drains for roof water. Photograph was made at test installation now being completed in Cambridge, Mass. Also encouraged by EFL, New York's Tishman Research Corp. will shortly announce a development program for a prefab, multi-modular system for schools.*



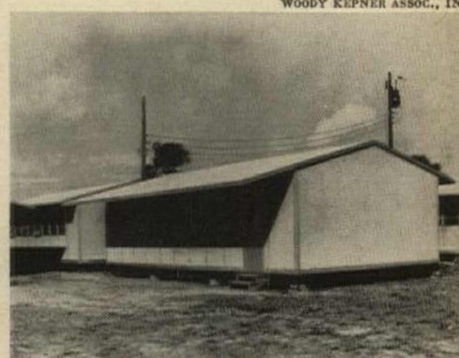


Flexible classroom component *developed by a subsidiary of Northrop Corporation (Architects: Charles Luckman Associates) will be a completely packaged set of parts to be assembled either in square classrooms or hexagonal (left). If hexagonal is the choice, the classrooms may be clustered, with pipe columns replacing the wall-bearing components toward the center of the cluster. Panels of this prefab have a core of polystyrene; skin is aluminum. This model is demountable; when the need for classrooms evaporates in any one neighborhood, the manufacturers expect no difficulties in unbolting the structure and moving it in parts to another neighborhood of the school district.*



HARPER LEIPER STUDIOS

WOODY KEPNER ASSOC., INC.



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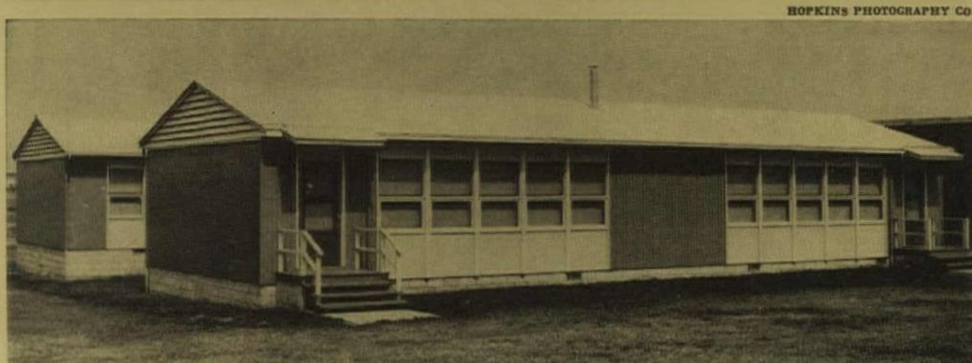
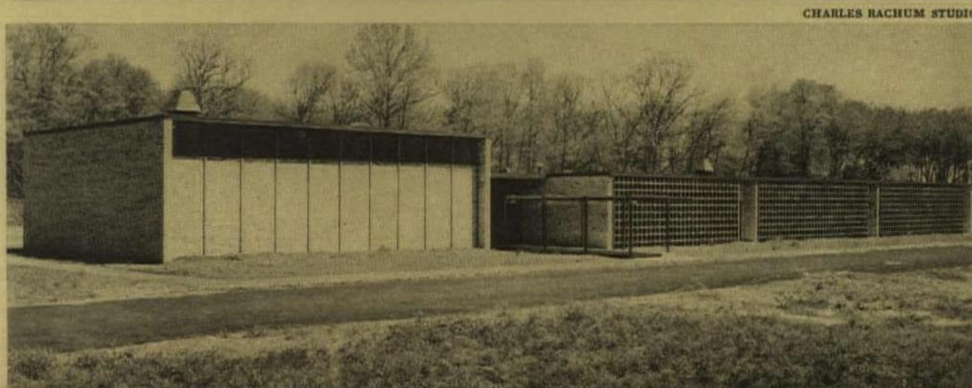


CHARLES RACHUM STUDIO



Factory-made schoolrooms, *or even factory-made components for making schoolrooms, vary in finish in the U.S. from steely to splintery; production quality of several of these is high, but only occasionally is there a design which architects and school superintendents admire. Too many, say critics, look like cheap motels. The range is shown in this gallery of some of the prefab and component prefab schools available in the U.S.: top left: Butler Manufacturing Co. school; top right: Panelfab Products, Inc. classroom; middle: Southern Mill and Manufacturing Co. classrooms; bottom: Unitec Corp. School.*

Testimony:

DRAWING BY GRAHAM RUST

Fourth answer: component systems, more flexible than Britain's, to match diverse architecture, universal bids, and the vagaries of local boards in the U. S.

So many boards, so many programs, so diverse an architecture, so much unrestricted opportunity to bid, means that components in the U.S. must be on virtually an industry-wide basis, contended one Inquiry member. First step: a test run where one architect is systematizing standard catalogue components so another can get his Erector set on a bid system. But the question remains: how much economy does this "cross-over" method achieve?

EZRA EHRENKRANTZ: The difficulties of embarking on a program of specific component prefab systems are greater in this country than in England. I think much more variety would have to be introduced into the program in order to make it possible here.

I was in England during the period of development from 1954 to 1956, which would probably be midway within the program. I was very much impressed, but I also had the feeling that the systems themselves were based on a substantial volume for a single manufacturer's kit of parts for an Erector set, and the standardization suited to a whole county in England might not be terribly successful in the U.S., with relatively smaller school boards and a greater need for variation. One other difficulty is the U.S. system of open bidding. Different manufacturers must submit bids separately, on the basis of price, for various products, such as windows, reducing the opportunity to take advantage of working with a single manufacturer's components. There is an advantage in working with a number of manufacturers, however, in that it enables the architect to specify what he believes to be the best product for a specific job.

Yet there is a possibility here, I believe, of setting up a system of Erector sets on a much wider basis, so that an individual architect could design a school using the parts of several separate manufacturers and not sticking with any particular Erector set. By reasonable coordination of the majority of components already used within the building industry, you can begin to make a great big Erector set—in effect, the total complexity of products which are available for regular construction. Thus, the coordinated component systems could be related to one another so that the designer could combine the most desired element of a number of manufacturers.

HASKELL: Ezra, aren't you trading one advantage for another?

EHRENKRANTZ: I don't think so. I think in this case you can have your cake and eat it, too. The flexibility for which you can design components is such that you are not limited to a single large grid. The increments of flexibility could be quite small: 4-, 3-, or even 2-inch increments.

PART: I see what Ezra is driving at, and the only concern that I would have would be that one should set one's self a manageable target to start with. If one's aims are too ambitious, the mathematical and design problems will be so extreme that everybody will collapse in dismay. So one must be reasonable.

I think one has to be rather careful not to get led down the path to subdividing this whole thing into 4 inches, because then you get into a thing which is really not a module in terms of practicality, in terms of Erector sets at all. I don't say it is impractical to make component systems interchangeable, but it is very ambitious.

EHRENKRANTZ: May I explain in a little more detail what we are trying to do in our E.F.L. project with the Cupertino school district in California?

Two architectural firms are involved in this project. Our own firm is trying to set up the flexible group of components for another architect to use—Kal Porter, who is the district architect for Cupertino. The separation of the design of the components and the use of them is made so that we could not be acccused of designing our own specials, which we would then incorporate in a given school system.

Our firm is coordinating the products that Porter normally uses. There are a number of different window types, for example, that he specifies on an approved basis, so that we have worked on these manufacturers' sizes and sections to coordinate them with other wall, floor, ceiling, and roof materials that he uses, including the interior cabinetwork, furniture, and floor materials. We also work with the manufacturers to explain the idea, the principles of the coordination, to see what sizes they can produce with existing production equipment. When analyzed, most of these components have flexibility possible in increments of 1 foot downward. We have worked with probably 25 different components. We are also going into lighting systems and heating systems, trying to be as comprehensive as possible.

The manufacturers indicate that there would be considerable potential savings if such a standard range could be used in a more general and wider application. If a range of these standard components could be developed and used which would give various architects reasonable flexibility for custom-designed schools, *large* economies could result.

GEORGE MARTIN: It is not uncommon to see two processes on a job: one the process of specification, and subsequently the process of selling what is actually used on the building. The material in the building can certainly be different from what was specified.

WALTER McQUADE: You mentioned that you perhaps could save on the price of windows as a component, between 20 per cent and 32 per cent [addressing Mr. Ehrenkrantz]. Always the question on standardization is: at what level do you make the saving? Would you have to coordinate a million dollars' worth of windows or even all the school program windows in California? Where would that saving come? At what point?

HASKELL: Could we get an answer from a manufacturer on that?

MARTIN: Well, in terms of today's context, the number of windows does not need to be large to effect economies. Today, if you get 100 windows of like specifications, it is a large order. Yet it is obvious on the surface that that is not mass production.

McQUADE: Suppose the difference were between 10 thousand windows and 100 thousand windows, would there be a great deal of saving?

MARTIN: I could not see that as being the breaking point in terms of *today's* technique. No, I think—and this is just off the top of the head—we would probably be talking in the *early* thousands as a breaking point to get into real benefits of standardization.

McQUADE: Then the standardization can be at a comparatively low level?

HASKELL: Five schools, or something like that perhaps?

PART: For what it is worth, the British answer was the school building program of a large local educational authority.

SHARP: I would like to get back to another point that was discussed. I think we have got some pretty good manufacturers of different parts. But it is always the *connection* that comes hard. Also, knowing which kind of deck you are going to get, particularly in public bidding.

For example I think there is more chance of succeeding if the Erector set is thought through all the way. So when we decide on a certain kind of window-wall panel, we know either what decks will go with it or have a system that, because of standard connections, will accept a number of alternate roof decks.

HASKELL: Let me tell you how I was imagining this thing being set up. I was imagining that the state of New York, without saying anything at all in this context about its present thoughts on stock plans, might propose: "Boys, we have another thing we want to try. We are going to call together an industry committee and some architects to try to work out a coordinated system which would be available just as the stock plans we have been doing are available, for bidding in this state, and in that case any manufacturers that conform to that system are available to bid, or contractors can bid any manufacturer's product that fits that system."

Is that bad?

JONATHAN KING: I too keep thinking of Governor Rockefeller's million dollars and wondering if this could not be used to some advantage in this direction. I would like to ask Mr. Part if he has any notion of the rough cost of developing these several Erector-set principles that were done in Britain.

PART: I am not sure I really ought not even to try to guess, but talking order of magnitude, the time of 20 or 30 men for a year—that sort of thing.

Evidence: flexibility within a component system?

Although the problems are considerable, Architect Ezra Ehrenkrantz believes that prefabricated, modular construction can be an effective method of providing flexibility to cope with changes in school theory and layout.

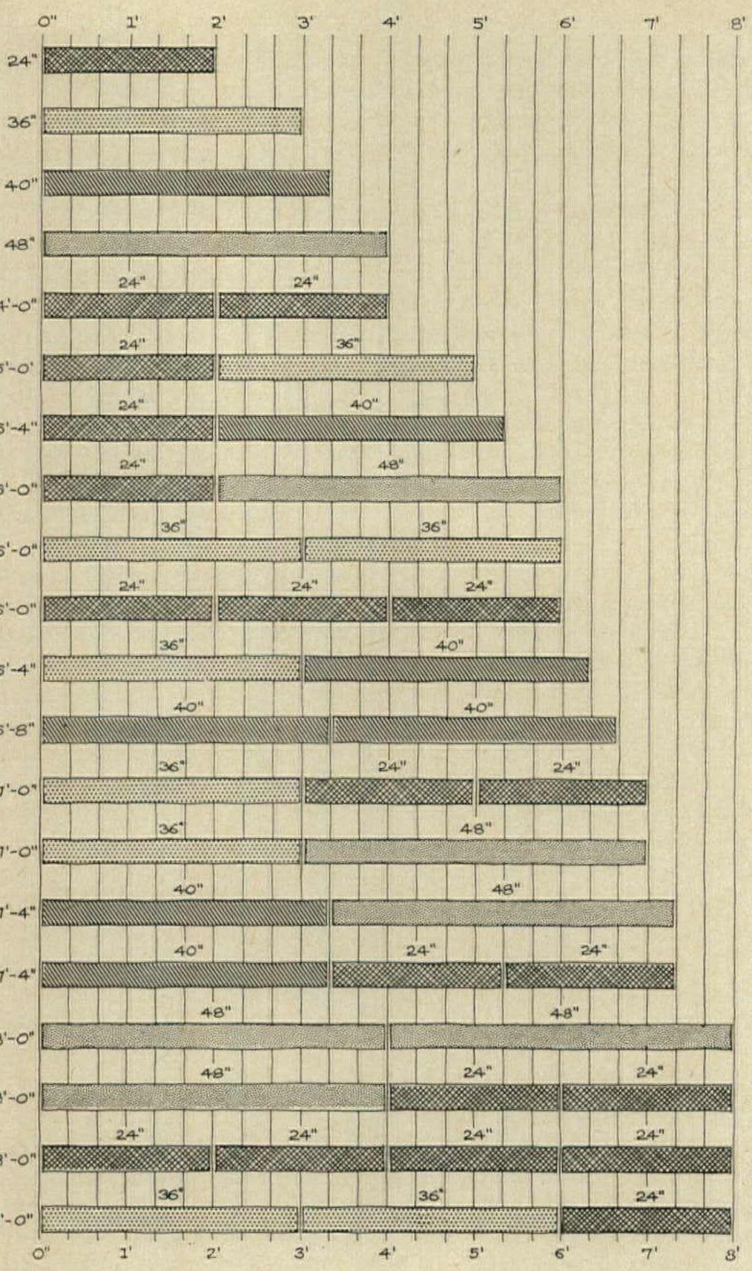
The physical requirements are varied and seemingly contradictory. Large and small architectural spaces as well as a wide variety of standard materials and products must be accommodated within the same modular system: walls as short as 3 feet or as long as 90 feet, bricks 4 inches wide, and window mullions $2\frac{3}{8}$ inches to $3\frac{1}{8}$ inches must somehow have workable meshing points in common. No single unit can accomplish this; for example, the smallest dimension which will accommodate multiples of a partition element at 30 inches, a window of 45 inches, and a ceiling panel of 24 inches, is an almost incredible 30 feet.

Ehrenkrantz, therefore, offers a solution based on "component ranges." What this amounts to is a sort of anagrams played with unit lengths. If only one unit of 4 feet is used, connections, changes, and turns can be made only at 4-foot intervals. But, if both 3-foot and 4-foot lengths are used, the interval drops to 1 foot (starting with 6 feet). And, if a third unit of 30 inches is added, then 6-inch flexibility is obtained. This can be continued: four different units can produce 3- or 4-inch flexibility, and as few as six units can produce 2-inch flexibility.

It is not necessary, nor is it generally possible, for different product ranges to provide the *same* increment of flexibility. Multiples of small units coincide so often that workable flexibility is almost automatic. (See chart below, right. For a more complete discussion of modular coordination, see "How to make things fit together," by Ezra Ehrenkrantz, FORUM, Aug. '60.)

How would this type of flexibility mesh with currently available product ranges for school construction? Ehrenkrantz has examined three of the most important products for prefabricated school construction: movable partitions, windows, and sheet products, and has reached some optimistic conclusions:

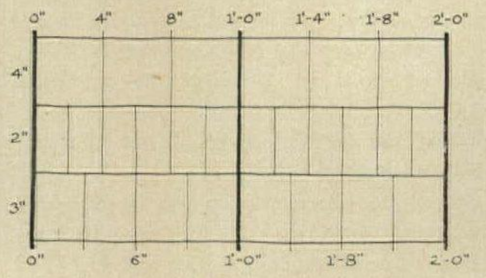
Movable partitions: The products of four major manufacturers were analyzed and it was discovered that each



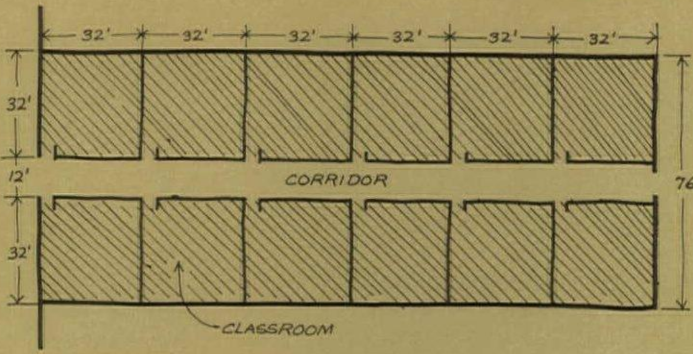
To demonstrate the ease with which a modular range of lengths can accommodate itself to various school layouts, Ezra Ehrenkrantz has chosen a sample range (above) and shuffled the lengths to produce five different diagrammatic plans (right).

The four panel lengths chosen were 24 inches, 36 inches, 40 inches, and 48 inches. These provide flexibility to increments of 4 inches beginning with 72 inches, excepting 7 feet, 8 inches (see diagram above).

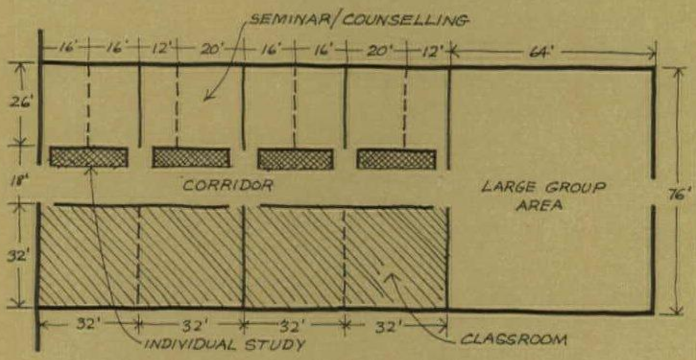
All of the plans assume clear spans bearing on permanent exterior walls and a 4-inch wall thickness throughout. Top right: a conventional classroom block consisting of a double-loaded corridor and 12 equal-sized rooms. Second from top, right: The original plan altered to provide a large group area, seminar, counseling, and individual study areas. Total linear feet of interior partitioning is reduced; partition panels taken out of use could go into storage. The other plans show additional variations of the basic classroom wing. All can house additional students in the bargain. If need be, it is always possible to revert to the campus plan.



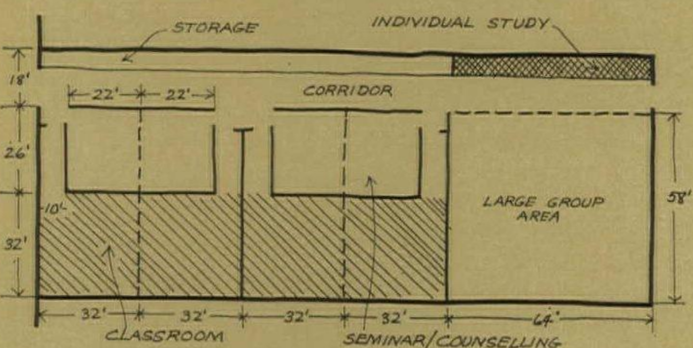
Scale showing relationship of 2-inch, 3-inch, 4-inch increments of flexibility in any 2-foot run (left). Two inches and 4 inches mesh three times each foot; 2 and 3, twice; and 3 and 4, once. Therefore, when product ranges having flexibility to 2, 3, and 4 inches are used together, changes of direction or unit can be made at least once each foot.



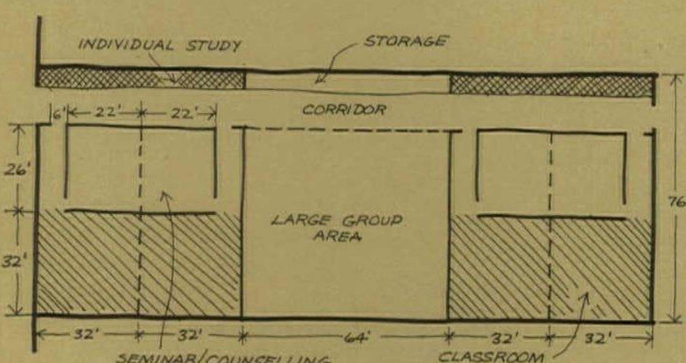
INTERIOR PARTITIONS = 768 LINEAR FEET



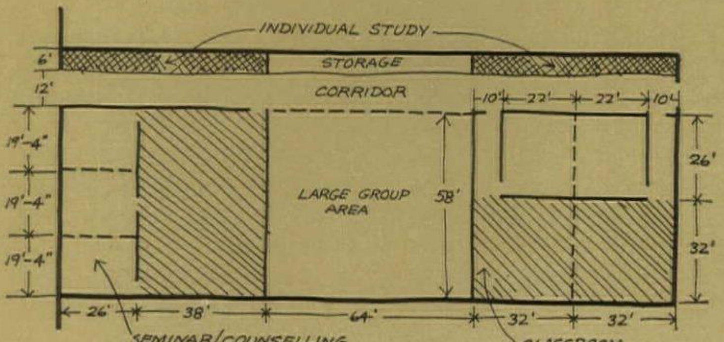
INTERIOR PARTITIONS = 722 LINEAR FEET



INTERIOR PARTITIONS = 772 LINEAR FEET



INTERIOR PARTITIONS = 760 LINEAR FEET



INTERIOR PARTITIONS = 710 LINEAR FEET

made from 10 to 19 different-sized partitions. According to Ehrenkrantz' figures, a selection of six or eight sizes is required to produce 2-inch flexibility, so that no change in the industrial process would be required to instigate Ehrenkrantz' coordination system. In fact, there could actually be a reduction in the number of standard sizes.

Windows: Only minor dimensional changes and the occasional cutting back of a section or the addition of an extra edge section would be necessary for modular coordination. No reduction or addition to the number of current standard sizes would be required.

Sheet Products: There is no technical reason, Ehrenkrantz maintains, why softwood plywood cannot be manufactured in 3 by 8 foot and 5 by 8 foot sizes as well as in the standard 4 by 8 foot panels. If the 4-foot panel were split into 2-foot pieces and the 5-foot panel into 20-inch and 40-inch pieces, 4-inch design flexibility would result without waste.

This approach to modular construction does not require that any developments which have already taken place be thrown out. On the contrary, materials and products which have been sized to various increments of 4 inches would actually become part of larger product ranges.

Says Ehrenkrantz: "Flexible and efficient school construction cannot be the sole aim. If a system is to succeed, all those concerned with the building process—designers, manufacturers, contractors, and clients—must find it an asset, for resistance by any one group can block the entire project."

He lists the advantages: For the designer the system could provide a neutral keyboard allowing varied architectural possibilities without esthetic bias. Time saved on structural engineering and detailing could be spent on design itself. For the materials manufacturer it could mean a simpler line of products, virtual elimination of "specials"—the cost of which, Ehrenkrantz maintains, usually exceeds the cost of resetting a jig—and the opening up of a new market. The contractor should be able to do more accurate bidding, closer scheduling, and have more freedom for substitution—the "or equal" problem which can make or break a building. And for the client it could mean cost reduction and quicker occupancy as well as providing flexibility for planning and later changes.

Conclusions and recommendations

The School Economy Inquiry did not take its positions by votes registering a majority and a minority but sought to unite on the "sense of the meeting," with which all agree sufficiently to endorse it. Antony Part, although his lucid reporting and commentary greatly contributed, made it clear all along that he would not join in any conclusions because he was a guest in a country not his own, where he did not affect to understand the full situation. Here, then, is the sense of the meeting, concurred in by the others:

Stock plans were not fully discussed; rather, the question of stock plans was laid to one side on the premise that a favorable outcome was so debatable, and the gains at best so minor, with so much history of failure, that the time of the Inquiry might better be spent on more promising proposals.

Appropriations by states and cities might henceforth better be applied, it was concluded, not to stock plans but to the development of prefabricated component systems, so-called Erector sets out of which any number of schoolhouse plans could be assembled. This the Inquiry thought must happen subject to certain qualifications:

1. Whether to choose any prefab system or not would be up to the individual school board, just as today boards are free to use stock plans or not at their own discretion. The Inquiry noted, however, that the very existence of component systems, or Erector sets of parts, would stimulate architects, even when creating completely independent designs, to adopt the newer techniques.

2. Prefabrication should not be developed by states in their own architectural departments if they have them, because the type of thought involved lies outside accustomed channels. It would be better either to contract for the development research of such systems on the precedent of defense development contracts, or to make available state funds to aid qualified groups that have initiated such development. About the essential composition of such groups, see second paragraph below.

Initiative can come from sources entirely private, such as progressive manufacturers of building components. The market in areas of rapid population growth, like the city of Los Angeles, needs none of the guarantees which were given to manufacturers in Britain by counties grouping themselves into "consortiums." Some concentrated American markets are so huge that they justify the whole heavy investment necessary for a true development program. In any event no prefab system of any worth can be developed without the assurance of a market.

An agreeable surprise is that even small runs of identical units, e.g., 100 stock windows, will start to cut costs if there are no specials (while a few thousand stock windows will cut costs significantly even if ordered over a period of time).

Participation in any balanced development program for prefab components must include not only progressive manufacturers and their skilled development engineers, but two kinds of architects of very rare and special ability: one that has the mathematical skill to work out components capable of being combined in hundreds of situations, the other a real *school* planning architect and not just a "big name." Fine educators must be consulted. For, "if this is started on a second-class basis," as Part said, "this will kill it, because you will come up with a slightly substandard, not very acceptable solution, and that will be the end of Erector sets in the U.S."

Among many kinds of prefabrication, the Inquiry had its strong preferences, though noting that the ultimate arbiter is the group of free-acting school boards that make up the market.

1. "Diner" or "motel" types of school prefab stood lowest on the Inquiry's scale. The first of these—a complete, cheap building into which education must be squeezed—would prevent any really good educational planning. The second—prefabs based on individual schoolrooms as the unit—though useful for additions and offering mobility as an asset, tend to freeze education dangerously into existing concepts. Nothing has been more characteristic in recent years than radical reshaping and regrouping of rooms to meet not only teacher shortages but new educational techniques.

2. Proprietary Erector set or component systems were placed higher, on the assumption that big school-market areas would induce enough of these to compete with one another to satisfy the American demand for real bidding competition. The form of proprietary prefab system in which some manufacturer was trying to sell a product such as a primary material was considered less likely to succeed than one in which *educational space* was regarded as the primary commodity offered. In actuality such a proprietary Erector set would probably require a joint venture by a number of manufacturers so that framing, walls, roofing, mechanical equipment, plumbing, and lighting would all fit together.

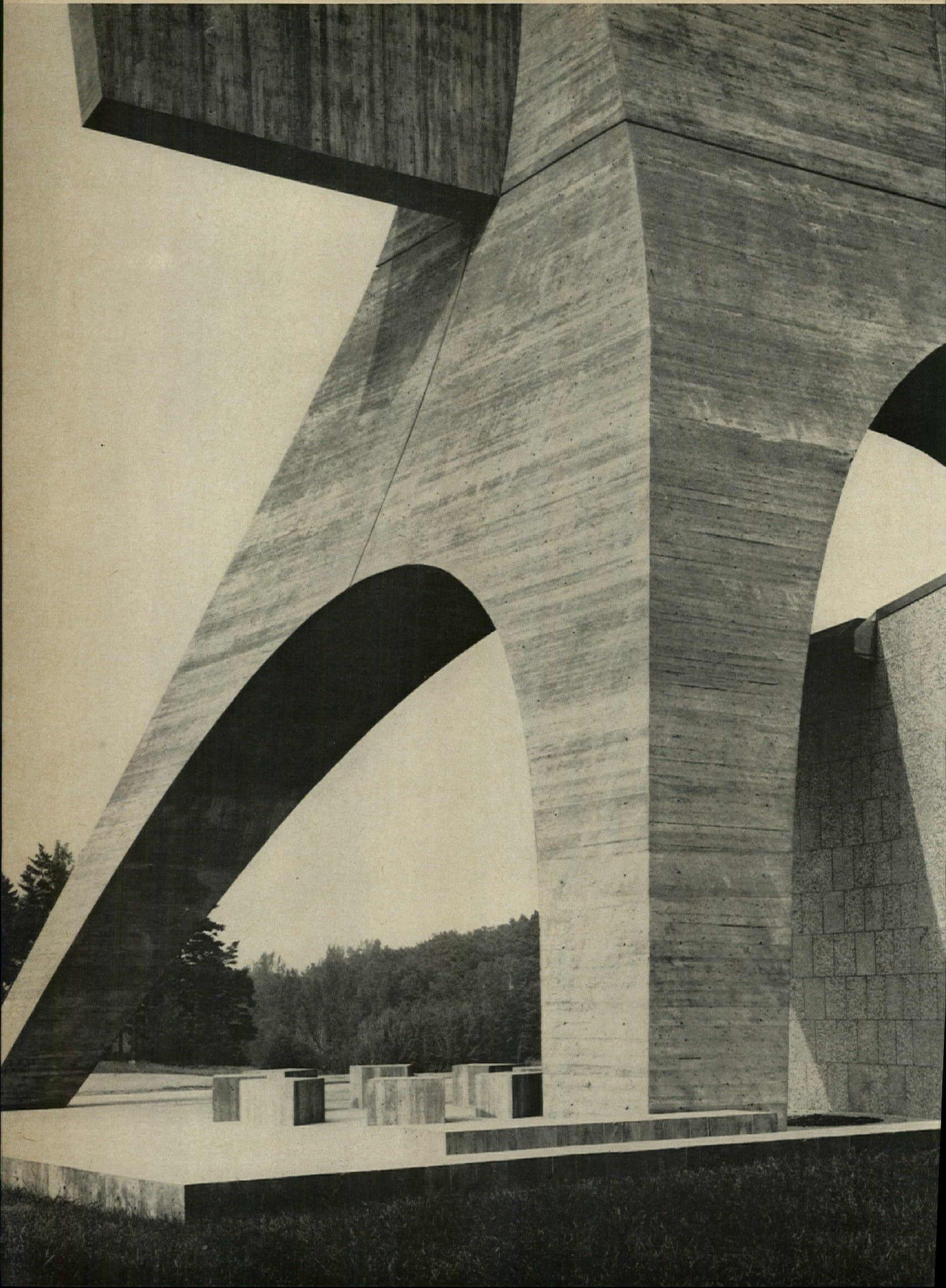
3. The "universal" or "cross-over" Erector-set system proposal was noted with interest. In this line of development a skilled "development architect" would pick out of existing catalogues those components that could fit, as is or with minor modifications, into the dimensioning system. The system would be available to other "design architects" planning individual buildings. In this way there would be a maximum number of chances to cross over from one manufacturer's product to another's. This would yield a greater spread of possible bidders, with consequent economy; on the other hand, the volume possible to one manufacturer might be less favorable, the adaptabilities less thorough.

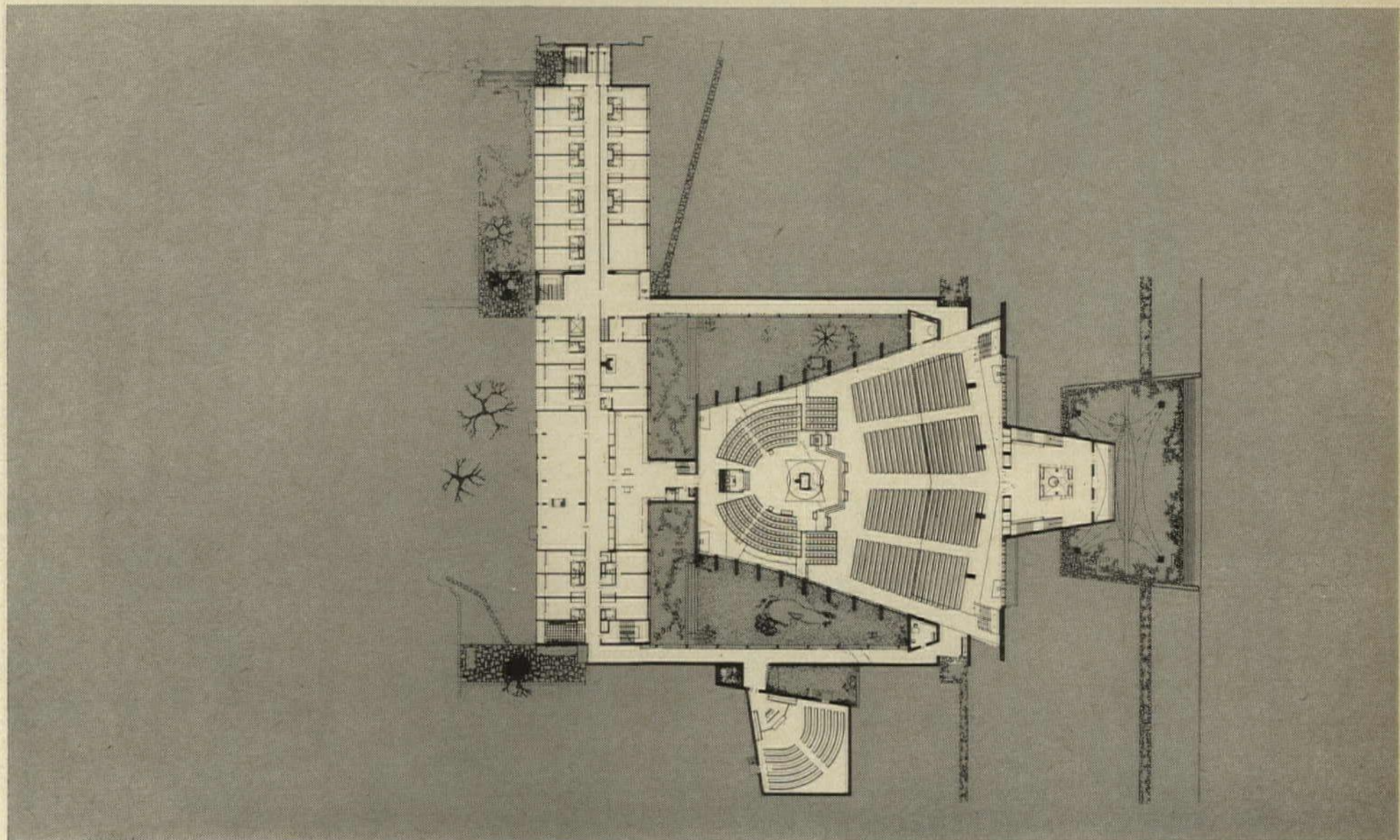
The Inquiry ended on the high hope that the vast industrial ingenuity of the U.S., coupled up with the brightest members of the architectural profession and given opportunity by enlightened administrators, might really lift programs for economical school production from today's compromised, future-destroying basis to one of high value for America's children.

The children are worth the trouble.

PHOTOGRAPHS RIGHT AND ON PAGE 110 BY GEORGE ZIMBEL AT THE RIDGE SCHOOL, RIDGEWOOD, N.J. ARCHITECTS: SHERWOOD, MILLS & SMITH.

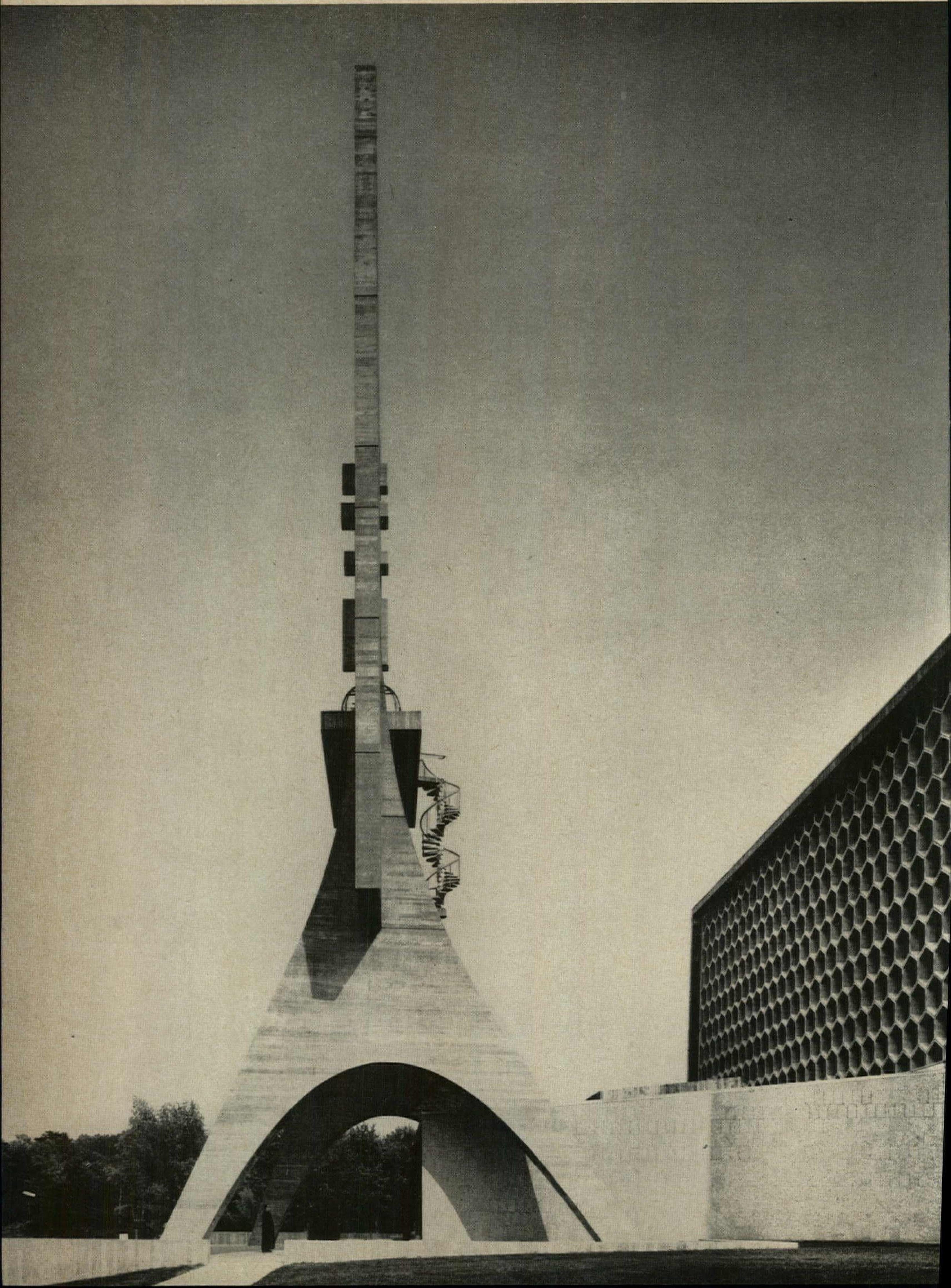
PHOTOS: SHIN KOYAMA

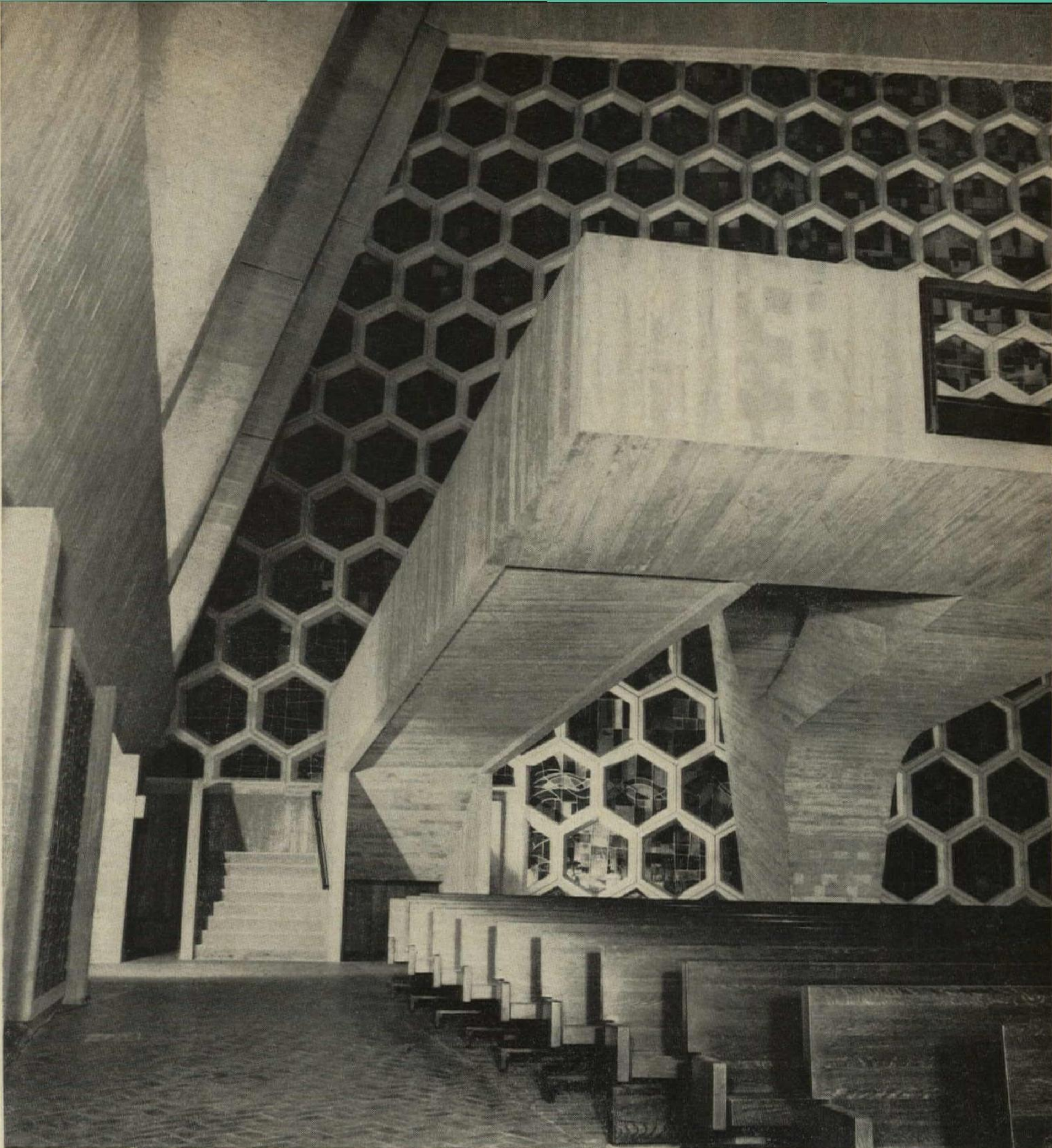




Modern fortress for an ancient faith

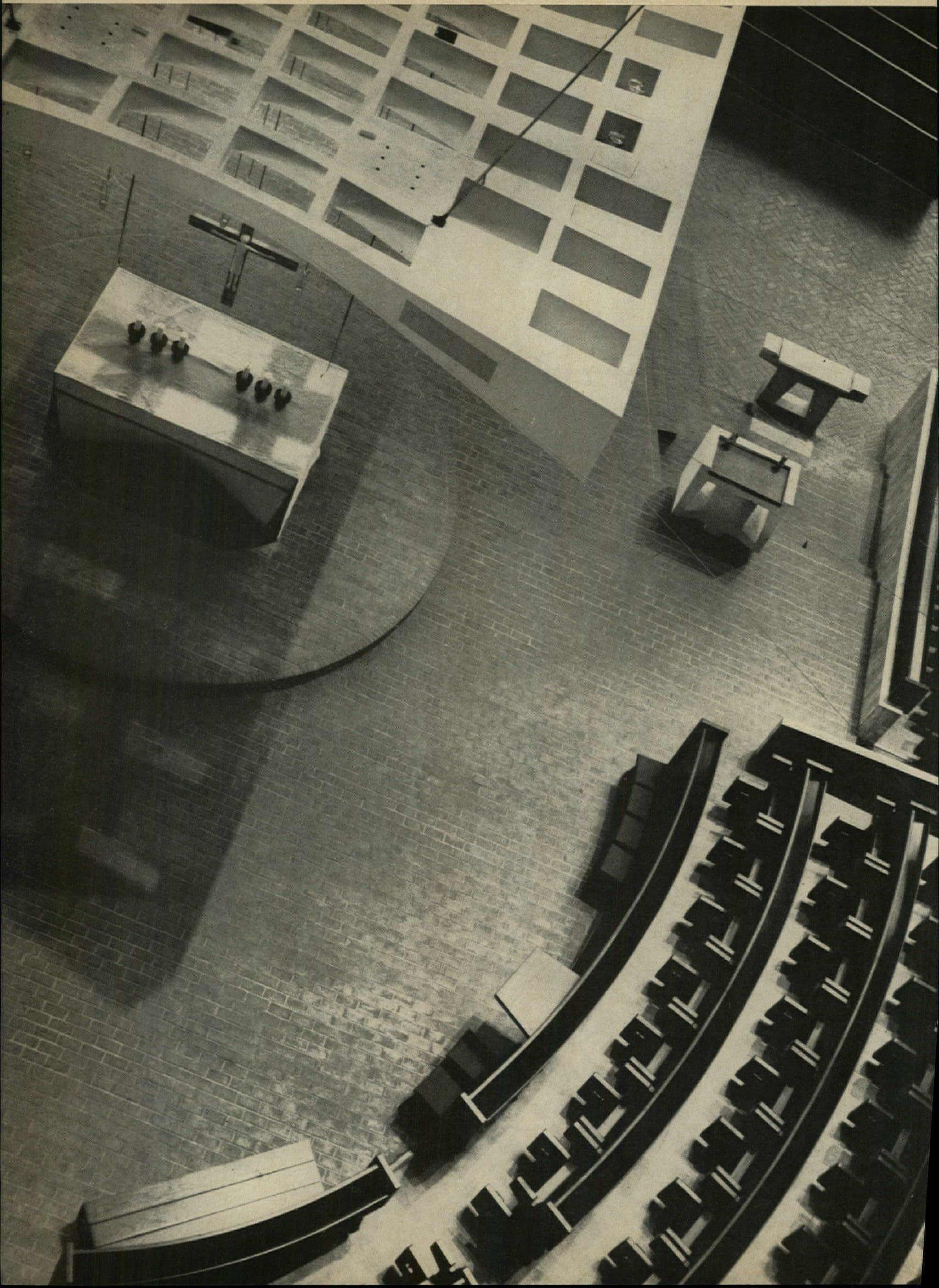
The Abbey Church of St. John's is the dramatic focus of Marcel Breuer's master plan for the Benedictine Monastery at Collegeville, Minn. The main approach to the church is between the massive supports of a great vertical slab (photo left), upturned 126 feet to form a bell tower. Next comes the low-ceilinged baptistry, and, finally, the great, wedge-shaped concrete hall itself. Its enclosing walls and roof form continuous folded bents that rest on two rows of buttresses.

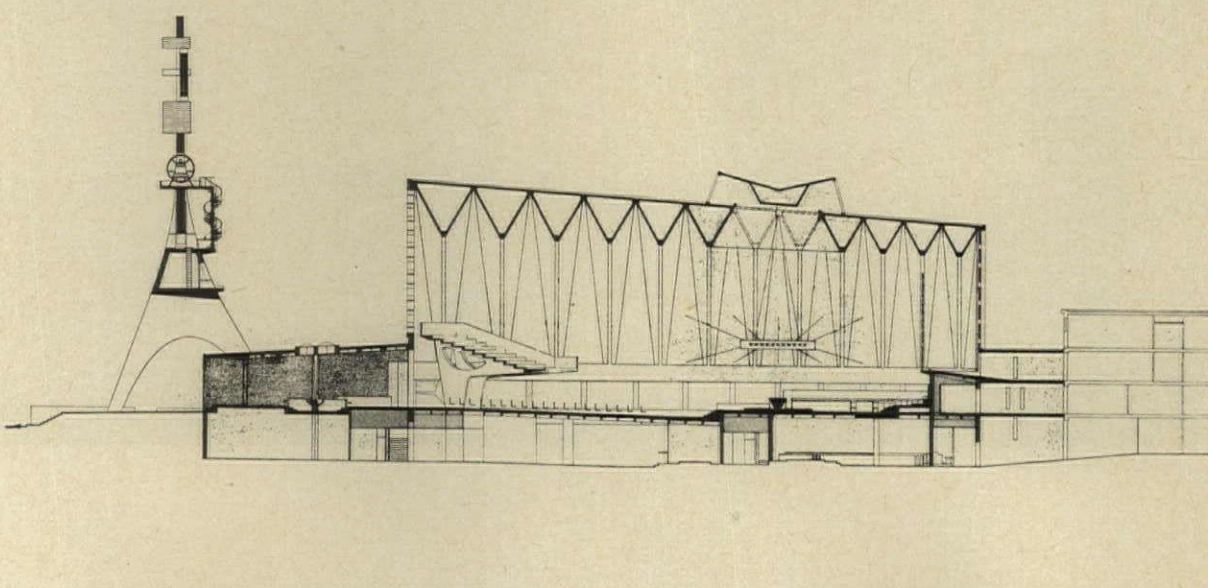




ARCHITECT: *Marcel Breuer.* ASSOCIATE: *Hamilton Smith.* STRUCTURAL ENGINEERS: *Weisenfeld, Hayward & Leon.* STRUCTURAL CONSULTANT ON THEORY: *Pier Luigi Nervi.* MECHANICAL ENGINEERS: *Gausman & Moore.* COORDINATORS FOR THE OWNER: *Traynor and Hermanson, architects.* GENERAL CONTRACTOR: *McGough Construction Co., Inc.*

The vertical slab substitutes for a traditional belfry. Not only does it house the wooden cross and four bells from the old Abbey Church, but, as a reflector, it bounces sunlight back against the glass and concrete honeycomb of the north wall of the church (left). Inside (right), a balcony raised on four heavy, cantilevered supports brings most of the worshipers close to the altar, thus avoiding the drawbacks of the traditional, long nave with its many distant pews.





A canopy, suspended on rods and stretched on wire beneath a skylight, lets brilliant shots of light fall upon the altar. On both sides of the altar are pews for the Brother's Choir, and to the rear is an arc of seats for the Monastic Choir.

The 1,600 seats for the college students face this composition as an auditorium faces a stage, bringing them close to the heart of the church without destroying the profound sense of mystery which is intrinsic in the Catholic ritual.

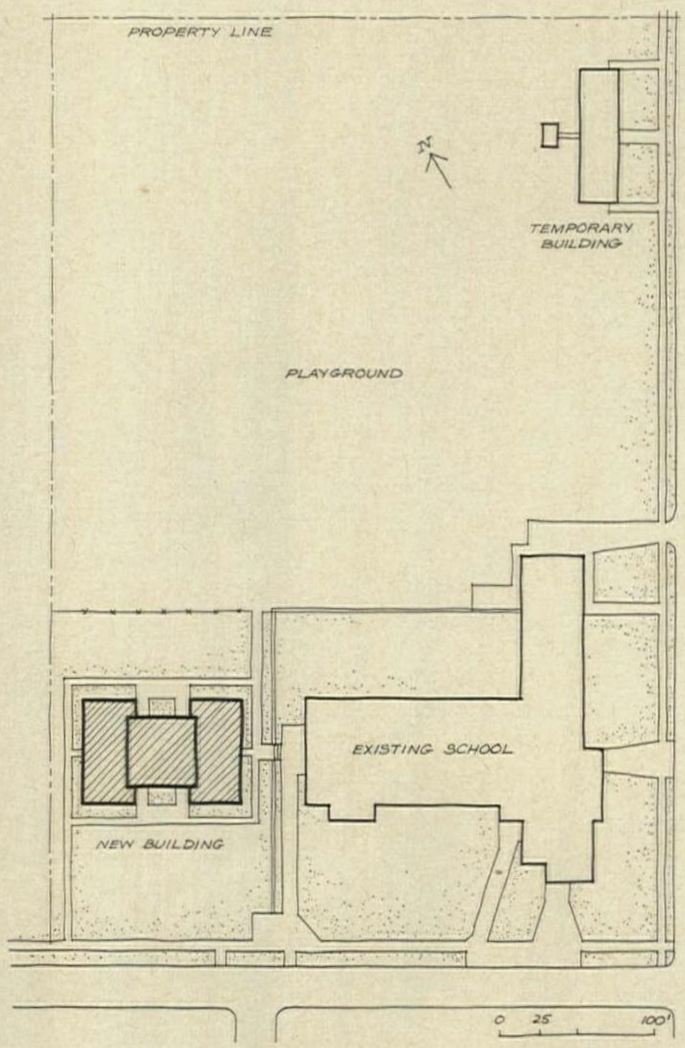
At the rear of the church are the monks' quarters (left, photo above). To the right of the ashlar-walled cloister garden is a chapter house. Looming over the entire composition is the granite-faced frame of the Abbey Church itself. Beneath the great hall of the church are a 440-seat chapel for the preparatory school and for neighboring parishioners, a 125-seat chapel for the Brothers, and 34 small individual chapels for the private devotions required daily of the priests.

Elementary school in miniature

The Minnie Jeffries Primary School in Detroit—four classrooms and an activity center—was designed to take the overflow from an existing school, as shown in the plot plan to the right. But it was designed at the same time to serve as a prototype for solving another kind of problem. Detroit has found it needs small but permanent school buildings for children who live in neighborhoods that have been isolated from existing schools by traffic arteries and other anomalies of city planning. The architects were asked to design a basic two-classroom unit that could be used either alone or in combinations of up to six classrooms, with or without an activity center, to be administered by a "mother" school either adjoining or at some distance.

The resulting design—in its first use shown here—cost $75,132, excluding fees. The cost of $11.92 a square foot neatly hit the program target of "approximately $12."

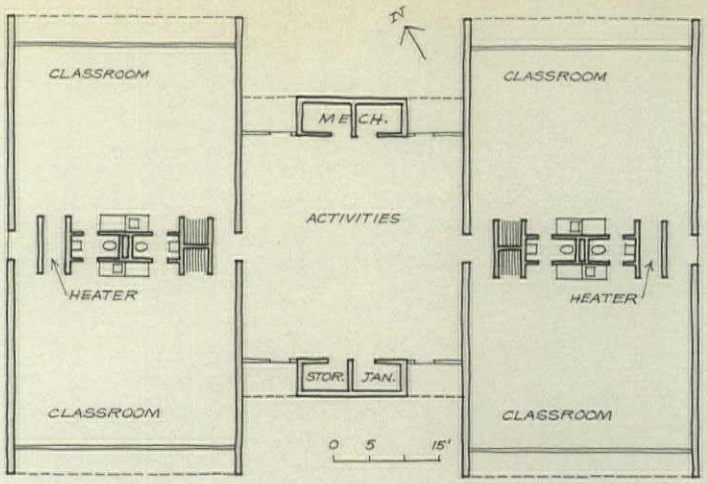
The basic unit (see plan, opposite page) is flexible enough so that pairs of classrooms (grouped around a mechanical core) can be added to one another or to existing facilities almost *ad infinitum*—with or without connecting links.



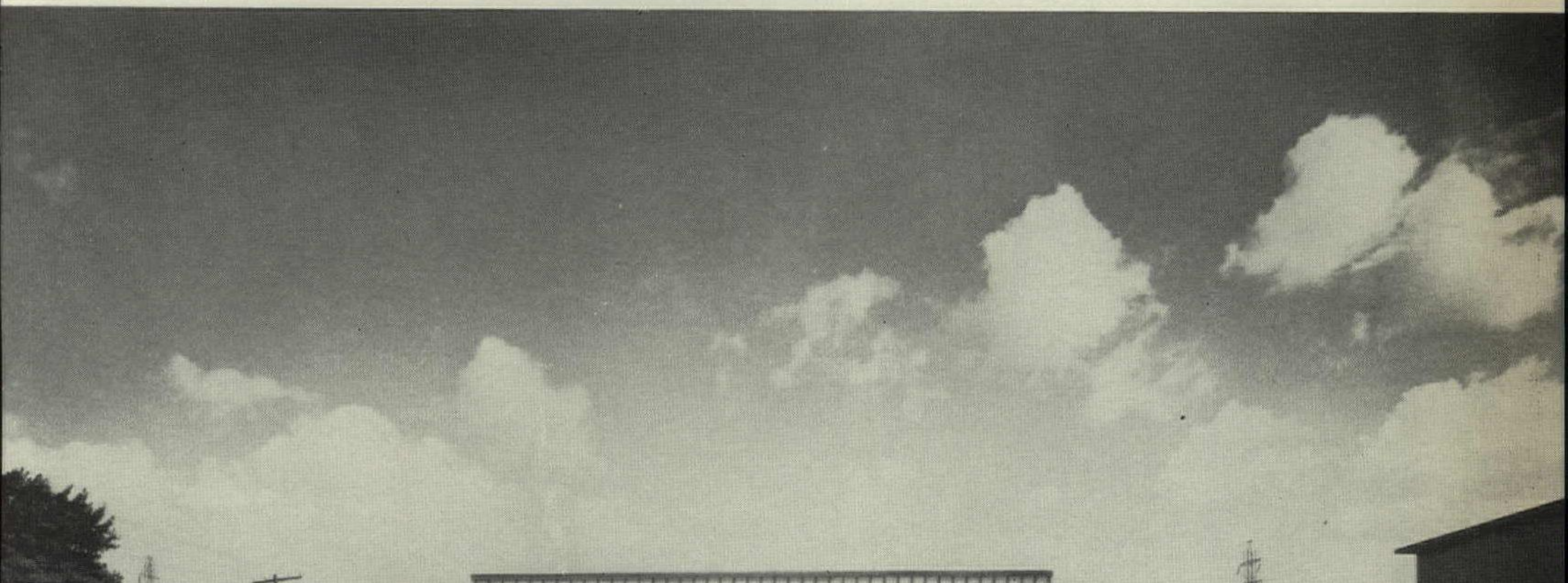
Bearing walls, *oriented east and west, are lightweight block with exterior face brick, arched at the entrance between classrooms.*

LENS-ART PHOTOS

MINNIE JEFFRIES PRIMARY SCHOOL, *Detroit, Mich.* ARCHITECTS AND ENGINEERS: *Linn Smith Associates, Inc.; R. H. McClurg Associates, Inc. (structural engineers).* GENERAL CONTRACTOR: *F. H. Martin Construction Co.* BOARD OF EDUCATION, CITY OF DETROIT: *Samuel M. Brownell, superintendent; Anthony G. Adinolfi, assistant.*

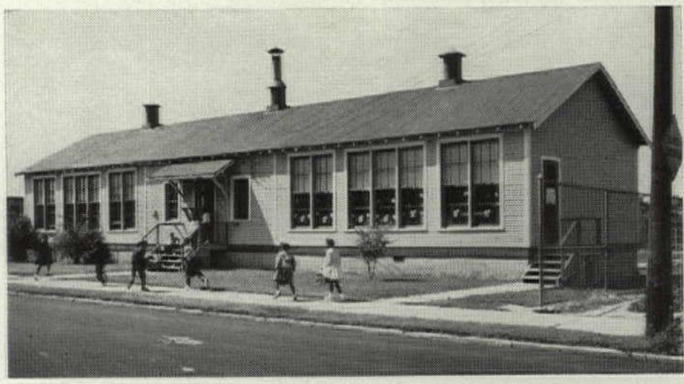


Basic unit *of two classrooms, laid out on a 4-foot module, is 32 by 56 feet. In the mechanical core at the center are toilets, sinks, and a gas-fired furnace for warm-air heating, making each pair of rooms self-contained and, if need be, relatively self-sufficient.*



An activity room *32 feet square joins the two pairs of classrooms and provides higher-roofed main entrances for the little building on each side. Although the unit was designed as a prototype for several combinations, it is not regarded as a "cure-all."*

Arched entrances *from classrooms into the higher-ceilinged activities area help make a very special place out of what could have seemed a routine, standardized unit, were it designed less imaginatively. Because of the open planning, a suspended acoustical tile ceiling is used throughout the school's interiors to dampen noise.*



Older "temporary" addition *on the same grounds shows dramatically the progress represented by the new expansion unit.*

Classroom view *(right) shows the mechanical core wall with a glimpse through to the other paired classroom. The view below is across the activity room. The basic two-room unit was designed to fit on a single residential lot where necessary. The structural design is based on stock components to cut construction time.*

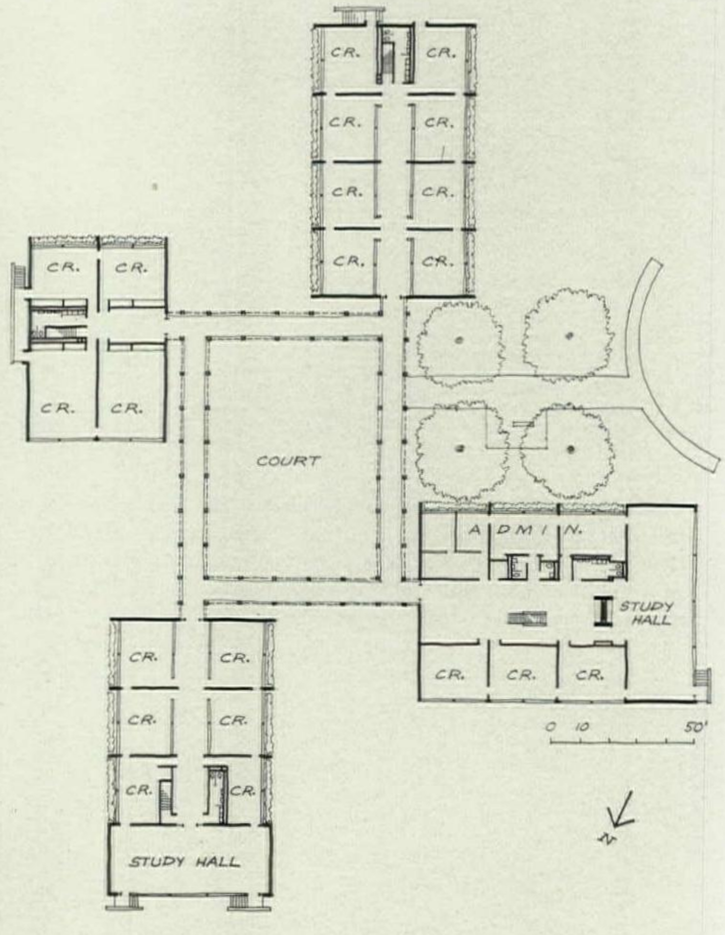
Four buildings on an open court

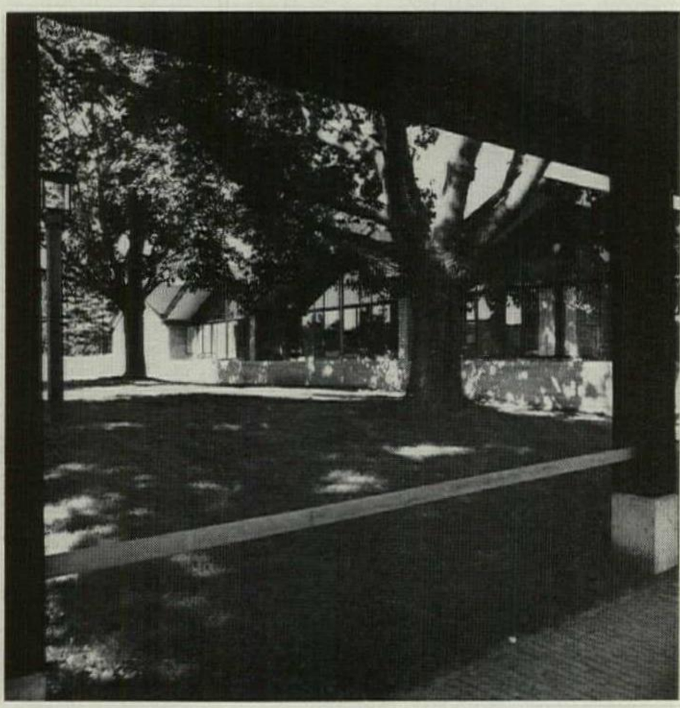
The heart of Rivers Country Day School in Weston, Mass. is a central, open-air court, appropriately so because the school, for boys aged 13 to 18, was first organized in 1914 (in Brookline, Mass.) by a group of Boston physicians as an open-air school. This tradition has been retained with the move to a new, rolling site.

Classrooms are grouped around the court in four buildings, one of which includes offices, faculty lounge, library, and study hall, and another the science facilities. In addition the school includes a gymnasium, not shown, which is being used temporarily for meals until a dining building can be provided. The buildings, of rough, buff-colored brick with gray asphalt shingled roofs, fit casually and easily into the unspoiled rural site.

The construction cost of the courtyard grouping and gymnasium, excluding fees, was $530,000; $18.50 per square foot.

The strung-out plan, together with the repetitive pattern of pitched roofs, makes the school look like a group of informal farm buildings, thus avoids the institutional character that so often plagues today's schools.





PHOTOS: © ROBERT STAHMAN

The outdoor courtyard, *paved with cobbles and bordered by a walkway canopy joining the buildings, is the center of the school, summer and winter. Its trees, paving, and alternations of openness and enclosure give it a pleasant and positive character (left).*

RIVERS COUNTRY DAY SCHOOL, *Weston, Mass.* ARCHITECT: *Allan Chapman; Remmert W. Huygens (associate architect).* ENGINEERS: *Souza & True (structural); Cleverdon, Varney & Pike (electrical).* GENERAL CONTRACTOR: *Temple & Crane.*

Classroom buildings *form a visually varied grouping, with the largest building two stories in height. The clump of trees marks the central court. All the building sites chosen are on slopes, leaving the level ground uninterrupted and undisturbed for sports.*

Interior finishes, *as in the hall (above) and library (below), are of natural oak, masonry block painted a putty color, and plaster with a white-sand finish. Fireplace pattern is by Amy Chapman.*

Typical classrooms *have one full wall of glass rising to the gable roof, which is repeated over each pair of classrooms on a 24-foot module. Structure is of steel beams supporting wood rafters.*

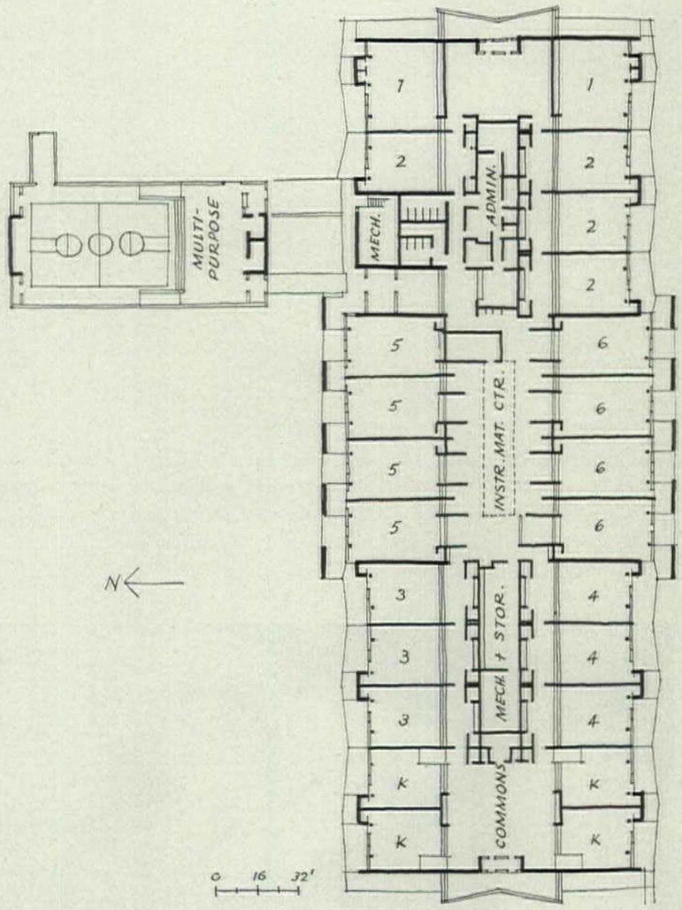
PHOTOS: © ROBERT STAHMAN

Split-level classrooms in an open plan

The Paul L. Dunbar Elementary School, in Gary, Ind., is difficult to describe with the ordinary words used for the parts of more conventional schools. The classrooms, one might say, are open-ended against a raised central corridor. But the raised corridor and its steps are also an integral part of these classrooms. Moreover, the corridor is only incidentally a corridor. It provides several of the most important instructional spaces.

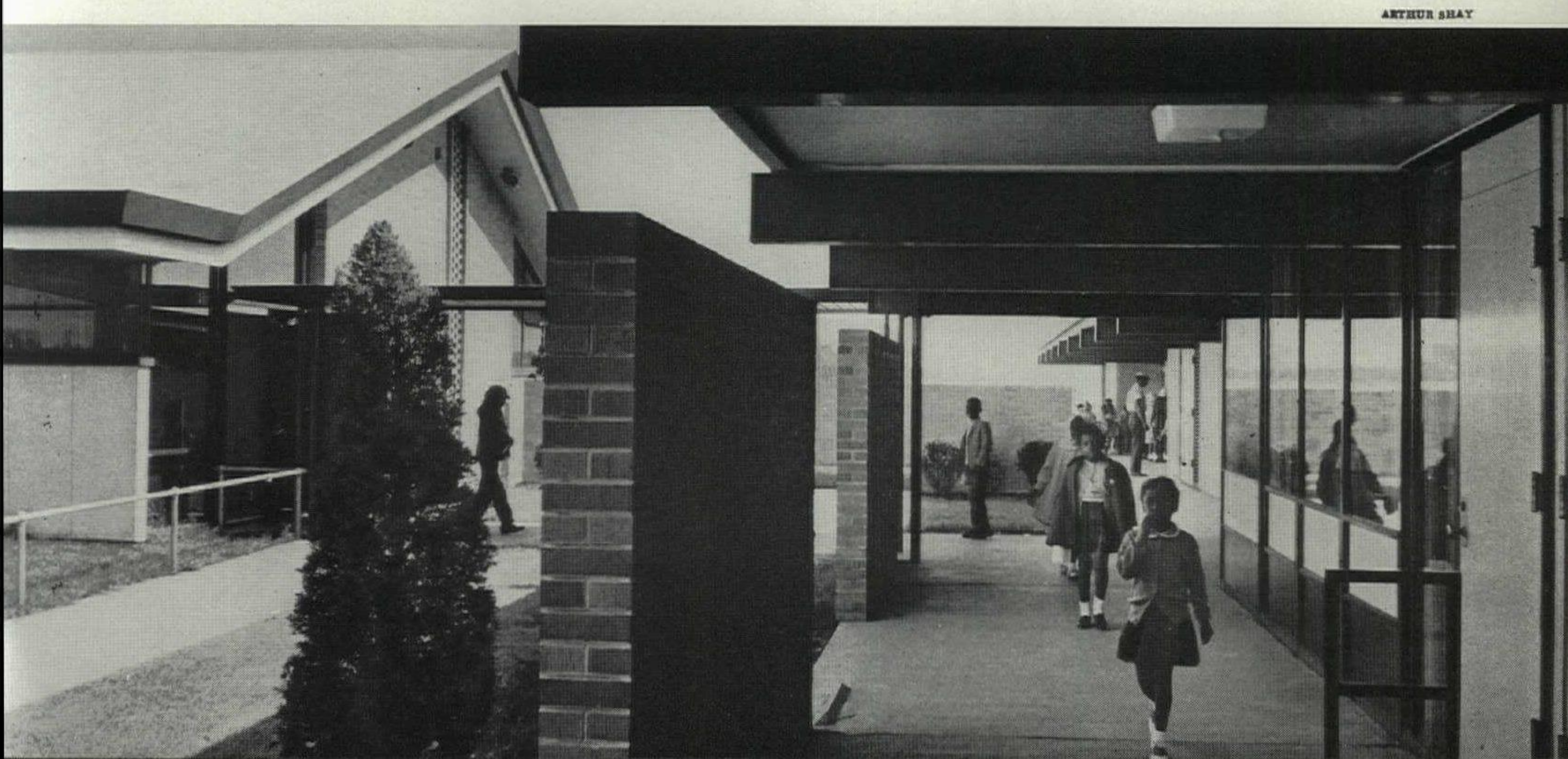
Deep and compact in plan, the school has an average of 60 square feet per pupil in comparison with a "normal" figure of about 85 square feet. But this remarkably low ratio has not in the least been won by skimping facilities; if anything, they are more varied and generous than is usual. It was won by a remarkably high score in space efficiency: 80 per cent of the floor area is used directly for education. Construction cost, including fees, was \$529,428, or \$11.87 per square foot; an average of \$22,060 for each of the 24 classrooms.

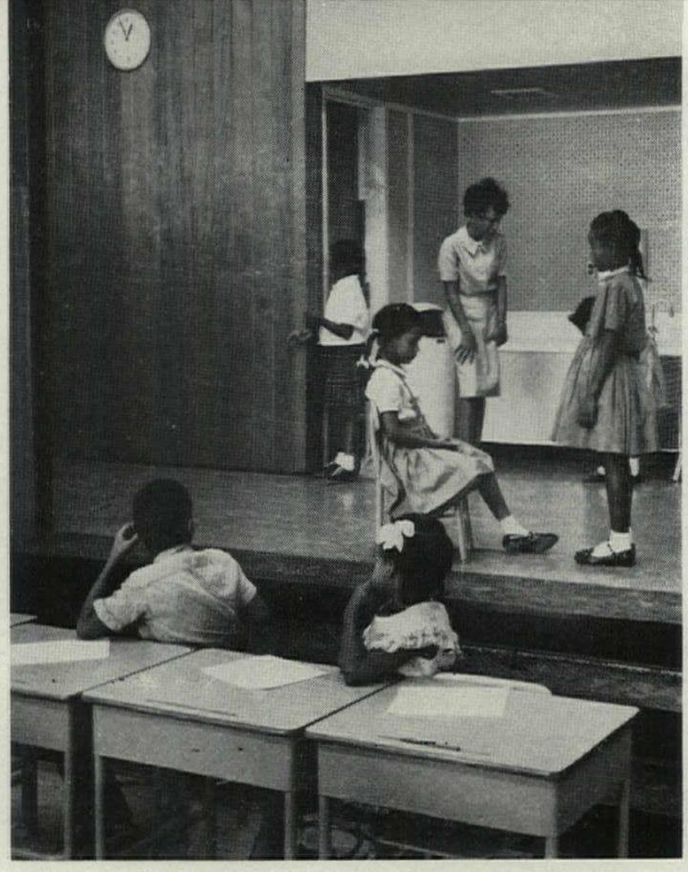
One reason for the low unit cost of the school may be found in the openness of its plan, and the many varied uses found for the areas at the core of that plan (right).



Outside walls *of classrooms are glass, shaded by the deep overhangs of outdoor walkways. The multipurpose unit shown to the left is a separate building to allow the community to use it.*

ARTHUR SHAY





Kindergarten commons *(below), used jointly by four classes, occupies a portion of the central "corridor" and corresponds to the library commons for older classes shown on the opposite page. The gable roof is formed of steel beams carrying wood joists.*

Raised "corridor" *end of each classroom (above) serves, among other uses, as a permanent stage. Although classrooms are open-ended, noise has not proved an annoyance, owing largely to acoustic treatment of ceiling and of work alcoves at the corridor end.*

PHOTOS: ARTHUR SHAY

Raised corridors *serve so many educational uses that circulation is almost the least of their functions. Special work and study classes, or reading groups as in the photograph, use the space while other classwork continues in the open, adjoining classrooms. Class bookshelves, placed where the classrooms and corridor merge, make a natural library of the area adjoining classrooms for older children.*

PAUL L. DUNBAR ELEMENTARY SCHOOL, *Gary, Ind.* ARCHITECTS: *Caudill, Rowlett & Scott; McPerson-Swing (associated architects).* ENGINEERS: *McDonald & Floyd (structural); James M. Samis (mechanical).* GENERAL CONTRACTOR: *Taylor & Taylor.* SUPERINTENDENT OF SCHOOLS: *Alden H. Blankenship.* BUILDING CONSULTANT: *Harold Silverthorn.*

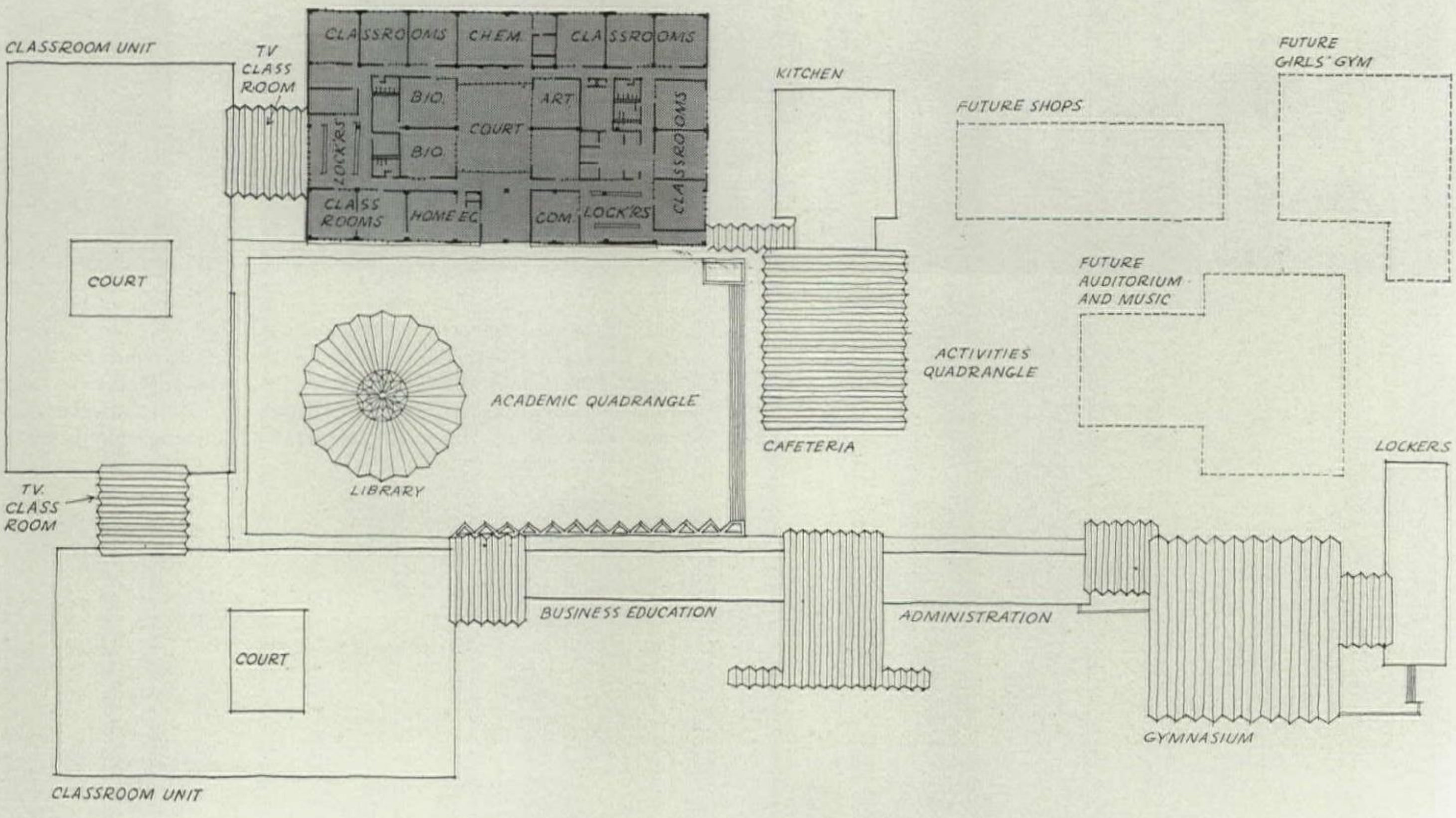
Carrousel in a quad

The two brightest stars of the new Garinger High School in Charlotte, N. C. are the library, with book stacks revolved like a carnival carrousel around a bright, skylit reading room; and a cafeteria, with its floor broken into multiple levels and its space shaped with screens like a fashionable restaurant. But ranged around these facilities are three down-to-earth academic units (each virtually a complete school-within-a-school), a spacious gymnasium, and a connecting loggialike building housing business education and the school administration.

To these parts of the scheme, built in three stages, will be added a fourth, housing shops, a girls' gym, and an auditorium-music building. After the completion of these facilities, the plan will be a neat, binuclear scheme.

The cost per square foot of the gym, cafeteria, library, and two academic units was $12.84 for 108,756 square feet in 1959. The administration link cost $16.27 for 16,675 square feet in the same year. The third academic unit cost $11.21 for 40,244 square feet in 1960. Total cost to date is $2,118,546, not including land, landscaping, furnishing, or architect's fee.

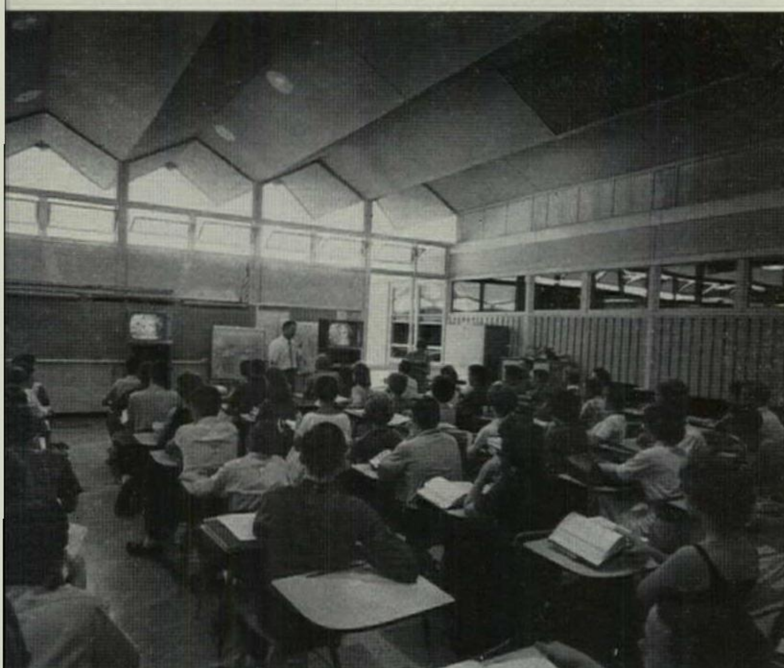
PHOTOS: © ROBERT STAHMAN

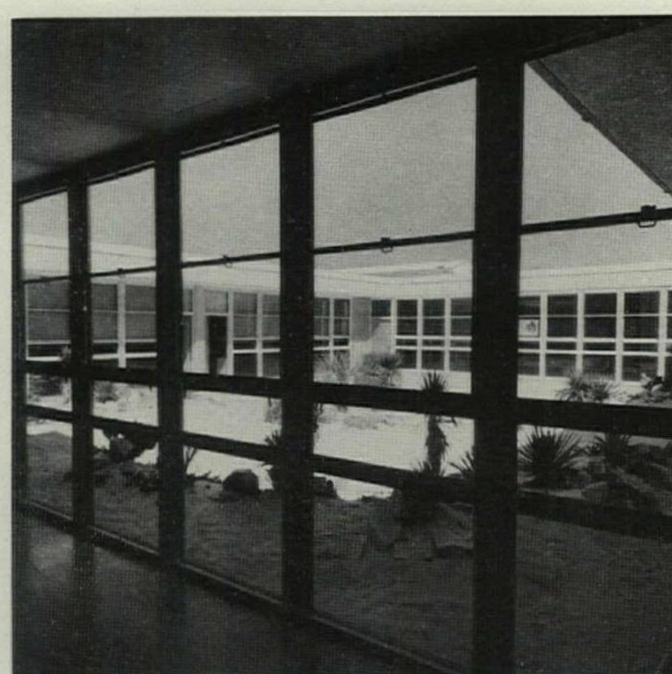


Tier of steps *rising from the academic quadrangle joins the cafeteria terrace to the grass-sward. The diamond-shaped roof fascia reveals the roof-framing system of purlins bearing alternately on the top chord of one truss and the bottom chord of the adjacent truss. This system is used over the cafeteria and gym, also over entrances and television classrooms.*

GARINGER HIGH SCHOOL, *Charlotte, N.C.* ARCHITECTS: *A. G. Odell Jr. & Associates.* LANDSCAPE ARCHITECT: *Lewis Clarke.* ENGINEERS: *W. H. Gardner Jr. & Associates (structural); W. P. Wells (mechanical); John C. Bolen (electrical).* EDUCATIONAL CONSULTANT: *Engelhardt, Engelhardt, & Leggett.* CONTRACTORS: *Z. B. Robinson Construction Co. (phase 1), Myers & Chapman (phases 2 & 3).*

Library ceiling *rises to a cone formed from flat wedges of honeycomb plastic panels over the reading area. The wedges show a face of clear resin within the room while the exterior face, seen out-of-doors, is brightly varihued. Perimeter areas, roofed in the diamond pattern which is the theme of the school, contain book stacks, offices, workrooms, and various service spaces.*





Academic units *are linked together by large television classrooms (photo, above). Each academic unit, virtually a complete school in itself, is arranged around an interior court planted to a theme. The desert court (photo right, above) is planted with an arboretum of cacti. Science classrooms flank the court, which opens to interior corridors through floor-to-ceiling glass.*

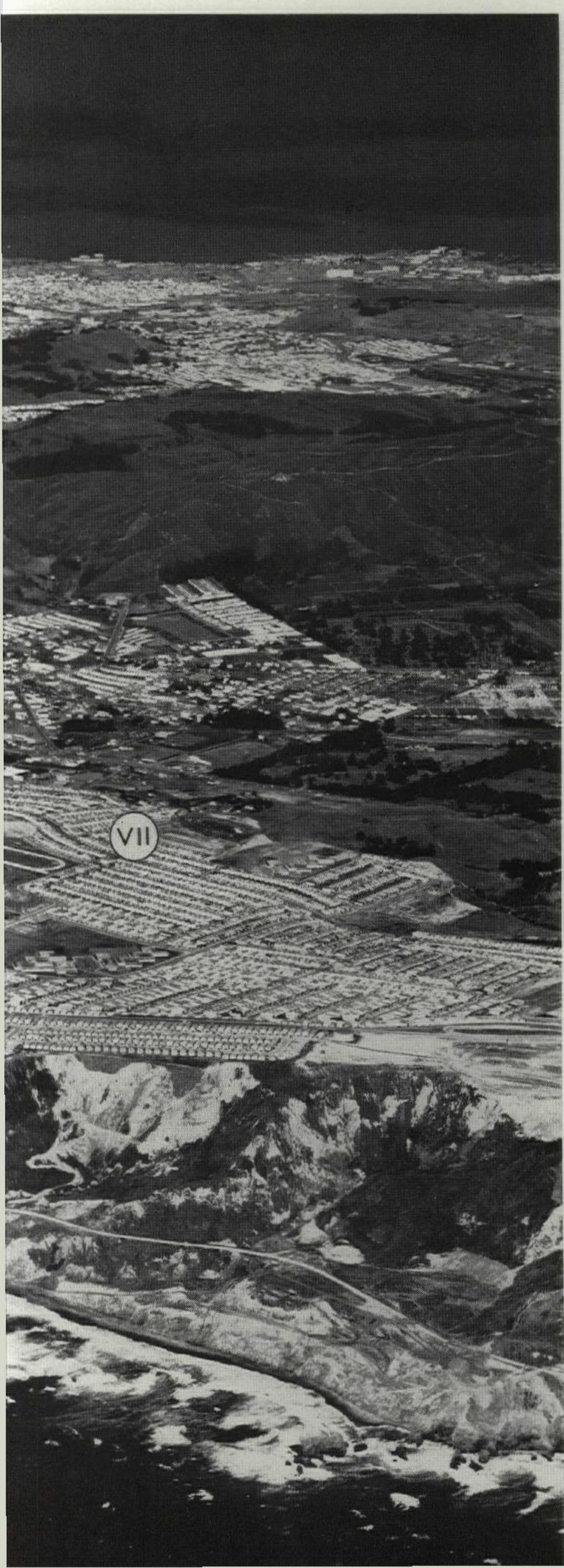
Cafeteria *(photo, below) is a lively, high-ceilinged space separated into smaller segments by changes in the floor level marked by table-height rails and diamond panel screens. Exterior walls are mostly floor-to-ceiling glass, offering a view into the academic quadrangle. The carrousel-like library is opposite, at the end of the rectangular, grass-floored courtyard.*

PHOTOS: © ROBERT STAHMAN

Daly City and its amazing schools

How Architect Mario Ciampi gave this plain suburb a new vision of education.

BY ALLAN TEMKO



MOULIN STUDIOS

Daly City, just south of San Francisco, was a wide-open town during Prohibition, and long after Repeal.

Today, however, Daly City is quite a different kind of bedroom community. Since 1947 the once magnificent countryside has been swallowed up by merchant-builders, one of whom, Henry Doelger, has alone erected 6,500 houses, 1,800 apartments, and two shopping centers of indifferent design. Sin—except for the unchecked desecration of the landscape—has been largely banished. The new Daly City is a fairly typical, lower-middle-income community. But its children attend some of the most atypical schools in the nation.

In the midst of the insipid subdivisions the schools appear with sudden brilliance: gay, technically inventive, adorned with paintings and sculpture, carefully sited, thoughtfully planned. In size and scale they range from monumental Westmoor High (1), to minuscule Fernando Rivera Elementary (2) nestled beneath its plywood shell roof. Each school is strikingly—almost defiantly—individualistic. Yet all bear the mark of one man—Mario J. Ciampi, who has singlehandedly put Daly City on the architectural map.

In the past five years Ciampi's schools have brought to this plain town no less than two AIA first national honor awards, the collaborative medal of honor of the Architectural League of New York, and a dozen more prizes and citations which wealthier and more sophisticated suburbs might envy.

Such a victory for serious design was achieved against great odds. Ciampi first came to Daly City in 1949 to do a trim recreational center which remains the only decent building in the tawdry business strip that lines outer Mission Street. It was a good start, but when he began doing the town's schools the following year, innumerable difficulties confronted him.

KARL H. RIEK

ARCHITECT MARIO J. CIAMPI

Daly City has no industry, and therefore lacks a strong tax base. By the standards of the prosperous Bay Region, it is not only crass, but comparatively poor. Still, a handful of citizens cared enough to see that every school bond issue proposed in the 1950s was passed.

Ciampi has been forced to work within the tight budgets of a bureaucratic state-aid program: none of his schools has cost more than $15 per square foot. And because the town is exploding with children—population since World War II has quadrupled to nearly 45,000 and existing schools were on double sessions—he has had to work fast. He has also had to deal with constantly changing school boards and profes-

Westmoor High School (I), *Fernando Rivera Elementary School* (II), *Olympia School* (III), *Westlake School* (IV), *Vista Grande School* (V), *Vista Mar School* (VI), *Pauline Brown School* (VII).

sional administrators: four different elementary school superintendents, and two in the high school district during the past ten years.

In the face of such social turbulence, Ciampi wisely proceeded with caution, sensing that there was much to be gained by patience. His first five schools—built one a year between 1950 and 1955—are all equally undistinguished works, rather coarsely executed in wood. They all adhere prosaically to the "finger plan," strung out and sun-admitting, which became popular in California after the war.

They were cheap; they met local preferences and state rules; they presented no special problems to contractors, and could be built quickly.

Very early Ciampi tried his best to convince the administrators that the finger plan made less sense in Daly City than in balmier communities. During a good part of the year the city's coastal terrain is cold and foggy, and swept by damp salt winds from the Pacific (which greatly increase the cost of maintaining wood). The overcast weather also makes artificial illumination a necessity in spite of all the glass.

Under these conditions, Ciampi argued, a compact school,

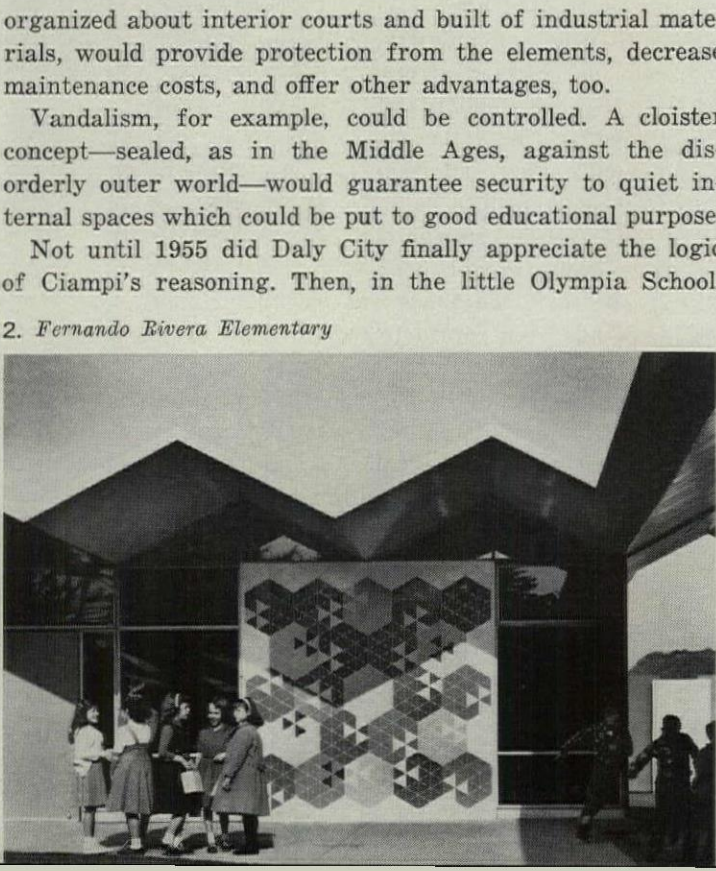
1. *Westmoor High*

organized about interior courts and built of industrial materials, would provide protection from the elements, decrease maintenance costs, and offer other advantages, too.

Vandalism, for example, could be controlled. A cloister concept—sealed, as in the Middle Ages, against the disorderly outer world—would guarantee security to quiet internal spaces which could be put to good educational purpose.

Not until 1955 did Daly City finally appreciate the logic of Ciampi's reasoning. Then, in the little Olympia School,

2. *Fernando Rivera Elementary*



KARL H. RIEK

which contains only a kindergarten and the first three grades, the architect was given his way (3).

The building remains one of Ciampi's most pleasant creations. On three sides the U-shaped structure embraces a calm oblong court landscaped by Lawrence Halprin. The fourth side is enclosed by a delightful mural by Anne Knorr—a tall, colorful fence which does not seem like a fence at all, and which Ciampi, in a winning gesture, donated to the school.

Within this court it is difficult to realize that, a short distance away, exists a housing tract of the dreariest sort. The school is therefore a very real educational device for all who enter it. The bright, patterned walls of concrete block show to the children and parents of Daly City what civilized color can be. The lift-slab roof demonstrates the clarity of a bold, structural esthetic. And the school's price of $12.75 per square foot demonstrates that excellence can be less expensive than mediocrity. Some of Ciampi's earlier schools cost more.

"A little building," Ciampi says, "may contain a big concept." Like a vigorous parish church in a nondescript neighborhood, Olympia marks Daly City's first step toward cultural self-reliance.

But Olympia was soon overshadowed by Westmoor High School (4), expressing the same social philosophy on a far more ambitious scale. This sweeping monument, crowned by its barrel-vaulted gymnasiums, was designed to give Daly City a vision of the full potentialities, including the technological possibilites, of the future. If Olympia suggests a parish church, Westmoor is Daly City's dominating cathedral.

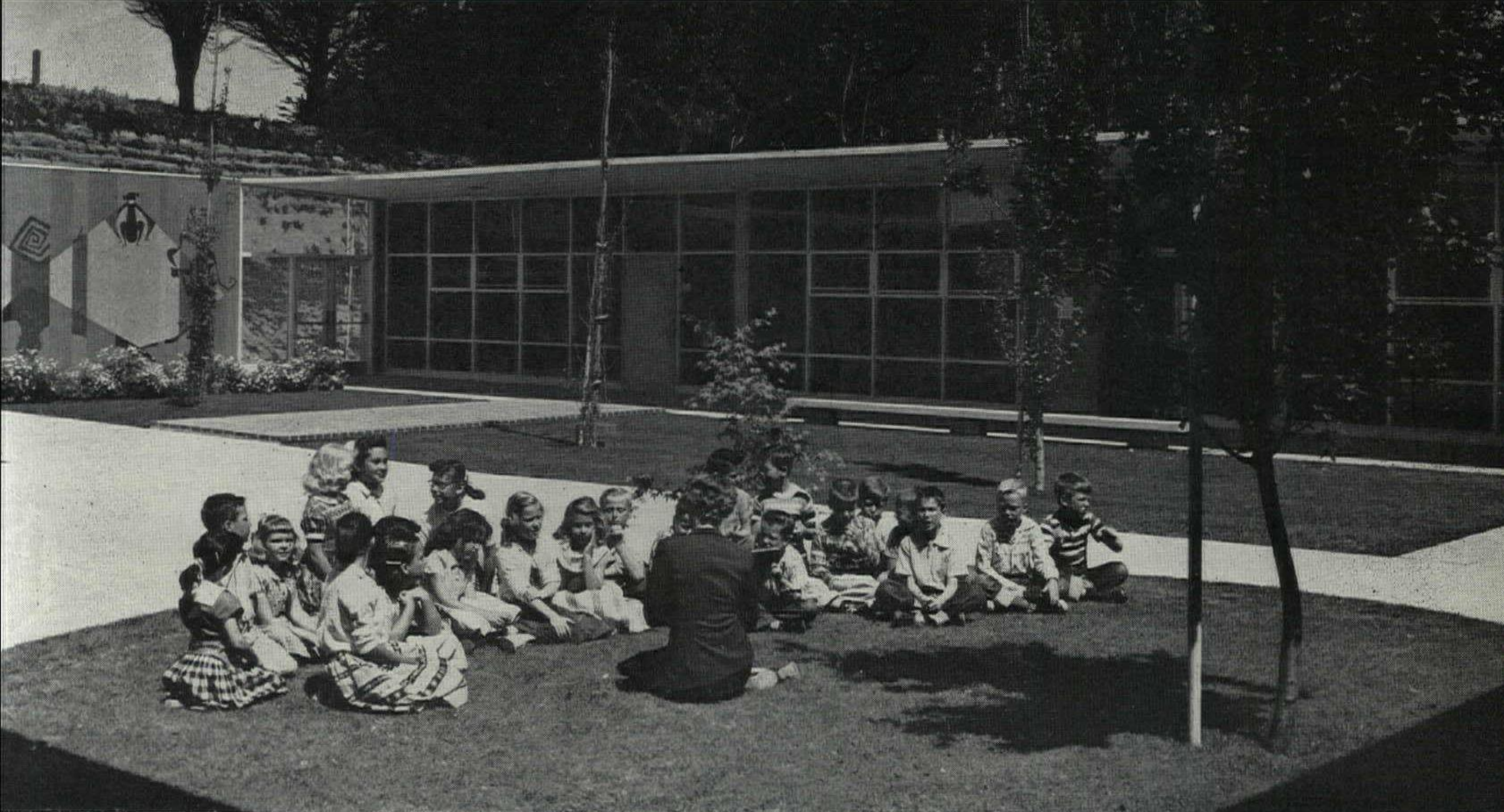
Ciampi was commissioned to design Westmoor as early as 1950, but fast population growth forced repeated program revisions—from an initial 600-student capacity to a final one three times larger. To determine the size of the structure was relatively easy. Much more vexing was the problem of anticipating changes in educational objectives.

Ciampi found his answer in the flexible loft plan. He had been fascinated by the first schematic design for such a school which the late Matthew Nowicki developed specially for FORUM in 1949. Not far from Daly City, John Lyon Reid was building just such a revolutionary structure: the long Hillsdale High School (FORUM, Jan. '56) with windowless but skylit interior classrooms, formed by movable partitions into spaces like an industrial plant.

Westmoor, brimming with bright primary colors, enlivened by sculptural forms in concrete, relieved by small interior courts, and charged with a certain restless exuberance (which Ciampi cheerfully concedes to be "Latin"), is a lyrical variation on the Hillsdale theme.

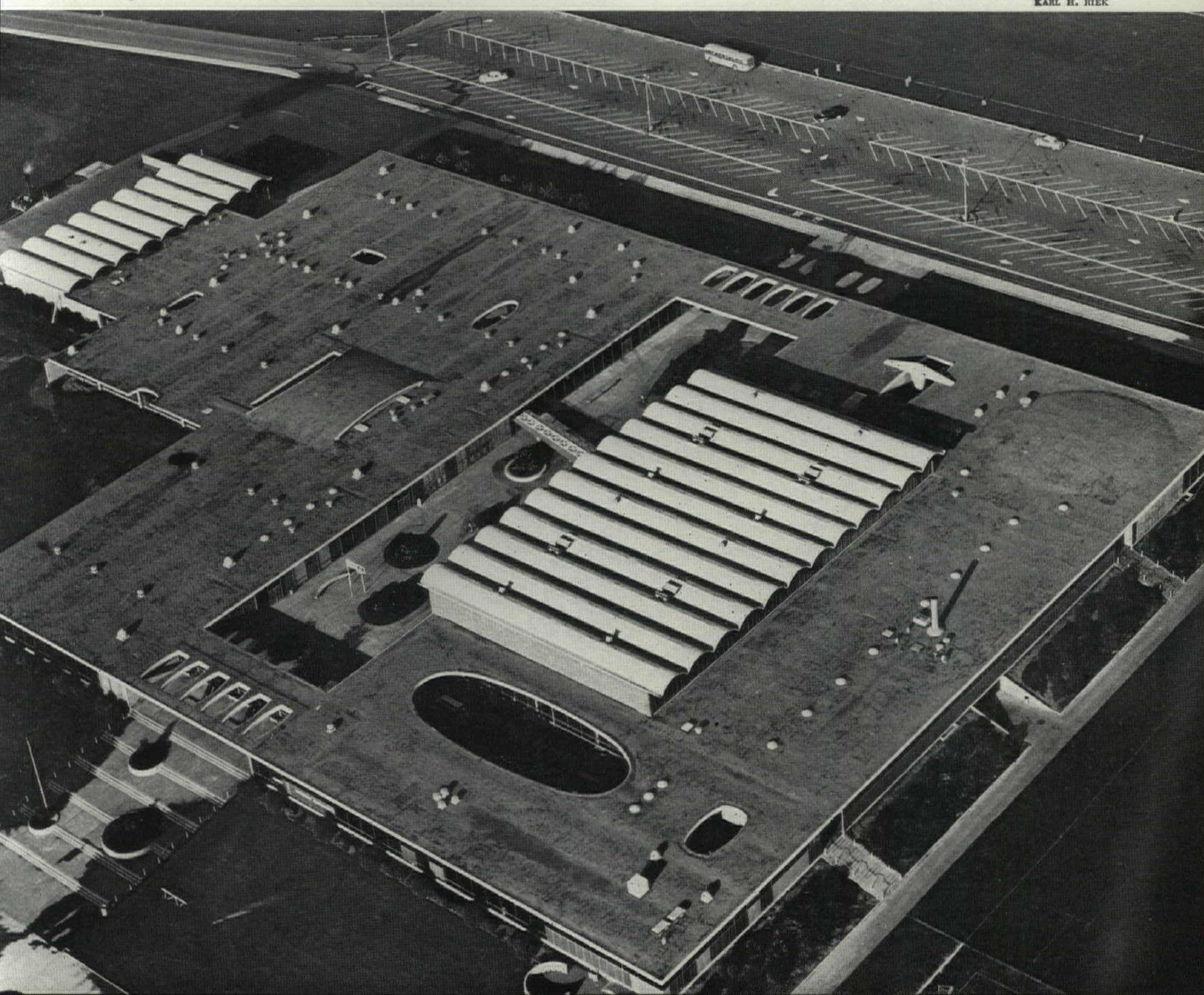
The advantages of the loft-plan school were dramatically revealed by Ciampi when he showed how easily the interior of Westmoor could be rearranged, without modification of basic structure. (The vast interior did create some new problems.)

Not only fog and wind, but the inchoate town itself is effectively kept out of Westmoor by the sleek façades of glass. The rather theatrical entrances, with their overstated essays in concrete sculpture, are really ceremonial portals



3. *Olympia School* RONDAL PARTRIDGE

4. *Westmoor High* KARL H. RIEK

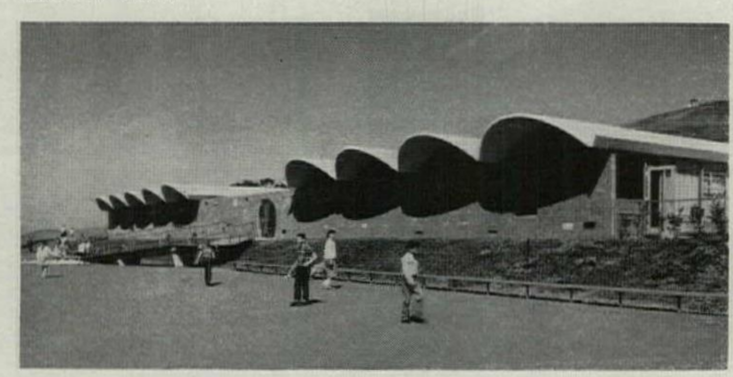


to the kind of an idealized inner environment to which the community might one day aspire. The great central court, between the two main instruction blocks, is actually a civic square: an agora for the new generation.

Since the building is for the young, an uninhibited freshness—some would say flashiness—abounds. The mixture of colors is not always sure, but the architect has had the heart to try them, and the over-all effect is lively. Once more there is a display of art: a long, abstract mural of ceramic panels by Anne Knorr (donated by a local builder), and some sculpture by Ernest Mundt (donated by Ciampi). Technology, too, is proclaimed an art in the long, precast concrete shells which cover the gym. These shells, 61 feet long, 15 feet wide, and 3½ inches thick are supported on precast frames that span 90 feet. The shells were the first of their kind used in the Bay Region.

Westmoor revealed Ciampi as a facile virtuoso of new forms. He had by now traveled extensively in Latin America and Europe, where he met and became friendly with the Engineers Nervi and Torroja. With characteristic acumen he made the lessons of these masters a part of the indoctrination course he was giving to Daly City.

Westmoor was followed by four excellent elementary schools, which brought Ciampi's total in Daly City—counting the early works—to ten. Gradually, but insistently, his buildings were becoming landmarks. Each of the later schools embellished its particular neighborhood with vivacity and tact—just as Olympia had. Again there was the emphasis on compactness, an inward-directed plan, adroit technology, and low cost.

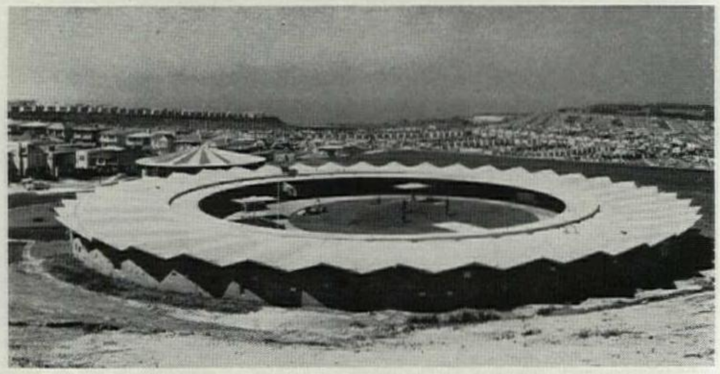


RONDAL PARTRIDGE

5. *Vista Grande School*

The first of this later group, Vista Grande (5), is set on a hill across the broad valley from Westmoor. Its precast barrel-vaults, spanning the parallel classrooms and central corridor of the little building, and jutting over its sides as sunbreaks, are an echo of the huge vaults of the high school which are clearly visible in the distance.

Vista Mar (6), seen on the slope below Westmoor, as a prelude to the high school when one walks up the hill, is somewhat finer than Vista Grande. Here Ciampi decided on a circular scheme reminiscent of Neutra's famous ring-plan project of 1928, but imbued with local veracity. The site was graded to form a bowl, so that the folded shells of the roof are seen as a rich geometric pattern from above, enclosing a gracious court.



6. *Vista Mar School*

In the latest two elementary schools, designed at the end of the decade, Ciampi decided to turn from precast concrete to plywood shells in order to obtain even lighter and more fanciful roofs. Plywood would, of course, enable him to lighten the supporting structure, and also to break up his composition into smaller, more intimate units. As to cost, there was no cheaper way to roof a small building. The Daly City authorities were quickly convinced, but Ciampi had to wage a long battle with Sacramento for the innovation.

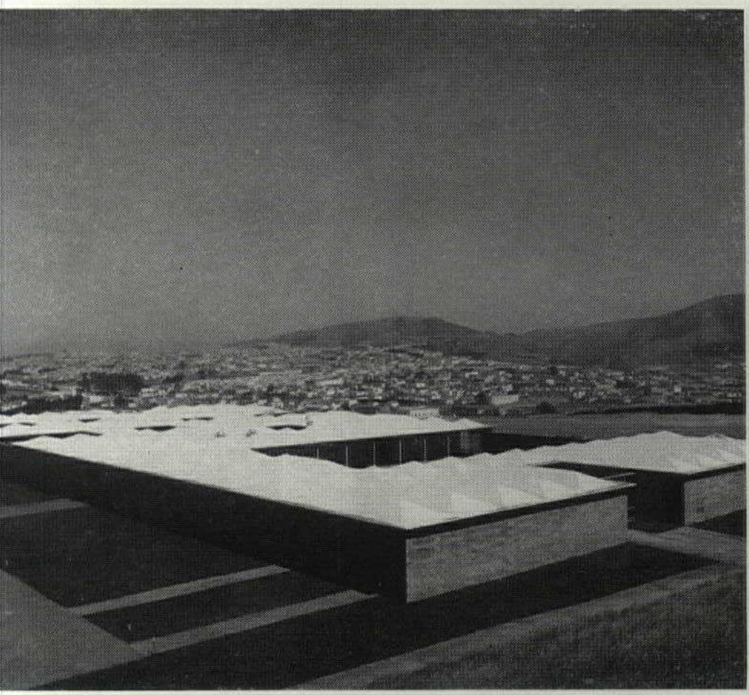
Luckily, he won. In the Pauline Brown School (7), completed this fall, Ciampi developed an intricate but fundamentally simple pattern of pyramidal shells, some square, some oblong in plan, which neatly cover the classroom units nested about their intimate courts.

In Fernando Rivera (8), finished last year, he did even better. The lithe folded plates of this cheerful structure dip down over open passageways. The result is a well-organized visual world for children. The school gave Daly City a second national honor award to follow Westmoor's.

This should have been the culminating triumph of ten years of incessant effort in a community which had not known of modern architecture. Instead, the victory was marred by a deplorable reversal of the town's artistic direction. Ciampi had been awarded commissions for two other elementary schools. The contracts were signed and he was ready to go ahead, when a new school board decided that his small office (his staff numbers only Associate Paul Reiter and five other men) could not produce the buildings quickly enough. Ciampi voluntarily agreed to relinquish the commissions. They were turned over to another firm willing to work at a fee lower than Ciampi's standard 8 per cent. This firm has now produced three almost identical, undistinguished schools for Daly City—at a fee of 6 per cent per school.

Meanwhile, not far from Daly City, on a site overlooking the open Pacific, a second high school by Ciampi—Oceana—is now nearing completion (9), and already shows what might have been accomplished elsewhere had Daly City retained Ciampi or a man of comparable talent. Oceana is a great crescent of a building, handsomely lodged in the curve of its hill. Even in its unfinished state it is a lucid and powerful concept, boldly defined in great bending ribs of concrete.

"Maybe the kids who go to this school," said Ciampi, "will learn to want the best." And this, after all, is the ultimate purpose of education.

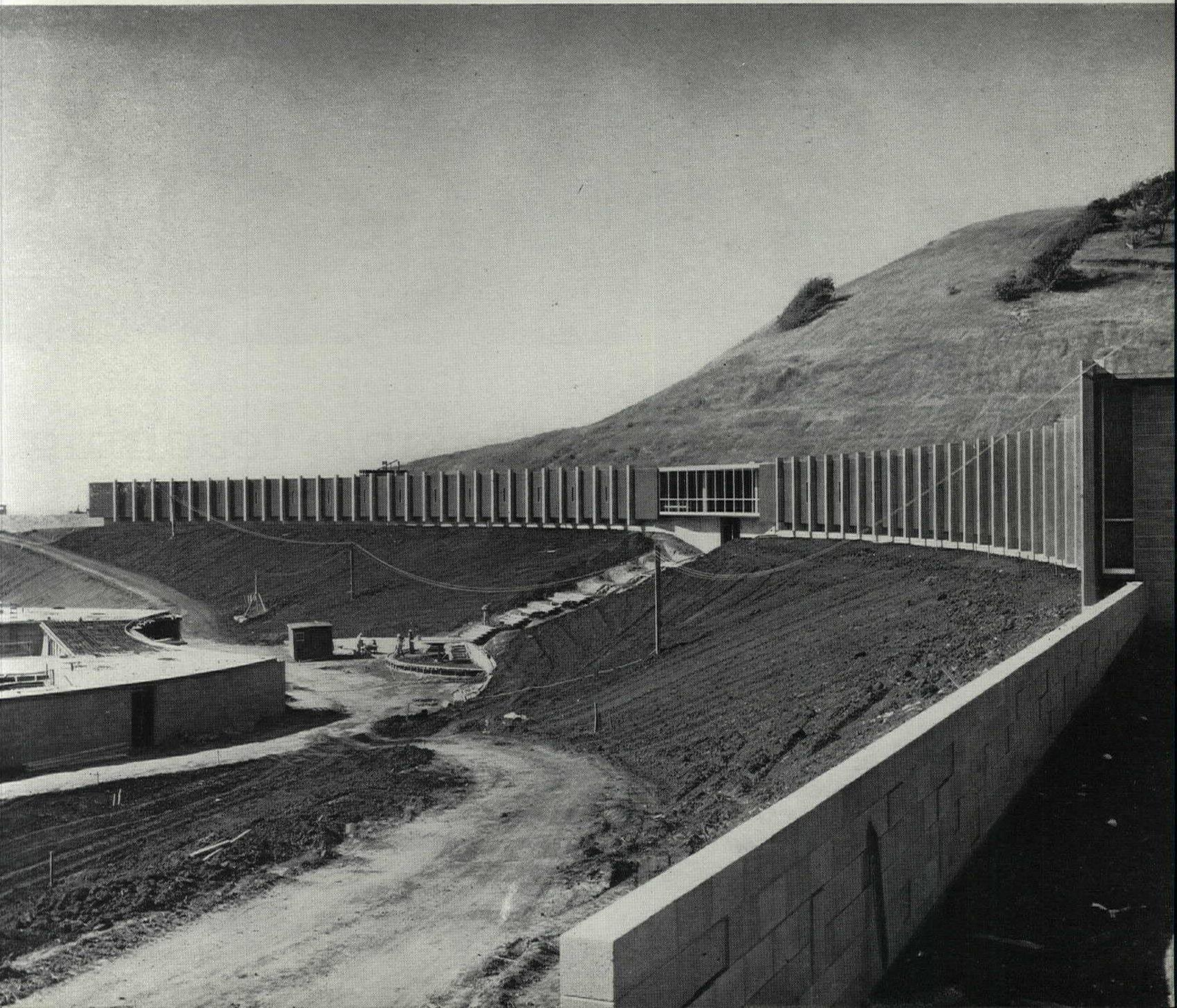


7. *Pauline Brown School*

8. *Fernando Rivera Elementary*

9. *Oceana School*

PHOTOS: KARL H. RIEK



GEORGE ZIMBEL

Flexible space for flexible teaching

For many years, U.S. teaching theory and basic classroom layout showed remarkable resistance to any fundamental change. After World War II, Georgian and Gothic gift wrappings were thrown out in favor of the curtain wall, but the contents of the package remained much the same.

In the past few years, however, architects and educators have begun to look inside. Armed with Trump Reports, new educational devices, and various theories of "team teaching," they have been re-evaluating the learning process and the space needed to accommodate it.

One response has been to match varied teaching methods and pupil groupings with a range of fixed rooms of different sizes for different needs. Though many benefits have been realized, lack of flexibility and complex problems of room scheduling can result from this approach. Other schools have attacked the problem of varying needs more directly by trying to provide truly adaptable spaces. On this and following pages are shown a variety of means, each with essentially the same goal: more flexible and efficient use of space.

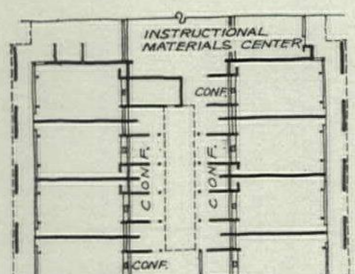
Some flexibility is demanded of the occupants, as well. Without discipline and cooperation from students, and close planning by teachers, few of the new schemes can succeed. Noise and visual distraction are problems the architect cannot afford to overlook.

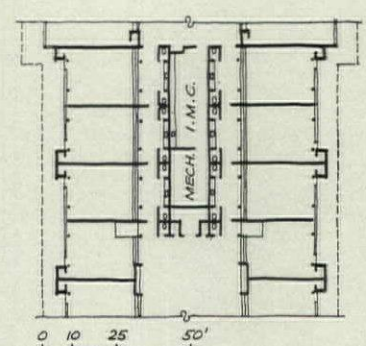
No one is yet certain that team teaching and variable group sizes will be permanent institutions, but a school which can provide a variety of different spaces at will is not limited to a single approach.

PHOTOS: ARTHUR SHAY

Corridors as rooms

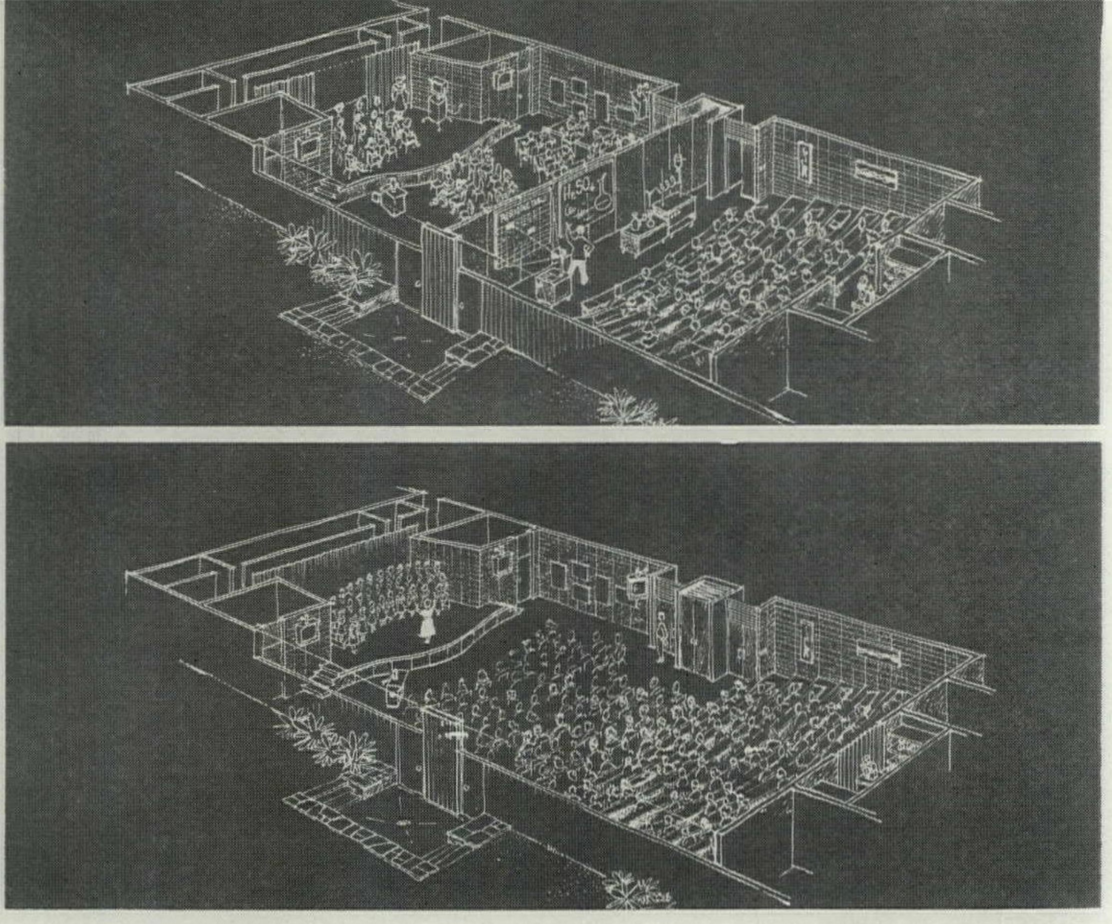
In order to meet a reduced budget, Architects Sherwood, Mills & Smith enlarged the corridors of the Ridge School, Ridgewood, N. J., to the point where they could count as part of the school's usable space. Each corridor-room is surrounded by six or seven classrooms serving the same age level, so that it not only creates a focal point for the group, but also provides space for group activities ranging from square dancing to art exhibits. Glass partitions between corridor and classrooms add visual unity. Little distraction is reported.





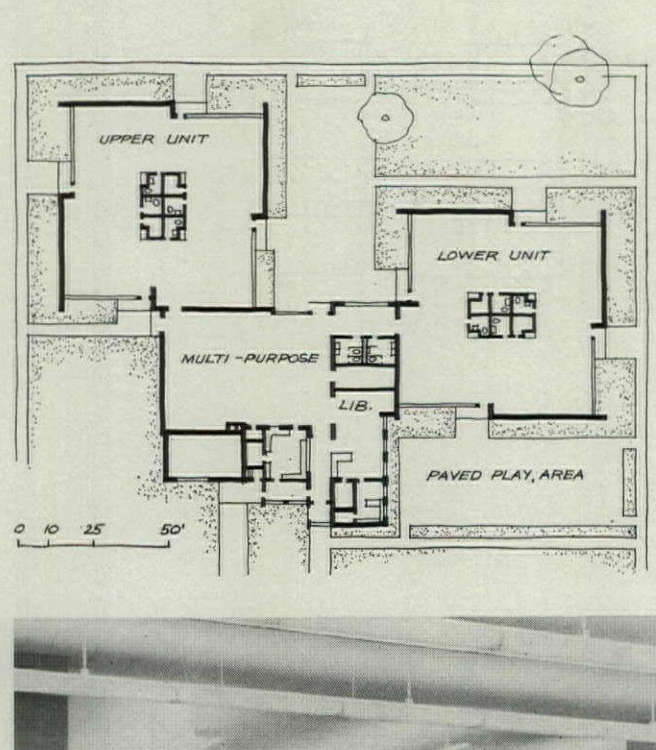
No corridors

Two methods are used to eliminate corridor space in the Paul L. Dunbar School in Gary, Ind. by Caudill, Rowlett & Scott. Fifth- and sixth-grade classrooms are entered via a large "instructional materials center" with study and conference alcoves as barriers along the way (plan and photo above). This "instructional materials center" houses library, audiovisual aids, and teaching machines. Classrooms for the lower, nonmechanized grades are backed by lavatories, mechanical rooms, and offices with circulation taking place on a raised area to the rear of the classrooms (lower photo and plans), which can be reclaimed as a stage or sitting area.



Two auditoriums in one

Thirty seconds is all it will take a folding wall to divide or unite a tiered lecture hall seating 100 and an auditorium-cum-stage in the Dundee Elementary School now under construction in Greenwich, Conn. Architects Perkins & Will designed the flexible unit to handle simultaneously groups of different size with different noise levels and lighting requirements. The rooms can be joined into one large space seating 200 to 300 for major assemblies, lectures, and performances. Particularly advantageous for a "team teaching" school such as Dundee, a divisible auditorium could be an asset in almost any school. (Dundee also has several classrooms with folding walls for the higher grades, although not for kindergarten or first grade.)

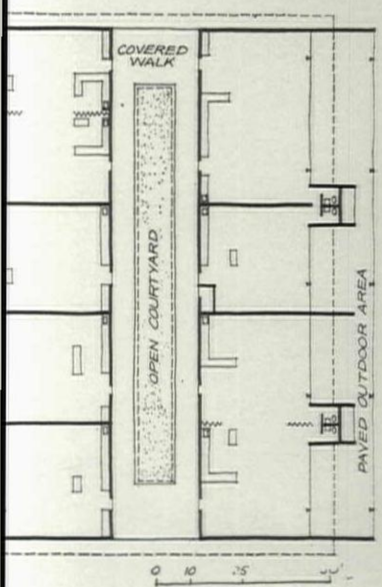


No walls at all

In each of the two nongraded, team-teaching areas of the Carson City Elementary School in Carson City, Mich., the only nonmovable object is a central block containing washrooms and closets. As all furniture is easily and constantly moved, students are not assigned permanent desks; each keeps his personal paraphernalia in a plastic "tote" tray which he carries about and slips into slots in the desk he is using at the time. Architects Louis C. Kingscott & Associates have controlled the over-all sound level by covering ceilings with acoustical tile and equipping all furniture legs with rubber tips. Singing and reading groups are not, however, placed next to each other.

Two-way flexibility

Like the Ridge School (page 158), the new Englewood Elementary School in Englewood, Fla. was originally laid out for a conventional program. Here, however, educational rather than monetary considerations gained the upper hand, and it was decided that a building was needed which could adapt itself to whatever teaching programs might emerge. The only permanent parts of the solution by Architects Bolton McBryde and West & Waters are the roof, its supporting bents, and the mechanical cores. All else is movable or removable. Thanks to folding vinyl walls in two large rooms (lower photo), and sliding glass doors on the exterior of all rooms (upper photo), the nongraded teaching groups can combine, contact, or move outdoors.



Instant walls

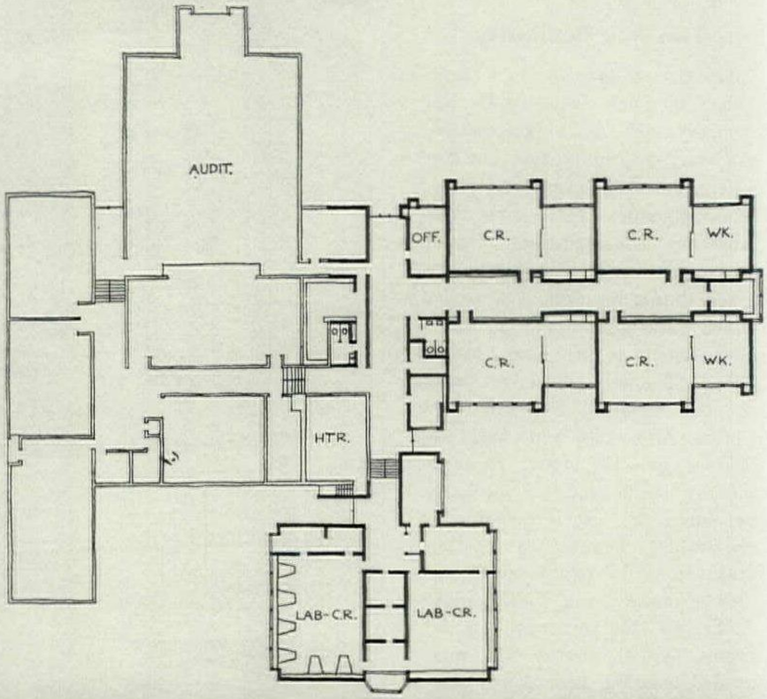
PHOTOS: PHILIP H. HISS

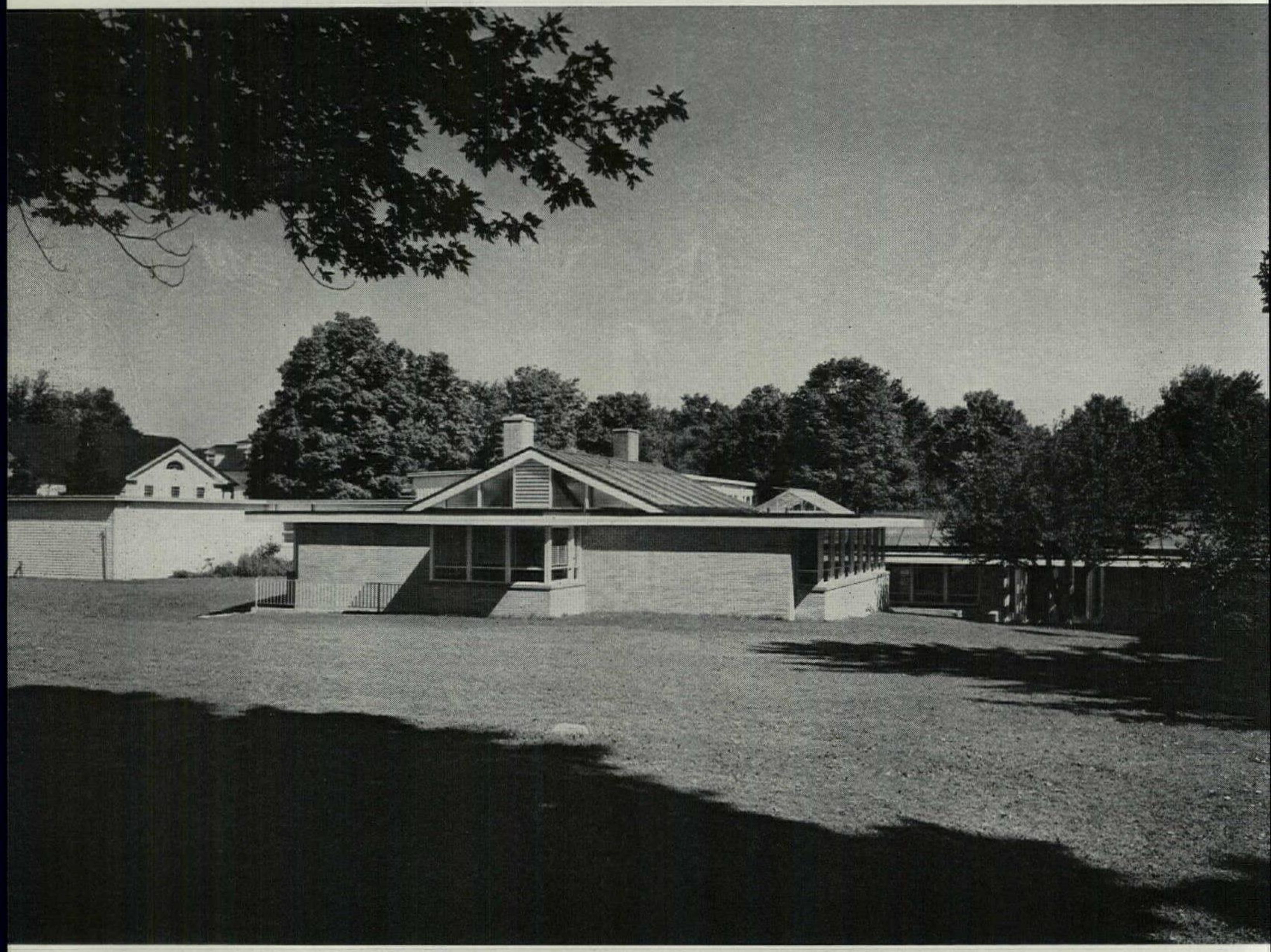
In Sarasota, Fla., a student at Brookside Junior High School (Ralph and William Zimmerman, architects) easily pushes aside a folding panel wall to join two classrooms. Other types of operating dividers have been tried in other schools: accordion-type plastic walls (sometimes used in double thickness to improve its acoustical qualities); "air walls" of tightly fitting wood panels held in place by an inflatable rubber rim at the top; steel-faced sandwich panels with a sound-absorbent filler which are electrically powered and have an automatically inflated joint.

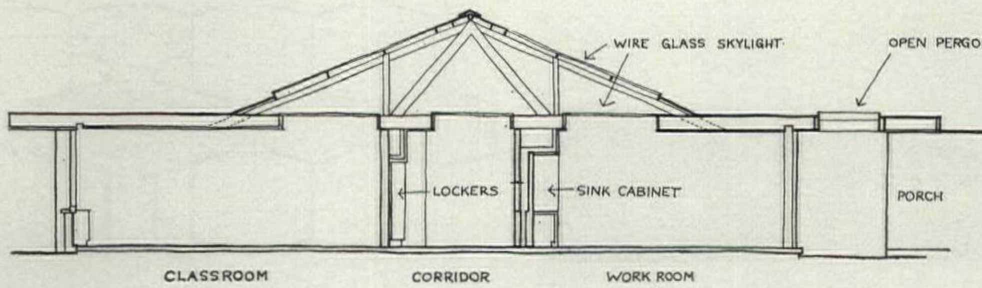
Two ways to expand a school:

New classroom additions

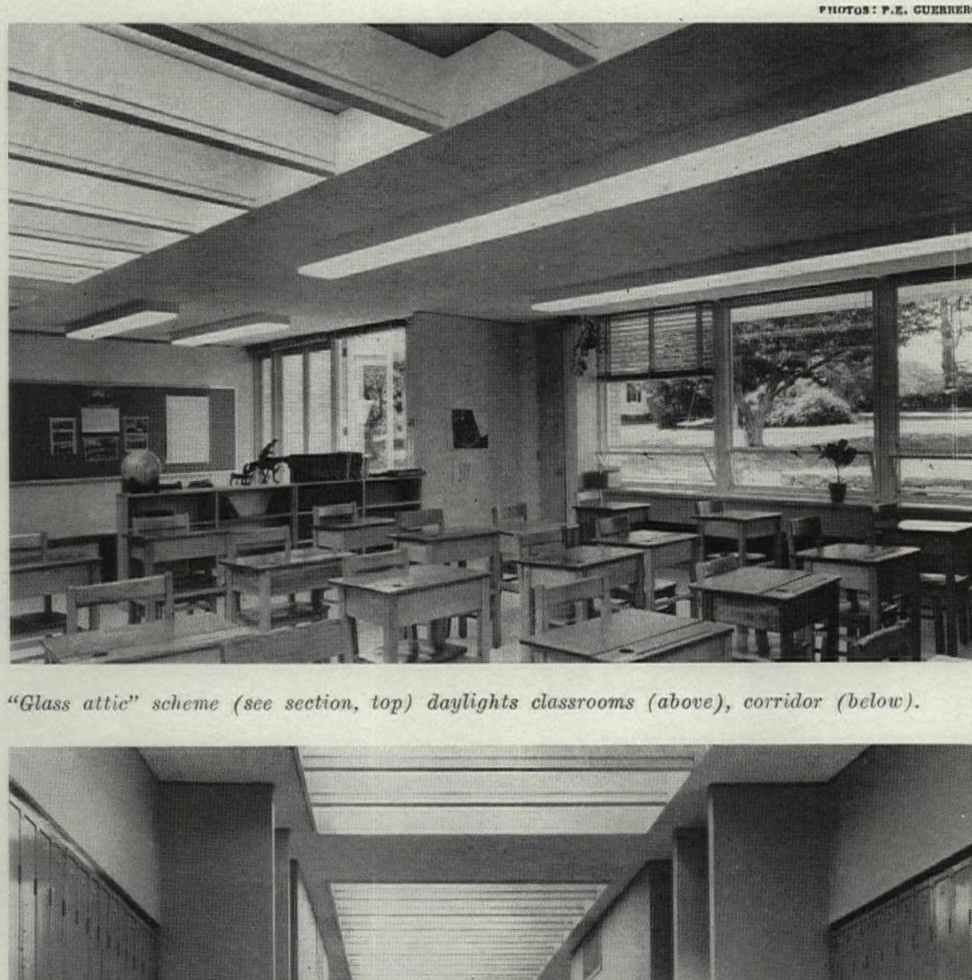
make notable improvements on the old.







PHOTOS: P.E. GUERRERO

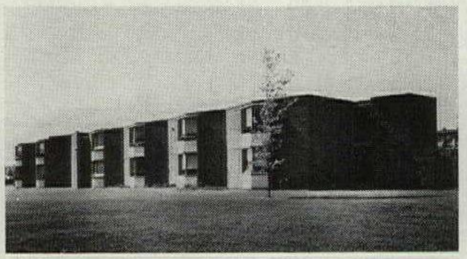


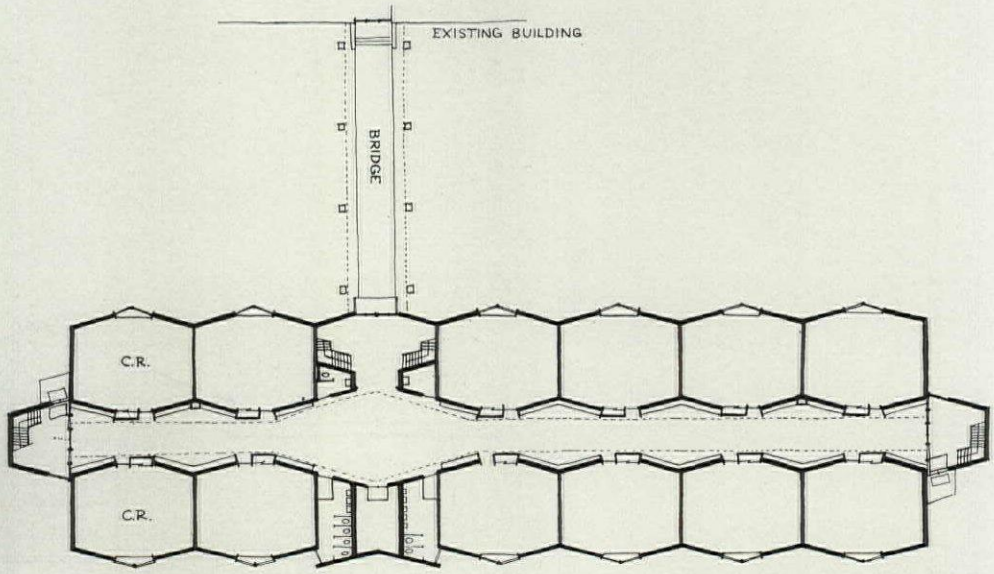
"Glass attic" scheme (see section, top) daylights classrooms (above), corridor (below).

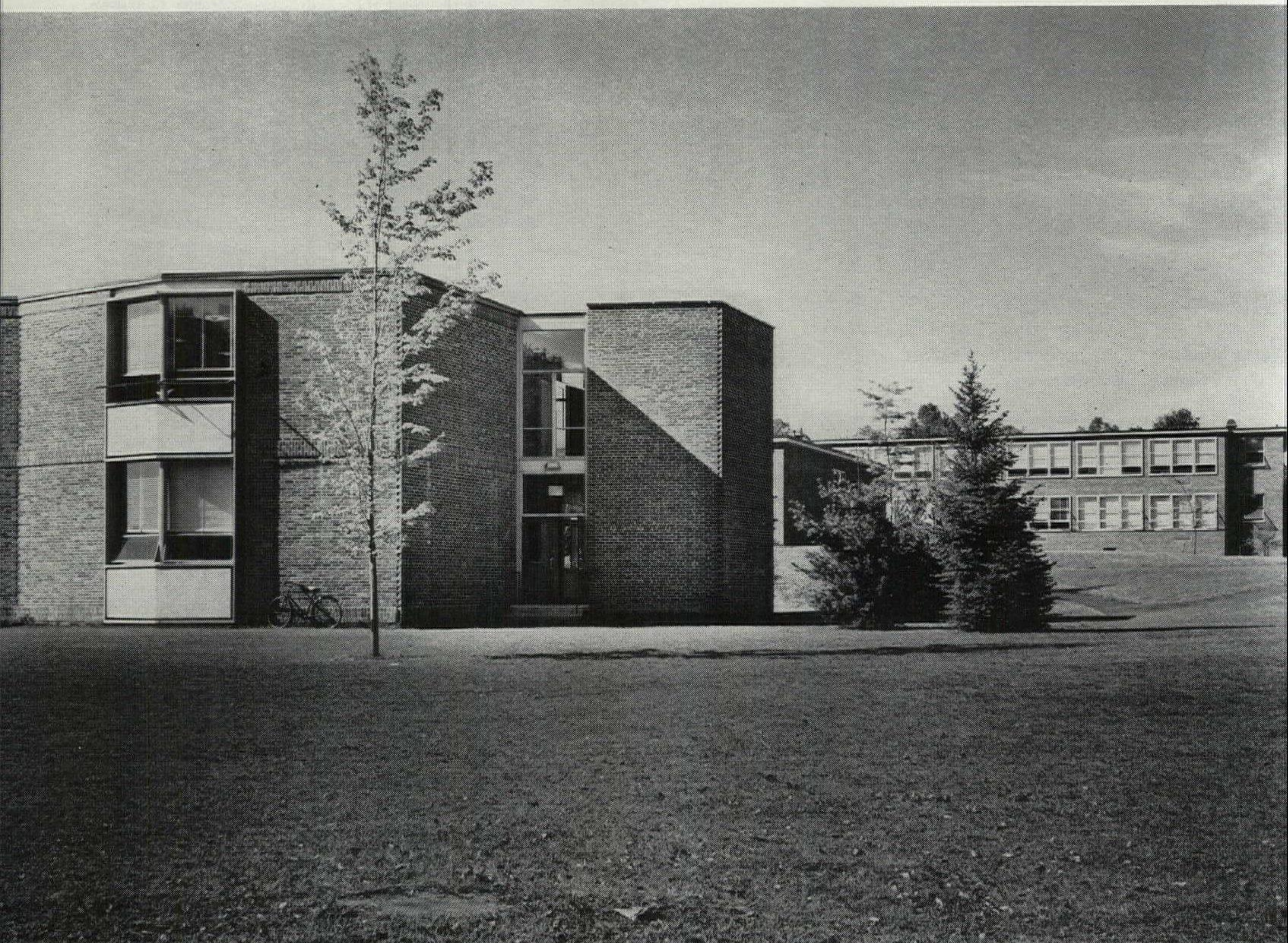
In most growing U.S. communities, school modernization is an almost constant race to keep up with bursting classrooms and new concepts in teaching and design. In New Canaan, Conn., the problem has been met recently with two smart new additions to schools themselves barely five years old. Both incorporate marked advances, and, significantly, both are designed for still further expansion.

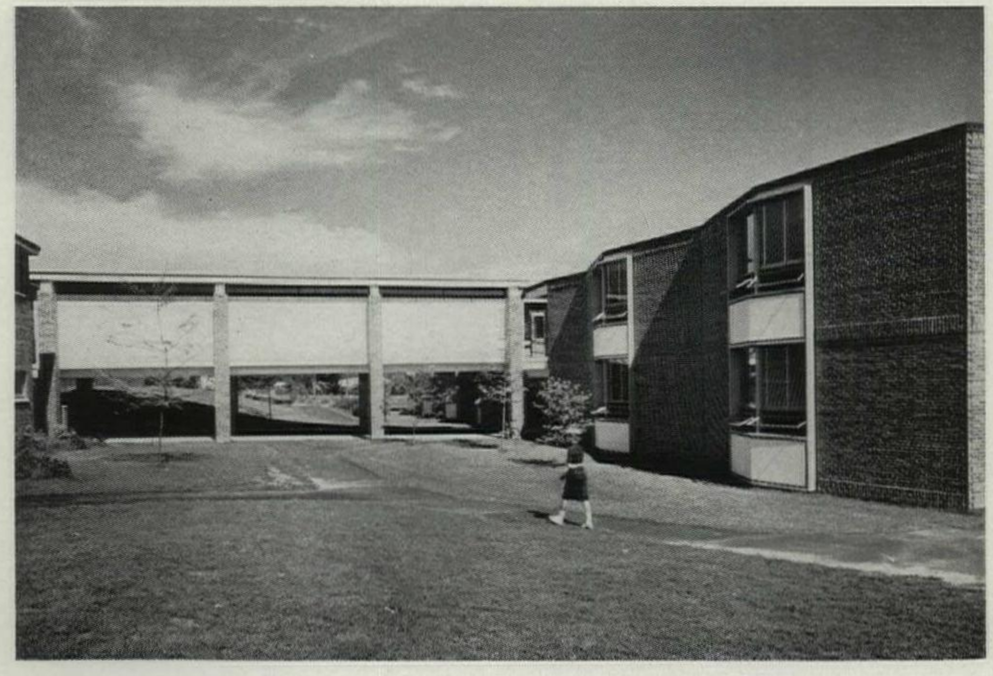
Shown on this page are the new classroom and science wings added to one building of the cooperatively owned New Canaan Country School. Apart from fine detailing and a friendly silhouette, the most notable aspect of Architect Landis Gores' design is its attic skylight scheme. Wood trusses 5 feet on centers straddle the load-bearing corridor walls, supporting roofs that are largely glass (section above). Daylight entering the attic space passes through ceiling openings of wired glass into fourth- and fifth-grade classrooms and work alcoves, and the corridor in between (photos, right). Movable horizontal blinds just above this glass give a good measure of light control; gable-end fans remove built-up attic heat. The 12,000-square-foot addition, detailed and bid in frame construction for $17 per square foot, was built in masonry (to satisfy new fire laws) at $19, including all built-ins and equipment. Engineers: Werner-Jensen & Korst. Contractor: John C. Smith.

Faceted classrooms and alcoved halls make a lively high-school addition.









Covered bridge to the old school doubles as a student art gallery inside.

Though it politely echoes the same red brick and white trim, this handsome addition behind the New Canaan High School differs sharply with an aging parent built less than five years ago. Its undulating walls, in fact, enclose one of the first school plans based on polygonal spaces instead of rigid rectangular ones. Dividends are already apparent. In developing his hexagonal classroom, Architect Victor Christ-Janer brought classes more intimately together in a space adaptable to various seating schemes, including circular groups (photo, right). By cutting his corners, Christ-Janer also saved space equivalent to another classroom per floor, and created corridors nicely broken into alcoves where lockers and drinking fountains are nestled out of traffic's way (lower photo). On entering a classroom, students face a single, slightly bowed window, ample for views yet easy to shade and to darken for visual aids (artificial light and ventilation are required anyway by law, the architect points out, so why overdo the 'window wall'?). Outside, Christ-Janer has replaced the usual ugly air-intake grilles with a simple and articulate slot around the under-window panels. The building, designed for a third story, cost about $18 per square foot. Associated architect: Landis Gores. Engineers: Henry Pfisterer (structural); Muzzillo & Tizian (Mechanical). Contractor: Gellatly Co.

Six-sided classrooms (above) create undulating halls with alcoves for lockers (below).

PHOTOS: P.E. GUERRERO

U.S. business lays plans for group-shelter survival

In the face of deepening East-West tensions, individual efforts to provide home fallout shelters have made much recent news. Less well publicized is the fact that some U.S. business leaders have been laying their own plans for group-shelter survival in the event of nuclear war:

■ The John Hancock Mutual Life Insurance Co. of Boston and International Business Machines Corp. of New York have both instituted extensive fallout-shelter programs. The John Hancock program, designed to provide food, water, and shelter for 6,000 home-office employees, has been under development for 18 months. Company officials designated the first six floors, and the basement area immediately below the first floor of the 26-story building as shelter areas. There is an interoffice alert system which in the case of attack would direct personnel to assigned core areas which provide a protection factor of over 1,000 according to radiation experts who have studied them. A hospital area with medical supplies already stockpiled has been designated and enough food and water has been stocked to give each person in the shelter a sparse but nutritionally adequate diet for ten days. Radiation-detection equipment has been set up at key points, and there are portable detection devices to probe other areas. Auxiliary power has been installed and the air-filter system has been redesigned to permit shutting off sections which would draw in air from the outside after attack. First aid equipment is stored in closets on each of the floors. Portable toilet facilities are to be installed in the shelter areas. The cost of all this is about $35,000, or $6 per employee.

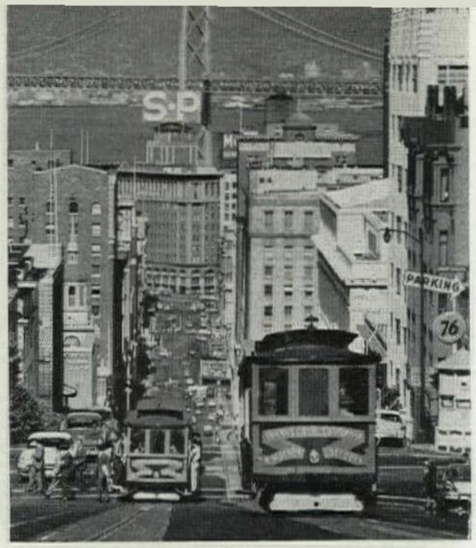
■ IBM's program is similar to John Hancock's, although not quite so extensive. Shelter areas in stair wells and basements have been designated in IBM corporate headquarters in Manhattan, and food, water, and medical supplies have been stock-piled. Auxiliary power and a filtered air system are to be installed. Radiation-detection equipment is already provided. First aid courses are given to personnel. IBM reports that all its branches throughout the country have working emergency planning programs which include group fallout shelters.

■ Possibly the largest shelter undertaking is now going forward at Manhattan's city-within-a-city, Rockefeller Center. Undeterred by the fact that the 16-building complex is located in the heart of what is seemingly a prime target area, the center's management recently announced the start of a fallout-shelter program to protect the 38,000 office workers and 160,000 visitors who come to the center on week days.

Some inside corridors and certain rooms have long been designated as shelter areas in accordance with civil defense regulations. But the new program, undertaken with the assistance of an outside engineering firm, Guy B. Panero, Inc., represents a drastic revision of plans. It will leave the center prepared to resist both light fallout, when 24-hour protection would suffice, and heavy fallout, which might require hibernation of two weeks or longer.

Preparing first for light fallout, the center management is marking off shelter space on each floor and asking tenants to help provide food, medical supplies, and emergency lights for the shelters. Water provisions are simplified by the location of the center's water tanks: underground and safe from radiation. Windows in the central engineers' control room are being bricked up to preserve vital communications and service between buildings. Next year comes the second, and harder, part of the program: converting deep spaces to shelters where office workers and sight-seers could wait out heavy fallout.

■ While government, both state and federal, has often reacted sluggishly to its own civil defense program, one tangible demonstration came recently with the completion in Albany of a basement fallout shelter in New York State's Capitol building, adequate to house all 1,100 Capitol workers for as long as two weeks. The shelter is stocked with food, water, and bedding; radiation baffle walls and emergency power for ventilation and lighting have been provided. Like most other group shelters, it is not designed to protect against blast from a nearby hit. But it does show that the shielding properties of an existing structure can be adapted with relative ease to provide effective group protection against radiation.



PHIL PALMER

No-neon natives unbuild big San Francisco signs

Since it was erected in 1954, the gigantic (40 by 70 foot), red and blue neon sign atop Southern Pacific's San Francisco headquarters building (photo above) blinked on each night as the sun set over the Pacific, blinked off as it rose over the brown hills across the bay. Now the sign blinks no more.

The initial outcry which greeted the big billboard soon subsided; but it revived recently in response to local newspaper editorials and a TIME cover story which quoted SP President Donald Russell as saying: "The sign was a mistake. It will come down some day before long." Plans were for SP to remove the sign when the lease on its headquarters came up for renewal; but suddenly, six months early, workers appeared and began the four-week-long dismantling operation.

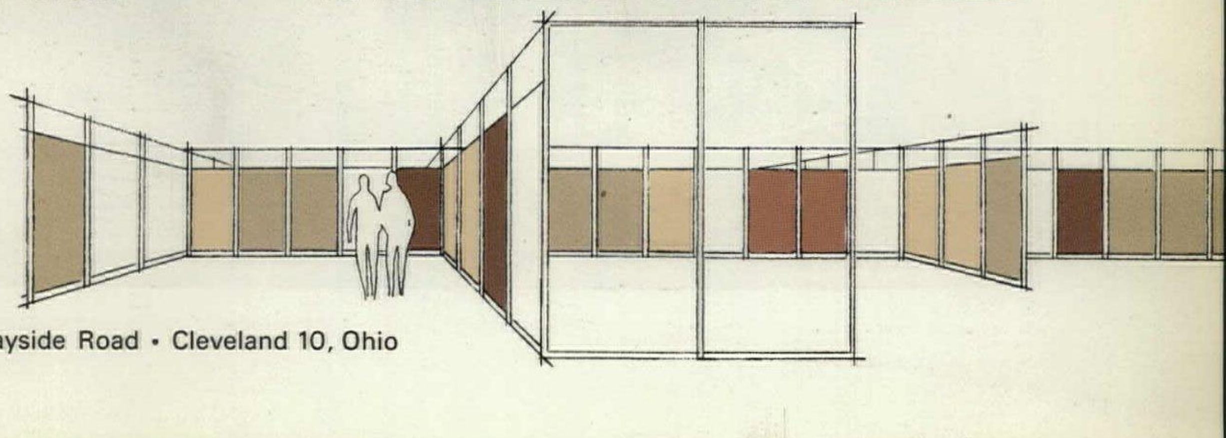
Encouraged by SP's compliance with public sentiment, local guardians of civic beauty began sharpening their spears for further game, cast about for more offensive signs which might be removed. Likely candidates were those of Matson Lines and Shell Oil. George Rockrise, an active member of San Francisco's City Planning Commission, promptly asked the two concerns how they felt about taking down their signs. Matson President Randolph Sevier was temporarily unavailable for comment but, by the next day, Rockrise had an answer from Selwyn Eddy, Shell's West Coast division vice president. Said Eddy: "I don't give a hoot. We don't believe in putting signs on our office buildings."

San Franciscans, already adept at stopping freeways that destroyed their scenery (FORUM, April '59 and '60), seemed to be starting another new sign of the times.

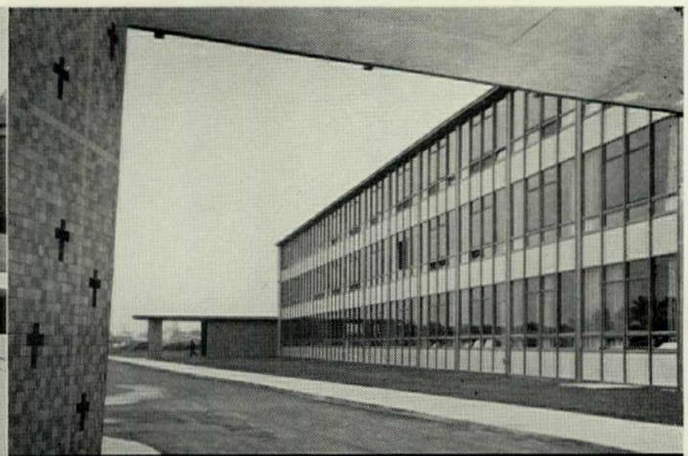
See next two pages

"Steel fastest, most economical." Speed of construction, low cost and reduced fire insurance rates were the main reasons why Structural Steel was used to build the 25-acre Preston Royal Shopping Center in Dallas, Texas. "Structural Steel in this type of construction is year-in and year-out the fastest and most economical method of framing in this area," the contractor said. "The quicker erection time with steel was figured in on this project from the very start." Readily available and speedily fabri-

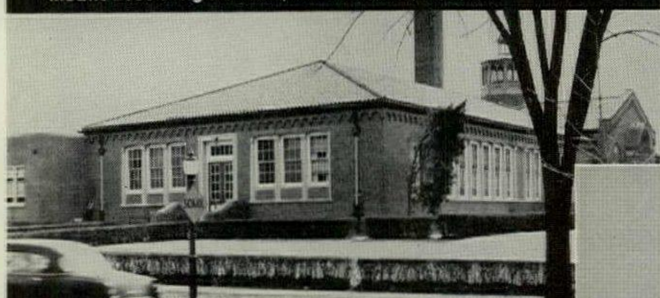
Interesting details — Preston Royal Village. The $2,000,000 shopping center is one of the largest in the Southwest—110,000 feet of floor space. This first use of steel Lamella construction in this area eliminated columns and permitted a gracefully curving roof for the main building. 26 businesses, including a theater, restaurant and service station, are housed in the shopping center . . . and fast erection with structural steel permitted early opening for all of them.



Mount Brook High School, Mount Brook, Alabama

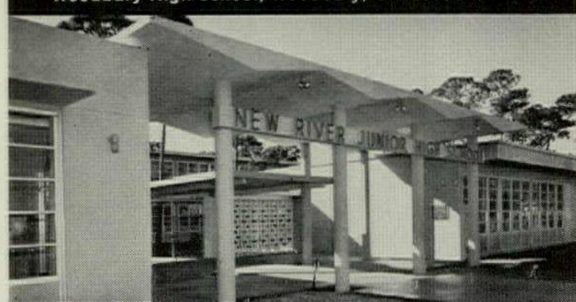


Regina Dominican High School, Wilmette, Illinois



Public School #232, Baltimore, Maryland

Woodbury High School, Woodbury, Connecticut



New River Junior High School, Fort Lauderdale, Florida

DUNHAM-BUSH HEATING-AIR CONDITIONING PRODUCTS SERVE* VARIED SCHOOL DESIGN and LOCALE

*Photos are a sampling of D/B conditioned schools

New schools or old schools, in warm, temperate or cold sections present varied heating and air conditioning problems. But the Dunham-Bush complete product array meets all needs. Ranging from a steam trap to a whole engineered heating system, from a cooling coil to roof mounted air conditioning systems, Dunham-Bush offers "1 Source-1 Responsibility" for school building or remodeling needs.

There's a nearby Dunham-Bush school conditioning specialist ready to assist in your building planning. Quite likely his wealth of experience can prove informative and beneficial. Write for Dunham-Bush school heating-cooling data today.

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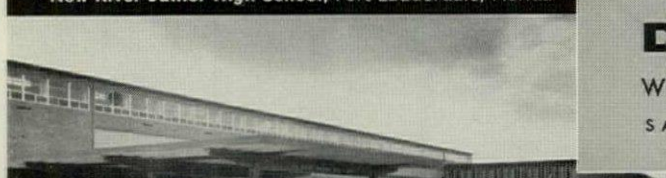
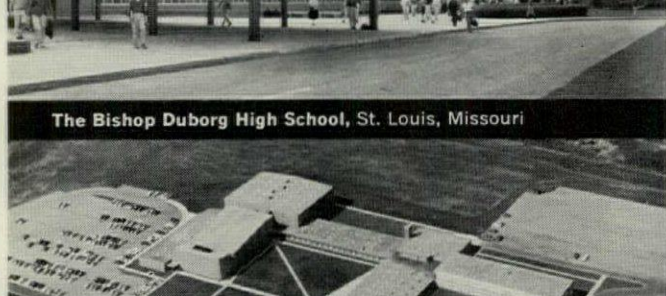
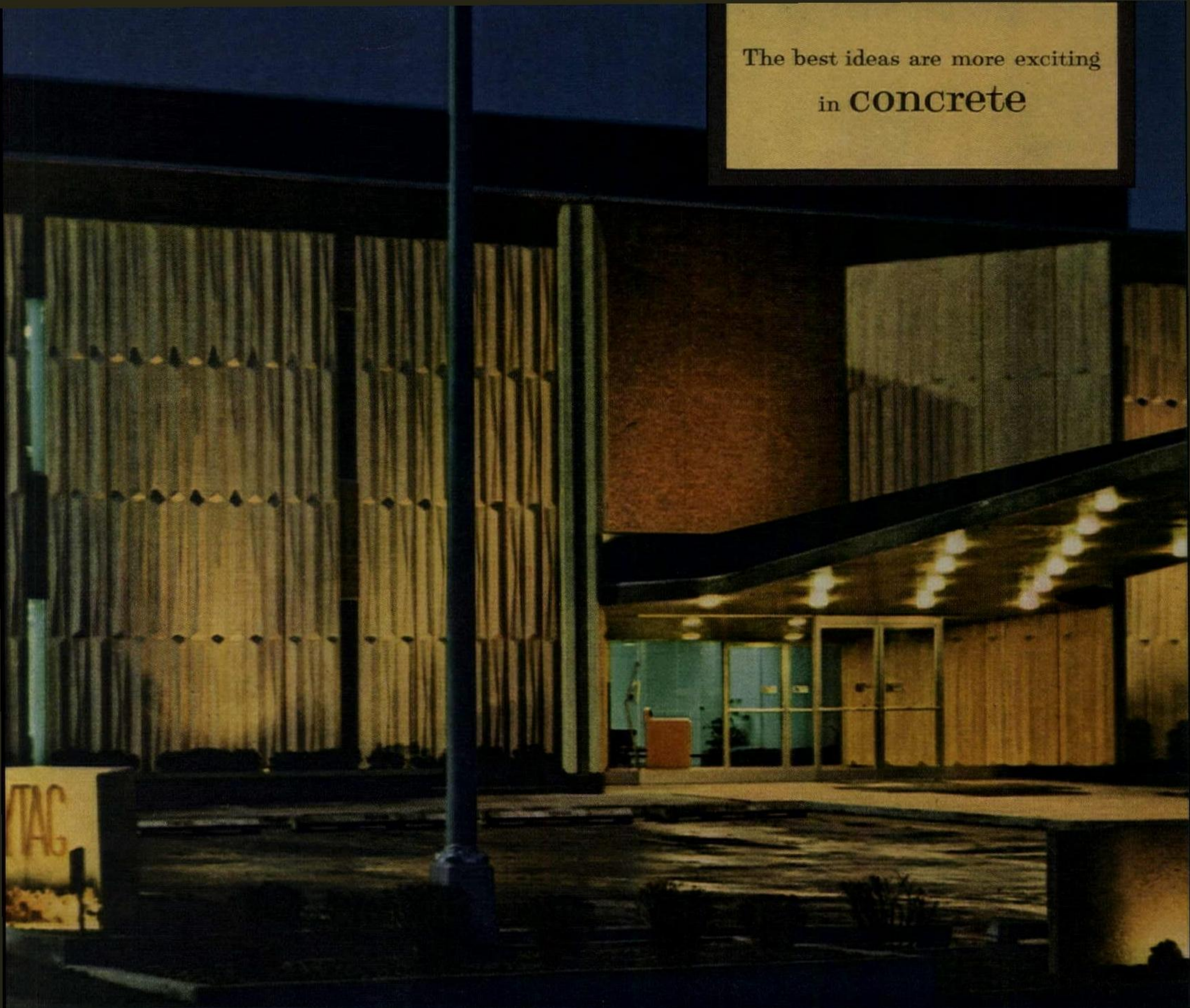


The Bishop Duborg High School, St. Louis, Missouri



Joplin Senior High School, Joplin, Missouri

Mother McAuley High School, Chicago, Illinois



Tapestries of precast concrete give new Maytag headquarters a decorator's touch!

Panels are curtain walls on frame of reinforced concrete. An older building was connected to the new, unified by simply surfacing with identical panels. Architect: Brooks-Borg; contractor: A. H. Neuman Bros., Co.—Des Moines, Iowa.

Visitors receive an impressive and efficient introduction to the Maytag Company in this new office building at Newton, Iowa.

The huge concrete curtain wall panels, weighing up to 10 tons each, were designed as an original sculpture by Los Angeles artist, Malcolm Leland. Varicolored exposed quartz chips and white cement add sparkle to the panels' dramatic light and shadow effects. A trim of Italian mosaic tile demonstrates again concrete's compatibility with other materials. The same tile lines the entrance canopy.

Architects find spectacular effects are easily achieved and unusually practical in modern concrete.

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

"CERAMIC TILE...A DURABLE MATERIAL ...A DECORATIVE EXTERIOR COVERING"

KAHN & JACOBS

P.a.B.

Design project: a commercial office building entrance. The designers: the New York architectural firm of Kahn & Jacobs. Here's another vivid reflection of architectural awareness of ceramic tile's growing role: for beautiful exterior walls, distinctive floors, colorful spandrels.

Ageless ceramic tile will enhance any commercial or institutional project you may have on the boards. And it will pay its way over the years for your clients with savings on maintenance.

THE MODERN STYLE IS

Penn's town . . . Jefferson's campus . . . Medds' mirro

Philadelphia's floating church (1849)

PENN'S GREAT TOWN. By George B. Tatum. Published by The University of Pennsylvania Press, Philadelphia, Pa. 352 pp. 9½" x 12½". Illus. $12.50.

The claim to attention of this book is that is carries a copiously illustrated history of architecture in Philadelphia straight through from the beginnings to 1961, having been commissioned, along with a corresponding exhibition, for the 1961 convention of the AIA in Philadelphia. No other volume exists on Philadelphia that is so complete in its continuity. Dr. George B. Tatum, the author, is associate professor of the history of art at the University of Pennsylvania, and primarily an architectural historian. Says Tatum: "The story of the great buildings of Philadelphia and the men who built them is, in fact, a kind of history of American architecture. . . . The architects and architecture of Philadelphia in a remarkable number of instances helped to create new styles or lead the way to their acceptances."

A good feature of the book is a full set of notes keyed to the illustrations. The antedeluvian state of the printing crafts in the U.S., however, still makes it impractical to put the two together. —D.H.

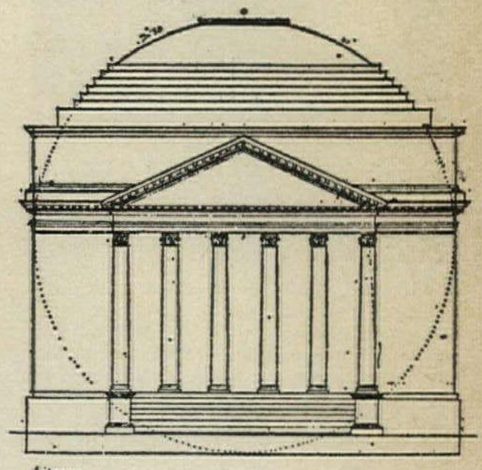
JEFFERSON'S BUILDINGS AT THE UNIVERSITY OF VIRGINIA. Part I, The Rotunda. By William B. O'Neal. Published by The University of Virginia Press, Box 3786, University Station, Charlottesville, Va. 62 pp. 8½" x 11¼". Illus. $8.

This is the first of a proposed three-volume series to be based entirely on original documentary material. Mr. O'Neal has divided his text into two parts: an attempt to reiterate the development and construction of the Rotunda in a narrative format, and the documents, letters, sketches, and quantity tallies themselves. As might be expected, the latter section captures more flavor of Thomas Jefferson as a man, and the Rotunda as an architectural endeavor.

Little attempt is made at analysis or even commentary, at times leaving the reader somewhat in the dark. For example: O'Neal merely drops the fact that the idea of a rotunda as centerpiece came in a sketch from Benjamin Latrobe. No mention is made of their personal relationship, nor of the fact that Jefferson had considerable correspondence with Latrobe concerning the work at the university.

There is more to be done with the subject matter than Mr. O'Neal has chosen to do, but he is easing the burden of those to follow. The plates are elegant and ample, but most will be familiar to Jefferson buffs.

Mr. O'Neal is currently associate professor of art in the School of Architecture at the University of Virginia. —W.C.



Jefferson's sketch for the Rotunda

SCHOOLS IN THE UNITED STATES. Building Bulletin No. 18. British Ministry of Education. Available from British Information Services, 45 Rockefeller Plaza, New York 20, N. Y. 360 pp. 6½" x 8". Illus. Paperback. $2.80.

Although no credits are given, this comprehensive publication evidently is the work of British Architects David and Mary Medd, who made a careful tour of the U.S. in 1958 and 1959 to see what the British could learn from our patterns of school construction. The unnamed authors should be proud of their work. It is unique and authoritative—a good look in the mirror for a good many Americans. Compared with most educational material published in the U.S. it has a refreshing lack of jargon, a clear personal style.

continued on page 175A

In general the Medds liked what they saw. Some of their asides, politely put, are quite telling, however. For instance:

"Prefabricated systems of construction in the U.S. . . . appear to be a minor issue beside the main stream of development in the building industry, although there are those who feel that such systems of construction should be available in an industrialized country."

Other comments bear less on the architecture (most of which is familiar to U.S. readers) than on its occupants: "No opportunity is missed for competition, awards, and the spotlight of publicity. In one West Coast school there is even a driving competition to establish the top ten drivers. This event, coinciding with a safety week, culminates in a dance at which door prizes include 'five gallons of gas, an oil change, lube job, a donated hamburger, a flashlight, and a squirrel knob.' Almost without fail there will be a photograph in the school paper of someone who, for example, is the 'Girls' League choice for April for congeniality,' or who 'has been chosen as the girl of the month for scholastic achievement, capability, and poise,' with a paragraph of family details. The desire to create prestige groups (so fundamentally at variance with American democracy) touches every corner of school life. But perhaps this reaches its zenith in the unveiling of Rose Festival Princess, who is subsequently crowned May Queen. This event is the culmination of prolonged and serious competition and publicity, regardless of its effect on winner and losers, and has all the air of a major public event."

The book is highly recommended. For centuries now, the British have been discerning tourists of the U.S.; seldom have they been more constructive than in the Medds' report. —W.MCQ.

CONTEMPORARY HOUSES, evaluated by their owners. By Thomas H. Creighton and Katherine M. Ford. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 224 pp. 8½" x 10½". Illus. $10.95.

This book contains photographs and floor plans of 36 American houses designed by 31 architects, some world famous, others not so well known. What makes it more interesting than just another collection of pretty good house photographs is that the authors queried all the owners to find out how well the house met their requirements. For each house, the authors supply a brief description, often incorporating quotes from the architect about the problems and how he tried to solve them, and a lengthy report of the owners' feeling about the house—and their architect. The authors conclude, somewhat blandly, that the owners "seem to give the contemporary American house an overwhelming vote of approval. . . . Not a single one . . . said he didn't like his house."—M.E.Y. END

Building materials and equipment for the school

The manufacturers' literature listed below is, in FORUM's opinion, worthy of particular note because of its specific and exclusive reference to the problems of school building.

Acoustics

Dual purpose acoustical ceilings—case-study report on the experiences of numerous schools in the use of an acoustical ceiling system which doubles as fire protection. 16 pp. Armstrong Cork Co., Lancaster, Pa.

"Sound Conditioning for Schools"—discussion of the uses of acoustical tile and panels in various kinds of schoolrooms. 12 pp. Celotex Corp., 120 S. LaSalle St., Chicago 3, Ill.

"Classrooms for Easy Listening"—description of how ceilings of hard surface serve as a sounding board for teacher's voice and how acoustical elements in classroom control reverberation. 16 pp. The Flexicore Co., Inc., 1932 E. Monument Ave., Dayton 2, O.

Classroom acoustics—account of the use of cellular glass acoustical units in the modernization of schools in Bloomington, Ill. 4 pp. Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22, Pa.

Building systems

"Modular School Design"—graphic description by Architect Roland S. Senseman of the various applications of a standardized structural steel framing system. 22 pp. Macomber Inc., Canton, O.

"Blueprint for Better Schools"—three concepts of school design showing use of lumber, timbers, laminated beams, and other wood products. 22 pp. National Lumber Manufacturers Assn., 1619 Massachusetts Ave., N.W., Washington 6, D. C.

Relocatable classrooms—description of a modular structural system featuring aluminum-faced honeycomb wall and roof panels. 4 pp. Panelfab Structures, Inc., 304 S. Burnby, Orlando, Fla.

Prefab steel schools—four "packaged" schools made of prefabricated steel products, ranging from roof decks and joists to cabinets and lockers. 12 pp. Republic Steel Corp., Truscon Div., Youngstown 1, O.

"More School for Your Money"—comparison of two schools, one conventionally built, the other based on the "Space Module Concept." 6 pp. Unitec Corp., Schoolmaker Div., 119 Huron View Blvd., Ann Arbor, Mich.

Daylighting

Skydomes for schools—illustrated examples of preassembled plastic skylights. 4 pp. American Cyanamid Co., Wasco Skydomes, 5 Bay State Rd., Cambridge 38, Mass.

Aluminum windows—several kinds of aluminum windows with specifications suitable for school classrooms. 20 pp. William Bayley Co., 1200 Warder St., Springfield, O.

"Light Control"—data on Venetian blinds with "S" shaped slats to darken school classrooms for the showing of films. 4 pp. Eastern Products Corp., 1601 Wicomico St., Baltimore 30, Md.

Translucent walls—examples and specifications of schools built with prefabricated translucent wall-panel units. 8 pp. Kalwall Corp., 43 Union St., Manchester, N. H.

Laminated glass windows—photographs of how glare-reducing glass windows are used in Michigan elementary and high schools. 2 brochures, 8 pp. Laminated Glass Corp., 9797 Erwin Ave., Detroit 13, Mich.

"Sun Control Spells Economy"—exterior louvers to reduce sun glare through classroom windows. 4 pp. Lemlar Manufacturing Co., Box 352, Gardena, Calif.

"Nature-quality Light for School Children"—discussion of the adequate daylighting of classrooms. 24 pp. Libbey-Owens-Ford Glass Co., 811 Madison Ave., Toledo 1, O.

"Glass Block Makes the Difference"—examples of how older schools can be renovated with glass block. 12 pp. Owens-Illinois Glass Co., Toledo 1, O.

Fiberglas panels for schools—illustrated examples of areas in which fiberglas panels can be used in schools. 4 pp. Reichhold Chemicals, Inc., Alsynite Division, 4654 DeSoto St., San Diego 9, Calif.

"Dome Skylights"—a guide to help architects, engineers, and contractors in specifying skylights and accessories for school corridors, classrooms, gymnasiums, etc. 18 pp. Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.

Electric lighting

Glass diffusers—selection of products for use with fluorescent and incandescent light sources. 4 pp. Corning Glass Works, Corning, N. Y.

Classroom lighting—description, suggested arrangements, and engineering data of fluorescent ceiling fixtures appropriate for classrooms. 8 pp. Day-Brite Lighting, Inc., 6260 N. Broadway, St. Louis 15, Mo.

Lighting fixtures—description of several fluorescent lamps ("Futurliters") for close to ceiling or pendant mounting. 8 pp. The Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 77, Mo.

"High Level Lighting and Common Sense"—brief discussion of the advantages and costs of various lighting techniques, different

continued on page 194

"The Gizmo", Students' Snack Room, Knox College. Architects: Perkins & Will. Plate 451.

What to use for a "Gizmo" Floor?

Murray Quarry Tile was selected for this student eating area because of its warm earthy colors and its well-known durability. These new Ember Flash tiles give a pleasing mottled effect, and the 8″x 3⅞″ size was used to achieve a subdued feeling of pattern. Quarry tile was preferred, too, in this heavy traffic area, because it is rugged, yet so easy to keep clean. Write for Murray Quarry Tile catalog 861.

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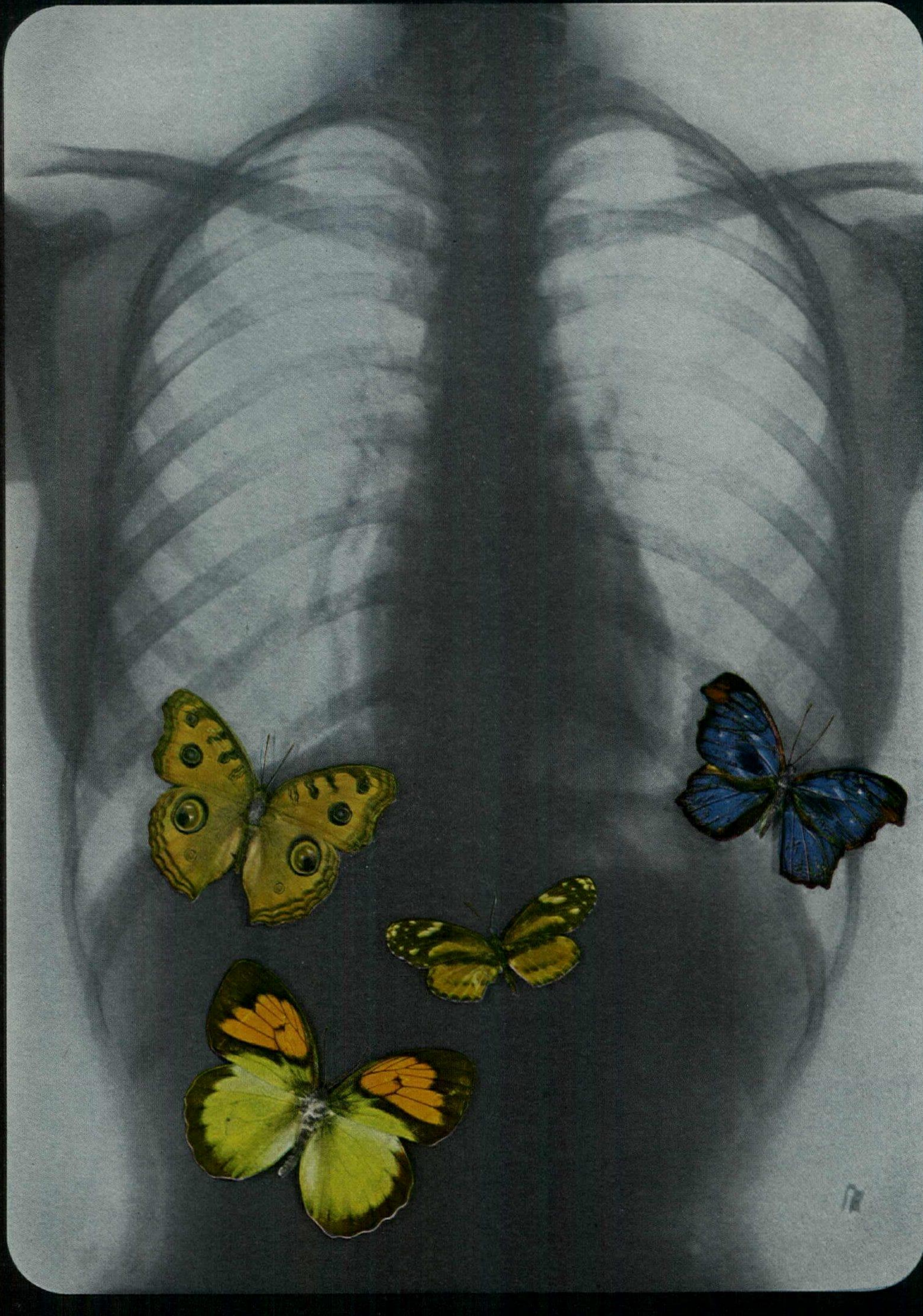

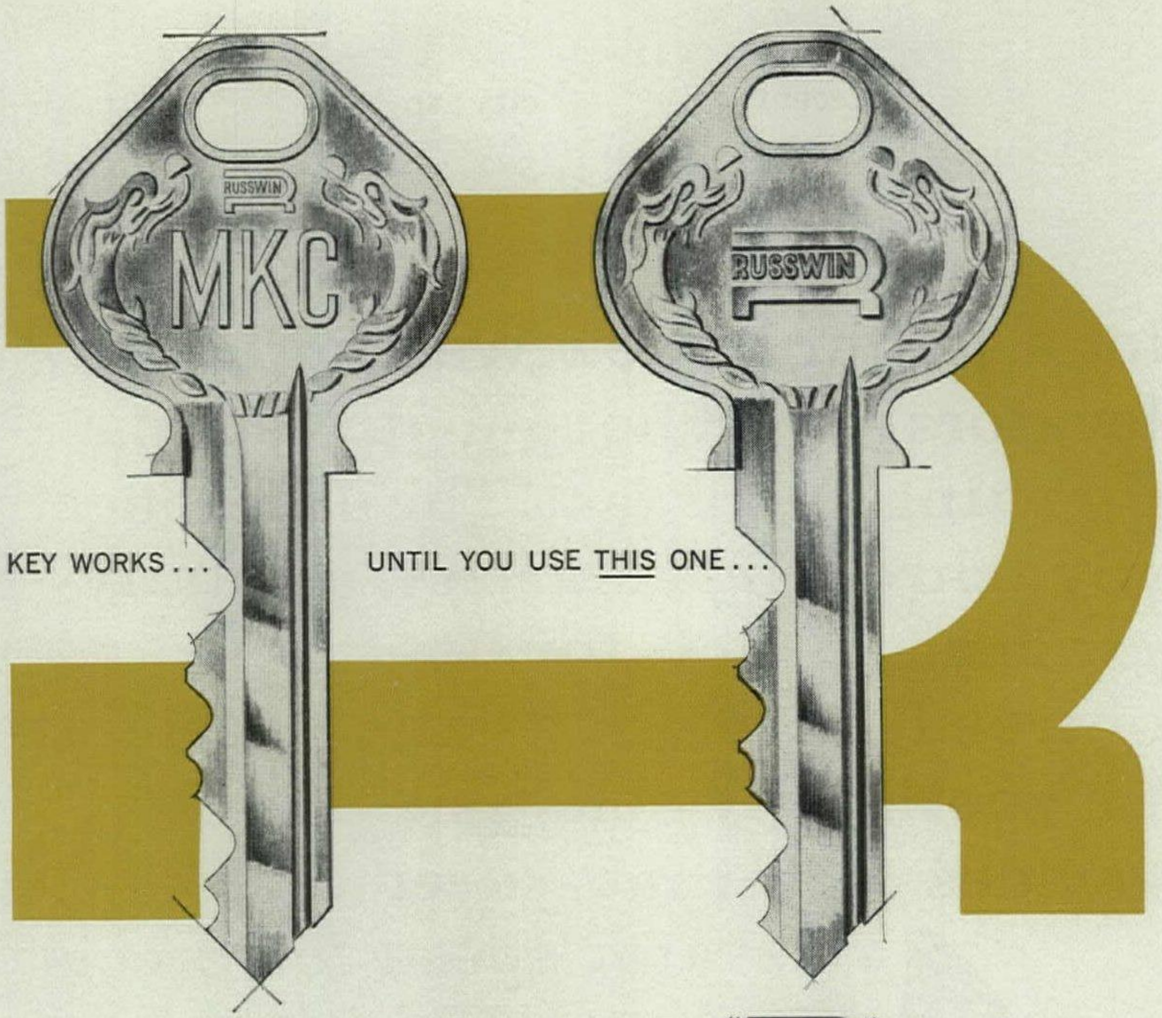

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One set of keys operates locks during building construction. The other set (the owner's keys) cancels out the first set after work is completed. No lock cylinders or pins to change. Russwin's unique Master Construction Key* System makes security simple . . . fast . . . completely practical for *any* building. Look to Russwin . . . for the finest in doorware . . . for the services of a specialist, your Russwin distributor. Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.

*Pat. appl'd. for

RUSSWIN

Glittering nightmare . . . decent housing . . . city streets

GLITTERING NIGHTMARE

Forum:

In the midst of New York City, on 51st Street between Lexington and Third Avenues, are flagrant examples of disregard for cityscape and neighboring architecture (for one example, see photo above).

It has been apparent for a long time that many new buildings in New York do not sufficiently take into account the problems imposed by proximity and continuity, not to mention the best tastes and techniques available to modern design. When three or more buildings of this kind come together, the result is a glittering nightmare. What can be done to stop this kind of mess?

R. GARY ALLEN
New York City

RICHER CITY STREETS

Forum:

Jane Jacobs' provocative urban design theories were refreshing to read in the September article, "Toward richer city streets."

The idea of adding pedestrian cross "streets" to long city blocks was a significant part of the original West Side Renewal Plan for Manhattan. Unfortunately this has been largely eliminated in the current "practical" version.

Among the few benefits of New York's gridiron street pattern are the slices of sunset as the sky cuts right down to the ground. In a new superblock between Lincoln Center and the Hudson River a mammoth slab of an apartment house runs across the former street blocking the sky from the innards of the city. This kind of a loss can be mitigated by requiring developers of these increasingly large-scale projects to conform to an open-space pattern which is a part of the city's over-all plan.

NORMAN KLEIN
Architect
New York City

BUILDING FOR PEACE

Forum:

Your editorial supporting President Kennedy's plea for decent housing for the world's ill-housed [FORUM, Sept. '61] deserves wide circulation. This is a fine article and we intend to publicize it appropriately.

I note that this is one in a series on the subject of "Building for peace" and look forward to others.

DAN R. HAMADY
Assistant administrator
Office of International Housing
Housing and Home Finance Agency
Washington, D.C.

INVESTORS AND ARCHITECTURE

Forum:

Allow me to congratulate you for the article in the September issue, "Can investment builders afford good architecture?" It touches a very sensitive field and uncovers realities which are usually carefully hidden and painful for architects themselves to acknowledge.

I regret to say that, unfortunately, FORUM's comments are too optimistic.

What has not been said, and seems to me to influence the architectural results a great deal, is that most speculators are actually concerned only with the equity they put into a project and not with its total cost.

The bank's appraisers consider for the mortgage evaluation almost exclusively the usable area and the number of rooms of a building, not its character. The architect's fee comes entirely out of the cash the speculator is going to invest. With the excuse that their experience permits them to buy only partial professional services, many builders shop around for plans already used, already satisfying areas and code characteristics, and use them with minor adjustments. As Mr. Friedman says, most tenants are willing to pay only for space and location, and even the disadvantages of poor construction make little difference to the speculative builder

continued on page 184

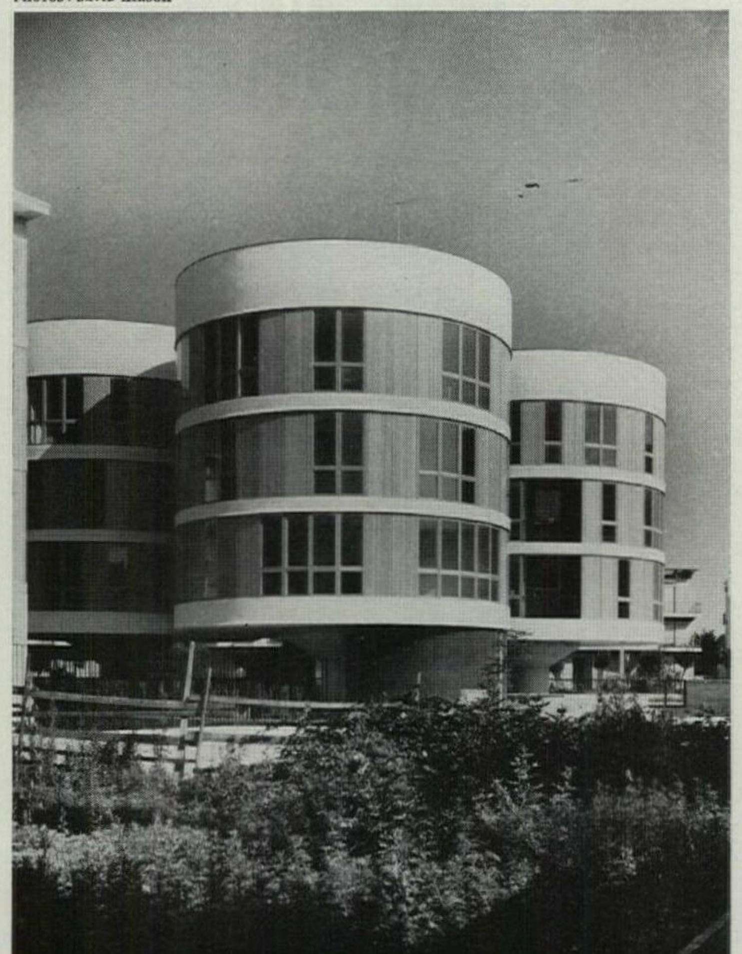
PHOTOS: COURTESY "ARCHITECTURAL REVIEW"

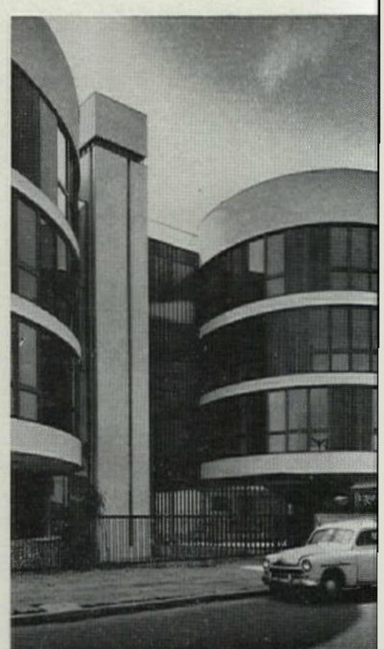
GOOD ENGLISH BEEF

Fitted together as precisely as a three-dimensional jigsaw puzzle, Architect Denys Lasdun's new luxury apartment block overlooking London's Green Park preserves the tone of its classical surroundings with heroic scale and fine finishes. It is a notable demonstration that straight-forward structural expression, without decoration, can provide rich visual rewards.

The building houses elevators and stairs in a core of reinforced concrete. Columns of the same material support the poured-in-place floor slabs, which terminate in broad edge beams stiffening the cantilevered balconies.

PHOTOS: DAVID HIRSCH





MUSHROOMS MILANESE

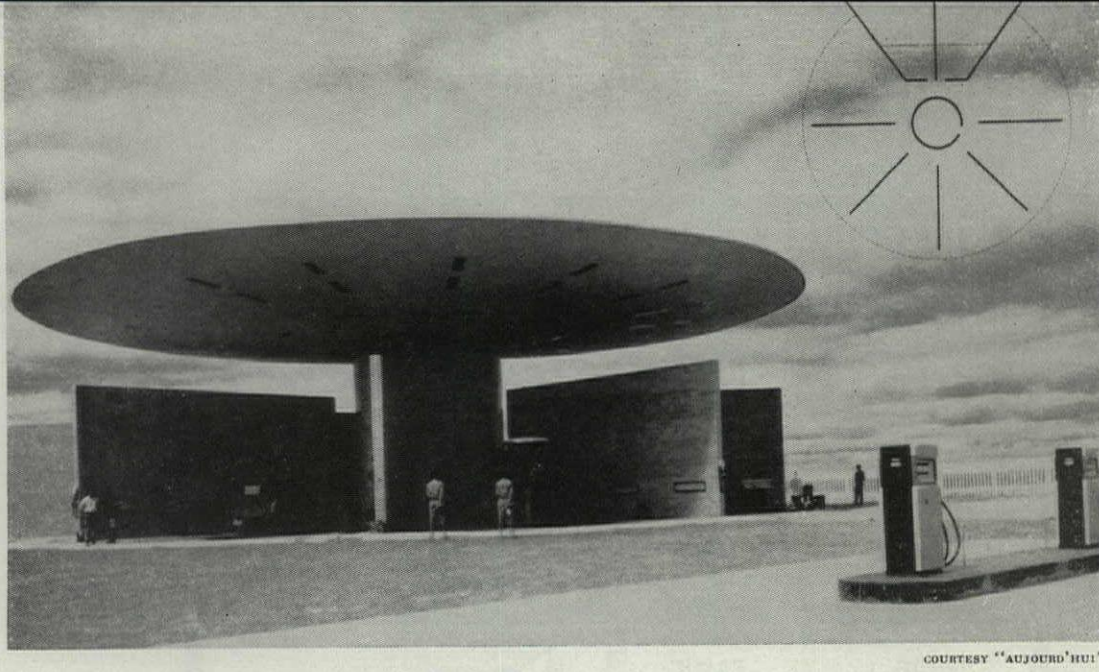
Inevitably, and appropriately, dubbed the Mushroom Houses, this striking three-building apartment group in San Siro, a suburb of Milan, is the work of noted Italian Architects Mangiarotti & Morassutti. The epithet derives, of course, from the single, mushroom-shaped column of reinforced concrete which supports each three-story building. What would normally be the ground floor is thus freed for plaza areas of varied spaces and intimate scale, providing transition from street to apartments.

The three buildings were designed as cylinders to catch maximum light and views, and are grouped in cluster fashion around a service tower in the center. The tower contains elevator, stairs, and, at ground level, the entrance lobby. Corridor bridges radiate from the tower, connecting it to the three cylinders.

The curved façades are made up of prefabricated sections of glass and solid panels, which are arranged according to each apartment owner's needs.

MUSHROOMS BRASILIENNE

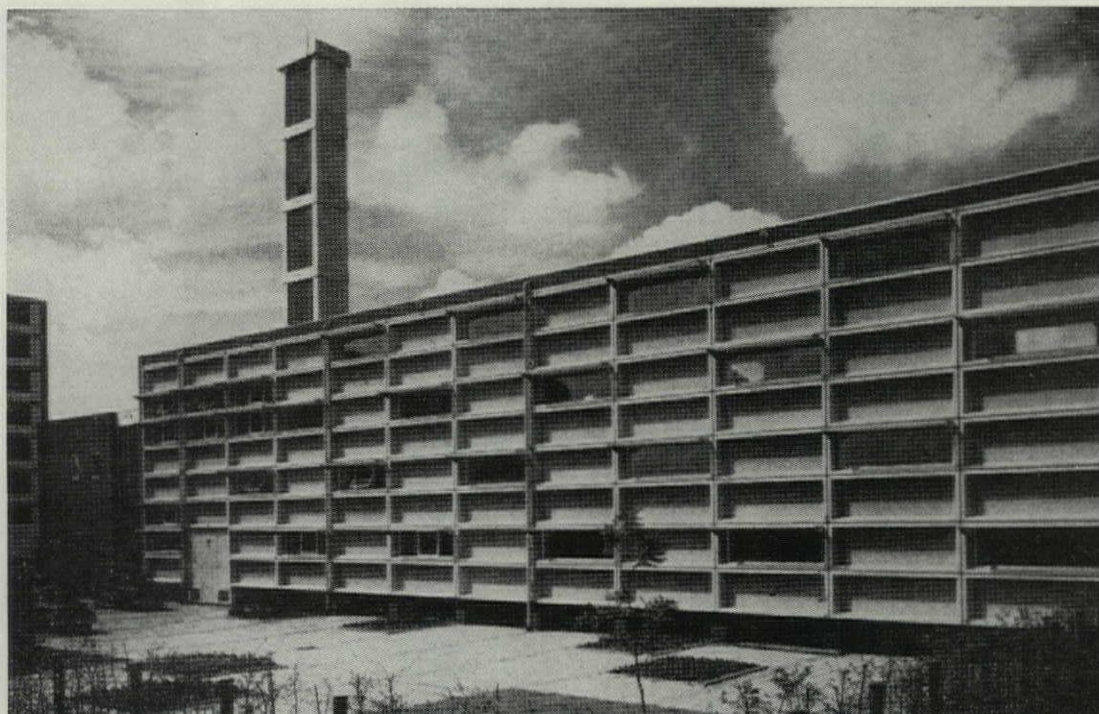
Sprouting from the ground like a giant jungle mushroom grown rampant in the heavy tropical rains, this service station is part of a complex which includes a motel and restaurant on the outskirts of Brasília. The architect, José Bina Fonyat Filho, sectioned the area beneath the canopy like a pie, using freestanding, brightly tiled walls. The structure nicely shelters cars and mechanics from the sun and rain, yet is deliberately left open to bring in the breeze.

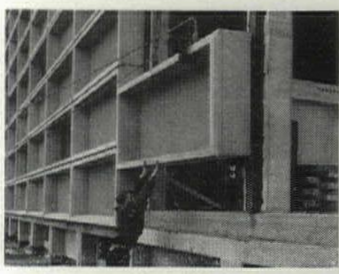


COURTESY "AUJOURD'HUI"

PRECAST HOLLANDAISE

Designed by Dutch Architect B. J. Odink and Engineer J. W. Kamerling, Amsterdam's new telephone building is a deliberate exercise in trompe l'œuil. Its apparently massive scale is deceptive in the absence of a human figure: where at a glance it appears to be eight stories high, in reality it is only two. Precast panels in a honeycomb conceal true floor divisions, creating the enlarged scale.





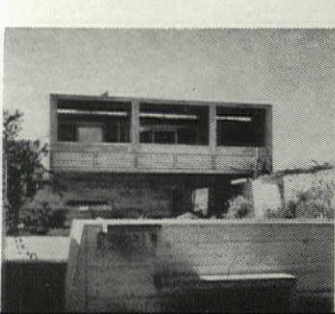
COURTESY "BOUW"

SWISS BOILERMAKERS

Like the boilers it produces, this factory in Thun, near Berne, is characterized by strength. Designed by a team of architects who call themselves Atelier 5, it displays rough forming techniques on façades vigorously punctuated in the Corbusian manner.

The boilers are produced in the two-story main hall. Atop the factory is the owner's apartment (below) overlooking a large roof garden and the mountains beyond. END

PHOTOS: COURTESY "ARCHITECTURAL DESIGN"



because by the time the high maintenance bills appear he will have "unloaded" the property by selling it for an established multiple of the rent roll.

Any society has only the architecture that expresses it. If we are living in a materialistic time of greed and gadgets, that is just about all we can expect.

GIORGIO CAVAGLIERI
Architect
New York City

Forum:

You were doing a convincing job of rebutting Mr. Friedman's allegations [FORUM, Sept. '61] until you began using the *Harper's* magazine article as the authority for your position. At that point, I lost complete confidence in your argument. Moreover, it was shocking that you would dignify the *Harper's* article by your apparent agreement with it.

HENRY S. MILLER JR.
Realtor
Dallas

■ FORUM *merely quoted from* Harper's *on selected points where the two magazines agreed.*—ED.

EDITORS NOTE: Herbert McLaughlin, whose comparisons of round and rectangular nursing unit schemes were presented in "Hospitals in the round" [FORUM, *July '61*], *has refined the analyses of these schemes subsequent to development of the material presented in* FORUM. *McLaughlin's new analyses are based on a recent and more accurate method of determining nursing-unit efficiency developed by Robert Pelletier and John Thompson of Yale. The new analyses, while resulting in somewhat different figures from those reported in* FORUM, *reinforce McLaughlin's point that rectangles can be superior to circles in nursing and construction efficiency. This is particularly true in the case of larger nursing units.*

Comparisons of refined designs of the 40-bed nursing units which appear in the July article are shown below.

	Rectangular	*Circular*
Ave. dist. patient bed to patient bed	*64.2'*	*78.1'*
Ave. dist. nurse's station to patient bed	*44.8'*	*57.6'*
Ave. dist. utility room to patient bed	*45.2'*	*60.5'*
Dist. nurse's station to utility room	*17'*	*18'*
Dist. nurse's station to elev. lobby	*70'*	*75'*
Dist. nurse's station to medicat. room	*4.5'*	*4.5'*
Total area (sq. ft.)	*7,284*	*8,598*
Area per bed (sq. ft.)	*182.1*	*214.9*
Length of ext. wall	*336.3'*	*377.1'*

END

for fire door specifications...

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N.H.O. ¾" offset only

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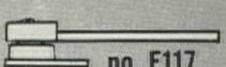

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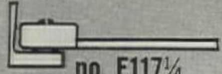

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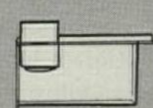
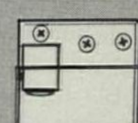
TOP PIVOTS: primed iron

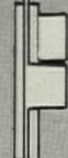


no. F280 half surface

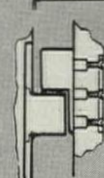


no. F480 full surface

SIDE JAMB PIVOTS: primed iron



no. FM19 full mortise



no. F219 half surface

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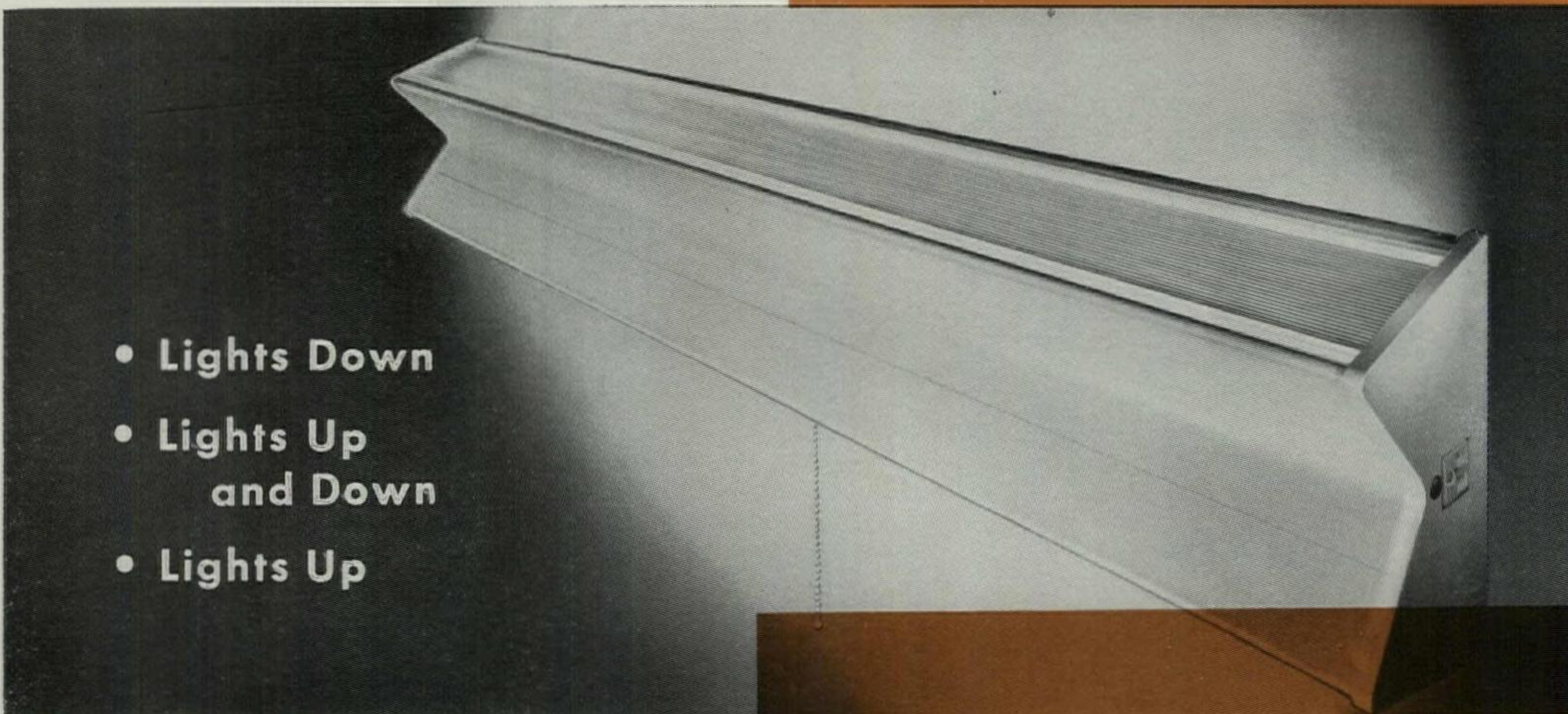

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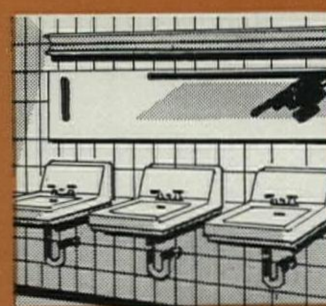
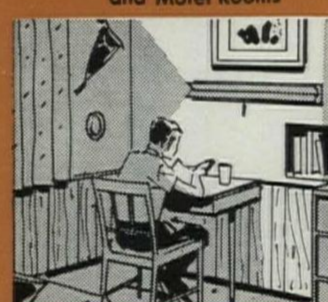
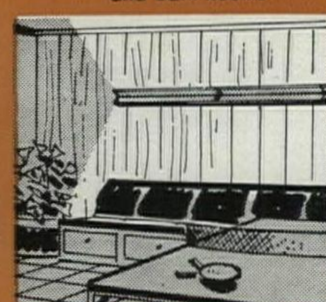


Wash Rooms and Bath Rooms

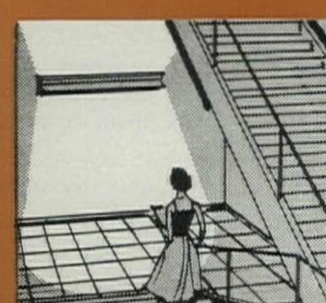


Home Study Areas

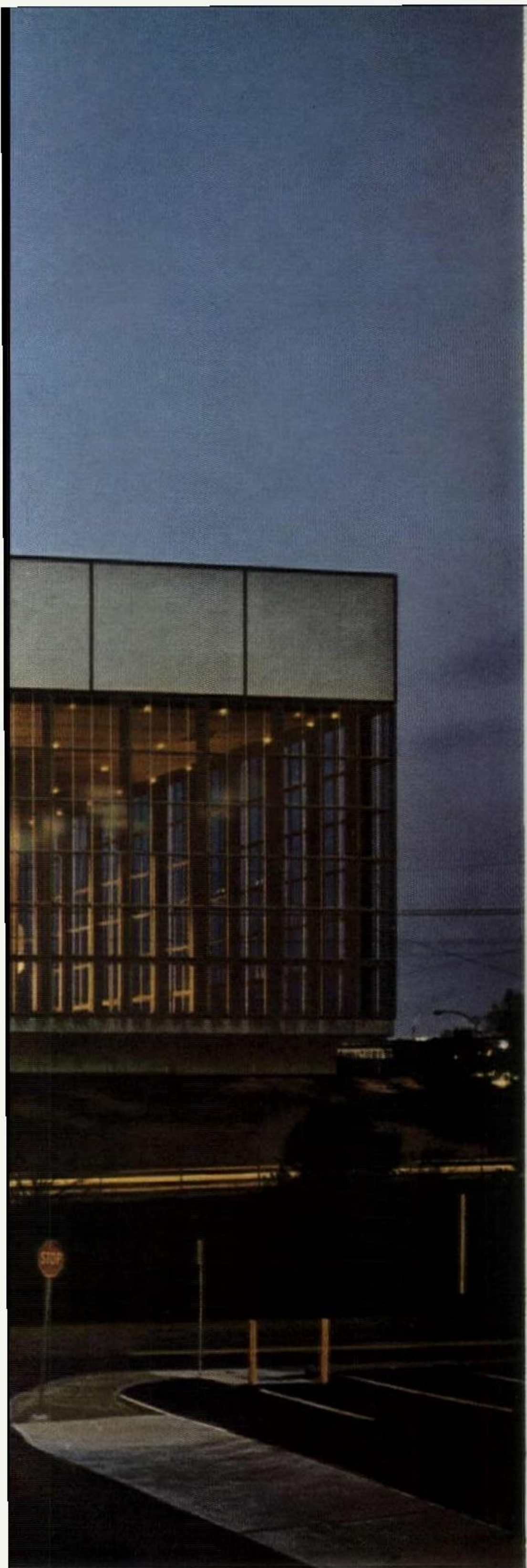


Recreation Rooms

Entryways



Stairwells



Variations

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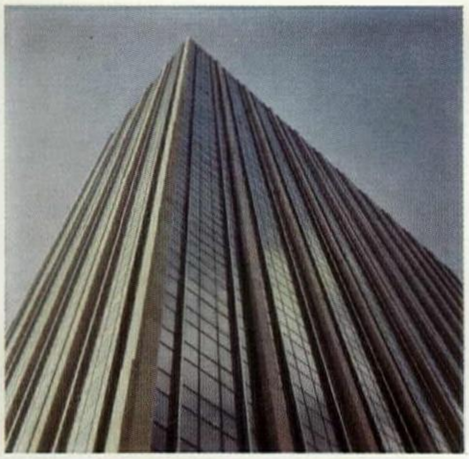
AWARD WINNING HEADQUARTERS BUILDING of Washington Water Power Company gains strong visual interest from spandrels of HUETEX® in two shades of blue. Huetex, A-SG's insulating glass facing, consists of glass, polished or textured on the weather side, with permanently bonded coatings of ceramic enamel and aluminum on the reverse. Colors may be matched to the architect's sample. *Architects:* Kenneth Brooks and Bruce Walker.

UNITED NATIONS HEADQUARTERS BUILDING was one of the first notable skyscrapers to utilize wired glass as a spandrel material. Here, heat-absorbing AKLO* in its wired form lends both structural qualities and cool dramatic green to one of the most breathtaking sights on the New York skyline. *Architects:* Harrison & Abramovitz. *Glazing Contractor:* David Shuldiner, Inc.

*Reg. T.M.-Lic. by Corning Glass Works



SUBTLE TEXTURE, DEEP REFLECTIONS characterize the facing of the Time and Life Building. Polished wired glass gives stunning effects in an unusual application of a familiar material. *Architects:* Harrison & Abramovitz & Harris. *Glazing Contractor:* David Shuldiner, Inc.

LONG, HORIZONTAL ACCENT is achieved by broad spandrel stripes of Huetex in striking Glacier White. Color adds dimension to the Fastener Division building of National Lock Company, Rockford, Illinois. *Architects:* Ragnar Benson, Inc.

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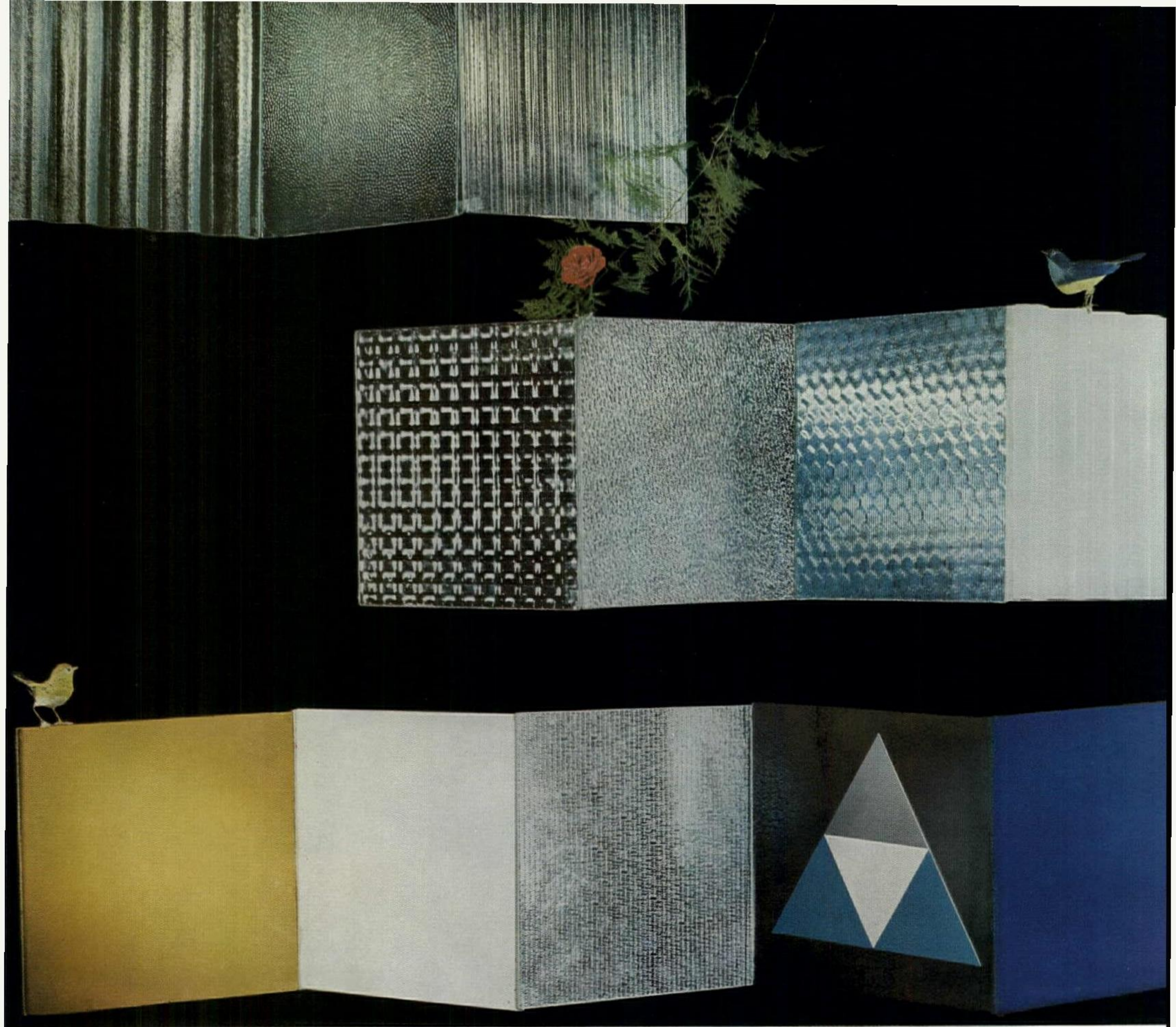

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lighting levels. 6 pp. Holophane Co. Inc., 342 Madison Ave., New York 17, N. Y.

"Surface and Pendant"—five styles of fluorescent ceiling fixtures. Brochure includes charts for determining the number and spacing of units at any level of illumination. 24 pp. Lightolier, 346 Claremont Ave., Jersey City 5, N. J.

Lighting for classrooms—technical handbook describing a luminous ceiling fixture system using reflected light; how to calculate the proper amount of light needed for typical classrooms; and suggested lighting arrangements. 27 pp. Silvray Lighting Inc., 1270 Avenue of the Americas, New York 20, N. Y.

"Modernize Classroom Lighting"—description of four "packaged" lighting systems and the costs involved to relight a typical 30 x 30 ft. classroom. 4 pp. Smoot-Holman Co., Inglewood, Calif.

School lighting systems—general information, installation, and dimension data for an indirect lighting system for classrooms. 8 pp. Sunbeam Lighting Co., 777 E. 14 Pl., Los Angeles 21, Calif.

"Condensed Guide to Lighting Fixtures"—an illustrated listing of fluorescent lighting systems for schools and libraries. 8 pp. Sylvania Electric Products, Inc., 48th St., Wheeling, W. Va.

Fluorescent lamps—a description of lamp types and a selection of side panels and shieldings designed for schools. 4 pp. Westinghouse Electric Corp., Lighting Div., Cleveland, O.

Fire and safety devices

"Fire Alarm System"—description of automatic electrical warning equipment. 4 pp. Autocall Co., Shelby, O.

Automatic sprinklers—reprint of an article on fire protection with automatic sprinkler systems. 3 pp. National Automatic Sprinkler and Fire Control Assn., Inc., 60 E. 42nd St., New York 17, N. Y.

Flooring and carpets

"Acoustical Flooring for Schools"—results of test installations of carpeting in classrooms, corridors, language laboratories, and other school areas. 11 pp. James Lees & Sons Co., Bridgeport, Pa.

Carpeting in schools—presentation of the case for carpets in new and old buildings. 20 pp. plus inserts. Mohasco Industries, Inc., Alexander Smith Div., 295 Fifth Ave., New

"Ultimate Cost of Flooring"—cost comparison of school flooring of various kinds. 12 pp. National Terrazzo Mosaic Assn. Inc., 2000 K St., N.W., Washington 6, D. C.

Furnishings & fixtures

Storage units—catalogue of lockers, file cabinets, and office furniture for the school. 12 pp. All-Steel Equipment Inc., Aurora, Ill.

School furnishings—presentation of a broad line of classroom, library, auditorium, office, and learning center equipment. 28 pp. American Seating Co., Grand Rapids 2, Mich.

Classroom furniture and modular partitions—description of a broad line of chairs, desks, tables, and partitions designed specifically for educational purposes. 108 pp. Brunswick Corp., 2605 E. Kilgore Rd., Kalamazoo, Mich.

Folding gym seating—description of a vinyl-coated steel seating which folds against gymnasium walls. 6 pp. Brunswick Corp., 2605 E. Kilgore Rd., Kalamazoo, Mich.

"Laboratory Sinks"—general data and dimensions of sinks and troughs treated with epoxy resins to resist chemicals used in a school laboratory. 12 pp. Duriron Co., Box 1019, Dayton 1, O.

Classroom storage—description of plastic trays for individual storage of students' materials. 3 pp. Fabri-Form Co., Byesville, O.

"Laboratory Equipment for Science Instruction"—description of tables, desks, storage cabinets, hardware, electrical and plumbing fixtures, etc., for science classrooms. 104 pp. Hamilton Manufacturing Co., Two Rivers, Wis.

Mobile platforms and tables—description and dimensions of mobile and wall tables, platforms, chord risers, etc. for schools. 2 brochures, each 4 pp. Hamilton Manufacturing Co., Hamilton Erickson Portable Products, Two Rivers, Wis.

"Steel Bookstacks"—examples and dimensions of stationary and sliding bookshelves and cases. 22 pp. Hamilton Manufacturing Co., Two Rivers, Wis.

School furniture and auditorium seating—description of a broad line of school furniture. 84 pp. Heywood-Wakefield Co., Gardner, Mass.

Roll out gym seats—descriptive and technical data concerning a closed deck system of flexible spectator seating. 14 pp. Hussey Manufacturing Co., N. Berwick, Me.

"New Directions in Chalkboards"—description of chalkboards made of cement and asbestos fibers and of their various uses in classrooms. 16 pp. Johns-Mansville Corp., 22 E. 40th St., New York 16, N. Y.

Counter shutters—description and suggested specifications of rolling shutters used as closures for school kitchen and lunch counters. 8 pp. Kinnear Manufacturing Co., 1191 Fields Ave., Columbus 16, O.

Folding units—brief description of various kinds of portable folding tables, benches, platforms, etc. 6 pp. Mitchell Manufacturing Co., Milwaukee 46, Wis.

"The Green Book of Chalkboards"—description giving advantages, size, weight, and prices of chalkboards and bulletin boards for classrooms. 24 pp. New York Silicate Book Slate Co., Inc., 600 Old Country Rd., Garden City, N. Y.

"Gym Mats"—description of various wall and floor mats and accessories for school gymnasiums. 12 pp. Petersen & Co., Inc., Belfield Ave. at Wister St., Philadelphia 44, Pa.

Vertical sliding panels—description of hardware and framing for movable chalkboards, tack boards, wardrobe closures, and pass windows. 4 pp. S. H. Pomeroy Co., 41 Magee Ave., Stamford, Conn.

"Telescoping Gym Seats"—description and specifications of disappearing spectator seating and basketball backstops, 8 pp. Safway Steel Products, Inc., 6228 W. State St., Milwaukee 13, Wis.

"Custom Flexibility for Science Classrooms"—floor plans and illustrations of custom-steel furniture and storage units for high school laboratories. 8 pp. St. Charles Manufacturing Co., St. Charles, Ill.

"Custom School Storage Furniture"—base, wall, and shelving units, including sink and countertops for school kitchens, sewing classrooms, and arts and crafts centers. 58 pp. St. Charles Manufacturing Co., St. Charles, Ill.

"Planning Homemaking Classrooms"—ideas, suggestions, and illlustrated examples of kitchens and sewing rooms and equipment for home economics courses. 32 pp. St. Charles Manufacturing Co., St. Charles, Ill.

Wall-recessed tables and benches—installation, operation, and various uses of steel table and bench units which fold into the wall. 6 pp. Schieber Sales Co., 12955 Inkster Rd., Detroit 39, Mich.

Dormitory furnishings—general description of metal framed furniture of all kinds and a technical bulletin covering dimensions, planning, and installation. Two brochures, 16 and 12 pp. respectively. Simmons Co., Merchandise Mart Plaza, Chicago 54, Ill.

Drawing and drafting equipment—description of tables, cabinets, and accessories for art classes, shops, and school libraries. 16 pp. Stacor Equipment Co., 285 Emmet St., Newark 5, N. J.

School doors—an example of how an Oregon elementary school cut costs with standard metal doors and frames. 3 pp. Steelcraft Manufacturing Co., 9017 Blue Ash Rd., Cincinnati 42, O.

Laboratory fixtures—description of water faucets, turrets, hose cocks, and stops for school laboratories. 4 pp. T & S Brass & Bronze Works, Inc., 128 Magnolia Ave., Westbury, N. Y.

"Library Bookstack Equipment"—description and planning data for adjustable metal bookstacks. 8 pp. Virginia Metal Products, Inc., Orange, Va.

Seating and equipment for sports—description and general specifications of seating stands for gymnasium and outdoor athletic fields. Also other school equipment (e.g., folding partitions, basketball backstops, folding stages). 44 pp. Wayne Iron Works, Wayne, Pa.

"Steel Lockers"—descriptions and dimensions of steel lockers and other locker-room equipment. 22 pp. Alan Wood Steel Co., Penco Div., Oaks, Pa.

Hardware

"Protective Controls for School Doors"—brief descriptive data on various kinds of stops and holders. 4 pp. Glynn Johnson Corp., 4422 North Ravenswood Ave., Chicago 40, Ill.

Locks for schools—description of several types of locks for school laboratories and lockers. 6 pp. National Lock Co., Industrial Hardware Div., Rockford, Ill.

Door closers—technical data on inconspicuous installations. 4 pp. Oscar C. Rixson Co., 9100 W. Belmont Ave., Franklin Pk. Ill.

"Hardware for Schools"—guide to the selection of locks for various areas of the school. 12 pp. Schlage Lock Co., Bayshore Blvd., P. O. Box 3324, San Francisco 19, Calif.

Locker locks—description of dial and key-operated locksets for school and gymnasium lockers. 8 pp. The Yale & Towne Manufacturing Co., Yale Lock and Hardware Div., White Plains, N. Y.

Heating, ventilating, and air conditioning

Classroom unit ventilators—description of automatic temperature control equipment for damper-controlled classroom unit ventilators. 4 pp. Barber-Colman Co., Rockford, Ill.

Ceilings that heat and cool—description of a radiant and acoustical ceiling for classrooms—6 pp. Burgess-Manning Co., Architectural Products Div. 749 E. Park Ave., Libertyville, Ill.

Classroom ventilation units—description of under-the-window induction units for use with a central heating and ventilating system. 8 pp. Carrier Air Conditioning Co., Syracuse 1, N. Y.

Heating and ventilating schoolrooms—description, room capacity, and dimension data for a two-zone heating-ventilating system in which fresh air is "mixed" with steam or hot water heat. 12 pp. Dunham-Bush, Inc., West Hartford 10, Conn.

Schoolhouse heating—description of an automatic temperature heating control system and examples of its use in schools. 8 pp. C. A. Dunham Co., 400 W. Madison St., Chicago 6, Ill.

Classroom heating-ventilating with gas—discussion of the problems of classroom comfort and a solution based on underwindow units supplied with gas-fired steam or hot water. 16 pp. Lennox Industries Inc., 200 S. 12th Ave. Marshalltown, Ia.

School heating—description and technical data concerning a self-contained individual-room heating and ventilation system. 4 pp. Midland-Ross Corp., Janitrol Heating and Air Conditioning Div., Columbus 16, O.

"Air Condition Your School and Cut Costs"—report on the advantages and economics of air conditioning plus three schoolhouse case studies. 20 pp. Minneapolis-Honeywell Regulator Co., 2747 Fourth Ave. S., Minneapolis 8, Minn.

"Educational Climate"—general and technical description of classroom air control equipment. 6 pp. Modine Manufacturing Co., Racine, Wis.

Classroom ventilation—discussion of the need for individual room thermal control and a description of underwindow unit ventilators. 24 pp. American Air Filter Co., Herman Nelson School Air Systems Div., 215 Central Ave., Louisville 8, Ky.

"Education and Air Conditioning"—explanation of the changing patterns in education; air conditioning's contribution to school environment; and how air conditioning can reduce building and maintenance costs. 16 pp. John J. Nesbitt, Inc., State Rd. and Rhawn St., Philadelphia 36, Pa.

"School Air Conditioning Case Study"—step-by-step documentation of how the citizens of McPherson, Kan., with the guidance of the Stanford University School Planning Laboratories, built a new high school and the savings they made. 12 pp. John J. Nesbitt, Inc., State Rd. and Rhawn St. Philadelphia 36, Pa.

Schoolroom heating—description of products, installations, and costs of gas-fired, forced-air school heating and ventilating systems. 8 pp. plus a 28 pp. specification manual. Norman Products Co., 1150 Chesapeake Ave., Columbus 12, O.

"Unit Ventilators"—general description and engineering data. 72 pp. Warren Webster & Co., Camden 5, N. J.

"Heating Schools Electrically"—brief discussion of different methods of electric heating plus cost data. 4 pp. Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

Partitions

Adjustable modular system—description of an integrated and flexible combination of chalk boards, tack boards, peg boards, book shelves, etc. 11 pp. Enamel Products Co., Korok Div., 341 Eddy Rd., Cleveland 8, O.

Toilet enclosures—brief description and specifications of low metal toilet partitions for kindergarten and lower grade schools. Fiat Metal Manufacturing Co., 9301 Belmont Ave., Franklin Park, Ill.

"Operable Wall"—description, details, and specifications for acoustical wall panels which hang from the ceiling and slide into place to divide classroom areas. Chalk boards and tack boards can be permanently attached to panels. 8 pp. E. F. Hauserman Co., 6800 Grant Ave., Cleveland 5, O.

Acoustical curtains—description of partitions which can be raised or lowered electrically from the ceiling, dividing large assembly areas into separate classrooms. 4 pp. Torjesen, Inc., 209 25th St. Brooklyn 32, N. Y.

"Modify Your School Layout"—movable metal partitions for new or old schools. 4 pp. Virginia Metal Products, Inc., Orange, Va.

Paint and protective finishes

Resurfacing desk tops—how to renew school desktops with plastic surfacing material. 8 pp. General Electric Co., Laminated Products Dept., Coshocton, O.

Paints for stadiums—description of paints recommended for outdoor athletic facilities. 4 pp. Glidden Co., 900 Commerce Bldg., Cleveland 14, O.

"Color dynamics for schools"—examples of paint colors suitable for classrooms, school shops, gymnasiums, etc. 8 pp. Pittsburgh Plate Glass Co., 632 Fort Duquesne Blvd., Pittsburgh 22, Pa.

continued on page 196

continued from page 195

Structural materials

Roof decks—design data concerning insulated and acoustical roof deck panels made of chemically treated wood fibers coated with Portland cement. 12 pp. Flintkote Co., 30 Rockefeller Center, New York, N. Y.

"A Wise Investment for Educational Buildings"—five reasons for considering limestone for school buildings. 4 pp. Indiana Limestone Institute, P. O. Box 757, Bloomington, Ind.

"Dignity and Beauty in School Walls"—a portfolio of 25 schools which used masonry for walls. 14 pp. Medusa Portland Cement Co., P. O. Box 5668, Cleveland 1, O.

"Environment for Learning"—assessment of the advantages of one-story wood school buildings. 18 pp. National Lumber Manufacturers Assn., 1619 Massachusetts Ave., N.W., Washington 6, D. C.

"Modern Wood School"—eight reasons for using wood in school construction. 24 pp. National Lumber Manufacturers Assn., 1619 Massachusetts Ave., N.W., Washington 6, D. C.

"Redwood Goes to School"—examples of the use of redwood in school construction. 16 pp. National Lumber Manufacturers Assn., 1619 Massachusetts Ave., N.W., Washington 6, D. C.

"Plaster"—the many and varied uses of plaster in school construction (e.g., walls, ceilings, chalk boards, etc.) with photographic examples. 20 pp. U. S. Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

School of wood—seven case studies with cost data and structural details. 12 pp. West Coast Lumberman's Assn., 1410 S.W. Morrison St., Portland 5, Ore.

Teaching aids

"Architectural Design Considerations for Language Laboratories"—detailed technical discussion of the requirements for an efficient installation. 11 pp. DuKane Corp., St. Charles, Ill.

"Sound Systems for Schools"—brief description of a broad line of sound systems for educational purposes. 6 pp. DuKane Corp., St. Charles, Ill.

Language laboratory—description of tape recording and respond units for teaching foreign languages. 4 pp. Edwards Co., Inc., Norwalk, Conn.

Television teaching—illustrated examples of how closed-circuit television is used in schools and colleges. 8 pp. General Precision Laboratory, Inc., 63 Bedford Rd., Pleasantville, N. Y.

Electrical training equipment—description of various kinds of variable voltage distribution equipment for technical education programs. 6 pp. General Time Corp., Stromberg Div., Thomaston, Conn.

"Language Teaching Systems"—description of electric equipment and furnishings used in teaching language courses. 8 pp. Hamilton Manufacturing Co., Two Rivers, Wis.

Electronics in teaching—brief descriptions of a wide variety of equipment ranging from record players to language laboratories. 8 pp. Radio Corp. of America, Meadow Lands, Pa.

Sound systems—detailed description of five sound systems with technical data. 8 pp. plus inserts. Radio Corp. of America, Meadow Lands, Pa.

School sound systems—brief description of several sound systems and compartments for school programs, emergency announcements, two-way room communications, etc. 4 pp. Rauland-Borg Corp., 3535 W. Addison St., Chicago 18, Ill.

"Developmental Reading Training"—description of packaged materials for reading instruction. 12 pp. plus inserts. Reading Laboratory, Inc., 500 Fifth Ave., New York 36, N. Y.

"Language Laboratories"—four types of audio-recording equipment for group and individual study. Two 4 pp. folders. Rheem Califone, 5922 Bowcroft Ave., Los Angeles 16, Calif.

Centralized sound systems—description of a centralized sound system for various educational and administrative purposes. 8 pp. Siegler Corp., Bogen-Presto Div., P. O. Box 500, Paramus, N. J.

Wall coverings

"Ceramic Tile for Schools"—illustrated examples of ceramic tile designs for school exteriors and interiors. 20 pp. American Olean Tile Co., Inc., Lansdale, Pa.

School planning guide for wall covering—description of uses of vinyl fabrics for school walls, tack boards, gymnasium wall padding. 8 pp. L. E. Carpenter & Co., Inc., Empire State Bldg., New York 1, N. Y.

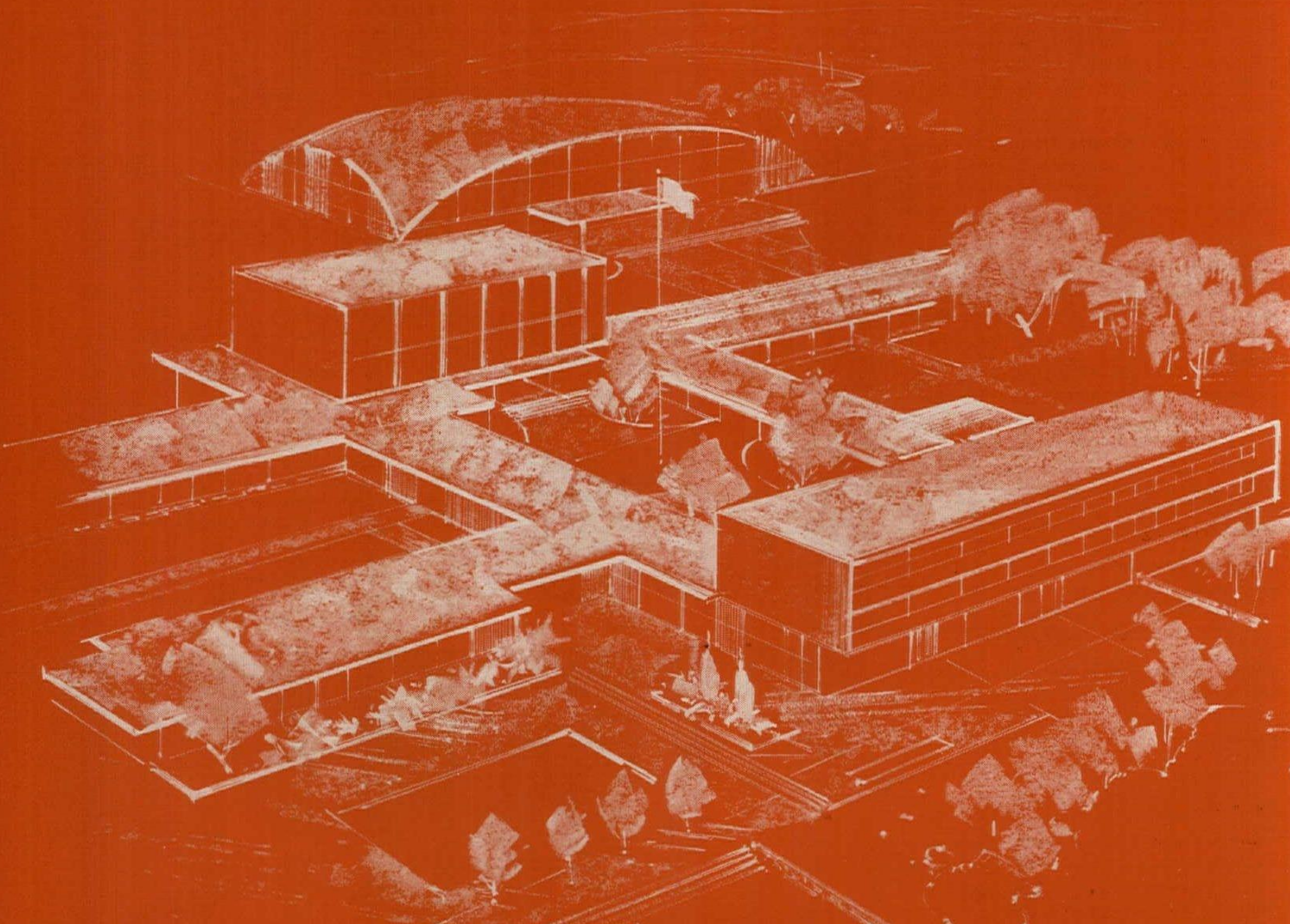
General

"Sweeping and Mopping Floors"—manual on the maintenance of classroom, gymnasium, and corridor floors. 24 pp. Huntington Laboratories, Inc., Huntington, Ind.

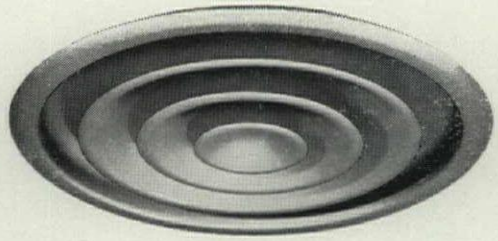
"A Study of Economics"—brief case histories of how schools cut maintenance costs. 12 pp. Hillyard Chemical Co., St. Joseph, Mo.

"Work Place for Learning"—illustrated book by Architect Lawrence B. Perkins about the art of school building. 62 pp., $4. ($2 to architects). Published by Reinhold for Libbey-Owens-Ford Glass Co., 811 Madison Ave., Toledo 1, O. END

IN A CLASS BY ITSELF...

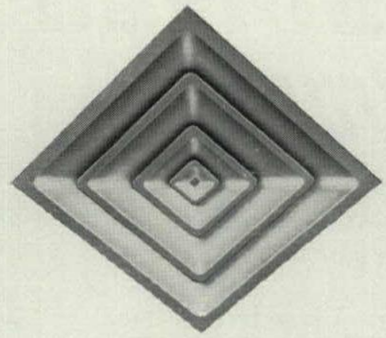


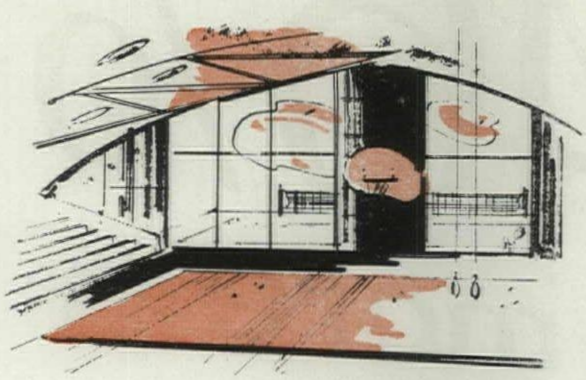
TUTTLE & BAILEY AIR DISTRIBUTION EQUIPMENT IS THE MARK OF A MODERN SCHOOL

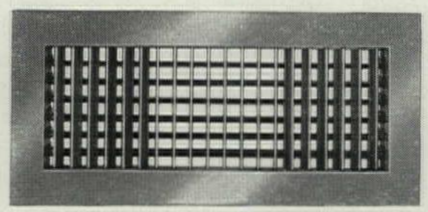


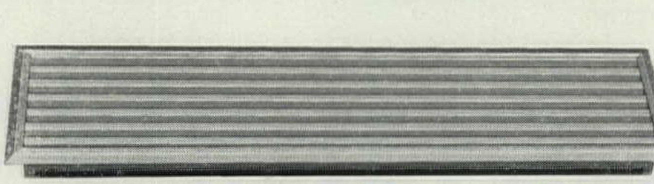
The broad range of T&B air distribution devices and accessory equipment for heating, cooling and ventilating answers every requirement of the architect, engineer and client. As the largest full-line manufacturer, T&B offers the precise piece of equipment for each job . . . setting the highest standards of appearance and performance.

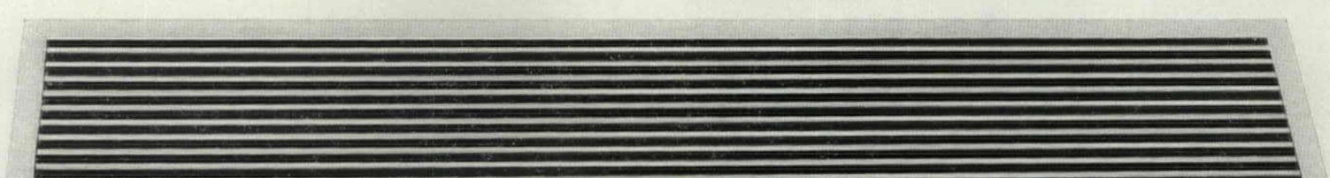
Write for the name and address of the Factory Office or Sales Representative nearest you.

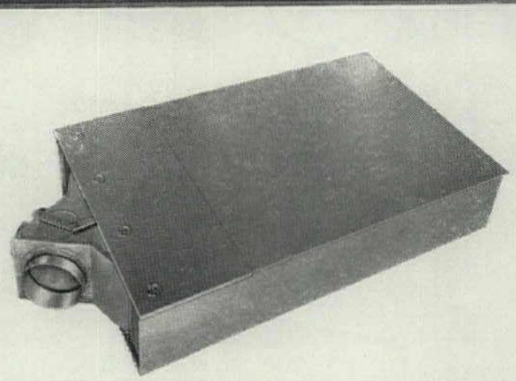












TUTTLE & BAILEY

Division of Allied Thermal Corporation
New Britain, Connecticut
Tuttle & Bailey Pacific, Inc., City of Industry, Calif.

St. Jane Frances de Chantal Church,
Riviera Beach, Md.

Architect: Edward Q. Rogers
Consulting Engineer:
James K. Wollford
Mechanical Contractor:
McGraw & Croft

For churches . . . for schools

cost-conserving comfort conditioning

Per pound, per square foot, per dollar invested . . . any way you may elect to measure it, you'll find that Acme-system equipment delivers the best return in comfort, cooling capacity and efficiency on the market today. For, in addition to being competitively priced, Acme equipment features a host of advantages that make Acme the best buy, by far, for church and school air conditioning. Acme, for example, offers such plus value features as . . . *compactness and light weight* to save floor space, and headroom, reduce floor loadings, cut building costs . . . *factory "packaging"* to eliminate on-the-job assembly, save installation time and charges . . . *easily accessible parts and controls* to facilitate inspection and maintenance, minimize service time and expenses . . . *factory certified performance* to guarantee efficient, reliable operation. All this and more, backed by a name that's been synonymous with quality since 1919.

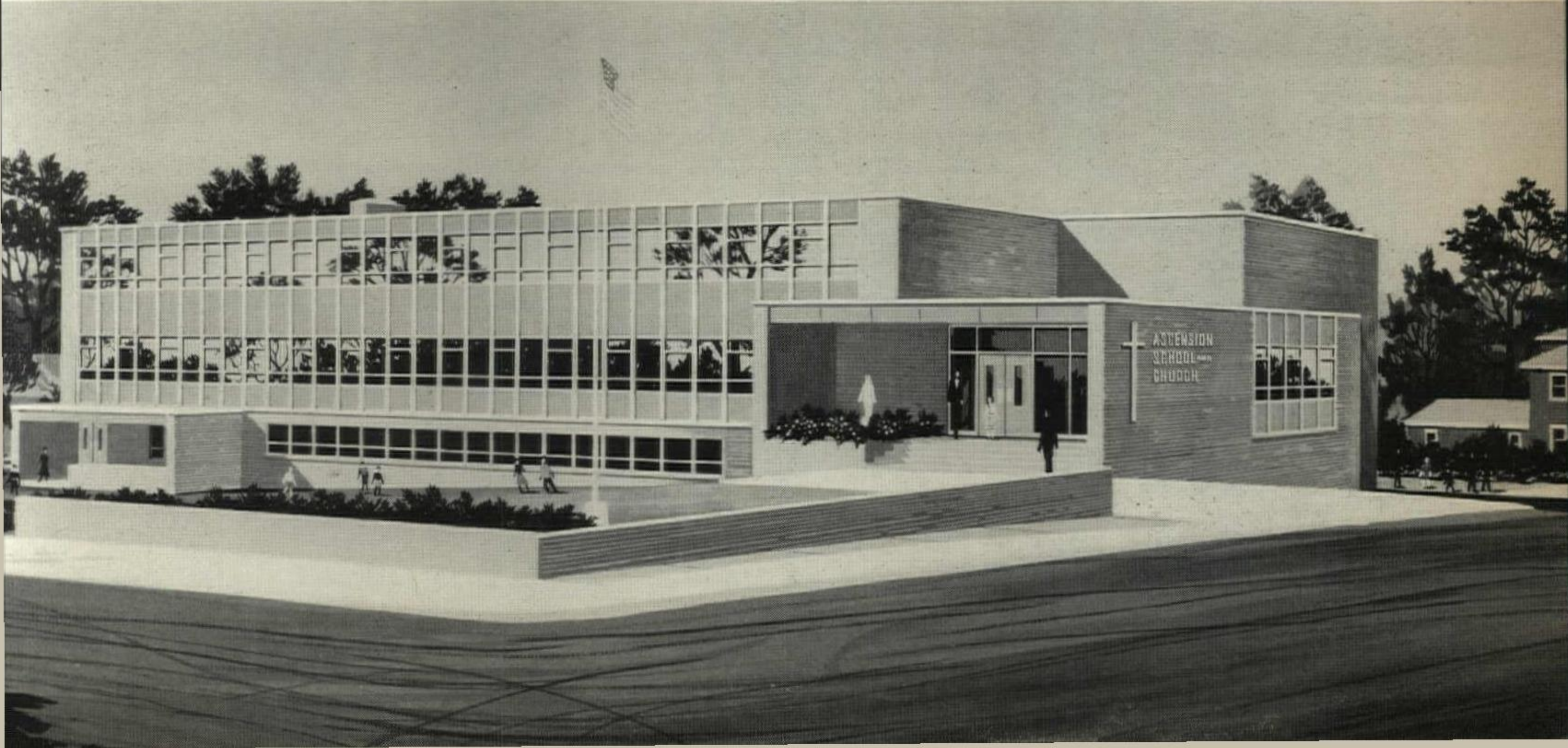
Acme INDUSTRIES, INC.

JACKSON, MICHIGAN • GREENVILLE, ALABAMA

MANUFACTURERS OF QUALITY AIR CONDITIONING AND REFRIGERATION EQUIPMENT SINCE 1919

The Ascension School & Church,
Halethorpe, Md.

Architect: Ferdinand P. Kelly • Consulting Engineer: Egli & Gompf • Mechanical Contractor: Paul-Rice Engineering Co.
General Contractor: Lordner & Wich, Inc.



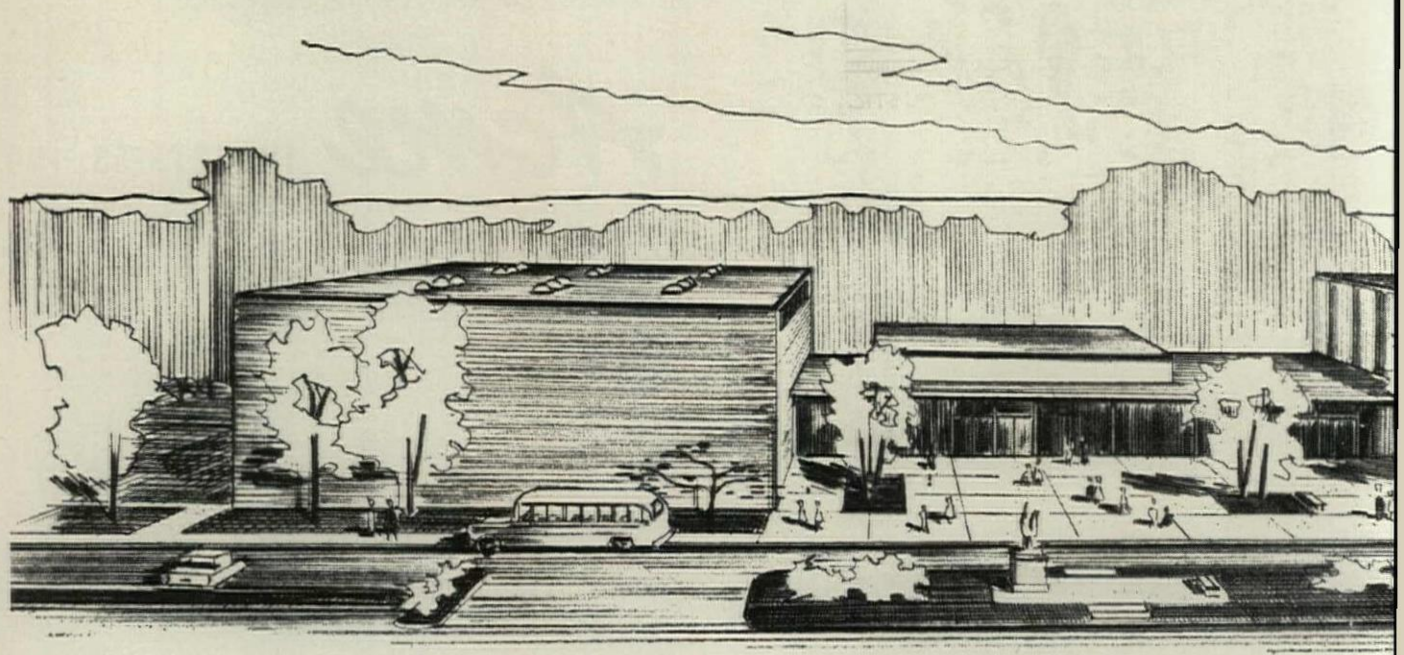
DIVIDEND ENGINEERING

FOR A NEW AIR-CONDITIONED HIGH SCHOOL: $13,950 SAVING ON EQUIPMENT; $1,836 FORECAST SAVINGS IN YEARLY OPERATING COSTS

DIVIDEND ENGINEERING
DOLLAR-SAVING PROPOSAL

Cost of Heating & Cooling Equipment	
Original Specifications	$20,700
Dividend Engineering Specifications	$ 6,750
Predicted Savings	$13,950
Additional Glass & Insulation Cost (in place)	$ 8,640
Net Initial Savings	$ 5,310

Projected Annual Operating Costs	
Original Specifications	$16,301
Dividend Engineering Specifications	$14,465
Annual Savings	$ 1,836



MAPLE PARK JUNIOR HIGH SCHOOL, North Kansas City School District, Kansas City, Mo., Dr. Ruie B. Doolin, Superintendent
Architects: Kivett & Myers & McCallum. Mechanical Engineer: W. L. Cassell.

AN $8,640 ADDITIONAL INVESTMENT WILL BRING THESE SAVINGS:

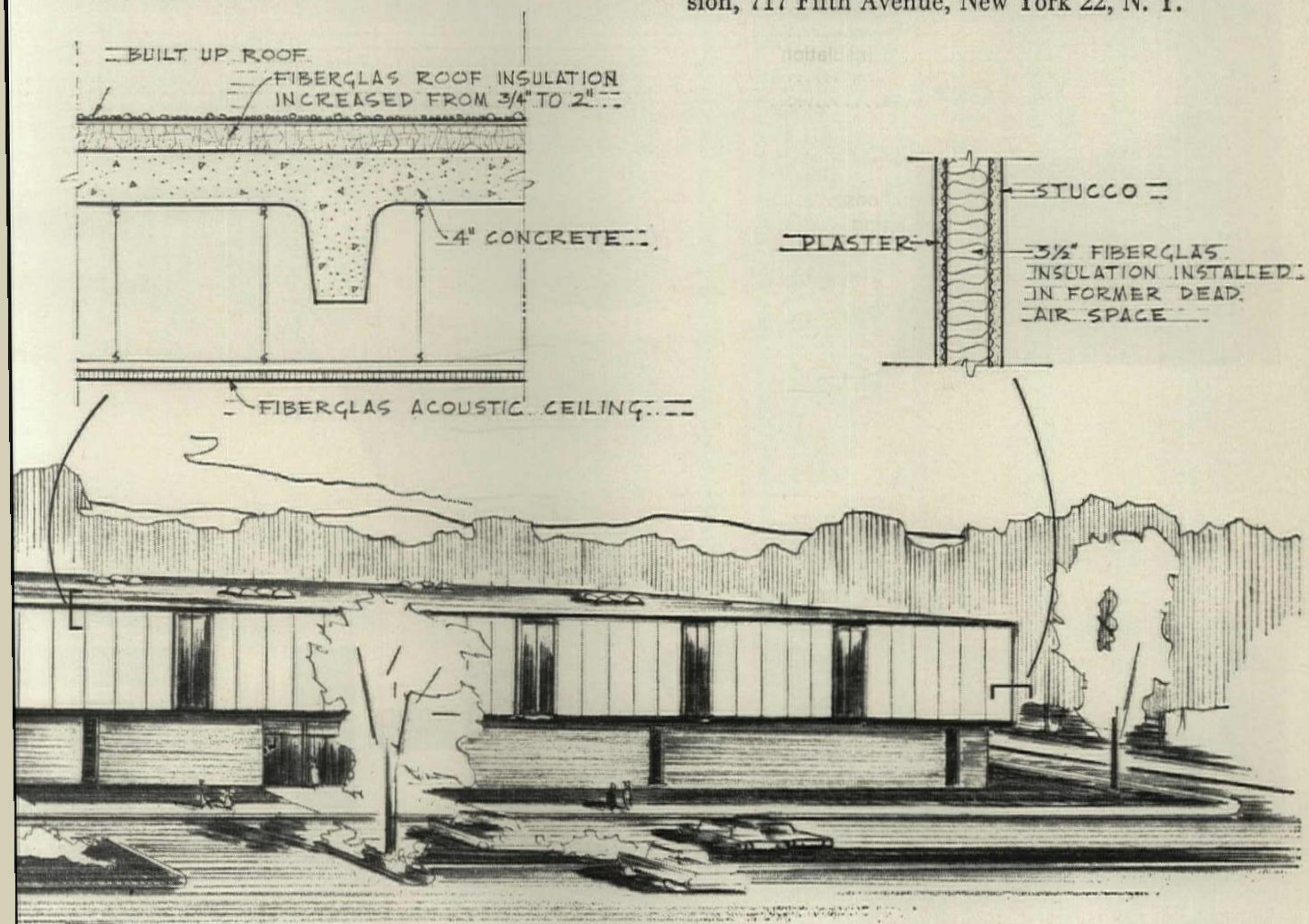
$13,950 ON HEATING-COOLING EQUIPMENT

The cost of construction for this air-conditioned school had to be $13 per sq. ft., or less. Original specifications called for ¾" of Fiberglas* Roof Insulation, a 3½" air space in the exterior walls, and plate glass windows. A Dividend Engineering analysis showed that increasing the roof insulation to 2", filling the walls with Fiberglas Building Insulation, and using heat reducing plate glass would produce optimum heat savings. The added efficiency, obtained at a cost of $8,640, should reduce the cost of the heating-cooling equipment by $13,950 . . . a net saving of $5,310 in the budget.

$1,836 FORECAST SAVINGS IN ANNUAL OPERATING COSTS

Dividend Engineering calculations also forecast a $1,836 saving in the cost of heating and cooling. Without this evaluation to point out the "thermo-economic" performance of the building, over $1,800 would be spent unnecessarily each year.

Let us show you how Dividend Engineering forecasts significant savings, and makes the comfort and production benefits of year-round air-conditioning economically feasible in buildings of every type. For more facts about Dividend Engineering, write: Owens-Corning Fiberglas Corporation, Industrial & Commercial Division, 717 Fifth Avenue, New York 22, N. Y.



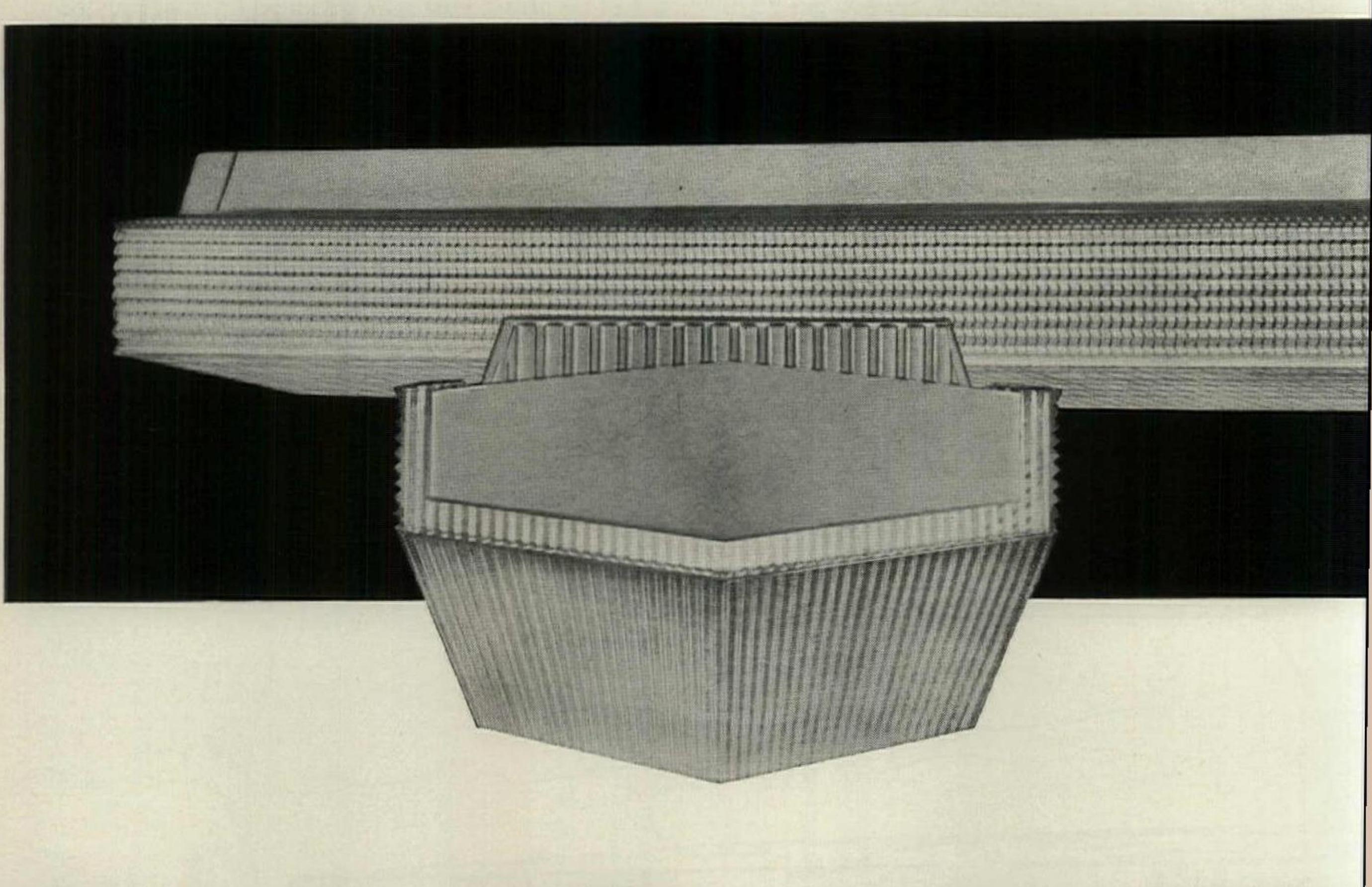
OWENS-CORNING RESEARCH pioneers new ideas in

OWENS-CORNING
FIBERGLAS
T.M. REG. U.S. PAT. OFF.

*T-M. (Reg. U.S. Pat. Off.) O-C.F. Corp.

This is Opticon...a fixture designed to prove that a modest budget need not mean the sacrifice of lighting performance, aesthetic standards, or top quality construction. The lens, for instance, is injection molded in a single, crystal-clear unit 48″ long. Secured by safety hinges, it swings away from either side for fast relamping without the use of tools. Its sides are patterned both inside and out with prisms that run at cross directions. The result is diffused peripheral lighting on ceiling areas for

NEW DESIGN CONCEPT



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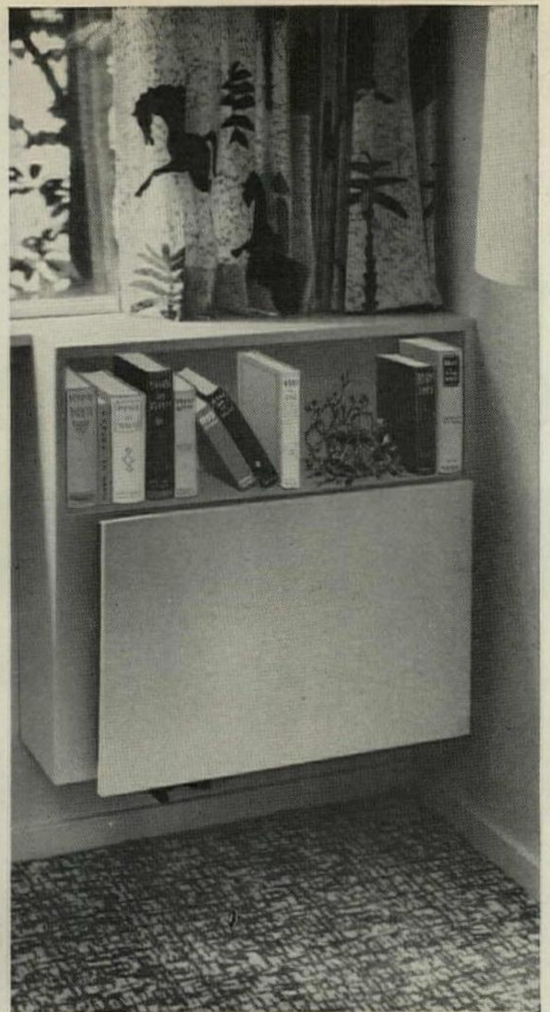
NEW MEXICO
Albuquerque:
The Lighting and Main Co.

General Electric Built-In Air Conditioners fit in perfectly with the striking exterior of the new Royal Manor hotel in Waikiki Beach. Two air conditioners are behind each of the specially-designed grilles.



Inside, the decorator baffle is painted to blend with guest-room décor. It also can be papered, panelled or covered with a picture or mirror.

Vacationists demand air conditioning . . . even at Waikiki

General Electric Built-In Room Units cool Hawaii's new Sheraton-Royal Manor Hotel

"We chose General Electric Built-In Thinlines because they're so easy to install," says Richard Holtzman, General Manager of Sheraton Hotels in Hawaii. "The concrete walls were poured around the cases during construction. Units were installed later.

"Room units are most practical for us. Each guest can control his own comfort, and we don't have to pay to cool rooms not being used. And with the decorator baffle on *Thinlines*, our rooms are as attractive inside as Waikiki is outside."

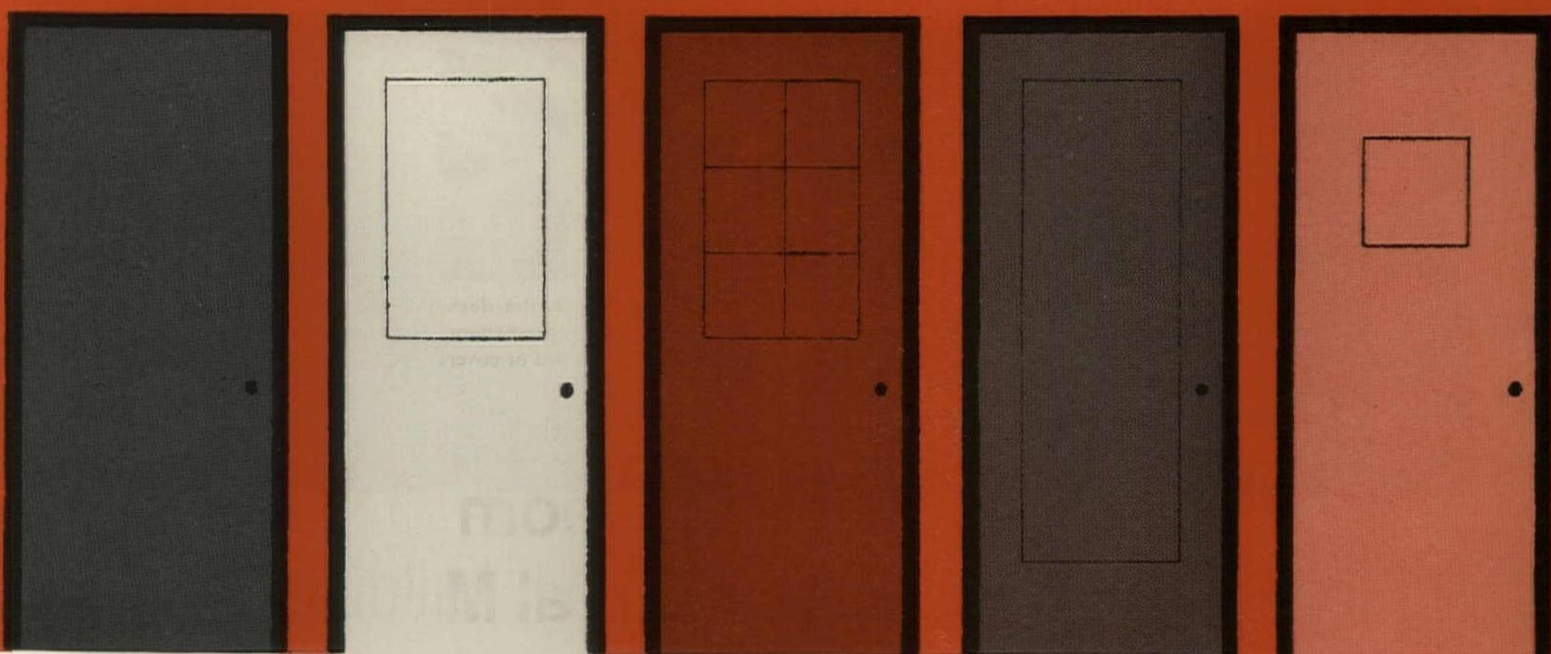
The only true built-in room air conditioner with a decorator baffle is the General Electric *Thinline*.

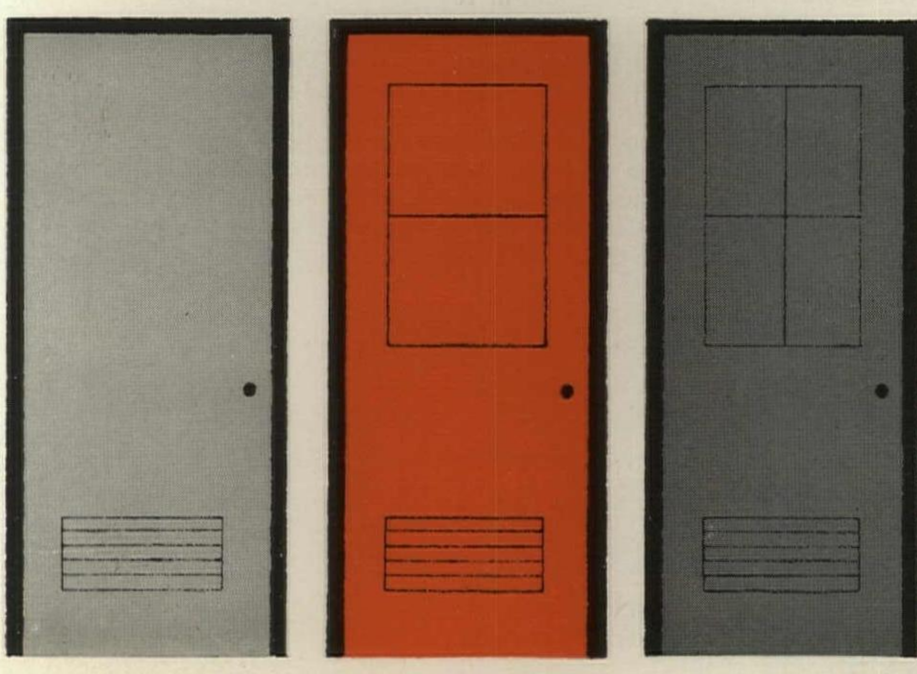
Choose from 18 Thinlines—from 6,000 to 18,000 BTU/Hr.* There's one for almost every air-conditioning need . . . every wiring and installation problem. Ask your General Electric Representative about the complete line of these new built-ins. General Electric Company, Room Air Conditioner Department, Appliance Park, Louisville 1, Kentucky.

*Cooling capacities are tested and rated in compliance with NEMA Standard CN 1-1960, and are stated in terms of British Thermal Units.

Progress Is Our Most Important Product

GENERAL ELECTRIC





let fenestra modular units cut your building costs

Be sure you're getting quality. Then check the price. The installed price of Fenestra school components usually adds up to substantial savings beyond that possible when building materials are purchased from separate suppliers. Reduced maintenance costs of Fenestra components result in additional savings, too.

Here's what Fenestra can offer you: *Curtainwalls* of steel that give you a completely watertight envelope; *roof panels* that double as finished ceilings with built-in lighting and sound control; and *metal doors* that never warp, rot, swell or stick.

And because the entire building shell can be engineered, manufactured and erected by one responsible source, you are assured of a weathertight building. If you are building a new school, it will pay you to call your local Fenestra representative (he's in the Yellow Pages), or write: Fenestra Incorporated, Dept. AF 111, 11801 Mack Avenue, Detroit 14, Michigan.

PRODUCTS FOR THE NEW AGE IN ARCHITECTURE

Fenestra

INCORPORATED

Steel curtainwall systems
Metal doors
Detention Screens
Light-gauge steel structural systems

Eliminate this Problem in YOUR New School

Install a SPENCER

Vacuslot® System

Dirty mops mean a messy building. Yet mops can't be properly cleaned except by **vacuum.**

For faster cleaning and superior sanitation, specify Spencer Vacuslot . . . the **built-in** vacuum system that handles **all** these maintenance chores:

- Dry mop cleaning.
- Carry-off of dirt and litter.
- Conventional vacuum cleaning.
- Wet pick-up.
- Boiler tube cleaning (with significant savings on fuel).

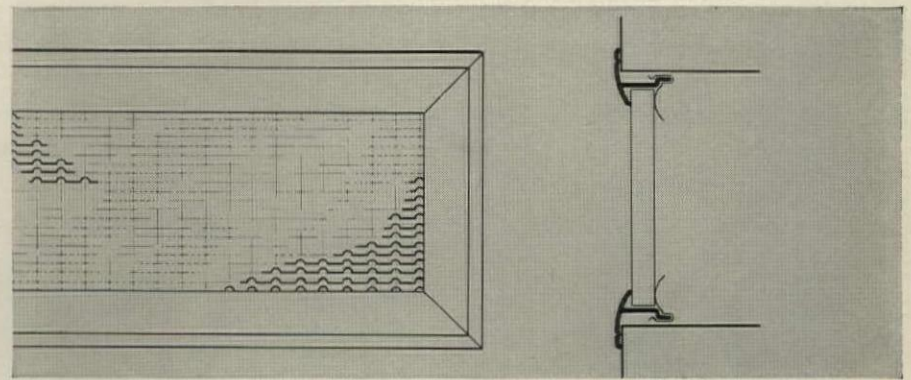
Request Bulletin No. 153C

The SPENCER TURBINE COMPANY
HARTFORD 6, CONNECTICUT


Making air behave...
Distinctive
styling
to suit
the room

. beautifully!

Comfort-proven Uni-Flo sidewall diffusers available in a wide variety of extruded aluminum frames



Now you can combine the air distribution superiority of the Uni-Flo sidewall diffuser with any one of a wide variety of attractive aluminum frame styles—to make air behave *beautifully* in more ways than one. Each extrusion opens a new realm of design opportunities to the architect—yet each possesses the architectural grace to blend inconspicuously into the room decor.

The adjustable Uni-Flo core available with *exclusive* extruded aluminum frame diffusers creates a controlled turbulence that thoroughly diffuses the conditioned air *before* it reaches the occupancy zone. This principle of air diffusion, long proven in the field and in the laboratory, creates Comfort-Chart conditions—completely eliminates drafts commonly associated with "streamlined" diffusers which can drop masses of cold air onto the people in a room.

Uni-Flo diffuser performance is guaranteed. Quiet, unobtrusive sound levels are assured in advance of installation because Barber-Colman provides comprehensive noise level data for every diffuser size and operating condition. For detailed information, call your local Barber-Colman office.

AFFILIATED WITH THE AMERICAN INSTITUTE OF ARCHITECTS
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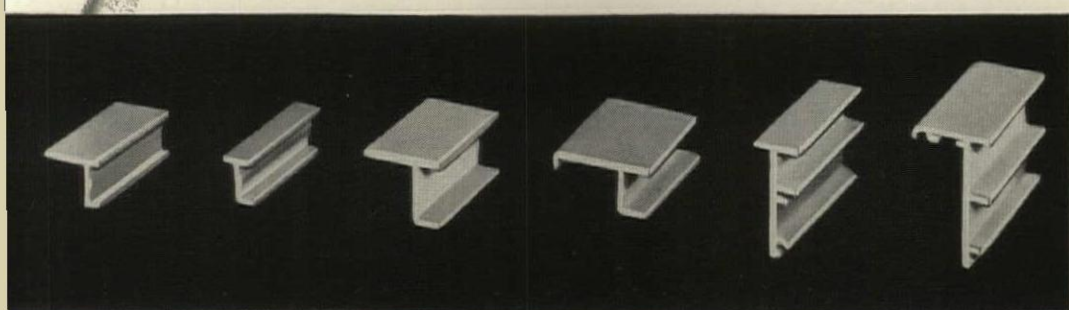

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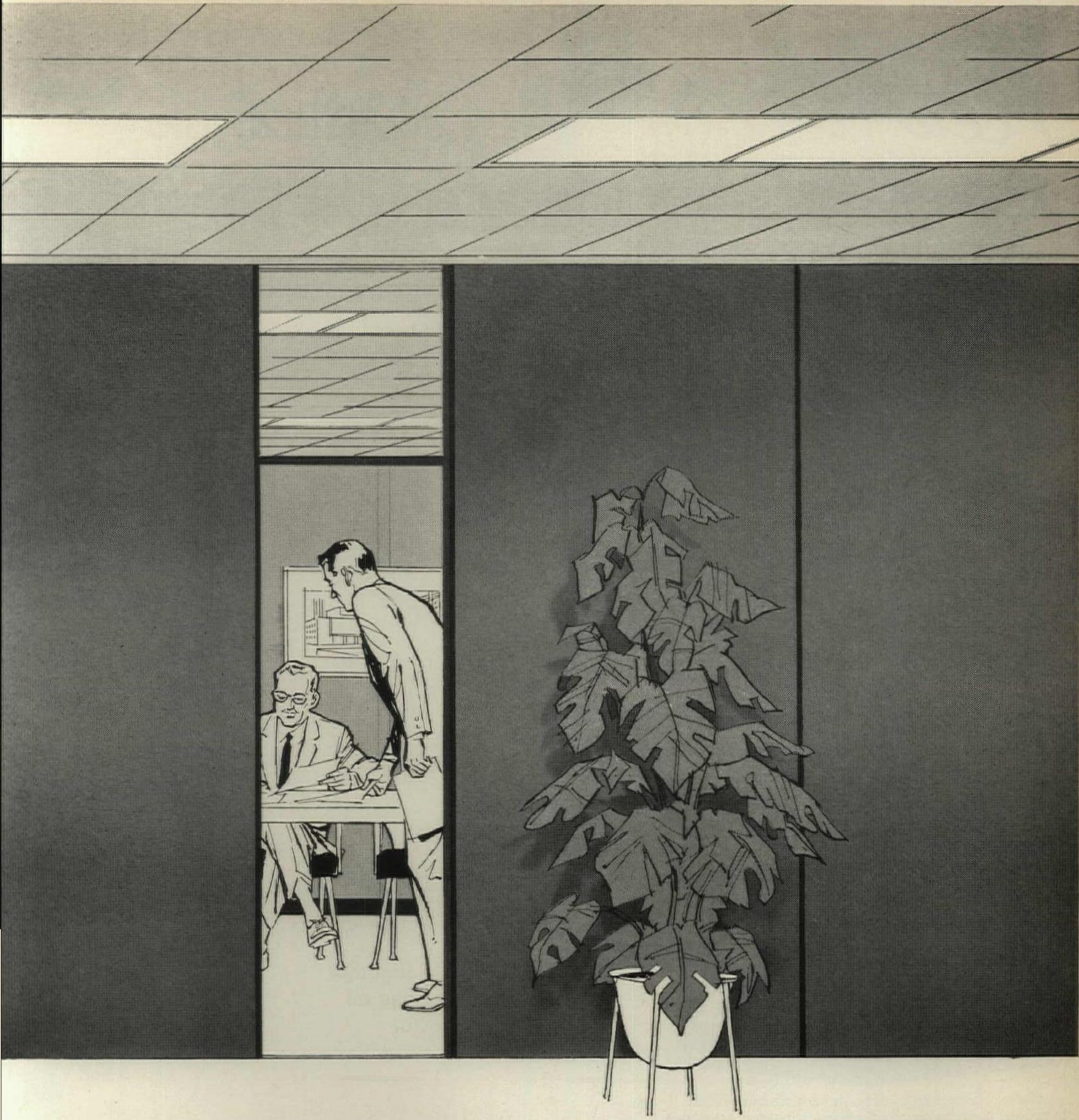
BARBER-COLMAN COMPANY

Dept. W, 1135 Rock Street, Rockford, Illinois

. . . where originality works for you

Here's new freedom from space limitations.
A new sliding acoustical wall that opens up space, divides space, controls sound effectively. Modular panels float together and interlock to act and look as solid as a permanent wall. Or skim back easily out of the way for effortless storage. Now, rooms can do double and triple duty.

No temporary look. No gaps at floor or ceiling. Manually operated, with no switching, and no complicated mechanisms to break down. Good sound control. Hauserman-handsome every inch. Traditional Hauserman quality construction. Widest choice of color and finish.



Case histories on the long-term savings achieved with Hauserman Movable Walls will be sent on request. Also literature on the full line of Hauserman Movable Walls... "Operable," "Signature," and "Delineator." Mail coupon.

THE E. F. HAUSERMAN COMPANY • 7585 Grant Avenue, Cleveland 5, Ohio

Please send me literature and specs on Hauserman Movable Walls for my

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The E. F. Hauserman Company • 7585 Grant Avenue, Cleveland 5, Ohio • Offices in 19 Leading Cities and Hauserman Ltd., Toronto, Ont.

New PROTECTONE* acoustical tile

A family of design-inspiring UL FIRE-RATED ceilings by CELOTEX

Widely varied in texture, pattern, and tonal effect...offering a choice of fire-rated acoustical ceiling assemblies... all with high sound absorption...these new PROTECTONE mineral fiber tile designs invite fresh new approaches.

SHOWN BELOW... new Natural-Fissured PROTECTONE mineral fiber tile... for 2-HOUR UL fire-rated ceiling assembly (including concrete deck over bar joists). All the traditional beauty and authentic character that only natural travertine fissuring provides. Square edge, kerfed for concealed H & T suspension system. (Also for 1-hour UL fire-rated wood deck assembly.)

*Trade Mark

Acousti-CELOTEX
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SOUND CONDITIONING PRODUCTS

The Celotex Corporation, 120 S. La Salle St., Chicago 3, Ill.
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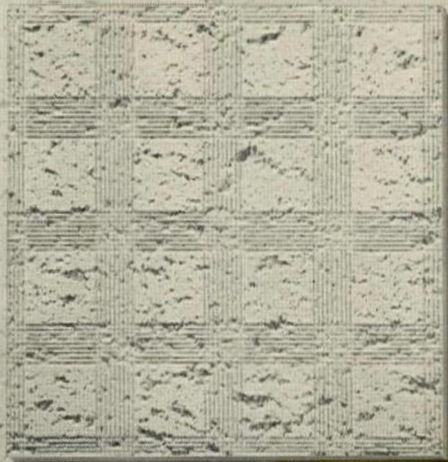
For samples, specifications, expert Ceiling Consultation Service, call your Acousti-Celotex distributor. He's in the Yellow Pages.

1

PROTECTONE* MINERAL FIBER UL FIRE-RATED PRODUCTS		
PRODUCTS	TIME-RATED	CEILING-FLOOR CONSTRUCTION
(1) Natural Fissured (2) Plaid (3) Striated	1-hr.	Wood deck over wood joists
	2-hr.	Concrete deck over steel bar joists
All above are 12" x 12", square-edge, kerfed for concealed H & T suspension system		
(4) Tiffany	2-hr.	Concrete deck over steel bar joists
12" x 12", tongue and groove, kerfed for concealed Z-runner suspension system		



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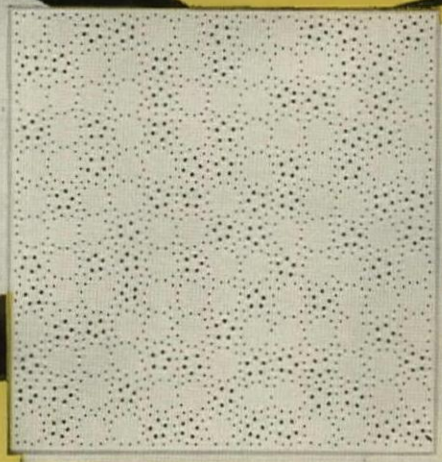

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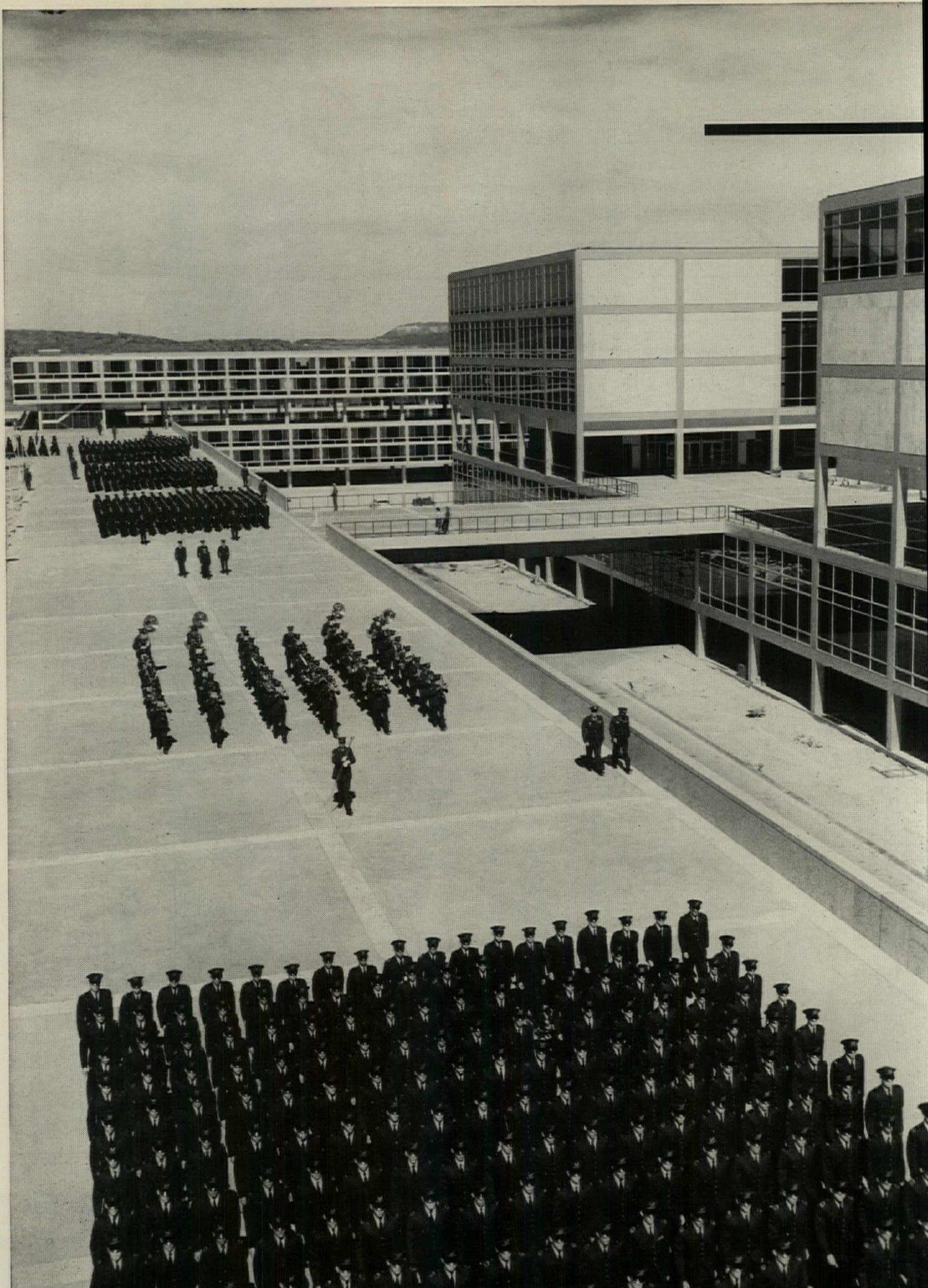


The new United States Air Force Academy perched at 7,200 feet above sea level near Colorado Springs and Pikes Peak.

AT THE U.S. AIR FORCE ACADEMY GAS-operated CARRIER ABSORPTION REFRIGERATION PROVIDES TROUBLE-FREE, ECONOMICAL COOLING

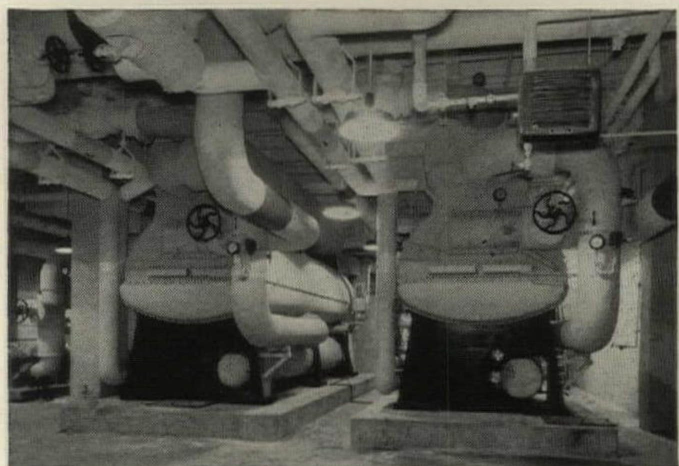
To provide comfort cooling, the new U. S. Air Force Academy is equipped with one of the most efficient, up-to-date, economical types of systems available today – gas-operated Carrier Absorption Refrigeration.

The absorption refrigeration unit makes use of one of the oldest and most reliable principles of refrigeration. No prime mover is required, only low-pressure steam or hot water. Seasonally idle or excess boiler capacity can be put to use on a year 'round basis.

This same type of automatic operation can put your heating system on a year 'round paying basis, too!

With gas as the boiler fuel, operating costs are cut to a minimum. This Carrier machine operates without noise and vibration . . . and because it is so compact and lightweight, it can be put almost anywhere – from basement to roof.

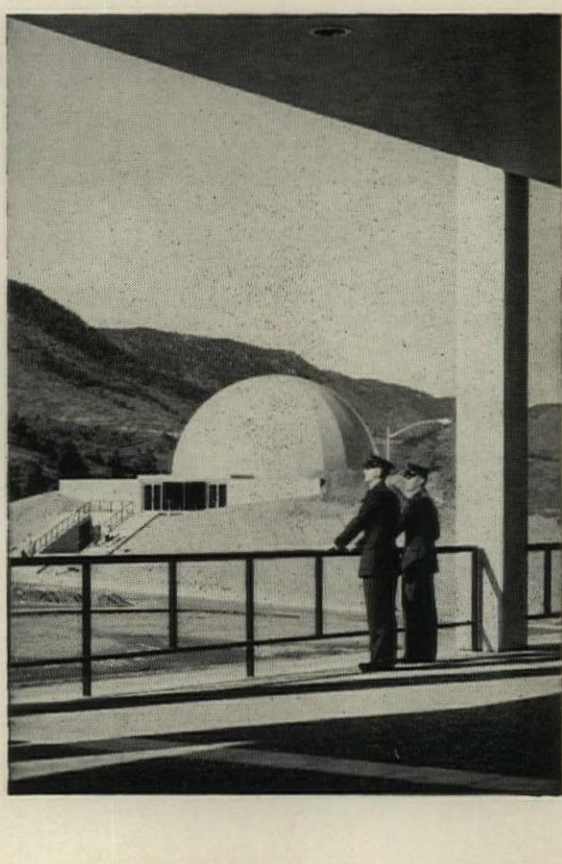
This is only part of the story of the efficiency and economy of specifying gas-operated Carrier Automatic Absorption Refrigeration equipment. Specific performance, engineering data and cost details are yours for the asking. Just call your local gas company, or write to Carrier Air Conditioning Co., Syracuse 1, New York. *American Gas Association.*

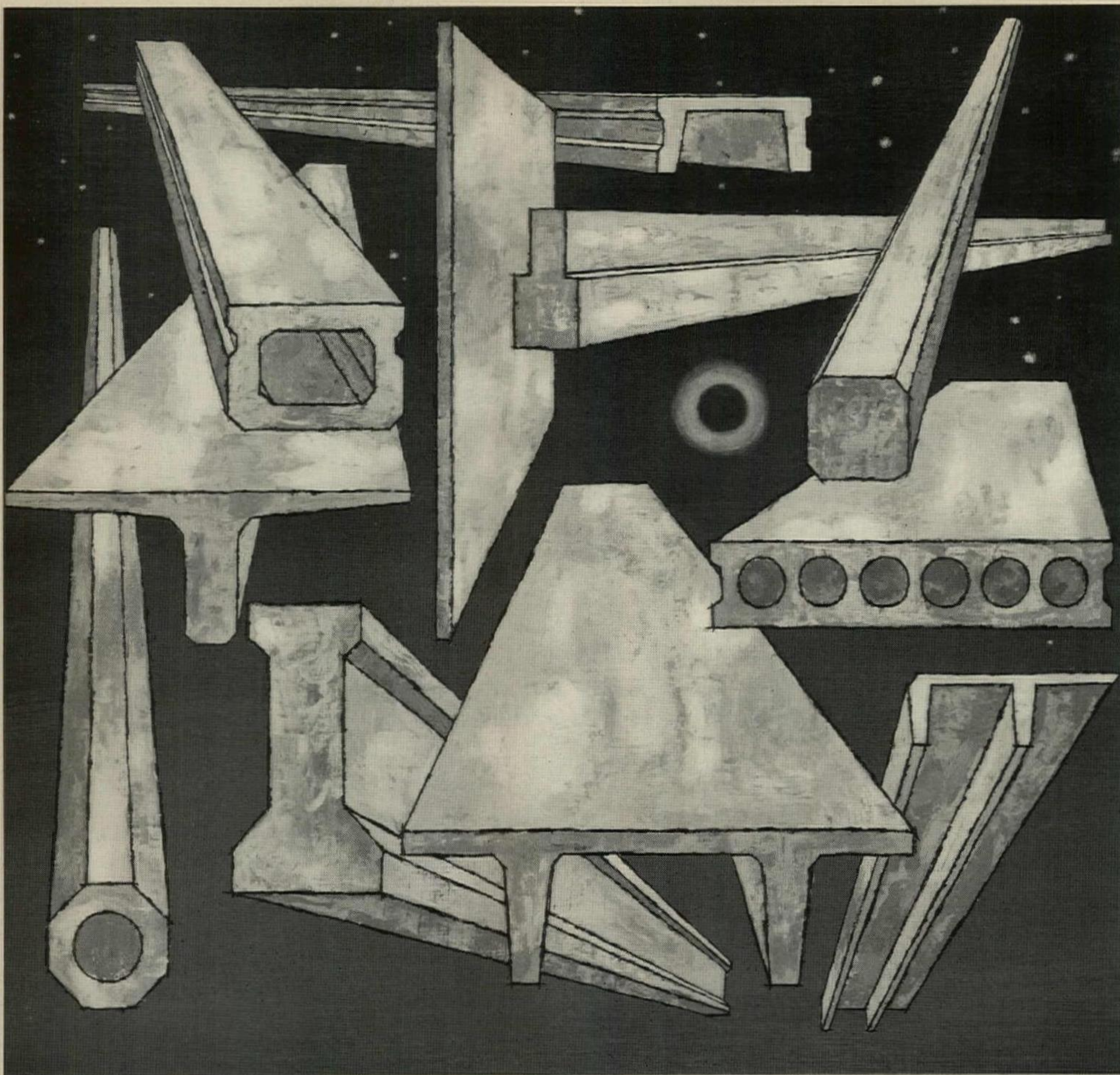


Gas-operated Carrier Automatic Absorption Refrigeration

- cuts operating expense
- lowers installation cost
- provides quiet, vibrationless operation
- answers space and weight problems
- automatically adjusts to varying loads

Architects: Skidmore, Owings & Merrill





These Three California Community Hospitals Achieve Life Long PERMANENCE & DEPENDABILITY With

Streamline® COPPER TUBE AND FITTINGS FOR SUPPLY AND DRAINAGE SYSTEMS

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"... in operation over two years ... the copper drainage system has been entirely trouble-free. We would recommend the use of your system and product in any modern structure."

—*Hospital Administrator*

In installations that must depend on clog-free, rust-proof, leak-proof, sanitary drainage, Mueller Brass Co. Streamline DWV tube and fittings are the logical choice. When compared with rustable materials, DWV Copper Tube and Fittings are MORE ECONOMICAL to install and will normally OUTLAST THE BUILDING ITSELF.

Woodruff Community Hospital

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MUELLER BRASS CO.

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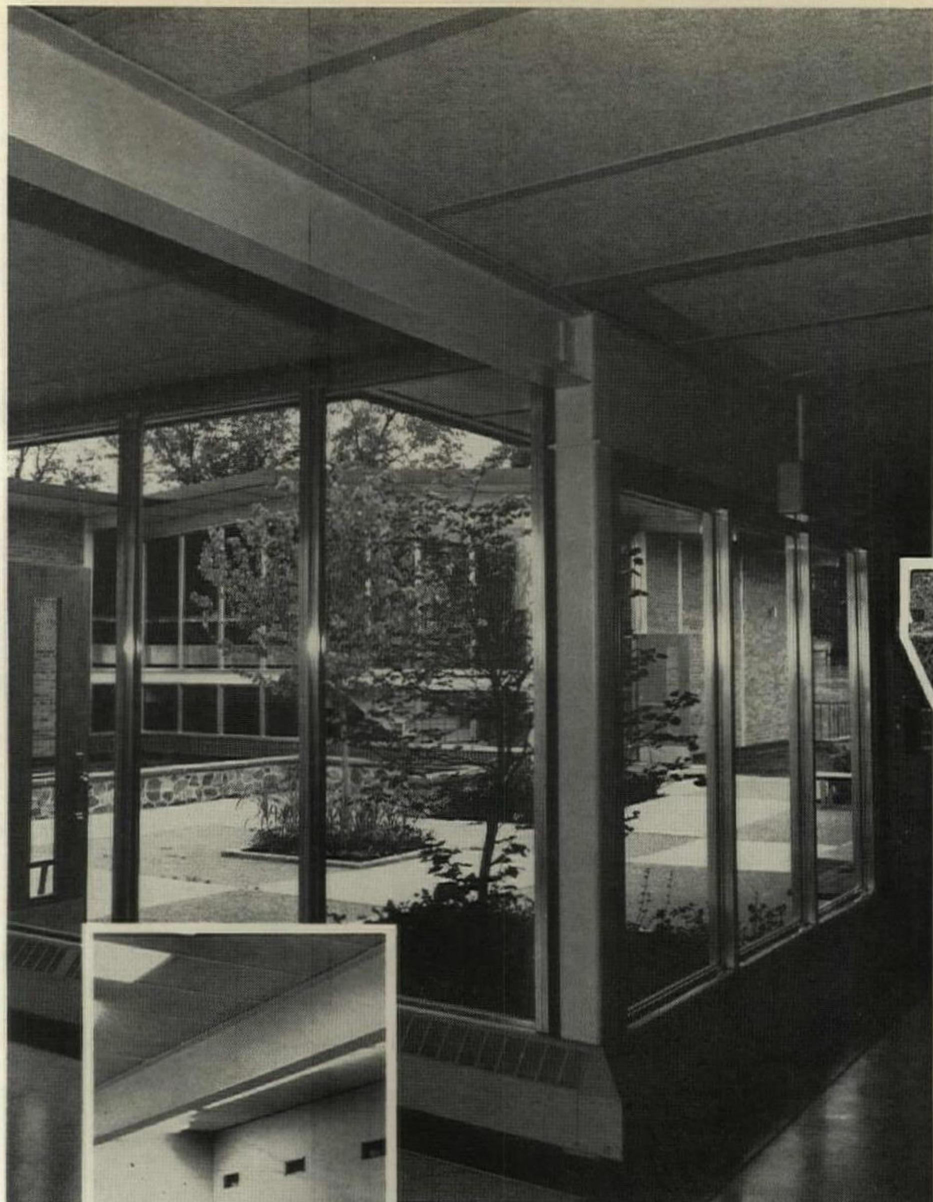
MADE IN U.S.A. TO THE STANDARDS OF AMERICAN INDUSTRY



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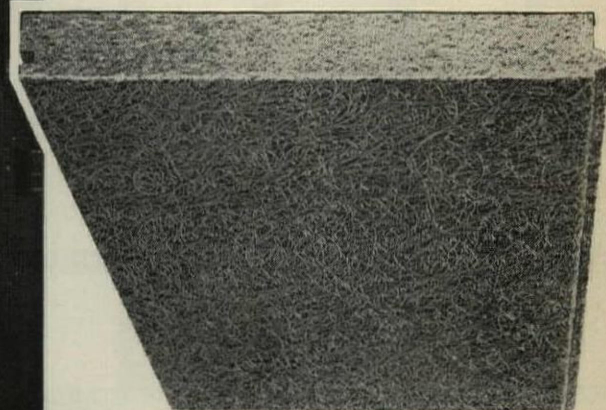
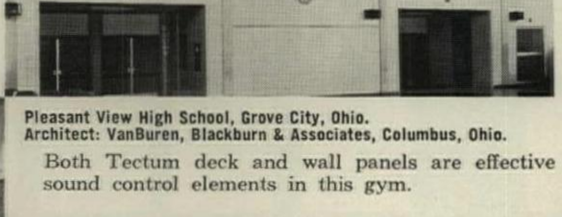


Newark High School, Newark, Ohio.
Architect: Perkins & Wills, Chicago, Illinois.

From the moment you enter a Tectum deck school you sense a new era of room design and function. The textured ceiling is the underside of Tectum roof deck planks or tiles. One material, one erection cost, no painting required normally, excellent light reflectance.

Acoustical properties are highly desirable for school music rooms. One hundred enthusiastic high school band members give this Tectum deck a real workout.



Pleasant View High School, Grove City, Ohio.
Architect: VanBuren, Blackburn & Associates, Columbus, Ohio.

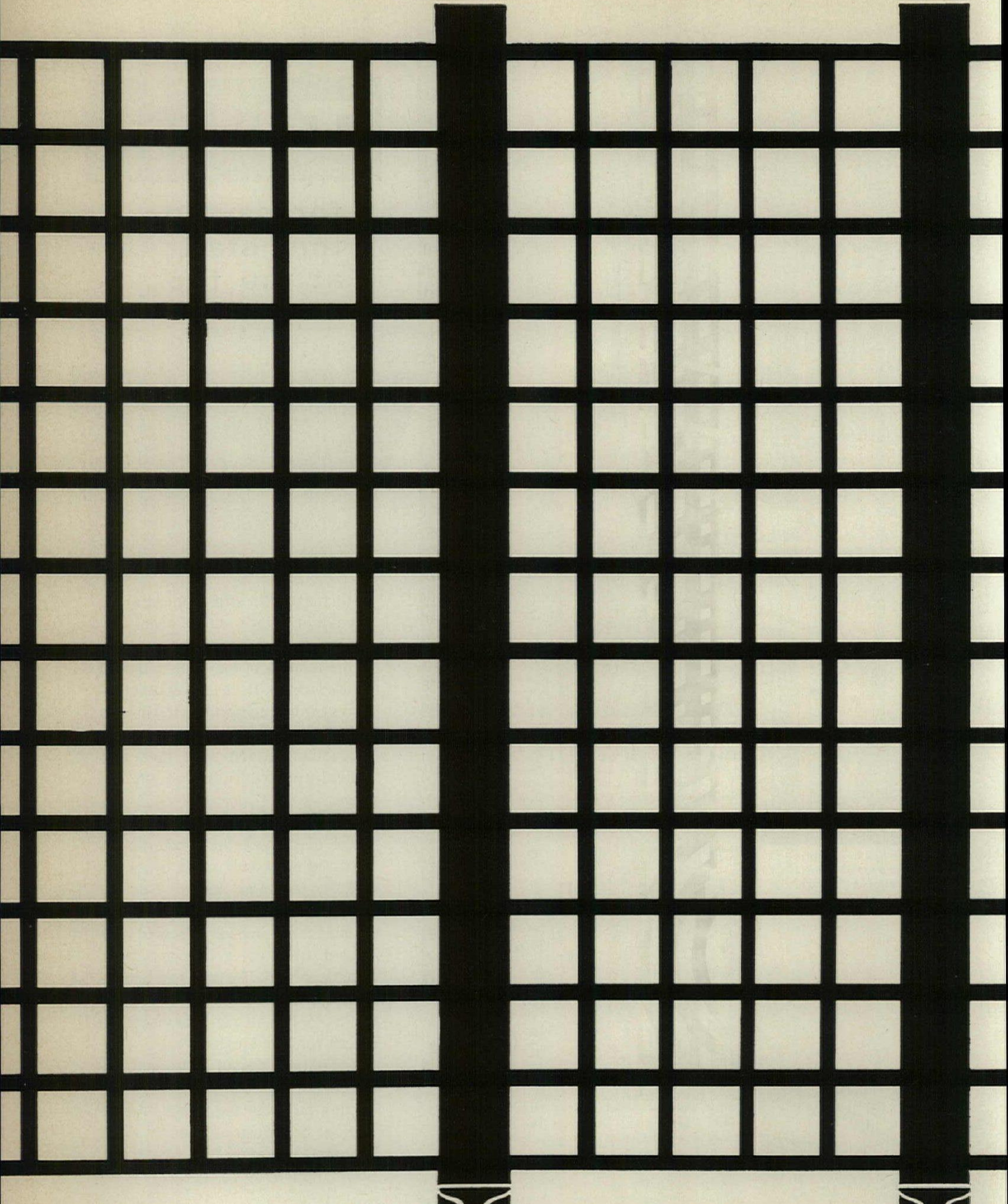
Both Tectum deck and wall panels are effective sound control elements in this gym.

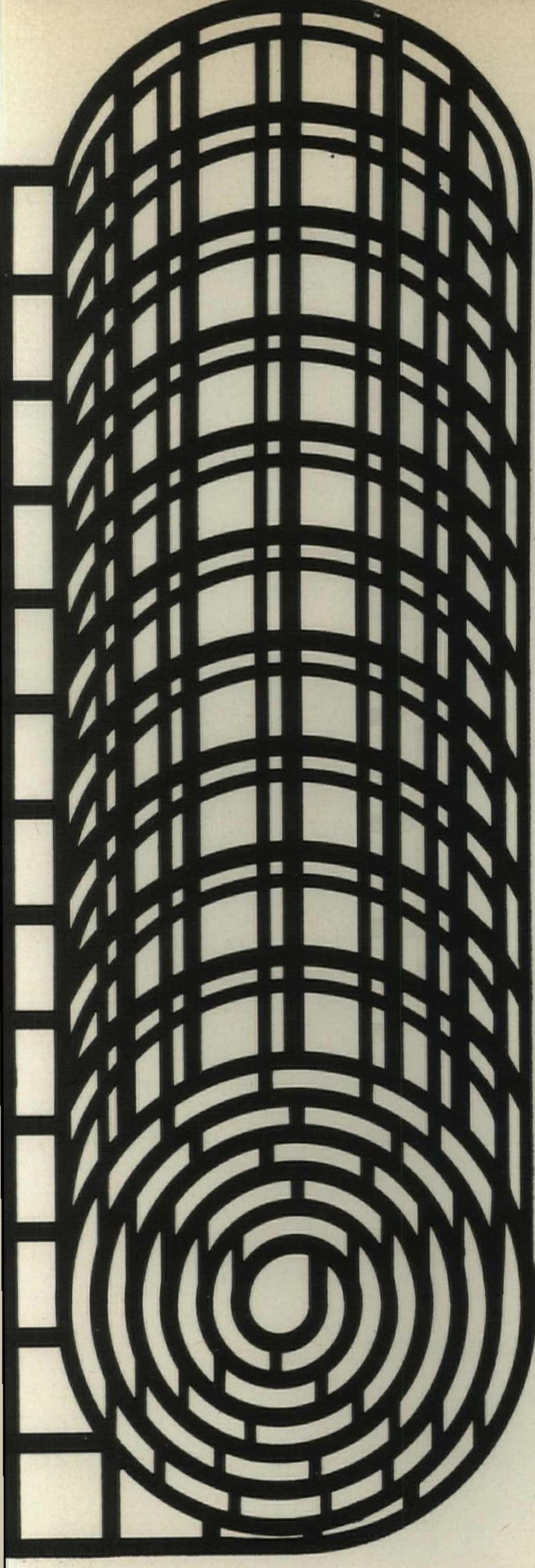
Special metal frames retain Tectum wall panels giving access to mechanical ventilating equipment behind this wall. Good design makes efficient use of area over corridors for utilities and mechanical equipment.

With materials and labor sharing equally in today's school costs, any method that reduces erection time or the number of materials required is newsworthy. Because Tectum roof decks contribute significantly in both ways, almost half of Tectum's total production capacity has gone into school construction through the years.

Tectum is a manufactured panel of compressed wood fibers, rendered non-combustible by its hydraulic, inorganic binder. Tectum has great structural strength, great resistance to impact. It's safe and rugged. It insulates to a maximum U-value of .15. Tectum has acoustical sound absorbing qualities up to .75-.85. It is also toxic to insects—resists rot and fungus.

Tectum makes good schools cost less. For complete data on Tectum products see Sweet's Architectural or Industrial Files or write Tectum Corporation, 535 East Broad Street, Columbus 15, Ohio.






A LATIN
GRAMMAR

One of Boston's architectural landmarks—the Home Office of the New England Mutual Life Insurance Company — has gained new stature through meticulously designed additions to the original building. General Bronze engineered and produced the bronze casement windows for the initial structure . . . was called on again to design and fabricate a modern but completely compatible window system for the additions.

Architects: Hoyle, Doran and Berry
Contractor: Turner Construction Company

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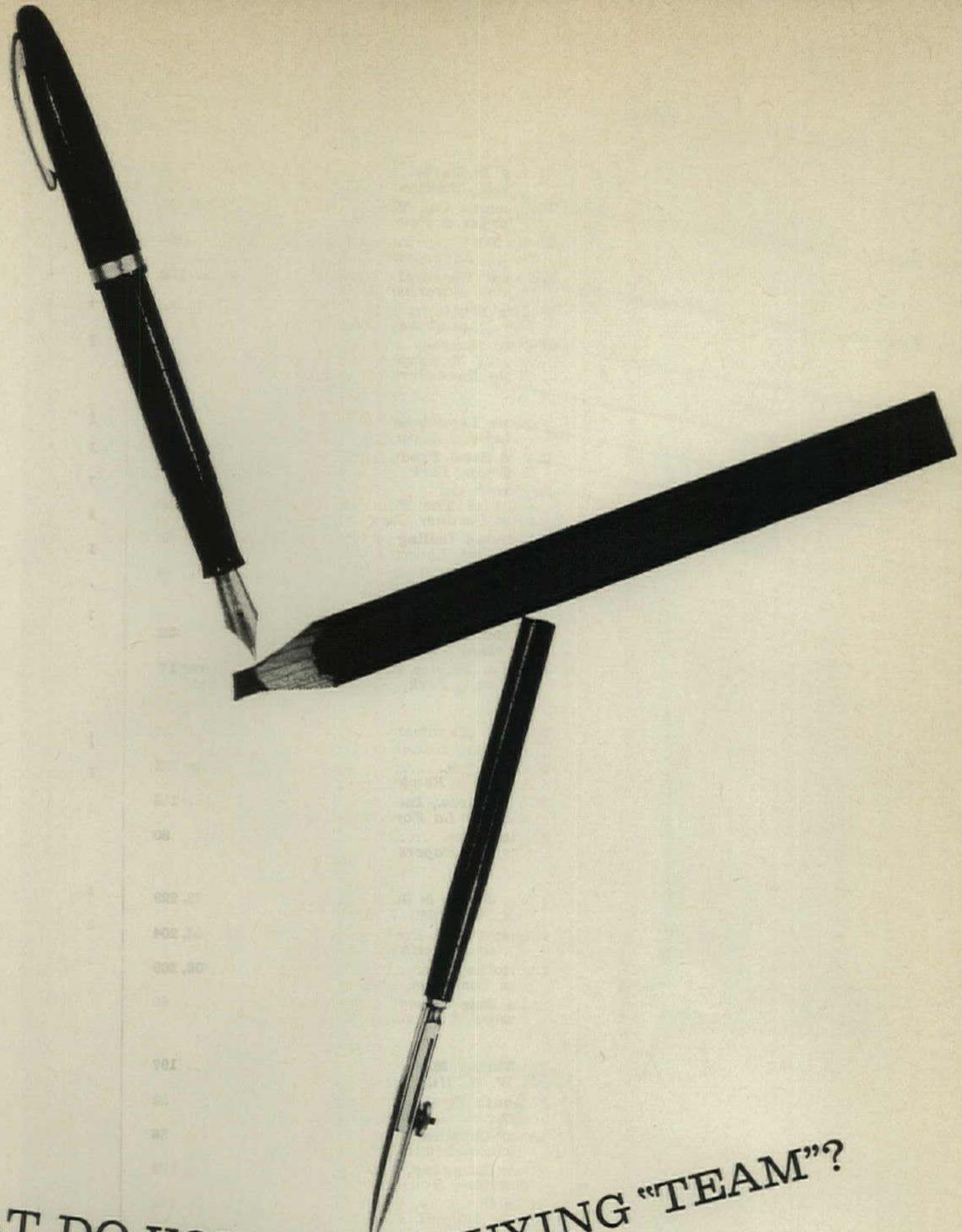

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*FORUM's circulation, the largest in its field, totals 62,000 architects, contractors, and clients. The latter group, 24,000 strong, consists not only of corporate clients, but also hotel operators, hospital administrators, school board members, real estate investors, store managers, etc. They are not just business executives, but business executives with building on their minds.

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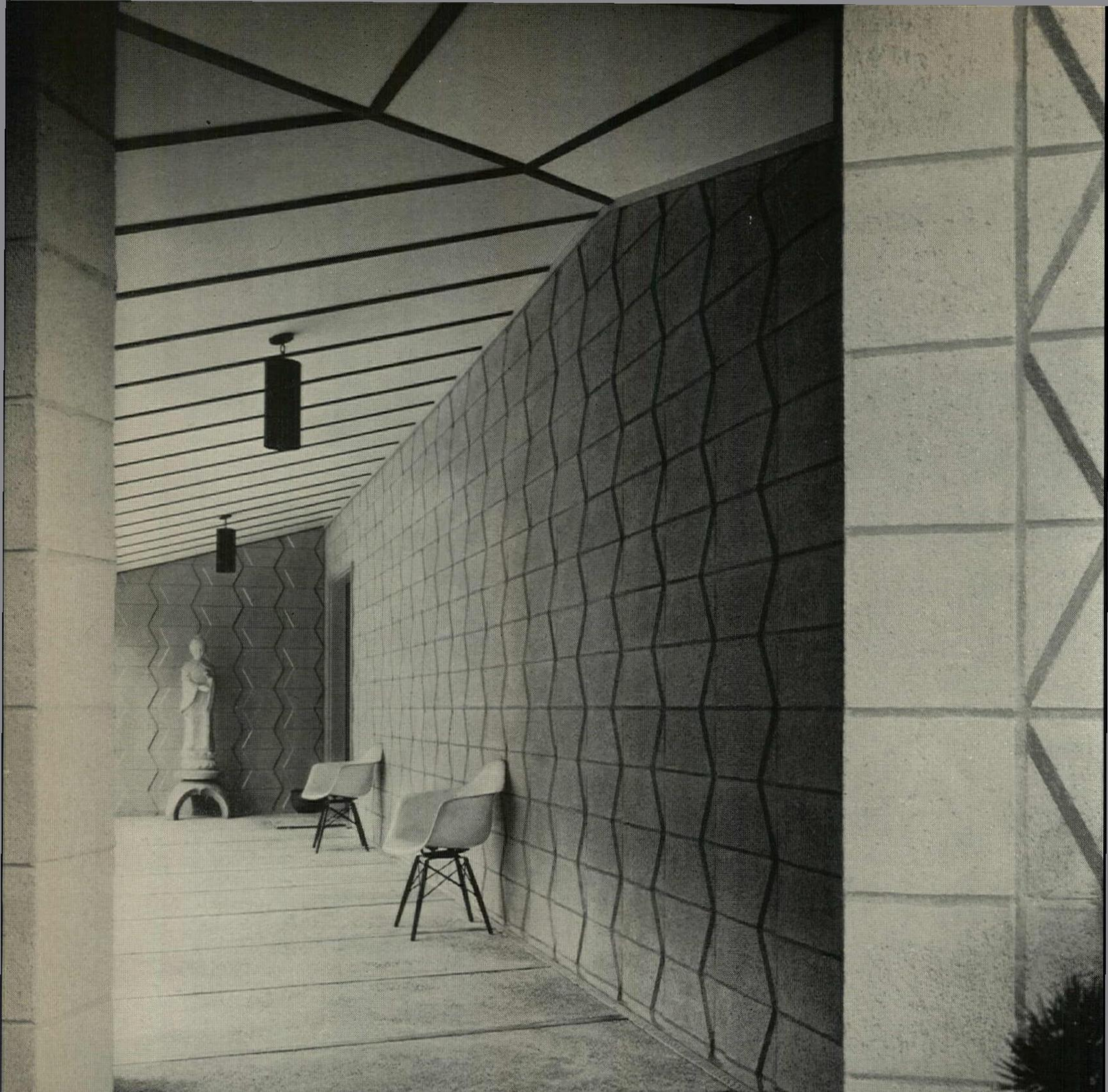

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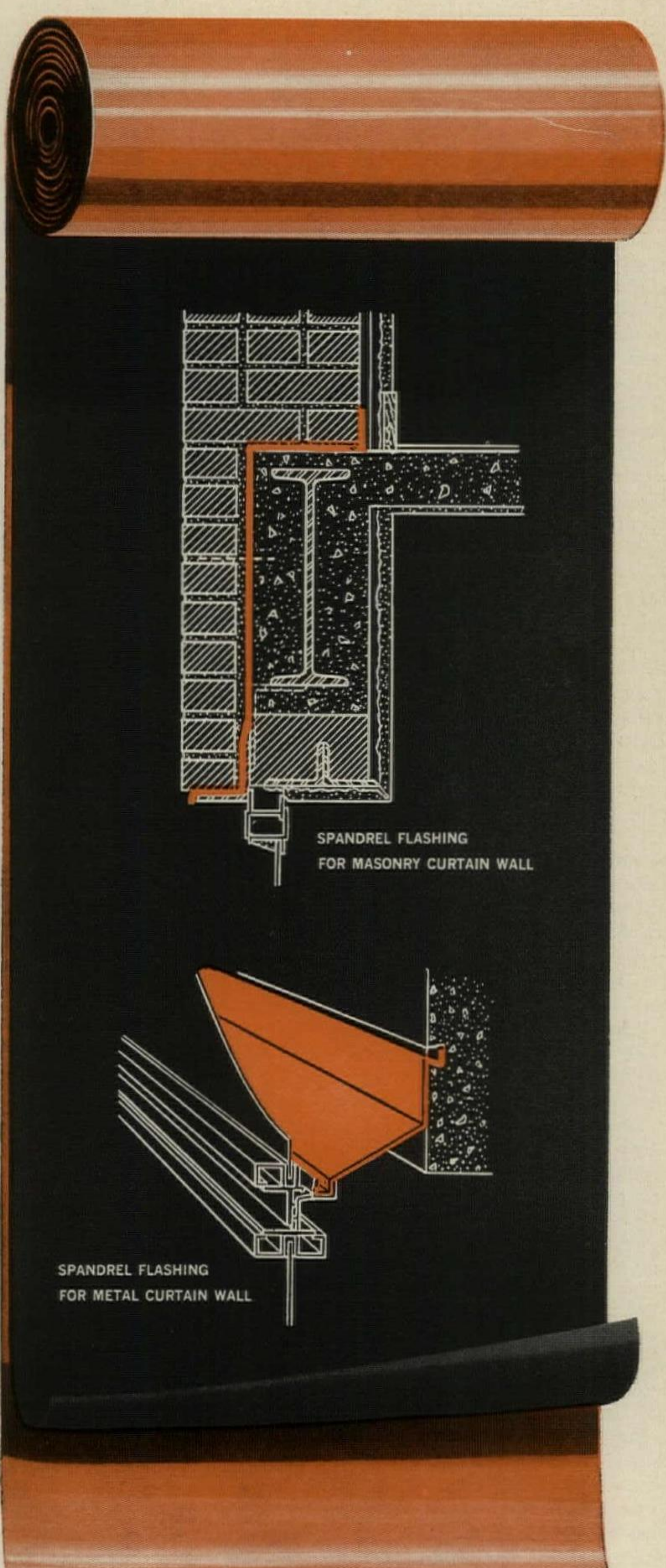

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Editor's note

UNRECOGNIZED ARCHITECTS

LIFE Magazine published a splendid article on architecture not long ago, but it infuriated architects. The reason: in six full pages of full-color illustration the name of not one architect was divulged. The text was all about Idlewild Airport outside New York and the thrill that it gave as a show. Yet the idea seems never to have occurred to the writer that the show was architecture, made by architects.

I have a theory about it. The process has to be turned the other way around. Let the magazine assignment start with a man known to be an architect, and at once the fact that he produces architecture gets recognized. Thus, in LIFE's story, the final page carried a correctly identified picture of Architect Eero Saarinen, who had just died; and so the TWA terminal for Idlewild was associated with him as an architectural "monument."

No, the lesson is not that an architect has to die to get named when a big weekly goes into the subject of architecture. But he does have to be heavily identified to get noticed. Look at it another way: no LIFE writer ever captioned a picture of Callas singing Puccini as "Beautiful noise made by the Metropolitan Opera Company," the way Idlewild was presented in LIFE—as if the thrill had been created by the Port Authority. Why not? Well, even a peasant visiting the Met can see Callas before him as a singer in the very act of producing the song, and the name of Puccini as the composer who created it is plastered all over the billboards. But no random visitor to the Idlewild show, journalist or other, ever saw the architects in the act of creating it. So, unless he is cultivated or is strongly nudged, he never thinks of architects.

Might I suggest to architectural groups producing such ensembles as Idlewild or Lincoln Center, or the Golden Gateway Redevelopment in San Francisco, that they get a sculptural monument erected to themselves, at the very point of focus, 250 feet high at least, and neon lighted, with letters a foot high spelling their names, so that thereafter they can get appropriate star billing?

UNRECOGNIZED ARCHITECTURE

Many others besides newsmen are not always certain whether they are dealing with architecture, or should be. A year or so ago a college president in Ohio was agreeing thoroughly in a conversation about the need of college undergraduates to be surrounded by an architecture of glory and wonder, nothing less. As he thought about it, in fact, "water came to his eye." But a few weeks ago FORUM received the renderings announcing his next dormitory program. . . . It seems that this college president regarded dormitories as an exception to the rule that college buildings should be architecture. For dormitories the one necessity was to get plans through the regional HHFA office fast, to secure approval of the loans; and the idea was afoot in that college that only unambitious architects could achieve this, not "high-style" architects. (This is deadly false.) Somehow it began to look as if the gentlemanly thing to do was not to try too much.

Then there was a college president who had a builder trustee who was a money-raising fool. This man modestly offered to put up some important college buildings (not dorms) himself with some of that money, not for a profit but to save the college from the irritations and delays caused by architects as artists. He intended to get the job done economically, and fast. This builder hires his own architects as an incidental factor in his own construction business and of course he keeps them firmly in hand. This begets speed; with regard to skill the contribution is debatable; as for the touch of glory and wonder—who will say?

Now everybody in this picture believes in architecture, but some of them think that lots of other things come first. So the liberal arts college in question does not mind at all allowing its program to become the opening wedge through which builder-dominated, business-managed design, as a system, enters colleges to replace the architect's approach. The fine teachers in that college who try to make architecture a serious study are the ones today for whom "water comes to the eye." The trustees are pleased with what they are getting; they seem to feel there is no difference.

Personally I like the response of President Paul Weaver of Ohio's Lake Erie College to an offer from a builder to donate a building and build it: this will be acceptable if the building is designed and supervised all the way through by a thoroughly ambitious and independent architect chosen by the college. That way you have the architect where you can see him.

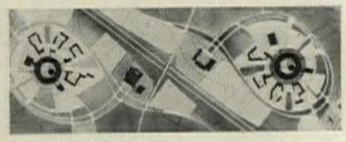
Perhaps colleges don't teach the same quaint cultural authorities any more. In my time we were told: "We are none of us so good as to be able to work habitually beneath our strength. . . ." We have to resist the temptation "of a stopping short wherever and whenever we can, of a lazy compliance with low conditions; of never a fair putting forth of our strength." This view of architecture belonged to John Ruskin. Fortunately there are some colleges in America that still attend to it.

If colleges teach architecture but do not believe in it, who will?

UNRECOGNIZED PLANNING

Also from Ohio comes a fascinating announcement about a family of building investors, the Slavins, who say they have put $1 million into land for a great figure-8 pair of "service centers" on each side of a throughway (see cut). As this "Twin Parks" project is conceived, it will grow into a super center for everything: for auto service first, then of course for motel accommodations, shopping, offices—and industry. Thus a prophecy is fulfilled. Last January, as often before, FORUM predicted that the interchanges, the access and exit points on the interstate highway system, would become the nodes of new urban "subcenters" and that these subcenters would increasingly provide not only homes but places of work. They would represent the next development beyond "suburbs."

Now, just as writers for LIFE might miss the fact that architecture was what they were writing about when architecture stood before them unlabeled, so I fear that many high-minded planners *and* architects will miss the fact that the Slavin brothers are really starting off an indigenous "new town" or "garden city" movement. Potentially these service centers *are* new towns. They meet the criteria: decentralized, not too big, supplying employment without need for a commuter trip, being surrounded by green belts. But God help us if these new towns of ours go as completely uncontrolled by over-all regional planning as there is every expectation that they will.



It has been proposed that the next convention of the American Institute of Architects in May devote itself to the subject of roads. Whatever the AIA may decide, the architects of America cannot wait another minute to get hip. FORUM is looking for a spot on the way to Slavin town for a 250-foot-high sign with neon lights, saying "Look, Cleveland architects: New Town."

This is the kind of job they must learn to master for tomorrow.

Douglas Haskell

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