hitectural Forum / the magazine of building / November 1959

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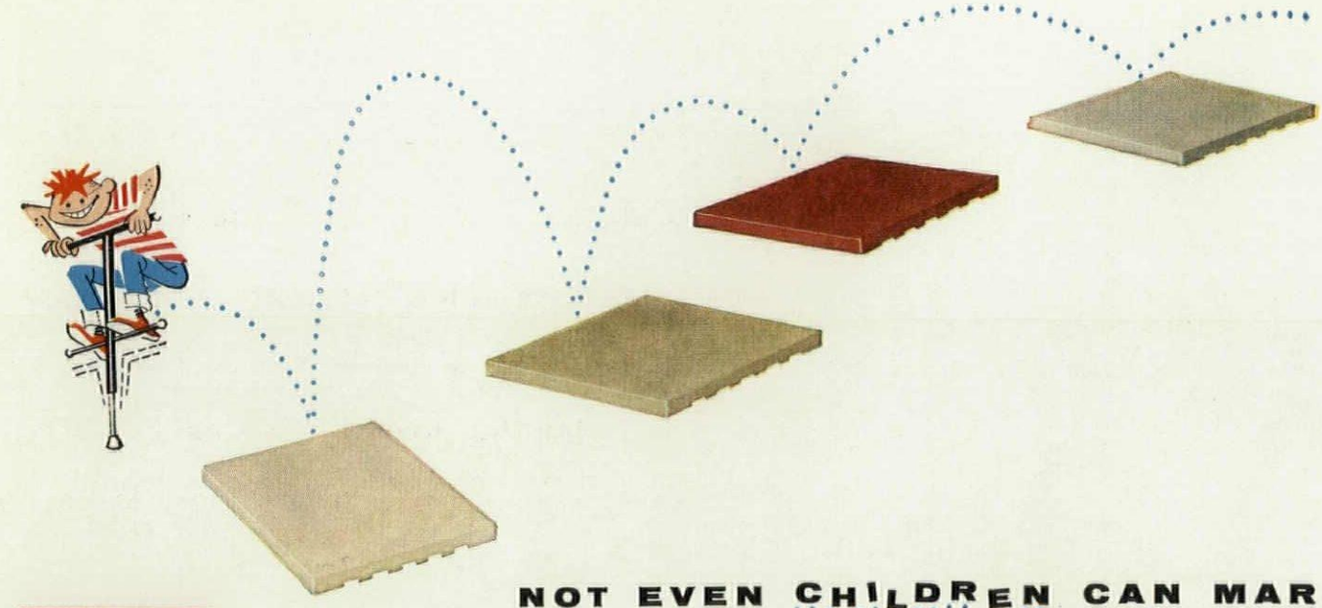
FORUM

School trends



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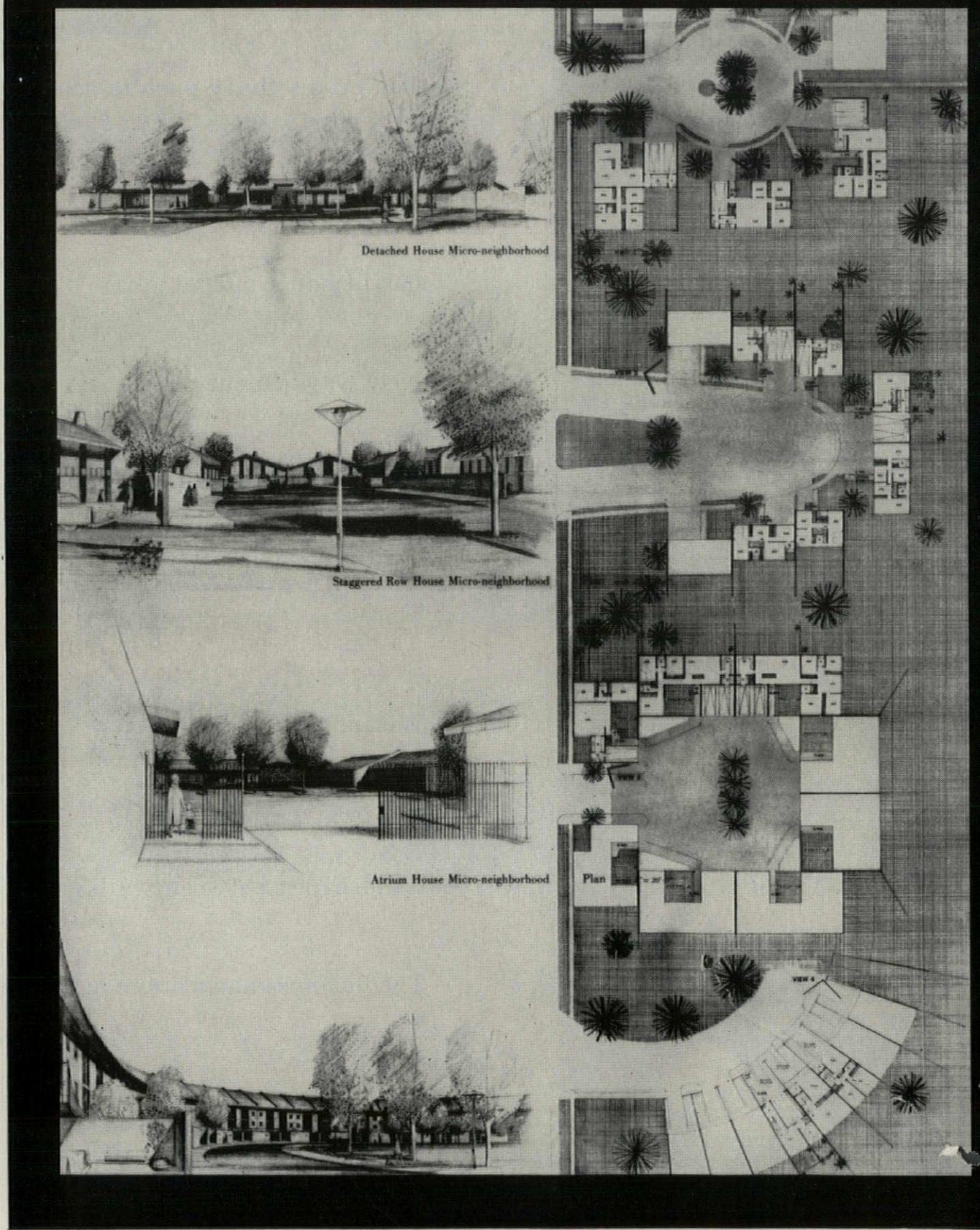
SCHOOL TRENDS

ART OF ARCHITECTURE

CITIES

TECHNOLOGY

GRAND PRIZE 1959



Annual Design Competition

CONCEPT

A major need in tract housing today is to express the small town community of the past in a new form. First, to better relate the individual home to its neighborhood community environment:

- We create a community of micro-neighborhoods sharing certain desirable facilities in common. Each of 56 micro-neighborhoods is located on a cul-de-sac with an average of ten homes. No home faces a circulation street. This makes possible the pedestrian environment essential to good family living where children's safety is primary: Common neighborhood areas are reached by crossing at most one circulation street.
- A variety of things to do are provided within the neighborhood. Pedestrian walks lead through "Small Stream Park" to small playgrounds, sports facilities, the community "country club," "general store" concession, bus stop, a late hour convenience grocer, and toward schools, churches, and shops.
- For the automobile, a circulation loop links micro-neighborhoods, community facilities, and access highways.
- The two small store concessions are conceived to help focus the neighborhood internally, and help support the community facilities.

To encourage more individual expression in ways of living we offer four housing types to appeal to varied age groups:

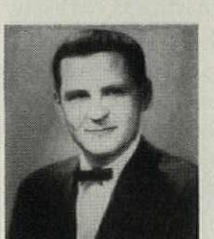
- One story individual homes grouped in micro-neighborhoods of different sizes and character comprise seventy percent of the development.
- Three types of row houses also grouped in micro-neighborhoods, are designed to afford economy of construction and land use. (See ledger.)
- Each type of housing is characterized by a private area for outdoor living. In the row house a front courtyard provides a transition from the street to house, and is also used to handle the automobile.

To create a visually appealing environment:

- We propose a comprehensive plan for community appearance. The municipal planning board is assumed to have special zoning powers to adopt this plot which will make the location and arrangement of building binding. These special powers under state enabling legislation are in existence in such cities as New York. They provide that where there is an adequate plan, ordinary zoning rules may be waived.
- To foster pride in the development, and to sustain it as a unity, we propose that deeds include ownership shares in a neighborhood corporation. This corporation shall own all common land, community buildings, and other community improvements, and maintain all private as well as community trees and lawns. An annual assessment of $30.00 per family will cover building maintenance and labor costs for five employees, each at a salary of $3000.00 per year.
- A sequence of spaces and vistas unifies the entire development. Both public and private spaces are organized by building masses, heights, and building lines, and by walls and tree patterns to encompass all things seen from the public way. "Vista easements" are provided for public enjoyment.
- A unity of form is achieved throughout the development with simple gable roofs of varying pitches.
- Within each micro-neighborhood a substantial portion of all structures shall be of the same material. Individual character in the micro-neighborhood is obtained with its building material, mass arrangement and special plants or sculpture as the focal point of each cul-de-sac.
- A special sidewalk pattern, street lamps, or other "street furniture" will contribute to the distinctive character of the development.
- The neighborhood is defined from the exterior with a landscaped fence zigzagged at a scale to be comprehended by speeding motorists, and by vistas from highways to the center of the development.

The image of the ideal small town environment can be given new form within the city by the conscious definition isolation of neighborhoods such as this one. If the individual is to flourish, he must again be able to preceive and relate himself to a finite environment of human scale and beauty.

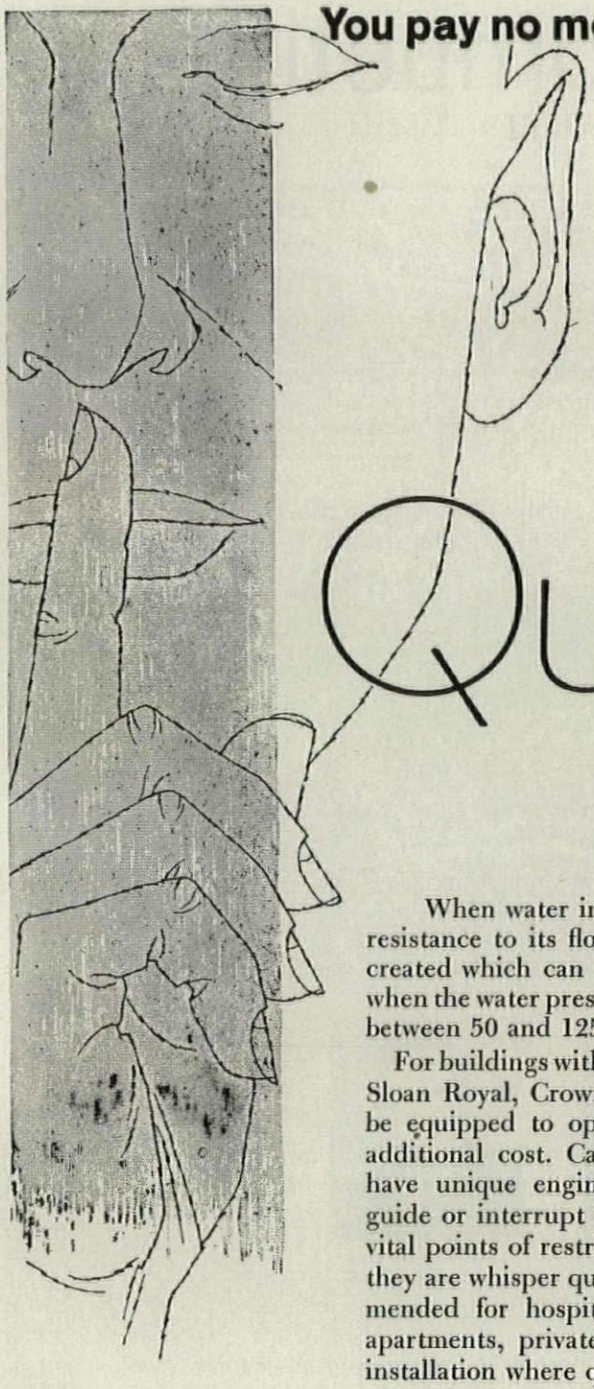
Howard R. Meyer, F.A.I.A.



James Reece Pratt, A.I.A.

John Harold Box, A.I.A.

"The jury awarded the Grand Prize to an entry showing an unusual degree of sensitiveness, coupled with practicality. By unanimous consent, they found it to be a most convincing and beautiful solution at all levels, from the general concept to the varied and well-conceived details. It shows a respect for economy without forgetting the essential demands for aesthetic expression. In the opinion of the jury no other entry had the same degree of self-assurance or clarity of direction."



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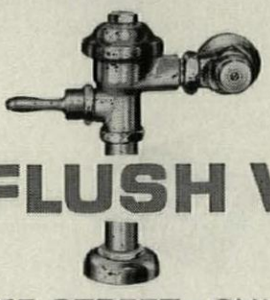
Quiet-Flush is another product of Sloan research which is constantly employed to help sustain Sloan's outstanding leadership of more than fifty years. And, since Sloan Flush Valves today are better than ever, why not make sure you get them?



SLOAN FLUSH VALVES

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Steel strike begins to hurt construction; office, factory projects hit hard, as builders exhaust stockpiled supplies

Near Milwaukee, a school stands, roofless, while workmen putter on smaller jobs. In Denver, a giant ICBM base at Lowry Base sprawls brokenly, only partially completed, while agents for the contractor anxiously solicit suppliers in all parts of the U.S. for badly needed steel. In Greenville, S. C., a spokesman for one of the nation's largest builders says simply, "It is impossible to design a steel building, due to the shortage of steel."

As the strike entered its fourth month, builders, architects, and clients were being made painfully aware of just how vital steel is in building. Although most work already in progress was provided for by shrewd pre-strike stockpiling, projects in early stages, or just coming off the drawing boards last month faced an uncertain future. Most builders hope that the Taft-Hartley injunction will signal the end of the stoppage, but the fact is that the uncertainty of future supply—not to mention future prices—will be a pivotal element in all building plans for at least another six months. Builders estimate it will take 60 to 90 days to get full deliveries of structural shapes. Although foreign steels, particularly steel bars and rods, have helped fill the gaps, there is not nearly enough imported steel to go around, and what there is gets siphoned off near the major ports of entry. There has also been some shift to reinforced concrete but the growing shortage of reinforcing rods has limited this somewhat.

The uncertainties of steel supply showed up most strongly in recent awards for new contracts, but even the building statistics for September gave evidence of the first effects of the steel strike. Construction over-all declined 4 per cent from August to September, which is not at all the usual seasonal pattern—in the past two years building has risen 1 per cent in August-September. While the expected slump in home-building—due in part to tighter mortgage money (see page 6)—accounted for about one-third of the drop in private building, another third of the decline came in nonresidential building, which declined 5 per cent from August to September.

The drop in nonresidential building showed up in every category, reversing a long procession of month-to-month gains in industrial and store building. The drop in the former is particularly disconcerting, because capital spending surveys have indicated—and FORUM predicted—an upswing in industrial building through the last half of this year and extending into 1960. If the steel shortage should continue, this area of building would be particularly hard-hit. At any rate, the rise in spending for new plants may well be stretched out over a longer period than originally forecast.

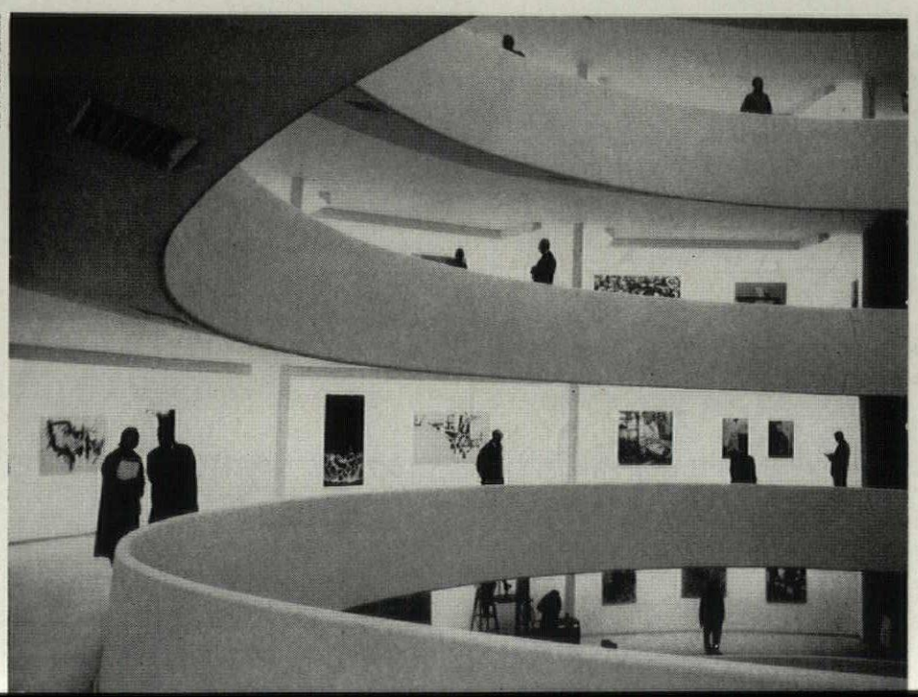
The steel shortage is also accelerating the decline in office building. For the first nine months of this year, office building had slumped about 3 per cent. But in September, that drop accelerated slightly to 4 per cent. And, of course, a long shortage of steel would badly cripple the whole field. Big builders who handle most of the largest office projects say that fabricators can handle their current needs, but they doubt that there is enough heavy structural steel to handle all the jobs that could be booked.

Public building declined 5 per cent in September, due largely to a drastic dip in highway construction, largest single component of all public construction. The highway program has been hit not only by scattered steel shortages, but also by the continuing slowdown in federal aid payments for the interstate system. The highway trust fund ran

continued on page 6

GUGGENHEIM MUSEUM OPENS

Last month, Manhattan's architecturally jaded cognoscenti got their first real jolt since the World's Fair opened two decades ago. The occasion was the opening of the late Frank Lloyd Wright's masterpiece, the Solomon R. Guggenheim Museum. Visitors were treated not only to the breathtaking freshness of Wright's spiralling gallery, but also to an ingenious mounting and lighting of the paintings themselves. Next month, FORUM will take a closer look at the newly opened Guggenheim museum.

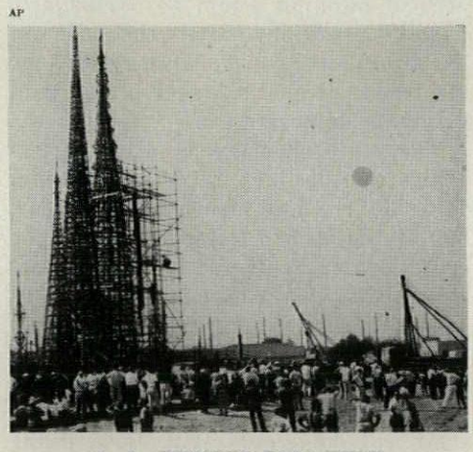


NEW YORK TIMES

dry last month, and, under a stopgap arrangement, the fund will have to borrow from the Treasury. Thus, in an effort to keep federal spending down until Congress can get pay-as-you-go financing operating on full scale again, the Administration has clamped tight controls on federal payments to states for highways. And last month, a special White House committee was considering steps to get the states to pay a higher percentage of interstate road costs than they now pay (10 per cent). One measure reportedly being weighed would be to discontinue federal aid to urban superhighways, which account for an estimated 42 per cent of the federal program's cost, while adding relatively little mileage. But, because of expected heavy political pressures against such a cut, it is not expected that highway aid to cities will be cut back very much, if at all.

Unless the United Steelworkers union successfully defeats an injunction against the strike, it is expected that the steel mills will be back in full-scale operation by the middle of this month. The biggest question mark will be the damage that may have been done to the lining of open-hearth furnaces by the long lay-off. If furnaces require much relining, and if the workers themselves go slow on production during the 80-day Taft-Hartley cooling-off period, there probably will not be enough new production in that time to be of much help to building projects stalled in the early stages. The best that can be expected is that supplies of already rolled shapes that have been lying at mills can be shipped immediately, and thereby give some temporary relief to those builders who had placed orders before the strike. But unless there is a settlement, construction is sure to be badly hurt this winter.

AP



L. A. TOWERS PASS TEST

Los Angeles' fabulous Watts Towers (FORUM, July '59), withstood every test of the city building inspectors last month and were pronounced fit to continue as the West Coast's premiere example of folk architecture. The 104 ft. towers are shown above as engineers applied 10,000 pounds of pressure to them, to test their stability. The result: the frame scaffolding built as part of the test buckled and a test cable snapped. The towers themselves, built of reinforced concrete and glass bits by an immigrant tile setter, held fast.

Tighter money threatens home-building market

This autumn, with construction steaming along at all-time record levels, builders have more than a steel strike to worry about. They are at least equally concerned with the increasing cost of money. Last month, in the wake of a 5 per cent Treasury issue—the highest rate in 30 years—builders and bankers alike were voicing serious concern about the swift upward climb of money rates and the possibility of actual mortgage money shortage. The latter is not expected to hurt conventional mortgages for either homes or heavy construction, but there are already definite signs that, despite higher rates for Federal Housing Administration insured mortgages, there has been some shift of investment funds away from government-backed mortgages.

One reason for this shift was the Treasury's 5 per cent issue itself, which was a favorite target for savings banks, savings & loan associations, and individuals. Seventy-three per cent of the $2.2 billion issue was taken by these groups, and about twenty-six per cent by commercial banks. As the savings institutions ordinarily are the biggest investors in mortgages, particularly for new homes, their heavy purchases of the Treasury issue will mean a diversion of funds to the commercial banks, where the Treasury caches most of its funds. This diversion could put further pressure on mortgage interest rates, already at their highest point in the postwar period.

In an effort to entice more investment into home mortgages, and stop discounting of FHA-insured mortgages, that agency recently raised its rates from 5¼ per cent to 5¾ per cent. So far, however, this does not appear to have accomplished either objective. The new mortgages are still being discounted, though by only one or two points compared to seven or eight points for the old 5¼s, and saving institutions are still relying heavily on the Federal National Mortgage Assn. as a source for new funds, because savings themselves have not risen fast enough to inject needed money into the mortgage market.

The immediate outlook for mortgage money is for continuing high rates, but, say market observers, there will probably be a better flow of funds by year-end than there has been recently. Conventional loans for large projects can still be had for 6 to 6½ per cent from large eastern institutions. Thus, it appears that, as usual, the major casualty in the present tight money market will be private house building, which is expected to decline from this year's anticipated near-record 1,070,000 starts, to about 950,000 in 1960 (FORUM, Oct. '59).

Boston businessmen form private renewal group

One of the most encouraging developments in the course of urban renewal progress in recent years has been the rise of the private redevelopment corporation. Cleveland, Pittsburgh, and Detroit have been among the larger cities which have enjoyed the benefits of these groups of influential citizens tackling the problems of urban blight in their own communities. More recently, a group was formed in Boston, and last month it was working on an $8 million project designed to meet one of the city's most basic needs—middle-income housing.

The Boston organization, called the Beacon Redevelopment Corp., is a limited dividend corporation headed by a group of well-known bankers and businessmen. (President is Ernest Henderson III, president of Sheraton Corp. of America.) It was set up as a sort of holding company for Charlesbank Homes, Inc., a charitable trust. As a trust, Charlesbank is not equipped to handle the technical side of a redevelopment project by itself, so William J. Furlong, a trustee of Charlesbank and real estate officer of the First National Bank of Boston, devised the idea of a limited-dividend corporation—the first under the state's ten-year-old enabling statute for such bodies. Furlong sold the idea to his fellow trustees, then enlisted the support of the urban renewal committee of the Boston Chamber of Commerce. With an impressive

array of executive talent, Beacon Redevelopment was launched nine months ago.

Beacon Redevelopment's first project is an 800-unit development in Roxbury, on the fringe of the central business district. Its three buildings are being designed by Hugh Stubbins & Associates, and, after some delays, construction is expected to start soon. The project has already been approved by the City Redevelopment Authority, Council, and Planning Board, and state approval under terms of the limited-dividend statute is expected momentarily. Rentals will be about $100 per month for 3½ and four-room units.

The initial project is unique in several respects. It involves a lease, rather than outright sale, of the 7.5 acre site to Beacon Redevelopment, which will pay the Redevelopment Authority a ground rental of $24,000 plus 15 per cent of gross income annually for 20 years. After that period, the ground rental stops, but BRC must still pay 15 per cent of gross income. Charlesbank is putting up $500,000 equity in the project, and the redevelopment authority will float bonds ($1.5 million worth) to pay acquisition and clearance costs for the site.

If Beacon Redevelopment proves successful, renewal leaders in Boston hope that other organizations will be attracted to the limited-dividend device for redevelopment. And in Boston, where redevelopment progress has heretofore been halting, the new venture can be significant if it does no more than enlist the services and interest of the city's powerful businessmen in urban renewal.

Newark gets plan for downtown renewal

Six years ago, Newark, N. J. took its first steps toward losing its identity as a grimy, congested backyard of New York City (FORUM, Sept. '57). Since then, it has moved in rather disjointed fashion to clear some slums, get new housing, and increase office space downtown. Until several weeks ago, however, Newark had no clear-cut guide lines for comprehensive urban redevelopment.

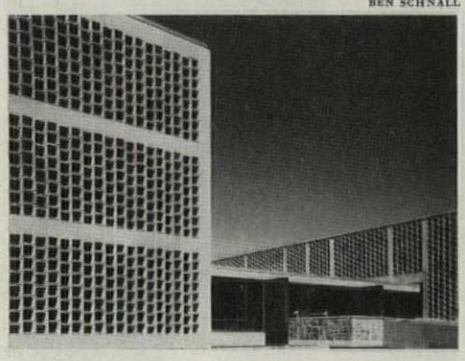
Such guide lines have now been laid out in a report by architect-planners Victor Gruen and Oskar Stonorov. The report is not a master plan, but rather an attempt to define Newark's most pressing problems and "propose prin-

continued on page 9

HEDRICH-BLESSING

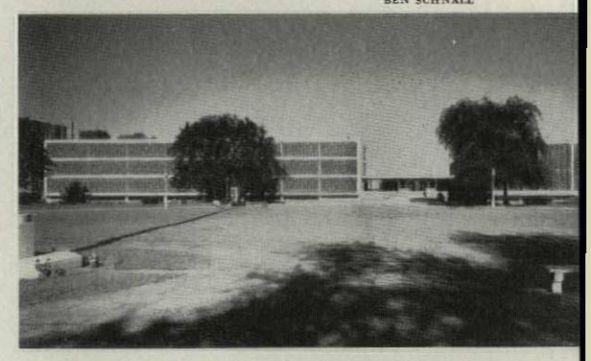
University of Chicago's $4 million, four-building law school was dedicated last month by Vice President Richard Nixon. Designed by Architect Eero Saarinen, the glass-walled buildings are arrayed around a reflecting pool. A circular auditorium is laid out so that students can watch real courtroom action, much as medical students watch surgery. Heart of the center is the six-story library-office building (shown above).

BEN SCHNALL



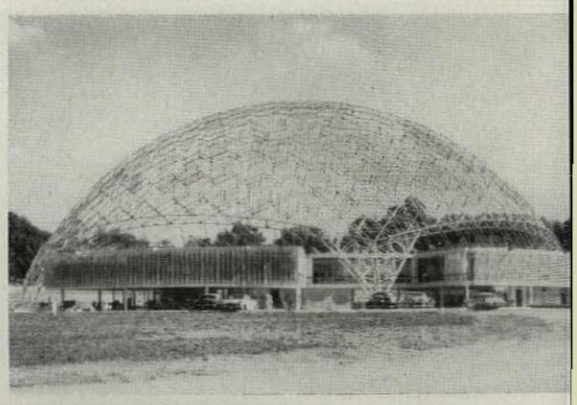
Architect Marcel Breuer has designed two new buildings for the Bronx campus of Hunter College: a limestone-faced classroom-administration building, and a glass-walled library.

BEN SCHNALL



Southern exposures of both Hunter buildings are shielded by a tile honeycomb screen, and the library has a thin shell vaulted roof, requiring only six interior columns.

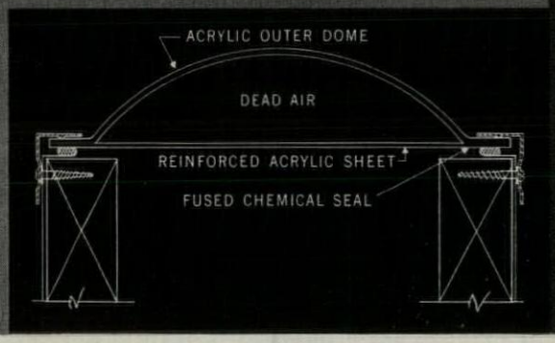
The National Bank of Detroit last month dedicated its $20 million main office, designed by Albert Kahn Associated Architects & Engineers. The 14-story bank, which is near the new Civic Center, is sheathed in white marble, with narrow, sunken casement windows.



A spiderweb-like geodesic dome, spun from aluminum, dominates the new headquarters of the American Society for Metals, near Cleveland, Ohio. Architect John Terence Kelly has set a garden in the center of the semicircular, glass-walled structure.

Harvard University's latest student dormitory, called Quincy House, is a seven-story brick structure with a "sandwich-system" of layout —three-floor units consisting of a middle-living-room unit and bedroom floors above and below the living rooms. Architects for the 231-student dormitory are Shepley, Bulfinch, Richarson & Abbott of Boston.

GOOD DAYLIGHTING DESIGN STARTS HERE...



New, WASCO ALL-ACRYLIC SEALED DOUBLE DOME provides an insulating barrier to stop inside condensation and reduce heat losses. Other improvements are: (1) the elimination of metal surfaces inside the light well . . . to prevent sweating; (2) lower-cost, weather-tight installations . . . Wasco Sealed Double Domes can be caulked to the curb and clamped tight with a simple aluminum frame; (3) improved diffusion of daylighting . . . by adding a fiber-glass reinforced base sheet, chemically fused to the dome. Wasco Sealed Double Domes fit either 1⅝″ or 4″ curbs, come in eighteen square and rectangular sizes . . . 20″ x 20″ to 64″ x 96″. See Sweet's Architectural File 20a/Wa for full details, or call your Wasco Representative.

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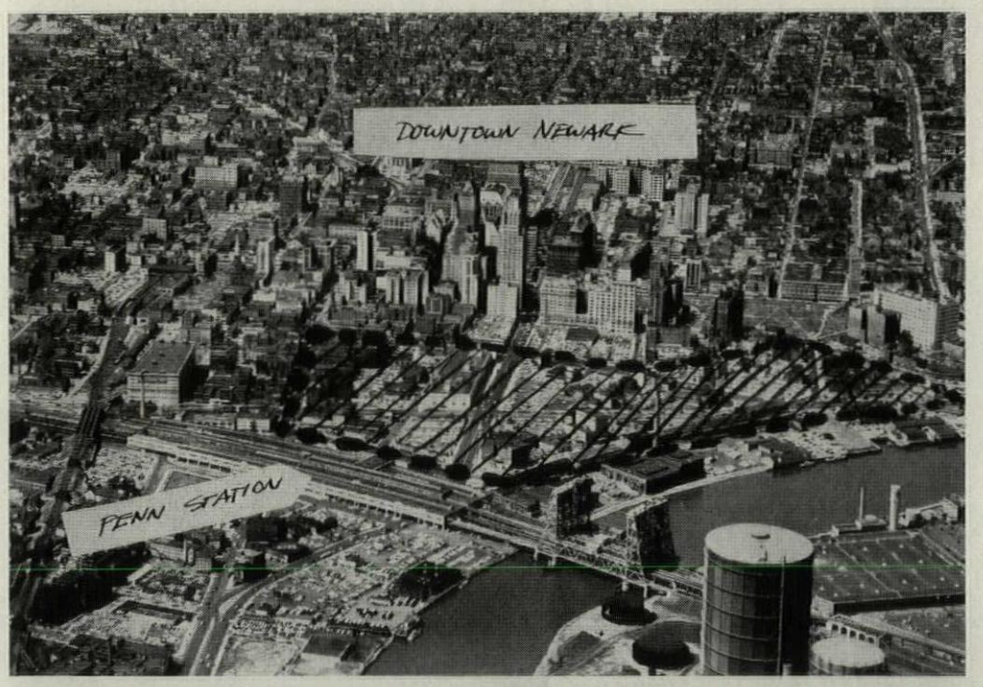
ciples according to which a blueprint for realization could be carried out." Concentrating on the central business district, the report sketches the potential outline of a $191 million redevelopment ($116 million of private investment; the rest, city, state, and county funds) which would transform downtown Newark through a combination of new construction and judicious rehabilitation of existing structures.

Probably the most imperative problem facing Newark is the unscrambling of its network of highways that now make the city a nightmare for driver and pedestrian alike. Traffic today funnels through several broad arteries directly into the busy core of the city—and this traffic ranks with the heaviest to be found anywhere in the country. The planners recommend loop highways around the central business district. These would involve the relocation of present arteries, and some new highway construction. The new pattern would isolate downtown Newark's major elements—residential, commercial, governmental, and educational—by creating large pedestrian islands interconnected by walkways. Parking also is badly needed (the planners estimate the demand at 18,000 new spaces by 1975) and provision is made for this in areas where traffic studies show the problem will be most intensive.

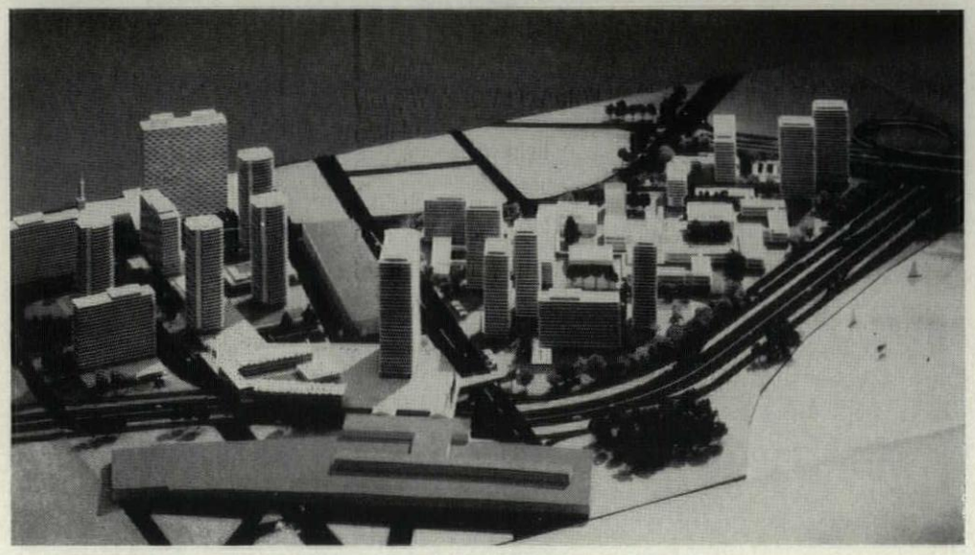
As a focus for downtown Newark, there is suggested in the report a colorful sunken pedestrian shopping plaza in Military Park, to connect rapid transit, buses, and a new garage. The architects also suggest a half-mile long pedestrian shopping mall, and the setting aside of areas near the central business district for industrial parks.

"Almost the greatest single need in downtown Newark," says the report, "is the removal of a number of unsightly, blighted areas," and their replacement by new high- and middle-income housing. Only three weeks after the Gruen-Stonorov report was submitted to Mayor Leo Carlin, a private group made a pitch to sponsor a residential-commercial area called Newark Plaza, just southeast of the central business district. The proposed project, sponsored by Philadelphia Builder Matthew B. Weinstein and Providence's Gilbane Building Co., and designed by Stonorov's own firm, Stonorov & Haws, would put multistory apartment buildings with a total of 4,100 units on the 27-acre urban renewal site. It would also build a 20-story office building, restaurants, a motel, and several two-story garages with recreational facilities on their roofs. A pedestrian plaza would connect the major part of the residential development with Penn Station, and the largest of the apartment buildings, a 33-story cooperative, would rise from this plaza, adjacent to a restaurant and motel. About one-third of the project area would be taken for Seton Hall University's expansion program, with facilities for 10,000 students. Total cost of the whole project: $95 million.

NEWARK PLAZA, $95 million residential-campus development designed by Oskar Stonorov's firm (picture, below) was proposed for blighted area near Newark's Penn Station (top picture).



FAIRCHILD AERIAL SURVEYS, INC.



Memphis architects design new civic center

Memphis architects, taking a leaf from their colleagues' book in Tulsa, Okla. (FORUM, Feb. '56), last month were completing their studies for a new civic center overlooking the Mississippi River. Members of the Memphis chapter of AIA formed a nonprofit corporation early this year to undertake a master site plan for the center, with the city paying only $30,000 to cover overhead costs. Last month, with a detailed report on site and building requirements completed, most of the preliminary planning already was approved by the County Planning Commission and the City Commission. Although the architects did not design the specific buildings, they did make models to show site layout and approximate mass of the buildings.

The core of the new center will be a

continued on page 11

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four-block section now intersected by the city's main street, which will be rerouted. A new city hall, federal and state administration buildings, as well as a headquarters for the municipally owned public utility company, will be grouped around a broad pedestrian plaza. At the head of the plaza, nearest the Mississippi, will be a 300 ft. tower commemorating the journeys of Hernando de Soto in the Memphis area some 400 years ago.

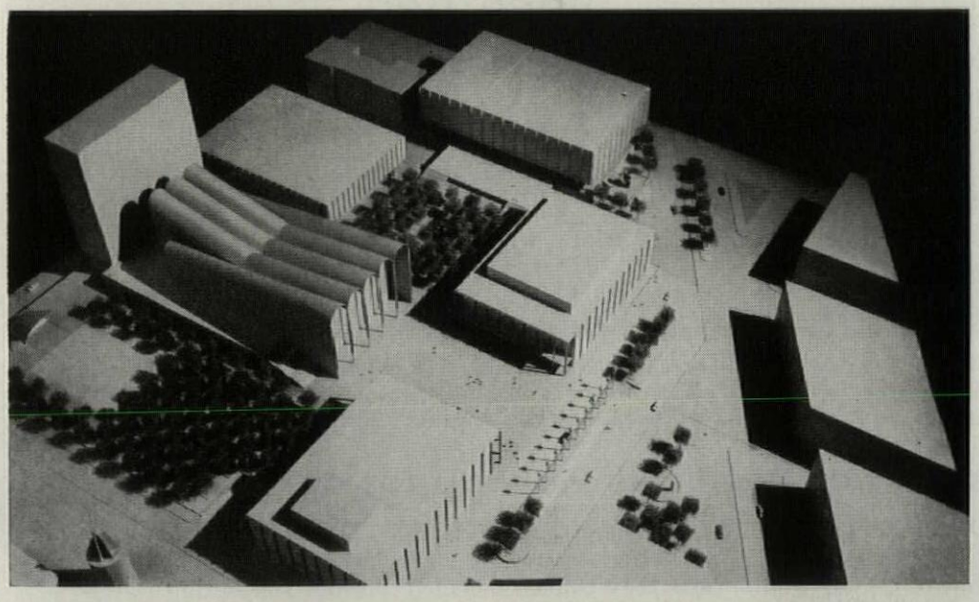
Lincoln Center design revamped again

The design for the ambitious Lincoln Center for the Performing Arts has undergone many changes since it was proposed over three years ago. The most recent model, which shows several major changes, was revealed last month. Work has already started on the first building, the Philharmonic Hall, designed by Max Abramovitz, one of the center's group of top architects. (The rest of the group comprises Gordon Bunshaft, Philip Johnson, Pietro Belluschi, Wallace Harrison, and Eero Saarinen.) The new model combines the Library-Museum and Repertory Theater buildings into a single structure, notable for having the theater in the center, with the library-museum "wrapped around" it. In previous plans, the Bunshaft-designed Library-Museum was adjacent to the Saarinen-designed Repertory Theater but separate from it. The new scheme will allow more open space to the right of the entrance to the new Opera House, probably for a small pool and a grove of trees. Across a plaza from this open space will be the remodified Juilliard School, designed by Belluschi.

Another major revision in structure is in the Opera House itself, designed by Harrison. In the spring, when the last previous sketches of Lincoln Center were released, the Opera House had high, narrow arches fronting the main plaza, sweeping back and up into a vast tower, which housed air conditioning and other equipment, as well as the scenery drop (see pictures, below). The revamped plan still shows arches, but the upswept rear section of the building has been replaced by a separate slab tower, connected to the Opera House itself only at the lower floors.

The new model also discards the covered walks that connected the buildings in the last version, and shows a generally more austere pattern in the whole complex of buildings. (The walks had been used, in the words of a Center spokesman, "to unify the buildings, but this is now accomplished through design.") Porticoes have been added to the plaza-front sides of both the Philharmonic and the Theater for the Dance.

Although there may be still further changes in design detailing of individual buildings, the latest model shows the final relationship of the buildings and their mass.



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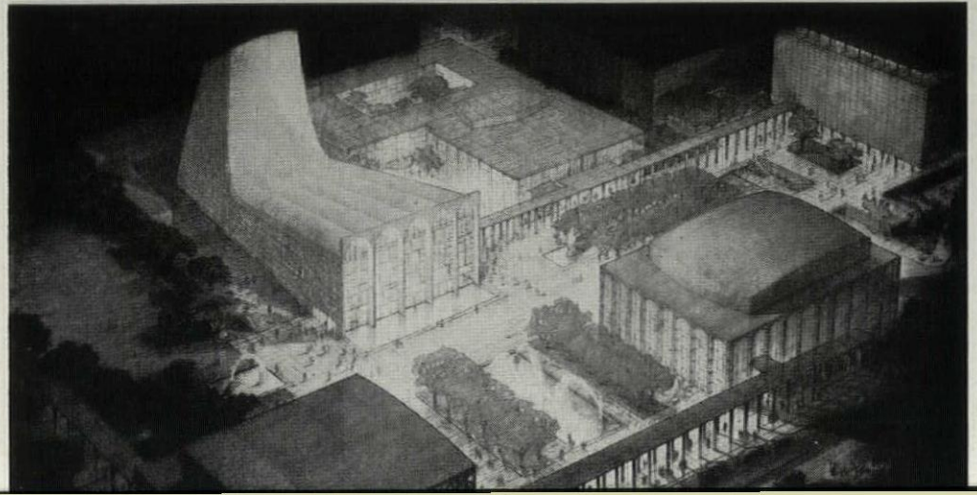

LINCOLN CENTER as it looked in design of last spring (below) and as it looks in latest plans. Counter-clockwise around vaulted-façade of Metropolitan Opera: Theater for Dance, Philharmonic, Juilliard, and the combined Library and Repertory Theater Building.

Briefs

A New World opportunity: City Center Properties, Ltd., a large British development firm, last month sunk $25 million into the $100 million Grand Central City project, backed by New York Developer Erwin S. Wolfson. The British will be equal partners with Wolfson, in what is the largest single dollar investment by Britishers in the U.S. in postwar years. Construction of the huge (2.4 million sq. ft.) building will start early next year.

Scorecard on malls: Pedestrian shopping malls, the latest fad in downtown regeneration, were making a varied showing around the nation last month. The permanent mall in Kalamazoo, Mich. was so successful that city officials now are impatient to make all downtown auto-free (FORUM, Sept. '59). In Toledo, Ohio, however, the costs of the city's mall experiment were being cautiously weighed before any decisions are made for a permanent mall. And Toledo had another problem—skid-row denizens, finding the mall benches attractive, were lounging happily in the mall after dark. Meanwhile, malls opened in Hempstead, N.Y. and Evansville, Ind., on an experimental basis.

Gargoyles for sale: Architects interested in buying any or all (36) of the European-made gargoyles being torn from the old Prudential building in Newark, N. J. can contact Cleveland Wrecking Co., headquartered in Cincinnati, Ohio.

New Air Traffic Control Tower at Newark Airport rises 150 ft. above field elevation. Unusual cantilevered top section houses 75 Federal Aviation Agency operating personnel and over a million dollars worth of control equipment. Ground floor, and top 3 stories are enclosed with lightweight, translucent Kalwall panels. A. Gordon Lorimer, Architect, Carl Buhr, Inc., Contractor.

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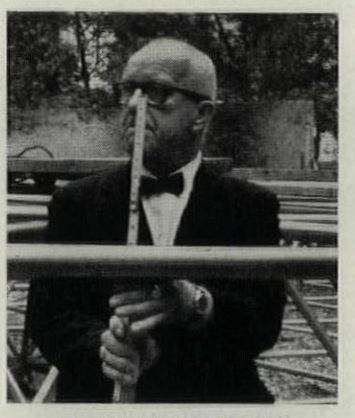
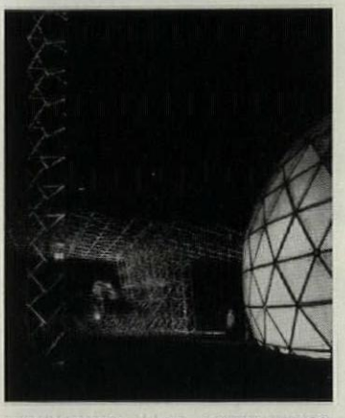
"Bucky" Fuller displays his creations in Manhattan, teaches "anticipatory design science" in Illinois

PHOTOS: ALEXANDRE GEORGES



R. BUCKMINSTER FULLER



TENSEGRITY MAST, OCTET TRUSS, GEODESIC DOME

Richard Buckminster Fuller is, at 64, finally moving out of the *enfant terrible* stage in design engineering. His geodesic dome structures have been solidly proved —there are more than 1,000 of them already in use, including the 384-ft. diameter roundhouse for Union Tank Car Co.—and engineers and architects are no longer so skeptical of Fuller's mathematical gyrations. Last month, Fuller showed some of his more recent creations, as well as a plastic dome, at a special show for New York City's Museum of Modern Art. And, as sophisticated museum-goers admired the creations of the far-reaching Fuller intellect, Fuller himself was, for the first time, settling down to a permanent teaching job at Southern Illinois University, in Carbondale, Ill.

Fuller, who has served about 100 various part-time faculty appointments in the past, has accepted the position of research professor in SIU's Department of Design, which is headed by one of Fuller's former students (at the Illinois Institute of Technology's Institute of Design), Harold Cohen. Fuller, who will live in Carbondale in a geodesic dome, will also supervise construction of another dome to house experiments in designing the "autonomous house" with self-contained water supply, utilities, waste disposal, etc., and will spend about one-quarter of the academic year lecturing at SIU. Most of his program will be devoted to what Fuller calls "comprehensive anticipatory design science." This is very different from architecture, Fuller maintains, in the same way that research in preventive medicine differs from usual medical treatment. The difficulty in architecture, Fuller says, is that the client usually has preconceived ideas and rigid cost limits. The result is that the design is frequently set by factors beyond the control of the architect, who becomes, in Fuller's words, "an accessory after the fact of prime design." Thus Fuller describes himself not as an architect, but rather as "a research department for architecture."

The fruits of this one-man "research department for architecture" make an eye-stopping show at the Museum of Modern Art. Of course, there is a dome, of triangular shaped, transluscent, green plastic panels. It is Geodesic Rigid Radome used to house radar installations on the Distant Early Warning Line (DEW) in the Canadian Arctic, and is smaller than many of Fuller's industrial domes or the domes used in U.S. exhibitions in Moscow, Karachi, Tokyo, and other foreign cities. The DEW Line domes, which were once believed too unsubstantial to withstand Arctic gales, have been proved in winds up to 200 miles per hour.

Biggest of the three Fuller exhibits is a 100-ft.-long frame of gold-anodized aluminum tubing cantilevered 24 ft. above the ground on a 35-ft.-wide support, also constructed of aluminum tubes. Fuller calls this a "space frame" as well as an Octet Truss (derived from the octahedronal and tetrahedronal pattern of the tubing), and sees it as a revolutionary advance in the design of airplane hangars and any structure requiring enormous clear spans. Like all Fuller creations, it is easily assembled of interchangeable parts.

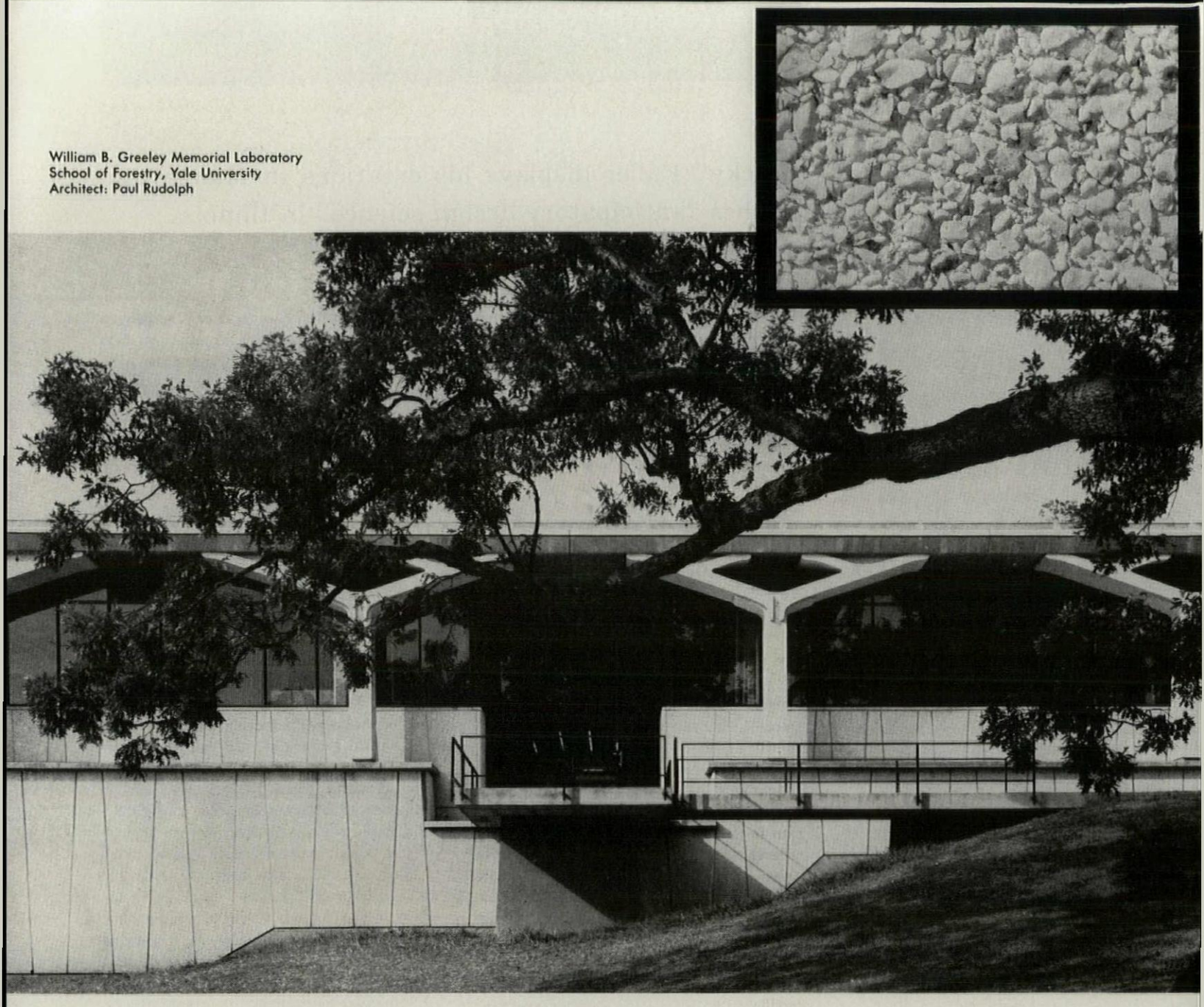
The third Fuller design is called a Tensegrity Mast, a 36-ft.-high tower of aluminum tubes and monel rods arranged so that compression members are not contiguous. This employs Fuller's favorite principle of playing compression members against parts in tension, thereby allowing great strength with little weight in the members themselves. (The tensegrity mast weighs only 90 pounds, yet Fuller believes structures built on the tensegrity principle would support many times their weight.)

Although loquacious, crew-cut Bucky Fuller still baffles people with his explanations of the "Energetic and Synergetic Geometry" underlying his work, his considerable recent success has won him renewed respect from architects and builders, as well as government and business. In defense of his own advanced thinking in design, and of such ideas as 2-mile diameter domes, sky and submarine islands built on the tensegrity principle, Fuller says "It's not doodleometry—I've never made a structure that wasn't pure mathematics and testing."

NEW URA BOSS GETS TOUGH

David M. Walker, who replaced Richard Steiner four months ago as commissioner of the Federal Urban Renewal Administration (FORUM, Aug. '59), is not particularly happy with the pace of renewal progress, and intends to do something about it. Walker told FORUM last month that "the big problem in urban renewal is not money but accomplishment." In an

William B. Greeley Memorial Laboratory
School of Forestry, Yale University
Architect: Paul Rudolph



YALE FORESTRY LABORATORY

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Paul Rudolph, chairman of the Department of Architecture at Yale, turned his talents to the design of a unique new building for his own campus: the new laboratory for the School of Forestry which design harmonizes with the steep wooded slope of the surrounding terrain.

For the exterior walls, Architect Rudolph chose versatile Mo-Sai with an exposed white and buff quartz aggregate surface. The Mo-Sai facing is backed up with five inches of lightweight insulating concrete making a six-inch-thick panel. Supporting precast concrete "Y" columns and sunscreen were also products of the Mo-Sai manufacturer.

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effort to prod cities into moving faster with renewal projects, Walker will insist on tangible evidence of progress or else cut the cities off from further federal aid for additional projects. And, should things drift too long, Walker might even cancel projects completely. Walker was backed up in his get-tough policy by HHFA Commissioner Norman Mason, who last month urged city planners to move faster on renewal work.

Walker, who for four years was Regional Administrator of the Housing & Home Finance Agency in Philadelphia and has a background as executive director of the city's Redevelopment Authority, cites this example of what he considers inexcusably laggard renewal operations in an unnamed city: "The proposed project went into the execution stage two years ago and there is still no indication that it is going ahead. In fact, only 20 per cent of the land has been acquired in that time." What makes Walker take an even dimmer view of this city's effort is that, despite its torpid pace, it is already discussing plans for two new projects.

In an effort to shake up the laggards and weed out those cities and projects that have got nowhere, Walker plans to cut about $63 million worth of projects from the $300 million already applied for, but not yet granted, reservations of federal capital funds. "We are going to consider lack of demonstrated urgency and feasibility as good and sufficient grounds for toning down any particular project,"

URA'S WALKER

Walker says. And, he adds, URA will also scrutinize new applications more carefully.

URA also will put more emphasis on rehabilitation, in keeping with the trend in HHFA generally since Norman Mason took over, and will switch rehabilitation and building code experts out of planning sections in regional offices, assigning them to rehabilitation fieldwork.

HHFA last month announced appointment of Louisville real estate developer, **Ben T. Perry III**, to the newly created post of Special Assistant to the Administrator for Workable Programs. This is part of the growing effort to tighten up workable program requirements, which have long been under fire as so lax as to be virtually meaningless.

JOHNSON ELECTED ACTION CHAIRMAN

Roy W. Johnson, former president and a charter board member of ACTION, Inc., last month was elected chairman, replacing LIFE magazine publisher **Andrew Heiskell**, who has become chairman of the executive committee. Johnson, a former executive

HEISKELL JOHNSON

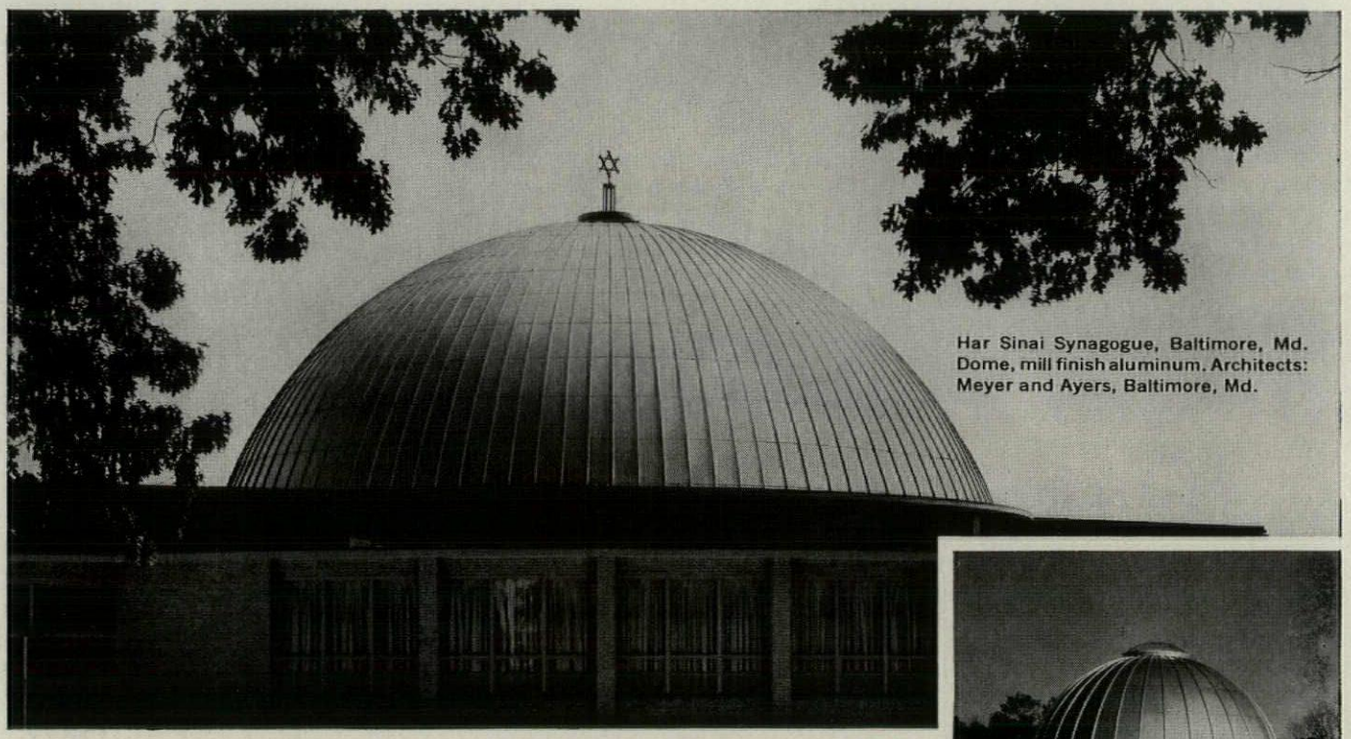
vice president of General Electric Co., has also been director of the Advanced Research Projects Agency, Department of Defense, a job from which he resigned last month to take up a career as a professional artist.

Johnson was president of ACTION from April 1957 to October 1958 and, as spokesman for GE's program of promoting urban redevelopment in cities where its plants operated, played a key role in getting industry backing for the enterprise. At the Sixth Annual ACTION meeting last month in the half-finished Chase Manhattan Bank building, Johnson announced an award, consisting of a bronze medallion and a certificate, to be called the Andrew Heiskell Award, which will be given from time to time to leaders in the field of urban renewal. The first medallion to be cast will be given to Heiskell himself.

People in brief

Frank A. Marston, of Boston's Metcalf & Eddy, is the new president of the American Society of Civil Engineers, succeeding Francis S. Friel of Philadelphia. Marston was formerly a director and vice president of ASCE.

John E. Dinwiddie, 56, dean of the Tulane University School of Architecture, died several weeks ago in New Orleans after a short illness. Dinwiddie was a well-known "Bay Area" architect noted particularly for his home designs in California, for which he won many awards. He also designed the Honolulu Oil Corp. building in Midland, Tex. END



Har Sinai Synagogue, Baltimore, Md. Dome, mill finish aluminum. Architects: Meyer and Ayers, Baltimore, Md.

Ahavath Achim Synagogue, Atlanta, Ga. Gold anodized aluminum dome. Architects: Roberts & Co. Associates, Atlanta, Ga.

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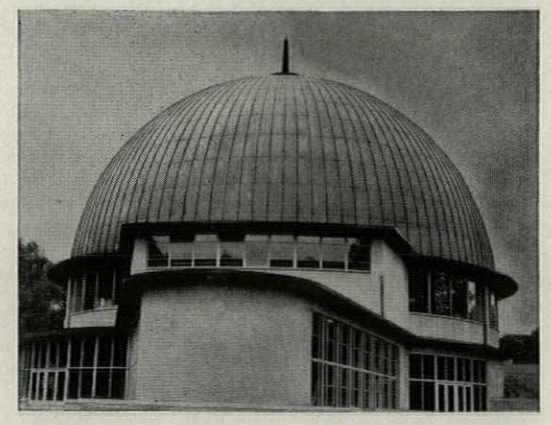
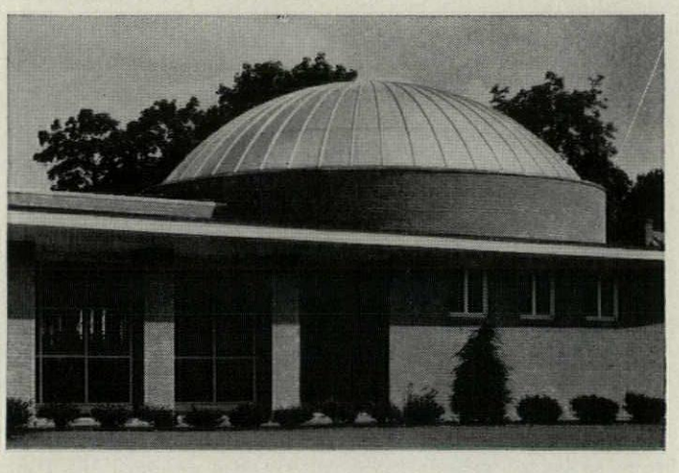


Cleveland Park Synagogue, Cleveland Heights, O. Dome of sheet copper. Architect: the late Eric Mendelsohn. Associate: Michael A. Gallis.



The Woodsdale Temple, Wheeling, W. Va. Dome of mill finish aluminum. Architect: Nathan Cantor, Pittsburgh, Pa.

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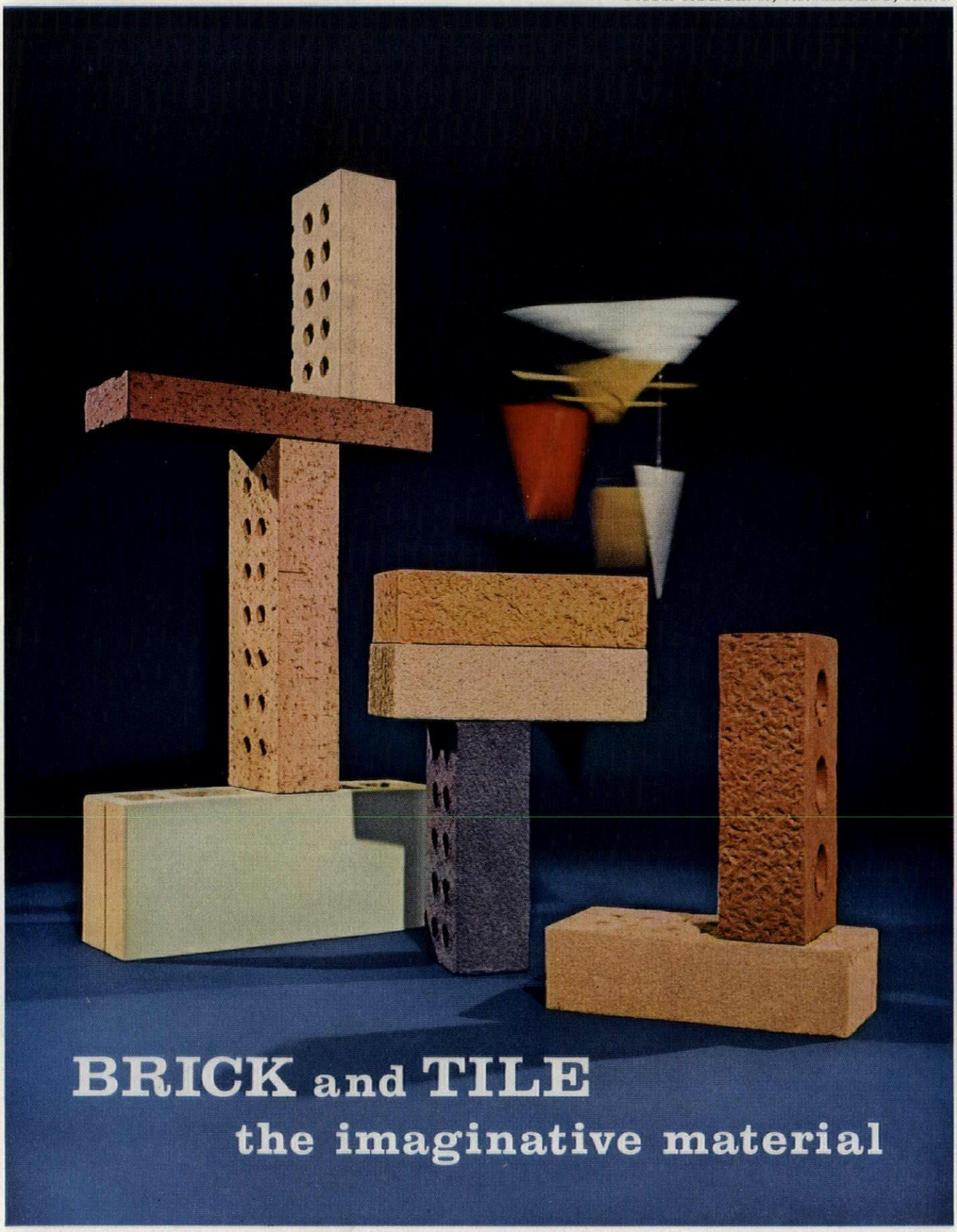

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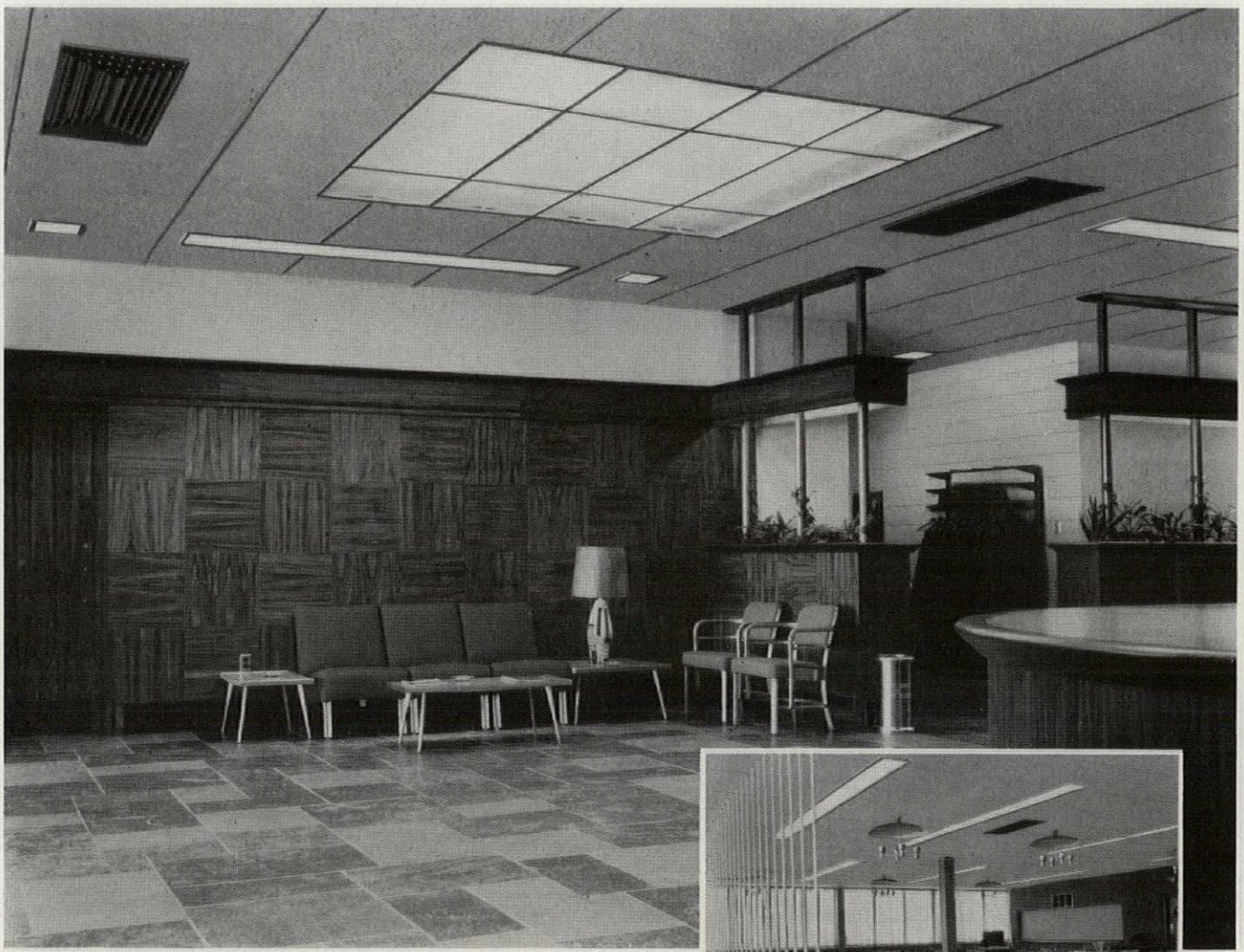

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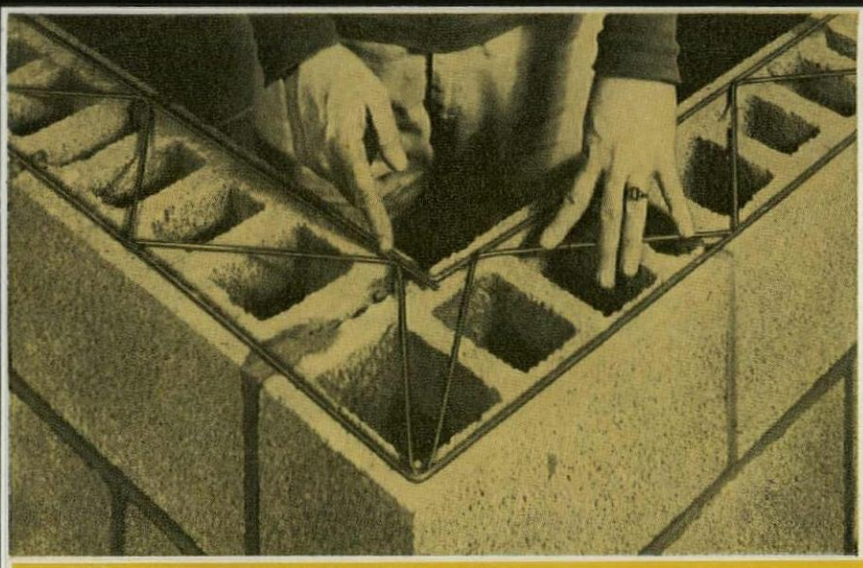

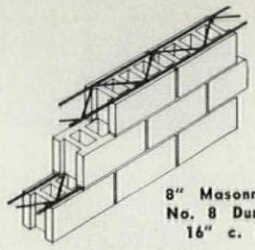

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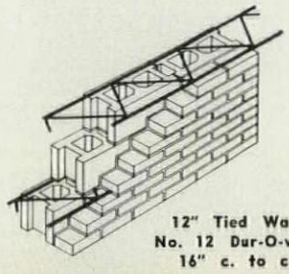

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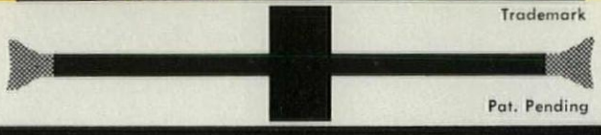

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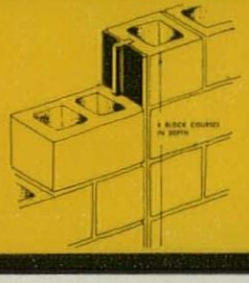

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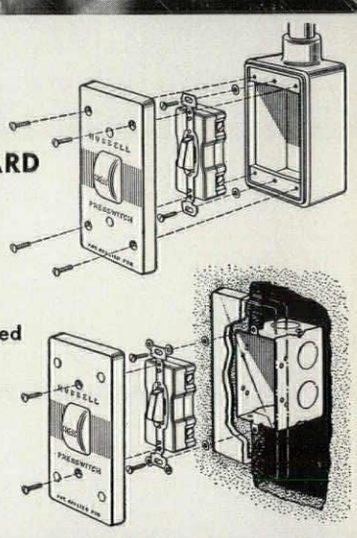

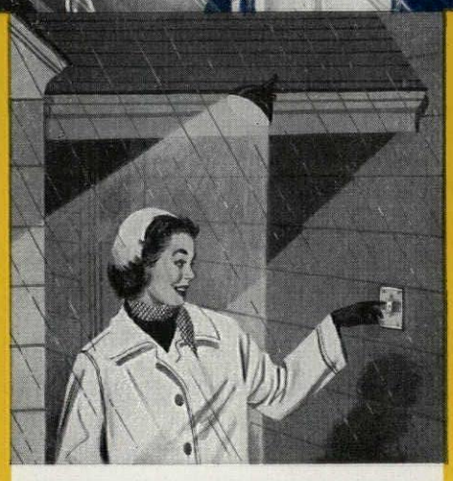

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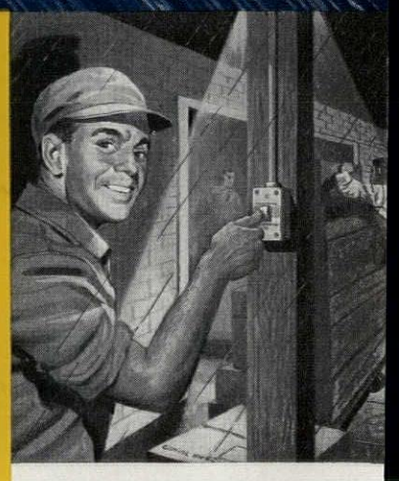

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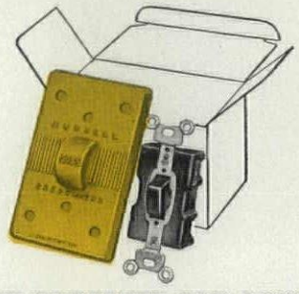
The switching mechanism is the fast-acting Hubbell "Presswitch", which responds to the gentlest touch of finger, hand, or elbow in any position. It is available in single or double pole, 3-way or 4-way action, in 15 or 20 ampere sizes for 120-277 volt A.C.

The "Insulprene" Plate and A.C. "Presswitch" combination is designed for FS or standard wall box mounting.

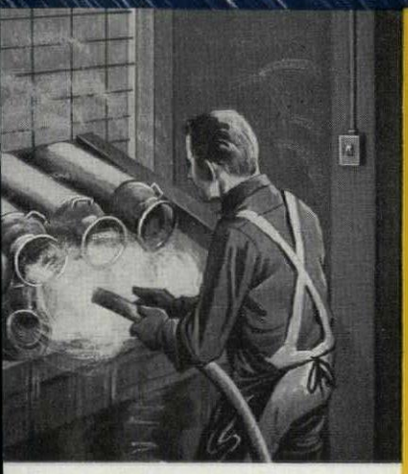
For further information about Hubbell rugged wiring devices, write to one of the offices listed below or refer to the Hubbell insert in the Architectural File of Sweet's Catalog (Sweet's No. 31b/Hu.)



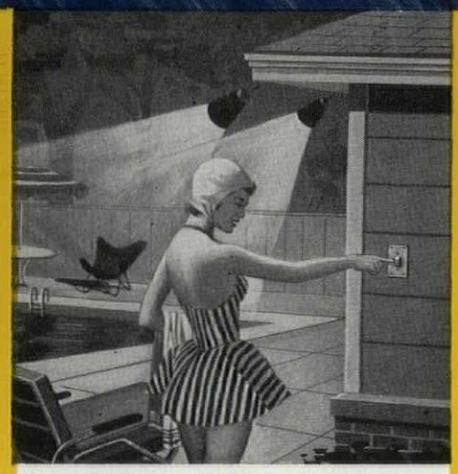
PACKAGED TOGETHER FOR CONVENIENCE

The "Insulprene" Plate and A.C. "Presswitch" are delivered to the job as a unit in this time-saving package, with complete mounting instructions for FS or standard wall boxes. Plate is available in gray (No. 1751) or in "Chem Marine" Yellow (No. 17CM51).

Words "Insulprene" and "Presswitch" are Hubbell trademarks.



DAIRIES



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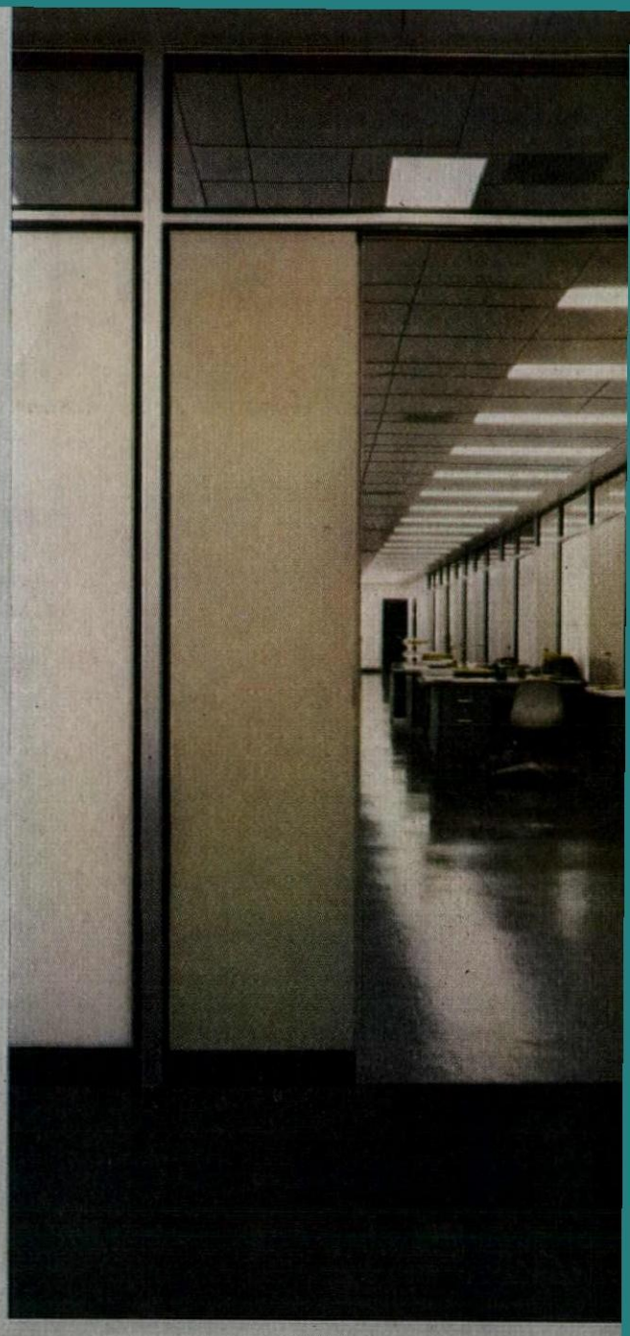
BRIDGEPORT, CONNECTICUT

IN CANADA: SCARBOROUGH, ONTARIO



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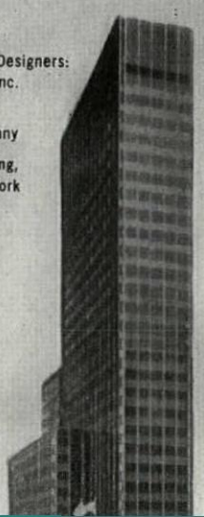

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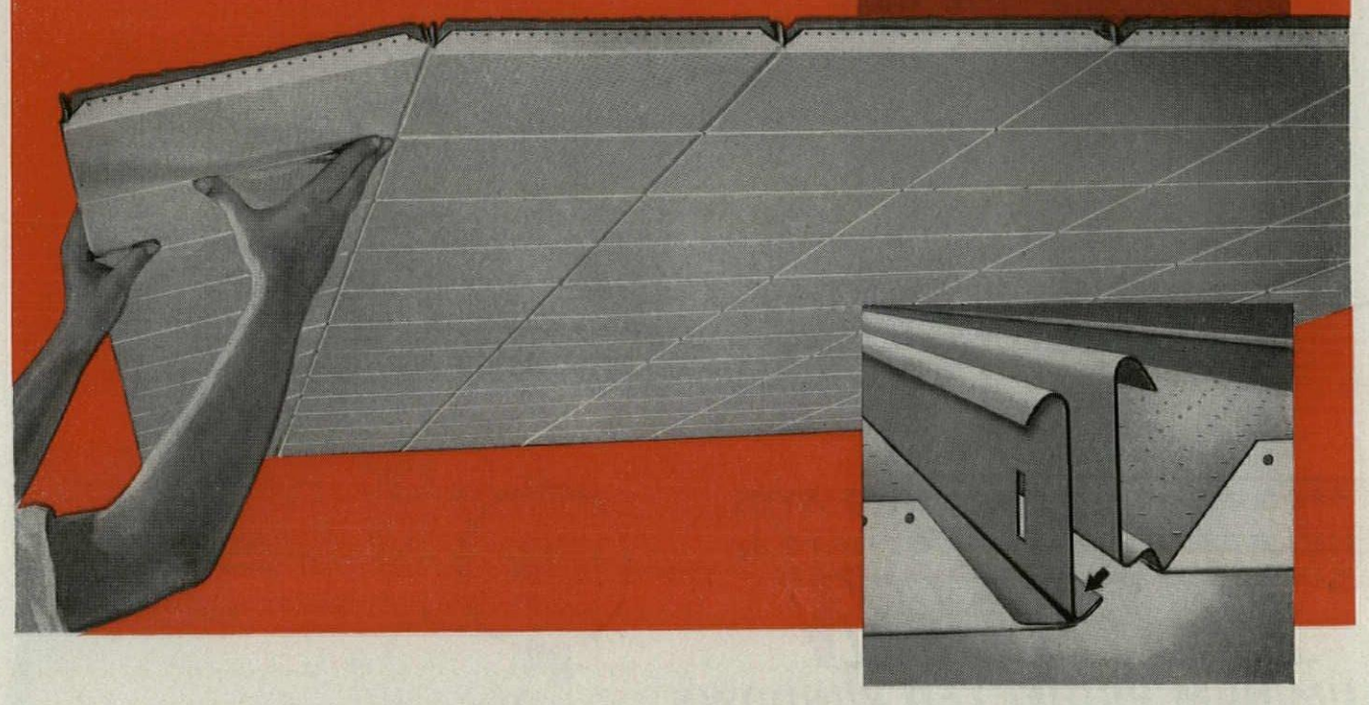

Only Eastern's all-metal acoustical "Silent Ceiling" assures a micro-smooth surface unaffected by vibration . . . because only Eastern's panels are individually interlocked with the ingenious "locking-lip". Unsightly panel shifting is eliminated . . . maintenance costs are lowest by far. Unique self-contained suspension ends time-consuming, space-wasting T-bar installations, too. Each panel is pre-fitted with sound absorbing pads to make installation faster yet. And the entire "Silent Ceiling" is rated Class "A" in flame resistance.

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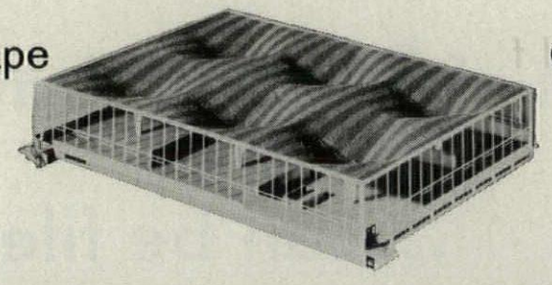
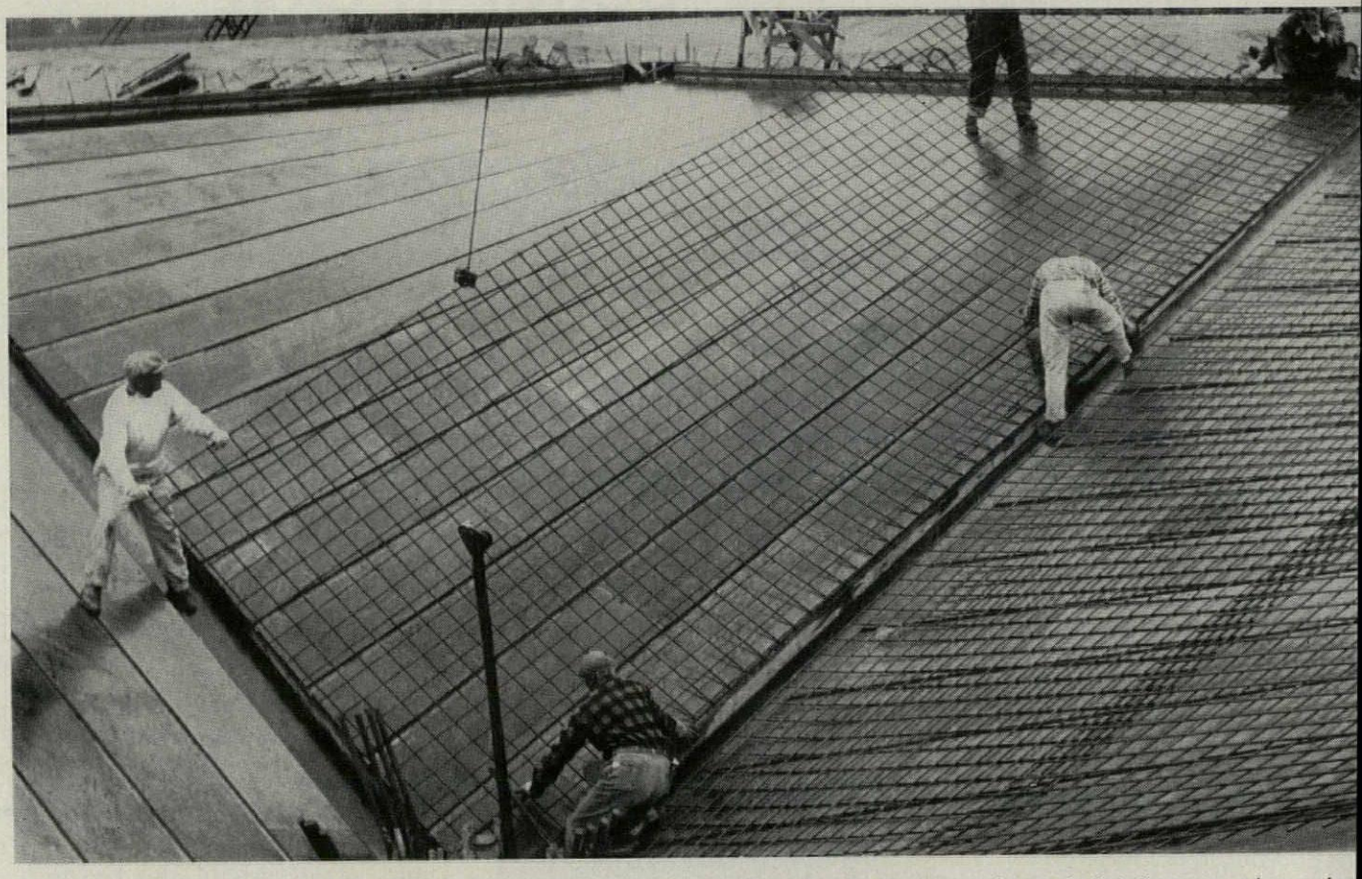
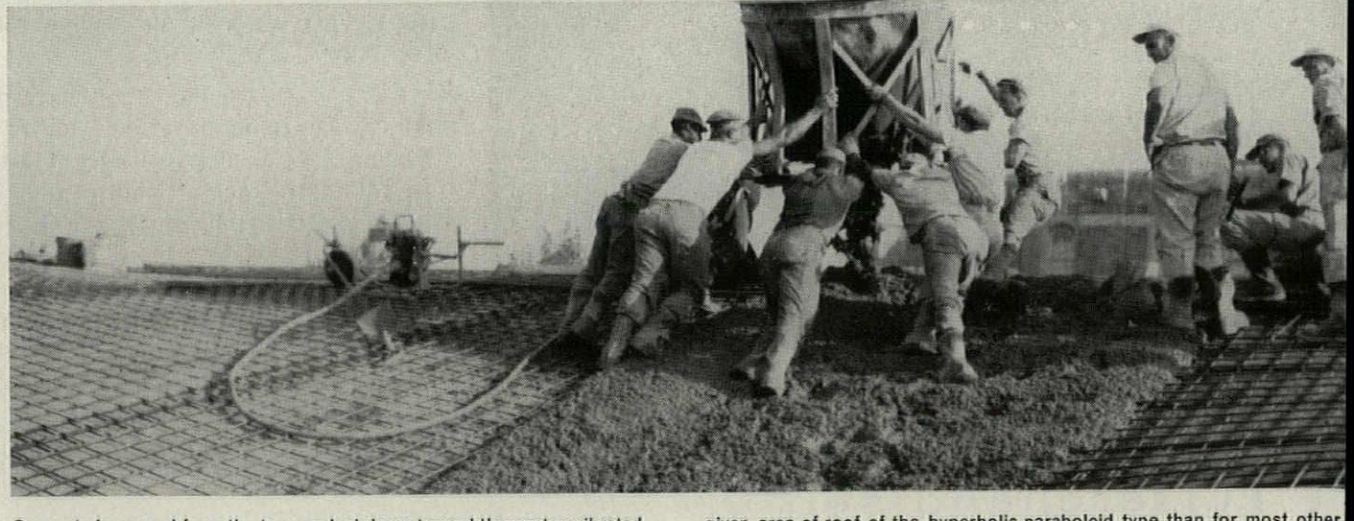
Eastern Products Corporation

SILENT CEILING

new shape  on the New York Skyline...



A 700-pound USS American Welded Wire Fabric Mat is placed on one of the six umbrellas. It is Style 6 x 6—5/0 and 5/0. The mats are lapped and tied at one-foot spacings and conform perfectly to the compound curves in spite of the large difference in elevation between opposite mat corners.



Concrete is poured from the top, worked down toward the center, vibrated and rough screeded. A 3" topping of perlite insulating concrete was poured directly on the rough surface. Less concrete is needed for any given area of roof of the hyperbolic-paraboloid type than for most other forms of construction, resulting in additional time savings.

Hyperbolic-Paraboloid Shell for Hunter College Library.

USS American Welded Wire Fabric provides important time-and-money saving in concrete reinforcement!

THIS new building, the first major use of this type of shell east of the Mississippi, consists of 6 inverted umbrellas of concrete, roofing a glass-enclosed library. To reinforce the 6 "inside-out" umbrellas, 30 tons of USS American Welded Wire Fabric mats were employed. The use of the 31′ x 10½′ mats saved 6 days in construction time. The 12 mats required for each umbrella were installed rapidly and easily by a small crew of metal lathers. After they had become familiar with the operation, the 12 mats required for one umbrella with an area of 3,600 sq. ft. were lifted from the ground and positioned on the forms in less than one hour.

USS American Welded Wire Fabric mats were selected for the job following a test conducted by Farkas & Barron to determine the mats' ability to "drape" and conform to the building's warped surface. All engineers and contractors concerned with the library are enthusiastic in their support of this selection. They report that the heavy gauge fabric sheets "fitted like a glove."

This is an excellent example of how USS American Welded Wire Fabric, a well-known and dependable building product, can be used effectively in modern types of buildings. For more information on the properties and uses of this material, write to American Steel & Wire, Room 9321, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

Shown here are three of the six umbrellas under construction. Each umbrella is supported by its central column and consists of four quadrants. The finished building will measure 120 feet by 180 feet. Each umbrella is self-supporting.

Architect:
Marcel Breuer—New York, N.Y.

Structural Engineers:
Farkas & Barron—New York, N.Y.

General Contractor:
Leon DeMatteis Construction Corp.—Elmont, N.Y.

Concrete Contractor:
Dic Concrete Corp.—Elmont, N.Y.

Fabric Distributor:
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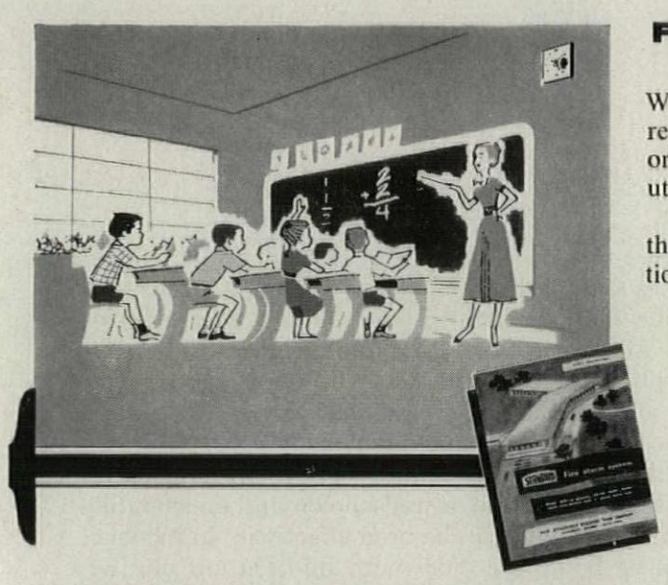

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- UL Listing on all components.

Request new 32-page Fire Alarm System Catalog. Ask for Publication No. 246.

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- UL Listings on all equipment.

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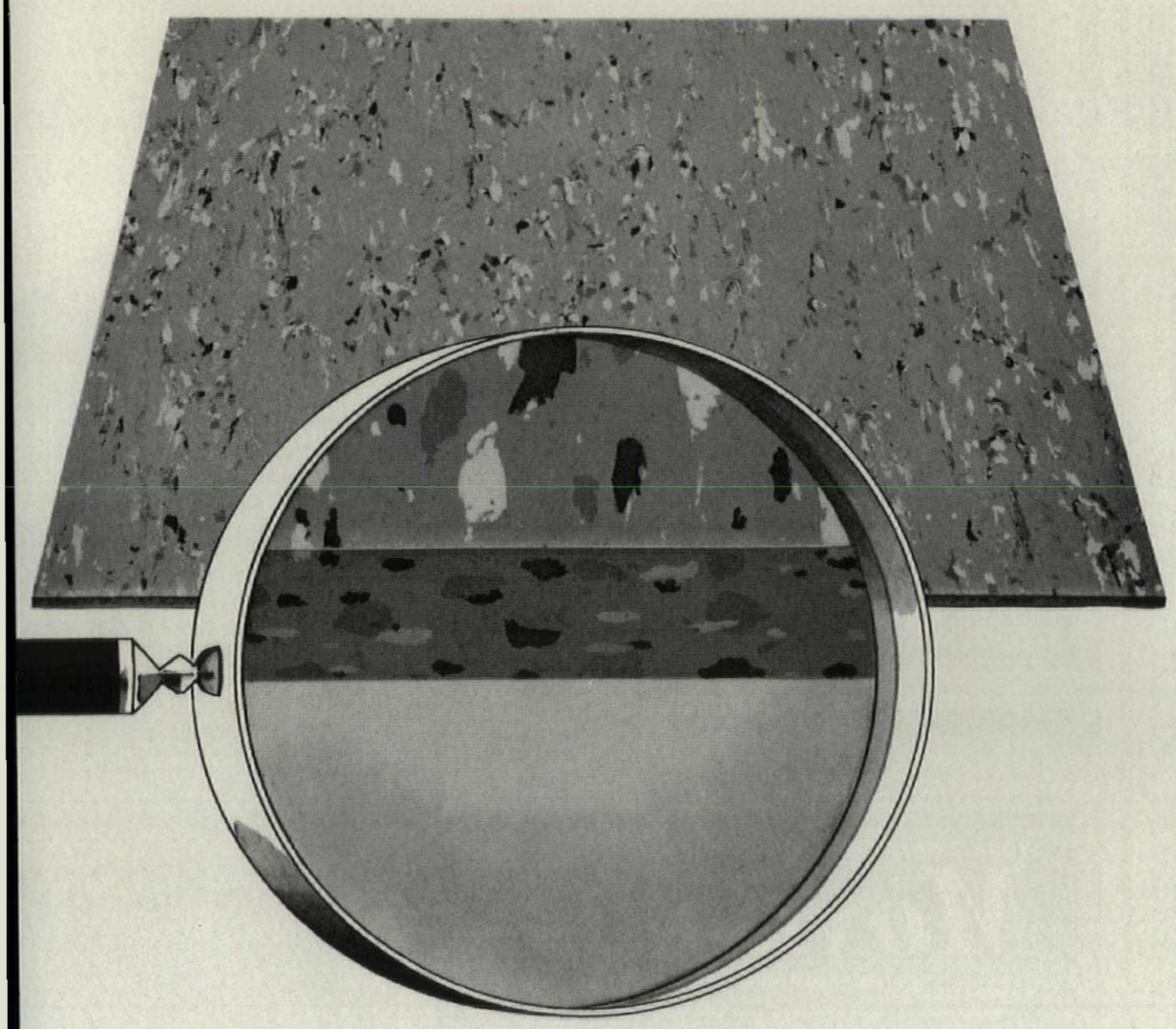
throughout the thickness of the tile--at no extra cost!



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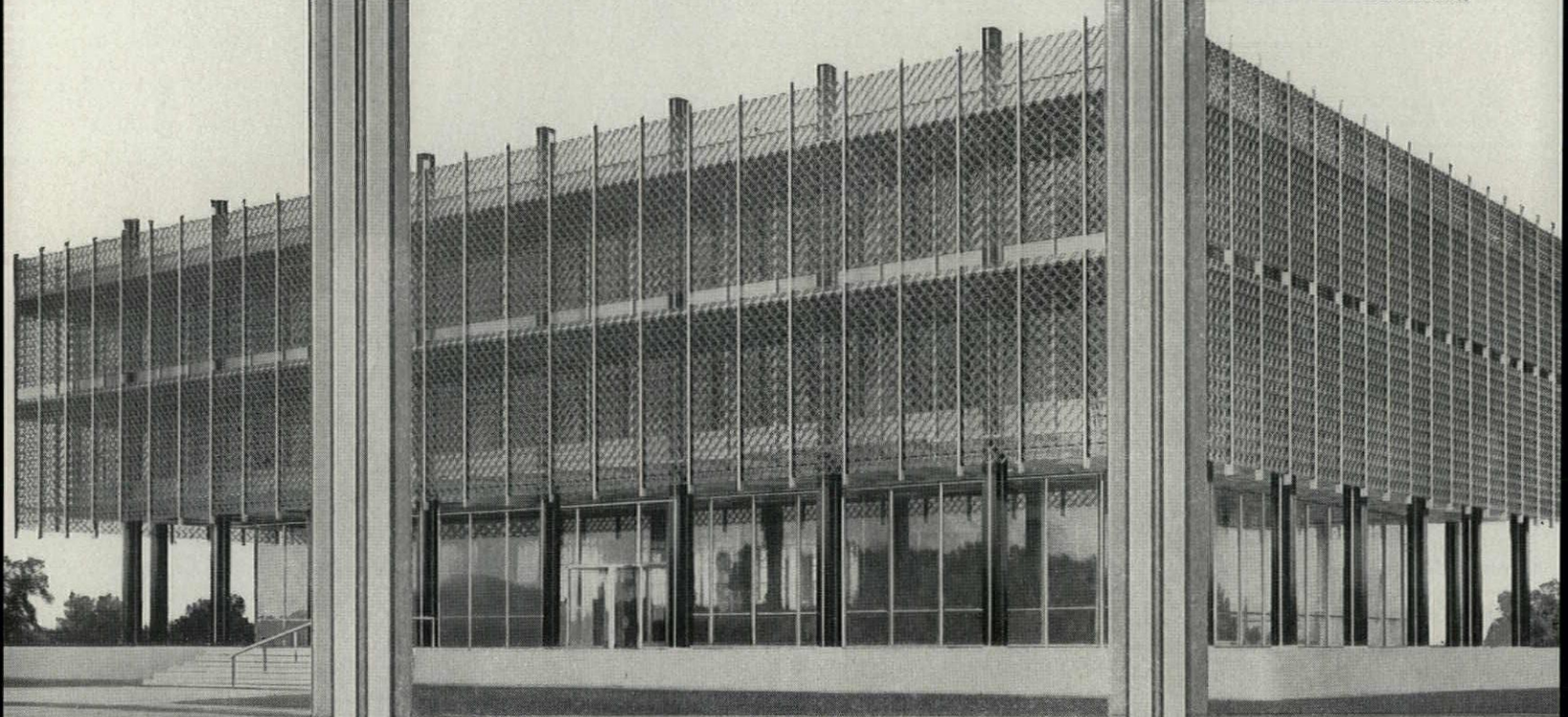
Regional Offices,
Reynolds Metals Company
Architects:
Minoru Yamasaki & Associates



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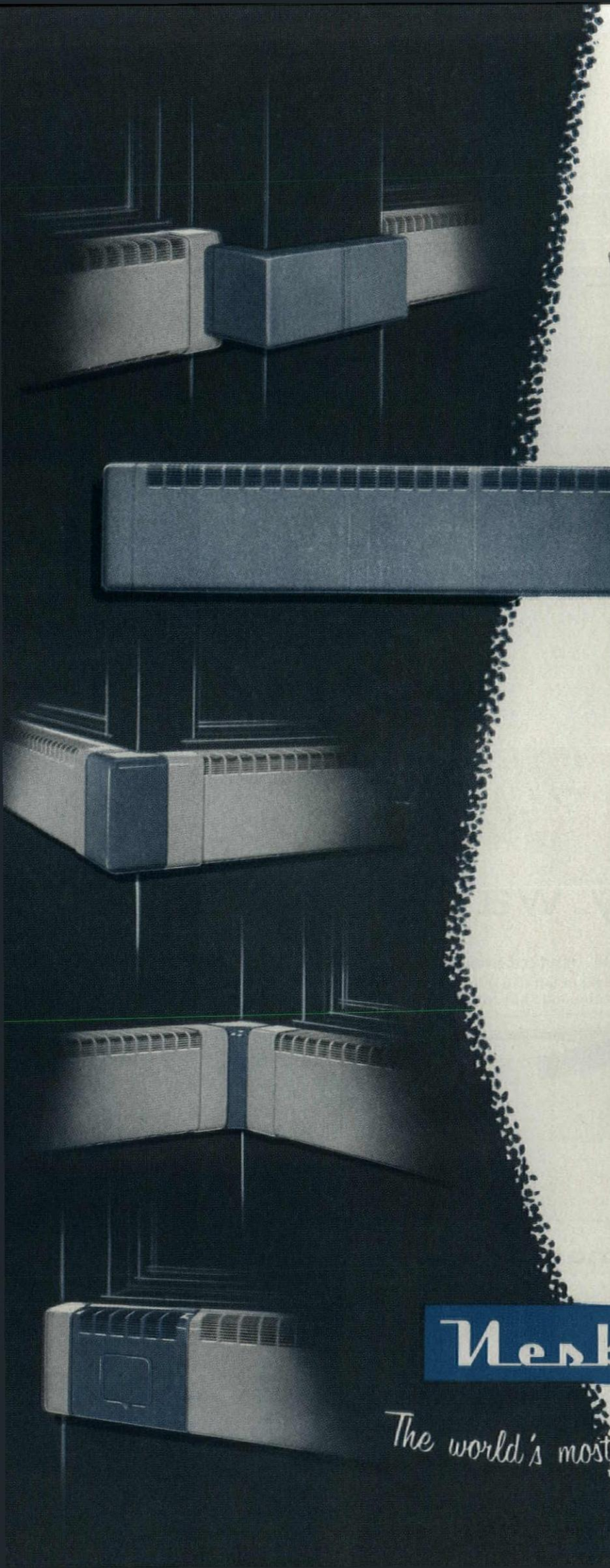

. . . to the nth degree!

Where perimeter heat is indicated, *Nesbitt Sill-line Radiation* is your prescription. The five Sill-line accessories shown here illustrate but one way this product has been designed to provide a better solution to most installation conditions. There are many others: the five enclosure styles; the six decorator colors; the one-piece back panel that permits mullion-to-mullion application on panel walls. All point up the versatility of *Nesbitt Sill-line Radiation*. For the full story, send for publication 30.

MEMBER

Sill-line Radiation is made and sold by
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Nesbitt **SILL-LINE**

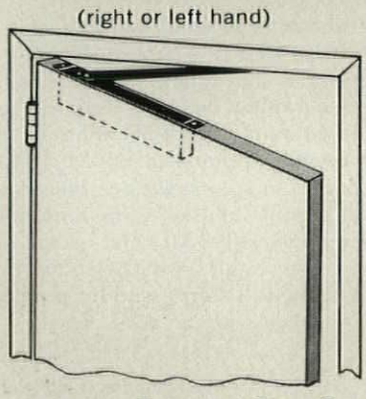
The world's most beautiful perimeter radiation

MULTI·CHECK®

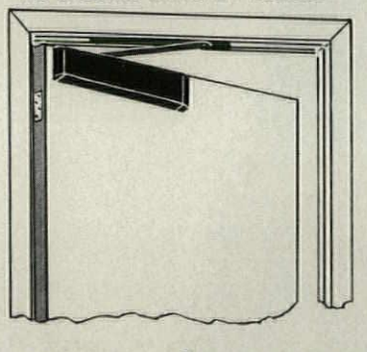
FOR INTERIOR DOORS

mounts any way you like...

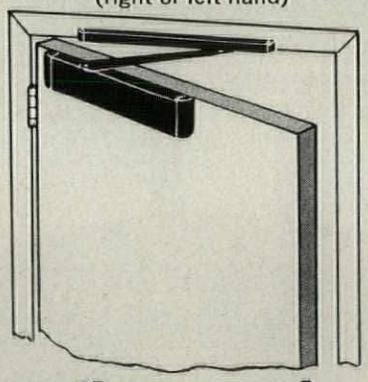
mortised in the door
(right or left hand)



push side—surface mounted
(right or left hand)
NO SPECIAL BRACKET NEEDED



pull side—surface mounted
(right or left hand)



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HOLD-OPEN quickly adjustable to any one of 7 points.

FLOATING ROLLER in arm rides freely to adjust to door sag or improper hanging.

TRAVELING SPINDLE moves with arm to relieve leverage stress on hinges and door frame.

TWO CLOSING SPEEDS independently adjustable.

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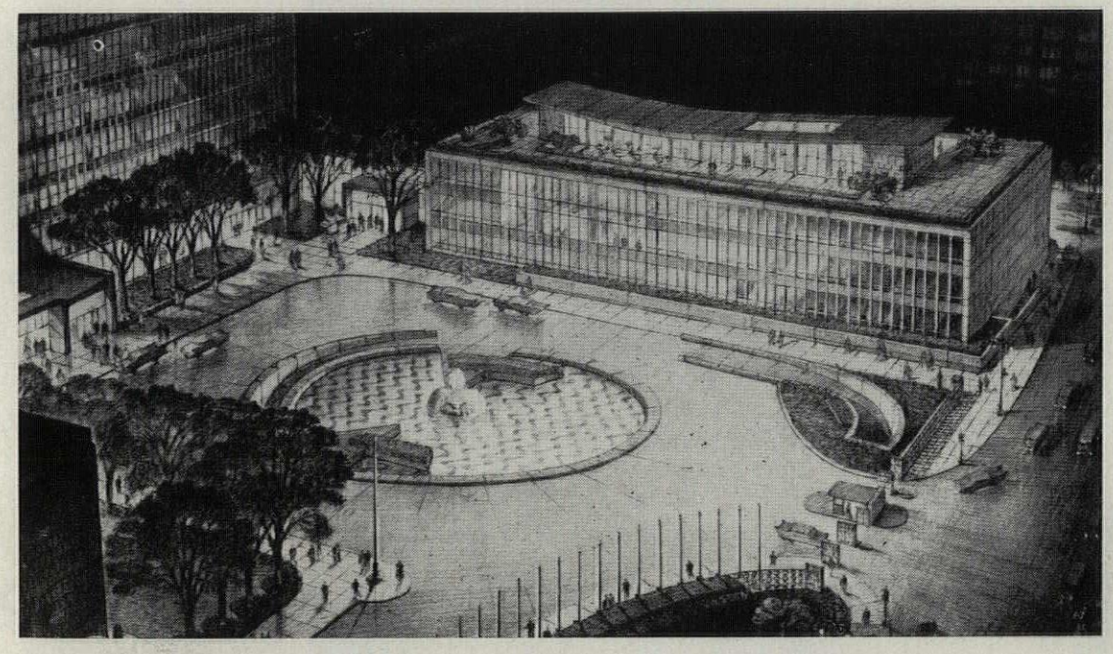
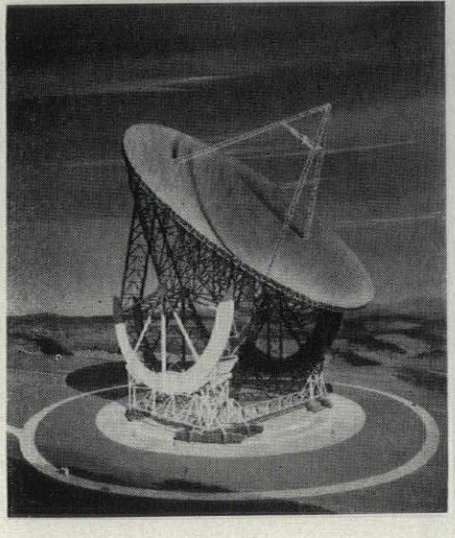
A roundup of recent and significant proposals



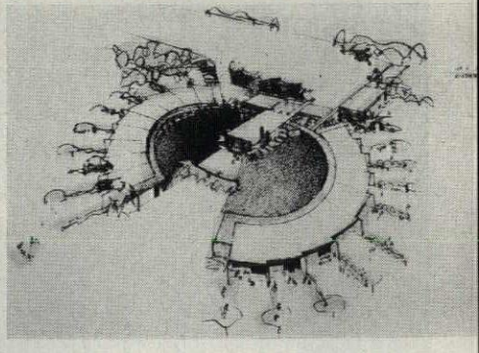
LIBRARY FOR UNITED NATIONS HEADQUARTERS

If the UN General Assembly approves, as is expected, the three-story library sketched above will replace an old public housing building at the south end of its site in Manhattan. The rendering shows the library as it will appear opposite a circular pool from the narrow end of the General Assembly building (left) and flanking the entry to the Secretariat (left, background). Finished in glass and marble, the library will accommodate 400,000 books in its three stories, three basements, and penthouse. This is twice the capacity of the present makeshift library which formerly served as the UN's first Manhattan office and was originally built as public housing. The $6.5 million cost of razing the old building and erecting and furnishing the new one will be contributed by the Ford Foundation. Architects: Harrison & Abramovitz.



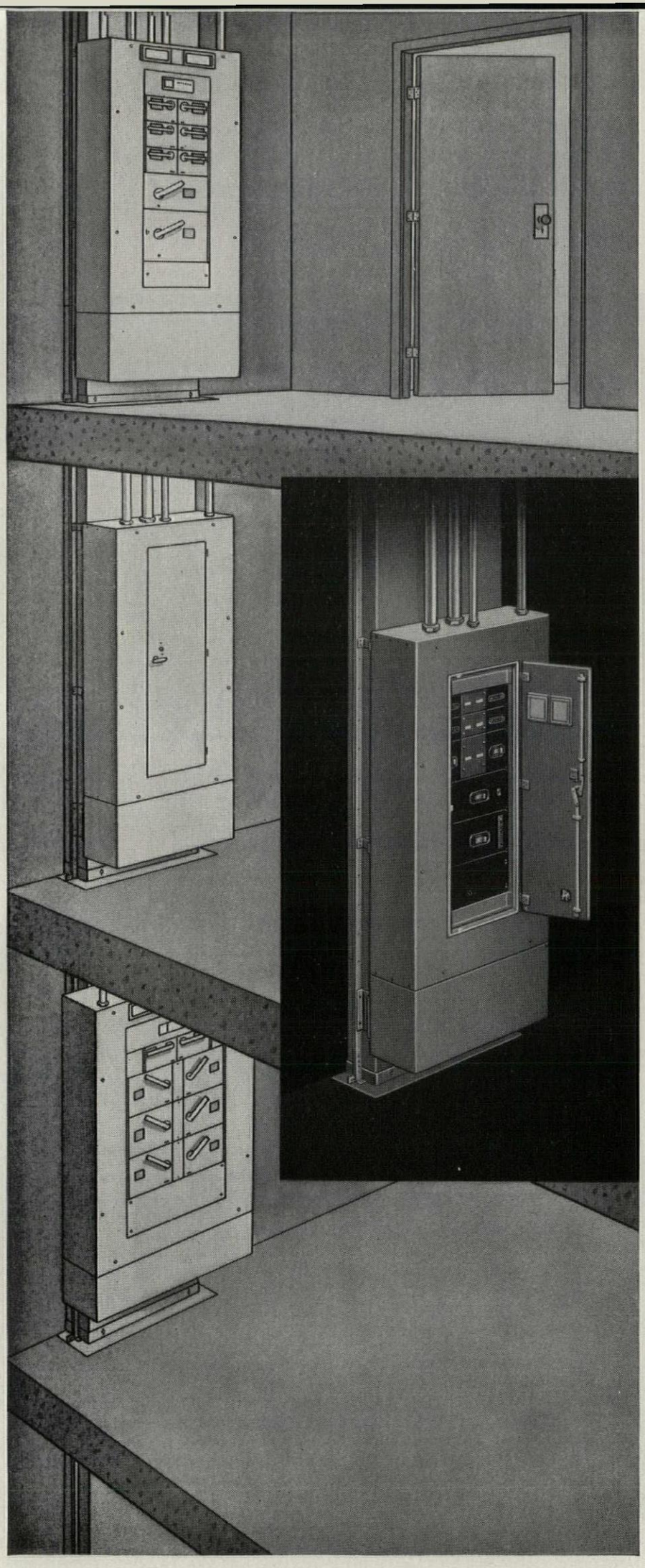
BIG DISH IN WEST VIRGINIA

One of the country's largest structures, a radio telescope 600 ft. in diameter, is being erected by the Navy on a 1,500-acre site in Sugar Grove, W.V. The 20,000 ton facility will be used for the same purpose as its famous little sister (250 ft. diameter) at Jodrell Bank, England, enabling scientists to tune in on radio signals from bodies 38 billion light years out in space. The dish-shaped receiver and projecting antenna are held in a cradle that allows rotation through 180 vertical degrees. The structure is being designed by Architects Grad, Urbahn & Seelye.



RING SCHOOL IN CALIFORNIA

Based on a design conceived by Richard Neutra in 1925, this ring of 18 classrooms and two kindergarten rooms for 705 students will soon be built at the Lemoore Naval Air Station in Central California. In addition to the wedge-shaped classrooms (each of which will have its own playground), the $700,000 building will include an administration wing, a kitchen, and a multipurpose room —all connected by covered corridors. The school's architects: Richard J. Neutra & Robert E. Alexander and Donald F. Haines. Its name: "The Richard J. Neutra School."



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RISER DUCT BY BULLDOG

Now, there's a *sure* way to get ample power as many stories high as you like — BullDog's new combination of high-performance Lo-X® duct and integral-mounted power panels.

It's a system where a low, balanced voltage-drop can be predetermined . . . where power loss is minimized . . . and where each duct section has an extra reserved current capacity inherent in its construction.

Other advantages: Power may be tapped off through the compact panels at *any joint* on the duct. Panels bolt easily to the bus bars . . . are available with I-T-E Molded Case Circuit Breakers through 800 amperes or with BullDog's famous Vacu-Break® Switching Units through 600 amperes. Provisions for current-limiting Amp-traps* are optional to protect against dangerous high short circuit currents. And most panels have space for adding future circuits when the need arises.

Choose wisely, choose the finest. Choose Integral Panel—Lo-X Riser Duct by BullDog.

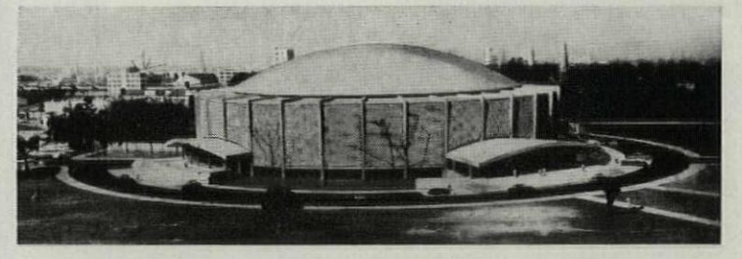
* Chase-Shawmut registered trademark

BULLDOG ELECTRIC PRODUCTS DIVISION
I-T-E CIRCUIT BREAKER COMPANY
BOX 177 • DETROIT 32, MICHIGAN

In Canada: 80 Clayson Rd., Toronto 15, Ont. Export Division: 13 East 40th St., New York 16, N.Y.

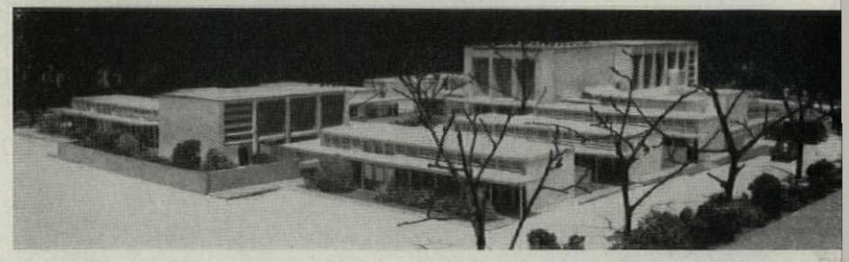
DORMS FOR WASHINGTON U.

Thanks to an uneven site, the 600 students in these two six-story dormitories at Washington University in Seattle will not have to walk more than two flights of stairs. They will enter a central one-story building (administration, recreation, and food service), cross enclosed bridges to the third floors of the flanking dormitories, then walk up or down to their rooms. Cost of the first dormitory and central building: $2.2 million. Architects: Young, Richardson & Carlson.



JACKSONVILLE COLISEUM

Now abuilding in Jacksonville, Fla., this building 300 ft. in diameter will provide 8,000 permanent seats and 4,000 temporary ones for such varied functions as boxing, hockey, concerts, trade shows, convention meetings, and the circus. The structure will consist of 32 concrete columns cantilevered in 26 ft. to carry the concrete and steel of the dome. A screen of clay masonry units will surround it. Architects: George Ryad Fisher & A. E. Celler. Cost: $2.9 million.



UNITARIAN CENTER AT AUSTIN

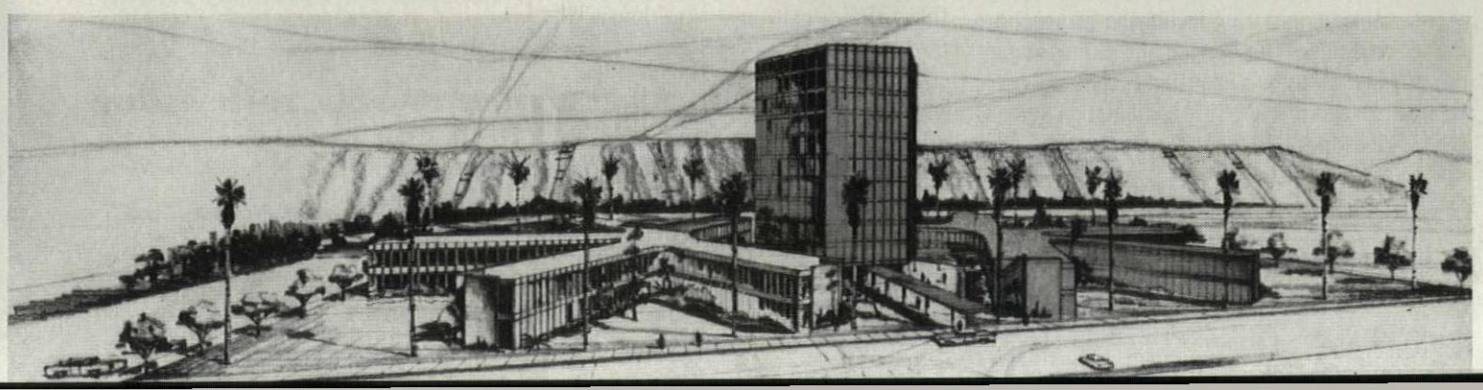
On a 3½ acre site in Austin, a Unitarian church of 130 members is planning a center that combines classical order with modern structural techniques. The eleven units of the church are grouped around a sunken court; the taller building (left in the model photo, above) is the children's chapel; in the background is the sanctuary and fellowship hall; the lower buildings are classrooms. The basic structural material is reinforced concrete. Architect: Martin S. Kermacy.

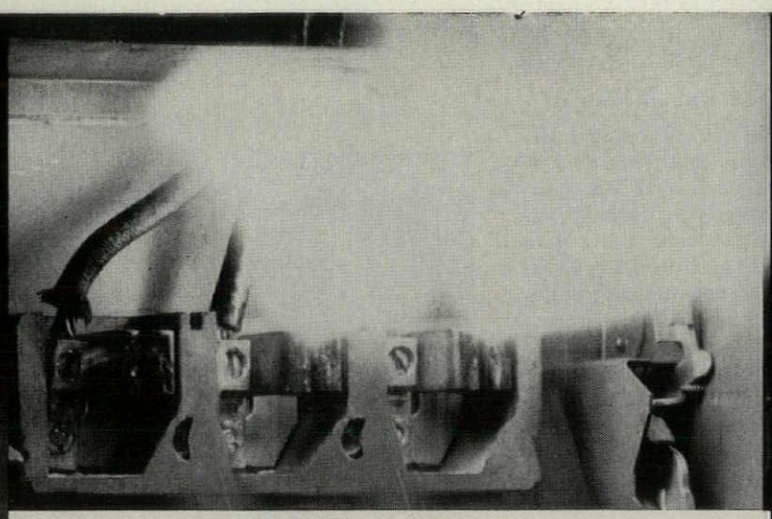
SAN DIEGO HEALTH CENTER

At the geographical center of the San Diego area, an oddly shaped complex of buildings is going up that will serve as offices and laboratories for at least 24 doctors and five dentists. As shown in the sketch below, the offices will be in the fingers of the twin, hand-shaped, two-story buildings, with a tower for the laboratories rising between. Total cost of the development is set at $4 million. Architects: Paderewski, Mitchell, Dean & Assocs.

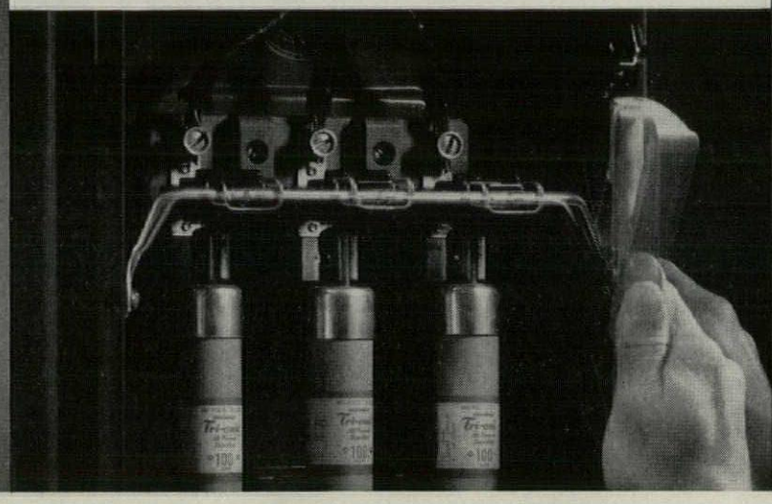
STATE OFFICES FOR INDIANA

A far cry architecturally from its old capitol, Indiana's $15 million office building will be a 13-story box sheathed in stainless steel, glass, and, as might be expected, Indiana limestone. Tunnels will connect it with the capitol, the State Library, and a parking lot. Graham, Anderson, Probst & White and Raymond S. Kastendick are the architects. When completed next year, the building will consolidate state departments now scattered in 22 buildings in Indianapolis.

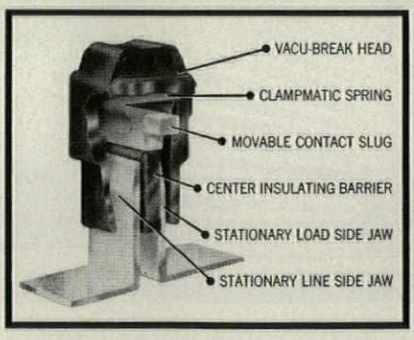




Dangerous flash explosion occurs at instant of "break" in open knifeblade switch. BullDog Vacu-Break chamber smothers arcs before they can burn and pit contacts. Both are 100-amp, 600-volt switches operating under 90-ampere, 440-volt load with 40% to 50% power factor. (These photographs were taken at instant of "break" and are unretouched.)



FOR SAFETY'S SAKE SPECIFY VACU-BREAK POWER PANELS



Close-up of Vacu-Break head shows movable contact slug inside the compact arc chamber. The Clampmatic spring assembly assures a bolt-tight contact, helps speed "break". This combination guarantees positive and safe operation, long switch life.

You switch with safety when you choose BullDog Power Panels with Vacu-Break* switch units! Exclusive Vacu-Break design houses contacts in compact arc chambers that limit the oxygen supply . . . actually starve the arc before it can explode and pit or burn contacts. Maintenance is practically eliminated.

Contacts in the Vacu-Break unit are attached directly to the operating handle for positive, safe switching every time. When the handle is in the OFF position—you know the switch is *off!* For extra safety the units have interlocking doors. The Vacu-Break unit also provides clamped-pressure switching contacts to prevent overheating. Clampmatic* design simulates a *bolted connection* when in the ON position . . . accelerates the break, too!

In recent tests, Standard BullDog switches with Amp-Traps** were subjected to 100,000-amp short circuit current. They were undamaged! You can get this extra safety and long-lasting performance by specifying BullDog Vacu-Break Power Panels.

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I-T-E CIRCUIT BREAKER COMPANY
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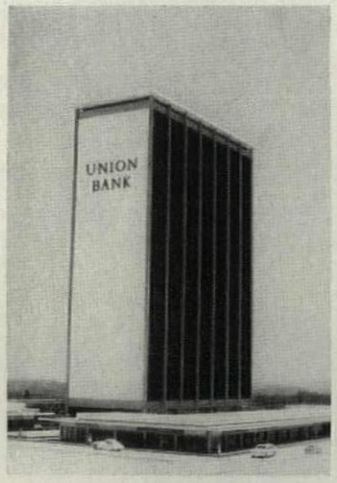
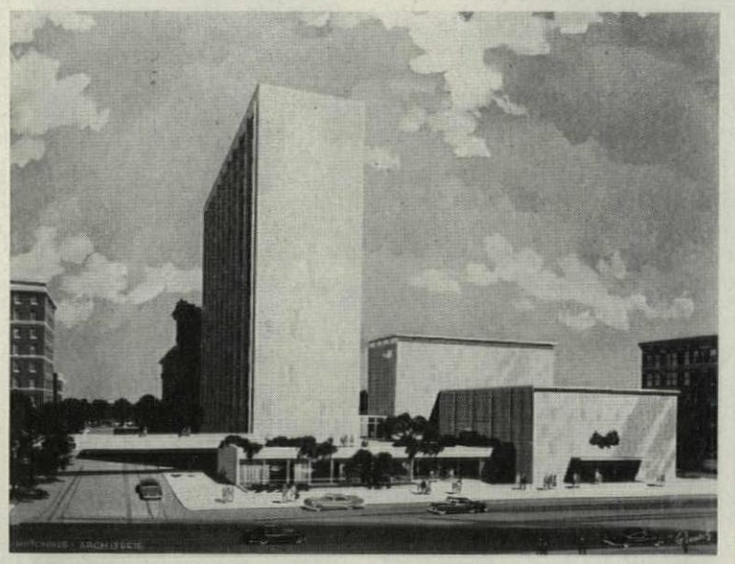
*Vacu-Break and Clampmatic are registered trademarks of the I-T-E Circuit Breaker Company. **Amp-Trap is a registered trademark of the Chase-Shawmut Company.

ORANGE COMMERCIAL CENTER

Unlike most shopping centers, which are dominated by department stores, Union Square in Orange, Calif. will be marked by a 19-story office tower of gray glass and white marble. Location of the tower in a central courtyard will force its occupants to pass some segment of the shopping area, making all shop space of uniform desirability. Parking space for 600 cars will surround the project. Architects: Ladd & Kelsey; developer: Howard B. Lawson Co. Completion date: 1961.



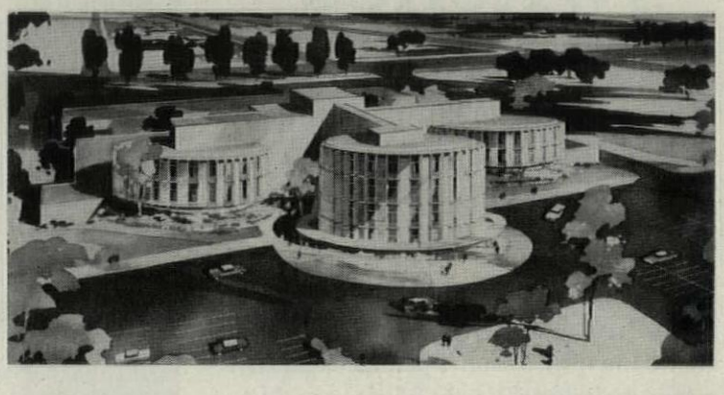


ARTS COLLEGE FOR COLUMBIA

Columbia University recently decided to bring its various arts courses together under one roof and to dignify them with the name "Graduate School of Modern Arts." Because of the variety of the facilities needed, the college's "one roof" is actually three: the two buildings at the right in the model photo (above) contain theaters for, respectviely, 600 and 299 persons; libraries, classrooms, and a "music laboratory" will be housed in the tower. Estimated total cost: $7 million. Architects: Moore & Hutchins.

NEW CIRCLE FOR VAN NUYS

The Valley Presbyterian Hospital in Van Nuys, Calif. was one of the original experiments in circular planning for hospitals (background, below). Another circular unit (foreground) is to start early next year, indicating that a ring of patient rooms around a service core is indeed easier on the nurses. The new wing will have four rather than three stories, the ground floor housing administrative facilities. Lift-slab construction will be used in the building of the addition. Architects: Charles Luckman Assocs.

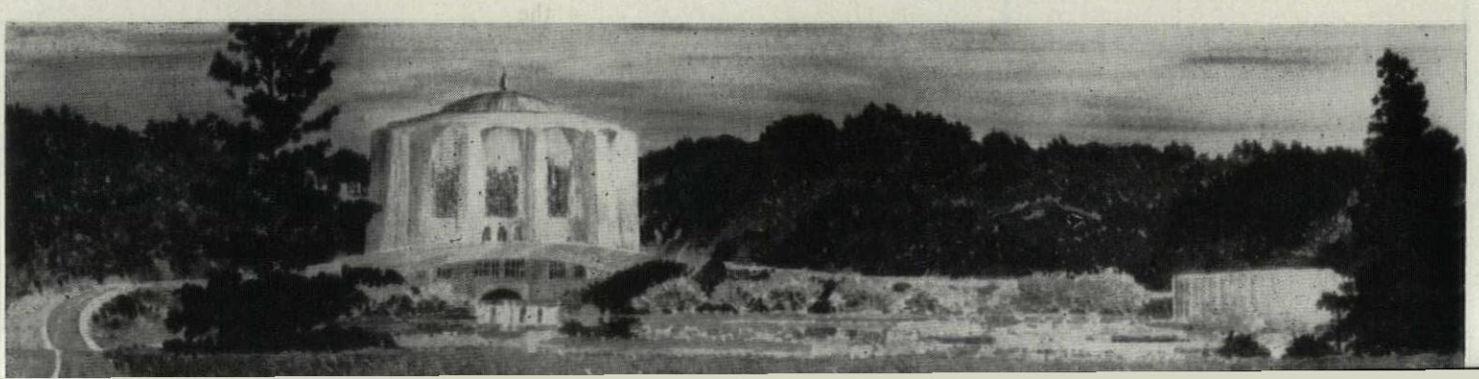


SAW-TOOTHED LIBRARY FOR THE UNIVERSITY OF NEVADA

The jagged roof of folded plate concrete over this three-story library at the University of Nevada in Reno will shelter 350,000 books and 1,400 students. It will be 5 in. thick and span 90 ft., thus freeing the interior for the flexible arrangement of book stacks and partitions. A limestone screen will form the south wall (foreground, photo below — background is a mirror image). Access to the $2.2 million building will be via an arcaded ramp. Architects: Robert E. Alexander & Assocs. and Vhay Assocs.

BRIDGED CHURCH NEAR SAN FRANCISCO

Straddling a woodland stream near Lake Merced, San Francisco's new Holy Trinity Orthodox Church will be a most unorthodox building. Arranged in a circle, the structure will consist of 12 huge reinforced concrete piers which will support a concrete ring and, in turn, a light metal dome measuring 60 ft. across and rising 80 ft. above the auditorium floor. Between the piers will be "walls" of glass. The front doors will open off a sweeping concrete arch which carries the access road across the stream to the adjacent parking area. Beneath the auditorium will be the Sunday school and, below it, the stream. Cost estimate: $650,000. Architects: Reid, Rockwell, Banwell, & Tarics of San Francisco.



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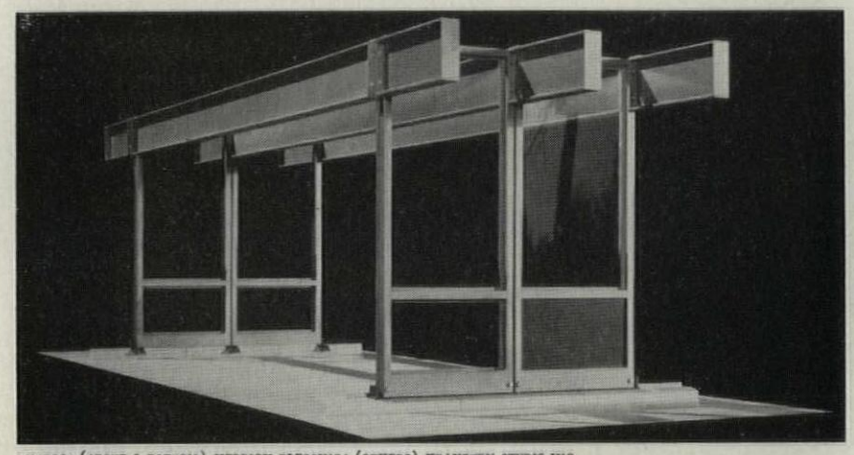
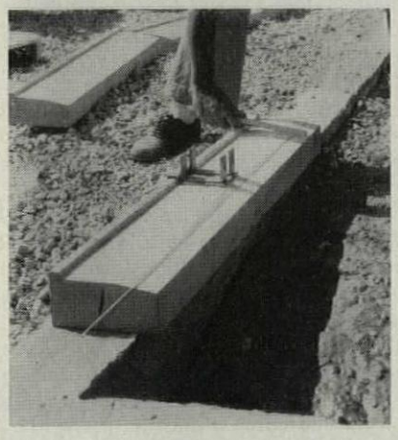
One-frame walls . . . a 1,000 ft. roof span . . . throw-away shelter . . . sidewalk scaffolding



1

PHOTOS: (ABOVE & BOTTOM) HEDRICH-BLESSING; (OTHERS) KRANZTEN STUDIO INC.



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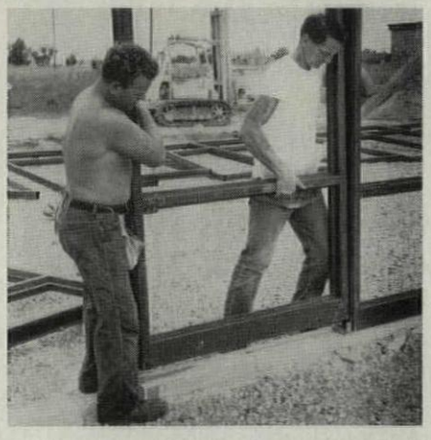


3

4

5

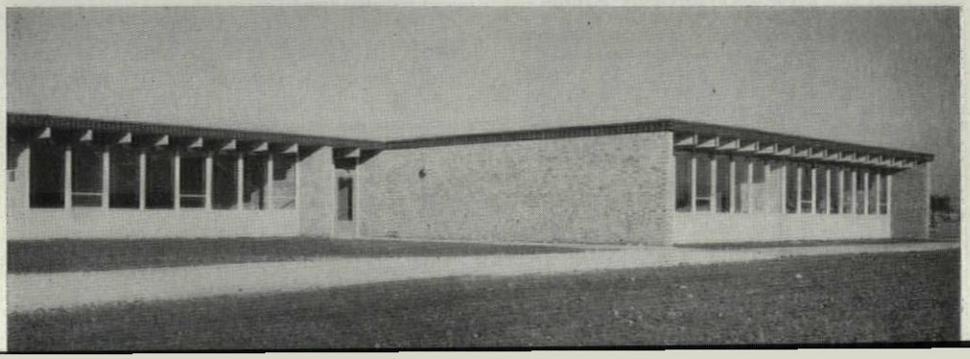
MODULAR FRAMING SYSTEM
reduces cost, components, sitework

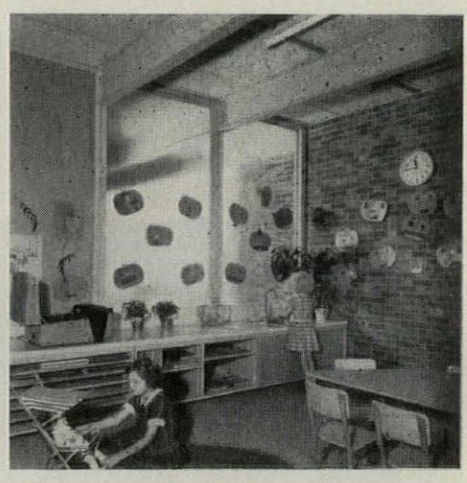
Modu-Frame, a five component framing system, was developed jointly by a school architect and a school contractor, both of whom felt the need of a simple framing system which would be at once economical (thanks to factory production) and flexible (allowing the architect great design freedom). The two collaborators are Architect Brooks Buderus of Park Ridge, Ill., and Contractor Glenn J. Chell of Chell & Anderson, Inc. Their basic unit is an exposed load-bearing structural frame 4 ft. wide by 9 ft., 6 in. high formed from 2 in. by 4 in. hollow steel sections. This basic unit is both structure and closure, eliminating separate framing for windows and doors. The complete system consists of the framing unit, a stone sill, an anchor plate, a 4 in. by 12 in. steel beam, and an optional overhang beam. Once the components are on the site and the sill has been laid, a three-man ironworker-carpenter crew can frame a building using only three tools: an automatic screwdriver, a crescent wrench, and a rubber mallet.

An inexperienced crew, during a time study, set 14 frames an hour at a direct labor cost of $14, or $1 a frame. Total site labor cost, including unloading and laying out frames, came to about $3 a frame. The same crew, supplemented by a high fork-lift truck, required only three to five days to frame the walls and roof for an eight-classroom school.

The photographs above show the five components and how they go together. First, a scale model of the whole system (1), showing the basic module, with a 32 ft. span and 4 ft. overhang. Plate glass and opaque panels are set in the frames with a glazing compound or curtain-wall sealant. The leveler for the system is the stone sill (2), cut and set by local masons, which serves as a water barrier and screed for the concrete floor. On top of the sill goes the third component, an anchor plate, to hold the wall frames. (Once the concrete is poured, the plate is embedded in the slab.) Then ironworkers set the framing units on the sill (3) and put the beams in place (4). The beams

continued on page 54





HEDRICH-BLESSING

6

rest on the alignment flanges until predrilled end plates are bolted to the columns.

The end product looks like the Edward I. Schafer School in Villa Park, Ill. (5 and 6), a prototype school of eight classrooms. Even though this was not a minimum-budget school, the negotiated contract for eight classrooms was $11.70 per sq. ft., including everything but the landscaping.

Recent bids in the Chicago area indicate savings of 3 per cent in a complete school, and about 25 per cent in the comparable roof and wall structure alone. In September, for example, a school architect found that a contractor offered a 2.9 per cent deduction on the total contract if Modu-Frame were used, and 24 per cent on actual structural costs. Chell and Buderus predict greater cost shavings when architects and general contractors show their subcontractors how to minimize on-the-job cutting and fitting.

The Modu-Frame system is adaptable to other one-story buildings such as offices, motels, and apartments.

Manufacturer: Functional Structures, Inc., 478 Northwest Hwy., Des Plaines, Ill.

ROOF, CEILING STRUCTURE
spans up to 1,000 ft. in one unit

The latest invention of Walter Behlen, a self-taught Nebraska engineer who has been called "The corn-belt Edison," is a lightweight structural system which incorporates roof and ceiling finish as working members.

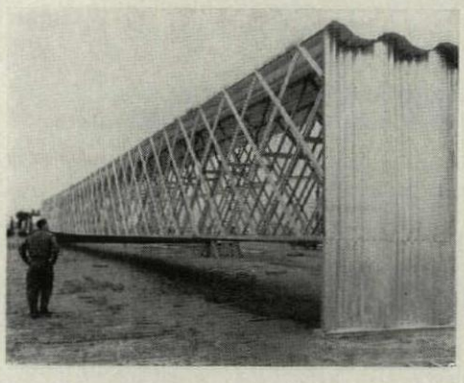
Behlen's 10 ft. deep roof system consists of vertical webs of U-shaped steel struts and horizontal corrugated steel panels top and bottom. The webs occur at 41 in. intervals, at the panel joints. The system can be used to span distances as great as 300 ft. with a flat roof or up to 1,000 with an arched roof.

Wide-span structures are made of 14 to 20 gauge metal and weigh 11.35 pounds per sq. ft. of roof area. Shorter structures—up to 40 ft. long—are made of 18 to 20 gauge metal and weigh 5 pounds per sq. ft. These weights are said to be

about the same as for ordinary steel trusses of the same span without roof and ceiling construction. As a result Behlen claims a saving of at least 25 per cent in weight and labor cost for his roof system for the longer spans.

Joints between the galvanized roof panels are sealed against the weather with a rubber compound. If desired, paint may be applied to the roof, and insulation may be either sprayed on the underside of the ceiling panels or inserted above them during construction of the roof system.

The photo (below) shows a roof section built for test purposes. It is three panels wide and spans 200 ft. between corrugated metal wall panels.



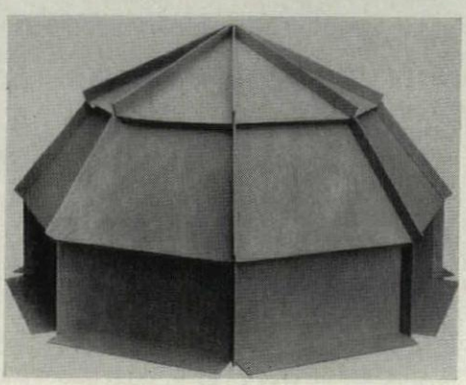
A manufacturer of various kinds of frameless corrugated metal buildings, Behlen designed his new roof system for use in conjunction with walls of brick, concrete, structural steel, or his own metal panels. The Behlen roof is shipped knocked down for assembly with bolts on the site.

Manufacturer: Metal Buildings Div., Behlen Manufacturing Co., Columbus, Neb.

DISPOSABLE CARDBOARD BUILDING
shelters materials, soldiers, campers

Looking more like a dollhouse than a U. S. Army hut in the Arctic, the structure below is a disposable shelter made of vinyl-coated cardboard. The Specialty Division of the Container Corp. designed it for the Army's Quartermaster Corps as a cheap and disposable dormitory for ten men. It measures 8 ft. high and 12 ft.

continued on page 56



MUSEUM OF MODERN ART

in diameter. As military shelter, the cardboard "container" was found to be better than a tent, which freezes and rips, and it costs only 10 per cent as much. For air drops, the shelter is packed flat in three packages—top, middle, and bottom, eight pieces to a package—assembled on the site, and stapled together. The same "box" has also been used as a disaster shelter.

Now looking for a wider market, the company will produce the shelter in other sizes but only in quantity orders. Possible uses: serviceable shelters for construction sites and temporary fishing and hunting quarters. The cost has run from $30 to $40 each but would be less in large quantities.

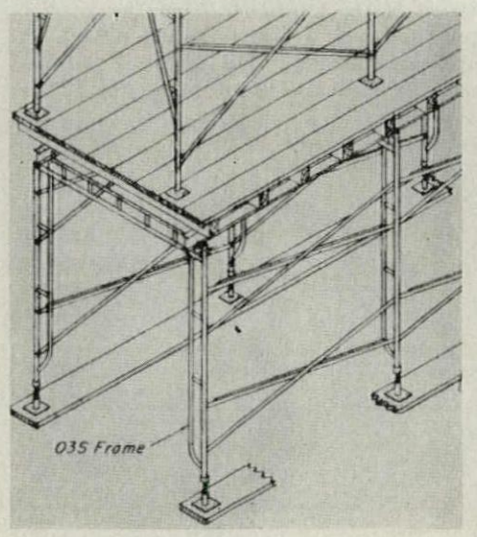
Manufacturer: Container Corp. of America, 38 S. Dearborn, Chicago.

SIDEWALK CANOPY FRAMES
adjust to slope, support scaffolding

Buildings being cleaned or face-lifted can look presentable and protect pedestrians at the same time. To serve both purposes, the Patent Scaffolding Co. offers a series of steel scaffolding frames 6 ft. wide and 7 ft., 6 in. tall. Depending on what kind of work is going on overhead, the frames can be set up in several ways. Where heavy-duty protection is not needed, the basic unit alone is used. It costs about $120 per 7 ft. bay, including frames, braces, legs, leg plates, and one layer of planking, but excluding erection labor. Adjustable legs rest on wood sills or directly on the sidewalk, conforming to its slope.

The drawing below shows a frame modified to carry heavy-duty scaffolding. Its load rating of 300 pounds per sq. ft. is achieved by the use of double bracing, 6 in. or 7 in. steel I-beams as headers, double planking, and parapets. In addition to selling the frames, the company rents them.

Manufacturer: Patent Scaffolding Co., Inc., 38-21 Twelfth St., Long Island City 1, N. Y.



PHOTOGRAPHIC SURVEYING
records building's piping, wiring

Photo Perspective is a system for making a record of the piping and wiring in a new building before they are buried in concrete. Thus the architect, builder, or owner will have an accurate location record, in photographs, if he should want to remodel.

The system works like this: Photo Perspective acts as purchasing agent in buying a camera, at factory list price, and then attaches to it a surveyor's level. A master grid is made for each camera, lens, and level combination and then the camera and level are sent to the buyer. The buyer photographs the sections of construction he wants to record (in 20 ft. by 20 ft., or 20 ft. by 40 ft. sections) prior to concrete pouring, using marked columns and a slate to identify the bays.

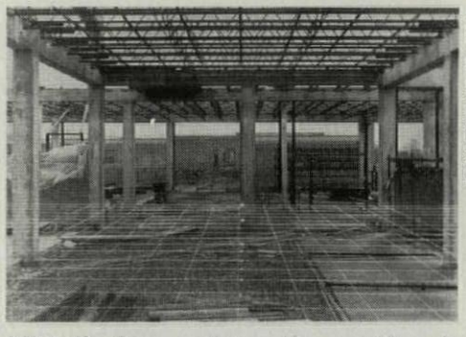


PHOTO PERSPECTIVE CORP.

After the buyer returns the negatives to Photo Perspective, the firm makes up 11 by 14 prints, including the superimposed grid (above), which are sent back to the buyer for his permanent records.

Photo Perspective recommends for its system either a 4 by 5 Pacemaker Speed Graphic or Crown Graphic, ranging from $238 to $370. Each 11 by 14 print costs $3.50.

Manufacturer: Photo Perspective Corp., 6645 Devonshire, St. Louis 9.

"TALIESIN RED" PAINT,
created for Wright, goes to market

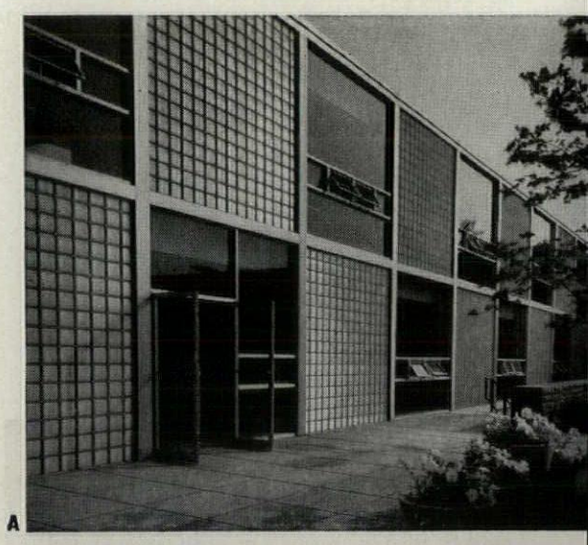
A rich red paint, especially created for the late Frank Lloyd Wright, was put on the market recently by Martin-Senour Co. The new shade, *"Taliesin Red,"* is the only exterior paint color at Taliesin and was approved by Wright shortly before his death. It was first used on Forest House, a remodeled student residence at Taliesin, last fall. Price: about $5 a gallon.

Manufacturer: Martin-Senour Co., 2500 S. Senour Ave., Chicago.

ERRATUM

Contrary to a statement made in this department of the September FORUM, *the U.S. distributor for the* Addfeet Junior *calculator is Alexander Drafting Equipment Co., 640 North Chester Ave., Pasadena, Calif.*

END



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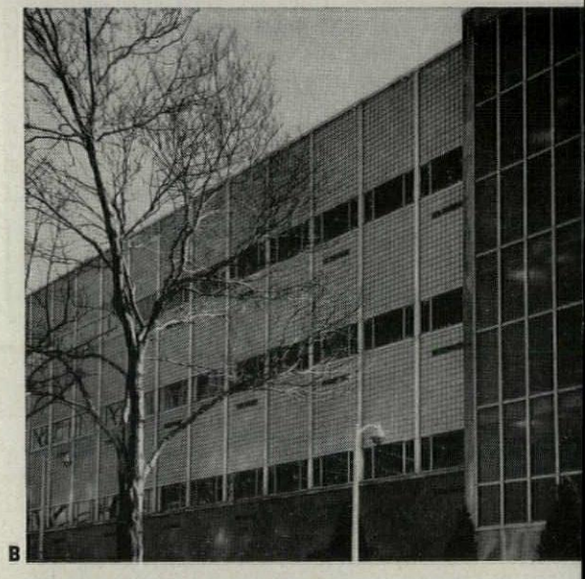


B

A product line that stimulates design authority in curtain wall concepts

PC GLASS BLOCKS: artful blend ofcolor, form and function matched to the curtain wall concept. A glance at these varied designs will show you how Pittsburgh Corning has transformed glass blocks into a versatile new medium of curtain wall design.

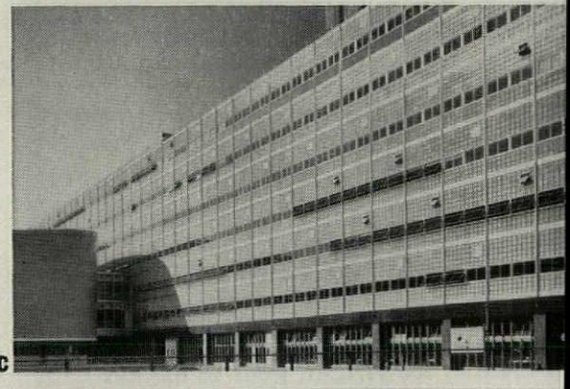
Consider color. PC developed 12 brilliant ceramic face hues to create sparkling color accents for glass block curtain walls.

And form. There's a new size and shape to PC Glass Blocks . . . the 4 x 12. Blended with standard square blocks, the 4 x 12—plain or colored—presents broad possibilities for form and pattern variation on the face of a curtain wall.

Texture, too. PC Glass Blocks provide a full range of surface patterns and textures to enhance design.

Add all this to reasonable initial cost, single trade installation and low maintenance, low surface condensation and good insulation value, privacy and protection with a better use of daylight. The sum total is a new range of curtain wall designs . . . flowing from the color, form and function blended in a growing line of PC Glass Blocks.

Write for our bulletin on PC Glass Blocks for Curtain Walls. Address: Pittsburgh Corning Corporation, Department E-109, One Gateway Center, Pittsburgh 22, Pa. In Canada: 3333 Cavendish Blvd., Montreal, Quebec.



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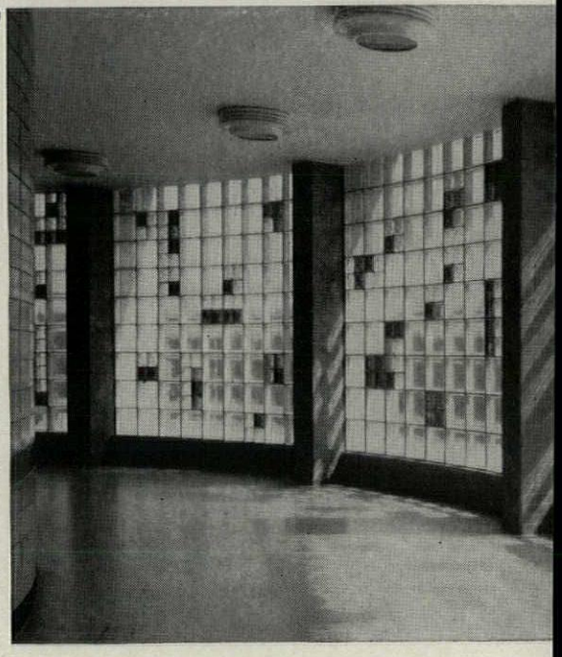


D

A—John J. Kane Memorial Hospital, Pittsburgh, Pa.
Architects: Mitchell & Ritchey—Button & McLean, Pittsburgh

B—City College of New York Library, New York City, New York
Architects: Lorimer & Rose, New York

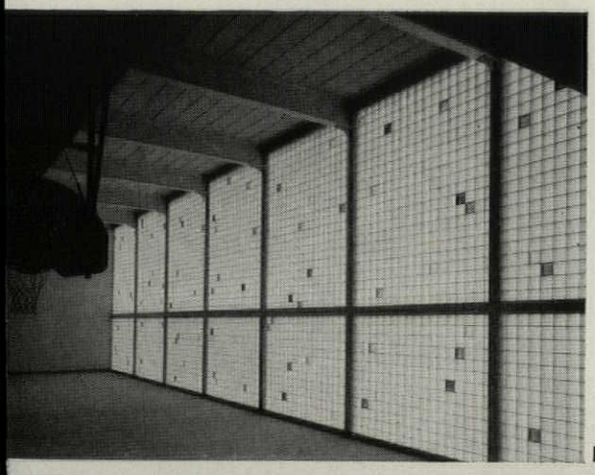
C—New York School of Printing, New York City, New York
Architects: Kelly & Gruzen, New York City

D—Springdale Junior-Senior High School, Springdale, Pa.
Architects: John A. Desmone, A.I.A., Springdale, Pa.
Wesley J. Henger, A.I.A., Pittsburgh, Pa.

E—Sacred Heart Seminary, Delaware, Ontario
Architects: Blackwell & Hagarty, London, Ontario

F—Development Workshop Building, Corning Glass Works, Corning, New York
Architects: Harrison & Abramovitz, New York

G—Highland Park High School, Highland Park, Illinois
Architects: Loebl, Schlossman & Bennett, Chicago



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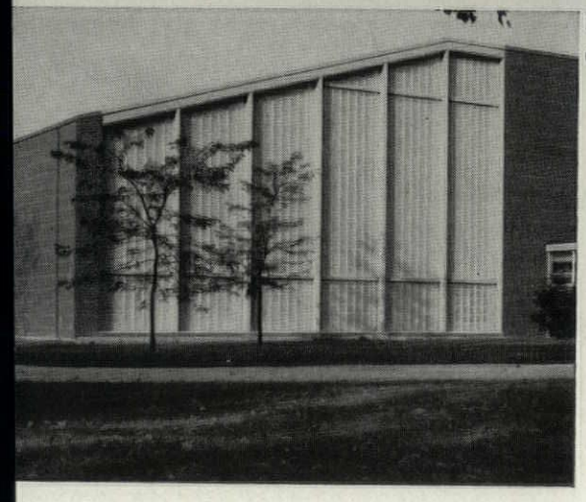
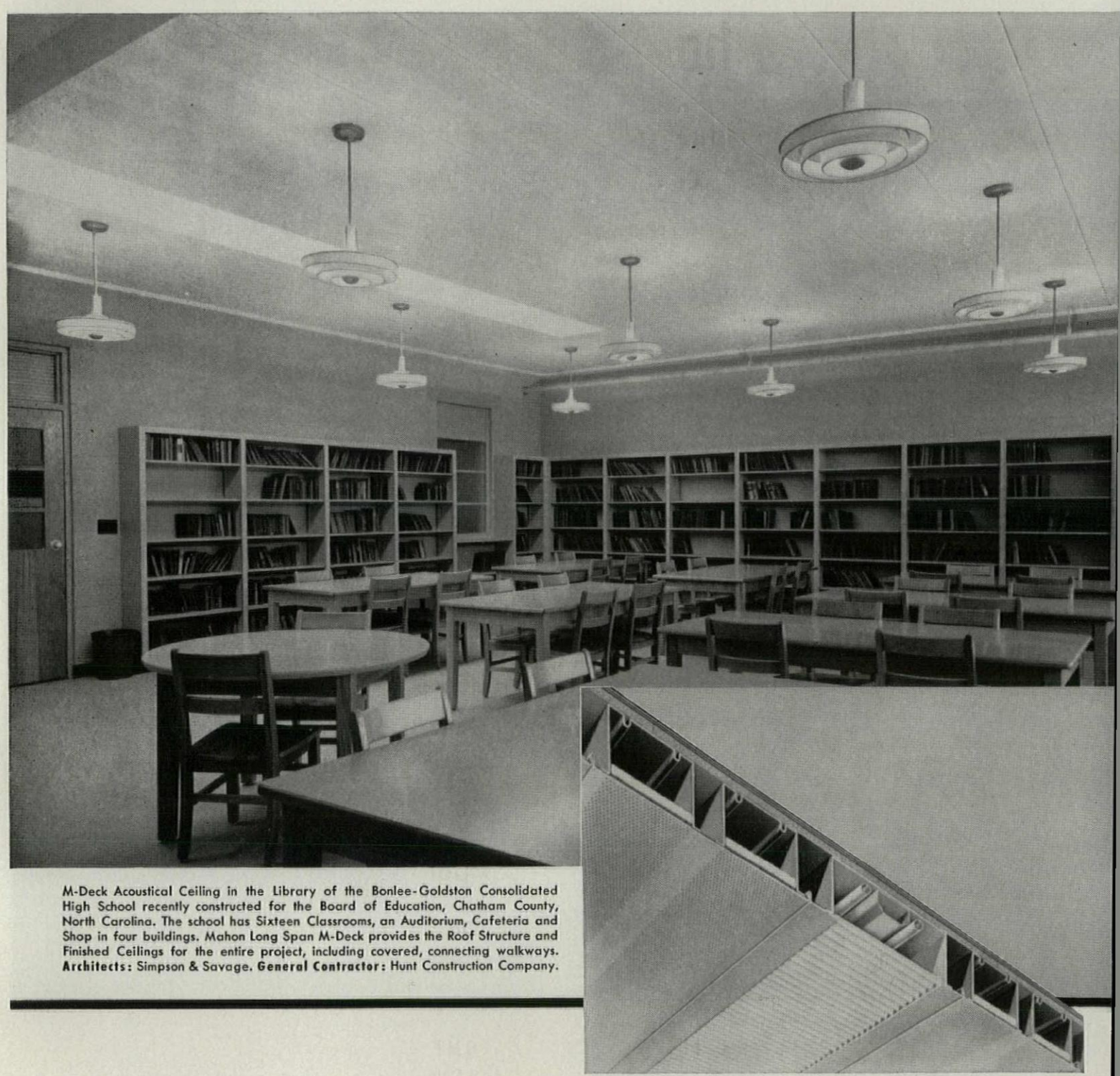


F
G

PITTSBURGH CORNING

M-DECK Provides Roof Structure



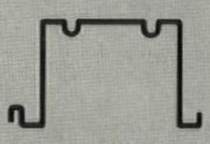
M-Deck Acoustical Ceiling in the Library of the Bonlee-Goldston Consolidated High School recently constructed for the Board of Education, Chatham County, North Carolina. The school has Sixteen Classrooms, an Auditorium, Cafeteria and Shop in four buildings. Mahon Long Span M-Deck provides the Roof Structure and Finished Ceilings for the entire project, including covered, connecting walkways. **Architects:** Simpson & Savage. **General Contractor:** Hunt Construction Company.

Serving the Construction Industry Through Fabrication of Structural Steel, Steel Plate Components, and Building Products

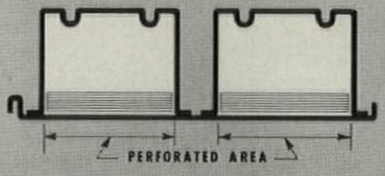
and Finished Ceiling Combined . . . Reduces School Cost to a Minimum!

Enough Money Was Saved on the Original Estimate to Completely Furnish a 19-Room High School

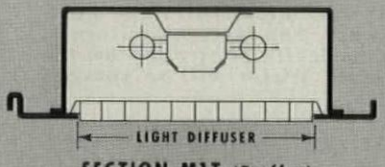
MAHON
Long Span
M-DECK SECTIONS



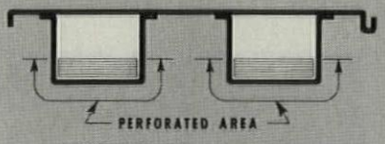
SECTION M1-OB
OPEN BEAM DEPTH 3", 4½", 6" or 7½"



SECTION M2SR (Acoustical)
CEL-BEAM DEPTH 1½", 3", 4½", 6 or 7½"



SECTION M1T (Troffer)
DEPTH 6" or 7½"



SECTION M2 (Acoustical)
CEL-BEAM DEPTH 1½", 3", 4½", 6 or 7½"

At Left: Cross Section of Long Span M-Deck Combined Roof-Ceiling with Troffer Lighting.

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- Insulated Metal Curtain Walls
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MAHON

Automatic sprinklers (see arrows) blend with the modern decor of Hillsdale High School, San Mateo, California. Any starting fire will be automatically controlled by the sprinkler poised above the blaze. Water will be sprayed only where fire exists.

Pupils study in safety from fire

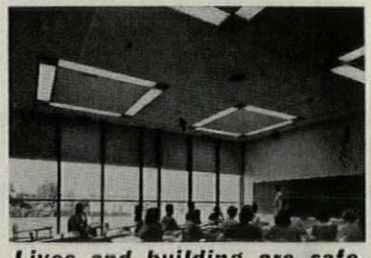
CONSTRUCTION ECONOMY AND FLEXIBILITY KEYNOTED

Fire safety, construction economy and flexibility were primary design considerations in the construction of Hillsdale High School in San Mateo, California. A complete automatic sprinkler system providing maximum fire protection was installed to decrease construction cost by eliminating the need for insulating steel members and installing fixed fire walls.

To anticipate school program changes which would require alteration in room size, movable interior walls were used. The result was a highly flexible and adaptable modern school. Architects John Lyon Reid & Partners received two awards from the American Institute of Architects.

The parents of the 1,750 pupils are assured of their children's safety in the event of fire. The taxpayers' $3.5 million *investment is secure, and the school's continuity of operation is assured.*

Your School . . .
Whether it is old or new, or just an image in an architect's mind; whether its construction is combustible or "fire resistive", it is within your power to make it indestructible from fire.



Lives and building are safe.

Remember, there is no "fireproof" building. Sufficient heat from burning contents in the most fire resistive building can cause irreparable damage.

Only a completely sprinklered school assures life safety, *saves construction and operation dollars;* and insures against inflated replacement building cost.

For particulars, write to the:

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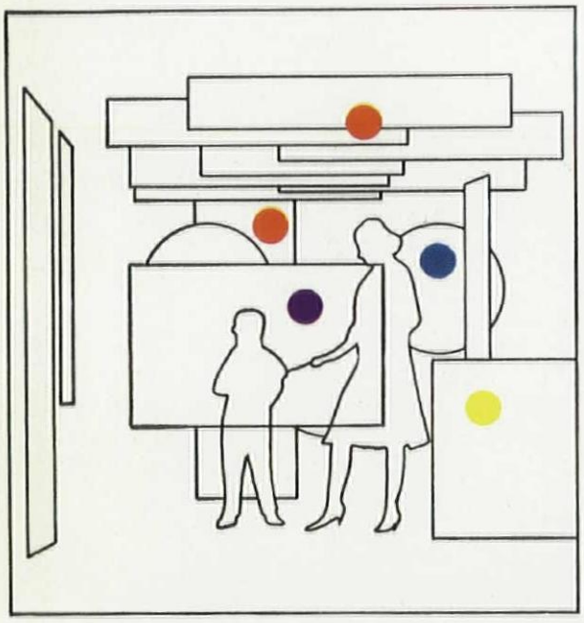

FOUR SAMPLES . . . FROM A VAST CATALOG OF ARCHITECTURAL IDEAS IN GLASS . . . are shown above and on the reverse, to suggest that you think of *American-Saint Gobain* when you think of glass. All the types and characteristics listed below . . . and combinations thereof . . . in the widest range of sizes and thicknesses . . . are available from this one source.

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COLORS: integral tints; fused ceramic coatings.

For detailed information, see the following Sweet's files: *Architectural*: 7a/AMR . . . 7a/Li . . . 3c/BL . . . 16d/BL. *Industrial Construction*: 3f/Li. *Light Construction*: 2d/AMR . . . 1f/Li. *Plant Engineering*: 5b/BL.

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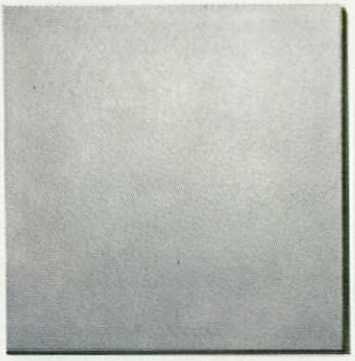

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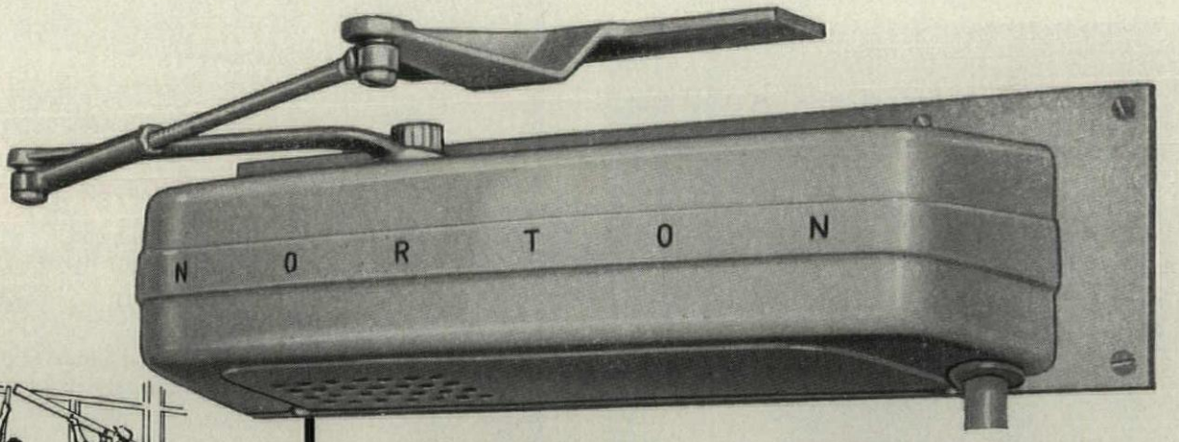

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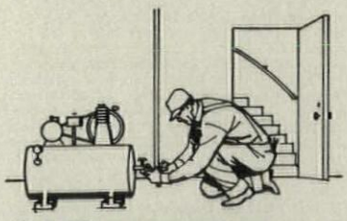

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Business Manager

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[SEAL]

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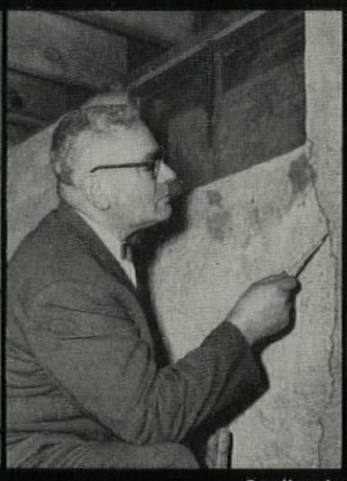

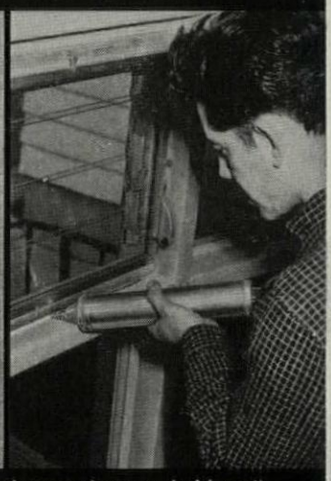

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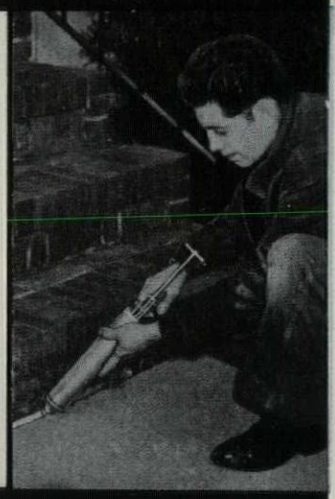

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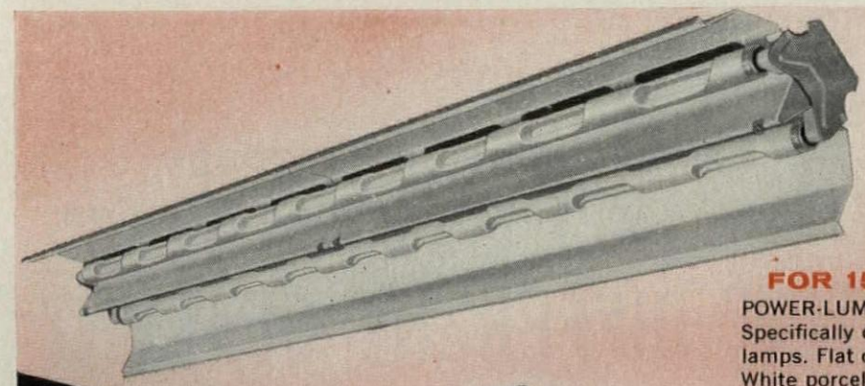

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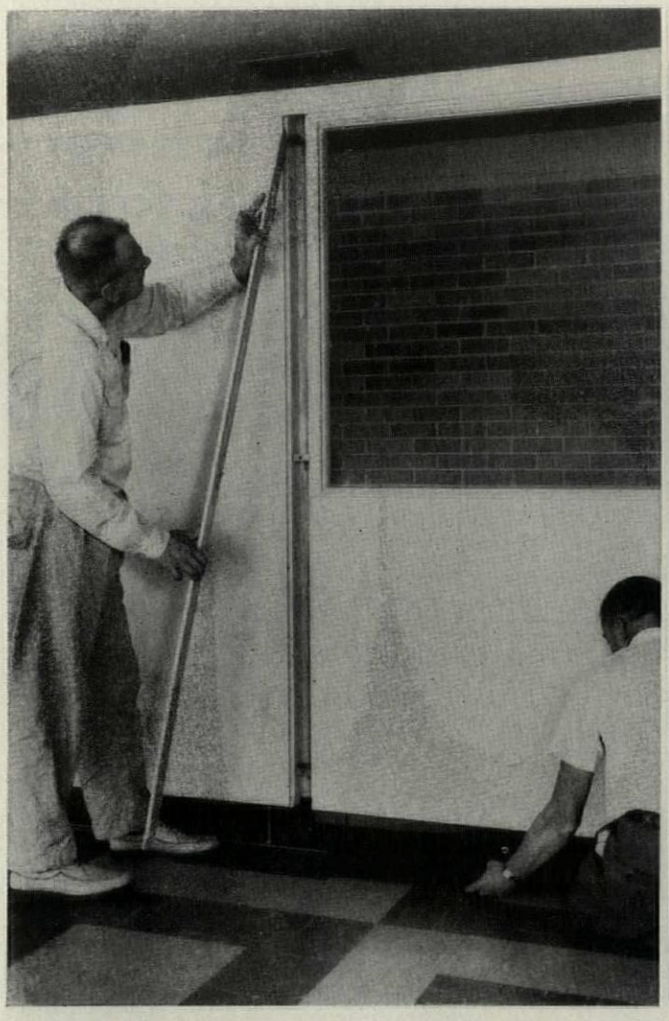

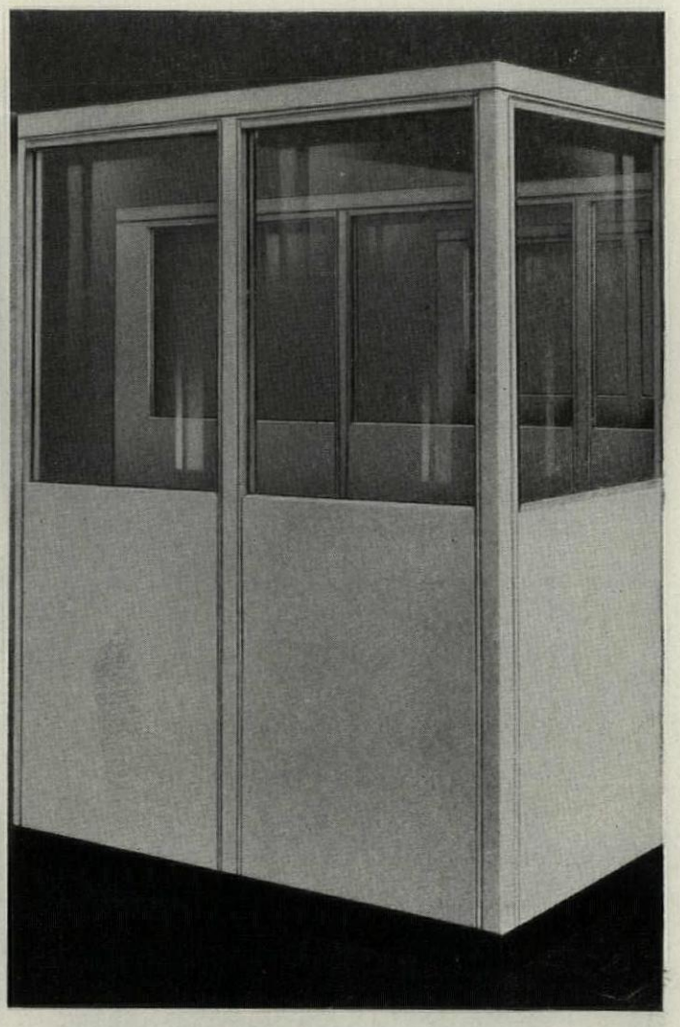

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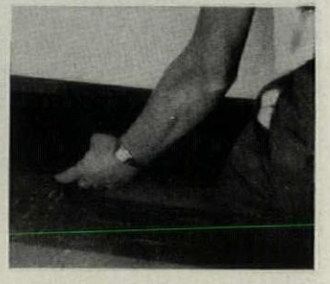

Panel height adjusters plus floating removable base compensate for uneven floors. Eliminate scribing at floor line.

The four illustrations above show the ease, speed and flexibility of GR Richland Wood Movable Wall installations. For GR Metal walls the application technique differs slightly but the end result . . . fast, reliable set-up or ease in dismantling to allow for office rearrangement . . . . is equally effective.

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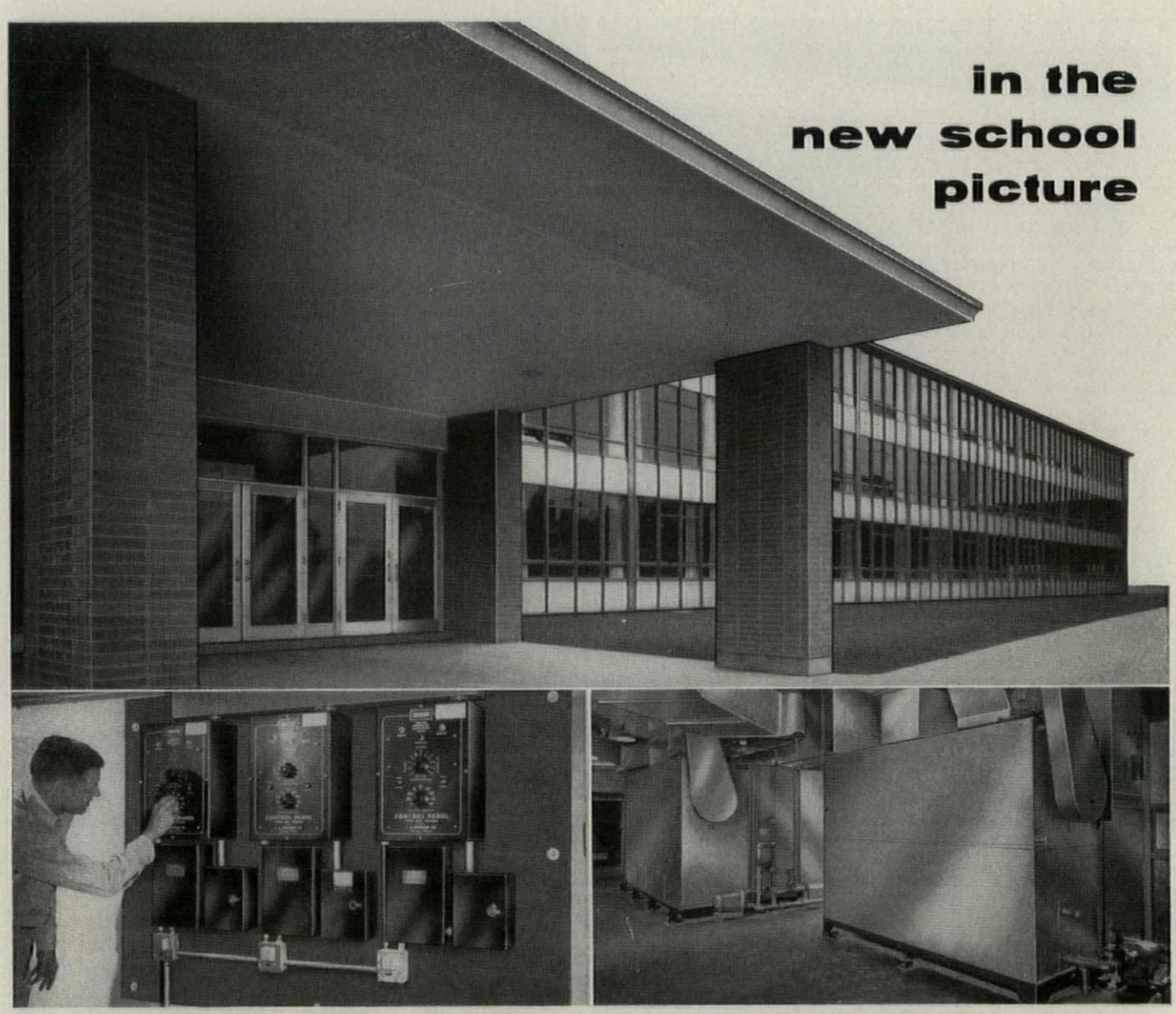

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At the recently opened, beautiful new three million dollar Regina Dominican Catholic High School in Wilmette, Illinois, there's a lesson to be learned by anyone connected with school building or modernization.

The problem: How to achieve economy and dependability in school heating?

The answer: Install, as they did in Wilmette, heating products from one-source—one-responsibility . . . Dunham-Bush, Inc.

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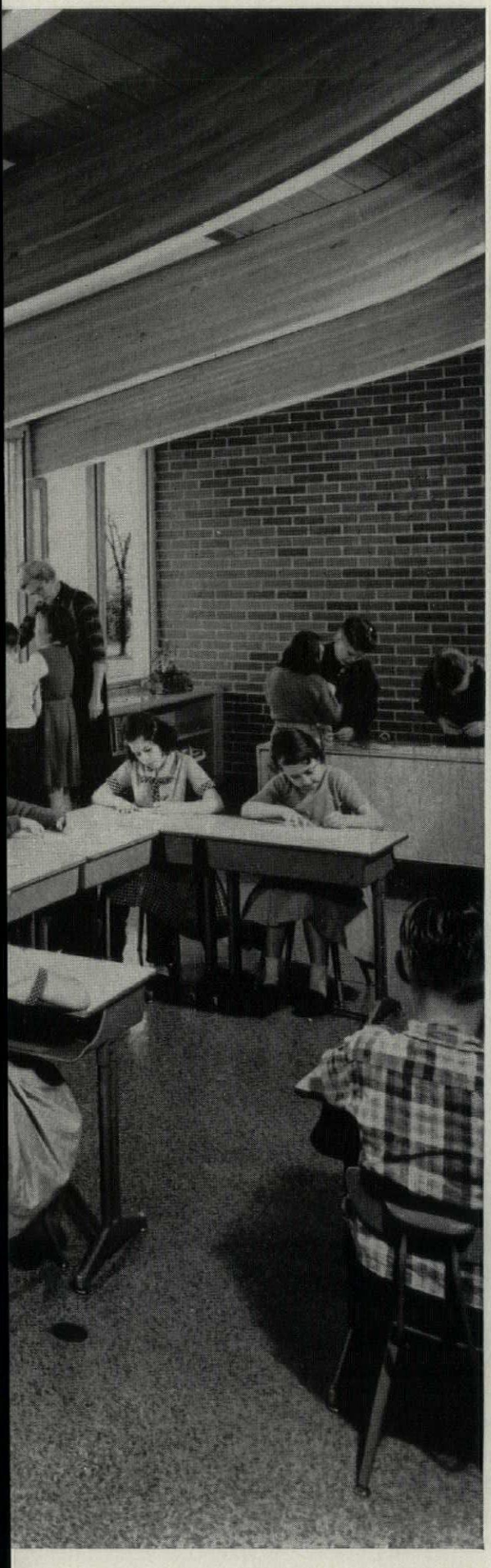

The Lennox Living Laboratory: This $50,000 school has been built by Lennox Industries, Inc. in Des Moines, Iowa to carry on research in the field of school classroom heating, ventilating and air conditioning. Extensive research and testing is carried on continuously, both with and without students present in the classrooms.

GAS *and* **LENNOX** *can provide your schools with the finest in fresh air heating and ventilating...*

at lower operating and building costs

This new Gas system automatically draws in fresh air from outside . . . warms, cleans, and circulates air quietly and evenly throughout the school.

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**overhead means out-of-the-way...*

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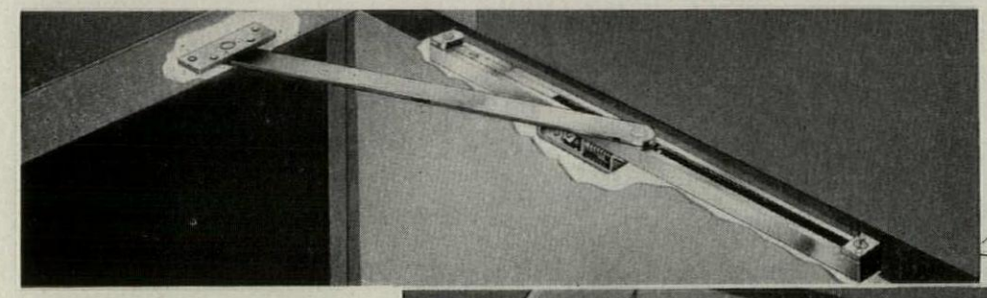

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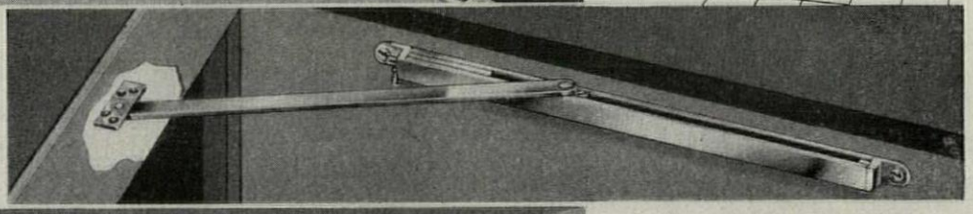
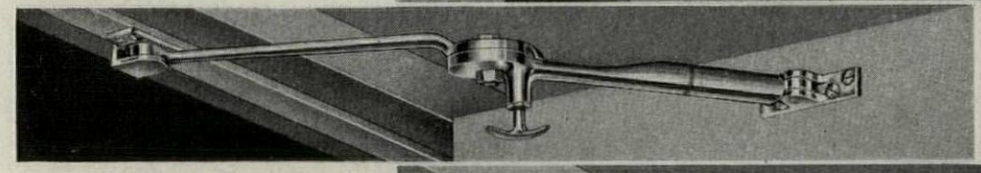
GJ 90▶ surface type (handed)





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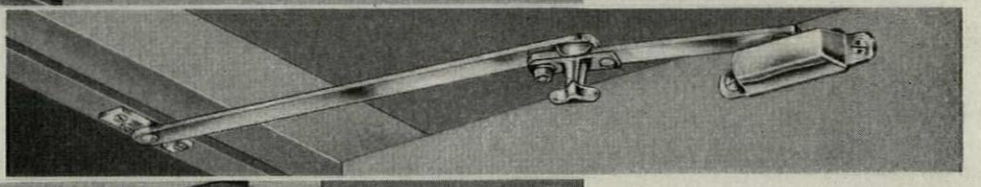

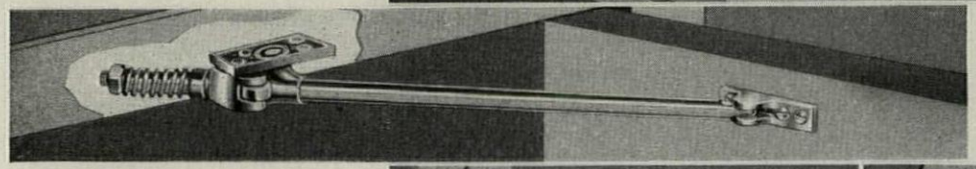

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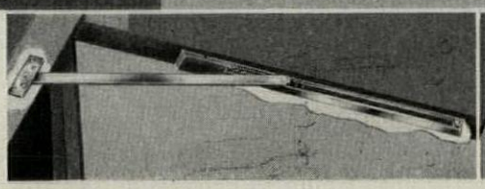
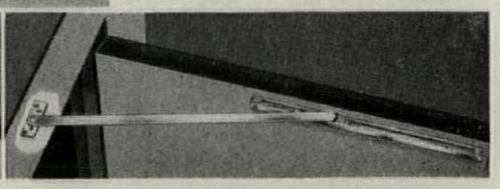
GJ 300 and GJ 500 series▶ (non-handed) concealed for single and double acting interior doors. Surface type for single acting doors. Spring cushion types and friction holder type.





CUSHION THE STOP... silently absorbing the shock of violent openings.

HOLD THE DOOR... hold-open engages silently... holds firmly...releases easily.

"*Life of the building*" GJ Overhead Door Holders are made of highest tensile strength alloys requiring minimum maintenance or replacements. They have built-in shock absorbers to cushion the stop and are made in various sizes for any width door.

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Great new things are shaping up in concrete block

Photo courtesy of National Concrete Masonry Association

Atlas Masonry Cement provides the right mortar

"Shadowal" concrete block has often been described as "the block with a thousand faces." Used here in combination with square blocks by Architect Mario J. Ciampi, San Francisco, this unit has created a striking and distinctive example of the role concrete block plays in today's building plans. And to lay up the new concrete masonry units, Atlas Masonry Cement continues to be the preferred cementing material for mortar. It helps produce a smooth, workable mortar . . . assures a stronger bond . . . gives weatherproof joints that are uniform in color. And Atlas Masonry Cement complies with ASTM and Federal Specifications. For information write: Universal Atlas Cement, Dept. M, 100 Park Avenue, New York 17, N. Y.

M-78

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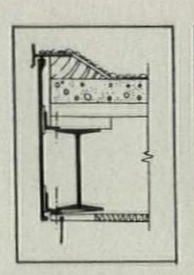
Here is a cast aluminum facia for one-story buildings that adds a decorative frieze to close in the area between roof and window. Michael's **cast patterned units are a natural** for this intimate type of building which is seen from a close viewpoint. Construction advantages include a cast slot for a weathertite interlocking gravel stop. The same castings **form a wall where screening is needed.** And, the low cost of patterns, availability of polished or colored surfaces permit individual designing. **Let Michaels show you** how new developments in cast wall products may benefit your building. For additional information, complete construction details and technical data request CWA·5-A.

THE MICHAELS ART BRONZE CO., P. O. BOX 668, COVINGTON, KY. PLANT, OFFICE: ERLANGER, KY.



M
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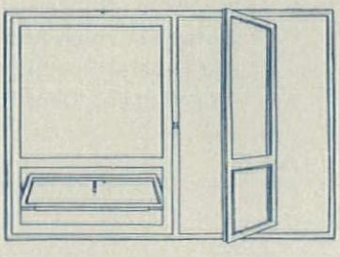
Architects: Design assistance for metal walls now available.



Rigidly pre-tested, this aluminum pivoted window was designed for monumental construction. Write today for complete construction details of VPA-1, see Sweet's Architectural File, 3a/Mic.

Editorial

Schools for an age of confusion

For years it was the Cassandra cry of American educators that an apathetic public was condemning its own sons and daughters to educational mediocrity. The public would always find something more pressing than education to worry about. Incidents in the cold war and unease about the U.S. economy would always crowd education off the front pages. The last thing the educators anticipated was that these very crises that had once diverted the public would one day scare it into realizing that education is the country's basic defense.

The scare had been brewing for some time and was composed of many anxious elements: the frustrations of never clearly winning an international dispute, the bafflement of a clinging recession. Yet what triggered it was nothing larger than the faint *beep-beep* of the first Sputnik. The storm of confusion and terror broke. Americans were left looking at each other in fright and ignorance.

As happens in storms, unlikely partners find themselves thrown together. Thus it was that American intellectuals and businessmen, neither of whom had been steadily focusing on the problems of public school education, suddenly found themselves working together for the same cause. They were both trying to patch up the educational system, and both felt somewhat guilty they had been absent from schools for so long.

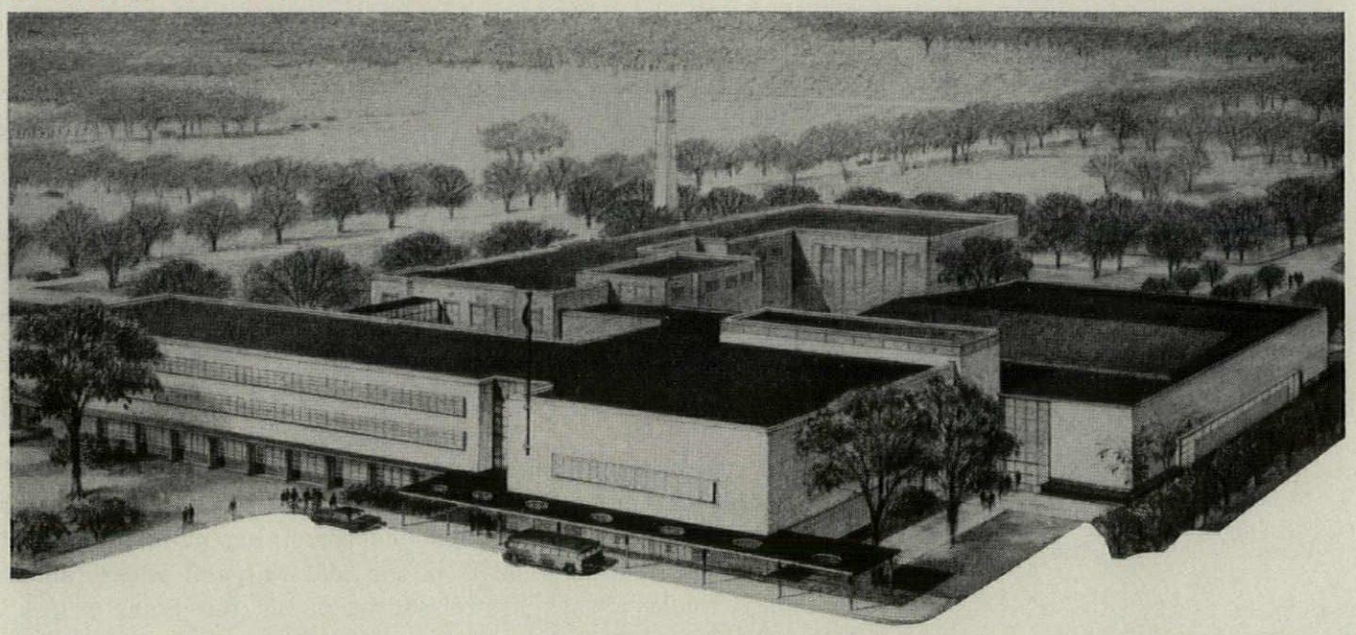
It had become obvious to both groups that, if only to advance their self-interest, education had to be served. For the intellectual, particularly for the newly prominent scientist, better schools were the only way to guarantee more capable assistants. For the businessman, particularly for the corporate executive who had recently learned that a higher level of community education meant a higher rate of consumption and more capable personnel for his own undertakings, better schools were the only way to get a corner on the future. Although their interest came rather late, and was in many cases not motivated by altruism, its effects can already be noted.

Thus, expenditure for the public school system rose above the $10 billion level for the first time in 1957; it was also in that year, the year of Sputnik I, that those expenditures rose for the first time above 3 per cent of our gross national product. In the latest academic year, 1958-59, $14.1 billions were spent on public school education—a more respectable 3.15 per cent of GNP. School bond issues have recently had an easier time of it—80 per cent of all issues requested this year have been approved, as against 73 per cent last year.

As well as financial support, substantive thought has recently been given to education. Most valuable of the many searching studies made to date is Dr. James Conant's *The American High School Today*. ("The academically

continued on page 109

BRICK BUILDS BETTER CURTAIN WALLS



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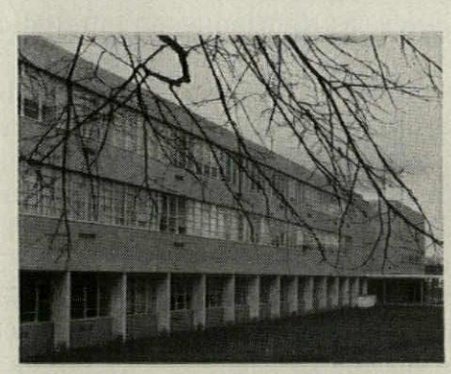

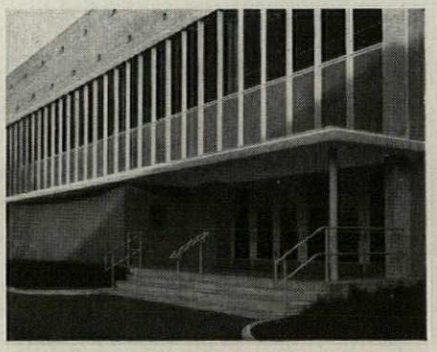

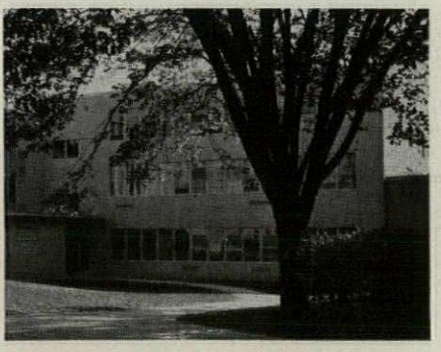

Downers Grove High School Addition
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Architects and Engineers: Holabird & Root, Chicago
General Contractor: S. N. Nielsen Company, Chicago
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talented student is not being sufficiently challenged.") Almost of equal value is a study by the business-directed Committee for Economic Development to be released next month. ("There is inadequate attention to what in business would be called research and development.") Yet neither of these high-level grapplings, nor the local school-board discussions in which businessmen and intellectuals are now also taking part, have cleared up the confused situation of the U.S. schools.

Support and study are not enough. The storm is still mushrooming beyond the control of those who are trying to fight it. Nearly 75 per cent of all American high schools could not afford a modern curriculum if they wanted one. In California this year overflow classes are being held in tents. The national "educational deficit" (the amount we should be spending to keep up with growth, but are not) is estimated variously at $6.8 and $9 billion a year. In the face of this desperate need, far greater and more devoted efforts will be needed from education's new patrons. The special skills that they have developed in their own fields, research techniques and management methods, must now be given to the schools.

These are, then, the new ideas and methods that FORUM has considered worth exploring in this issue. Five of them, each a topical question with which school boards across the country must wrestle, appear particularly noteworthy. They are:

Can educational productivity be increased by technology?

A survey of the various attempts to increase learning by technological means shows that one of the potential teaching aids that needs the most work for improved efficiency is the schoolhouse itself (page 110).

Must an industrial-age school emulate industry?

A critical look at John Lyon Reid's machinelike high school in Millbrae, Calif. shows some of the liabilities of a school that reflects the efficiency it achieves rather than the human qualities it seeks to inculcate (page 126).

Are there designs which can improve the quality of our local schools?

A deliberately nonindustrial, relaxed elementary school in California by Architects Callister & Rosse indicates that the answer is yes. It also indicates that a more human environment can mean higher marks (page 116).

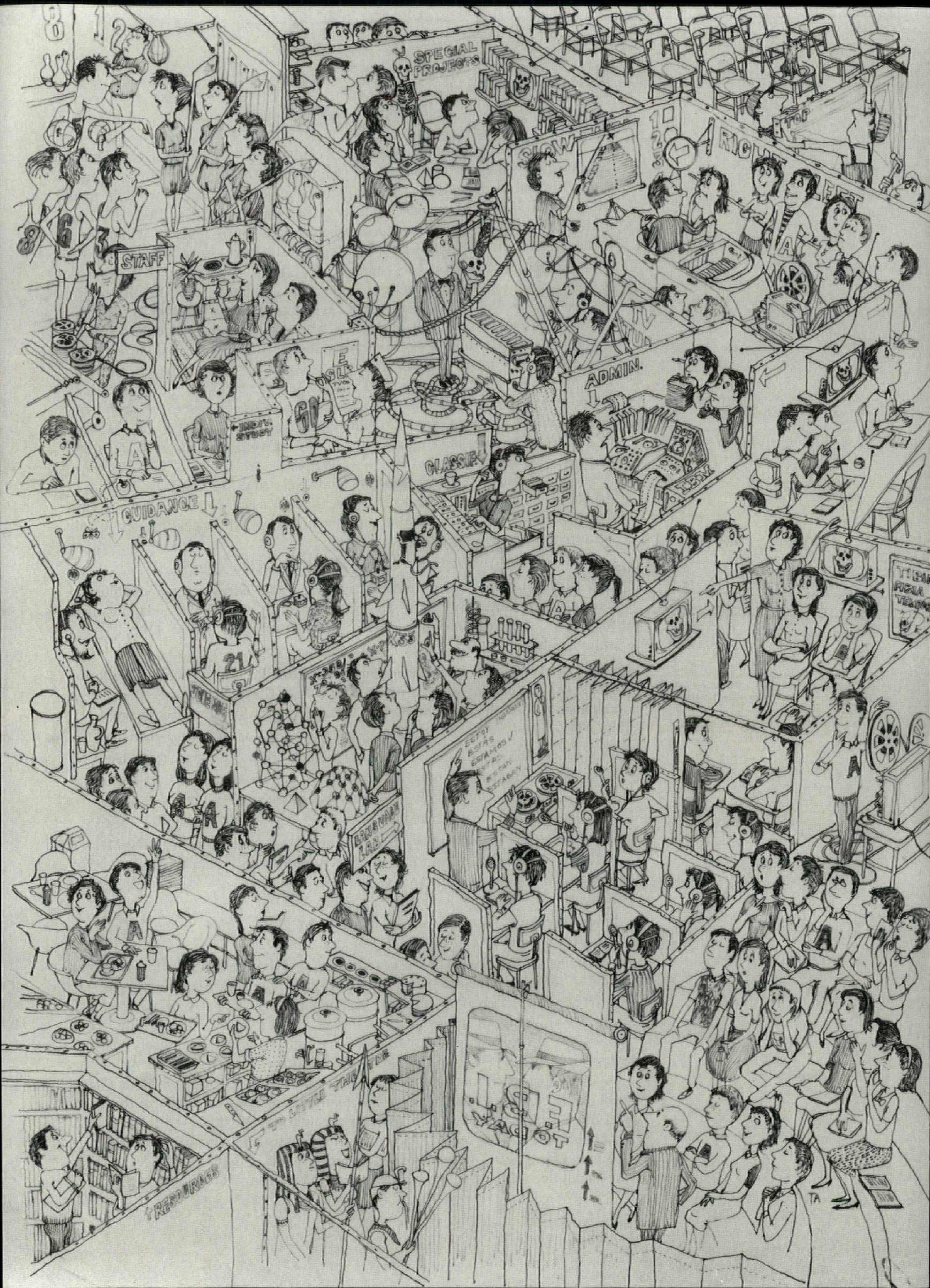
Can good schools be built at low costs?

Two low-cost schools in western Michigan by Architects Vander Meiden & Koteles argue that attention to construction details can save money for educational extras. A similar conclusion is reached in a recent study by the Educational Facilities Laboratories (page 120).

What sort of program for education beyond the high school can communities develop?

The public junior college is now emerging as the most significant extention of the U.S. educational system. Ernest J. Kump's design for a college near San Francisco is among the best examples of this trend (page 134).

Such an example indicates that the architect's role in answering these questions is a uniquely creative one. He must do more than merely provide the forms for a new kind of higher-productivity school; since many of the business-sponsored management methods and new scientific techniques have not yet been tested and are bound to lead to some confusion along the way, he must create buildings that may be considerably reconverted later on. As stated in the CED's report: "Perhaps the greatest need of all in our educational system is for methods of determining what is useful, and accelerating the adoption of new ideas." This is the job of the professional.


SPECIAL PROJECTS
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TA

The productivity push in schools

On top of other problems, a new age of educational experiment now threatens to make many "modern" school plants obsolete. How can school boards and architects plan for a future still not clear?

BY OGDEN TANNER

The most significant new ingredient in the educational stew now bubbling healthily around the U. S. is not the enrollment crisis, nor the teacher-classroom shortage, nor even the aging "school palaces" controversy that still raises its unlovely head from time to time. It involves answers to all of them, to be sure. But the new ingredient is really a maturing, if still slightly confused, approach to education, with a new "productivity" as its goal.

The new productivity marches under many banners, most of which boil down to better teacher utilization and intensified student effort. There is growing agreement that not only is the "gifted" child being left largely unchallenged, but that some not-so-gifted children could learn better and faster as well. French and Spanish, algebra and geometry are creeping down into the lower grades for the first time, and college courses such as calculus are penetrating the upper years of high school. School days are growing longer by a half an hour, an optional period, an extra subject. School years are including more and longer summer sessions, not only for remedial courses but for voluntary acceleration work, foreshadowing year-around, air-conditioned schools. Guidance counselors are multiplying, helping students to find their individual interests and pursue them independently. Television, films, and tape-fed "language laboratories" continue to proliferate, making new subjects and skilled teachers available where they were not before. The school system itself continues to reform on new lines: the old "K-8" elementary school and four-year high school, opened up years ago to accommodate junior high schools (K-6, 3, 3), are being joined by new experiments with K-4, 4, 4, including advanced college placement courses, and even K-6, 4, 4, with two years of junior college thrown in.

The planning and design implications of this newest revolution in schools are already vast and varied, and promise to become more so. There is increasing evidence that the experiments, indeed, have only just begun. Furthermore, the experimenters themselves caution architects that, even beyond their own present recommendations, still other concepts may develop, and room for further change must be built in. A sharp challenge was made this year in a slim booklet by J. Lloyd Trump, professor of education at the University of Illinois.* The "Trump report" proposes a radical reorganization of schools, not only to make better use of scarce teaching talent, but also to improve the quality of learning by stimulating students to think and work more on their own.

The most striking recommendation of the report, and one urged repeatedly by other progress-minded educators, is the abandonment of the standard "egg-crate" classrooms of 25 to 35 seats in favor of more variety in learning methods, staff, scheduling, and surroundings. The proposals: 1) *large instruction groups* of 100 or more in large rooms, using material more carefully prepared by fewer and better-paid "teacher specialists" and introduced through lectures, demonstrations, films, or television (these sessions, varying in length, would take up about 12 hours, or 40 per cent, of the student's week); 2) *small discussion groups* of 12 to 15 students in seminars, where topics would be developed further by "general teachers," who would also have more opportunities for individual guidance and evaluation (six hours, or 20 per cent); 3) increased *individual study* in more private quarters, such as the boothlike carrels provided in some college libraries, and independent projects in and out of school (12 hours, or 40 per cent); 4) specialists to round out a more efficient teaching "team," including parents or apprentice teachers as part-time "instruction assistants" to correct papers and supervise laboratory work, aides and clerks to

* "Images of the Future—A New Approach to the Secondary School," by J. Lloyd Trump, director of the Commission on the Experimental Study of the Utilization of the Staff in the Secondary School, appointed by the National Association of Secondary School Principals and supported by the Ford Foundation. Copies available from the Commission at 200 Gregory Hall, Urbana, Ill.

DRAWING BY TED ANDRESAKES

take over administrative chores and free others up the line for teaching, and consultants drawn from the community for advice and student talks. Each pupil would be able to move forward at close to his own speed, instead of having to sit all year in a class either behind or ahead of his actual abilities.

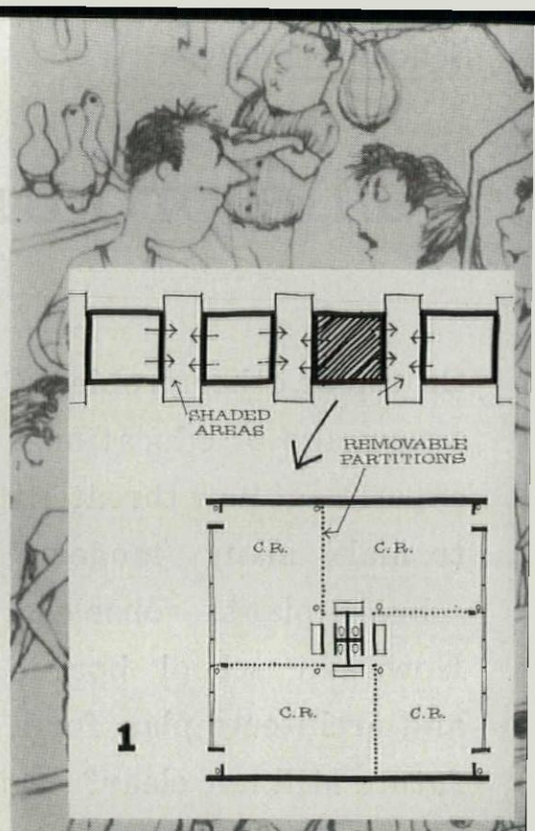
What the Trump report optimistically describes, of course, is a collegelike approach made still more efficient and applied at high school level. How do you design a school that can experiment with such a program, adjust to new findings, or return to more conventional ways if it does not prove out? At this writing, a workshop of ten leading school architects and a score of educators were exploring the question at the University of Michigan—and coming up with a surprising diversity of answers (to be reported in detail later). Some felt a "Trump plan" would allow less attention to the individual student, others, a great deal more. By his interpretation, Architect John Lyon Reid estimated that a Trump school would require 40 per cent more space per student than today's conventional school; on the other hand, the administrators of the new Wayland, Mass. High School (page 114) felt that in their interpretation they could get along with 50 per cent less. Perhaps the most interesting demonstration came from Reid, who showed how the loft plan of his new Mills High School could adapt to the Trump program without any rebuilding; the variety of new spaces created, in fact, might mitigate some of the criticisms of the present school (see page 126).

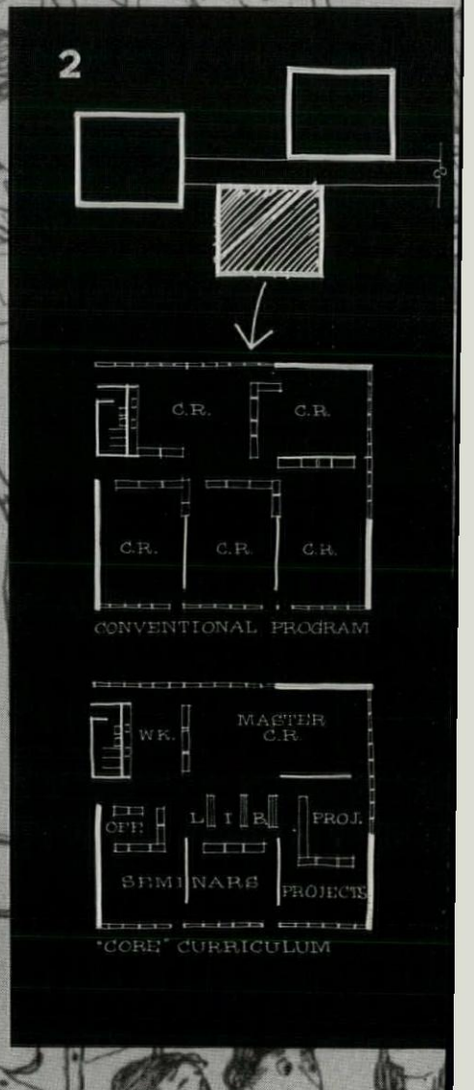
The exploding classroom

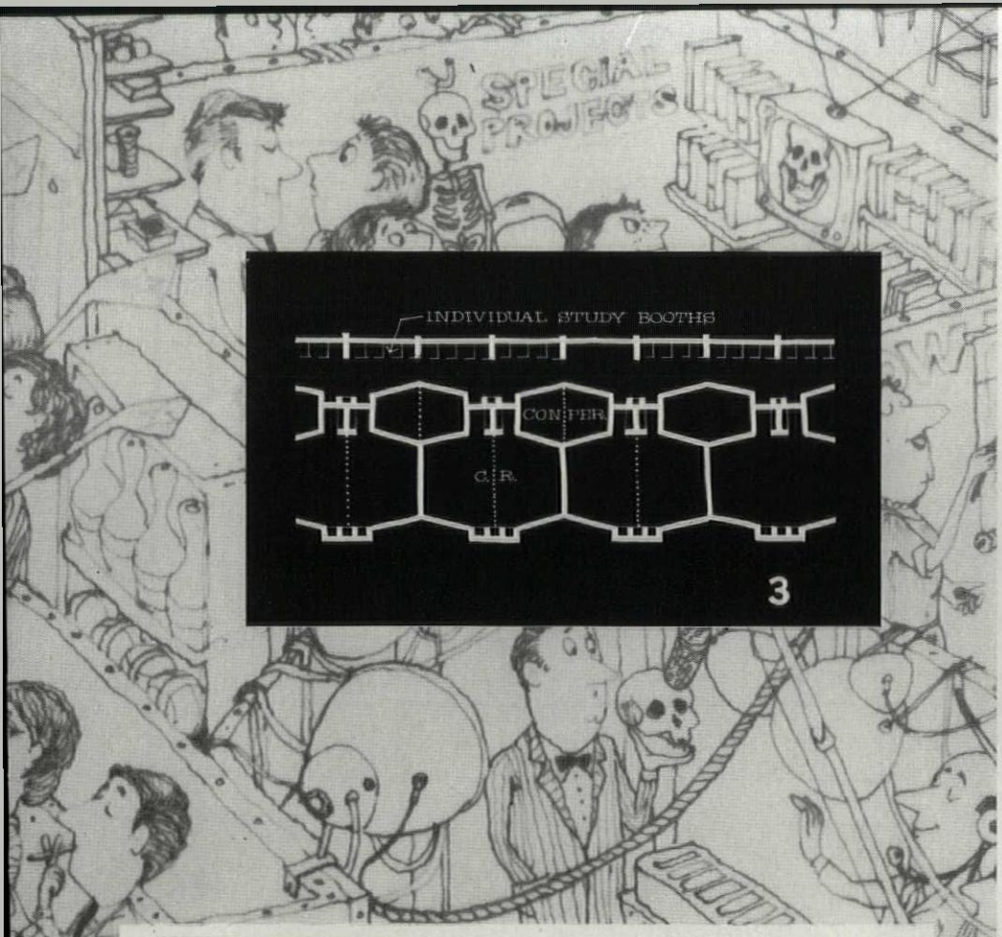
The first steps in loosening up schools for a more productive education, of course, came years ago with the advent of larger, pleasanter classrooms and movable furniture, which first permitted kindergarten and lower-grade teachers to arrange their space more freely for a variety of activities and projects. Soon a work alcove appeared off the classroom and became an indispensable new kind of space for individual projects, conferences, teacher work, and storage (for a new version, see page 123). By now the alcove has grown up and gone to high school in dozens of different kinds of larger, multiuse spaces shared by neighboring classrooms, which open up to them through glass walls and over low storage dividers. In some new schools, walls *between* adjoining classrooms are being folded back or up with varying success, converting smaller spaces into larger ones for meetings, group projects, plays, or lunch.

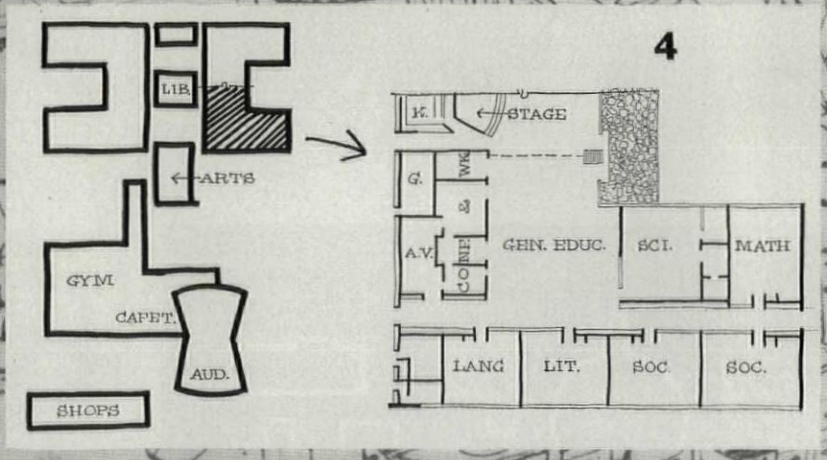
Along with the unfreezing of long-standardized classrooms into larger, more varied, and more flexible learning spaces, sheer size has demanded a breakup of more and more big schools into smaller building units for administrative and psychological reasons, not to mention fire risk and insurance rates, and the fact that separated units can be built to present needs and added onto later. But whether a school is planned as a collection of "little schools," or as a single, massive "loft plan", it could still become a white elephant overnight if it is not designed for change *inside*.

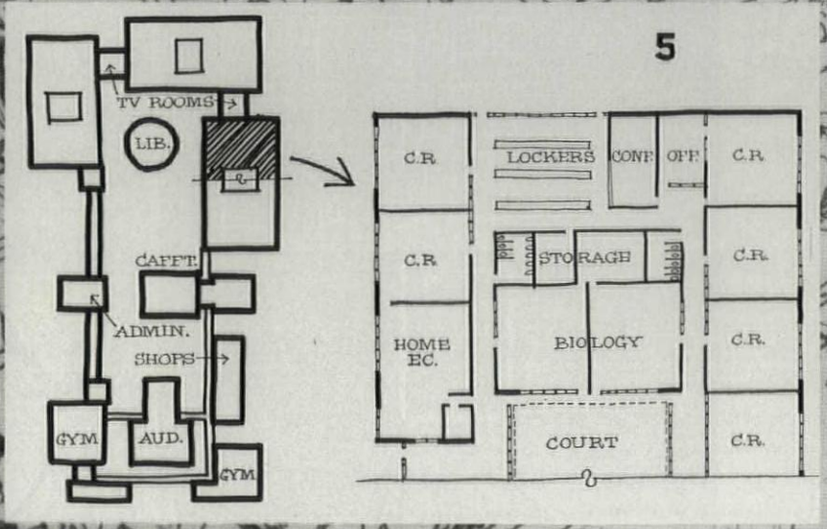
Among new classroom-cluster schools, some have already foregone flexibility by permanently placing toilets, heating rooms, closets, and stairs between their teaching spaces. Others, however, suggest ways to accommodate change. In three new schools in Laredo, Tex., for example, Architects Caudill, Rowlett & Scott have used compact, economical units of four classrooms grouped around an unusually tight central utility core **(1)**. Since partitions between classrooms are not load-bearing, they can be designed either to fold back, giving day-to-day flexibility in combined project or lunchrooms, or to be easily removable or rearrangeable to provide more slowly changing combinations of larger and smaller spaces. At high school level, the new regional school at Hebron, Conn. has its fixed utilities removed to one side, leaving each home-room unit for 120 to 150 students still more open to change **(2)**. At present the space is divided by movable storage units into five conventional classrooms. The cabinetwork, however, can easily be moved around to accommodate a transitional program, a "core" curriculum of closely related subjects, or whatever else may come. (Architect: Louis J. Drakos; Educational Consultants: Sargent & Mitchell.) At a new teachers' college planned for the Chicago Board of Education by Architects Perkins & Will, a string of hexagonal classrooms and conference











rooms can be further subdivided to give no less than four different sizes of teaching space, in addition to individual study booths in the hall **(3)**.

Still other schools have committed themselves more fully to emerging educational patterns. At Maryland's North Hagerstown High **(4)**, each grade of up to 400 students has its own classrooms grouped around a "learning laboratory" for arts and crafts, science and dramatics. During lunch hour, meetings, or plays, the learning laboratories of adjoining grades are opened to a central dining-assembly room, which also serves as a headquarters for club meetings and social events after school. Right off this big space are smaller interior rooms where students can drop by for a talk with their counselor without trudging up to the "front office," other spaces where they can hold small meetings, play recordings, or run films. There are also convenient workrooms and storage spaces needed by teachers for all their new equipment and curricular work but not always remembered in new school plans. (Architects: McLeod & Ferrara; Educational Consultants: Engelhardt, Engelhardt, Leggett & Cornell.)

In the new Garinger Senior High School in Charlotte, N.C., the same consultants helped organize three little schools of 600 students each, not by grade, but by cross section of the school as a whole, to mix students of different ages and interests **(5)**. Each block-shaped unit has some of the interior flexibility of the loft-plan type of school, yet all classrooms face outside or toward a central court. The narrower links joining classroom blocks are equipped as student lounges, meeting rooms, and high-windowed audio-visual teaching rooms seating 100 or more. (Architects: A. G. Odell Jr. & Assoc.)

In a third school shown on the following page **(6)**, planned for a college-oriented community, the Engelhardt firm subdivided the plant by subject matter. At the core of its humanities center may be seen the same useful special rooms, in this case assigned to language training, conferences, projects, remedial reading, student publications. Beside the normal-sized classrooms, there are also central audio-visual and speech-dramatics rooms seating 50 separately or 100 together. Again a deep floor plan, a frame struc-

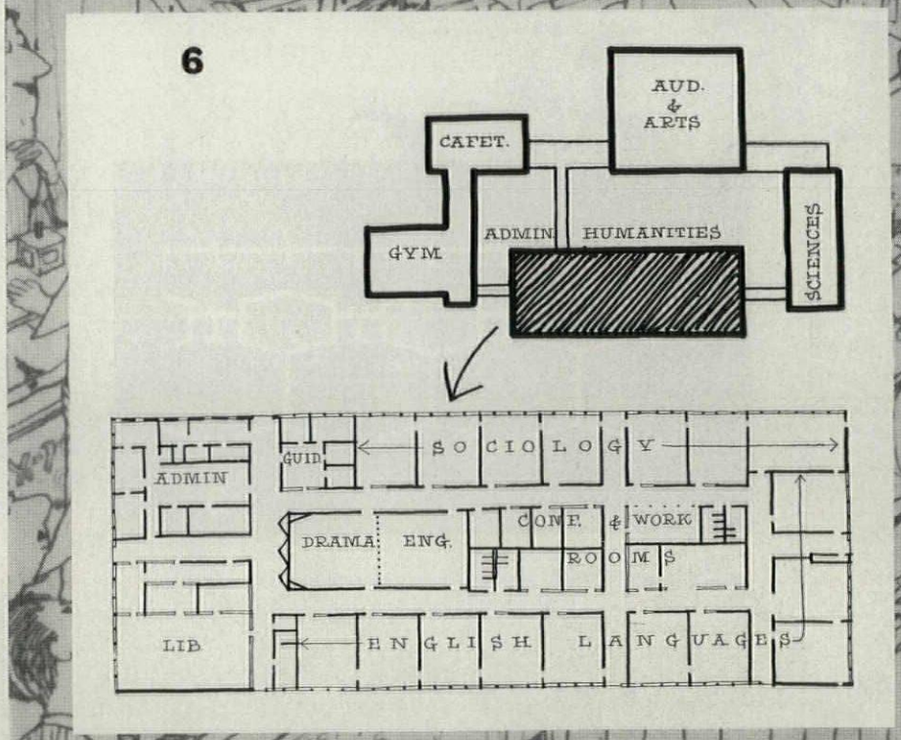
ture and no load-bearing interior walls permit rearrangement of spaces should other needs arise. (Concord-Carlisle Regional High School, Concord, Mass.; Architect: Warren H. Ashley.)

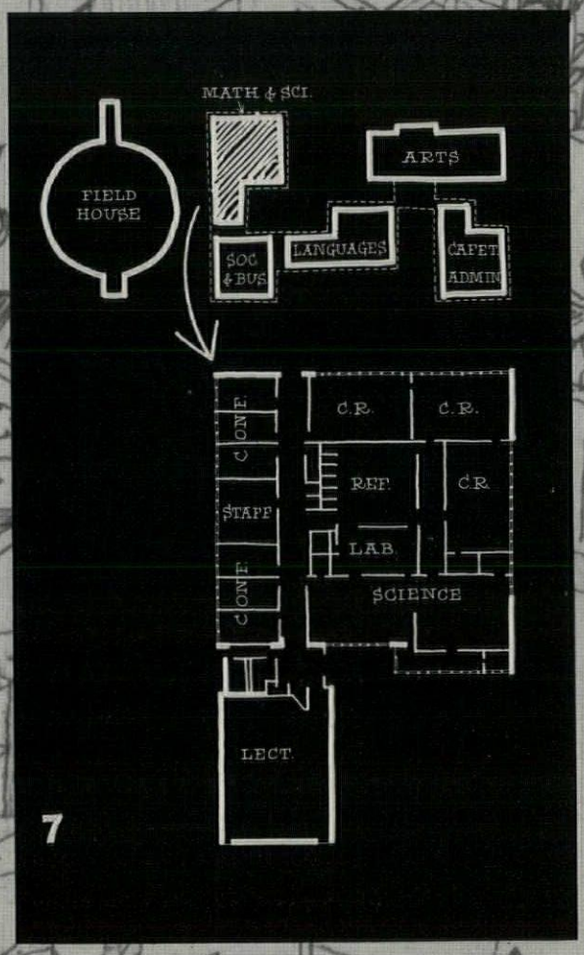
The high-school college

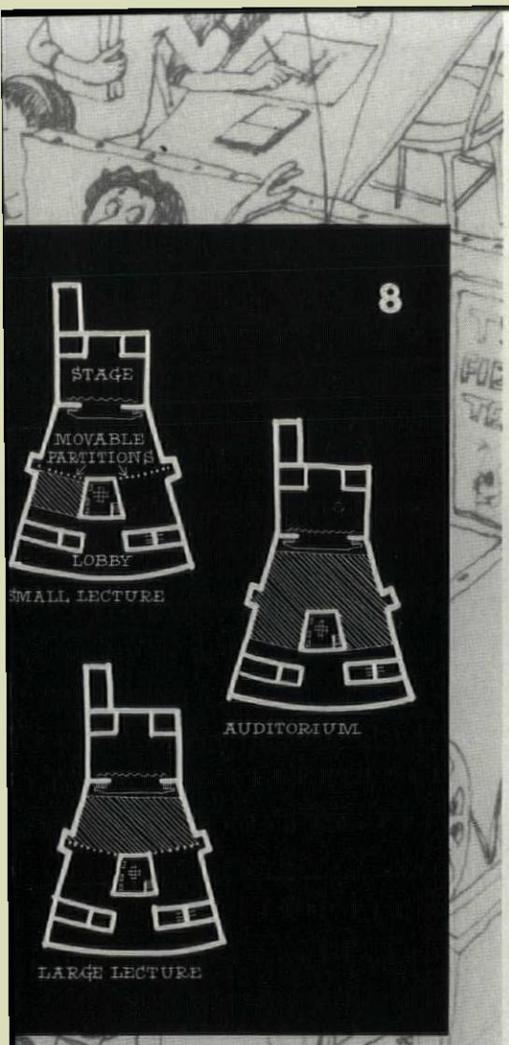
One of the most remarkable of the new schools, and perhaps the closest yet to what Dr. Trump ordered, is now being built not far away in Wayland, Mass. **(7)**. Like the Concord school, it is arranged as a tight group of little "colleges" of related arts and sciences (since most of the students here will be going on to real colleges, vocational departments are left to other nearby schools). At the center of each "college" is a reference-resource center, a sort of sub-library where current texts, periodicals, tapes, and films in that field are kept readily available to students and teachers, and a row of private study booths provided to use them in. In addition to normal-sized classrooms for 25 to 30 students, each college has the use of an adjoining lecture room seating 125 or 150 students (amphitheater-style for better visibility), and a 350-seat little theater in the nearby arts building. For smaller groups of 10 to 12 there is a generous handful of conference rooms. Each college has its own teaching staff; in the social-studies–business building, for example, there will be three social-studies teachers, two business teachers, three teacher-college "interns" learning the ropes at less than full teacher's pay, and a clerk-librarian to supervise the reference room and handle duplicating, student records, and other administrative duties. To provide for change even in this advanced layout, most interior partitions will be of inexpensive, sound-absorbent layers of gypsum board, which can be torn out to rearrange spaces, either toward still more variety, or even back to standard classrooms. (The Architects Collaborative; Educational Consultants: Kargman, Mitchell & Sargent.)

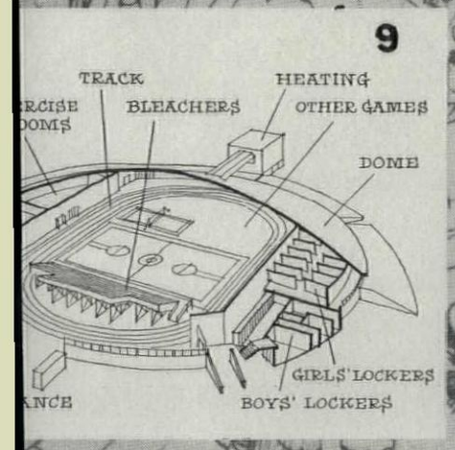
The vanishing gym?

In Wayland and other productivity-minded schools, not only are teaching spaces undergoing radical change, but the big common spaces of gymnasium, auditorium, and cafeteria are coming under more serious questioning. Not only are they expensive for the amount









of time they are in use, school men are discovering, but they are not always appropriate to new educational goals. The big, professionally equipped high school auditorium and stage may be the pride of the community, and in some cases the only place for town meetings and visiting artists. But it often stands idle 90 per cent of the time, used by the school itself only for a general assembly once a week, if that. One answer is to make the auditorium divisible into smaller everyday teaching spaces easily darkened and ventilated for audio-visual use. In a scheme for Nevada's new Boulder City High School (Architects Zick & Sharp, with Stanford University's School Planning Laboratory), motor-driven, soundproofed partitions are being developed to close off the back part of the auditorium into two rooms seating about 100 each **(8)**. An enlarged projection booth between and above them will house television equipment, film storage, a work desk, and controls for lighting, air conditioning, and partitioning. The front part of the auditorium can be used simultaneously as a larger lecture hall or little theater for 200. For large events, the walls will be rolled back and extra chairs added to seat a total of 600.

Wayland's answer, on the other hand, is to eliminate the big standard auditorium completely, using a little theater and lecture rooms instead. At the same time Wayland provides a noteworthy solution to the "basketball-itis," which many educators feel has long afflicted U.S. communities to the detriment of other sports, not to mention academic values. Instead of the standard gymnasium, expensively equipped for Saturday-night basketball games and little else, Wayland is building a big field-house **(9)** or "cage" not unlike those in use at some colleges. It will have a removable basketball floor, and space for track, tennis, and other outdoor sports which normally have to stop in cold or wet weather. Its proponents point out that the space, besides being more versatile, is less expensive per square foot than academic areas, rather than more ($11 per sq. ft. at Wayland, compared to $15 for the main building group). Furthermore, it is big enough for almost everything from graduations to a small-sized county fair.

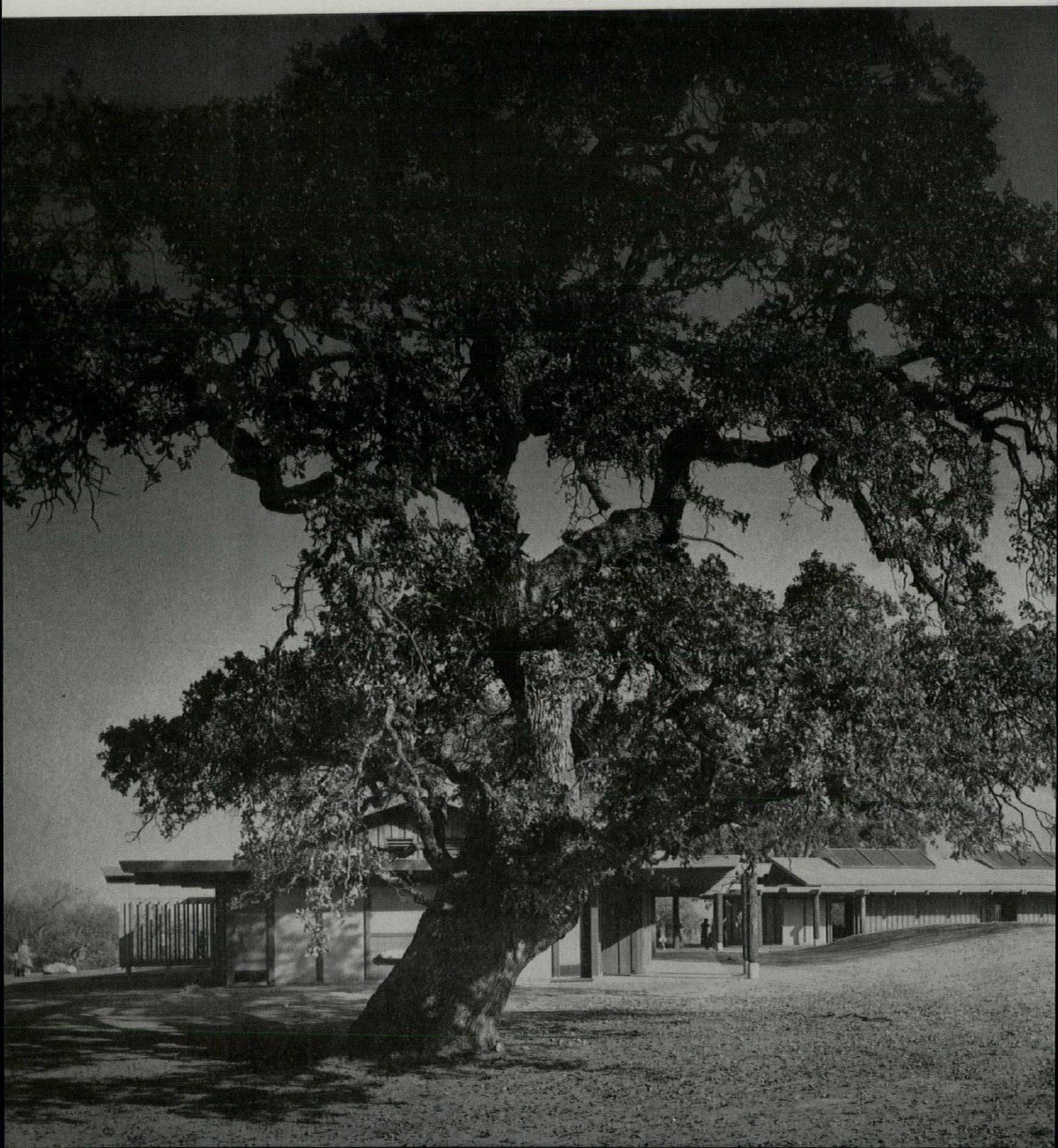
The school cafeteria seems more likely to remain, as long as hot-lunch programs stay in style. But an increasing number of elementary schools have found it cheaper and pleasanter to cart food directly to their homelike new classrooms (some from an economical central kitchen serving the whole school system). And more high schools are either decentralizing their eating facilities along with their academic spaces, or, in the general trend toward treating teen-agers like responsible human beings, have begun to break up the big noisy central cafeteria into different levels or semipartitioned spaces where students can eat in smaller, informal groups around tables of normal size.

In the push toward higher productivity for the educational dollar, there are plenty of tools and techniques which still need sorting out. The pros and cons of television are still hotly argued, but most schools are either experimenting with it or providing for it in their plans (the newest experiment: lessons beamed to schools over a 200-mile radius by a high-flying DC-7). Better management methods are showing schools how to consolidate their teaching talent as well as their books and equipment. Business machines and computers are coming into use not only for school business records, but to keep pace with the growing complexity of short-period and individual scheduling, tests, and grading. Big-city school systems are beginning to delve deeper into their own problems of specialized schools, and of land shortages and shifting school populations, as well as juvenile crime.

Despite all the individual experiments, some educators feel that a breakthrough to really better schools is long overdue, and that it cannot be brought about without a unified, comprehensive job of basic research and development to pull all the bits and pieces together. Others remain skeptical that business inventions can be applied to teaching without the loss of the close personal relationships that lie at the core of a good education. Meanwhile, the outpouring of new concepts, new machines, and new materials could easily outrun school boards and architects who lose sight of basic educational, and human, aims. For whether they make more productive—and more beautiful—schools or not, their buildings will shape the child.

School Trends

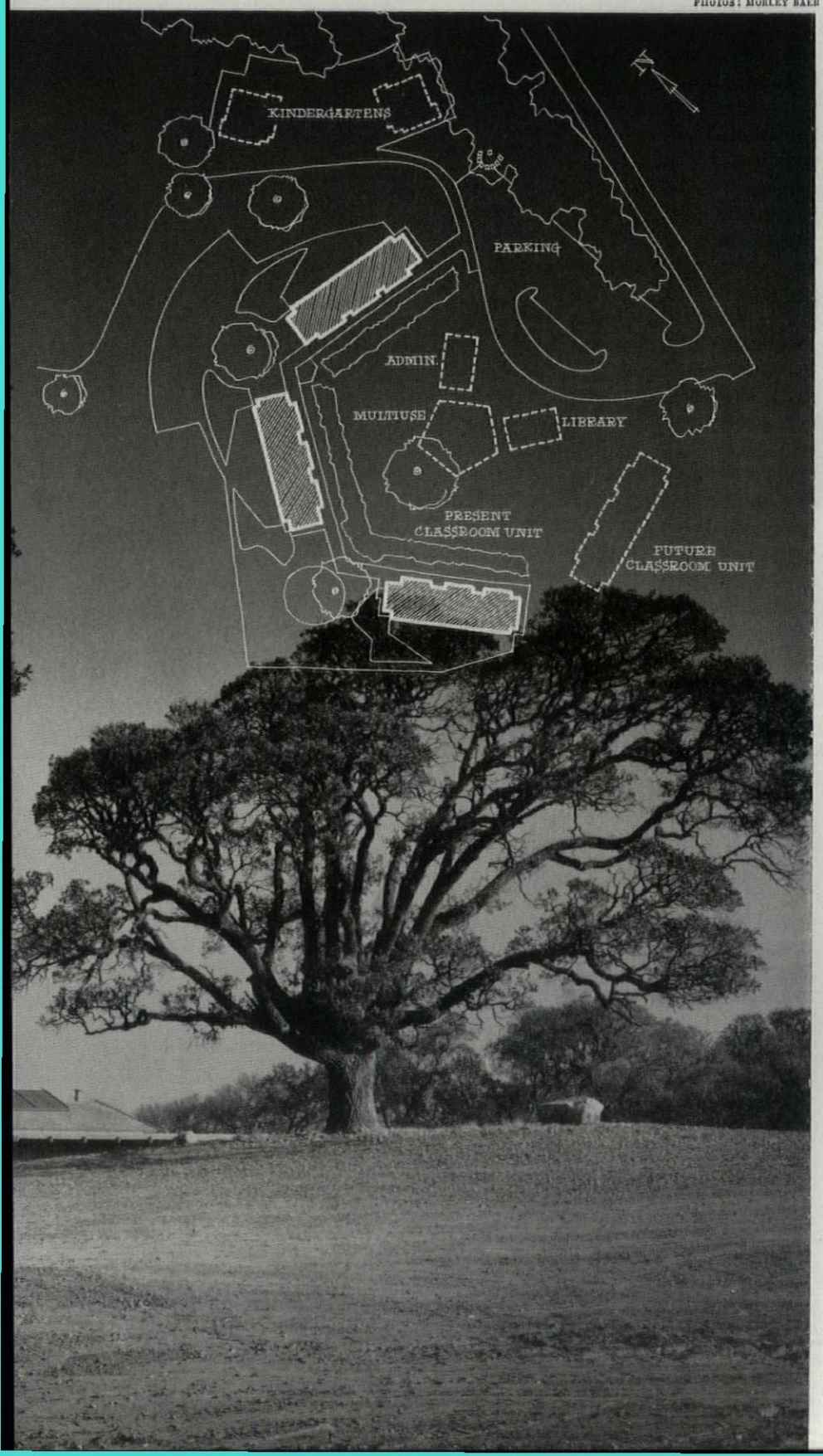
Friendlier architecture,



higher grades

A pleasant place for learning grows from Architects Callister and Rosse's respect for the site, the materials—and children

PHOTOS: MORLEY BAER



Deliberately scaled down, deliberately nonindustrial, deliberately domestic, this group of nine classrooms—the beginning of an elementary school on ten acres of serene California slope—is the antithesis in aim of the briskly efficient kind of educational "facility" being bolted together in countless school districts across the country.

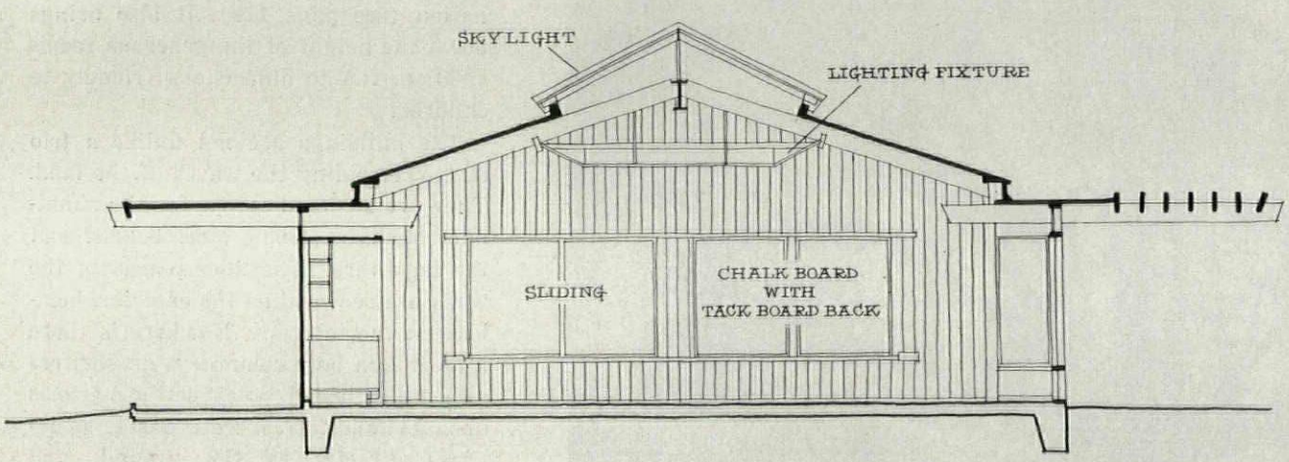
Its classrooms are grouped three to a roof (but each one would have been in a separate little building, if state agencies had not taken a slightly more stringent view toward the design than the local school board's).

In the shade of four enormous, protective oaks, ennobling the site, these three buildings are connected by walks which in turn are canopied and shaded by extensions of the wide overhangs. The line of these canopies is also continued right into the classroom, under the roof gable. Under the central skylight is a frame carrying vinyl plastic diffusers to soften and spread illumination (see page 119). It also brings down the height of the generous rooms (960 sq. ft.) to dimensions friendly to children.

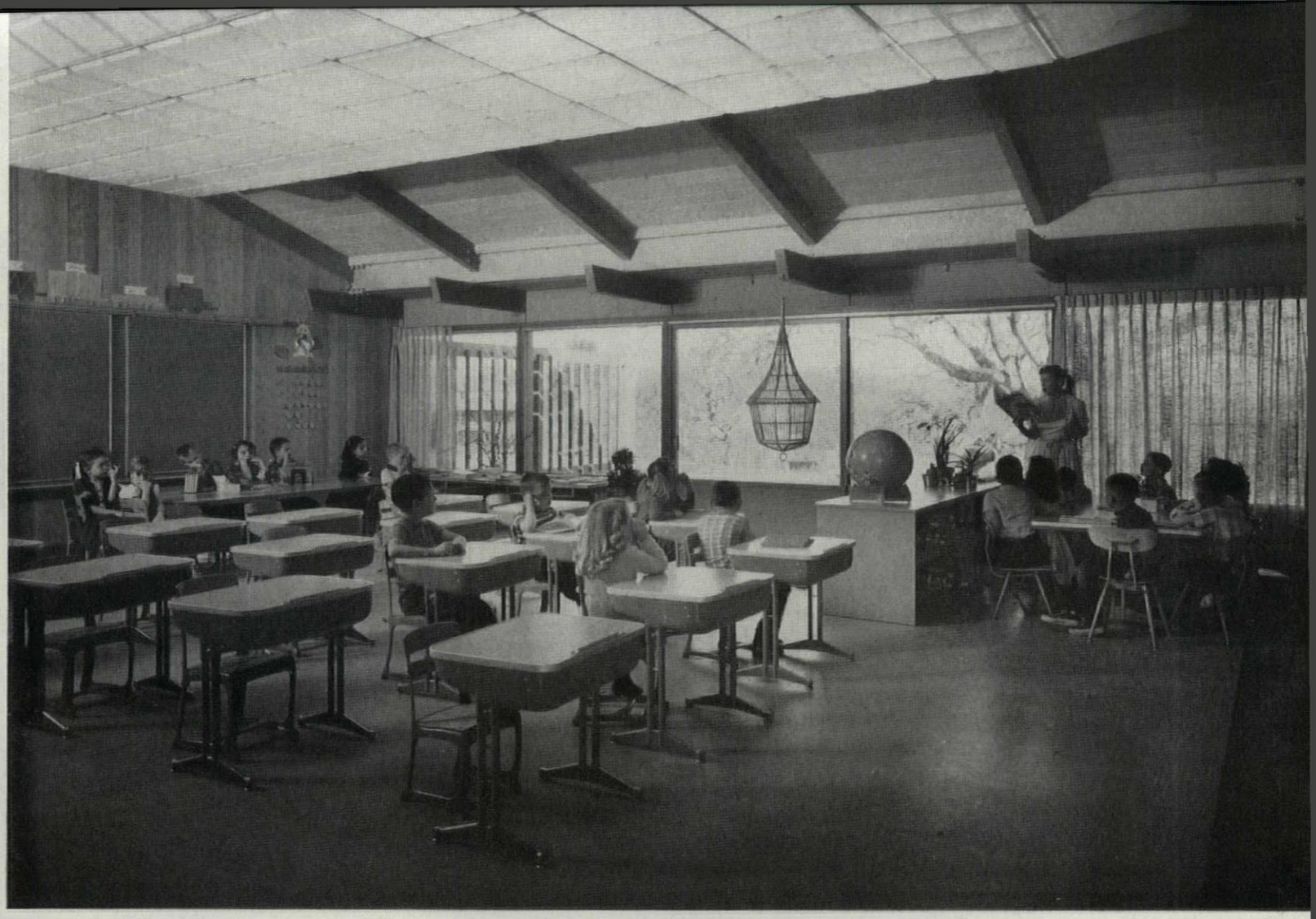
The buildings are not unlike a trio of barges riding the waves of the land. They are all wood except for the aluminum skylights, some steel beams, and the hardware. The filler panels in the walls are redwood on the exterior, hemlock on the interior. Nowhere is there a hard iron lally column; walk shelters are peeled wood poles set sometimes upon cylindrical concrete bases, sometimes directly in the ground, and notched to receive the beams above.

Why such friendly domesticity, so unusual in today's schoolhouses? It is not all sentiment—sentiment of parents for children, or of architects for a site: in the experience of the teachers and the superintendent of the school district, children who study in classrooms that are warm in character and isolated from one another achieve higher scholastic averages.

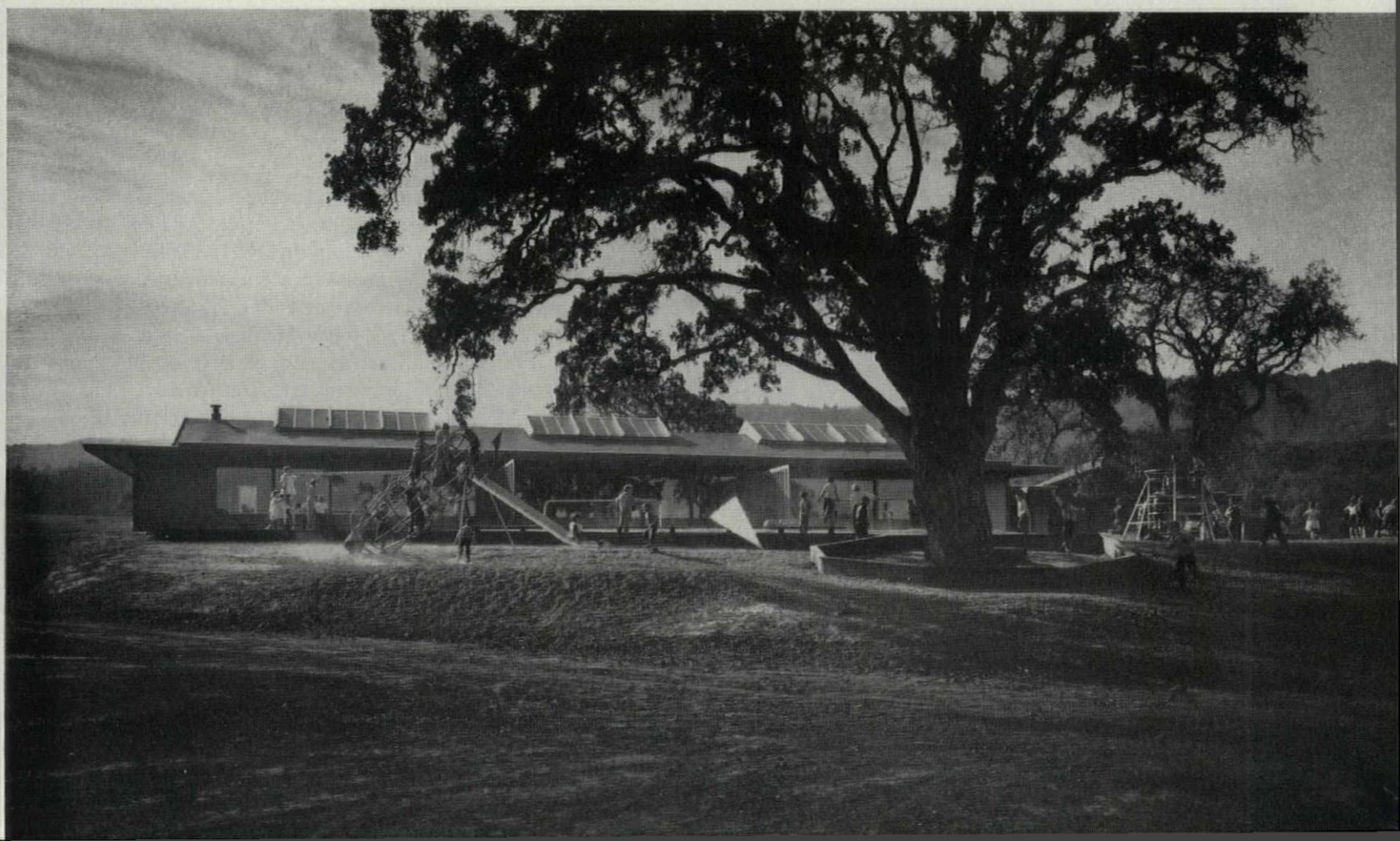
Slatted overhangs *kill direct sunlight without blocking all sky illumination from classroom windows. The nine classrooms cost $171,500, $14.57 per sq. ft., plus an additional $47,734 for site improvements.*



CORTE MADERA SCHOOL:
Portola Valley, Calif.
ARCHITECTS: Callister & Rosse
STRUCTURAL ENGINEER:
John A. Blume & Assocs.
MECHANICAL ENGINEER: Daniel Yanow
ELECTRICAL ENGINEER: Ben Lezin
GENERAL CONTRACTORS:
Hub Pacific Building Co., Dan Dana Co.



Natural finishes *are stressed inside the classrooms as well as outside. Each of the classrooms has its own outdoor space for quiet play, bounded by louvered fences close to the building, but farther out the three spaces merge into a mutual area for more active, louder recreation. These buildings are the beginning of a school; eventually a pair of kindergartens, three more classrooms, and a multiuse building will be added.*



For $7.01 a sq. ft., *rural Robinson County got a handsome, stone-faced school that would be a credit to many better-off communities. Steel joists are exposed overhead in the classrooms—one of the school's many cost-saving features. The adequately proportioned classrooms (24 ft. by 30 ft.) are partitioned by lightweight 8 in. block walls finished with two coats of plastic paint, suffer only from a lack of special wardrobe space.*

School trends

Quality on a budget

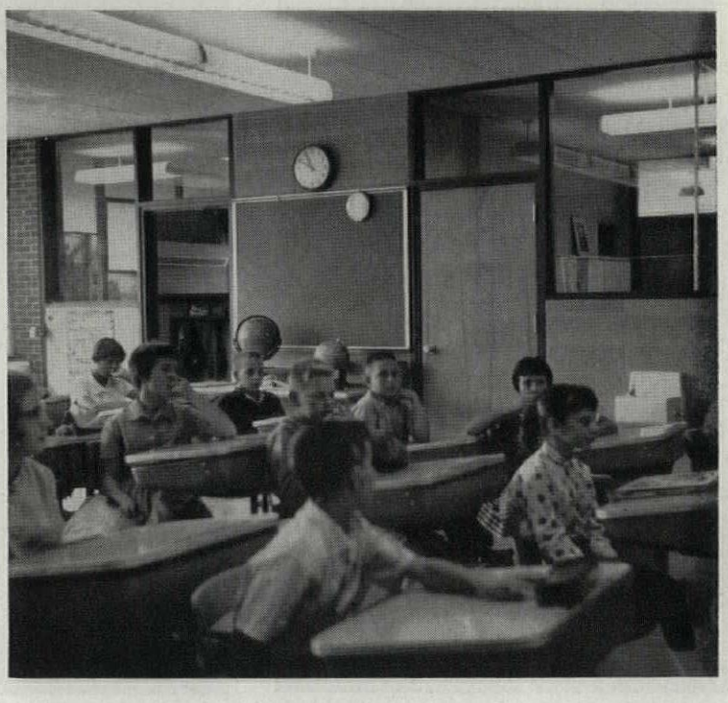
Although they do not look it, these two schools by the same architects averaged only $8.64 a sq. ft. The secret: careful design

In western Michigan, where severe winters and industry-jacked labor wages have kept school building costs high, two young architects have found ways to reduce costs nearly $3 per sq. ft. below other schools in the state. Two years ago the architects, John Vander Meiden (40) and Michael J. Koteles (32) of Grand Haven, Mich., brought in their economy elementary school for rural Robinson Township at the astounding cost of $7.01 a sq. ft.* Last year they kept the costs of their Mary A. White School in Grand Haven, which was designed with an eye for beauty and educational experimentation, down to $10.27 a sq. ft. They are now working on a high school for nearby Muskegon that is being built at $10.03 a sq. ft. And as they work, their reputation for delivering quality schools on a tight budget is spreading across the country.

Vander Meiden, a veteran of North Africa and Sicily, came home to practice architecture in Grand Haven five years ago after getting his degree at Michigan State University and after working for several contracting and architectural offices. He explains his success with costs this way: "There is no one miracle in the planning or building of schools that allows savings. It is the continual search in every design and construction detail for the elimination of unnecessary labor and

*Including costs of construction, built-in equipment, sewage; excluding land, landscaping, fees, movable equipment.

PHOTOS: (BELOW) RUSSELL BOURNE; (OPP. PAGE) GERALD CARD



For $10.27 a sq. ft., *comfortable Grand Haven, Mich. got a school that is both a distinctive educational plan and the best piece of municipal architecture in town. Main feature of the Mary A. White School's plan is the special educational space between classrooms (above, right). This and other extras, such as the generous planting garden (above, left) in the kindergarten, are allowed by the school's basic construction economy.*

material costs that pays off. By analysis of every detail in advance, unpleasant cost surprises are eliminated."

Yet there are surprises in the Vander Meiden & Koteles schools. The biggest of them is that, even with the architects' passion for economy, the schools are pleasant places in which to learn and to teach. This results in part from a generous use of materials and methods that are not usually found in low-cost schools. Some of the materials and methods used by the architects are: terrazzo floors and ceramic tile wainscoting in corridors and washrooms, forced hot-water heat controlled by individual thermostats in the classrooms, noncombustible structure and deck, 20-year bonded roof, and fluorescent lights. But the schools' pleasantness also results from the respectful use of some simple materials that low-cost schools generally do employ. For example, the exposed steel joists of the Robinson Township School are not dressed up in many colors, but are all painted a rich brown, giving high-level interest and unity throughout the building. Similarly, the ceiling of the Mary A. White School is composed of mineral tile set in a 2 ft. by 2 ft. exposed T system which allows the ceiling to be easily removed. The appearance of the schools is thus contemporary in the most profound sense; from a careful analysis of materials and function, both good design and economy have been achieved.

Robinson Township School

Rural Robinson Township had accumulated over the years no less than seven run-down elementary schools, no one of which was large enough to take the district's 360 students from kindergarten through the eighth grade. It would obviously be more efficient to combine them under one roof. But to raise the necessary funds (estimated at $170,000) meant that the tax rate would jump a steep 11 mills. Nevertheless, based on the architects' assurances that the building would be built as inexpensively as possible, the bond issue was passed by a comfortable two-to-one vote.

As it turned out, the total cost of the 18,167 sq. ft. building was $127,478. This put the per-pupil cost at the incredibly low figure of $354. And, as the plan on the following page shows, the school is not designed to provide much beyond classrooms: a storage room off the principal's office doubles as a health office; the multipurpose room is usable only as a luncheon room or for games

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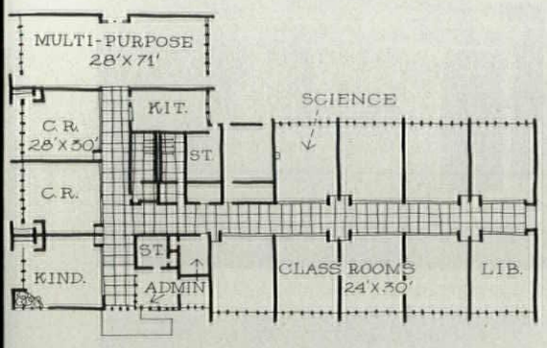
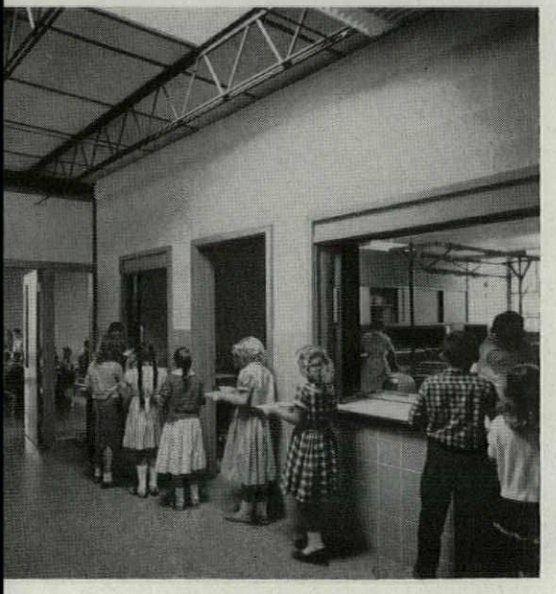
PHOTOS: GERALD CARD





Plan of the Robinson Township School *shows several economies: the uncomplicated form, classrooms without individual toilets or access to outdoors, the tight administrative offices. And, despite the label on the door, the multi-purpose room is not large enough to serve as a gym or full-size auditorium. But because of the school's careful details, well-lighted corridors, and quality materials, it seems neither cramped nor impoverished.*

Cost savers used in these schools

Architects Vander Meiden & Koteles find that their cost-saving devices fall into three categories: design techniques, materials selection, and construction methods. Here is a summary of typical economies in each category:

Design techniques

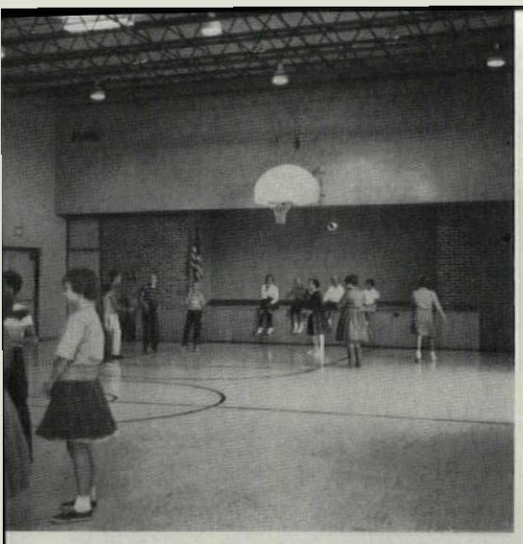
- Select a level site with good drainage, low water table.
- Detail drawings and specifications so carefully that few extras will show up after contract is let.
- Design a one-story building with load-bearing walls and a table-flat roof.
- Place long axis of classrooms at right angle to corridor, thus limiting corridor length.
- Do not overdesign structurally by adding "fudge factors" for extra safety.
- Design throughout for standard sizes in construction materials.

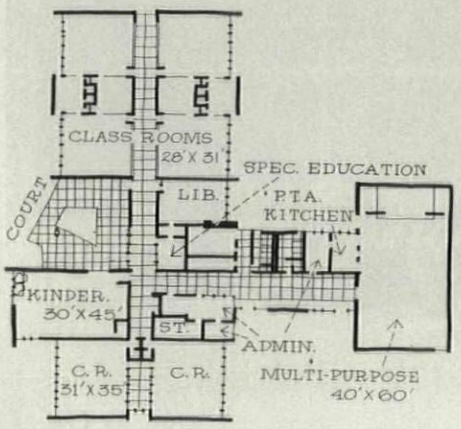
Materials selection

- Indicate to contractors what products are acceptable; specify alternatives so that competitive bids will be received on each item.
- Use aluminum instead of stone sills (saving up to 50 per cent).
- Do not use movable sash and louvered doors unless ventilation studies indicate a need (saving an average $7 per louver).
- Use fireproofed, wooden doors instead of metal fire doors (saving $35 each).
- Inside, use hollow core institutional doors instead of solid (saving $15 each).
- Use concrete block on reinforced concrete footings instead of poured concrete for foundation walls (saving 50 cents per sq. ft. of foundation wall surface).

Construction methods

- Eliminate pipe trenching.
- Leave underside of roof exposed, no ceilings (saving 50 cents per sq. ft.).
- Bond brick veneer to lightweight block walls with galvanized reinforcement ties instead of header blocks (saving 10 cents per sq. ft.).
- Reduce height and cost of chimneys by use of forced draft boilers (saving an estimated $300 per installation).
- Nail wood to lightweight block instead of bolting it wherever structurally feasible (saving 7 cents per linear foot).
- Instead of using prefab, floor-to-ceiling window wall panels, build up wall of 6 in. lightweight block, insulation, sash, and exterior finish panel (saving an estimated $1.20 to $2.70 per sq. ft.).





Plan of the Mary A. White School *reflects the experimental nature of the educational program and the community thought given to the school: the public lobby, the PTA kitchen (the school does not have a hot-lunch program), the large administrative spaces, and the two-story multipurpose room is designed to double as a gym and auditorium. Corridors can be somewhat narrow (10 ft.) because classrooms are self-contained.*

—it was designed to be split into two more classrooms when expansion is necessary.

But the tight plan of the Robinson County School was not the most significant explanation of its low square-foot cost. Far more important for that purpose were the cumulative cost-cutting devices, large and small, used by the architects. These included such major items as a level, sandy, and hence well-drained site (which had to be defended against the attacks of a swamp-suspicious schoolboard member) and foundation walls of concrete block rather than poured concrete (which Vander Meiden and Koteles figure saved them 50 cents per sq. ft. of wall surface). There were also many inventive minor items. For example, the architects had observed in their contracting experience that much on-site time was wasted in cutting concrete blocks to fit irregular measurements; in their schools all walls and openings now conform to the block module. Similarly, they found that case-hardened screw-tight nails had enough holding power in lightweight block and could be used in place of bolts for attaching wood furring strips, door jambs, and frames. Unorthodox but adequate.

Mary A. White School

Essentially the same methods were used in the building of the noticeably more commodious Mary A. White School (kindergarten through sixth grade) in nearby Grand Haven. But, in this case, they were used not merely to economize but also to allow the school builders to spend more money on extra educational facilities.

The most striking extra in the plan of the school is the unexpected space between adjacent classrooms. The outer portion of this space is a wardrobe, with good access out to play areas (see plan); the central portion houses the washrooms; and the inner portion is used for a supplementary teaching area more or less like the L-shaped alcoves of the famous Crow Island School (FORUM, Oct. '55). Advanced students may go there to work on special projects after completion of tests that the rest of the class is still sweating through; and, because of the glass partitions above the dividing walls, the students may still be observed by their home-room teachers.

The 210-pupil school has other luxury features that somewhat increased its total cost ($195,127) as well as its per-pupil cost ($929). Among them are its

GERALD CARD

Outdoor spaces *of the Mary A. White School, like the kindergarten court (bottom), were designed to be logical extensions of the interior. Also, equipment for neighborhood sporting events is kept in lockers that are accessible from the outside. By contrast, the Robinson Township School (top) sits on its level site without relation to outside activities. Funds for exterior development have recently become available.*

outdoor classroom, its generous lobby and PTA kitchen for public occasions, and its fireplace-equipped library. But the point is that the Mary A. White School was not built under emergency conditions; it was built as a community facility that will continue to serve a fairly stable, fairly well-to-do population for some time in the future. It will also serve as an excellent core from which to expand when additional classrooms become necessary.

The architects readily admit that an important reason for the planning success of the Mary A. White School was the citizens' advisory committee, composed of teachers and laymen, which gave them a clear picture of the town's needs and desires. The committee visited many schools throughout the state, concluded that a school of the quality they preferred would cost no less than $15 per sq. ft. When Vander Meiden & Koteles surveyed the site and the program and allowed that they could do it for $10.50, their proposal was greeted with as much skepticism as delight. But the argument that the school could be designed with a more generous educational plan if Vander Meiden & Koteles were allowed to use their cost-cutting techniques won the day. Ultimately convincing was the fact that the school was actually built for only $10.27 a sq. ft.

There are, to be sure, differences between the Mary A. White School and the Robinson Township School. Some of them are: the more expensive school admits fresh air from the outside directly into heating units, whereas the cheaper depends on windows for all ventilation; porcelain enamel panels are used on the outside of the Mary A. White School, whereas cement asbestos board is used for the Robinson Township School; overhead pipes and joists have been covered with an acoustical-mineral-tile suspended ceiling in the Mary A. White School for an extra cost of 50 cents a sq. ft. (Vander Meiden's only esthetic regret about the exposed joists in the less expensive school is that the deck was not lowered to ceiling height because the school board hopes one day to put in a ceiling.)

But for anyone who searches in these schools for quick answers to the nationwide enigma of how to bring school building costs down to the point where they can be afforded by growing U.S. communities, the architects repeat: "There is no one miracle. It is the continual search for the contemporary way."

School trends

New ways to cut costs

A just-completed study tells how to save on 15 key parts of the typical school

Editor's note: This article is adapted from a forthcoming book on school costs by Educational Facilities Laboratories. An offspring of the Ford Foundation, EFL recently surveyed the costs of 100 secondary schools in 16 states.

If American communities are to get the most for their school-building dollars, they are going to have to pay a great deal more attention to unit construction costs than they do today. Economy in school building is not just a matter of efficient educational programming and design; it also demands great care in the choice of building components: foundations and plumbing; roofs and lighting; framing and heating. Indeed, the only intelligent way to save money on school construction is to start with a realistic program and a competent design—and follow through with the best buys possible on construction.

Actually, economy in building should be considered quite apart from the question of how many rooms and other facilities a school should provide. These needs are tied intimately to a community's educational program and as such should be decided on long before an architect gets to blueprints. Granted that a town must weigh facilities against its resources—space and equipment are undoubtedly the biggest elements in determining how many dollars the town will spend. But it should not mix questions of prudence in selecting facilities, which bear on educational philosophy and values, with questions of construction economy.

To save money on construction costs, a community first has to have some idea of what it is paying for the various parts of its school. Total cost per square foot is a theoretical figure which becomes truly useful only when it is broken down into the cost per square foot of each of its components—floors, walls, heating, lighting, etc. For example, there is much abstract discussion about the costs of different types of walls. If in a contractor's estimate the cost per square foot of wall is isolated from all other construction expenses, it is possible to pin down the price of a particular type of wall, compare it with others, and choose the type which is most economical.

At the present time most builders break down the total cost of a school at the beginning of construction in order to justify and substantiate their monthly bills. In other words, their monthly statement is based on the percentage of the amount of each part that is completed that month. These builder breakdowns are far from uniform, but they do provide some basis for determining the relative cost of each building component. And, in cases where specification changes are possible, the breakdowns can lead to reducing the cost of those components that are out of line.

In its recent survey EFL collected cost breakdowns for 72 secondary schools. Here is what these breakdowns show in average figures:

COST/SQ. FT. OF GROSS BUILDING AREA	
Excavation	$ .34
Footings and foundations	1.00
Structural frame	1.57
Structural floors	1.25
Roof deck	.50
Roofing and insulation	.45
Exterior walls (masonry, windows, glass)	2.00
Interior partitions	2.45
Finished floors	.40
Ceilings	.28
Plumbing	1.15
Heating and ventilating	1.90
Electrical and lighting fixtures	1.45
Miscellaneous equipment (built-in)	.75
Contractor's job overhead	.50
Total	$15.99

NOTE: All costs adjusted to the 1959 *Engineering News Record Index.*

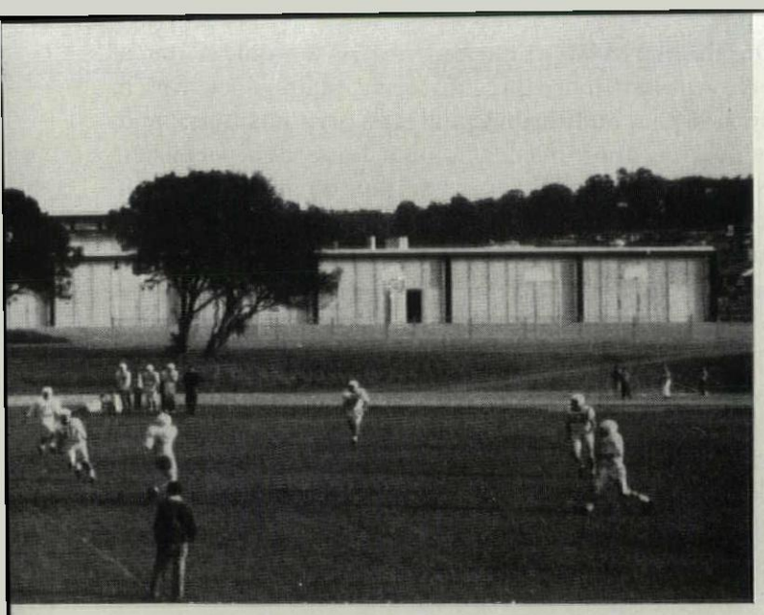
Perhaps the most significant fact revealed by these averages is the importance of mechanical components (i.e.,

continued on page 206

School trends: criticism

A school for the future?

PHOTOS: ERNEST BRAUN



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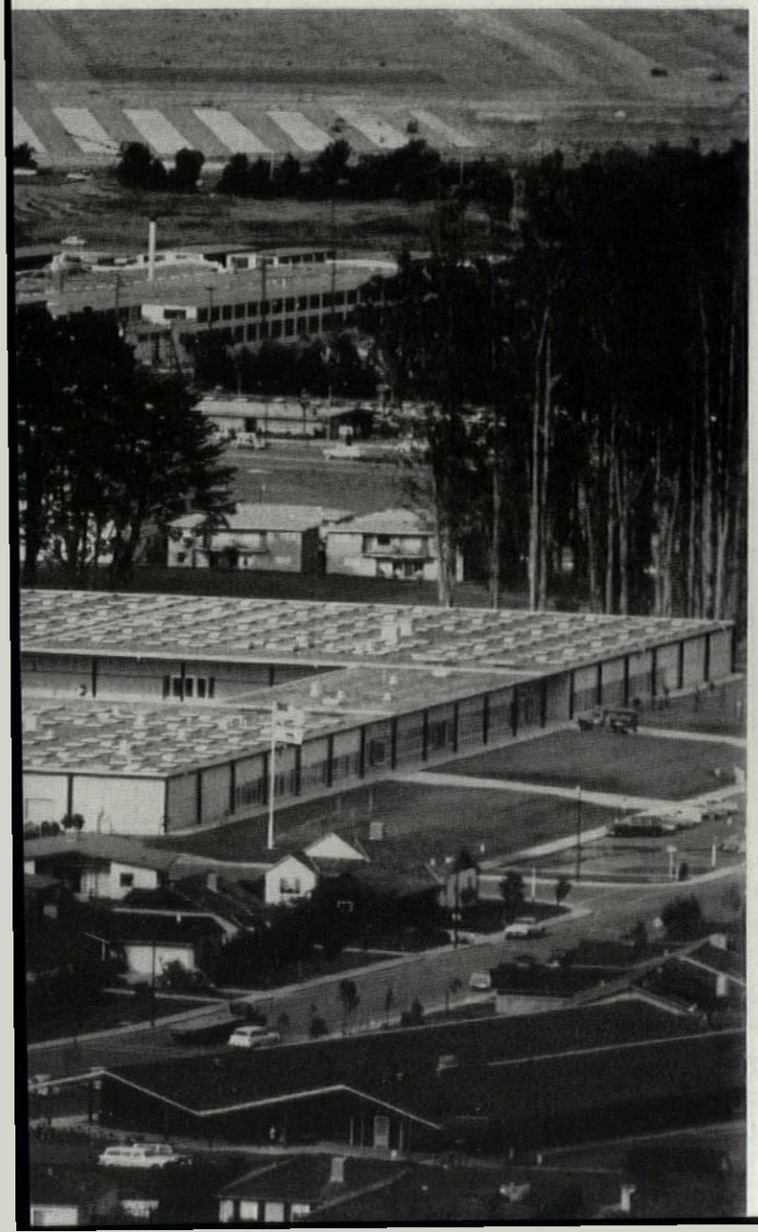
Built on the principle of the industrial loft, highly adaptable to operating changes and monumental in effect, a California high school raises anew the question of humanism

BY ALLAN TEMKO



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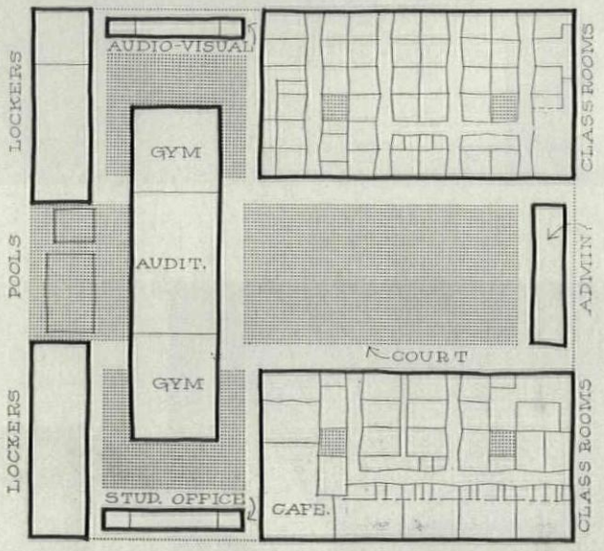
Overlooking the jet airstrips and new factories on the flat shore of the San Francisco Bay stands Mills High School in the midst of one of the prosperous young sprawling communities of the peninsula, 15 miles south of San Francisco itself **(2)**. This is the second essay of Architect John Lyon Reid in producing a "loft plan" school in which, as in a factory, the exterior walls surround huge floor areas lighted through the roof, and in which large numbers of interior classrooms are consequently windowless (see plan). At Mills the windows of those classrooms that do have a share of exterior wall are sealed, and ventilation is all mechanical. Movable partitions let classrooms be changed at will.

Although much of the area was once occupied by the seigneurial 3,700-acre estate of Darius Ogden



Mills, some of whose magnificent stands of eucalyptus and cypress remain on the school grounds, today Millbrae is an expanse of middle-class houses which have sprung up since the war. Like most suburbs, Millbrae is nondescript enough, but since this is California the homes are painted in gay pastels, cheerfully catching the sunlight. On the tawny hills to the west, bulldozers churn up dust, preparing the way for new, equally nondescript subdivisions. One wonders if the town will ever have residential architecture to match the grand, sober elegance of the high school in which its children are educated.

For Mills, like its brotherly prototype a few miles away at Hillsdale, is not only a revolutionary educational structure, it is also unmistakably a monument. Although it lacks the dramatic sloping site and impressive three-level grouping of Hillsdale, Mills in its own right is as imposing in scale, and as formidable in mood, as a walled monastic establishment of the Middle Ages **(1)**. The very plan, compactly organized around a great central court and two smaller courts at either side of the rear of the building, is cloistral; and the open galleries which border the courts, and link them together, enhance the cloistered effect. The great court, which measures 252 ft. by 140 ft., is flanked on east and west by broad, low classroom wings. On the south it is closed by the administrative office, set in a deep loggia which is the main entrance to the building.

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Data on the school: capacity, 2,000 students, optimum, 1,750; area, 196,400 sq. ft.; total cost, $3.5 million; cost per square foot, $17.82; cost per student at capacity, $1,760. Reid, Rockwell, Banwell & Tarics, architects; Burton L. Rockwell, partner in charge. The school board, having built two schools of this type, is well satisfied and is building two more.—ED.

On the north all three courts are dominated by a nobly proportioned but austerely plain block which houses the auditorium and the gymnasiums, and which has the dimensions of a large abbey church.

And certainly Mills is as serious as any Cistercian abbey in its deliberate suppression of ornamentation and color. All is manly, calm, ascetic: not the slightest frill is discernible in the long, horizontal sweep of the walls. The silvery gray sheathing of transite, framed in aluminum, is set off only by the powerful, black colonnades of steel. The exterior is relieved only by isolated metal doors and by a few glazed entries and window strips. None of the windows can be opened. The building is hermetic: it stands aloof on a low rise of lawn, sealed from the capricious, disorderly world around it.

Indeed, with some pride, confronting a suburb littered with TV aerials, the school asserts its own disciplined ideal of rational order in a technological age. To convey this ideal has been the first purpose of the architect, whose structural scheme is inseparable from his searching philosophy of education, as is made strikingly apparent the instant the great court is entered **(3)**. The dignity of this lordly space, if it provides the students with nothing else, should give them an intimation of the potential grandeur and unity of an environment created entirely, except for the sunlight and grass and shrubs, from industrial materials.

For in the court the full strength of the steelwork suddenly comes into play: Architect Reid can probably give special thanks for its brilliant articulation to engineering partner Alexander Tarics who, as in all the firm's work, participated in the design process from its earliest stage. There are few places—Illinois Institute of Technology in Chicago is one—where steel can be seen employed with such lucid strength, and with esthetics so appropriate, in an educational setting. The virile columns—16 ft. tall and 28 ft. apart—create a steady, processional rhythm, reiterated by the beams exposed overhead in the spacious galleries **(4)**, and this rhythm is the chief unifying factor of the design. Athenians, conversing eloquently, or pensive friars or nuns, rather than easy-mannered young Californians, might stroll in these broad promenades.

Yet, in spite of the nobility of these spaces, their mood is strangely troubling, and grows more disturbing as each further step is taken. From the first it was clear that this would be a no-nonsense school, but the degree of sobriety with which it has been treated comes as a surprise. To be sure, the school's *raison d'être*—limitless flexibility of interior dispositions—might well justify the sacrifice of certain amenities. But it comes as a surprise that the building has been stripped to its barest essentials, like a warship readied for action.

The harshness of detailing verges on brutality. Not a single mechanical detail has been softened or concealed. Pipes, vents, electrical circuits are exposed as they would be in an industrial plant, simply hung from the steel overhead decking. If this mechanical clutter could have been saved from grimness by vivid color, the architect did not see

the chance. As on the outside of the building, all is chastened gray and black, with an occasional dull touch of brown. Yet the gray transite itself would have provided an admirably neutral complement for reds and yellows, oranges and blues; and brighter paint would not have been more expensive.

But more than in the over-all somberness, or even in the outright indifference with which the lockers that line the walls were allowed to seem a discordant part of the over-all pattern, the mood of the great court is vexing. One of the joys of courtyard existence is to have a view of tranquil enclosed space, but here the classrooms, already sealed from the outer world, are also shut off from the inner world the architect has created. It is little comfort to know that one day, if need be, the transite walls could be shifted or replaced with little cost or effort. For all that matters today, they might be steel plate.

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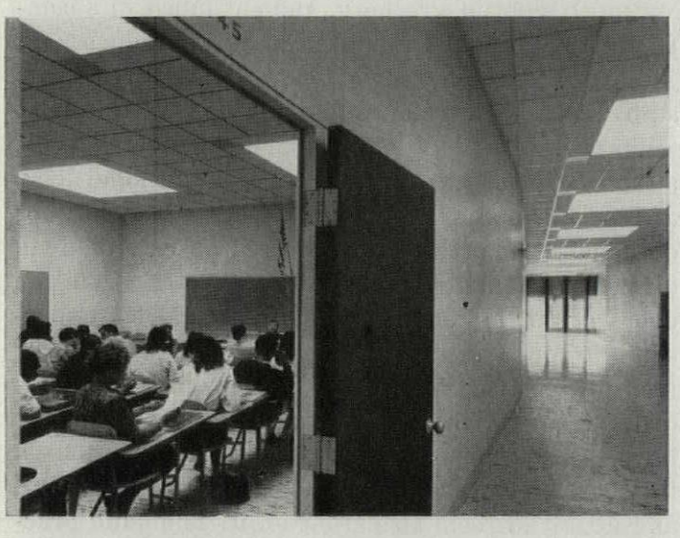
Still, one is willing to concede that the severity can perhaps be justified by the results it may yield within the classrooms themselves. And in fact, the corridors are scarcely uninviting. A suspended acoustical ceiling which hides the mechanical equipment; the natural illumination which floods downward through the well-spaced skylights; the stirring appearance of the steel colonnades marching bravely —at long intervals—through the building; and the fresh novelty of the zigzag arrangement of the movable wall partitions, all make for a pleasant effect, especially when the generously sized corridors are filled with children **(5)**. When empty, however, without the bright clothing of the children to enliven them, the corridors are rather forbidding. The colors are pale, even chilly; off-white, weak green, and predominant in the speckled resilient tile flooring, light gray. The doors are either cinnamon brown or an uninspired green. Again, even though liveliness could have been easily obtained—the baked enamel partitions, for example, certainly could have been ordered in more attractive colors—there seems to have been a deliberate renunciation of gaiety on the part of the architects.



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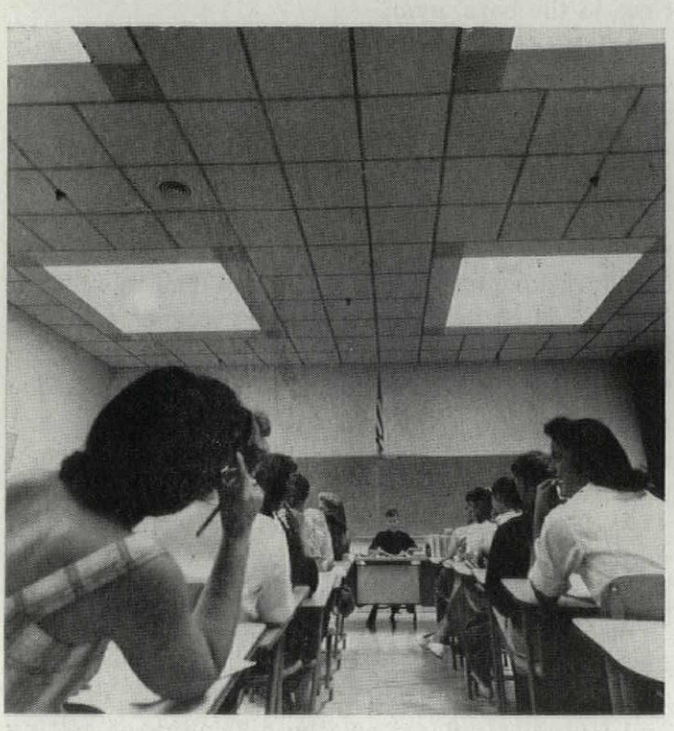
Once instruction begins, moreover, a goodly number of classroom doors remain open **(6)**—strange in a school, where sounds carry. This is the first indication that the viewless, mechanically ventilated classrooms, on which the ultimate success of the school must rest, are profoundly unsatisfactory.



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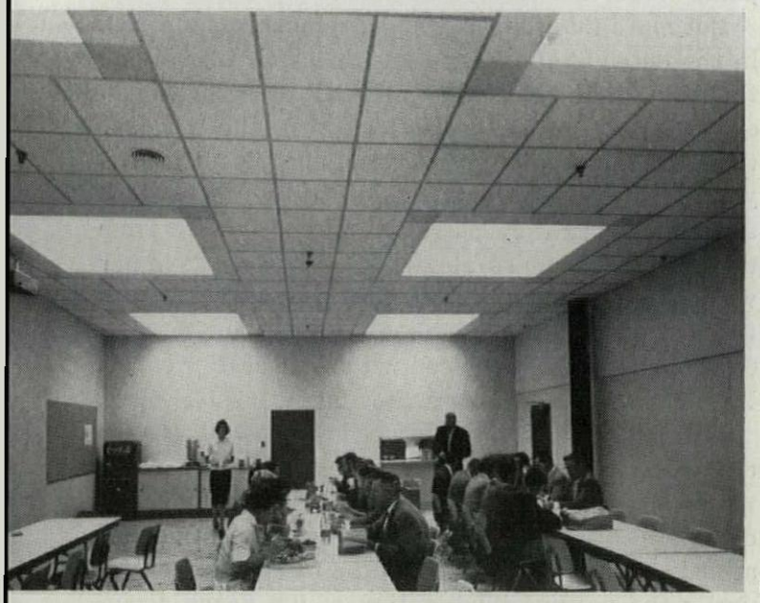
What is one to make of these Kafkalike enclosures **(7)**? If Architect Reid, when planning Hillsdale, once spent two full days within a full-sized model of such a classroom at the University of Michigan, and reported no ill effects, I am sorry to say that my own experience has been quite the reverse. Claustrophobia set in fast. Furthermore, although extended rectifications of the ventilation system have by now prevented the rooms from growing overly warm, it is eerie to breathe an artificially created atmosphere when, a few feet away, beyond the walls, exists one of the finest natural climates on earth. Although Reid took pains to install an alternative to the electric-eye illumination control in the skylights (which turns the lamps on or off according to the intensity of



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natural daylight), he failed to provide any alternative to mechanical ventilation even in those few (about a dozen) rooms which have windows. Why operable sash were not installed is a mystery.

And truly, in some respects the denaturalized classroom environment does seem the product of a *mystique* rather than of a *rationale*. One instructor (significantly a science teacher delighted with the entire concept as well as with his sumptuous laboratory equipment) confided that the windowless rooms permit "absolute control" of the class. He meant this by way of praise, but the implications of the remark are harrowing. Is not a part of education, and surely far from an insignificant part, the facility to dream—to look out momentarily, for example, at a tree or singing bird? Mills High School, as might be guessed, almost willfully turns its side to the splendid trees on the eastern part of the site. The students, except when they go outdoors for sports, never see them.

Yet the students have the advantage over the teachers, who spend most of their working day without much sight of greenery, and eat lunch in a compartment **(8)** that resembles nothing so much as a junior officers' wardroom below decks on a large ship (alas, without even the pin-ups that josh at unnatural isolation). The students' cafeteria **(9)**, although it has an unmistakable institutional look, at least has a view on one of the lateral courts; but once again the architect saw no reason why the long glass wall should have any apertures other than the doors at either end. Here was a wonderful opportunity to open an important room of the school, far from the instruction area, to the incomparable outdoor air of northern California. The court might have been developed as an open-air eating space—a little social plaza, really, since the students' store and activities room also front on it. The band practice room is nearby. Noise does not matter here, close to the boys' gym.

But, as far as architecture is concerned, the only delight provided for the students is the dramatic structural display of the 92 ft. Vierendeel trusses which span the gymnasium block **(14)**. Undeniably handsome, the steelwork does not seem enough.

This systematic indifference to the emotional needs of the students, as detail adds to brutal detail, has a crushing effect. The student council room, with its exposed piping, might well be a corner of a factory set aside for union meetings (and yet it is here that the PTA is also supposed to hold its teas). The restrooms—both for boys and girls—are not equipped with individual washbowls, but with communal basins at which coal miners might scrub up **(10)**. The toilets in the boys' locker room, designed with an arrogance which industrial workers would not tolerate, have no doors **(11)**.

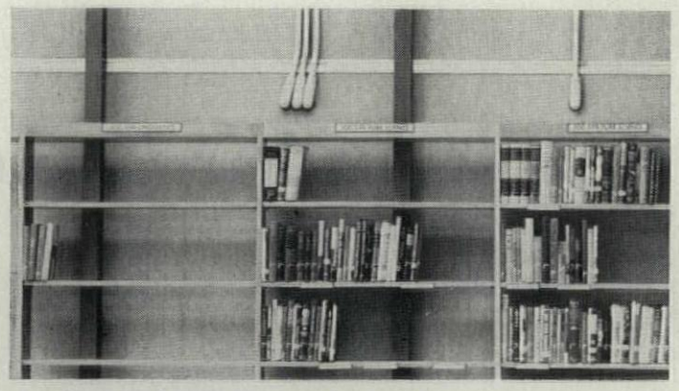
What John Lyon Reid has created in Mills is not flexibility for the future, but poverty for the present. One school official, defending the concept of Mills and Hillsdale, pointed out the difficulties of getting bond issues passed in San Mateo County, whose per-capita income, it should be noted, ranks with the highest in the country. But the school, although it

may not be expensive to remodel, certainly was not cheap to build. Furthermore, why should it not have been costly? Why, for example, was the blank, staring wall of the gymnasium not enriched by a mural **(14)**? Why was the library—theoretically one of the key portions of the building—made a characterless cubicle whose empty bookshelves **(12)** are a standing reproach to the sumptuously equipped gyms and shops?

How much responsibility for Mills must be laid to the charge of the architect, and how much to the community itself, are questions worth pondering. The gymnasiums, as they do in almost every American school, here continue to enjoy an entirely unwarranted architectural prominence. Squeezed between them, and impossible to identify from the exterior, is an auditorium **(13)** so crassly handled that it is shuddering to visualize the ceremonies which will take place beneath the steel decking. The corrugations are filled with glass-fiber acoustical matting, on which the spotlights are turned. The stage curtains are buff colored and solid black. The projection booth is a glass box, plunked at the rear of the room. The Group Theater, in the heyday of proletarian drama of the thirties, could not have devised a colder room.

All this could have been foreseen at Hillsdale, completed four years ago, and in almost every way a more congenial building. But, as if to reverse Picasso's dictum: "We do it first, and others come along and make it pretty," Reid in his second loft-plan school has seemed determined to make it as unpretty as possible.

The problems facing American education may not be pretty, but in the third high school in this series, now under construction in the same district, Reid has altered his philosophy little. There will be some courts in the classroom wing, not primarily to give the students a glimpse of greenery, but to improve the ventilation system. There will be more color. But the fundamental hermetic quality will remain, hemmed-in, troglodytic, a dream of technocracy, as if the year were already 1984.



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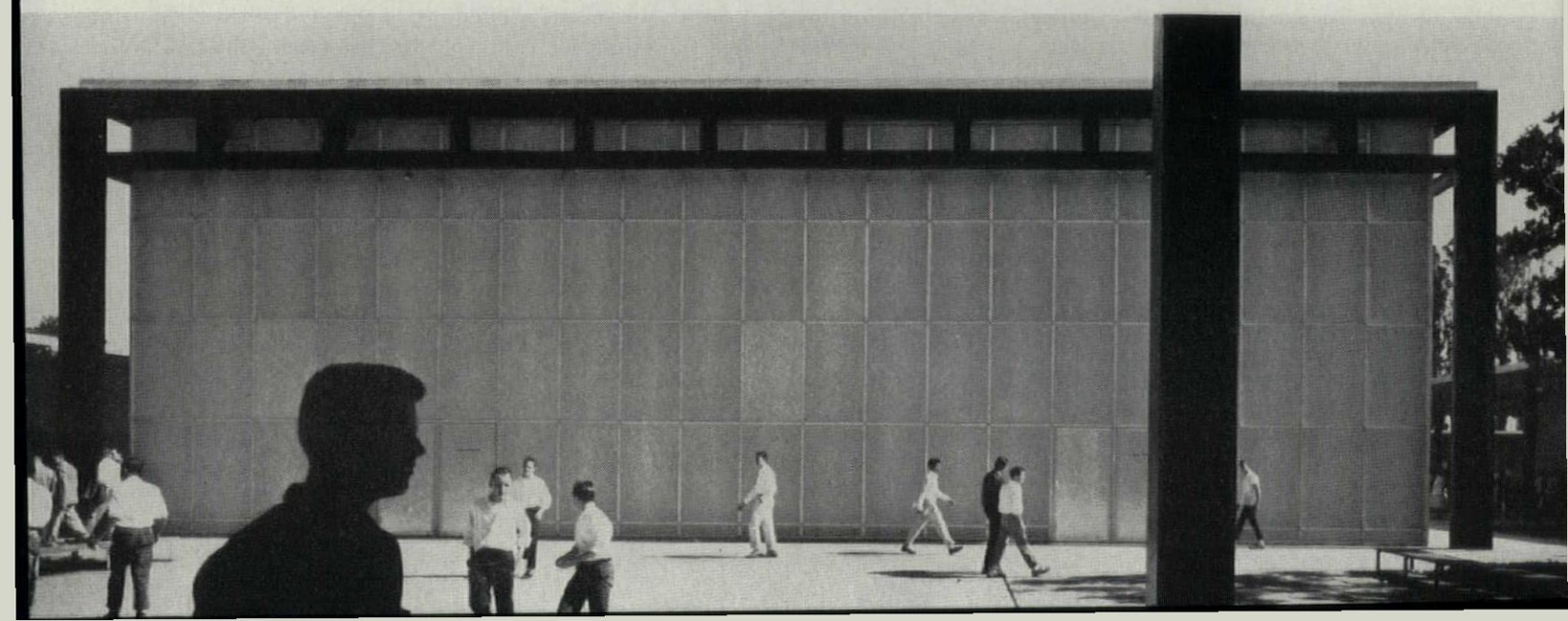


Colleges for the community

The big growth in junior colleges means some basic changes in education and some knotty problems in design, finance, and administration

What has long been the missing link in U.S. education—an institution that is more than a local high school, but less than a university—is being supplied by a relatively new kind of establishment: the community college. And by the looks of things, the community, or publicly controlled, *local* junior college may soon become as big as the full-fledged university itself.

The evidence is both in the rapid growth of junior colleges during the past 25 years, and in the predictable U.S. population increases over the decades to come. Twenty-five years ago there were 500 junior colleges in the U.S. (most of them private); their total enrollment was a mere 100,000 students. Today, there are 667 junior colleges with nearly 900,000 students, and enrollment is growing at a fantastic rate. Finally, by 1965 some 60 per cent of all high school graduates will look for places to carry on their education—i.e., there will be some 5 million boys and girls looking for *some* sort of college! This is a figure that chills the blood of most university presidents.

What is a junior college?

In trying to find ways of meeting this huge demand for more learning, educators look upon the junior college as a godsend. As a matter of fact, the junior college as such is nothing new—it has been around, in the U.S., since 1896. What *is* new is the sudden, explosive growth of junior colleges for specific, local communities. While a few experts feel that the words "junior college" are merely a euphemism for the old "trade school," most realize that the junior college can accomplish at least three things not being accomplished by any other educational tool in the U.S. today: first, it enables the less well-to-do to extend their education by two years beyond high school and at low cost; second, it gives students a two-year period in which to decide whether or not they want to proceed to a full-fledged college education; and, third, the junior college provides facilities for adult education on a scale never before available in U.S. communities.

All three of these accomplishments are of major importance: the youngster, whose parents cannot afford the $1,500 or more annually required for room and board at most universities, has a chance to take accredited freshman- and sophomore-year courses while living at home, at an annual tuition fee—at *public* junior colleges—ranging from nothing to about $300. Moreover, the junior-college student can even hold down a part-time job in the community while extending his education. At the end of this two-year stint, the junior-college graduate will receive an associate degree (in arts or sciences); and if he wishes to continue at a university, the latter will, in most cases, give him full credit for courses completed at junior college.

Even more important is the fact that the junior college takes the heat off the crowded first two years of regular college, during which a good many students tend to drop out. Many educators have found that present college-entrance examinations do not really provide any clues to a student's future potential and feel that the two-year junior college provides a more accurate yardstick: boys and girls who really want to continue their education beyond that (and have shown sufficient ability to do so) are certain to make valuable students. Indeed, one educator has predicted that there will soon be only junior and "senior" colleges, the latter confining their curricula to the last two years of today's four-year college course, and to postgraduate work.

Finally, the community college is proving to be a fine tool of adult education. More than one third of all junior-college students today are adults, and the chances are that only a tiny fraction of these could have afforded to continue their education at a far-off college. The new junior college, being a community institution, has enabled these men and women to expand their knowledge without breaking off family ties or leaving their regular jobs.

In physical terms, junior colleges may be anything from a night school, carried on in the local high school building, to an expensive "finishing school" for postdebs. But the physical pattern that is beginning to emerge in *new* junior colleges is something like this: a fairly elaborate campus, located close to a major population center, with many of the facilities of a small college—except for dormitories. There also tends to be a difference in emphasis in the educational program: most junior colleges go in for many "practical" courses like nursing or radio, recognizing the fact that the majority of their students will *not* transfer to a regular college but, instead, apply their new

knowledge to a trade or business after their two-year stint. Students who want to prepare for regular college courses later on may select a more basic program in liberal arts or sciences.

The junior-college movement has spread like wildfire through western states; in California alone, more than 400,000 were enrolled in junior colleges last year. Advocates of this new educational tool believe that the junior-college movement is sure to spread through most other states as well: the $250 million bond issue voted for education in New York State in 1958 will go largely toward the creation of junior colleges, and similar programs are under way in Illinois, Florida, Maryland, South Carolina, and elsewhere.

A new kind of campus plan

Because most junior-college students do not live in, it becomes doubly important—in designing this new kind of campus—to develop a physical plant that will create a sense of educational community, while stimulating an understanding of the breadth of education. This can be achieved in many different ways, but some of the better new junior-college plans have tried to do two things: they group their teaching units in clusters that are related to teachers' studies and administrative offices, so that the contact between students and instructors can be close and intimate; and they deliberately string out these clusters so as to force students to walk past and through other, specialized, teaching areas and to become aware of other fields of endeavor. The plan for Foothill College (see next page) is a good case in point.

In addition, because much of the social life of the living-in college is missing, special emphasis is laid upon providing communal student facilities such as lounges, recreation areas, assembly halls, and the like. And, finally, the location of any proposed junior or community college is as carefully selected as that of any shopping center, and according to some of the same principles—for the community college, if it is to fill a real need, should be near the present (or future) geographical center of a heavily populated area.

In short, the new junior-college campus differs radically from the traditional college campus in one fundamental respect: whereas the traditional campus tended, whenever possible, to seek a certain isolation (on the theory that students and professors needed a setting conducive to detached scholarship), the junior-college campus has to be an integral, physical part of the daily life of its community. The chances are that both the community and the junior college will benefit: the community because its most promising talent will not be lured away by better educational facilities elsewhere, and the junior college because it can draw upon local experts in business and the professions to supplement its teaching resources.

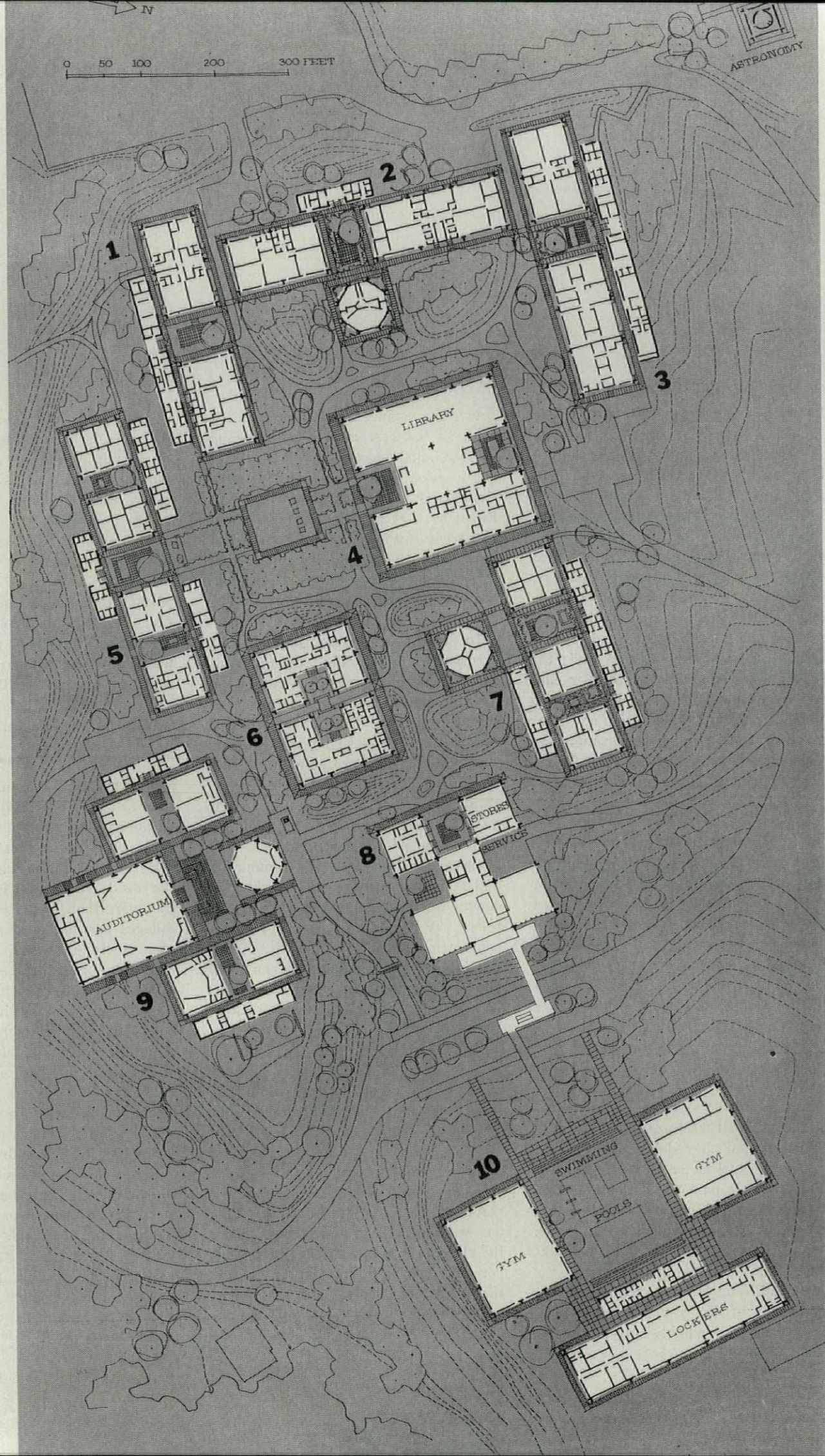
Who foots the bill?

The operating expenses of junior colleges are met in many different ways. The most common method is for the state to set aside a certain sum (or a percentage of running costs) and for the community to raise the balance through taxes and tuition fees. This has worked well in California, where the state pays at least $120 per student per year, and the community collects the balance of $300 to $400 that seems to be needed, per capita, to operate one of these new campuses. The chief reasons for the economies achieved in junior-college operation are two: first, no dormitory facilities need to be provided; and, second, freshman and sophomore courses do not require so many costly and elaborate facilities as are used by juniors and seniors in regular universities.

The initial costs of building a new, public junior-college campus may range from $2,000 to $4,000 per student. These sums have been raised in various ways, the most popular being to obtain about 50 per cent of the total through state aid, and the balance through private gifts, local taxes, or bond issues.

And who runs the show?

The majority of junior colleges in the U.S. are controlled by some public authority—usually a local board, supervised by a state agency. (These colleges account for nearly 90 per cent of the total enrollment in the country.) But more than 40 per cent of all junior colleges are independent or related to some religious group. Still, as the states become increasingly conscious of the problem— and move to do something about it—the junior college is bound to become, increasingly, a tool of public education, closely related to other public institutions, such as state universities and local elementary and secondary schools. How important a tool the junior college may become was suggested by President Eisenhower during a recent discussion on education, when he brought up the possibility that every young American attend a "local free system" of schools for at least one or two years after graduating from high school. If this proposal comes true, the junior college will become the most important institution of higher education in the U.S.



1. *Natural and health sciences*
2. *Physical science*
3. *Engineering and technical training*
4. *Library*
5. *Language arts and mass communications*
6. *Administration*
7. *Social science and business education*
8. *Campus center*
9. *Fine and applied arts*
10. *Physical education*

A prototype for community colleges

Novel junior college for 3,500 full-time students was designed to become the educational and cultural center of the community which it will serve

On a 122-acre site some 30 miles south of San Francisco, work is about to begin on one of California's newest (and most elaborate) community colleges; and when the $10.4 million campus of Foothill College is completed, it may set a new, high standard for other junior colleges through the U.S.

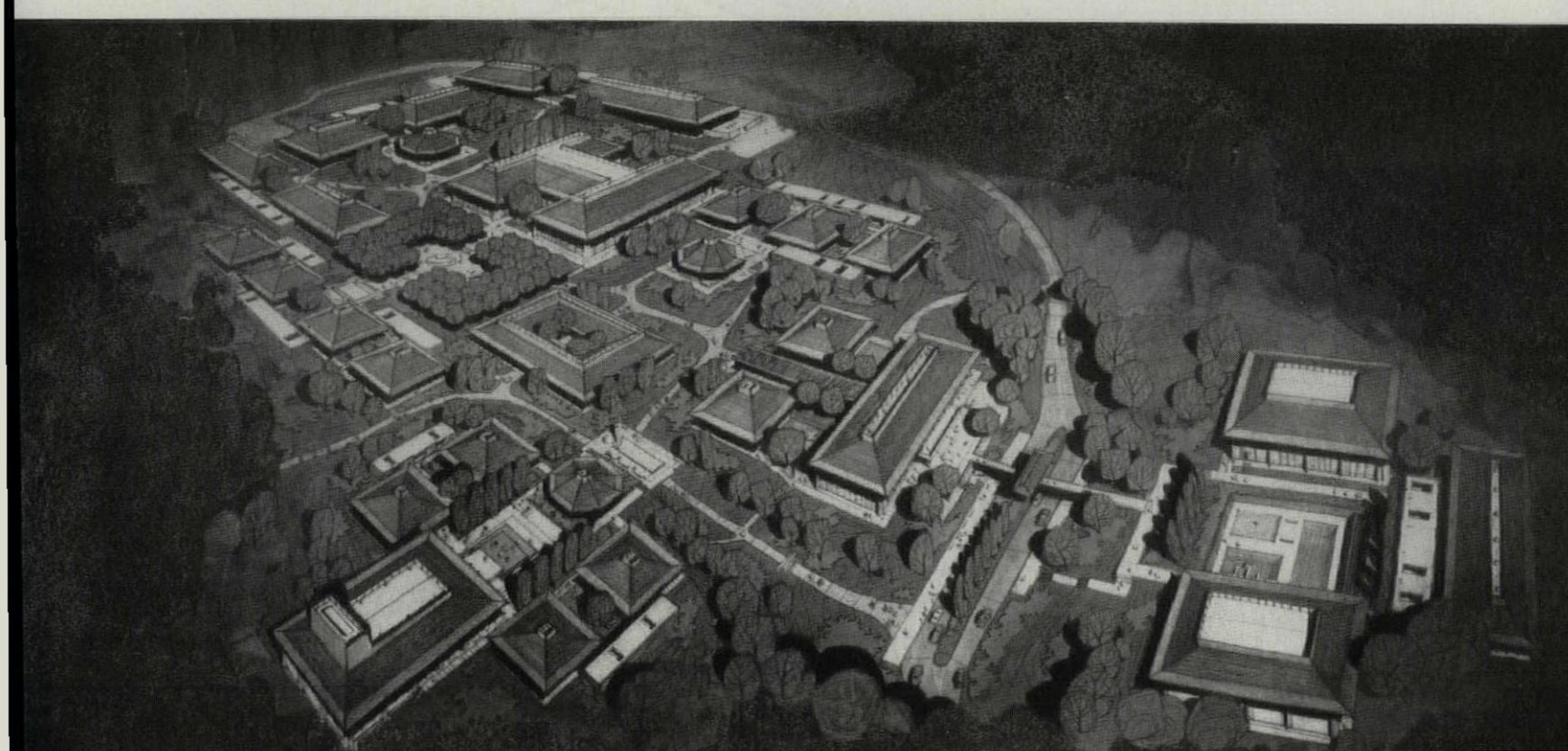
This is so in part because the Architects—Ernest J. Kump and Masten & Hurd—carried out an exhaustive and original study of the things that go into the making of a successful community college; it is so, also, because the state of California has the most enlightened junior-college program in the country; and, finally, Foothill College may set a new standard because, from over-all plan to smallest detail, it establishes a new physical pattern in higher education.

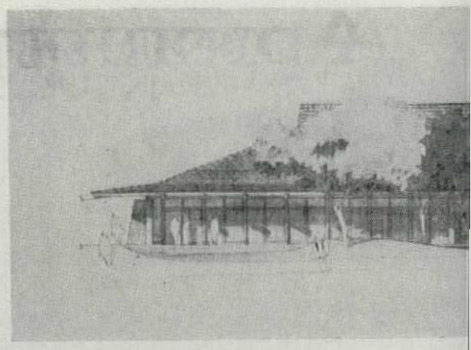
The pattern developed for Foothill College was determined by several considerations: to start with, the architects felt that today's junior-college program is still a rather amorphous thing; for this reason, they argued, the buildings for the college should be flexible enough in plan to accommodate almost any teaching activity today—and tomorrow. A unified "space module," on which all academic units are based, was the result (see pages 136-137).

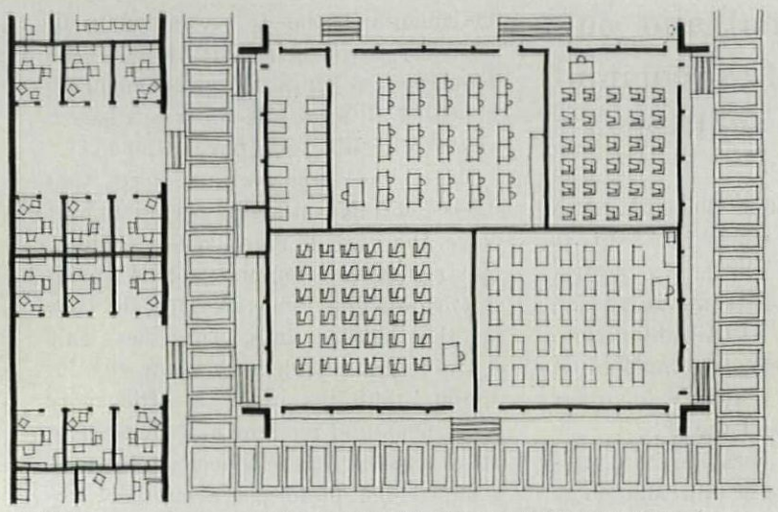
Next, the architects decided that since Foothill's students would live at home, the campus must convey some of the feeling of community often absent among students who spend little time together outside class. To achieve this character, the architects made the individual buildings look a little more permanent and monumental than those of a typical high school; and they grouped the buildings around 44 related, landscaped courts (ranging in size from small, intimate patios to a large, formal area for outdoor assembly) and thus created dozens of "outdoor rooms" in which students can meet informally between and after classes (see below and opposite).

Finally, because Foothill was planned as a *community* college (and center), its buildings were designed to reflect the character of the Bay Region, and the informal landscaping was developed to respond to the contours of the site.

Main access *to the college is by a highway that circles the hilltop on which the campus is located. A bridge over the highway (see below) connects the physical education areas (right) and the H-shaped campus center. A system of many courts is revealed in the site plan (opposite), which also shows the formal, symmetrical court in the center of the campus, in front of the library. This area will be used for outdoor assemblies. In other courts the landscaping is informal.*



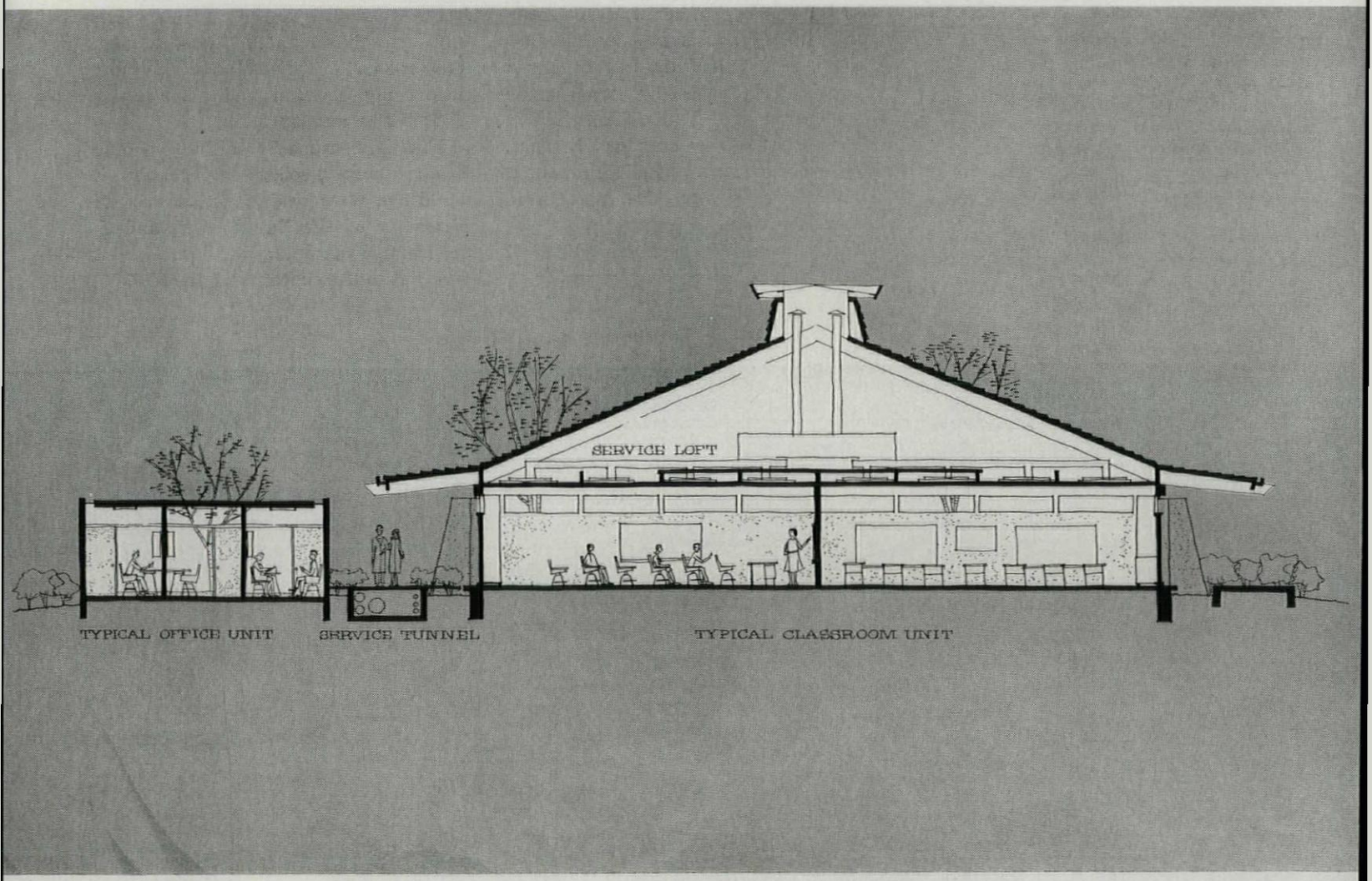


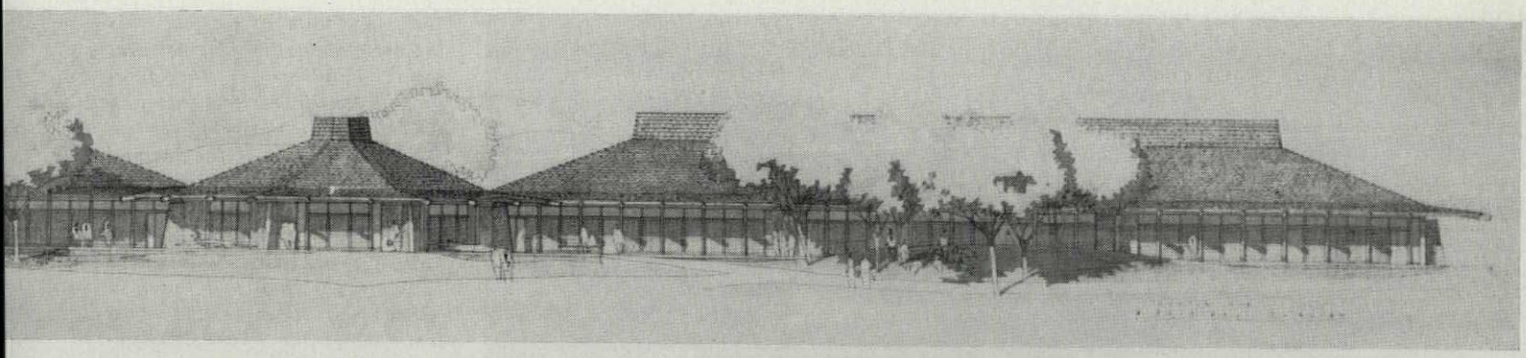


TYPICAL OFFICE UNIT

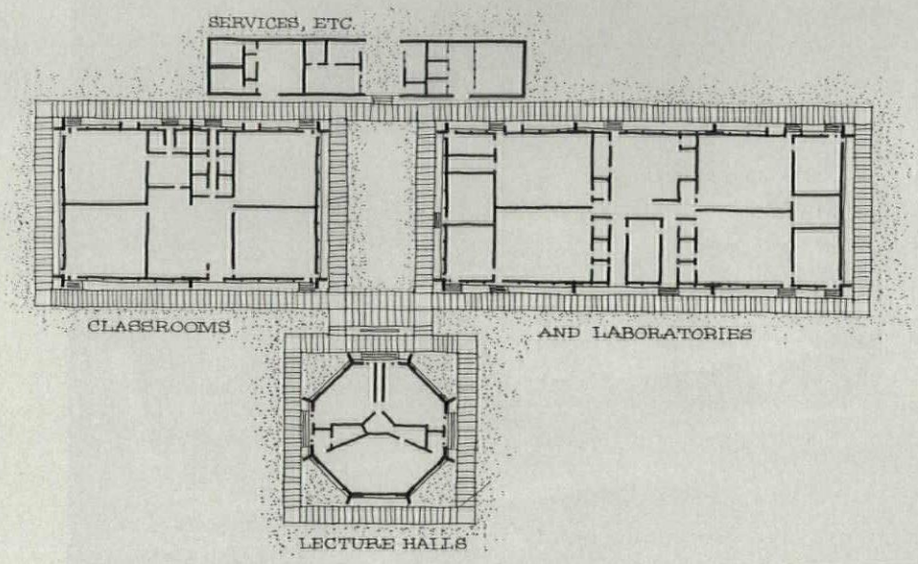
TYPICAL CLASSROOM UNIT (SPACE MODULE)

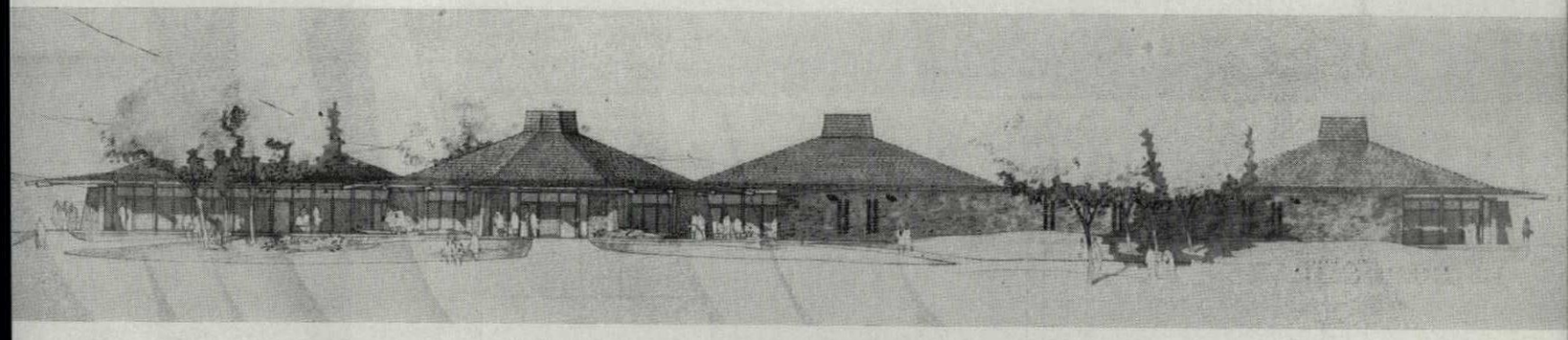
"Space module" *developed by the architects for all academic units is a plan-rectangle of 60 ft. by 68 ft., whose corners are formed by concrete piers (see plan at left). The piers in turn support a steep hip roof whose attic space contains all mechanical equipment. Ceilings and wall panels are based on a 4 ft. grid. Section (below) shows the typical teaching unit with hip roof, and the flat-roofed, brick-walled office and service structure next to it. The close relationship between administrative and teaching units makes younger students feel at home.*



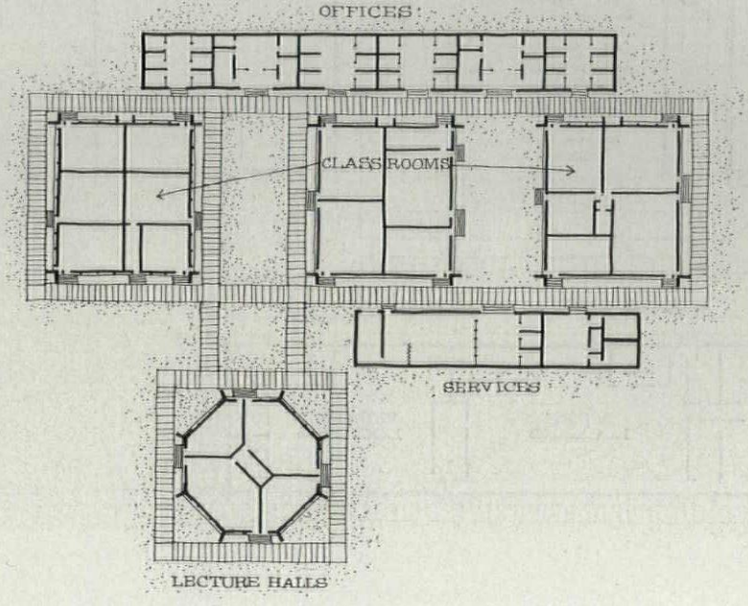


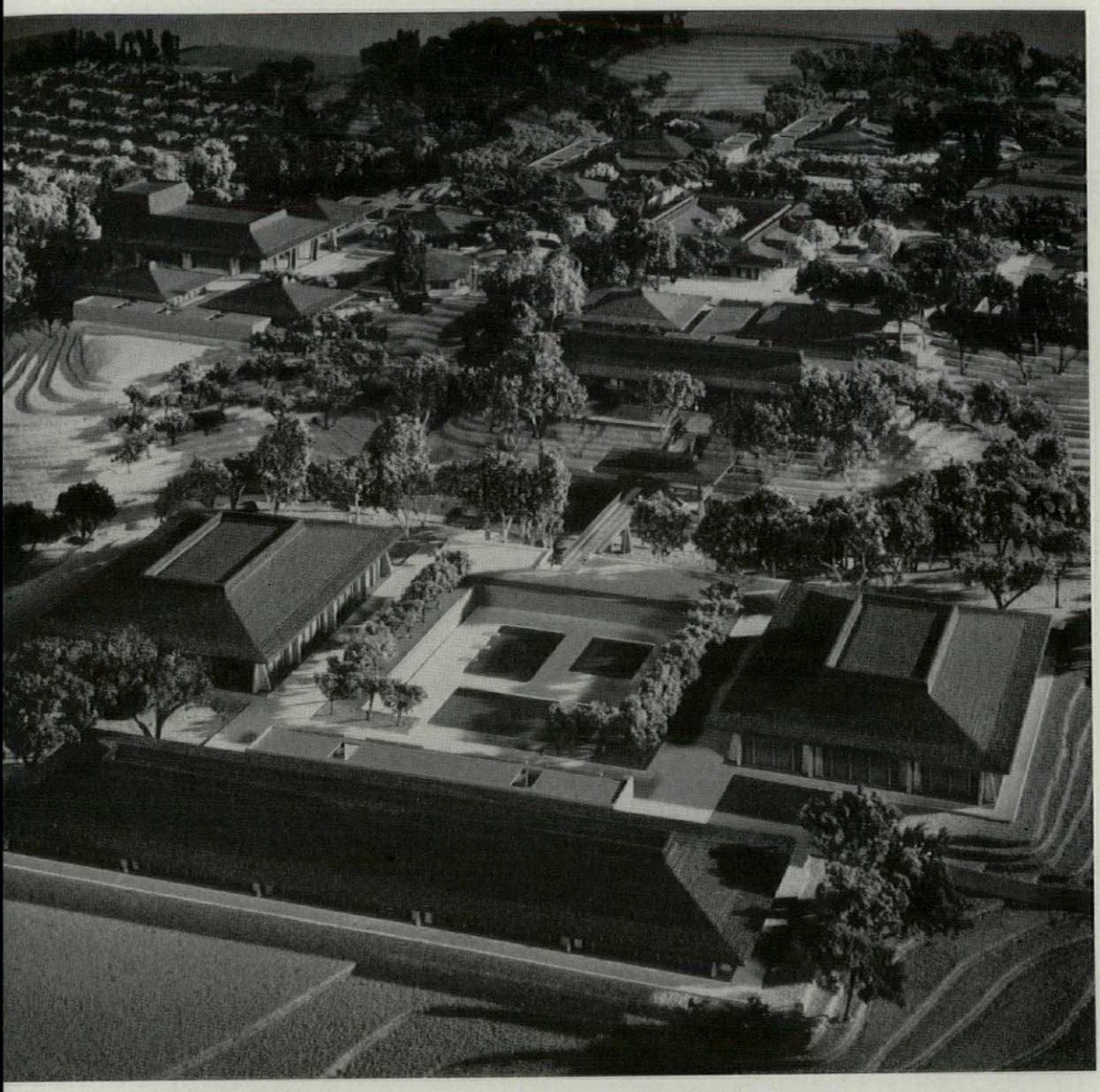
Physical science cluster *shows how basic units of 60 ft. by 68 ft. "space module" can be combined to form larger buildings. When units are so combined, the space module is adjusted to include the width of masonry piers. The octagonal lecture-hall building can be subdivided to accommodate two, three, or four small lecture rooms, or serve as a single, large hall. Exterior finishes on all structures include redwood shakes, redwood siding, brick, and the rough, rock-aggregate concrete of the piers. A liberal sprinkling of elms, sycamores, pines, and birches will help produce variety.*





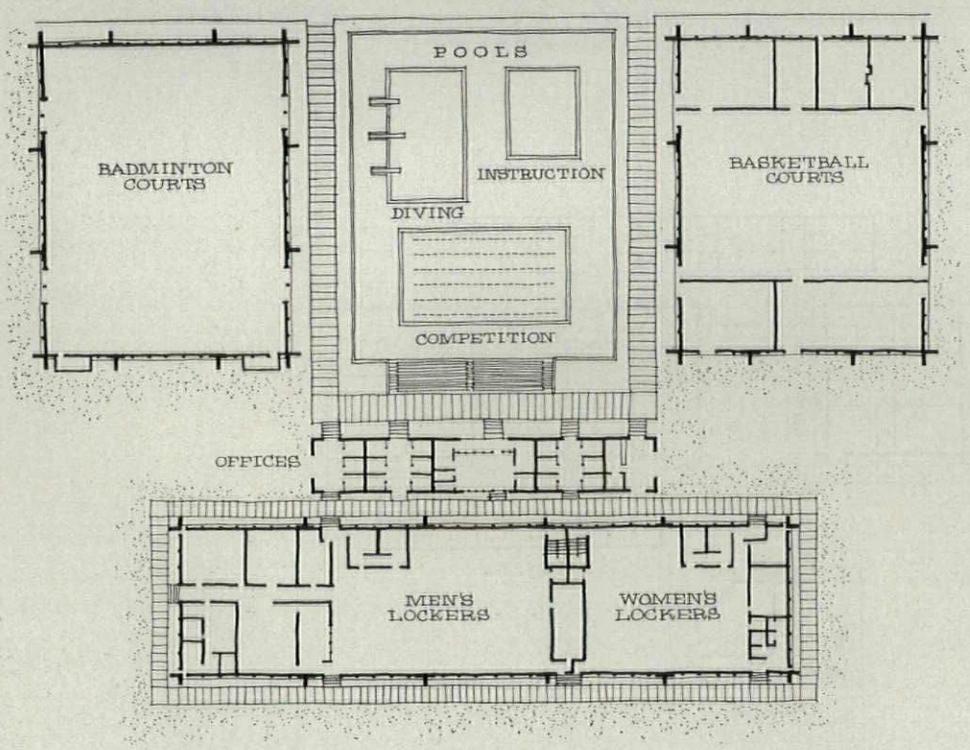
Social science and business *group is typical of clusters of teaching units that make up the campus. Small- and medium-sized courts are used to give clusters an intimate scale. Octagonal structures are lecture halls, which will form focal points in larger courtyards. The small, rectangular annexes not only contain faculty offices, but can also accommodate special labs and students' toilets. In California's climate, corridors are universally replaced by covered, outdoor walks.*

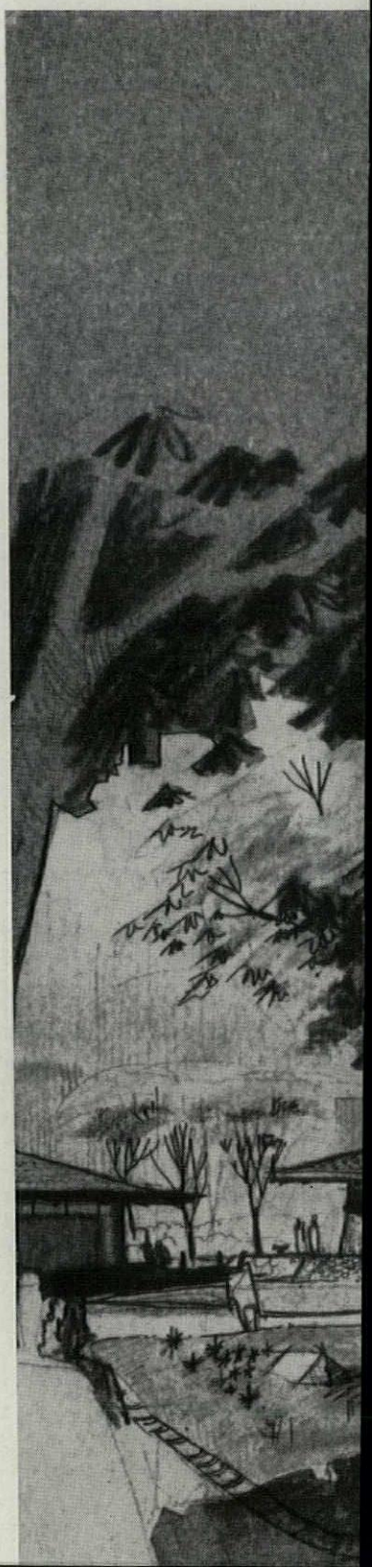




DWAIN FAUBION

Bird's-eye view *of campus from the north shows the physical education buildings in the foreground and the campus center in the distance. To the left of the center are the buildings for fine and applied arts, including a theater. Because this group is close to the entrance to the campus, it is treated with some formality and boasts a pool and bell tower in its symmetrical court. Plan (below) shows the physical education buildings, whose structural organization is closely related to the module used elsewhere, despite the fact that much larger spaces were called for.*



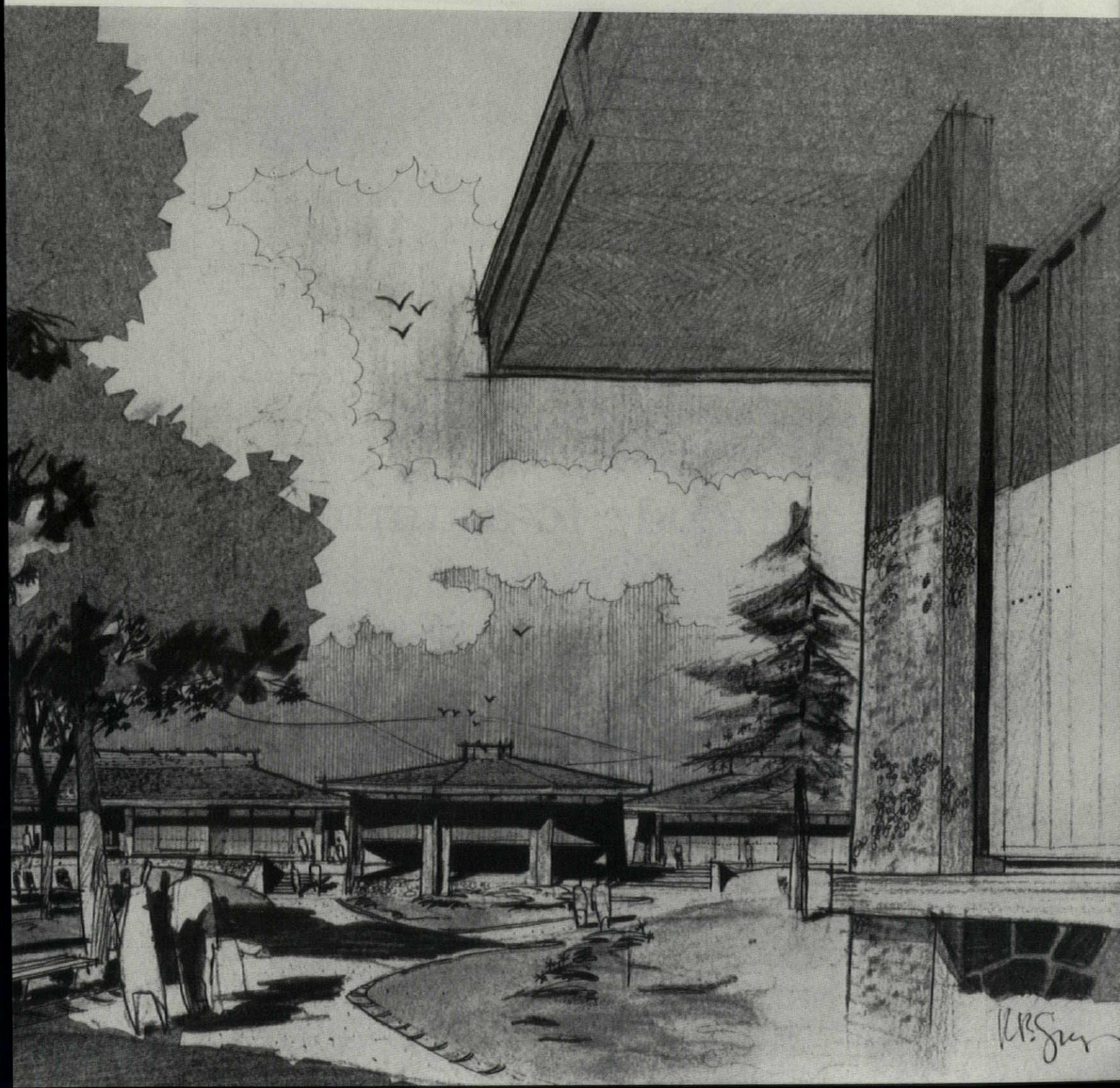


Typical informal court *(with physical science buildings in the distance) has meandering paths and rolling lawns. The landscape architects have tried to "sculpt the earth so as to repeat, at pedestrian scale, the larger forms found throughout the surrounding valley." Many courts are used as extensions of indoor teaching areas: e.g., in the natural science group, a pendulum will be placed in the court to show the movement of the earth; and the art court has a stage for models in outdoor classes.*

FOOTHILL COLLEGE, Los Altos Hills, Calif.

ARCHITECTS: Ernest J. Kump (partners: Stanley M. Smith, James D. Fessenden, and Arthur B. Sweetser); and Masten & Hurd.

LANDSCAPE ARCHITECTS: Sasaki, Walker & Assocs.



PHOTOS: BALTAZAR KORAB

With all the enticements of a glittering jewel box, Reynolds' new Great Lakes headquarters soft-sells aluminum on a busy Detroit expressway

Yamasaki's ode to aluminum

Aluminum producers, who have so far supplied the auto industry with only small parts, have long hoped to capture a larger share of Detroit's big-volume metals business. This fall, as part of an all-out sales campaign, architecture-conscious Reynolds Metals Company made Detroit aluminum-conscious when it opened its new $2 million Great Lakes Sales Region Headquarters Building on the Northwestern Highway opposite famed Northland Shopping Center (photo, above). The 45,500 sq. ft. showcase building designed by Detroit Architect Minoru Yamasaki & Associates* is glitteringly dramatic and meticulously crafted and should prove mightily effective as a sales tool. Framed by a shallow reflecting pool which is set on a raised white terrazzo podium, the three-story structure is precisely organized around an interior court—carpeted with a thick royal purple rug and crowned by a many-faceted, tetrahedral, trussed skylight. The first floor, unbroken by partitions, is a reception center and exhibition space. The upper two floors contain offices and conference rooms flexibly partitioned on a 5 ft. module. In the podium base is a 100-seat auditorium and meeting room and additional exhibition space.

*The architect's project staff included Cass S. Wadowski, Harold Tsuchiya, Gunnar Birkerts, and Lillian Pierce.

plan through which people in a locality work together to banish slums and block their return. The Workable Program focuses the attention of local people on local problems. It provides for pleasant city living and working conditions. It looks forward to healthy growth.

Let's not sell private enterprise or the initiative of American citizens short.

NORMAN P. MASON, *administrator*
Housing and Home Finance Agency
Washington, D.C.

SAVING THE SHORE LINE

Forum:

I am surprised at FORUM's support of the Neuberger bill, relating to nationalization of shore-line areas (FORUM, July '59).

"Shore line," as we have discovered from recent activities of the National Park Service, can be interpreted to include the width of Cape Cod, from ocean to bay, taking all the established homes that lie between.

Surely FORUM does not advocate that a government appointee be given power to slap a hand on a map of the U.S. and, wherever it falls, say "I take possession of this property for the benefit of the public at large." No public hearings as to the public *need* for the property, no advance consultation with or concern for the provident citizens who have established homes and spent lifetimes developing communities and a way of life in them. Benefit of the public, indeed!

WILLIAM H. WENNEMAN
Cleveland

■ FORUM *is, of course, opposed to indiscriminate confiscation of private property for public use. Since introduction of the broadly worded Neuberger bill, identical bills for a Cape Cod National Seashore Park have been introduced by Senators Kennedy (D, Mass.) and Saltonstall (R, Mass.), and Representative Thompson (D, N.J.). These bills define the actual limits of the park, include specific standard protections for towns and property owners (e.g., lifetime occupancy clauses), and require that six of the nine members of the Park Advisory Commission be recommended by the towns affected.*

DEVILS AND MANIACS

Forum:

The printer's devil—no friend of mine nor of "action architecture"—has by inserting an innocent letter "a" into the "manic esthetic" of my article (page 244, October issue)—changed its meaning to something quite diabolical. I am confident that no reader of yours was taken in by such low cunning.

G. M. KALLMANN, *A.A. Dip. A.R.I.B.A.*

	1958 Actual	1959 Est.	1958-59 Change	1960 Forecast	1959-60 Change	1958-60 Average annual change
PUBLIC TOTAL	15,276	16,350	7.0	**16,425**	0.5	3.8
Nonresidential	4,653	4,450	—4.4	**4,500**	1.1	—1.7
Industrial	408	350	—14.2	**375**	7.1	—3.6
Educational	2,875	2,600	—9.6	**2,700**	3.8	—2.9
Hospital and institutional	390	450	15.4	**475**	5.6	10.5
Administrative and service	532	575	8.1	**500**	—13.0	—2.5
Other nonresidential	448	475	6.0	**450**	—5.3	0.4
Residential	846	1,025	21.2	**750**	—26.8	—2.8
Military facilities	1,402	1,550	10.6	**1,650**	6.5	8.6
Highways	5,364	5,900	10.0	**5,900**	0	5.0
Sewer and water	1,387	1,450	4.5	**1,550**	6.9	5.7
Sewer	836	900	7.7	**950**	5.6	6.7
Water	551	550	—0.2	**600**	9.1	4.5
Public service	451	550	22.0	**500**	—9.1	6.5
Conservation and development	1,019	1,200	17.8	**1,300**	8.3	13.1
All other public	154	225	46.1	**275**	22.2	34.2

ERRATUM

The same printer's devil transposed the figures on public construction in the tabulation accompanying FORUM's *forecast of building activity for 1960 (*FORUM, *Oct. '59, page 130). The correct figures for this portion of the tabulation appear above and in the reprint of the article which is available upon request.*—ED.

IMITATING TIVOLI

Forum:

In our city planning we should be influenced by those same principles of design which helped to make Tivoli (FORUM, Aug. '59) itself so successful.

First of all, it has *character*. It was born with some, in the nature of the ground and surrounding environment, and what it may not have had there originally was put there or cultivated by the architects.

Second, it has *unity*. The diverse elements are knitted together. Every part is related to another, yet is somehow different. A city like New York, the melting pot of nations, should not fuse together the cultures of its different inhabitants but should help develop the best characteristics of each and every one. The naked jungle of concrete and glass would disappear if individuality were encouraged. I cannot see, for example, why New York City wants to have an all-purpose lamppost.

Third, Tivoli has *vistas*. In a great city the turn of every corner should present a new and exciting experience. When you come to Tivoli you are led you know not where; but as you explore its precincts your curiosity is aroused. It is a restful inquisitiveness—there are no neon directional signs—no "walk" or "don't walk" commands. At Tivoli you do not feel forced to do what you do not want to do. It is like exploring Paris or Rome without a guidebook, and without American Express.

Finally, not only are the vistas interesting at Tivoli but the walks are gauged to the *traffic* they bear. You can sense, without the aid of any signs (for there are few), which way you should walk. There are major arteries and minor tributaries; the grand boulevards where one can stroll, or sit and watch the world go by; and the small, secluded groves to enjoy solitude.

If our American heritage, customs and habits, embodying the backgrounds of many nations, in addition to our own, could be properly analyzed and interpreted by our architects and planners—as they have been in older countries of Europe, and at Tivoli—then our cities would serve us much better than they now do.

JEFFREY ELLIS ARONIN, *architect*
New York City

CURTAINS

Forum:

We appreciate your using several of our studies of the U.S. Mission elevations to illustrate your article on curtain walls (FORUM, Oct. '59); we are, however, embarrassed at receiving all the credit. This job was done by us in association with Kahn & Jacobs.

B. SUMNER GRUZEN, *architect*
Kelly & Gruzen
New York City

END

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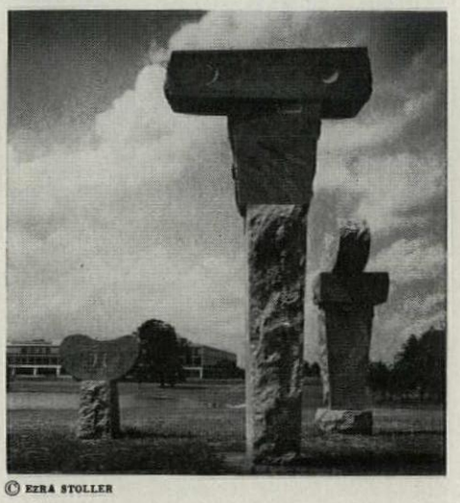
Criticism . . . urban robbery . . . shore-line bills

WALLACE LITWIN



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CRITICAL BULL'S-EYES

Forum:

Your article "Saying nothing, going nowhere" was a bold step in the right direction (FORUM, Aug. '59). Criticism of this sort is justified and I wish we had more like it. This is one of the best articles you have published in a long time and I took the liberty of quoting it in the architectural section of our local newspaper.

BROOKS MARTIN, *architect*
Brooks Martin Assocs.
San Antonio

Forum:

Robin Boyd scores a bull's-eye in his July statement. Liberaces who continue to produce "architectural erotica" should be kicked in the behind and shown the error of their ways.

If we must have poetry, let it be a pragmatic poetry which stems from the firm conviction that architecture serves man and his needs. There is more beauty in a cubic yard of Kahn's concrete than in a square mile of Stone's screens.

JOHN DALTON, *architect*
John Dalton & Peter Heathwood
Brisbane, Australia

MIAMI ART

Forum:

The yellow pages in your August issue ("Miami Beach: Dream Dump, U.S.A.") is a perfect example of the damaging effect of criticism by removing from context.

The most carefully planned city in the world could be photographed to point up the ludicrous.

This is a resort city and as such, the architects must reflect a whimsical, playful, and even, at times, satirical approach. This should not be condemned, since the city itself was conceived and grew in an atmosphere of carefree vacation fun and a gay holiday spirit. I would dread to think what Miami Beach would look like if we followed the glass cage which has transformed Madison Avenue into the canyon of rectangles.

It is all very well to speak jokingly of Aphrodite and Apollo Belvedere as "A couple of swell kids," yet these statues represent timeless and undying art, and I am sure are just as beautiful and eye-catching today as they were two thousand years ago. I wonder if "The Family" by Noguchi, which adorns the lawns of the Connecticut General Life Insurance Co., is as acceptable to as many people as the timeless art of the Greco-Roman culture.

MORRIS LAPIDUS, *architect*
New York City and Miami Beach

■ FORUM *is happy to show the two alternatives in their respective settings (far left).*

FEDERAL BLIND SPOTS

Forum:

"Cheating the cities" (FORUM, Sept. '59) has long needed saying. In this brief treatment you have suceeded in getting through to the federal government's blind spots: 1) new problems for the urban citizens are being created by federal action, 2) the crescendo of the urban population is a national problem, 3) the urban taxpayer is being shortchanged to the benefit of others.

ROBERT M. TINSTMAN, *executive secretary*
Downtown Committee of the Chamber of Commerce
Kansas City

Forum:

Private enterprise has just awakened to the problems of urban blight. The term urban renewal was practically unknown five years ago. Today it is the banner of a giant force of businessmen, civic leaders, church organizations, public officers, and federal officials.

People and opinions are the cities' forgotten resources that will turn the tide of urban blight. They are the catalyst—not just federal dollars. Experience has shown that millions of urban renewal dollars can be spent in one area of a city while another side-by-side area is sinking into slum decay. Your editorial also seems to overlook the fact that the federal government has *now*, and the administration wants to *continue*, programs of leadership in the renewal of America's cities. The list of such programs includes: insured property improvement loans, Section 220; insured mortgages on urban renewal projects, Section 221; insured loans for displaced persons, as well as capital grants and special assistance authorization through the Federal National Mortgage Assn.

The brightest star in the whole constellation of federal aids to urban renewal is the Workable Program. It's a community's own design for better living—a practical

continued on page 236

Radiant Ceiling News

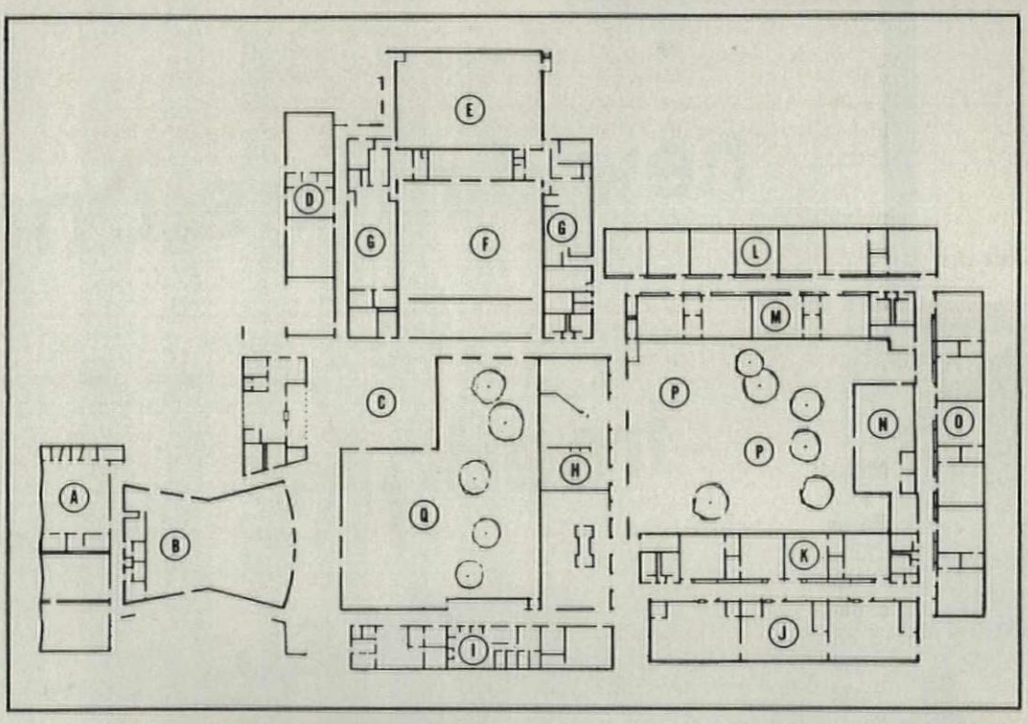
With Burgess-Manning Ceilings — Your Building Is Better — Your Building Budget No Bigger

In Michigan, Dearborn's Strikingly Modern William Stout Junior High School—

Designed by Architects Bennett & Straight Inc., Dearborn, Mich.—has built-in thermal comfort with Burgess-Manning Radiant Acoustical Ceilings.

The beauty, efficiency and completeness of this new educational unit is told graphically by the exterior view and the floor plan.

Providing a full complement of facilities for well rounded Jr. High activities, this building is being erected for the square foot price of an "average" school building—including the comfort and operating economy of Burgess-Manning Radiant Acoustical Ceilings.



- (A) MUSIC — Band, Music Practice, Choral
- (B) AUDITORIUM — Stage, Stagecraft, Social Corridor
- (C) DINING — Kitchen, Cafeteria, Teachers Dining, Multi-Use Area
- (D) SERVICE AREA — Boiler Room, Electrical
- (E) SWIMMING POOL — Bleachers, Public Entry
- (F) GYMNASIUM — Dual-Boys & Girls, Activities Room, Health Classroom
- (G) LOCKER ROOMS — Coachs Offices, Storage
- (H) HOME ECONOMICS — Meal Service Center, Studio, Living Area, Arts & Crafts
- (I) ADMINISTRATION — Supt. Office, Clerical, Health & Guidance Classroom
- (J) INDUSTRIAL ARTS — Power Mechanics, Wood Shop, Machine Shop
- (K) ACADEMIC — Classrooms, Conference Rooms
- (L) CLASSROOMS — Math, Social Studies
- (M) CLASSROOMS — Science, Work Rooms
- (N) LIBRARY — Office, Work Room
- (O) ACADEMIC — Classrooms, Conference Rooms
- (P) STUDENT GARDEN PLOT
- INSTRUCTIONAL COURT
- (Q) SOCIAL COURT

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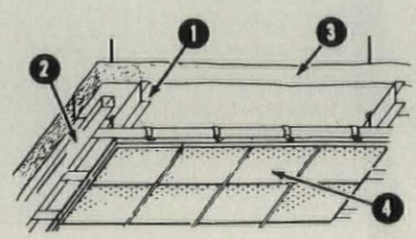
(2) Hot or chilled water circulation coil.
(3) Sound absorbing blanket.
(4) Perforated aluminum ceiling panels clipped directly to coil for efficient heat transfer.



Write for descriptive Burgess-Manning Catalog No. 138-2F

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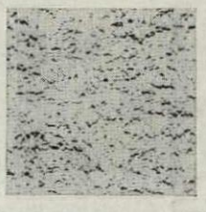

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Sprayolite Plaster cuts noise at new Reynolds Metals Building

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A partial view of the Arena floor with Heywood-Wakefield Portable Chairs. Architect: Welton Beckett & Associates.

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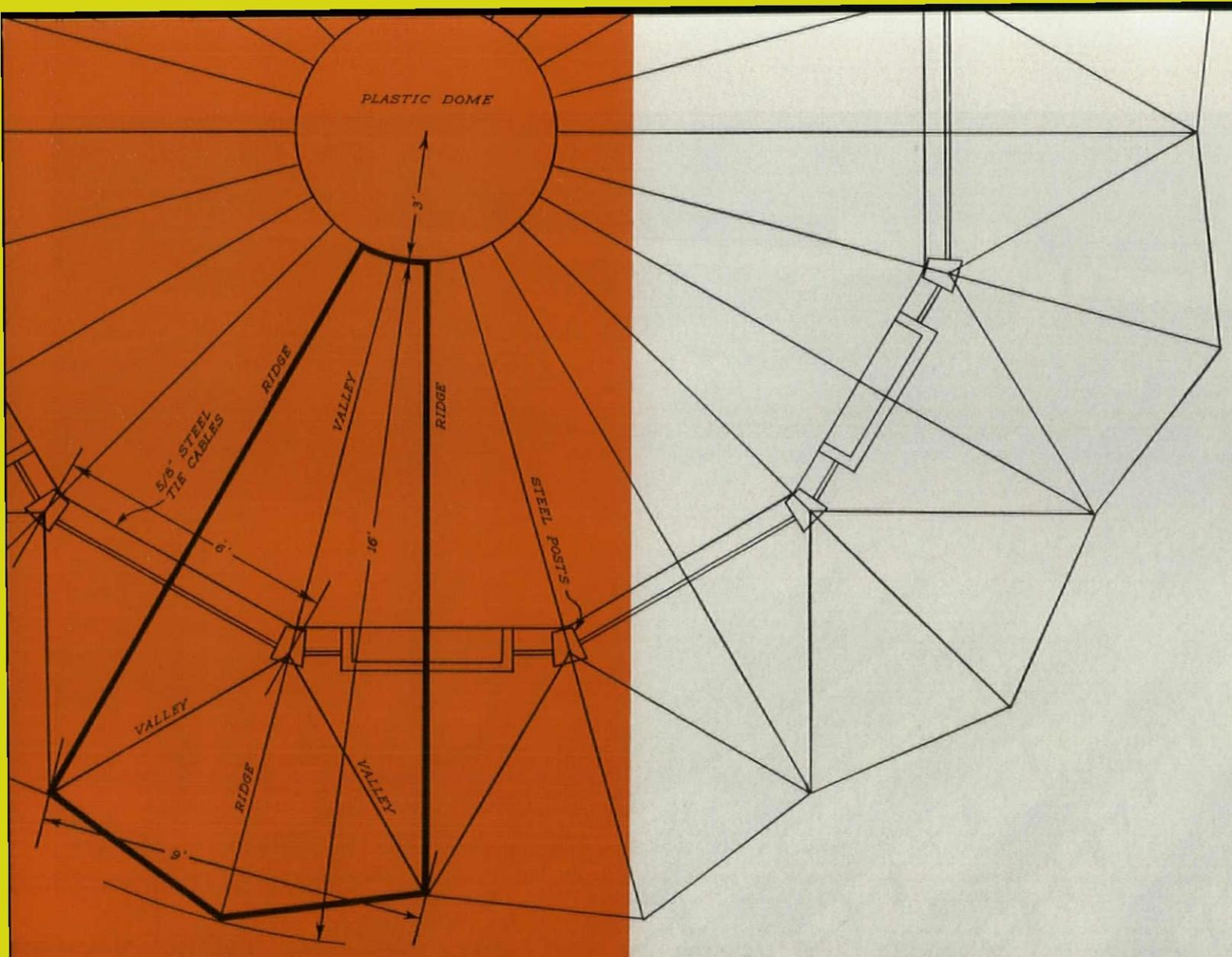
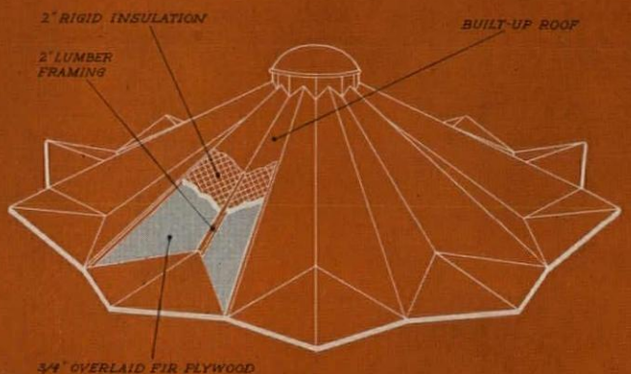
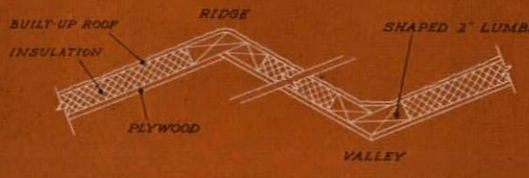






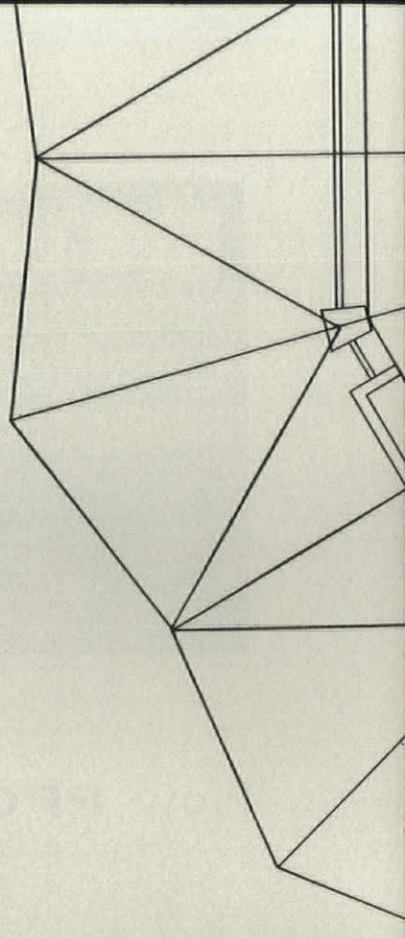
ARCHITECT:	Alexander Knox LaFarge, Knox & Murphy, New York, N.Y.
BUILDER:	Charles Rush, Amagansett, Long Island
LOCATION:	Bridgehampton, New York

THE PLEATED ROOF that crowns this pavilion-like living room is a prime example of the bold and imaginative forms derived from the basic fir plywood folded plate principal. Shape rather than mass is the key to its strength. The distinctive sawtooth configuration capitalizes on fir plywood's high diaphragm strength to create, in effect, a series of rigid, lightweight "V" beams. Intermediate posts, trusses and bulky framing are eliminated.

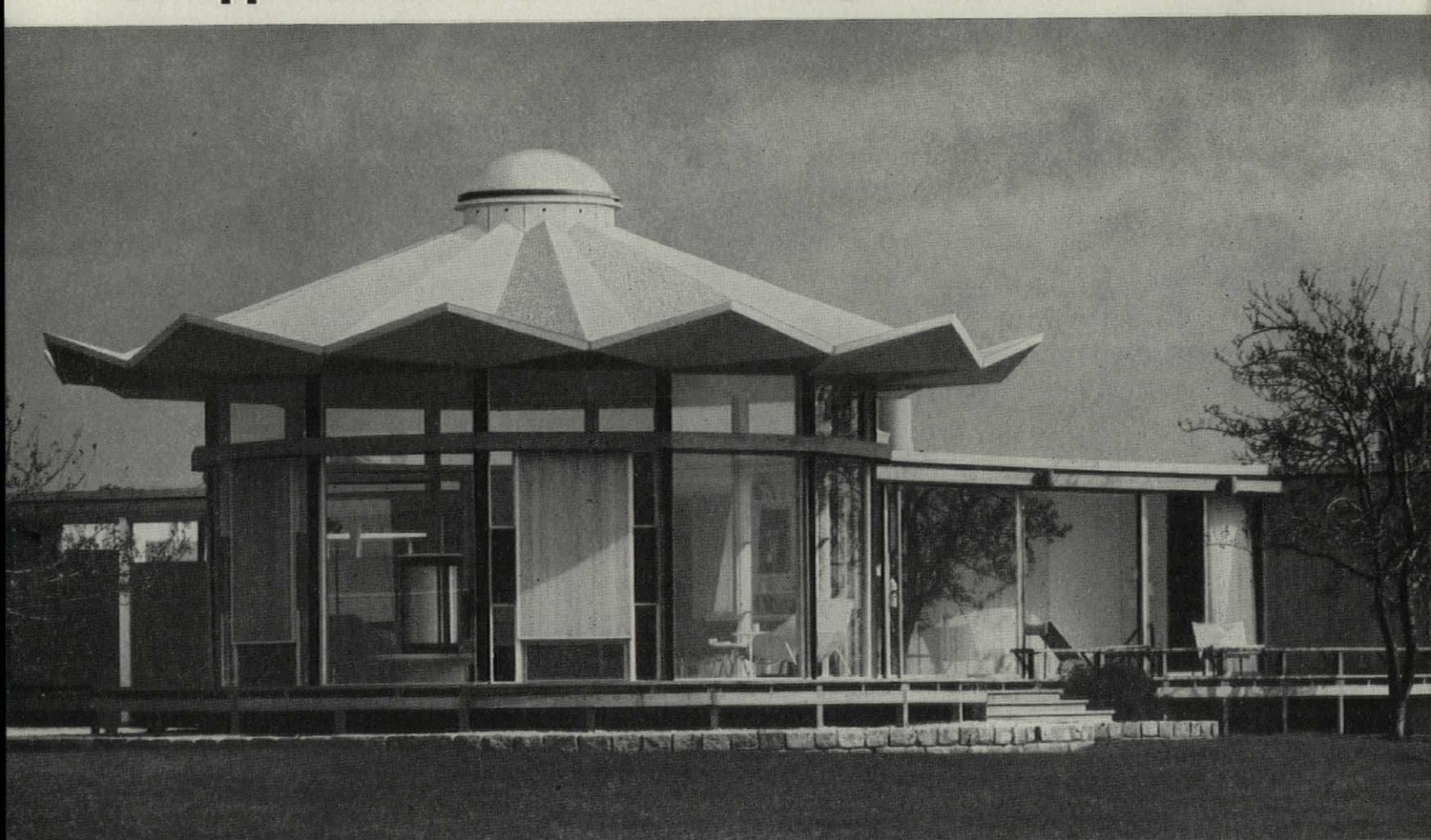
In this sophisticated circular design, the plywood folded plates provide a dome, spanning 26 feet, wall to wall. No central support is required. Where desired, far greater spans could be achieved utilizing the same basic system.

The roof itself is composed of 12 basic "boat-shaped" fir plywood components which were crane-lifted into position atop the steel supporting columns. Each component, in turn, is made of four triangular pieces of ¾" overlaid fir plywood, perimeter framed and interconnected with shaped two-inch lumber. Alternate projecting and recessed stiffeners along the ridges connect each component with its neighbors. Each component combines roof deck, insulation and finish ceiling.

For basic design data or other information, write (USA only) Douglas Fir Plywood Association, Tacoma 2, Washington.



new approaches to structural design with fir plywood



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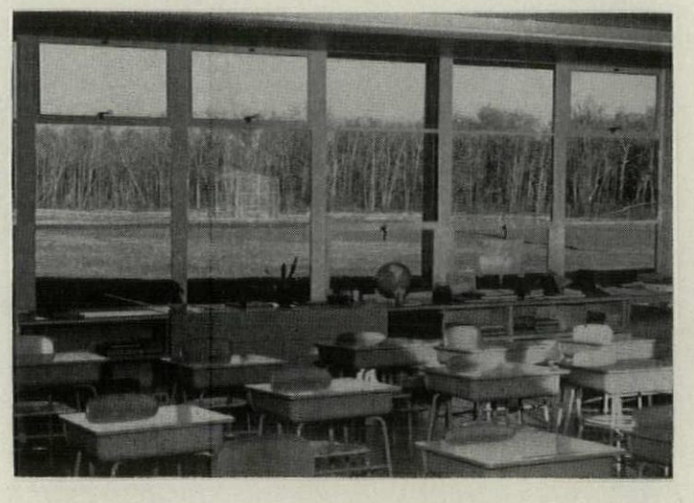

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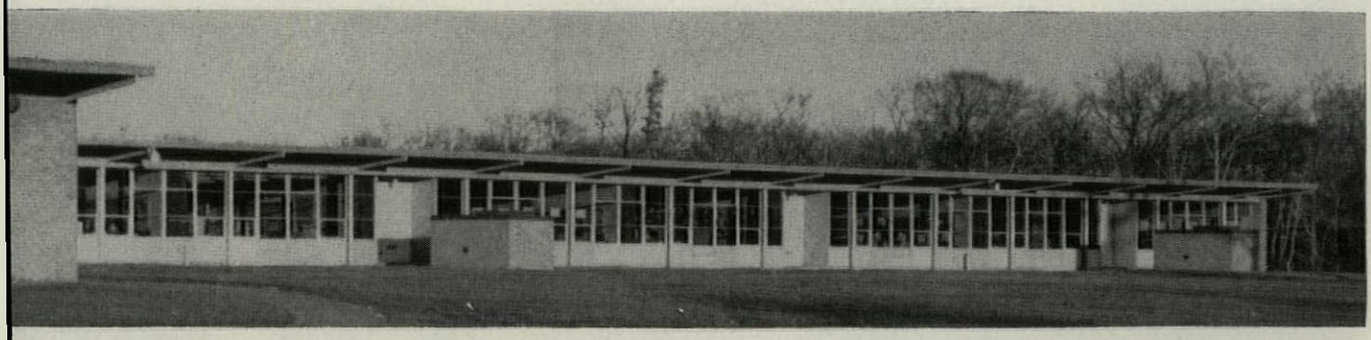

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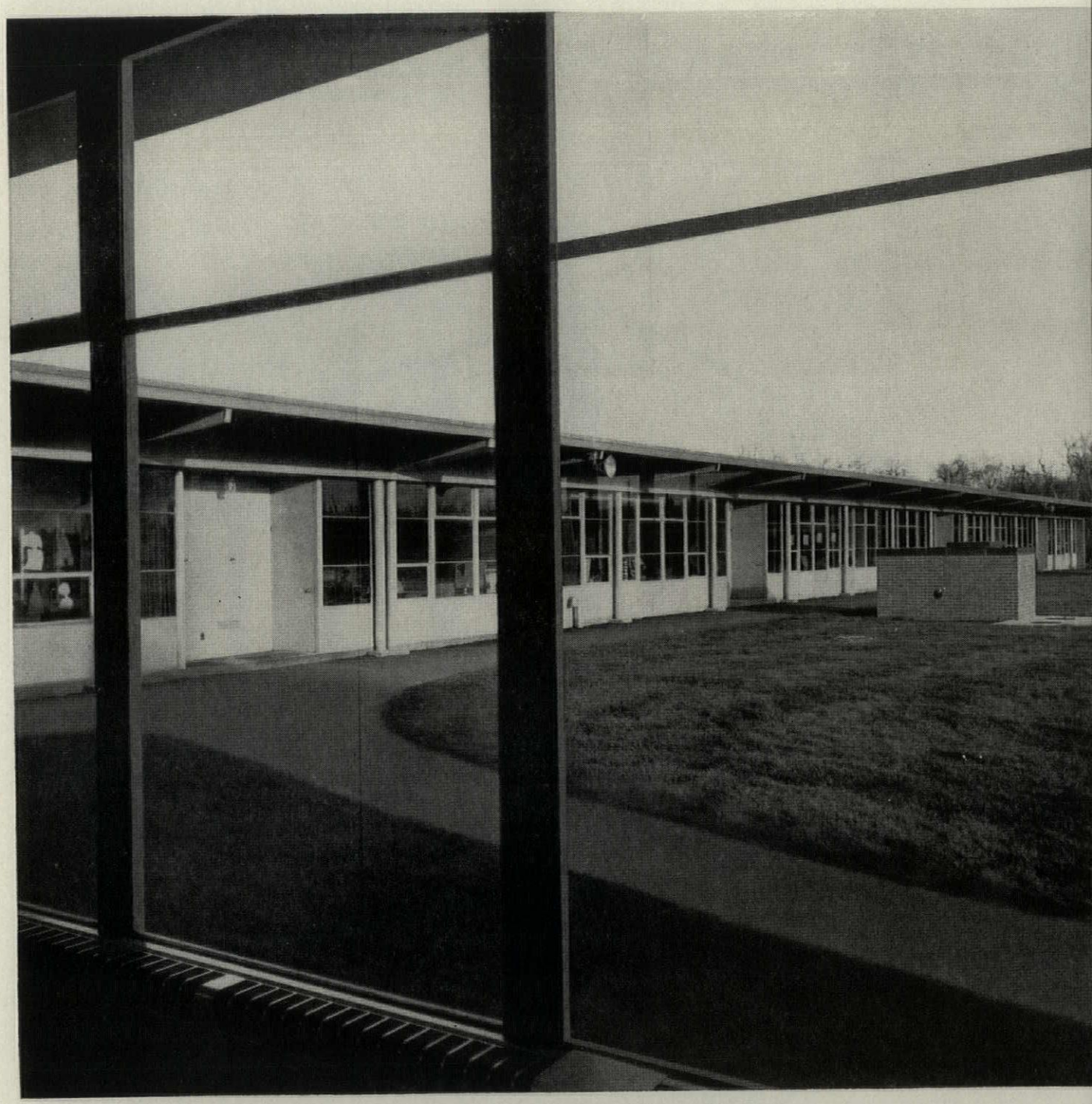

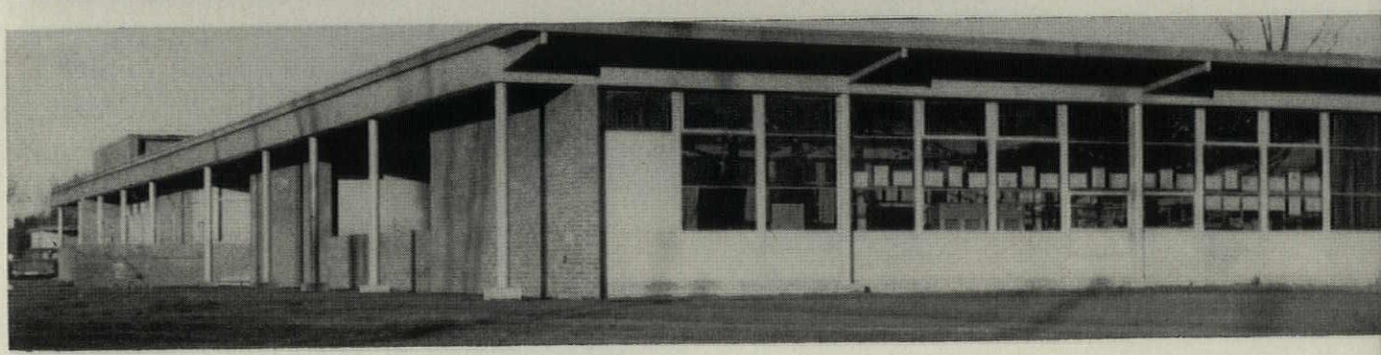

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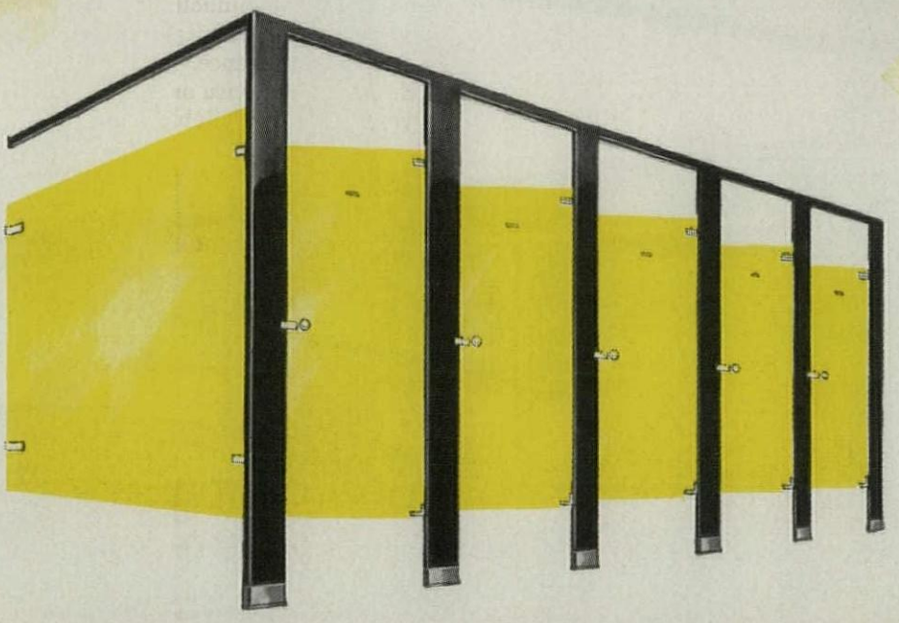

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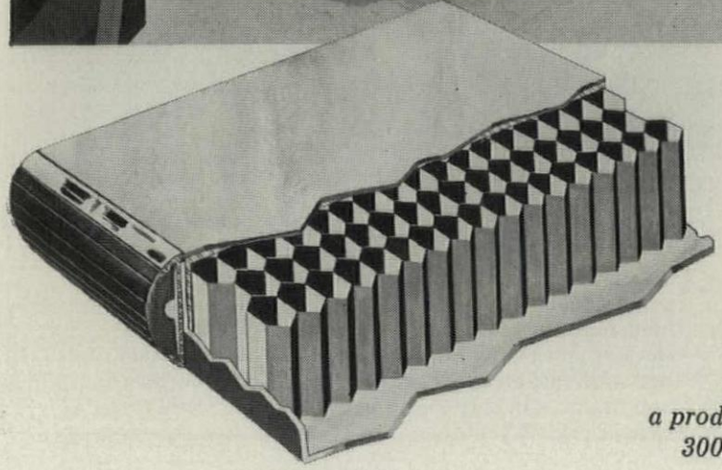

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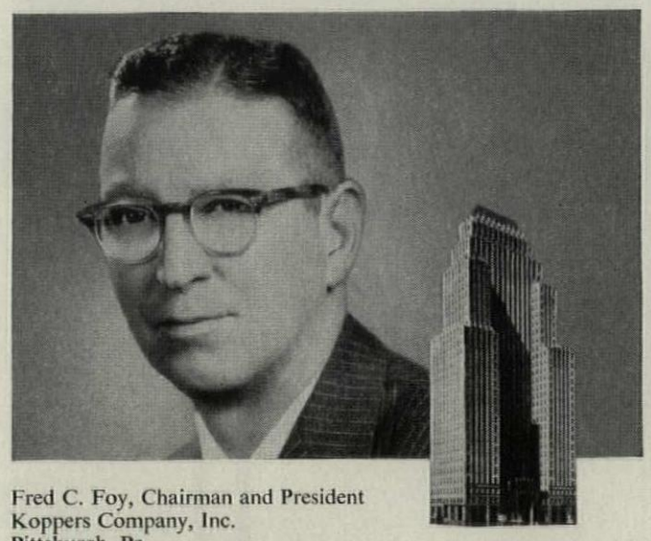

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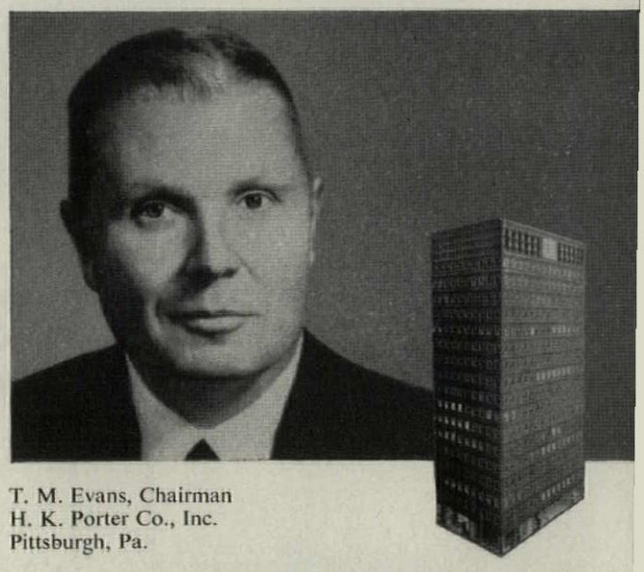

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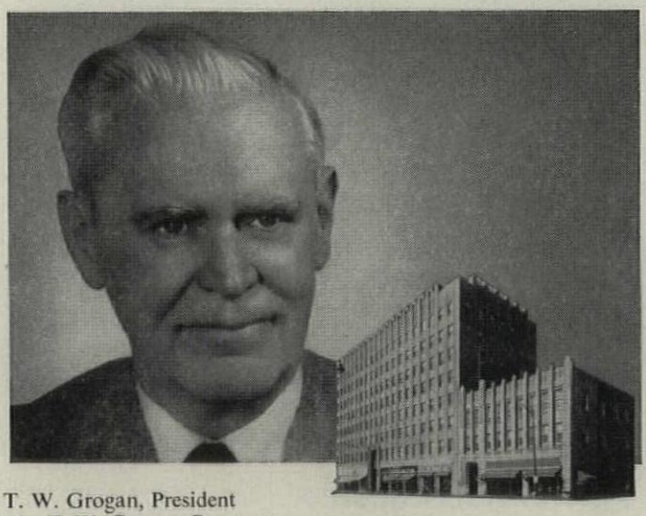
"Since an elevator system for our new building was a major capital expenditure, we investigated thoroughly. The Westinghouse Elevator System in the Porter Building has exceeded our expectations, and has provided added advantages for both our Company and our tenants. The computer control handles traffic without delay at peak as well as normal periods."



T. W. Grogan, President
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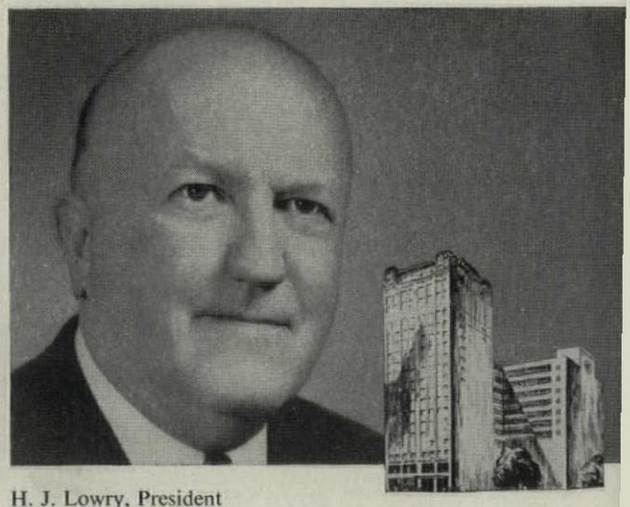
"When I experienced an actual '30-Minute Eye-Opener' demonstration of the Westinghouse Selectomatic System, I was impressed with its smooth, silent and safe automatic operation. The pleasing possibility of economy, coupled with dependability, was evident. I have since purchased three systems comprising thirteen cars, which now give double satisfaction, first, to the passengers, and second, to the owner."



H. J. Lowry, President
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"At the time we decided to modernize our elevators, my staff and I took a behind-the-scenes Westinghouse demonstration. We were impressed with the efficient operation of the elevator system, particularly the time-saving features offered by automatic elevators. This demonstration was a big factor in the selection of Westinghouse Elevators for our building."

continued on page 214

unsatisfactory. Mechanical exhausts should be used in toilets, locker rooms, auditoriums, gymnasiums, and similar areas. Automatic controls on ventilation systems are costly and complicated and should be avoided. Simple on-off switches are adequate.

13. *Plumbing.* The use of nonferrous water supply piping such as copper is generally recommended, because smaller pipe sizes are possible and labor installation costs are lower. Threading and reaming of piping is eliminated and lighter pipe hangers may be used.

Insulation of domestic water piping is rarely required unless located in unheated spaces in the outdoor air or above frost line. Where a boiler is used for heating, domestic hot water may be obtained as a by-product—and a small separate water heater used to supply hot water when the heating plant is not in operation. In no case should 180° F. water be stored because of the needs of an automatic dishwasher. This is both dangerous and expensive; a small booster water heater makes more sense. The use of blending valves is to be avoided.

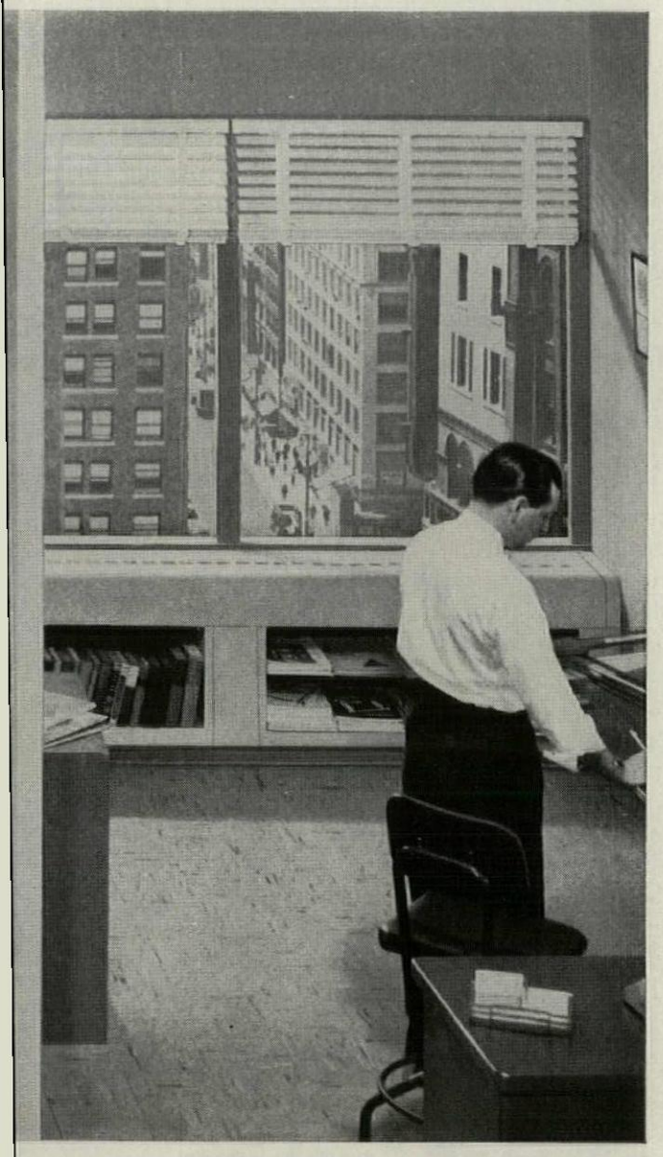
Generally, there is not much need to provide more toilets and fixtures than local codes require. All toilets should have automatic flush valves to reduce water waste.

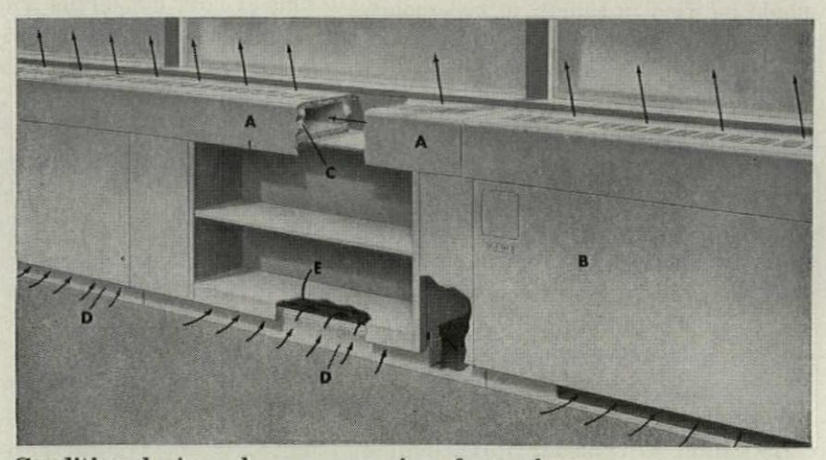
14. *Lighting.* Fluorescent lighting is usually somewhat more expensive to install than incandescent lighting. But fluorescent is cheaper to operate at the levels of illumination required in today's schools. It also releases substantially less heat per watt, a considerable advantage in most areas.

In the interest of operating economy, separate switches should be provided for the outside row of lights parallel to the windows. Elaborate and expensive fixtures should not be used in public areas. Fixtures should be selected that will gather little dust and are easy to clean and relamp. Incandescent fixtures should be installed in rooms where lights are used intermittently and for short periods of time and where high-intensity illumination is not required. Simple industrial fixtures can be used in service areas. Recessed fixtures ordinarily cost more to install.

15. *Kitchen equipment.* School kitchen equipment must withstand many times the wear of ordinary residential fixtures. Stainless-steel sinks and work surfaces may cost one and one-half to two times as much as galvanized iron. But they will probably last eight to ten times longer and be more sanitary and more easily cleaned.

Automatic dishwashers are preferred for the larger schools which have a hot-lunch program. The booster water heater to supply sterilizing water should be located at the dishwasher in order to reduce operating costs and prevent inadequate temperatures in the washing unit. END





Conditioned air under pressure rises from plenum extensions (A) and central unit (B)—along entire outside wall. Plenum extensions are heavily insulated (C) to prevent condensation and to reduce noise to an absolute minimum. Return air is drawn through openings at base (D) along the entire installation . . . passes through return air duct (E) to central unit (B).

Check these exclusive Trane features!

- Complete tenant change flexibility at lowest cost.
- Lower installation cost; fewer controls, less piping.
- Quieter operation; air distribution ducts are Fiberglas insulated.
- Custom appearance, attractive shelving, with standard modular units.
- One source for entire operation.

air conditioning "Wall-Line" system!

equipment! In new buildings, there is greater freedom of design than with conventional air conditioning systems: space requirements and floor plans may be worked out *after* the air conditioning has been installed.

Costs are cut because the new TRANE "Wall-Line" system requires fewer individual air conditioning units; in many cases, *one* unit will suffice where *three* would be required with a conventional system. And there is a corresponding saving in controls, piping and installation costs. On-the-job labor is substantially reduced because components are factory-built, ready to install. And this new, improved system provides space for attractive TRANE shelving below the lateral duct extensions. These shelving units enhance the appearance of any office space.

An entirely new concept in big building air conditioning, this new system is available *only* with UniTrane Air Conditioning. For complete facts and specifications, consult your nearby TRANE Sales Office. Or write TRANE, La Crosse, Wisconsin.

For any air condition, turn to

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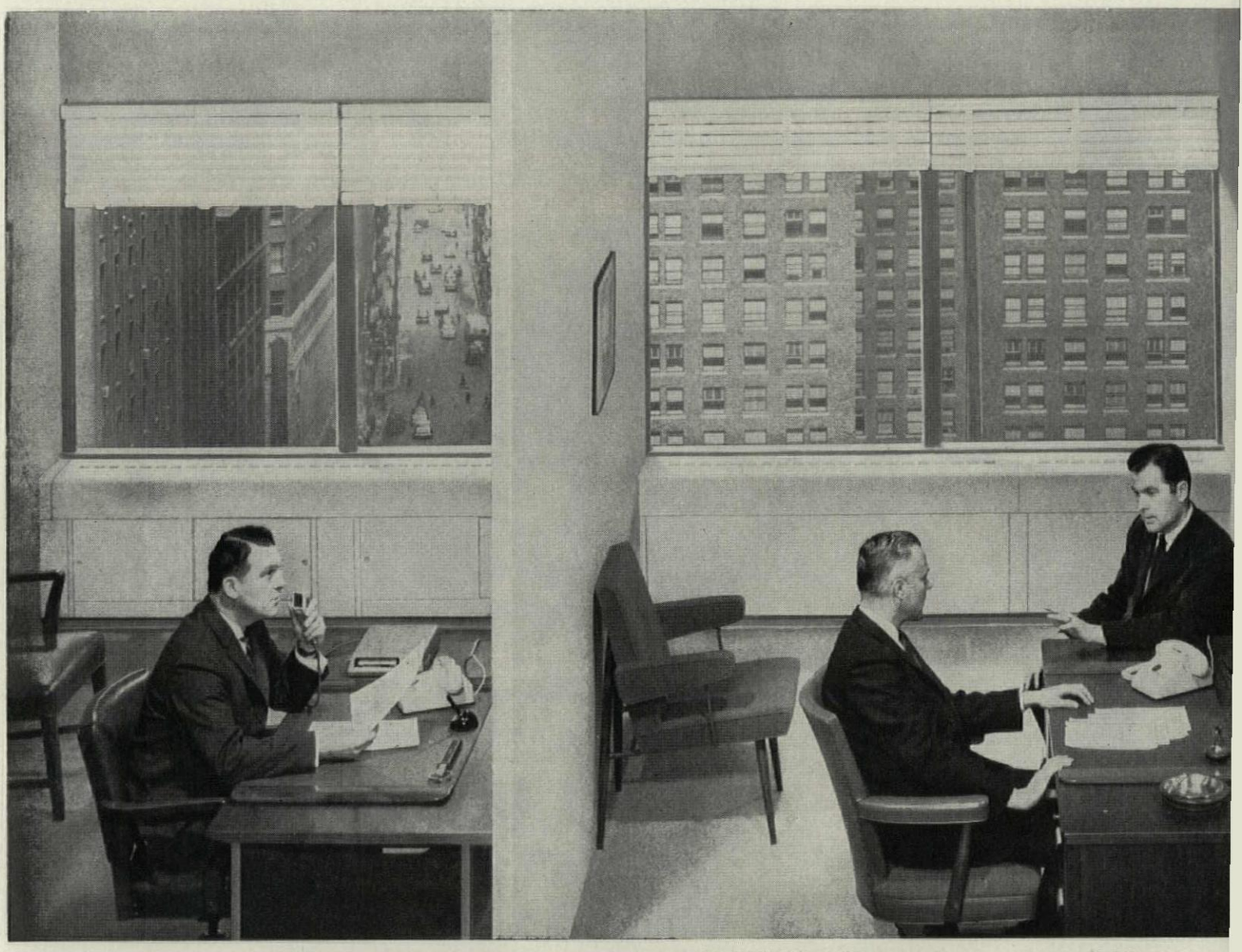
TRANE COMPANY OF CANADA, LIMITED, TORONTO • 100 U.S. AND 19 CANADIAN OFFICES



Here's how one UniTrane unit (center office) air conditions an entire 24-foot bay. Lateral duct extensions in adjoining offices distribute air from this unit. Components go together quickly, easily, with a minimum of on-the-job fitting.

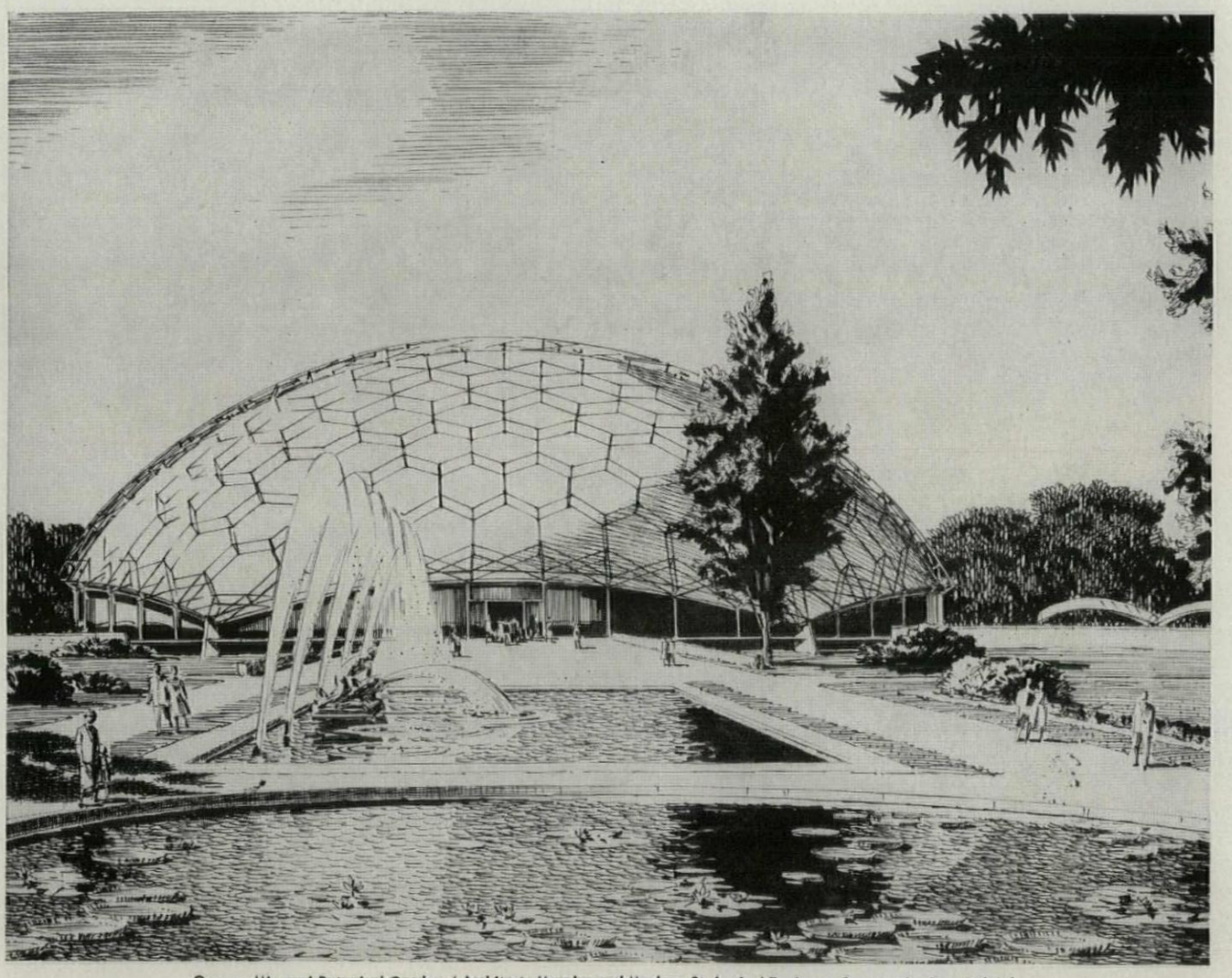
Now! True perimeter with exclusive Trane

Provides a blanket of comfort around building's perimeter—meets changing tenant needs; simplifies installation; cuts piping and control costs

Here is true perimeter air conditioning that meets today's needs for tenant changes—and does it economically. It's the new, exclusive TRANE "Wall-Line" method of air distribution that cuts installation and control costs, makes it easy to meet the varying and changing needs of every building.

Here's how it works:

For example, you install *one* central fan-coil UniTrane Air Conditioner with lateral duct extensions in a twenty-foot bay, instead of three individually controlled units. The extensions distribute conditioned air from the UniTrane unit (cool in summer, warm in winter) all along the outside wall of the bay. And by linking additional fan-coil UniTrane units with winged extensions in adjacent bays or offices, a blanket of comfort is provided around the entire perimeter of the building. There is more flexibility in altering existing walls and partitions—without altering or moving the air conditioning



Owner: Missouri Botanical Garden / Architect: Murphy and Mackey, St. Louis / Engineer: Synergetics Inc., Raleigh, North Carolina / Dome Design: R. Buckminster Fuller / Aluminum Materials: Aluminum Company of America

THE GEODESIC DOME:

TO CAPTURE CLIMATES FOR SHAW'S GARDEN

ST. LOUIS is a town with considerable seasonal variation in its climate. It is also the home of Shaw's Garden, one of the leading botanical centers of the world.

Architectural Metals of the Columbus Division of North American Aviation, Inc. is building one of the remarkable new "Geodesic Domes" to protect and house the main part of the Missouri Botanical Garden, as it is officially known. The dome will span 175 feet with no interior supports, and will be a "greenhouse" with several distinct climates inside.

The re-building of Shaw's Garden brings to the forward-looking city of St. Louis a lasting monument, the functional yet esthetic design of which is in keeping with the future. This world-famous center will combine facilities for scientific study with the cultural values of a fascinating educational exhibit for the public.

Should you wish to investigate the Geodesic Dome and the other new concepts brought to the building industry by one of the world's largest aircraft manufacturers, we would like to hear from you. Our other architectural metals capabilities include Curtain Wall construction. Please contact: The Columbus Division of North American Aviation, Inc., Columbus, Ohio.

ARCHITECTURAL METALS

THE COLUMBUS DIVISION OF NORTH AMERICAN AVIATION, INC.

Columbus, Ohio

continued from page 210

ent. EFL says the least expensive way to make them absorbent is to use the underside of a precast roof plank as the exposed room ceiling (this, however, is possible only for rooms directly under the roof). Flameproofed fiber acoustical tile can be cemented directly to the underside of a roof or floor slab. On the other hand, mineral acoustical tile is better looking and fireproof, but costs about 50 per cent more. Hung or suspended ceilings are costly and should be avoided whenever possible.

New plaster ceilings are better left unpainted until the walls receive their first repainting; by then the plaster will have dried out more thoroughly. It is barely possible to detect that the ceiling has not been painted.

11. *Heating systems.* The design aspects of the school will usually enable an engineer to make some preliminary decisions on heating. For example, slab-on-ground construction where cold floors are a problem lends itself to the use of radiant heat. Large glass areas with subsequent draft and ambient temperature distribution problems tend to rule against air heating systems. If large areas of the school are not in use for extended periods, a fluid heating system, where zone control valves can be used, is a logical choice. Campus-plan schools lend themselves to steam and hot water systems, permitting the economy of a single-control heating plant with underground heat distribution systems.

The heating system should not be sized for the extreme conditions which may occur once every 15 years, but should be signed on the basis of the established outdoor design temperature for the area.

Indoor temperature conditions should be carefully selected as the operating cost of heating increases approximately 3 per cent for every degree above 70°F. Finally, the heating system should not be overcontrolled. Present highly developed automatic secondary controls are expensive, both in first costs and maintenance.

12. *Ventilation.* Mechanical ventilation is a source of operating and maintenance problems. The more complicated the system of ventilation, says EFL, the more likely the system will be

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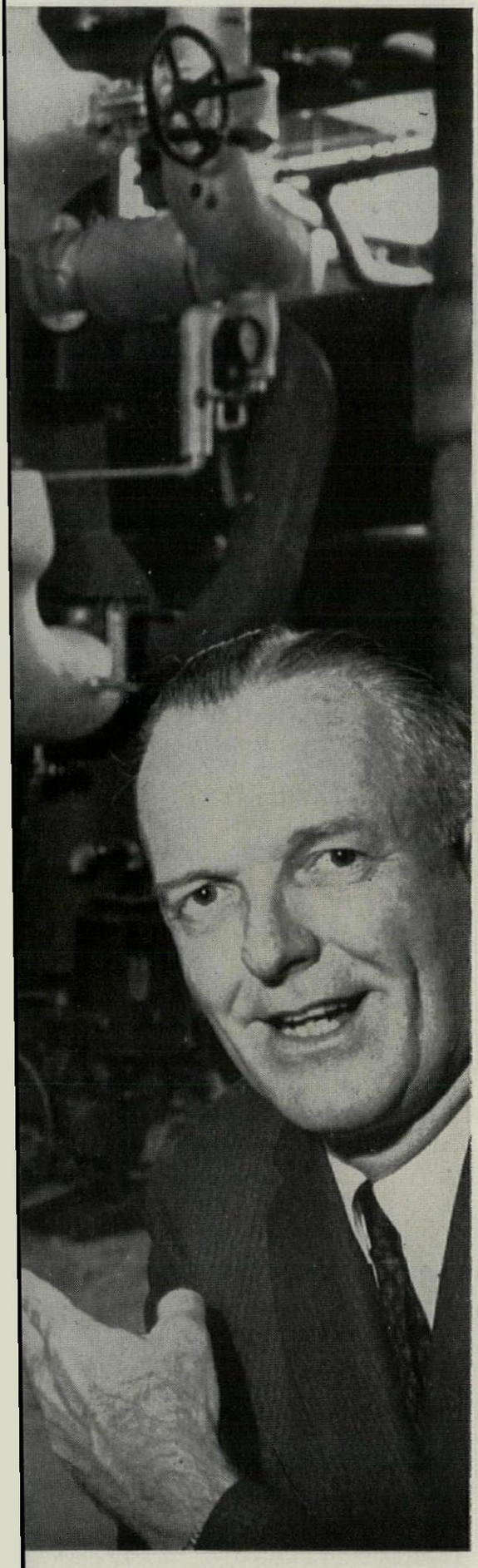
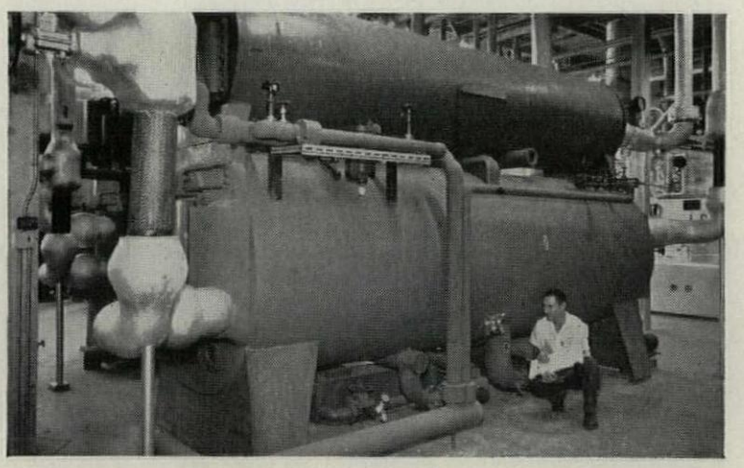




MAINTENANCE COSTS TO DATE—ZERO! The Allen Company uses two York machines—a 230-ton unit serving 45,000 sq. ft. of office and cafeteria space, a 170-ton unit for process water cooling. Three small pumps and motors are the only moving parts in the entire system.

"with **YORK GAS** *air conditioning our boilers keep us cool all summer"*

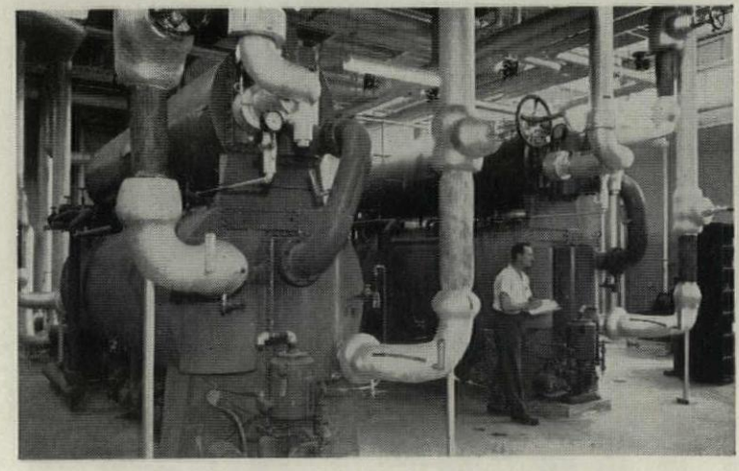
"With our boilers sized for a winter load, we were naturally oversized for the summer months. But York's gas-operated Lithium Bromide absorption water chillers permit us to make efficient use of part of this steam capacity to cool," says Mr. M. J. Mather, President of the Allen Manufacturing Company, makers of hex-socket screws.

The York Lithium Bromide system eliminates the need for huge compressors found in other types of cooling equipment . . . which brings down the original cost considerably. And with gas the boiler fuel, you make year-round use of an otherwise wasted source of power *at rock bottom costs.* In addition, York machines are noiseless, lightweight, compact—easy to install and readily adaptable to almost any plant layout.

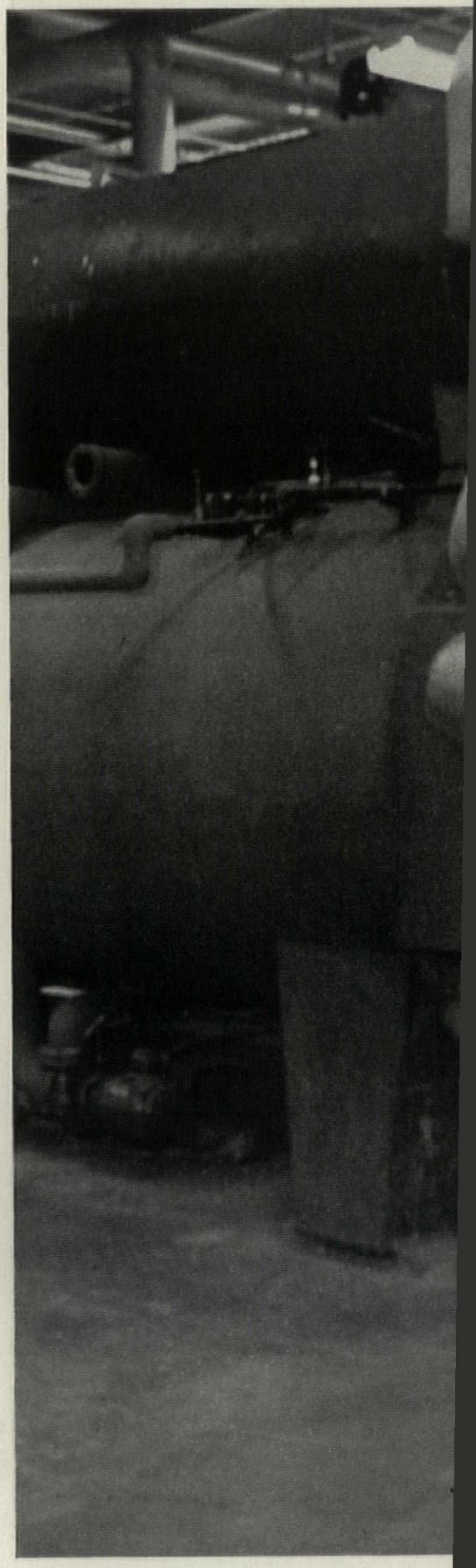
Find out how your present heating system can pay off for you all year 'round with gas-operated York automatic water chilling units. Call your local gas company or write to the York Corporation, Subsidiary of Borg-Warner Corporation, York, Pennsylvania. *American Gas Association.*

NO SUMMERTIME SLUMP With gas as the boiler fuel and York machines, the switch to summer cooling was no problem. Operating costs are low, too, thanks to Gas.

LATEST IN COOLING Gas operated York machines feature the use of tap water as refrigerant and lithium bromide as absorbent, one of the most efficient, practical refrigeration cycles developed so far. Machines start and stop automatically.



THE UTMOST IN FLEXIBILITY The units are cross-connected so that each operates independently if necessary.



SCHOOL COSTS

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partitions of steel studs and rock lath; wood stud partitions with metal lath and plaster. Such walls are inflexible, however; moreover, lightweight block strikes some authorities as esthetically unsatisfactory. The use of prefabricated metal partitions of the sort ordinarily found in offices will be more expensive initially. But, with school programs changing rapidly today, such flexibility may be justified, for it will enable the school plant to accommodate to changing programs over its expected life. The wisely selected use of removable partitions, expensive as they are, will make areas usable for groups of varying sizes —two or there small rooms from one large room—and can contribute to higher space utilization in the school.

8. *Finished floors.* For general use, ⅛ in. asphalt tile floors are economical. The greaseproof type can be used in cafeterias. The premium cost of 3/16 in. tile, says the EFL study, is not justified by additional length of life since tile is usually replaced because of cupping or brittleness before it wears through. The cost of vinyl asbestos tile is almost double, and there is no conclusive evidence, says EFL, that its long life or low maintenance warrants the added initial cost. It is true that vinyl tile can be used without waxing for a while (usually not over six months). But once it has been waxed, the cost of upkeep is about the same as for asphalt tile. Terrazzo floors are difficult to justify economically in many sections of the country for their cost may run as high as three and one-third times the cost of asphalt tile.

9. *Painting and wall finishes.* Expensive finishes which eliminate repainting should be checked carefully as to their initial cost. The desirability of ceramic tile for toilet-room walls, kitchens, and corridors is generally accepted, although some of the new "spray on" cement enamel finishes are proving most serviceable at one half to one third of the cost. Some of the applied plastic films may cost 75 cents or more per sq. ft. Their economy against paint at 6 cents per sq. ft. is open to question—it is doubtful if their life will ever justify the difference.

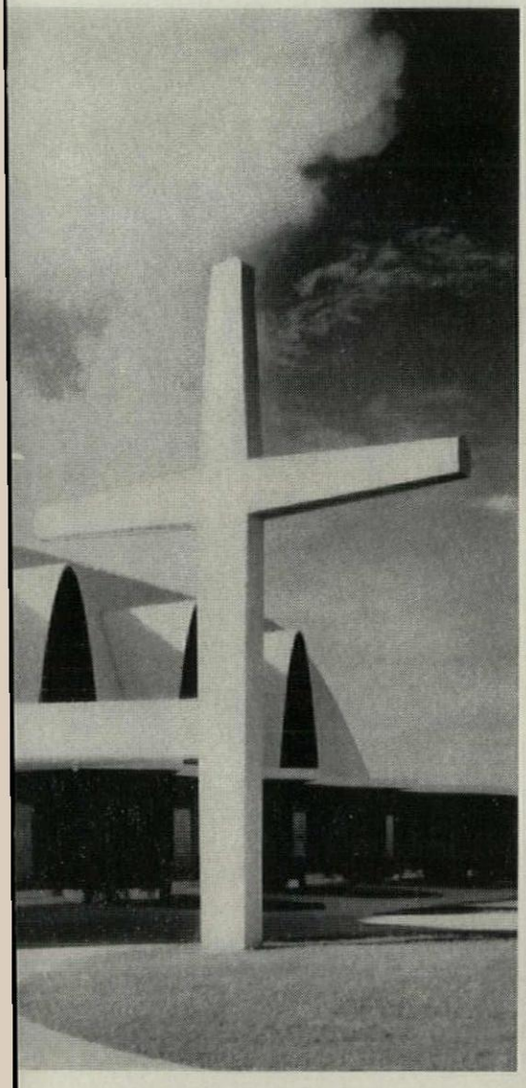
10. *Ceilings.* Most schoolrooms and corridors should be acoustically absorb-

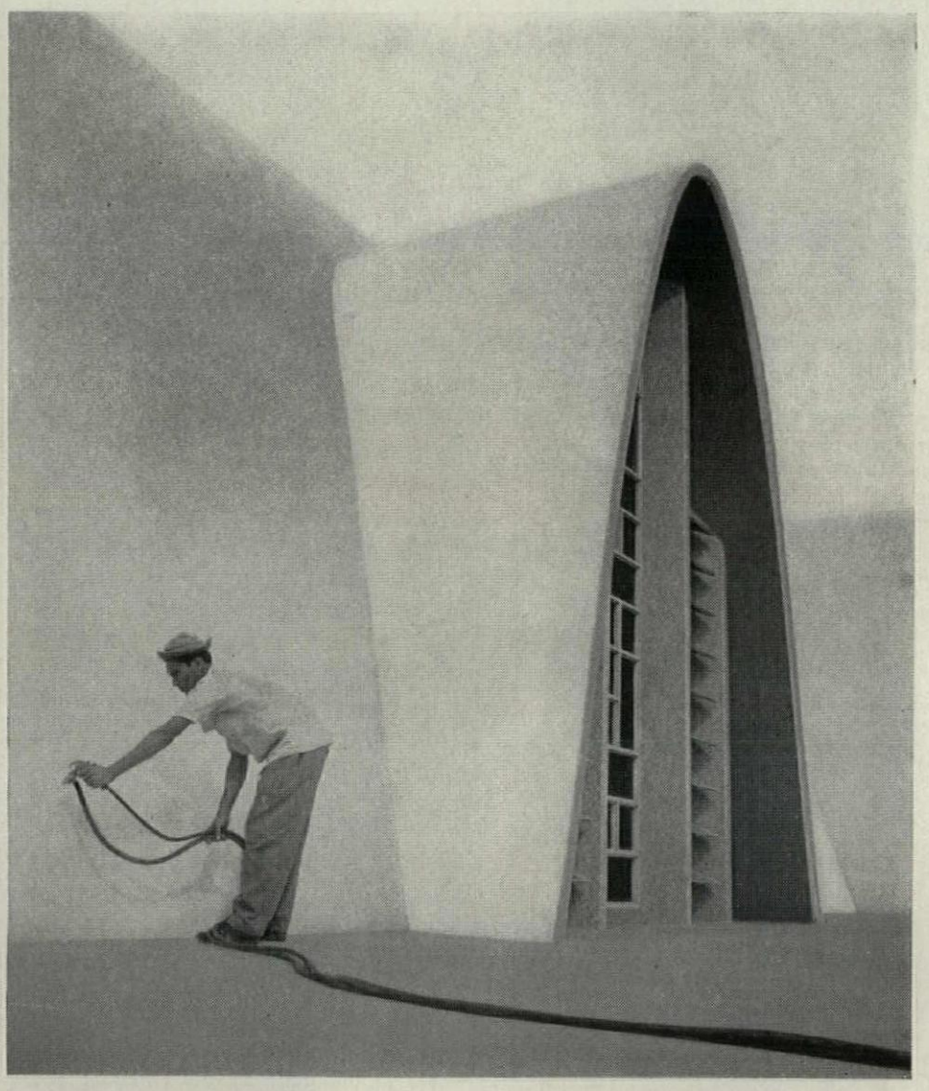
continued on page 214

For tough tropical exposure, the architects of this gleaming Caribbean cathedral chose roof coatings made with HYPALON synthetic rubber for its permanent resilience, oxidation resistance and good color stability.

Its weathering performance is exceptional. Experience had shown them that conventional roof coatings in the tropics normally had to be patched or replaced after two years. With more than two years' exposure to torrid sun, wind, rain and salt spray, this reflective roof coating shows no sign of deterioration. (Tests indicate excellent performance in excess of ten years.) Thermal expansion and contraction of the roof does not impair the strong bond between the concrete and this elastic roofing material.

Flame resistance, weather resistance, lasting resilience and color stability are only some of the advantages coatings made with HYPALON offer you as a design material for roofs. For more information, write to Elastomer Chemicals Dept. AF-11, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.





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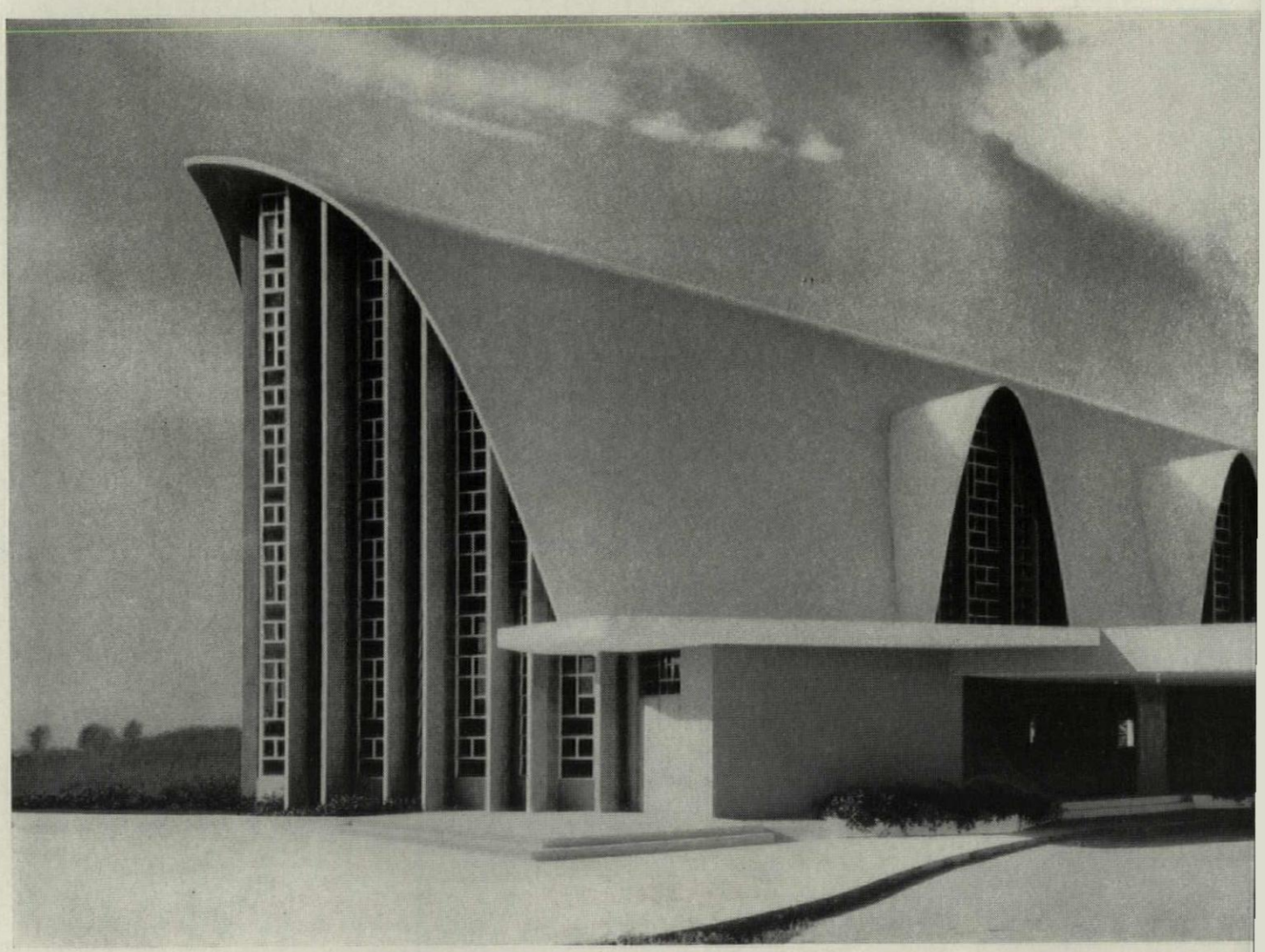
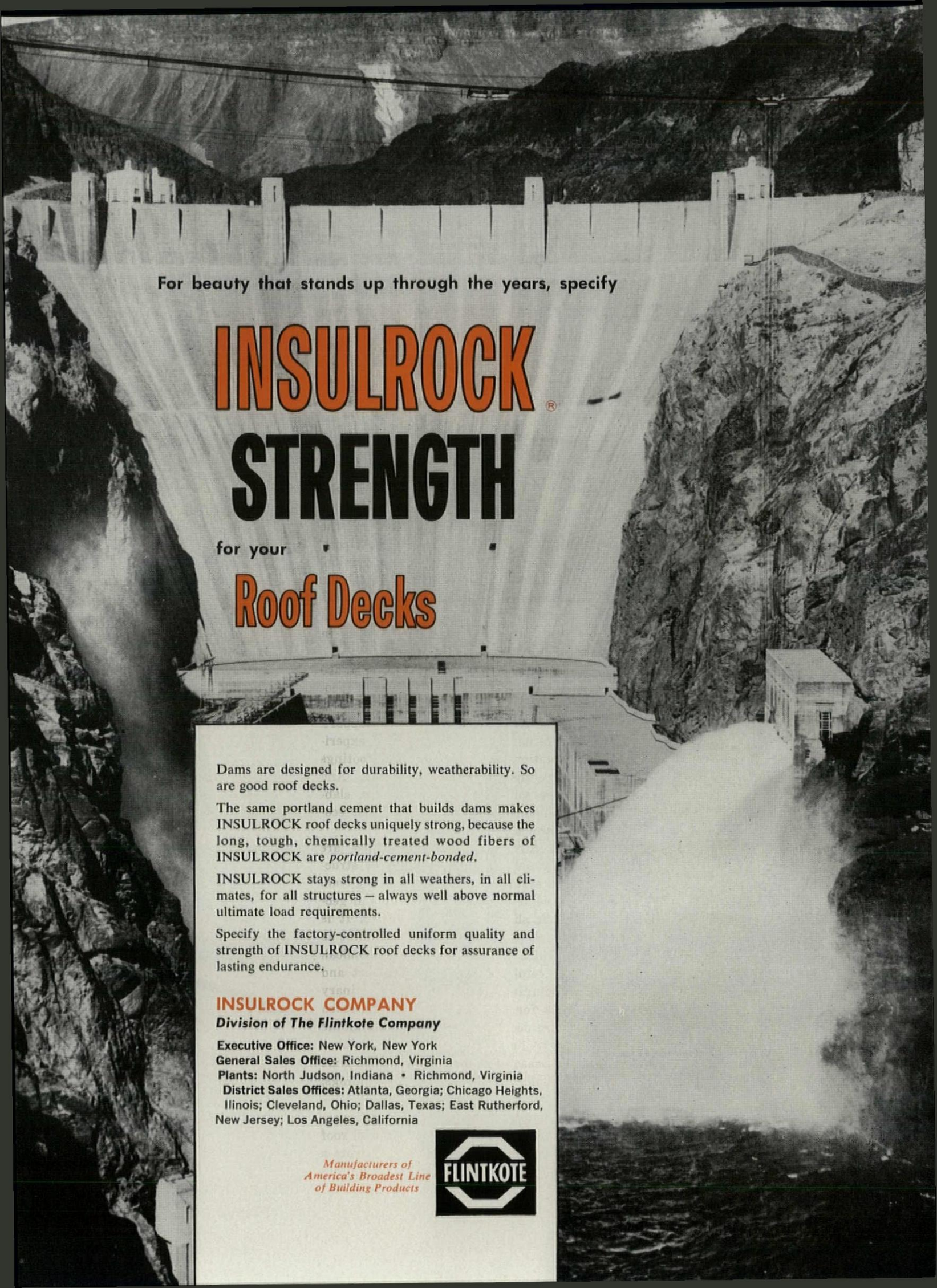


This three-inch reinforced concrete roof of the Santa Maria Reina Church in Ponce, Puerto Rico, is sprayed with coatings based on Du Pont HYPALON. Tests indicate that these coatings will give excellent performance in excess of ten years.

(Right) Two coats were sprayed over the reinforced concrete with conventional equipment. Local labor did the work.



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Dams are designed for durability, weatherability. So are good roof decks.

The same portland cement that builds dams makes INSULROCK roof decks uniquely strong, because the long, tough, chemically treated wood fibers of INSULROCK are *portland-cement-bonded.*

INSULROCK stays strong in all weathers, in all climates, for all structures – always well above normal ultimate load requirements.

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FLINTKOTE

continued from page 125

plumbing, heating, and electrical equipment) in school economy. The average mechanical cost for the 72 schools was $4.50 per sq. ft., or roughly 30 per cent of the total building cost; in some sections of the country the bills ran as high as $5.69 a sq. ft. Obviously, mechanical components should be prime targets for cost-cutting. But what can be done to trim them?

In the course of its study, EFL looked at many components, large and small, which can affect the cost of a school. On a score or so it made specific cost-cutting recommendations, some of them admittedly controversial and subject to exceptions which local architects know best. Here is what it proposed for 15 key components, including the mechanical parts:

1. *Shape and mass.* In general, the simpler the shape, the lower the cost, regardless of the type of construction. With simple shapes, exterior walls can enclose a maximum of space. There is also a saving on wall construction when there are few corners or changes in direction in the exterior wall.

2. *Foundations.* Foundations designed for imposed loads, rather than for theoretical loads, can effect savings and will at the same time give better support. There has been a good deal of experimentation in eliminating wall footings where light loads are involved. And where soil conditions are stable, slab-on-ground construction is a most economical method of building.

3. *Structural systems.* There are really only four basic types of structural systems for schools: bearing wall, braced frame, post and lintel, and geometric shapes and rigid frames. It is difficult to make a general statement as to which will be the most economical. A careful study by the architect and structural engineer of the preliminary plans for the building will be needed before deciding on one system over the others. Points to consider: local labor and seasonal working conditions, time schedules for the use of the buildings, and delivery cost of materials.

4. *Roofs.* There is considerable controversy over the most economical roof system. One school of thought favors a slightly sloping roof. Another prefers dead level roofs, maintaining that the puddles of water on the roof both help keep the building cool in hot weather and preserve the roofing material. Still another group of experts wants to get the water off the roof as soon as it falls.

Whatever the roof system, avoid irregular changes in level; also avoid valleys, ridges, dormers, etc. Precast roof plank construction is economical and fast to install. Avoid waste space between roofs and ceilings below. Use quality flashings. Where strict economy is required, and eaves extend substantially out from building walls, the gutters and leaders can be omitted and water allowed to run over the edge. Avoid too much insulation; anything more than the equivalent of 4 in. of mineral wool with proper vapor barrier will probably not pay for itself in preventing heat loss.

5. *Exteriors.* There is no conclusive evidence favoring either masonry walls or the so-called metal wall or sandwich panel. Different wall constructions will vary in cost by locality and will even vary between the contractors who figure them. One point to remember: use of many different materials requiring the services of different trades, such as carpenters, masons, plasterers, concrete workers, cement finishers, tile setters, and steel panel erectors, increases cost. The fewer trades involved, the better the price.

6. *Windows, clerestories, skylights.* Modern artificial lighting, which has provided good levels of illumination at low cost, makes the large glass areas common in all types of buildings today strictly an esthetic consideration. Daylight is a variable source of both light and heat and hence extra expense is incurred in controlling its excesses. The glass area of a building has more effect on the heating cost than any other single factor. In warm seasons, it causes heat gains which are difficult and expensive to control. Further, excessive use of glass adds to the initial cost of a building by requiring higher-cost heating plants, shades, and other controls. If economy is the aim, glass should be used judiciously.

7. *Interior partitions.* In many localities throughout the country the cheapest classroom partition will be painted lightweight block. Also economical:

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The 1959 FORUM Directory of the 100 BIGGEST

ARCHITECTS

CLIENTS

CONTRACTORS

FORUM's guide to Building's Biggest, the new 1959 Directory of 100 largest Architectural Firms–Building Customers–Building Contractors is now ready. Only 25¢ per copy prepaid. Order from Room 828, FORUM, 9 Rockefeller Plaza, New York 20.

Maintenance-free Aluminum -- Fabricated to Please and Protect

Here is a pleasant cafeteria building, light and airy to fit a southern climate. The aluminum extruded sections which lend to this feeling are part of the HV Trimline of American Art Metals Company, made from Reynolds Aluminum. Again, maintenance-free aluminum helped achieve good design and practical, long-lasting structural value. For information on any architectural or structural use of aluminum it will help you to get in touch with your nearest Reynolds representative. Look under "Aluminum" in the Yellow Pages, or write Reynolds Metals Company, Richmond 18, Virginia.

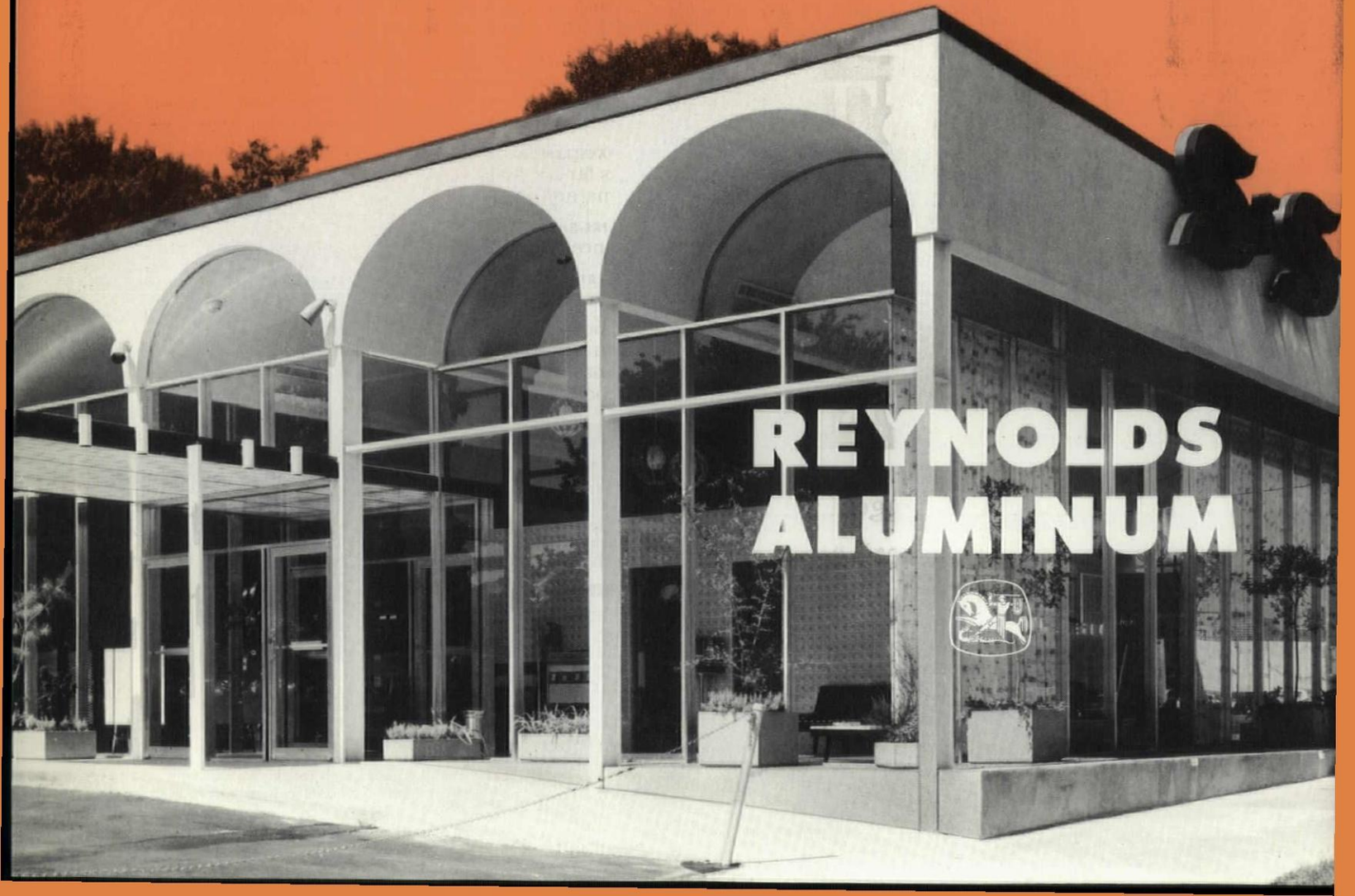
S & S CAFETERIA
Columbus, Georgia

ARCHITECTS:
Bernard A. Webb, Jr., Macon, Ga.

GENERAL CONTRACTOR:
The Jordan Co., Columbus, Ga.

ALUMINUM FABRICATOR:
American Art Metals Co., Atlanta, Ga.

STORE FRONT AND GLAZING CONTRACTOR:
Columbus Glass Co., Columbus, Ga.

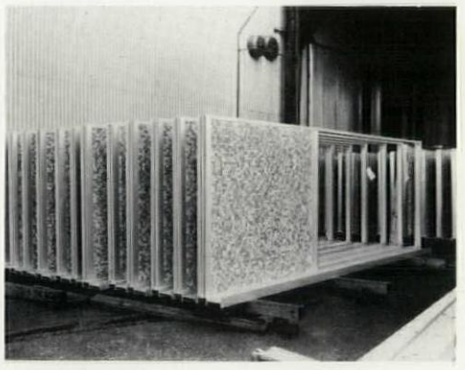


num

Working with Reynolds Aluminum, and with Reynolds technicians, leading manufacturers and fabricators of metal products help create many of the exciting new buildings that are going up all over America. These manufacturers and fabricators work closely with architects and help translate good design into good structure. For their names in your locality or region write Reynolds Metals Company, Richmond 18, Virginia.

FIRST NATIONAL BANK OF OREGON Portland, Oregon

ARCHITECTS: Stanton, Boles, Maguire and Church, Portland, Ore.
GENERAL CONTRACTOR: Hoffman Construction Company, Portland, Ore.
CURTAIN WALL FABRICATOR: Universal Corporation, Dallas, Texas.



Fabrication of the unusual wall panels of this structure starts with large extruded sash of Reynolds Aluminum, roughly 5′ x 10′ in size. Five shades of translucent Italian blue glass mosaic mounted in these aluminum wall sections, with mullions and window panel frames of Reynolds Aluminum, make up the striking exterior of this new bank building. Details of the fabrication of these panels are shown for their interest. Another example of imaginative design translated into structural form by a fabricator using Reynolds Aluminum.

No matter what the job, large or small, Aluminum usually does the job best. If your office library does not have Reynolds authoritative three-volume set "Aluminum in Modern Architecture," write Reynolds Metals Company, Richmond 18, Virginia.

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See Reynolds shows—James Michener's "ADVENTURES IN PARADISE" Monday nights and "ALL STAR GOLF" every Saturday ABC-TV Network.

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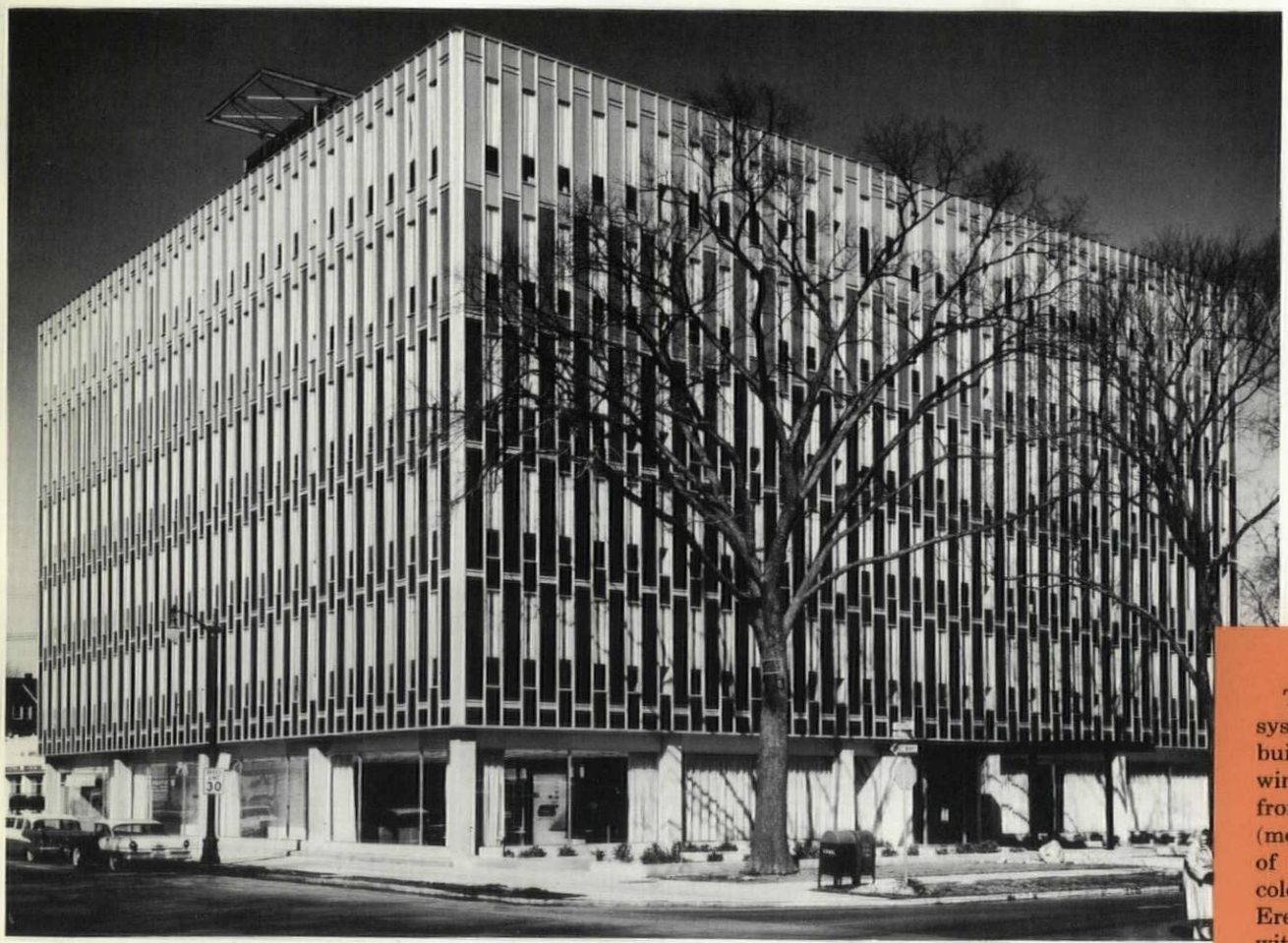

INTERNATIONAL BUSINESS MACHINES OFFICE BUILDING
Detroit, Michigan

ARCHITECTS:
Pedersen and Tilney,
New York, New York

GENERAL CONTRACTOR:
R. E. Dailey & Company,
Detroit, Michigan

CURTAIN WALL FABRICATOR AND ERECTOR:
Moynahan Bronze Company,
Flat Rock, Michigan

The entire exterior gri
system of this new offi
building, including fixe
windows, was fabricate
from Reynolds Aluminu
(more than 110,000 poun
of it). The spandrels a
colorful porcelain ename
Erection was complete
within 21 working day
Here again, teamwork b
tween architect and fab
cator resulted in anoth
good looking, practic
business structure.

Reynolds helps fabricators create exciting uses for

Aluminum In Modern Architecture

"A great symbol... a mountain of light," is the way Frank Lloyd Wright described this extraordinary religious building. Many of its structural and decorative elements are made from Reynolds Aluminum by a leading fabricator of metal products—castings for the patterned ornamental coverings for the tripod beams; entrance canopy fascia, gutter fascia, flashing fascia; interior beam facings; ornamental covering for choir loft supports; altar fixtures, menorahs, design of flaming bush. An outstanding example of the ability of aluminum to execute unusual shapes within the context of exciting architectural design.

TEMPLE BETH SHOLOM
Elkins Park, Pennsylvania

ARCHITECT:
Frank Lloyd Wright

GENERAL CONTRACTOR:
Culwell Construction Co., Oklahoma City, Okla.

ORNAMENTAL ALUMINUM FABRICATOR:
A.R.K. Foundry and Manufacturing Co., Oklahoma City, Okla.

ALUMINUM REQUIREMENTS ON ROOF:
J. Edward Linck Sheet Metal Co., Philadelphia, Pa.

for a building in a heavily built-up area.

The means of handling building–air space relationships should make use of outdoor space forms—plazas, courts, passageways, terracing, the forms that give definition to the air space horizontally and vertically. Even sculpture and outdoor details, signs, markers, lighting units, all must be considered. The big-plaza idea may be utilized as a huge forecourt from the expressway side of the property and thus provide the tie and continuity in the main approach and view to the whole development. The play of large and small open spaces between and around the buildings should be studied in three-dimensional models and through perspectives.

The spaces between and around buildings have an important practical role in relation to drainage of the site, location and maintenance of utilities, fire and safety protection, and provision for expansion, growth, and adaptation of building facilities. These factors become long-range determinants of the site plan, whereas the buildings themselves may change in requirements and ideas in future development. Therefore, it is wise to approach the whole site plan in terms primarily of the allocation and distribution of the open spaces.

WHAT'S WRONG WITH HOUSING?

Floyd Hunter, author of the recently published Top Leadership, U.S.A. *(published by the University of North Carolina Press), interviewed a cross-section of the building industry on the issues facing it. There was by no means unanimous agreement, but some strong opinions stood out.*

When asked: "What are the issues in housing?" 55 leaders in the industry felt that the major issues revolved around ways in which to solve the problems of urban blight, to get more mortgage money to builders and buyers, to settle the problem of public vs. private development, to solve problems of costs, to attack local development problems, and to handle minority housing. A few mentioned market inflation, tax reductions, housing for the aged, and cabinet status for the industry (see table).

Issue	Times mentioned
Urban redevelopment, renewal, slum clearance	14
Shortage of mortgage money	11
Private vs. public housing	10
High cost of housing	8
Scarcity of land, other local problems	5
Minority housing	4
Inflation of market	2
Tax reduction	2
Cabinet status for the industry	1
Housing for the aged	1

As I talked with the leaders, it was interesting to note that many of them were concerned and troubled about the redevelopment of urban communities. This was as true of the ones who could surely be classified as conservative in their attitudes as of the labor leaders and others who had long taken a position to the left. The conservatives were convinced, however, that the best way of eliminating urban blight, getting low-cost housing for slum families, and meeting the demands for housing on the part of disadvantaged minorities was to expand and extend the arrangements of the FHA type of financing, which was considered the private enterprise solution. The contradiction with government's role in this solution had been resolved through years of experience in working with government and of fairly well-established lines of control. Those at the extreme opposite of the conservative interests contended that the problem was too big for private financial interests acting alone, and they pointed to the fact that there was in 1956 an extreme shortage of mortgage-lending money. END

Architect: Thomas M. James Company, Architects, Boston, Mass. Associate Architects: Perry, Shaw, Hepburn and Dean, Architects, Boston, Mass. General Contractor: George B. H. Macomber Co., Boston, Mass. Curtain Wall Contractor: Hope's Windows, Inc., Jamestown, N. Y. Panel Fabricator: Seaporcel Metals, Inc., Long Island City, N. Y.

Boston Bank draws more interest with walls of steel

When the Merchants National Bank of Boston decided to build a 4-story addition to one corner of their existing building, they wanted it to reflect a progressive, enthusiastic company. The building would be small and low in cost, yet it had to be an impressive stand-out in the area.

So they built the new building with these colorful steel curtain walls. The factory-assembled wall units are faced with porcelain-enameled steel panels. They cost less than any other coated or colored metal panel and they make a strong weather-tight wall. The panels are laminated to 1/8" asbestos board, a full inch of fibrous glass and 24-gage steel backing.

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abandoned them. No state recommended stock plans.

There are certainly good sound reasons for this record. A few of the obvious ones:

1. Advances in school building design cease when such plans are used.

2. An attempt to adapt standard plans to the necessary changes can easily result in more cost than the architect's fee.

3. Many critically important planning decisions are made by persons who are not as vitally concerned or as responsible to the local community as the private architect.

4. The low standard which the stock plan must have to serve all comers is a bar to progress.

5. The use of bureau planning by governmental agencies is more expensive. In New York, a 10 per cent saving was affected at once when trained private architects were commissioned to design the schools formerly designed by bureaucratic employees.

6. When a recommended educational feature is not found in the stock plan, it becomes necessary to determine if plan changes required will nullify the cost and time savings which were contemplated when the stock plan was adopted. When the project is developed on an individual need basis, the inclusion of special recommended features is simply accomplished as a part of the planning.

WHAT INDUSTRY WANTS

One of the most eloquent statements of industry's site-location desires was made by Ray R. Eppert, president of Burroughs Corp., speaking before the National Association of County Officials in Detroit.

What industry wants most of all is economic promotion by geographic area. It wants coordinated transit facilities, road systems, and maintenance. It wants master development programs and centralized zoning. It wants an umbrella of area cooperation which prevents one section from freezing in the rain while another kidnaps new plants, new industries, and new tax monies. It wants diversification in order to avoid the pitfalls of overspecialization, which leave an area extremely sensitive to economic temblors.

I do not suggest a retreat from local autonomy and diversity. But I do plead that each jurisdiction not go its separate way in disregard of urban sprawl, cheap commercial developments, congested schools, traffic jams, and recurrent crises in mass transportation. These fritter away the economic potential of an environment. Governments in deadlock impede, rather than speed, the flow of production and distribution. When space is not assigned to appropriate economic uses, when water is not available at industrial sites, when highways provide poor access to work or bypass suitable subareas, each affected community invites needless and regressive burdens.

The county area provides the natural framework to resolve this metropolitan crazy quilt. Certainly, where a regional economy is contained within a single county, a governmental mechanism can be equipped with new policy-making powers. Its organization can be reinforced. It can be vested with service as well as administrative functions.

THE IMPORTANCE OF HOLES

Texas Site Planner S. B. Zisman recently made some notes on the wisdom of planning building groups so that all parts of the scheme are thought of as a pattern of solids and voids. His notes were published in the August issue of the AIP Journal.

New methods and ideas in building construction open up new possibilities of site location. For a long time, buildings have been tied to the ground under old and rigid concepts of gravity. The result has been that even now much architecture is dominated by the concept of the massive load-bearing wall, with the roof subordinate, incidental, and misused.

Today, however, we are beginning to perceive in new and fresh terms the significance of the roof as a logical expression of construction; and no building today can reach for greatness unless this idea is understood.

The significance of these new structural ideas is that the siting of buildings must be looked at anew. The building need not be a mass of heavy wall bedded in the ground but an enclosure of space within which there can be flexible use and easy adaptation to work and operations. This approach makes possible below-floor circulation and adjustment of interior height for changing needs. It opens up rich possibilities to take advantage of the grades. It opens up the possibilities of terrace parking intimately related to the buildings and of new solutions for circulation. It also opens the possibility of a grouping and spacing of buildings unhampered by old concepts and prejudices of wall-dominated planning.

One little understood problem in site planning in relation to the siting of buildings is the handling of "air spaces." More bad planning is perpetrated through this lack of understanding than perhaps any other single factor. Witness the mess in our cities when there is virtually no study in planning of the air spaces in relation to buildings. There are few good examples of group planning where this problem is understood. Harvard and Haverford College give some lessons. The GM Research Laboratories come close. Rockefeller Center tried. Lever House is a good example of the study of air spaces

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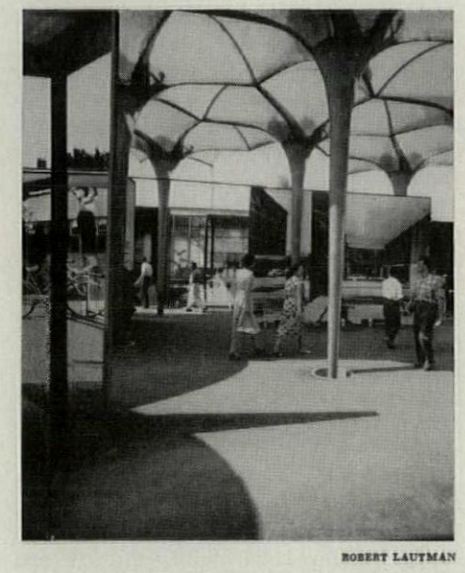
What other people are saying



ROBERT LAUTMAN

WHAT ARCHITECTURE CAN DO

In commenting on the success of the recent U.S. Exposition in Moscow, Norman Cousins, editor of the Saturday Review, *indicated a role for architecture in the cold war.*

The American Exposition in Moscow may have lacked the scope and elegance of the U.S. Pavilion at Brussels World's Fair last year, but it was just what the doctor ordered in the U.S.S.R.

Begin with architecture. Russian architecture tends to be formal, squat, somewhat spiritless. This is not solely the result of the need to build quickly, durably, and functionally because of the devastation in World War II. Traditionally, Russian architecture has leaned to the massive and conservative. The revolutionary drive didn't quite carry over into many of the creative arts, particularly in architecture and design.

Against this setting, the American Exposition was more than an innovation; it was an explosion and a shower of sparks. For it brought to Moscow revolutionary ideas in structure, materials, and design. As is now generally known, the main exposition building was dominated by the plastic, prefabricated dome—a vast, igloo-shaped golden semisphere made of octagonal plastic units that admit natural light. Two outdoor exhibits took place under large plastic canopies resting on tuliplike props (photo above).

It is possible, even likely, that there were some snickerings in Moscow at the unusual nature of the general architecture. But it is even more likely that Soviet citizens regarded the buildings for what they really were—a daring and imaginative use of design and building materials to open up new dimensions in architecture.

It is no longer adequate to think of American security in military terms. It is not even enough to think in terms of increased productive capacity and economic aid, though both are critically essential. Our security depends on imagination, on our ability to work with ideas, on our skill in making vital connections with people, on our success in helping to transform a world geographic unit into an interdependent society. The kind of vision that went into the making of the U.S. Exposition in Moscow is a happy hint of what is needed.

NO STOCK SCHOOL PLANS

When he recently took a look at the problem of lowering school costs, Architect Leslie N. Boney, vice president of the North Carolina AIA chapter, found that the biggest illusion on the scene was that stock plans save money. His findings were published in a recent Bulletin *of his state's AGC branch.*

The record shows that during the last 20 years school costs have risen only 150 per cent, while the cost of general construction has risen 250 per cent, common labor 330 per cent, and automobiles 200 per cent.

Architects have had no small part in this most welcome and remarkable accomplishment. The structures they have designed have been improved and are more in tune with the eductaional needs than ever before. No stock plan or magic has wrought this miracle, but it has come by painstaking attention to the minute and detailed requirements of each individual school plant.

The architect's reluctance to repeat plans stems not from his consideration of the fee, but rather from his intimate knowledge of the process of architectural design and construction costs and the varying conditions which affect these processes. From experience, he knows how few schools actually have similar sites and identical requirements.

The repetitious use of standard plans has not been profitable in states where it was used. At the time of a recent survey, only ten of the states had any form of stock plans available, and these were largely for one- and two-room or other small rural schools. Twenty-three states had never used stock plans and 12 states that formerly used them had

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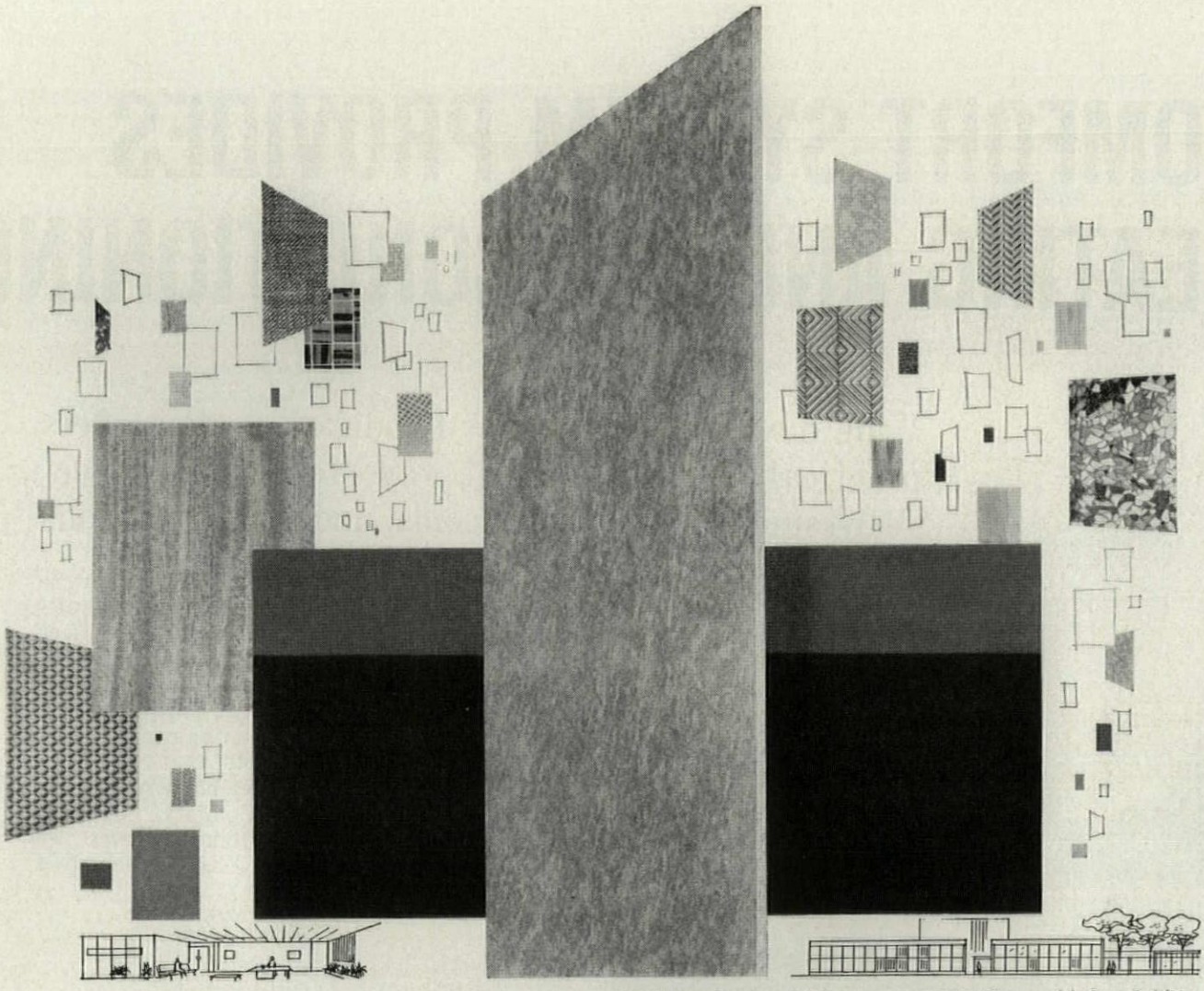

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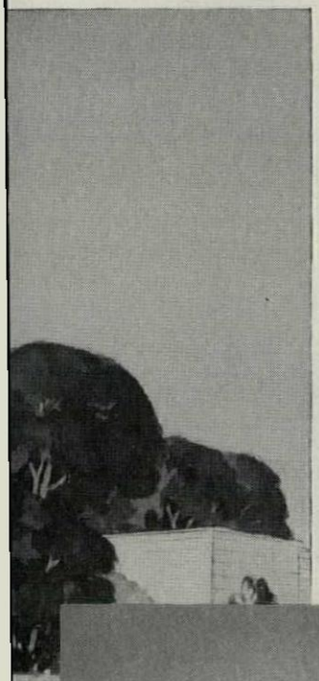

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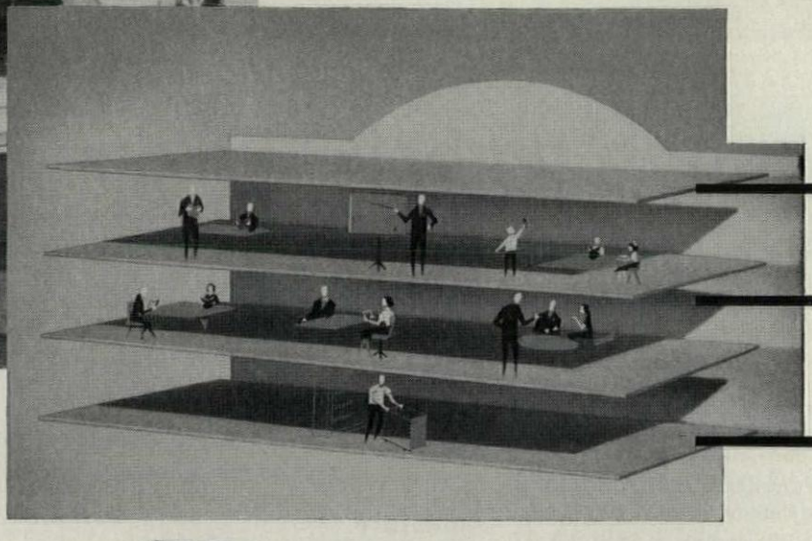

2nd floor—three zones
Three Landmarks cover 10,000 sq. ft.—reading rooms, offices, club rooms

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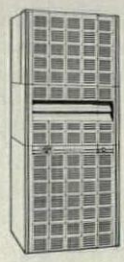
Eight Landmarks cover 21,000 sq. ft.—main reading room, children's library, lecture room, smoking lounge

Basement—two zones
Two Landmarks (heating only) cover 14,000 sq. ft.—storage



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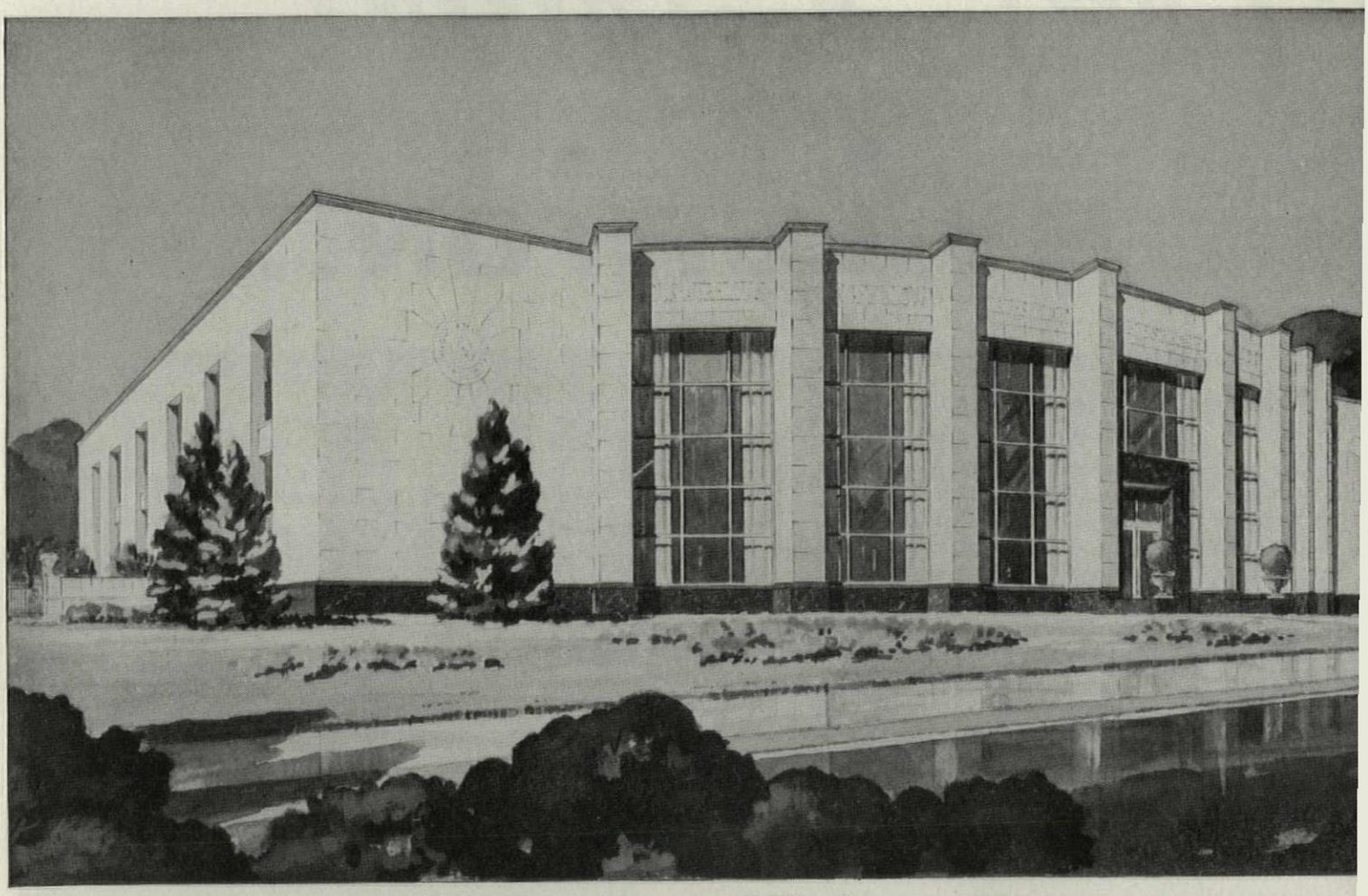

Santa Ana Public Library, Santa Ana, California
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Lee Fabian	Project Architect
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See SWEET'S (Sections 3 and 17) for the Michael Flynn Aluminum Curtain-Wall and Window catalogs, and write for further specific information. A call to the nearest LUPTON representative (see the Yellow Pages under "Windows—Metal") will bring fast action without obligation.

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#2 Broadway, New York City. Architect: Emery Roth & Sons, New York. Owner and Builder: Uris Brothers, New York. Photo by Wurts.

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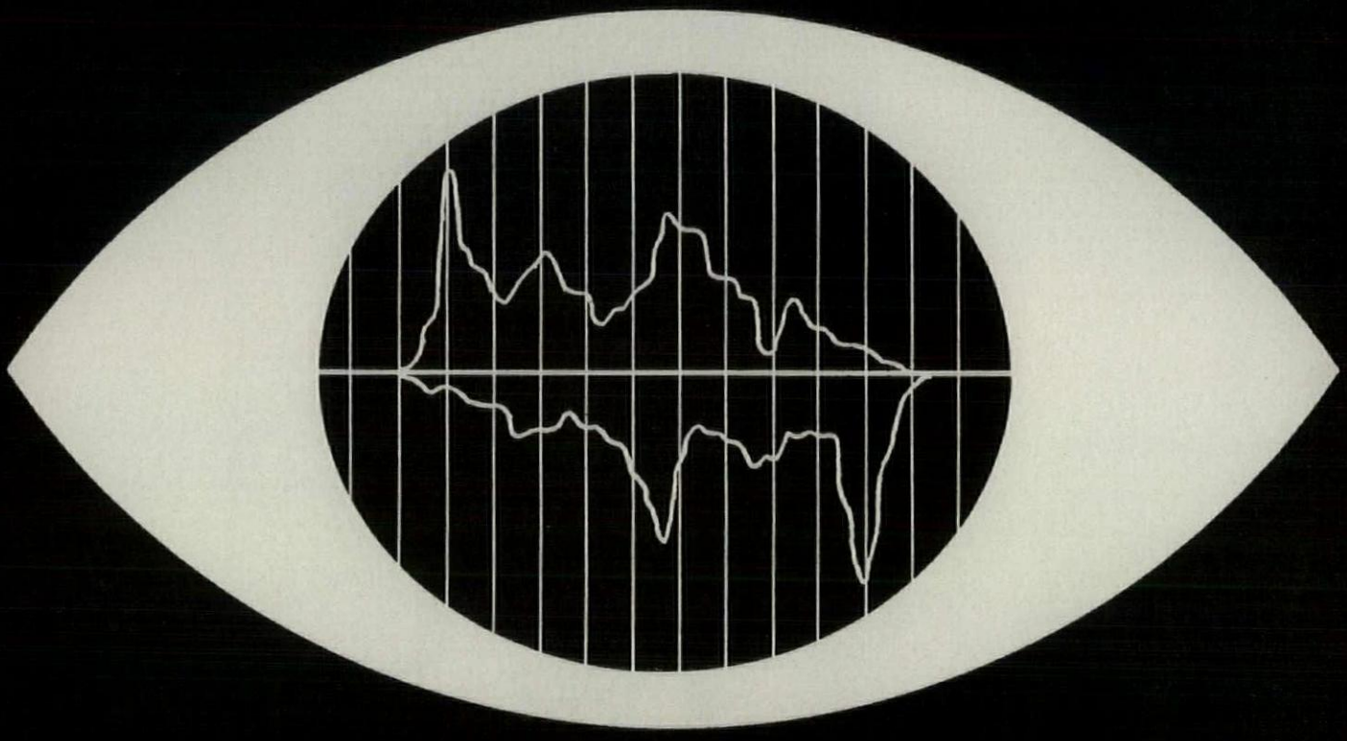

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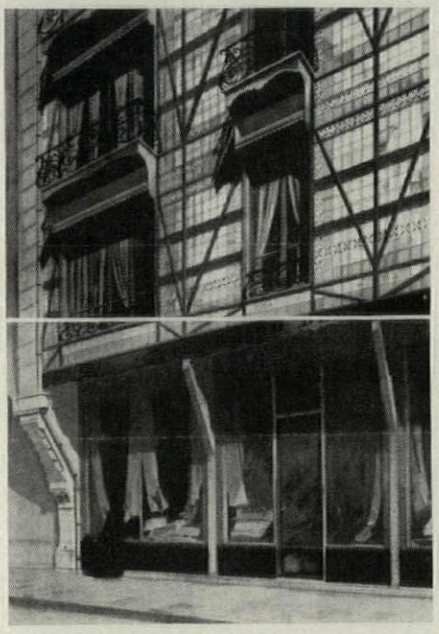
"true beauty has never been attainable without the concurrence of those invariable laws which are based on reason. To every work that is absolutely beautiful there will be always found to correspond a principle rigorously logical." These criteria led Viollet-Le-Duc to reject many an "important" building of the past in favor of some simple cottage that followed the essential, "rigorously logical principle." And this was 80 years before Dr. Giedion introduced his readers to the qualities to be found in certain anonymous building.

In one of the lectures contained in the second volume, Viollet-Le-Duc applies his functionalist principles to the building of



iron-framed buildings (above)—and comes up with a system that, except for certain decorative details, is almost undistinguishable from the steel-and-brick structures of Mies van der Rohe, or the *pilotis*-supported buildings of Le Corbusier today! Viollet-Le-Duc also shows how much "in the swim" he was in his own day by referring, in an important footnote, to his contemporary, Saulnier, whose exposed steel frame structures in the middle of the nineteenth century in France are today considered among the most important pioneer works of the modern movement.

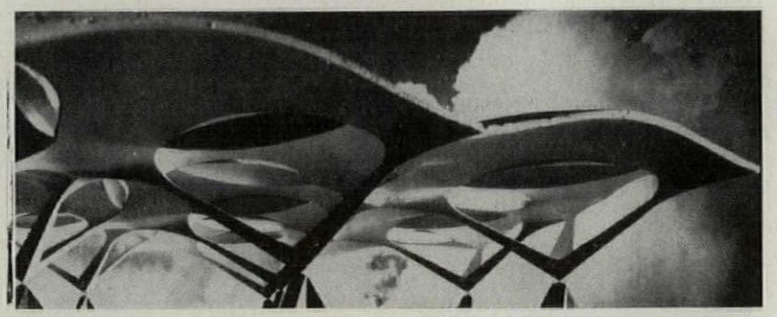
In short, the republication of the *Discourses* is a pleasant and important event—and one that may imbue some latter-day modernists with a touch of humility.

FOUNDATION DESIGN AND PRACTICE — An Economic View. By J. H. Thornley. Published by Columbia University Press, Morningside Heights, New York, N.Y. 298 pp. 10" x 8¼". Illus. $15.

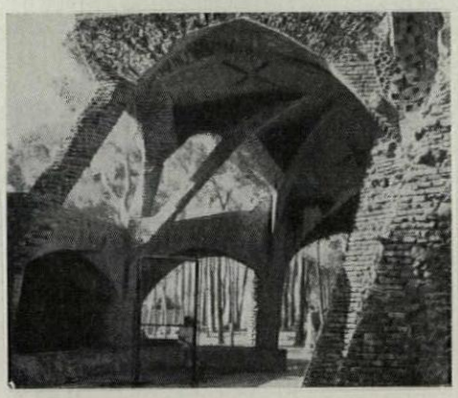
The purpose of this book is to help the designing architect or engineer choose the correct foundation for a given structure at the least possible cost to the owner.

END

History . . . the skyscraper . . . Viollet-Le-Duc



From shells for Naples . . . back to a chapel by Gaudí



A HISTORY OF MODERN ARCHITECTURE. By Jurgen Joedicke. Published by Frederick A. Praeger, Inc., 15 W. 47th St., New York, N.Y. 243 pp. 7¾" x 10¼". Illus. $10.

There has not been a manageable, profusely illustrated, accurate, comprehensive, interesting book on modern architecture in the English language for some time. Most of the existing works are either too heavy (both physically and in their style), too old, or in German. This new entry is therefore a godsend: it is clear, well laid out, compact, up to date—in fact, if it has any serious weakness at all, this would be its slight overemphasis on very recent buildings (which may not seem quite so world shaking in their impact when the dust begins to settle).

The author is a teacher at the *Technische Hochschule* in Stuttgart, and he must be a good one, for the simplicity of his style (apparent in the excellent translation) adds much to the effectiveness of the book. If he has a personal prejudice in favor of (or against) some of the movements he describes, he has managed to keep it under his hat. And if the book has any major faults these, too, escape notice. Teachers of architecture in the English-speaking countries will find this an extremely valuable record of one of the richest and most varied movements in the history of art.

OFFICES IN THE SKY. By Earle Shultz & Walter Simmons. Published by Bobbs-Merrill Co., Inc., Indianapolis and New York. 328 pp. 5¾" x 8½". Illus. $6.

In celebrating its 50th anniversary two years ago at New York's Waldorf-Astoria, the National Association of Building Owners and Managers decided a suitable project would be to catalogue the rise of the American skyscraper and its own multibillion dollar industry. The resulting book, one of whose authors is a former NABOM president, faithfully takes the reader from Chicago's ten-story Montauk block of the 1880's, through Elisha Graves Otis' first go with the safety-braked elevator, through the Woolworth and Empire State Buildings, the ups and downs of depression and wars, New York City's incredible building boom, the Renaissance of Pittsburgh and other cities, and the flowering of today's great glass and metal monuments. Most of this has been recorded before, though there are a few insights and figures from the building owner's point of view, a few digs at city planners. Authors Shultz and Simmons leave the reader with the thought that cities are here to stay, but that competition rather than beauty will be the great fact of America's urban life.

DISCOURSES ON ARCHITECTURE. By Eugene Emmanuel Viollet-Le-Duc. Translated from the French by Benjamin Bucknall. Two Volumes. Published by Grove Press Inc., New York, N. Y. 487 pp. & 464 pp., respectively. 8¾" x 11¼". $22.50.

When the late Frank Lloyd Wright looked for a book on architecture to give to one of his sons, he chose these volumes by the midnineteenth-century French architect, Viollet-Le-Duc, and said, characteristically: "The rest you can learn from me." The *Discourses* have now been republished in the original English translation, and their availability will open the eyes of many to one of the most original sources of architectural thinking in the history of the Western World. For here, in Viollet-Le-Duc's comments, is where modern architecture really began.

The first of these two volumes is concerned, on the face of it, with the history of architecture from the Greeks to the nineteenth century. But Viollet-Le-Duc was much more than a historian—even more than a critic. He was a moralizer, a commentator, who, in telling the story of a particular period in architecture, was able to extract and state certain principles which he thought should govern architecture in the future. It is possible, for example, to find the entire dogma of functionalism spelled out by Viollet-Le-Duc more than 100 years ago: "We may . . . class the various styles . . . according to . . . the true expression of the requirements and necessities of the structure," he said. But then he went one important step beyond the early functionalists by adding: "Conceptions based on the soundest reason sometimes produce only repulsive works." Nonetheless he was quite certain that

continued on page 182

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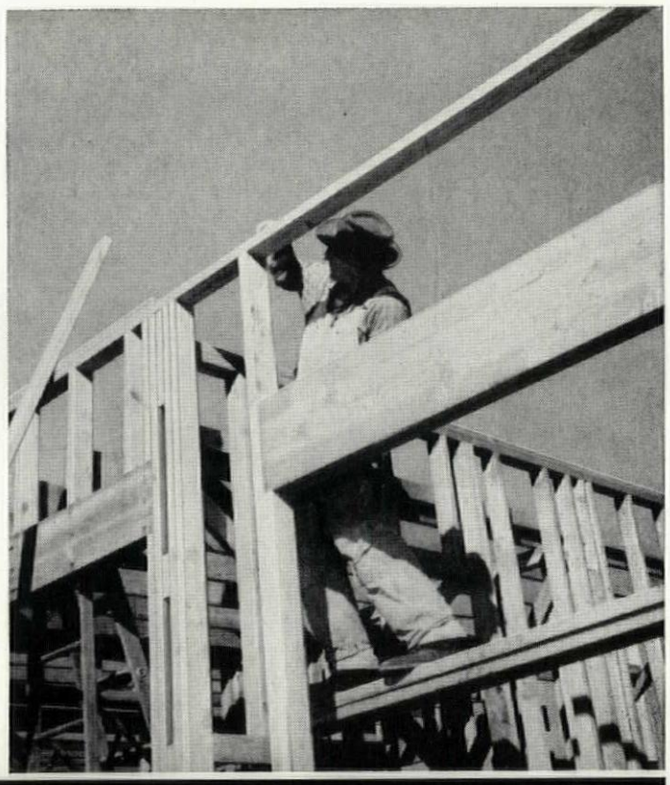

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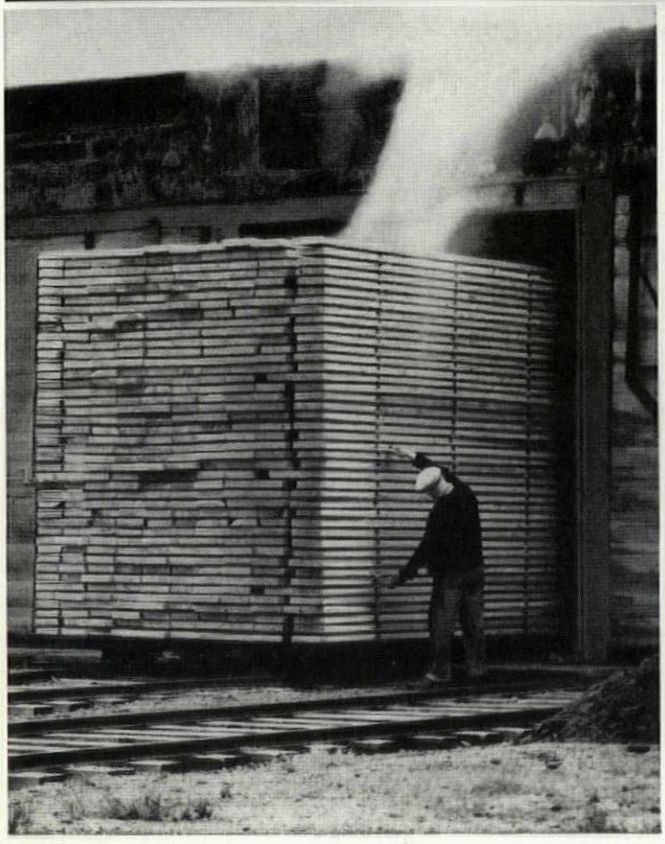

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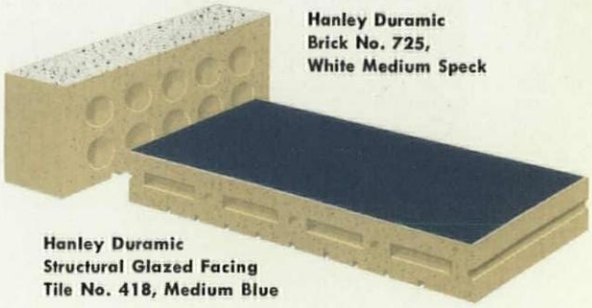
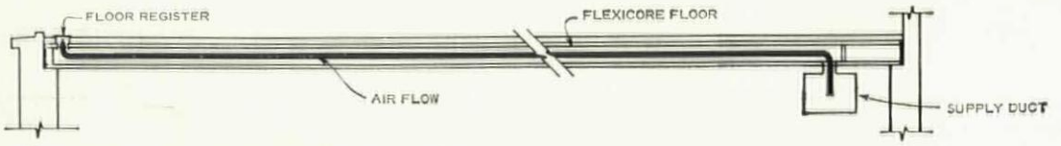


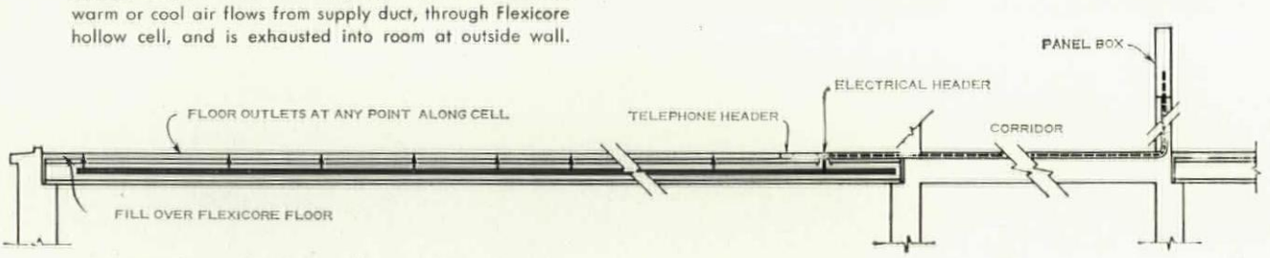
Hanley Duramic Brick No. 725, White Medium Speck

Hanley Duramic Structural Glazed Facing Tile No. 418, Medium Blue

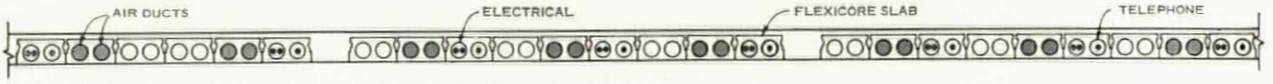


Ask for Flexicore Facts No. 82

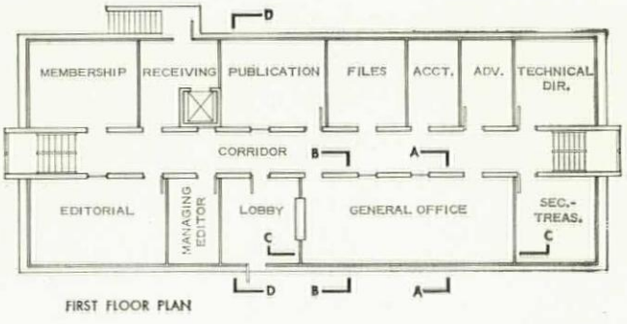
Section AA. At American Concrete Institute in Detroit, warm or cool air flows from supply duct, through Flexicore hollow cell, and is exhausted into room at outside wall.



Section BB. Electrical wiring runs from panel box, through header, then through Flexicore hollow cell to floor outlet. Similar system is provided for telephone.



Section CC. Selected cells are used for electrical, telephone, and for air ducts. Electrical fittings by Conduflor Corp., Cleveland.



FIRST FLOOR PLAN

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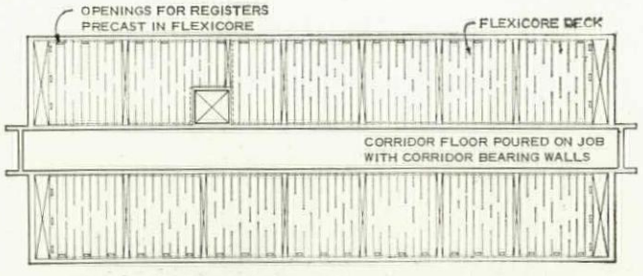
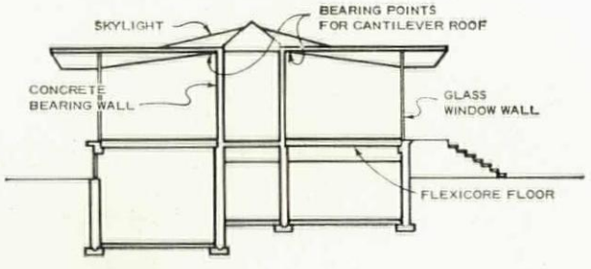


First Floor Framing. Corridor floor was cast in place with corridor bearing walls. Flexicore clear-spans from corridor walls to outside walls.



Section DD. Corridor walls are sole support for roof.

Minoru Yamasaki & Associates, Architects, Birmingham, Michigan

Hollow cells in Flexicore precast, fireproof floors are used for electrical and telephone wiring, and as air ducts for warm air heating, air conditioning and ventilating at American Concrete Institute Headquarters, Detroit.

For more information on this project, ask for Flexicore Facts No. 82. Write The Flexicore Co., Inc., Dayton, Ohio, the Flexicore Manufacturers Association, 297 S. High St., Columbus 15, Ohio or look under "Flexicore" in the white pages of your telephone book.

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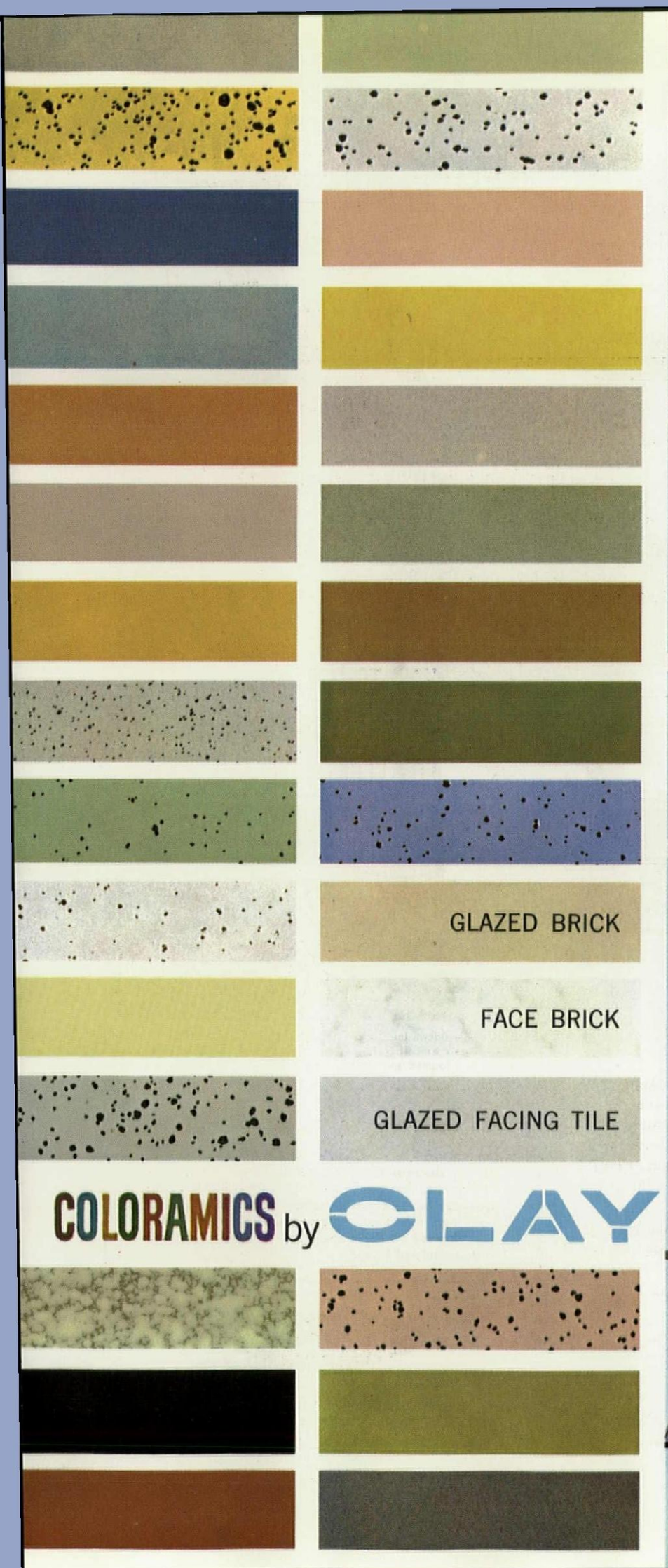

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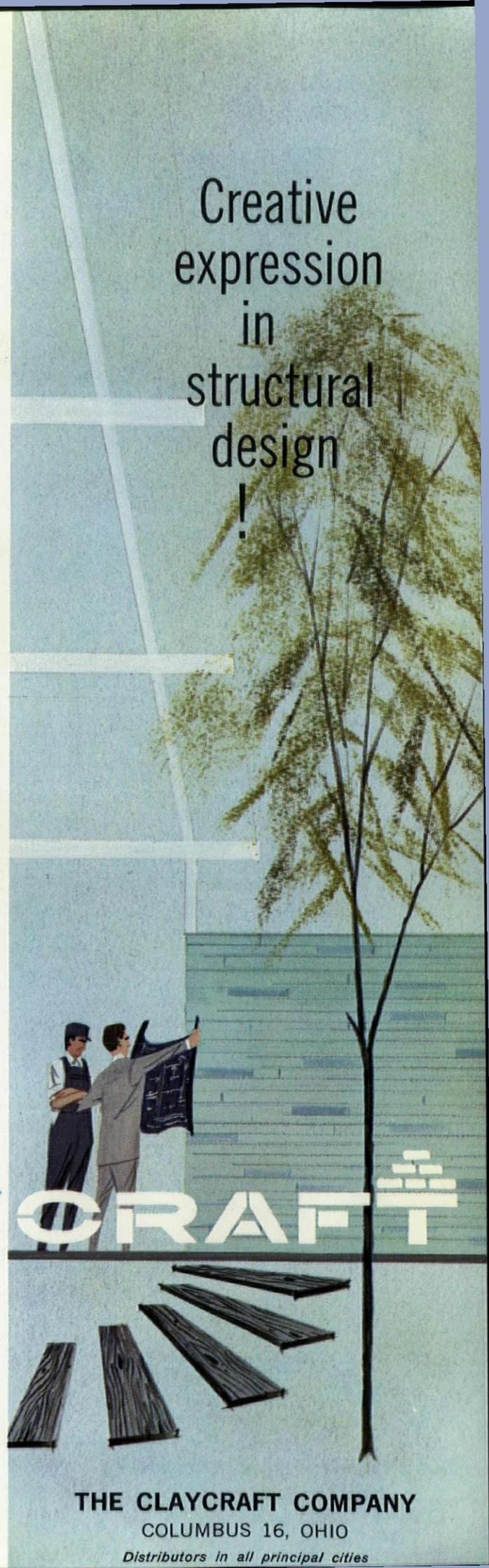

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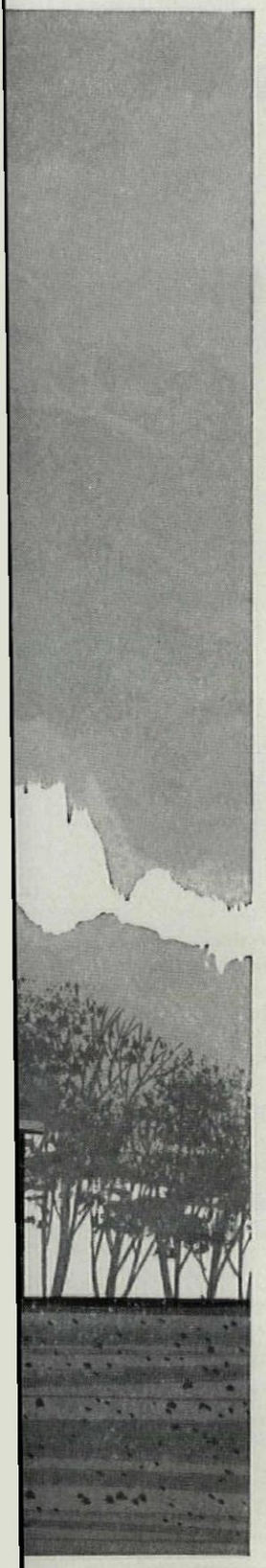

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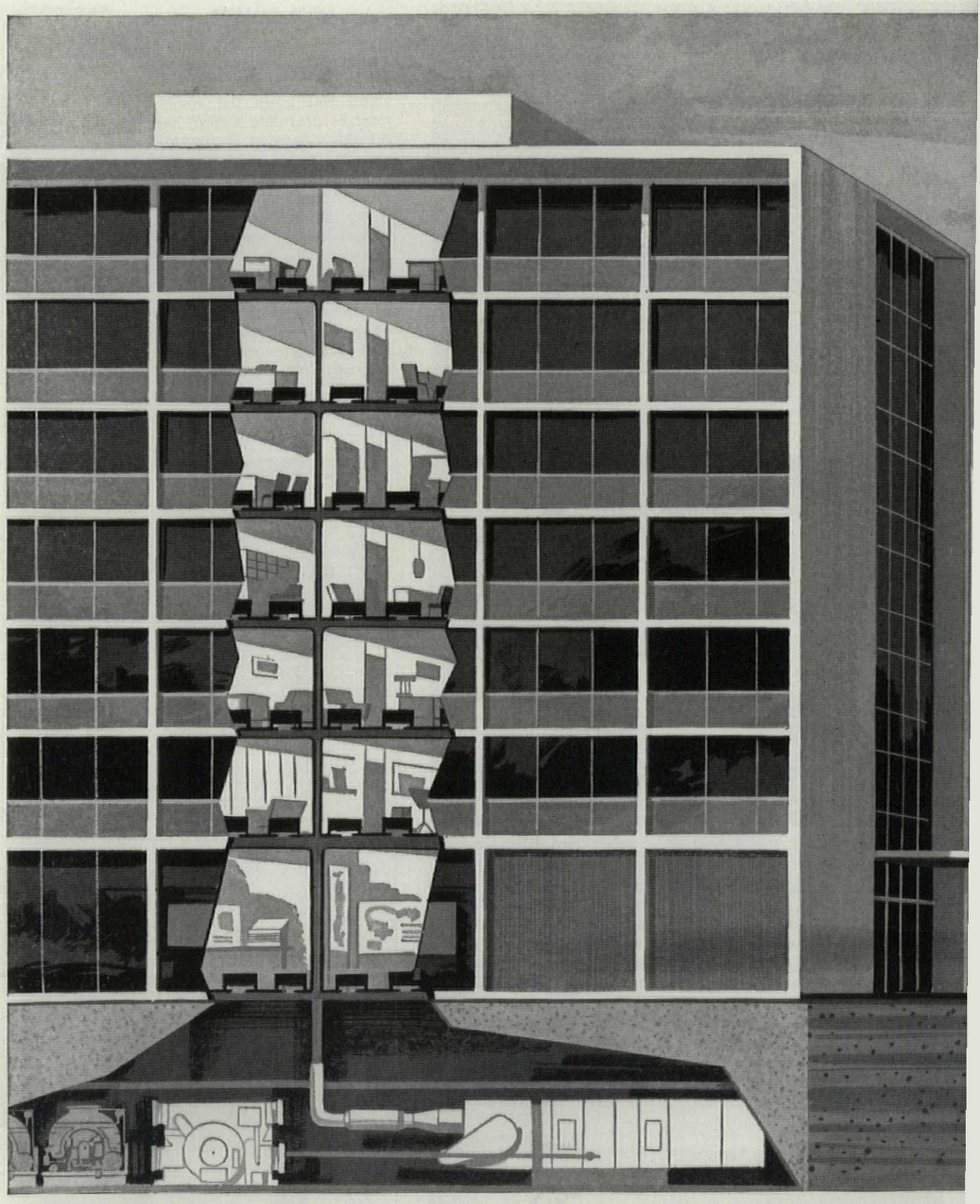

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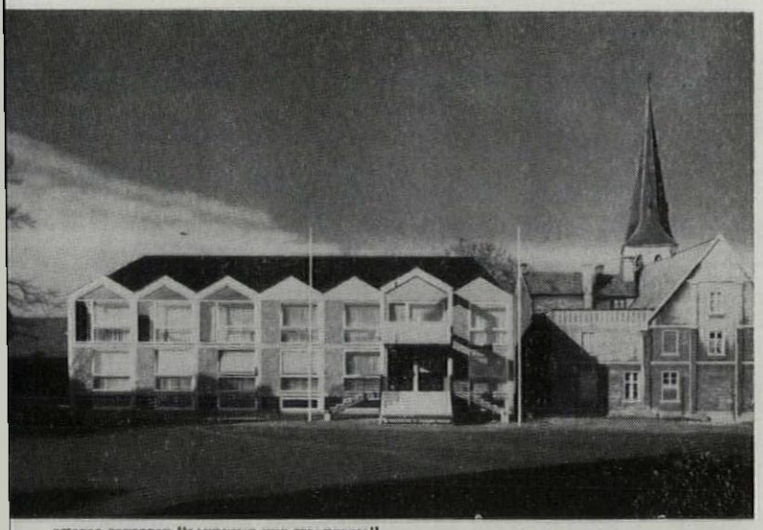
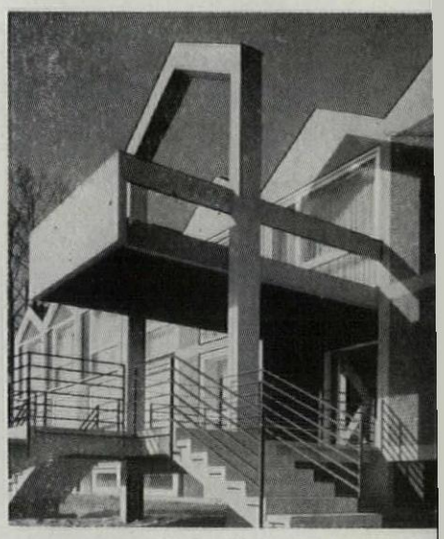


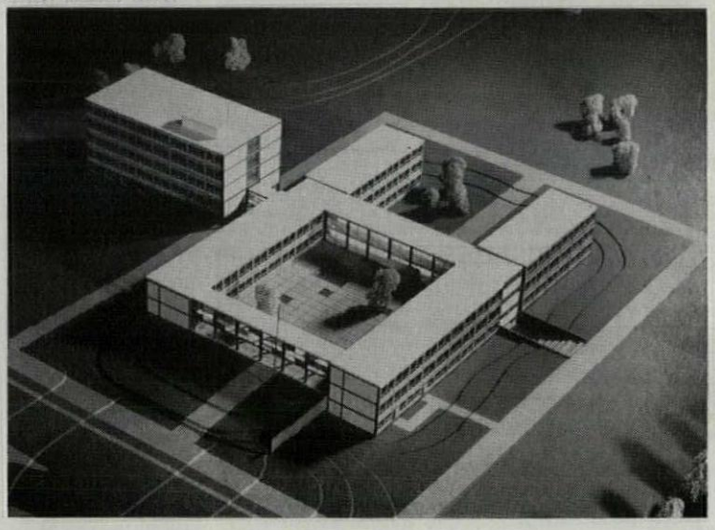
PHOTOS COURTESY "BAUKUNST UND WERKFORM"

SWISS GALLOWS

When Swiss Architect Harold Deilmann, well-known for his severely disciplined cubic designs, was given the assignment of providing a town hall for the village of Nordwalde, he relaxed his discipline far enough to allow a nicely gabled façade and a pitched roof (left). But in one detail his control was somewhat too relaxed: the main entrance (right) is covered by a balcony suspended from a frame which fits in nicely with the façade when seen from the front, but which stands out like a gallows at dawn from the side.

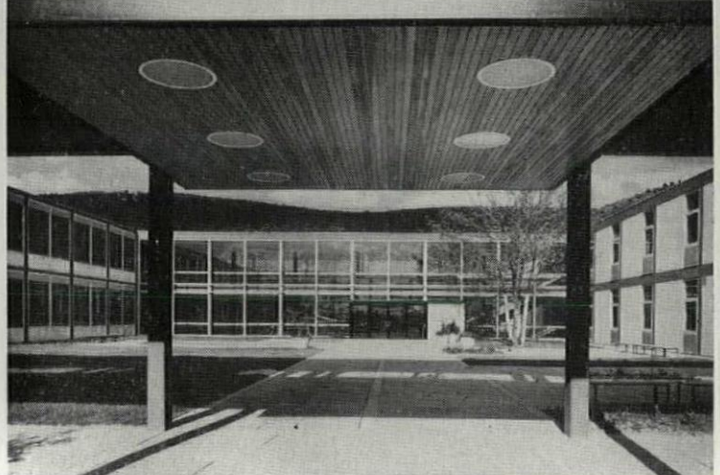


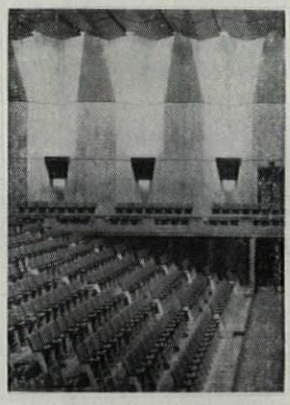
PHOTOS: BARBARA MONSE

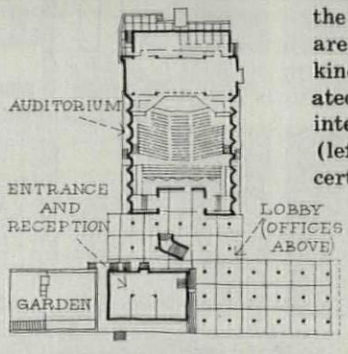


HEIDELBERG CAGE

When planning the Heidelberg Business College, Architect F. W. Kraemer split the plan into two clearly defined parts: the compact, four-storied vocational school and the sprawling, two-story business school (see model photo, above). His theory was that the more academic of the two curricula should be pursued in a leisurely environment of pools and courts; the trade school could fit in a box. Both parts are framed with a reinforced concrete skeleton that is thin and precise enough to look like steel (below). The skeleton is in-filled with aluminum-framed window elements and occasional masonry panels. Because of all the glass, the school has already won the nickname in tradition-bent Heidelberg of the "Glass Cage."



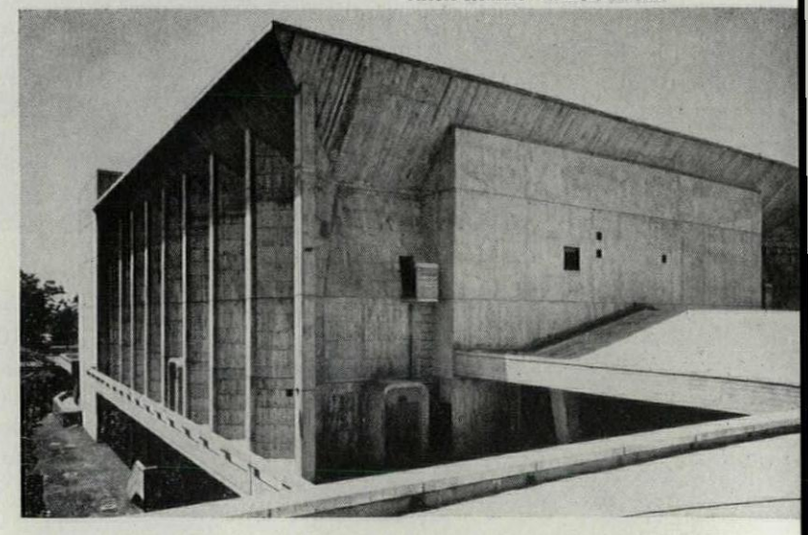


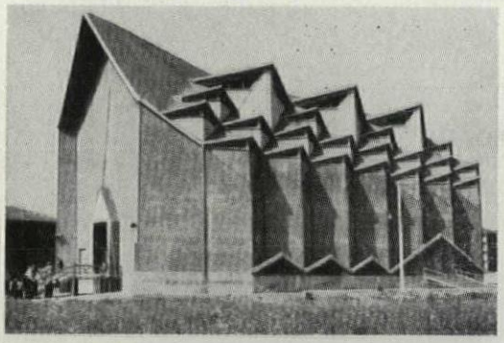


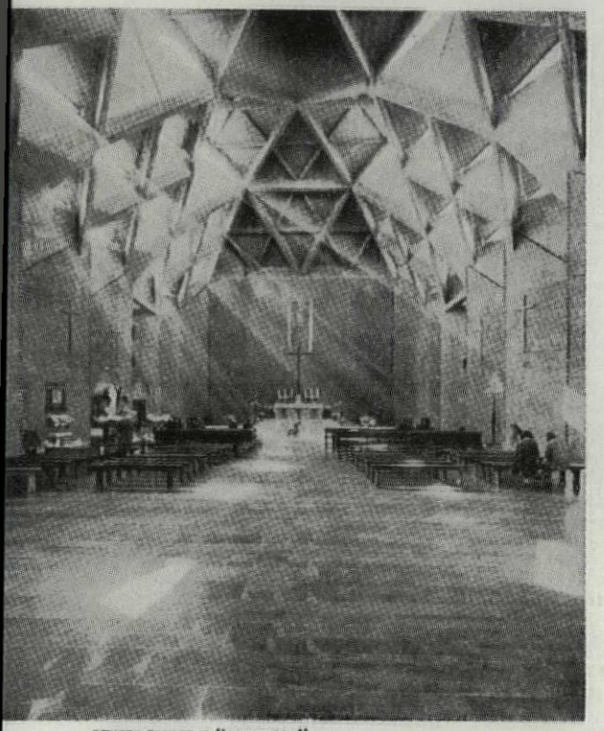
JAPANESE BARENESS

The exterior of Kunio Maekawa's auditorium and community center for suburban Setagaya (below) has the naked honesty of a not fully completed structure: the marks of the concrete forms are readily seen; the plaited strength of the auditorium's thin side walls can be read at a glance; and the fact that the roof is held up only by the walls is as obvious as the building itself. Fortunately the structure and the plan of the building (left) are interesting enough so this kind of bareness can be tolerated in a public place. And the interior of the auditorium (left, above) even achieves a certain, unadorned grandeur.

PHOTOS COURTESY "KOKUSAI-KENTIKU"



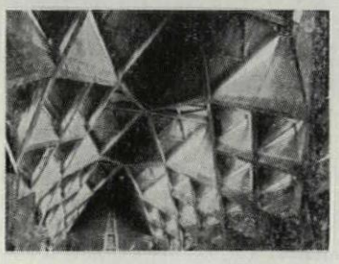


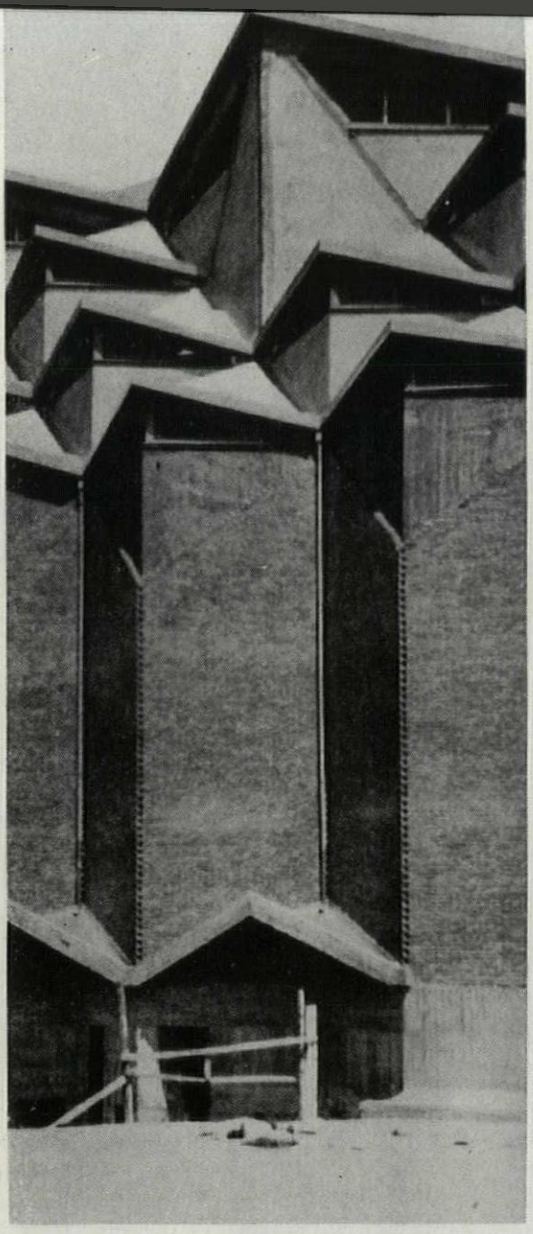


PHOTOS COURTESY "CASABELLA"

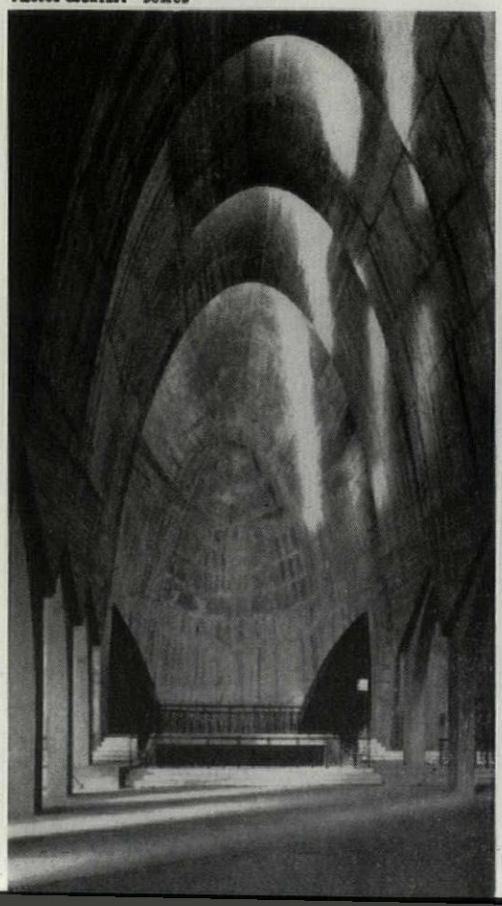
LIGHT IN ITALY

The architects of this many-gabled church outside Turin, Nicola and Leonardo Mosso and Livio Norzi, justify its unusual exterior by pointing to the remarkable quality of the light that is admitted (left) and by demonstrating how the design grew from the structural plan. The tall brick walls of the church (right) zigzag along their lengths to gain additional strength and are held together across their tops by a web of concrete ribs. To emphasize the structure, the designers brought light down through the web rather than through the walls; to catch and deflect the light, they built gables up from the web's interstices. The result from within, as in many other modern religious buildings, is that light is used as the major spiritual symbol.



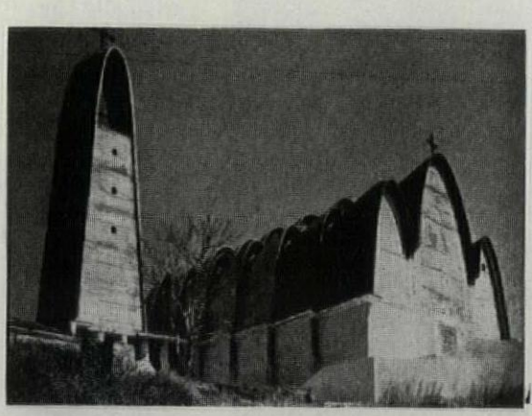


PHOTOS COURTESY "DOMUS"



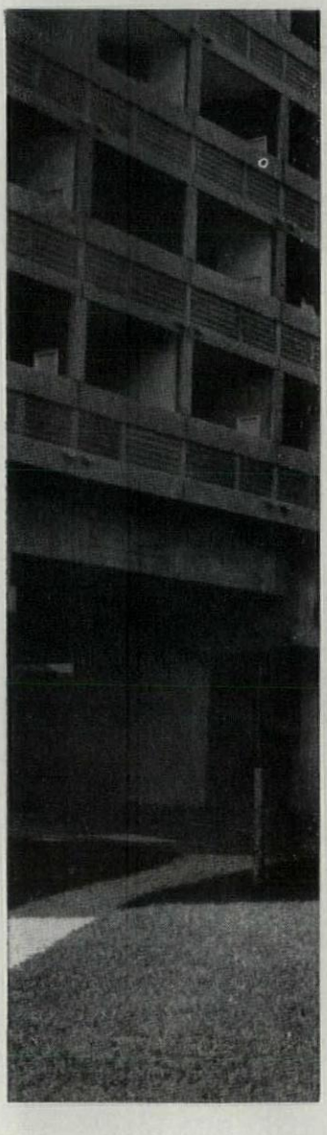
LIGHT IN TRIESTE

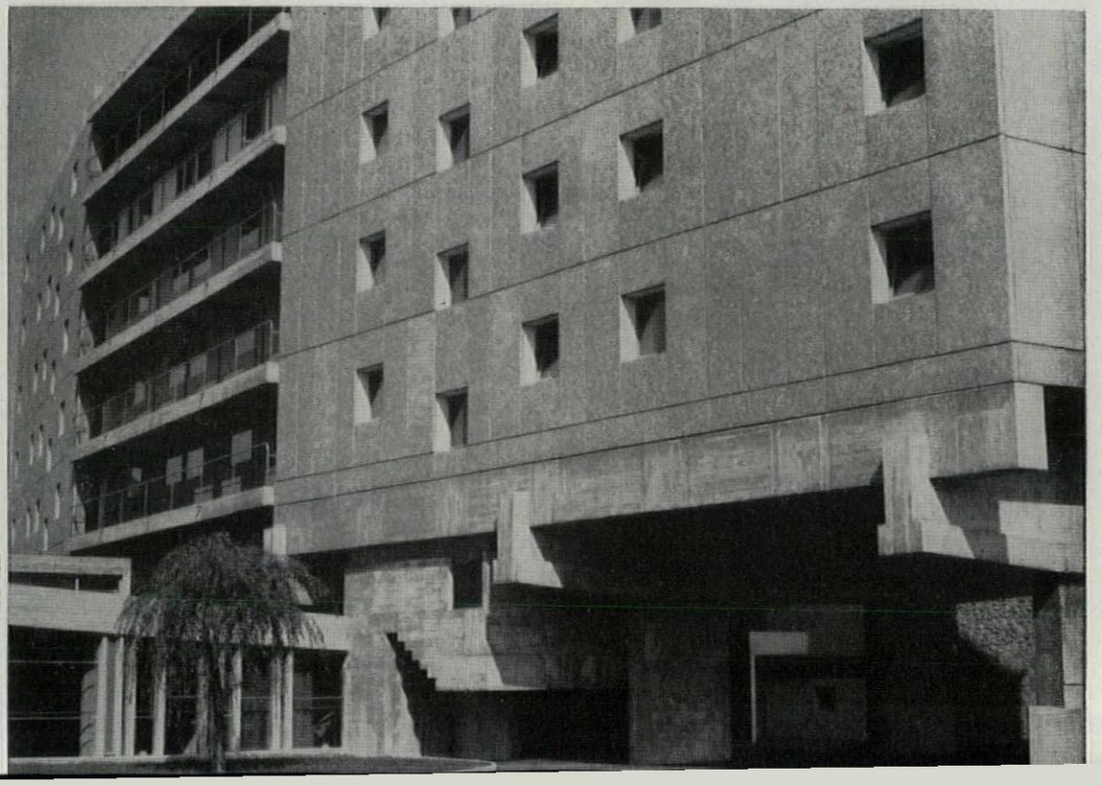
On the brow of a hill above Trieste is a church of soaring, overlapping vaults that achieves a sense of God-in-light through means similar to those used in the different-looking Italian church above. Each of this Trieste church's three parallel naves is roofed by a series of reinforced concrete shells. Light enters the two side naves along the edges of the shells (right, below), comes into the higher central nave where the shells overlap at the top. The effect in the central nave (left) is almost that of a cathedral with a luminous ceiling. Outside the church (right, above) Engineer Dino Tamburini has erected a bell tower of the same hyperbolic form.



A continuing review of international building

PETER BLAKE





PETER BLAKE

CORBU'S BRAZIL IN PARIS

The *Maison du Brésil,* which now bulks above a section of suburban Paris sky line (above), is a residence for Brazilian students at the University City. It was designed originally by Brazil's senior architect, Lucio Costa, but executed by Le Corbusier, and officially opened this summer. When seen close up, the building shows off a number of surprises. Gone are the cylindrical Corbu *pilotis;* in their place are wooden-looking columns and crossbeams. Gone are the expected, sculpted swoops and odd-sized windows; in their place is a structure that would look almost institutional (note the bowed east façade below) if it were not for the brightly colored panels in the recessed balconies. On the west façade (left) there are even gargoyles. And the detailing throughout, particularly the use of pebbly aggregate panels and rough concrete on the exterior, and stone walls on the adjoining auditorium (above, right), gives the building an unorthodox textural richness.

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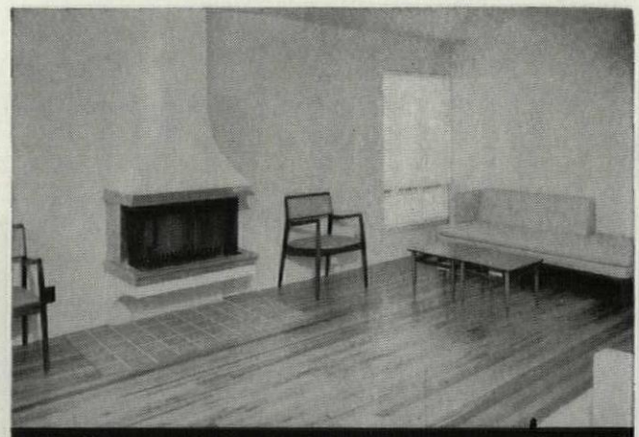

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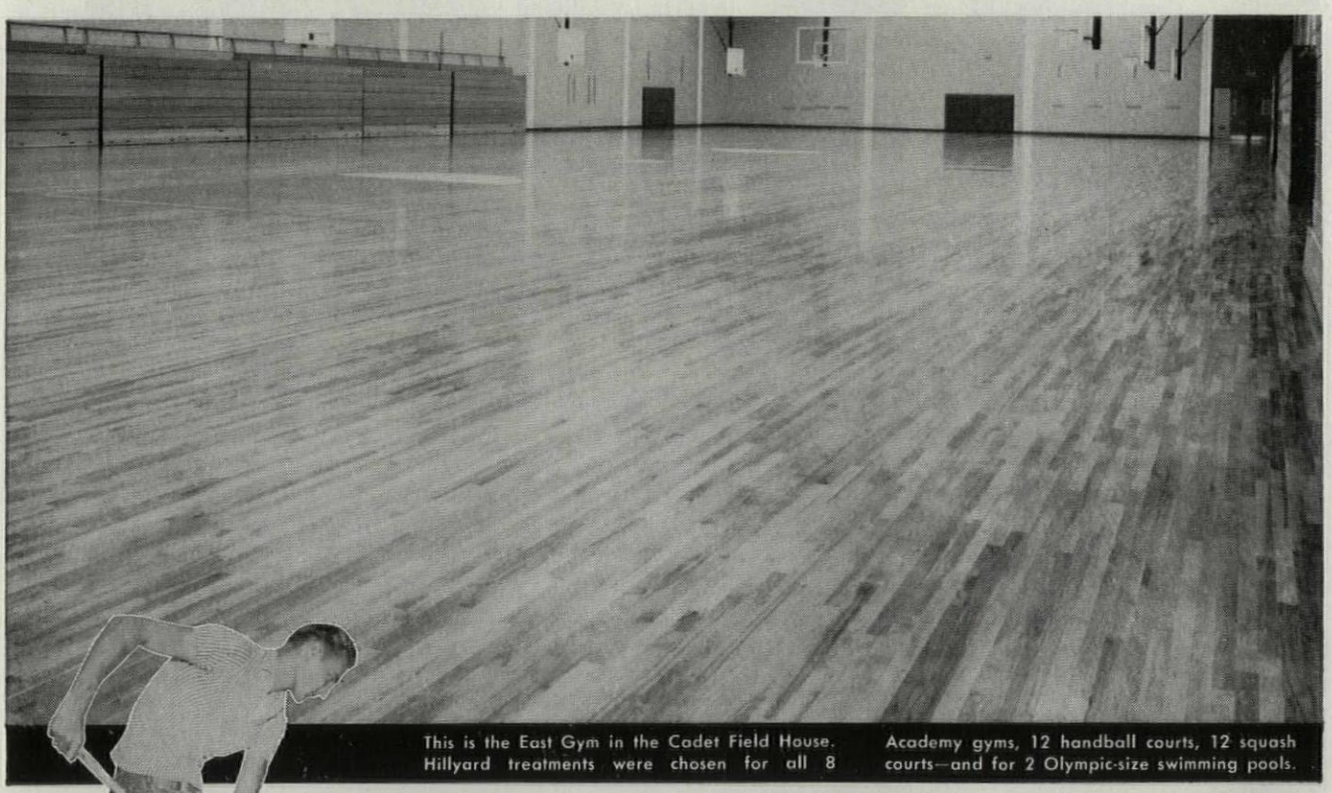
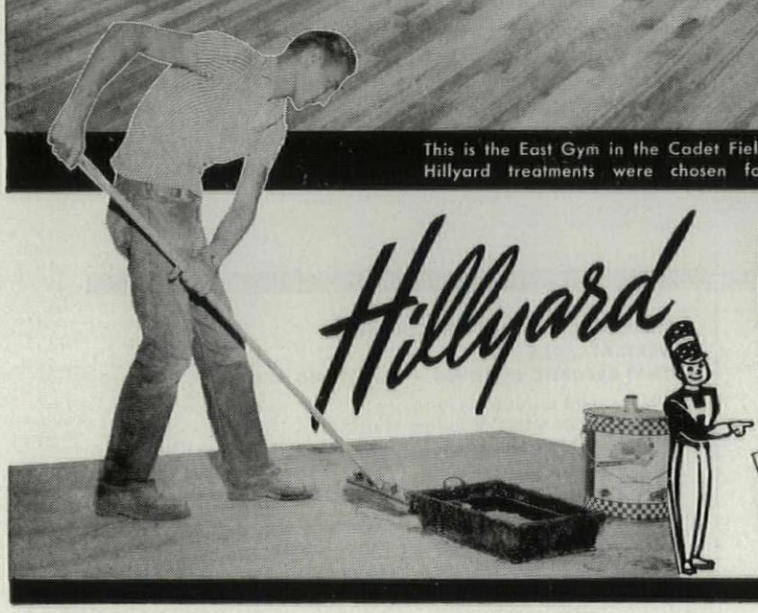


This is the East Gym in the Cadet Field House. Hillyard treatments were chosen for all 8 Academy gyms, 12 handball courts, 12 squash courts—and for 2 Olympic-size swimming pools.



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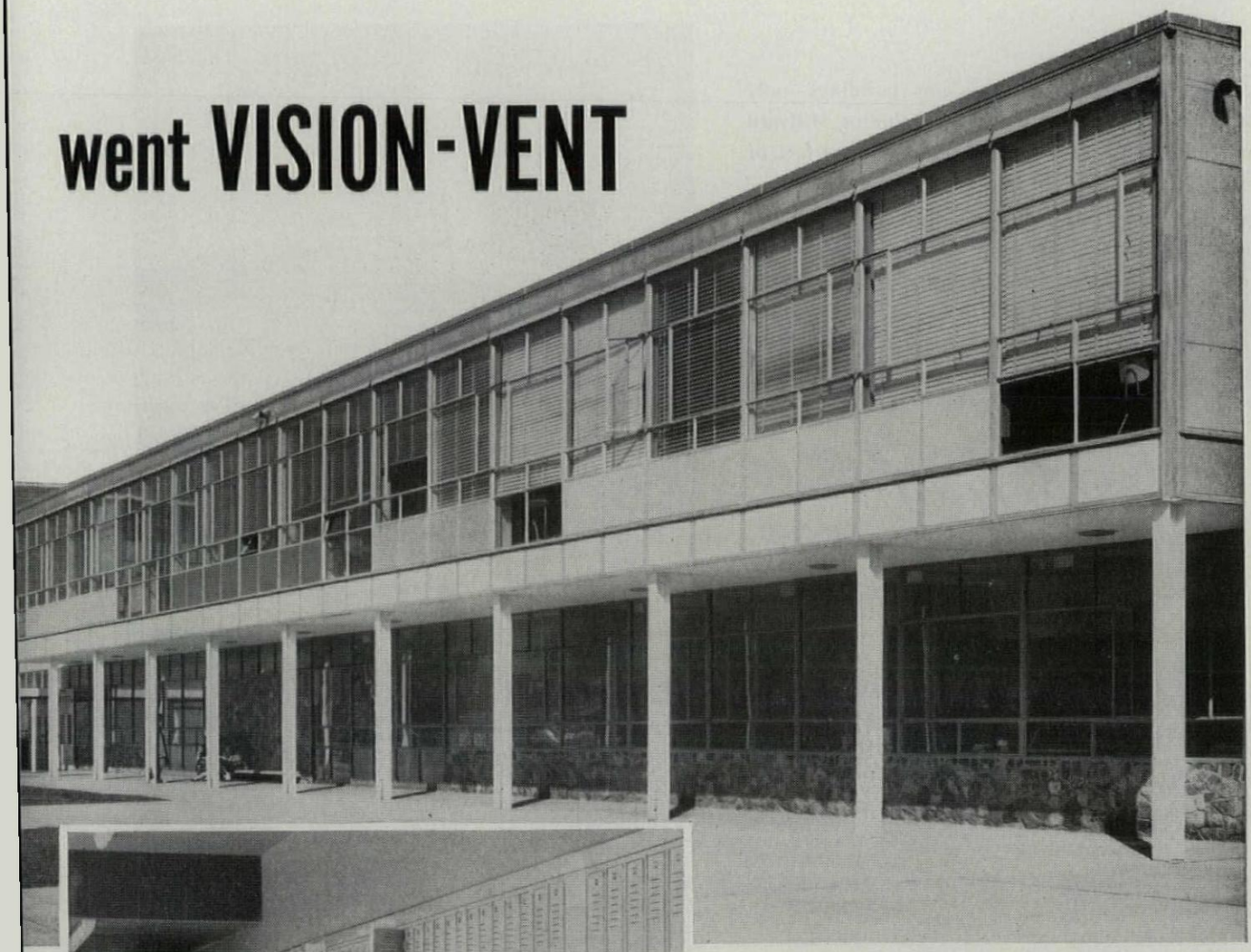

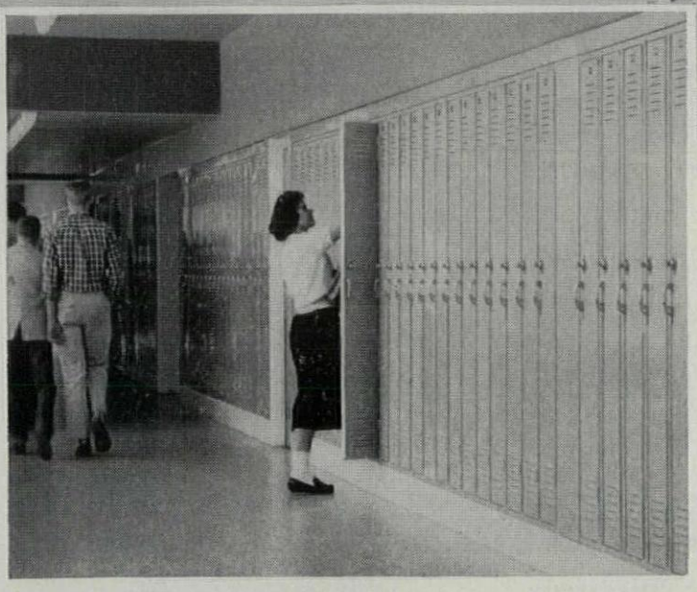

Architects: McLeod & Ferrara, Washington, D.C.

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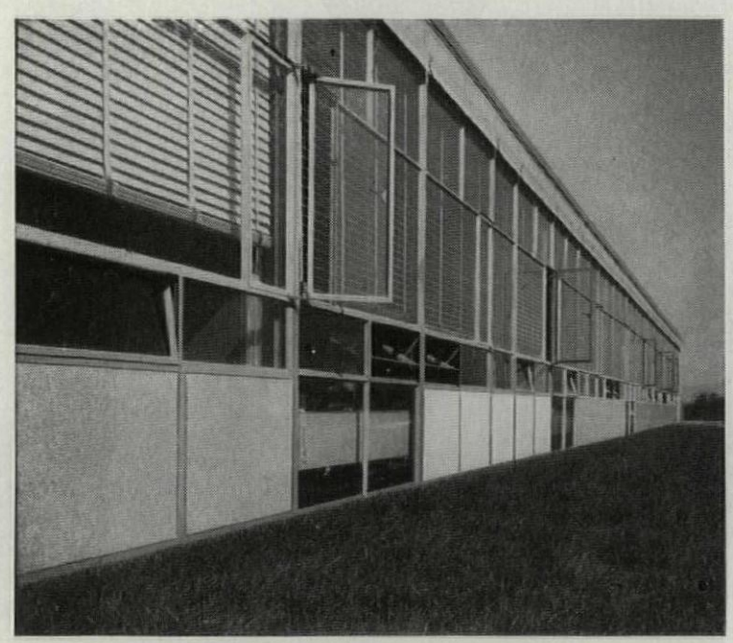

Cost of VISION-VENT Window Wall construction utilized by McLeod & Ferrara, Architects, compared favorably with any other type of construction considered. No other type, however, offered the combination of added light, beauty, durability, and complete flexibility of design.

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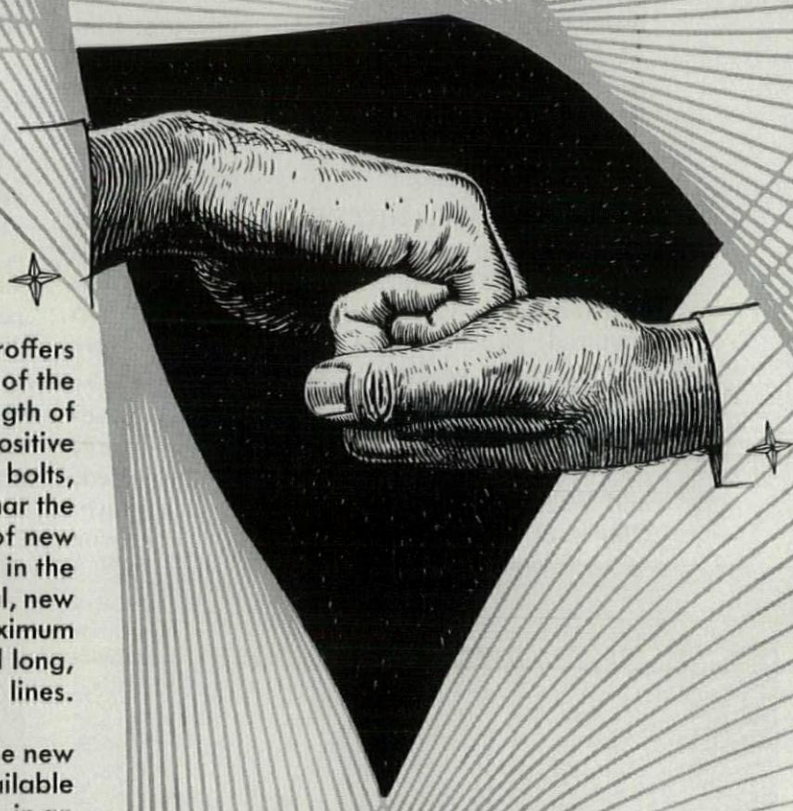

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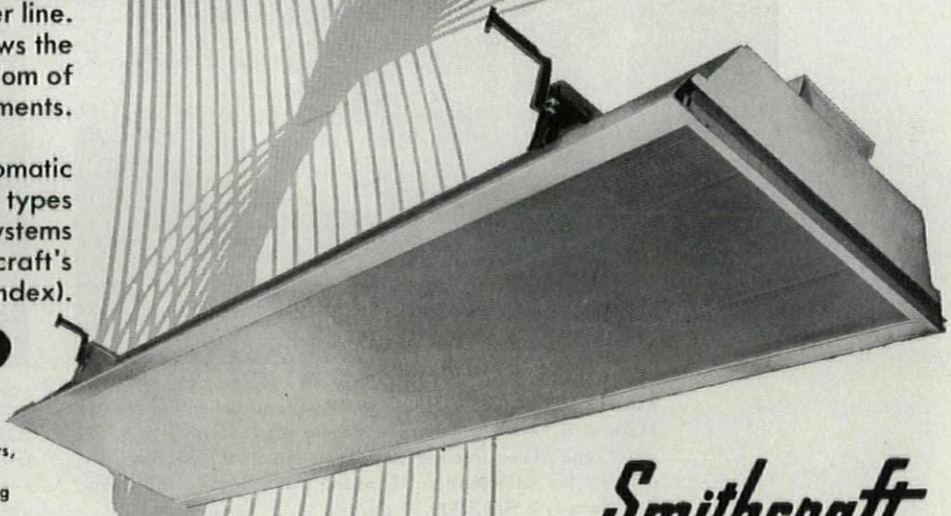

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? *How to raise enough equity funds for a redevelopment project without borrowing beyond the amount of the first mortgage.*

! *Form a partnership with an investor who will supply all the necessary working capital as a counterpart to the redeveloper's planning supervision and know-how.*

When Redeveloper Lewis E. Kitchen erected the first five buildings in his Quality Hill apartment project in Kansas City in 1951 he had to invest about $350,000 of equity funds above the mortgage financing he obtained through the City Bond and Mortgage Co. of Kansas City. But when he started the $2 million, 11-story addition to Quality Hill, to be completed next month, he had City Bond and Mortgage as a partner, freeing him from the need to use any of his own working capital. City Bond had become so sold on urban renewal that it took a dual role in the new venture: 1) arranging the Section 220 FHA 90 per cent mortgage financing, and 2) becoming a substantial partner under an agreement to supply all the equity money needed above the mortgage financing. The agreement provides that this equity loan will be fully repaid out of earnings (anticipated in less than five years) before distribution of any profits to either partner. Thus, the redeveloper was able to erect the project without any direct cash investment in its construction, although he still had to make considerable indirect outlays in his planning, overhead, and project promotion expenses; it took three years of planning and processing before the latest building could be started.

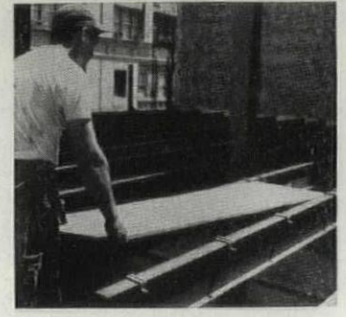
Last month City Bond President Dale M. Thompson, urging mortgage bankers to support renewal projects of experienced redevelopers in other cities in this manner, said: "There is no way the redeveloper, the contractor, and the architect can pool their fees to present the entire equity in a Section 220 project. The redeveloper probably will prefer to take in a financial partner than to tie up his working capital. The mortgage banker will find it very worth-while either to supply or arrange this equity financing. It can represent a sound investment with a terrific leverage. Our company expects to increase its earnings and net worth substantially through its equity in Quality Hill."

? *How to simplify the process of forming concrete floors.*

! *Replace bulky formwork with sheets of plywood, held in place by snap-off clips.*

New York Engineer Edward Klausner has developed a simple, low-cost method of constructing reinforced concrete flooring, shown in the photo below. The cost of this building, a 350-car parking garage in midtown Manhattan, was $1,000 per parking space, including land costs, considerably under that of most buildings of this type, which ordinarily range from $3,000 to $6,000 per parking space.

In Klausner's technique, the building's lightweight structural steel beams are positioned less than 2½ ft. apart, and specially designed cast-iron clips are fitted over the top flanges of the beam at 3 ft. intervals. The cast-iron clips support sheets of plywood, positioned between the beams. Next, wire mesh is rolled over the plywood, and concrete is poured to a thickness of 2¼ in. After the concrete has set, a worker goes along beneath the floor slab and knocks off the tail of each of the cast-iron clips; the plywood falls away, to be used again for other floors.



HEDRICH-BLESSING

? *How to overcome the disadvantage of a parking garage built across the street from the store or office building it is meant to serve.*

! *Obtain city permission for a bridge (or tunnel) to provide a direct connection from the garage to the building.*

When officials of the Hudson's Bay Co. decided that they would have to provide extensive parking facilities if their store in Calgary, Alberta was to retain its leading position against the inroads of new shopping centers, there was one great drawback. The most practical site was just across one of the city's most heavily trafficked streets. Store officials turned this liability into an asset, however, when they hit on the idea of a bridge or "skywalk" (their copyrighted name) to link their new garage with the store, at the same time providing an additional sheltered entrance without the pedestrian hazards of crossing the busy street. The enclosed bridge, heated in winter, connects the third floor of the store to the fourth floor of an elevator tower in the six-level, 475-car parking garage (see photo).

The steel-frame, aluminum, and glass "skywalk," now a Calgary tourists' spot, accounted for about one tenth of the $1.5 million spent for the garage project, which includes a group of specialty stores on the street level of the parking garage. J. Stevenson & Associates, of Calgary, were architects for the bridge and stores, and were associate architects with National Garages, Inc. of Detroit for the self-parking, open-deck garage.

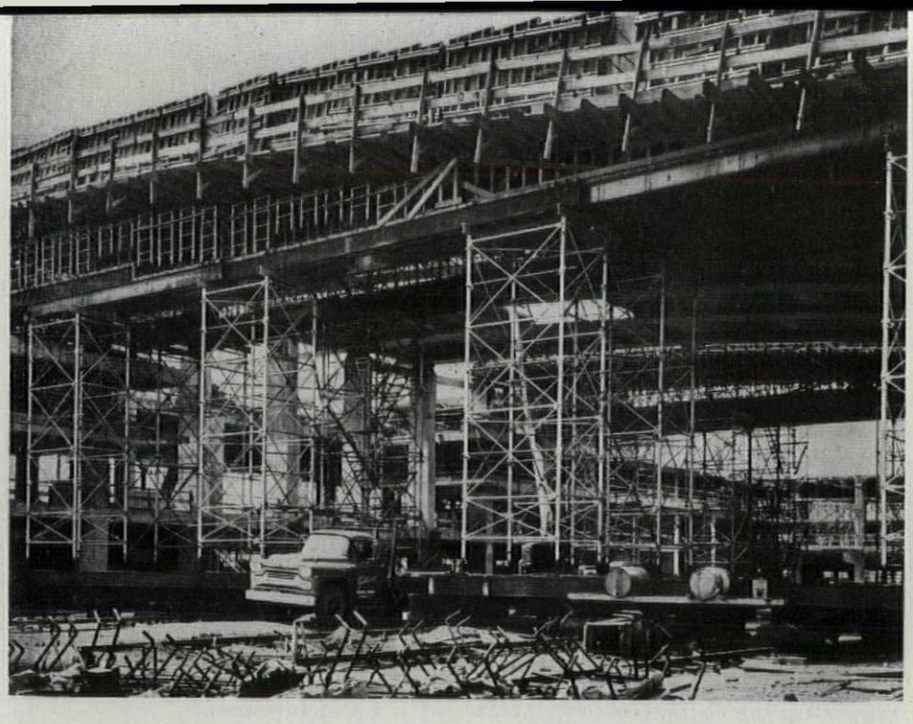
? *How to keep baseball and football fans comfortable in a sometimes-chilly climate.*

! *Install a radiant heating system in the concrete tiers on which seats and feet rest.*

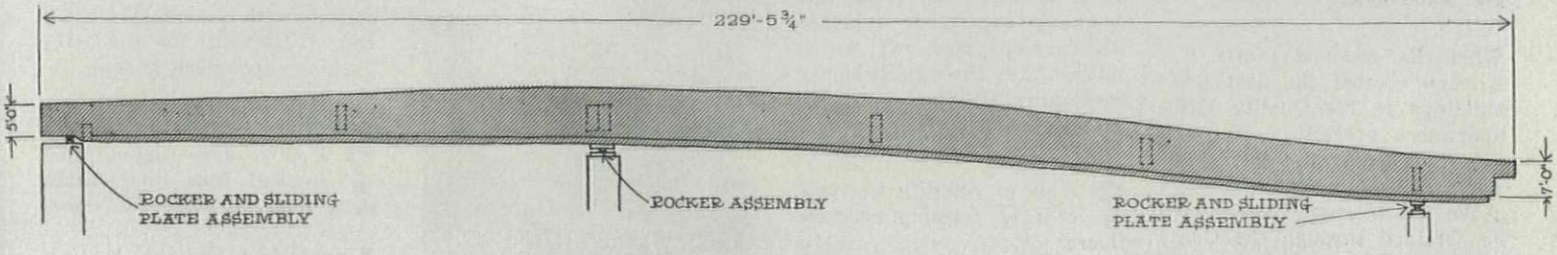
Watching baseball and football in the new Giant's stadium in San Francisco will be as comfortable as watching it on TV. Architect John Bolles' plans call for warming at least half of the new stadium's 40,000 seats. Some 35,000 ft. of ¾ in. pipe coiled beneath the treads on which the box, reserved, and general-admission seats are installed will carry water pumped from a huge boiler. Under a formula worked out by Hy Eagleson, San Francisco consulting engineer, the hot water will permeate each block of concrete to bring room comfort to spectators' feet and presumably to their bottoms seated about 1½ ft. above the concrete.

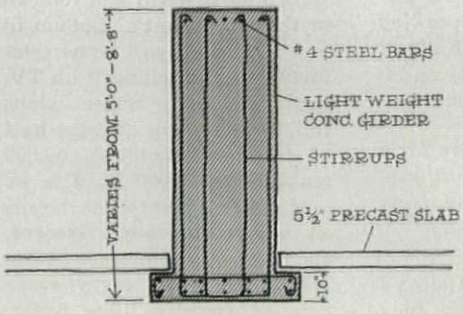
The entire system, unique for American ball parks, will cost an estimated $86,000. There is no present estimate of operating cost, but it is expected to be small because the system probably will be used only about 12 times each baseball season, plus a few days during the football season.

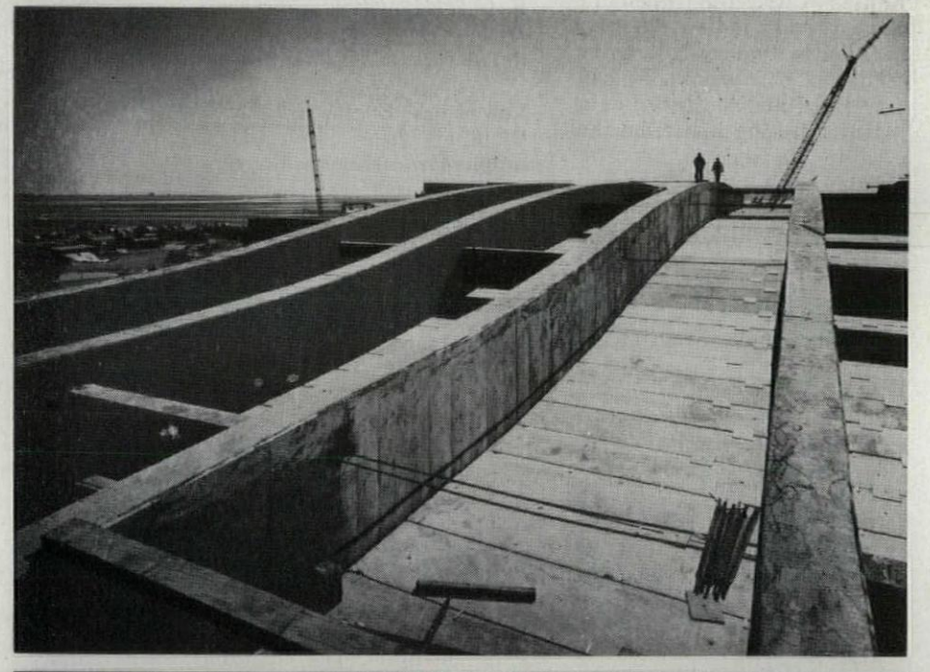
The idea was worked out between the city fathers and Bolles after many baseball spectators complained of freezing days and nights in the old Seals' Stadium, which was in a fogbound area of the city.



Economy in concrete: *instead of pouring the terminal's arched girders and roof slabs monolithically, which would have required extensive formwork, the contractor first poured the girders, using tubular scaffolds (right) to support the forms. Next, with girders in place, he returned to pour the building's roof slabs. The rooftop photo (below) shows the slabs in place between the giant girders, spaced 15 to 18 ft. apart. In the lobby (bottom photo), roof slabs are shown resting atop wide shoulders of the roof's arched girders.*

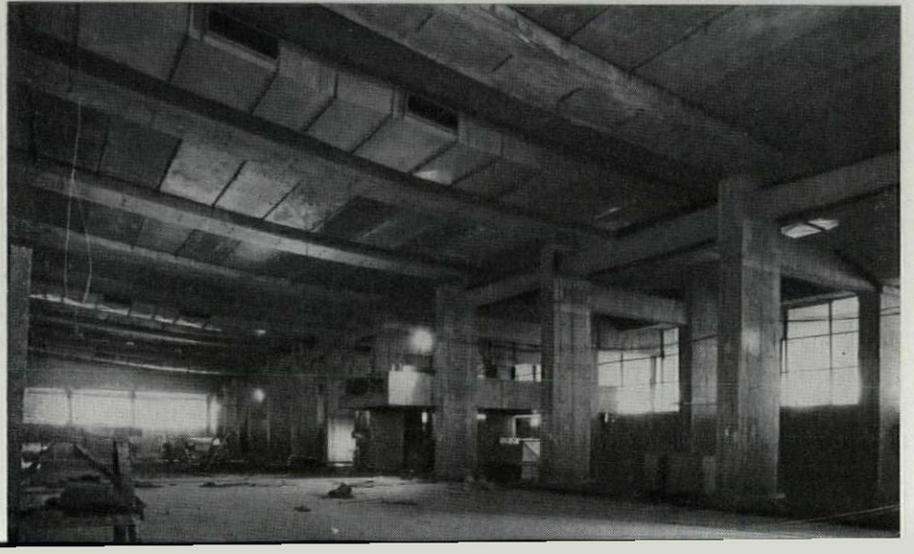


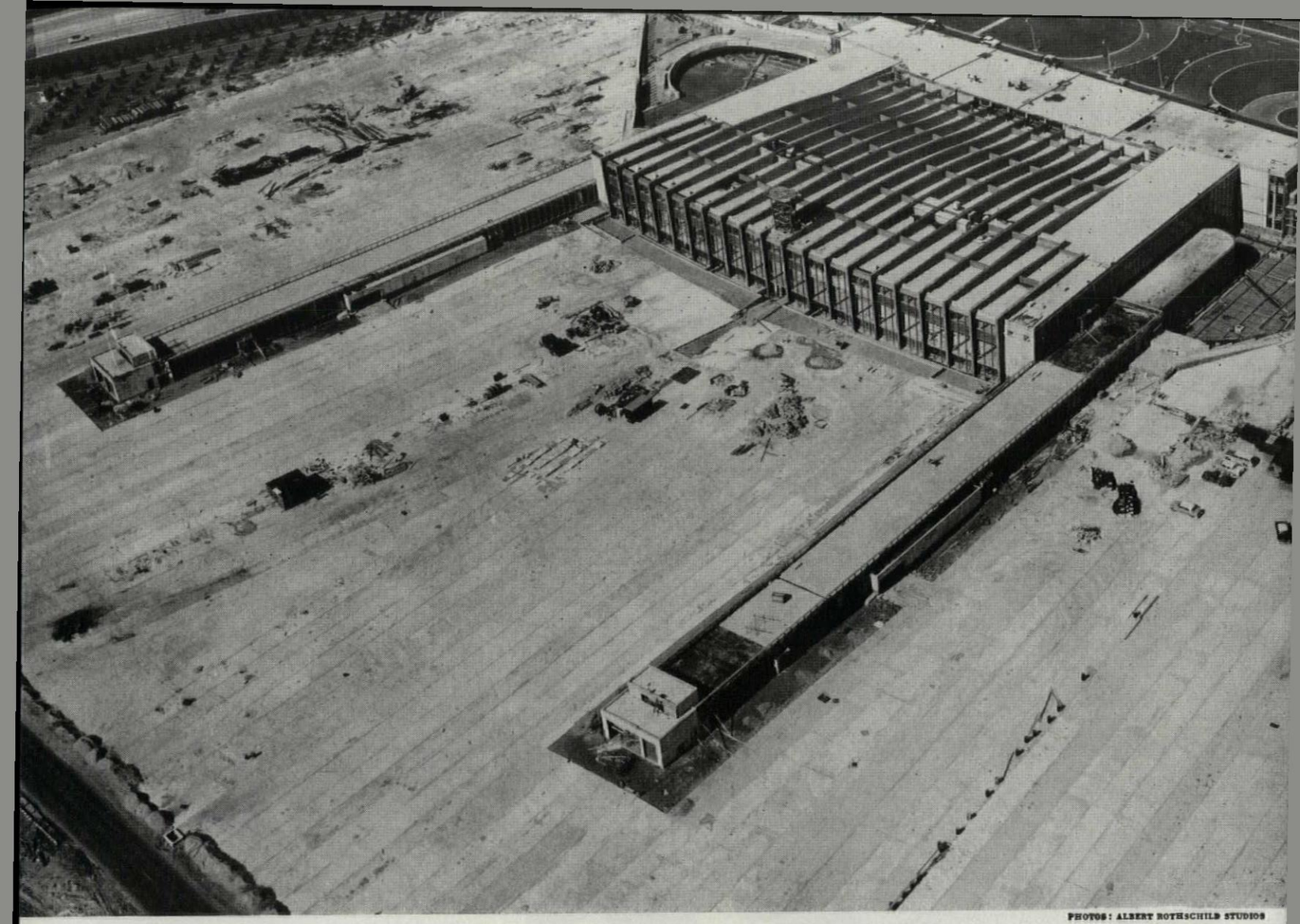




ferior soil conditions at the site, requiring extensive piling, lightweight concrete proved to be an economic lifesaver; had it been necessary to use conventional concrete in the building, an additional 1,400 piles would have been needed, at an added cost of some $340,000.

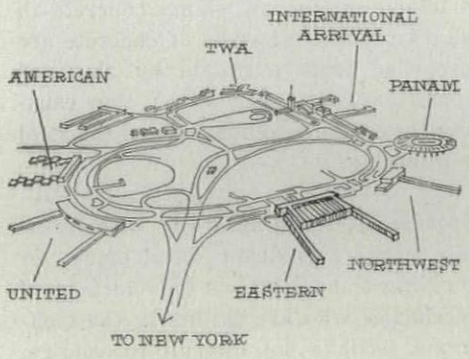
The late Chester L. Churchill was the terminal's architect. His work was completed by Albert C. Gray, associated architects and engineers, with Alexander Bernhard as project architect. Consulting engineering was performed by Seelye, Stevenson, Value & Knecht, with H. S. Woodward, partner, as project engineer. Gilbane Building Co., Providence, R. I., was the contractor.





PHOTOS: ALBERT ROTHSCHILD STUDIOS

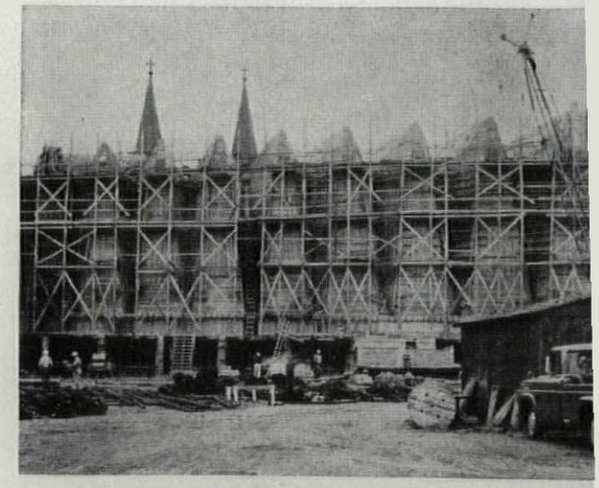
Lightweight colossus

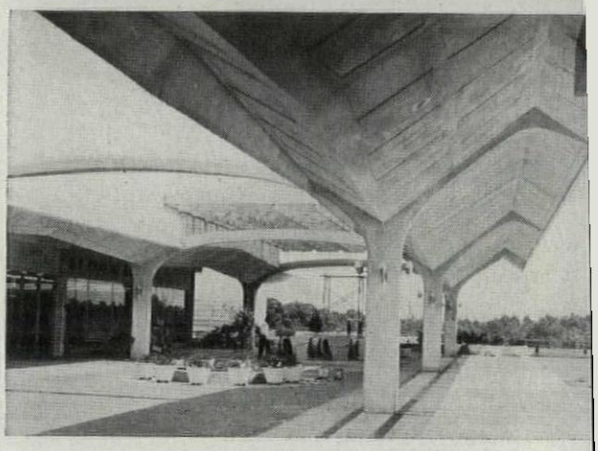


The massiveness of Eastern Air Lines' new terminal building at New York's International Airport—the largest terminal ever built for a single airline—conceals one of the building's most significant features; in a relative way, this structure is a lightweight. By virtue of the concrete put into it, a lightweight variety weighing 22 per cent less per cubic foot than ordinary concrete, some 18 million pounds were trimmed from the terminal's great frame.

One of the most dramatic elements in the building is its pattern of lightweight concrete roof girders. Each was cast as a continuous member (weight: 270 tons) and supported on three columns over its 230 ft. length (see sketch, right). The girders cantilever at both ends of the building, 4 ft. in the back and 15 ft. on the lobby side. With a span of 126 ft. between columns at the front of the building, the architects were able to provide a column-free lobby with 27,720 sq. ft. of uninterrupted space. (The lobby is 220 ft. wide, 126 ft. deep.) Each of the roof girders is 8 ft., 8 in. deep, with 8 in. wide shoulders cast integrally along both sides of its bottom chord. The building's precast roof slabs rest atop these shoulders.

The building rests on 5,400 piles, some penetrating 70 ft. into the marshy Long Island subsoil. Because of in-





The True gun *owes its success to its ability to deliver uniformly high-strength concrete, made possible by control mechanisms which are built into the system (sketch, left). Shown above is St. John's Abbey Church in Collegeville, Minn., whose roof is being formed with the gun. Below: paraboloid shelters at Atlanta's Lenox Square Shopping Center were formed with similar spray equipment.*

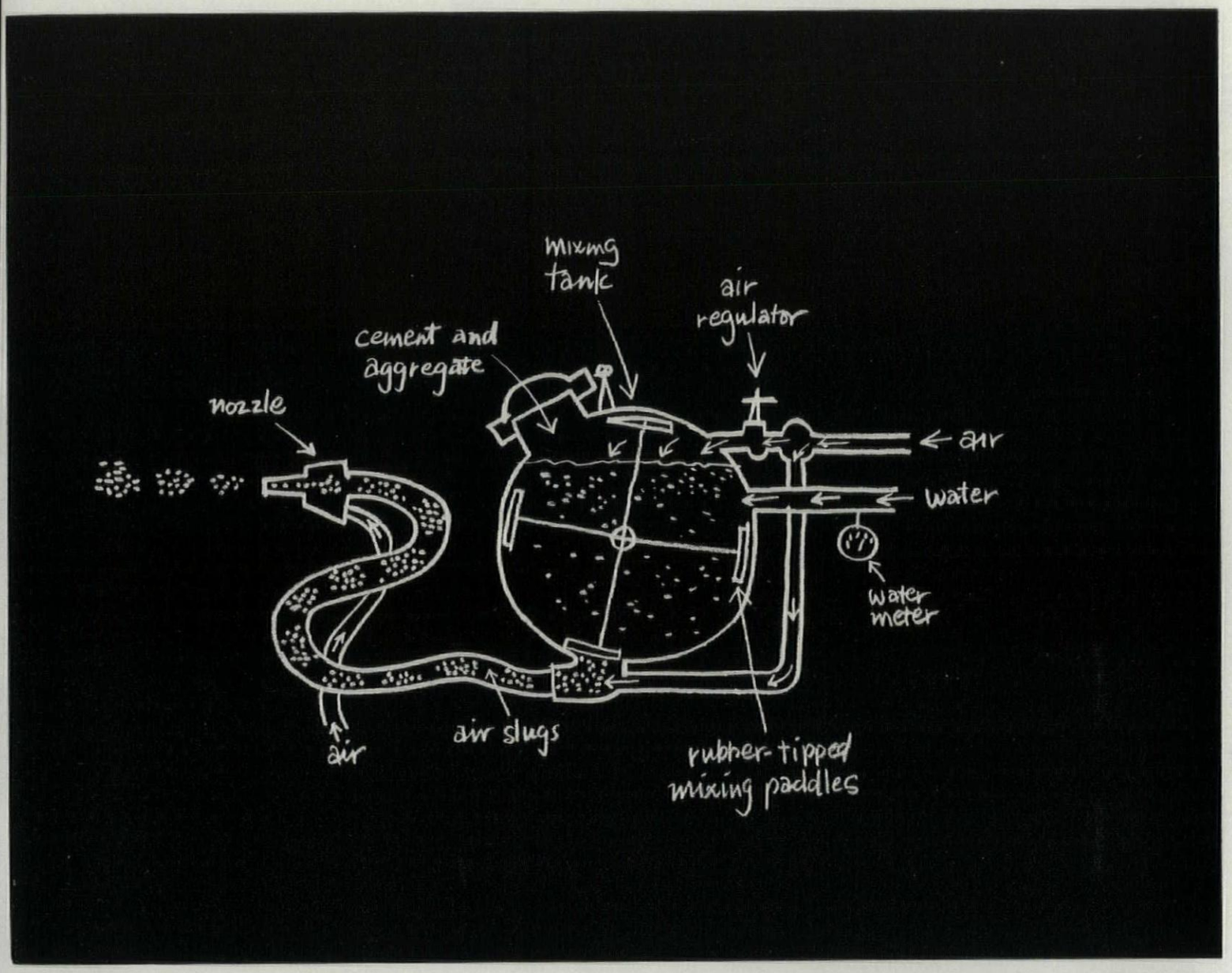
tects Toombs, Amisano & Wells; the Tokyo Trade Fair building, by Architect Maschika Murata. And it has been lyrically used by Mexico's great hyperbolic paraboloid man, Felix Candela (see page 154). Even a concrete Buddha, the largest built in Japan in years (80 ft. high), has been formed by this technique.

The inventor and promoter of the new process is a 43-year-old contractor from Tulsa, named Max M. True, who lives in a sprayed-concrete house with a concrete roof that does not leak. The roof is a 2½ in. thick hyperbolic paraboloid: 2½ in. of pea gravel concrete atop an inch-thick insulation board which served as formwork during its construction. True believes that his technique and the machine he developed for it could well be the elements which will build the homes of tomorrow.

True has six machines on the market, ranging from a low-capacity type, which can place 4 cu. yd. of concrete per hour, using ⅜ in. aggregate in the mix, to a large model, with a capacity of 8 to 10 cu. yd. and capable of handling larger aggregate: up to ⅝ in. graded rock.

True's machines yield consistently high-strength concrete. At St. John's Abbey Church, for example, the six-sack mix of ordinary cement tested at 4,000 pounds per sq. in. in seven days. The machine sprays low slump concrete in slight pulsations: wads of concrete are propelled from a nozzle by slugs of compressed air (see sketch), thus causing the concrete to flow around the steel reinforcing.

As of now, the only barrier to still-broader use in building—as with virtually every significant development in building technology—is the shortage of mechanics who are skilled in the technique. Skill is not difficult to acquire, but it takes training. Says Architect Joseph Amisano, an enthusiast as a result of his experience with the process at Lenox Square: "It's the kind of technique where you can be fooled by the simplicity."



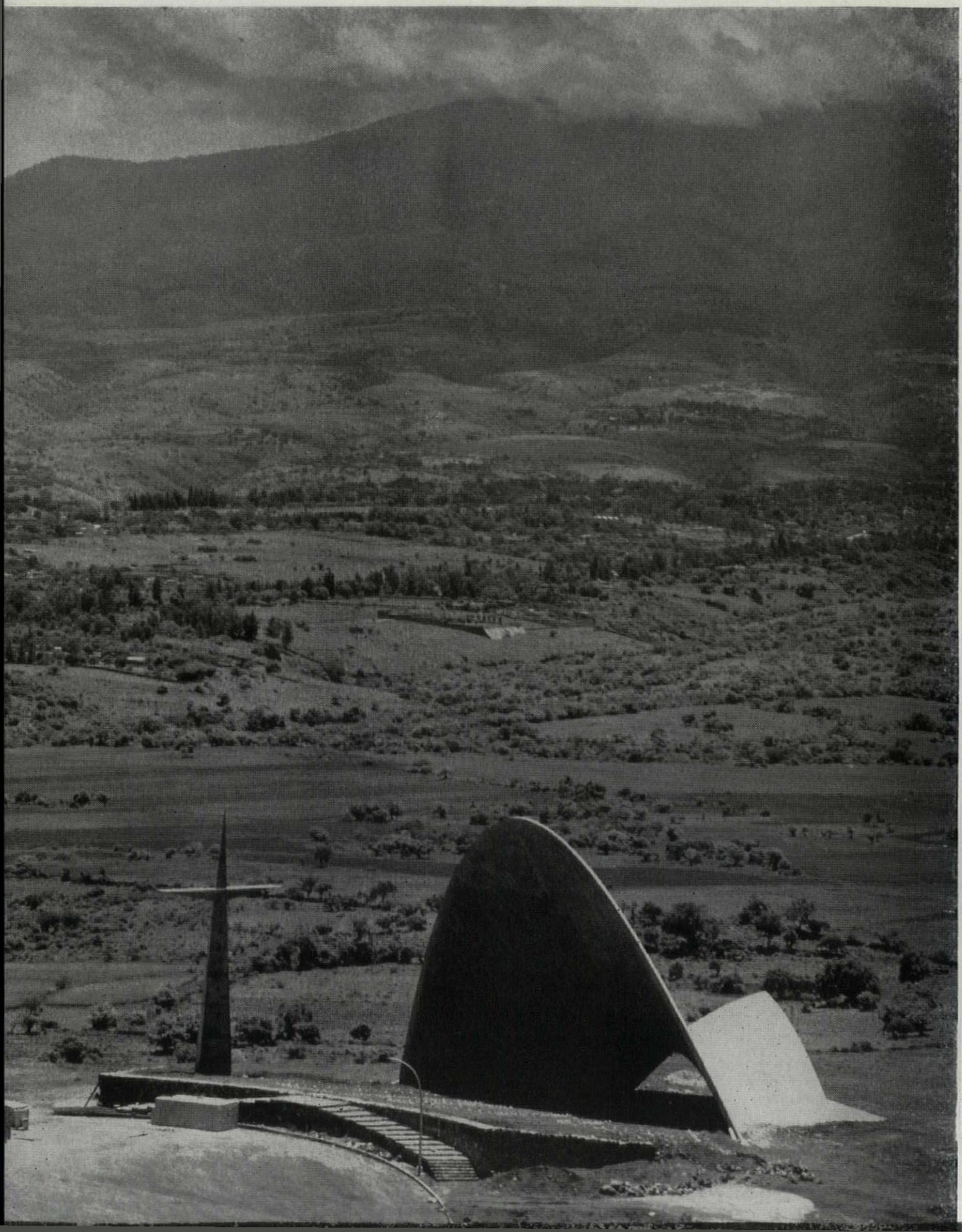
A gun for thin shells

Technology

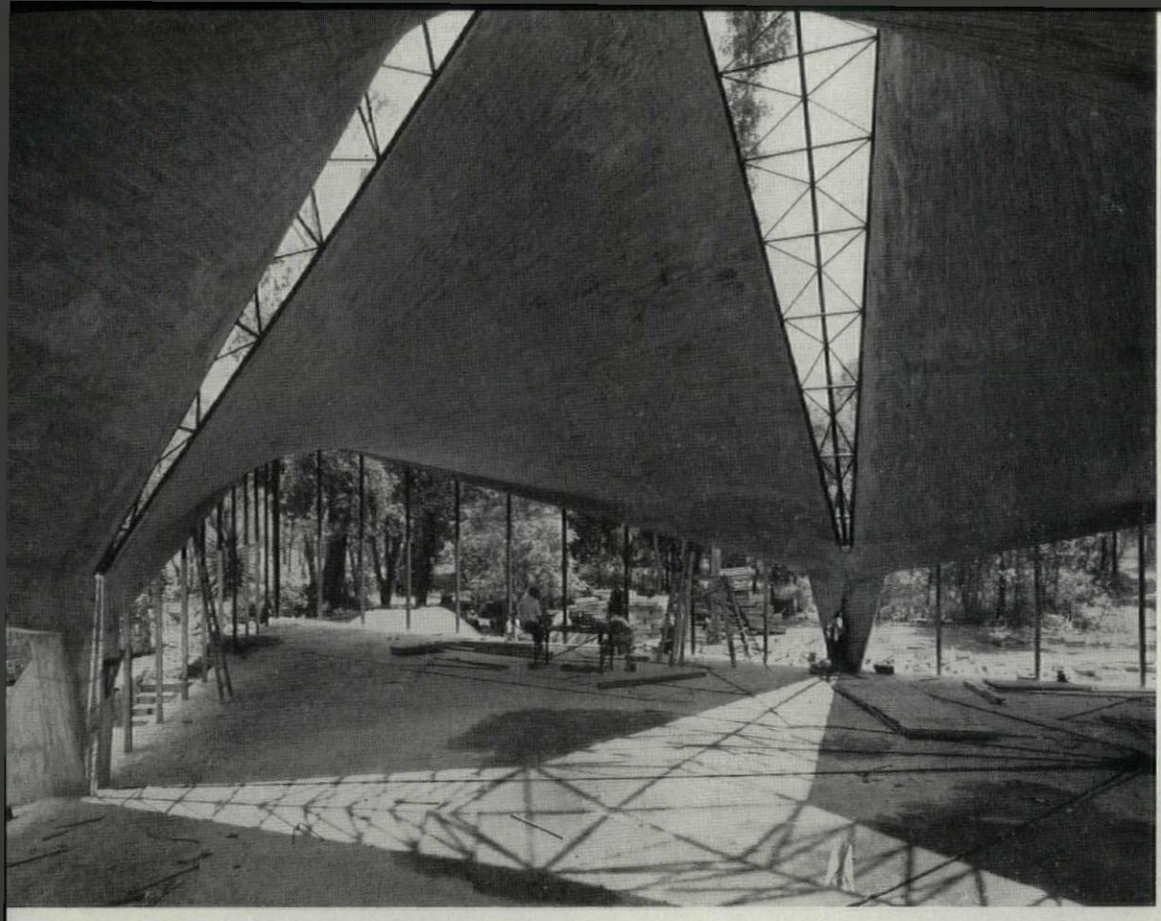
A new spray-gun technique for laying concrete is one of those seemingly small technological innovations that goes far beyond the apparent simplicity of the new tool. Unlike previous spray-gun methods, which had the defects of spattering wastefully and laying concrete of uneven quality, the new system (sketch above) has the ability to place a dense, dry charge of concrete precisely and uniformly in the most intricate forms, with close control of composition, against lightweight backup forms or armatures, in even the steepest vertical planes. The new system, therefore, is much more economical than older techniques, in which costs climbed with heavy formwork. And it opens the way for the construction of all kinds of concrete structures, particularly thin-shell concrete and other plastic forms, whose cost might be prohibitive if built by conventional means.

In four years, since its introduction in building, the new technique has been used to construct some notable architecture (see photos): St. John's Abbey Church in Collegeville, Minn., by Architect Marcel Breuer; Lenox Square Shopping Center in Atlanta, by Archi-

Hilltop chapel near Cuernavaca stands open to the wind and worshipers seated outside—a pure expression of the hyperbolic paraboloid as a single, sweeping, saddle shape. Architects: Guillermo Rosell and Manuel Larosa.



PHOTOS: GEORGE CSERNA

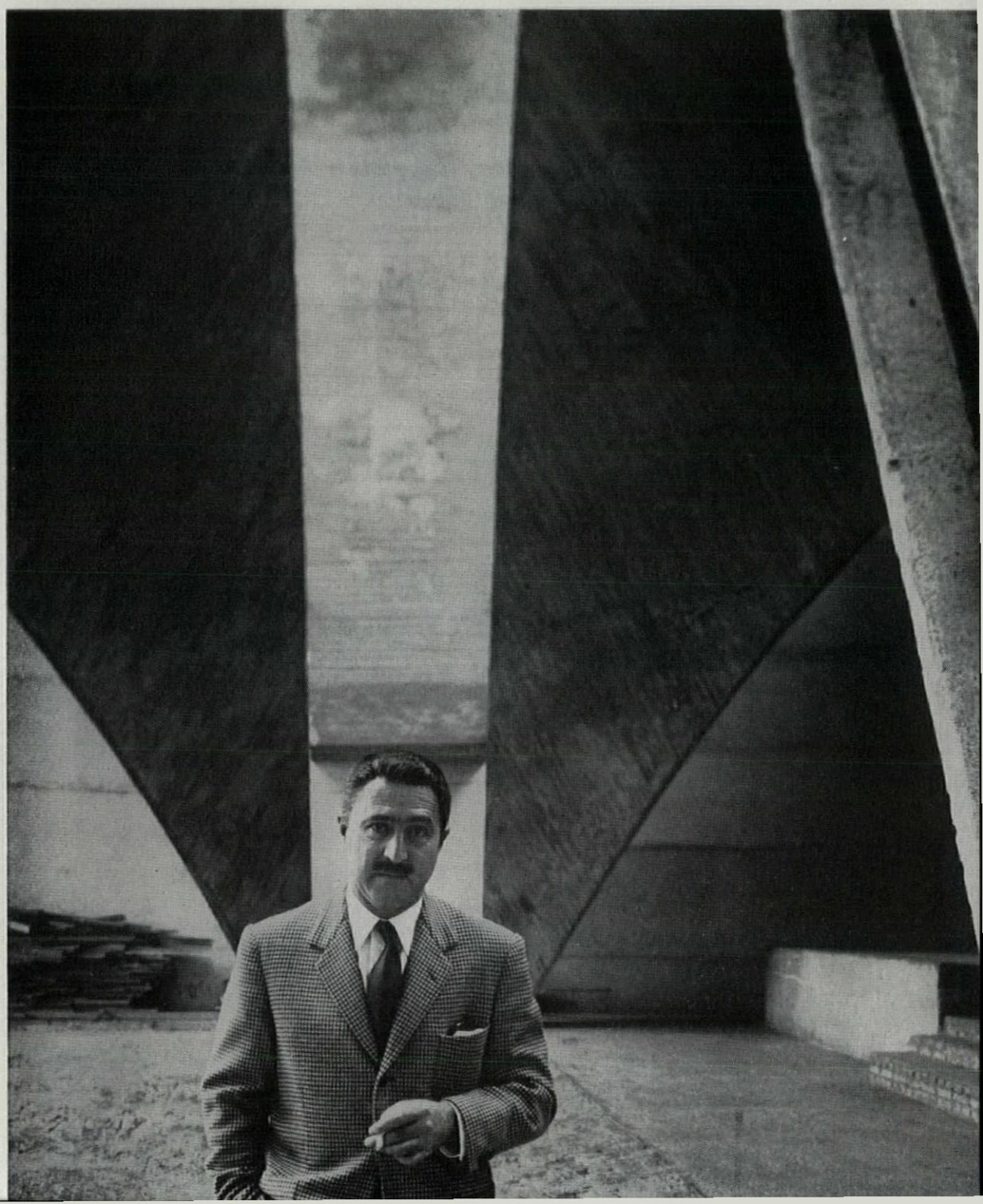


Upswept like the headdress of its nuns, Candela's convent chapel of San Vicente de Paul in Mexico City raises three hyperbolic paraboloids to a latticed peak, which, like the lower section, will later be sealed with glass. Architects: Enrique de la Mora and Fernando Lopez Carmona.

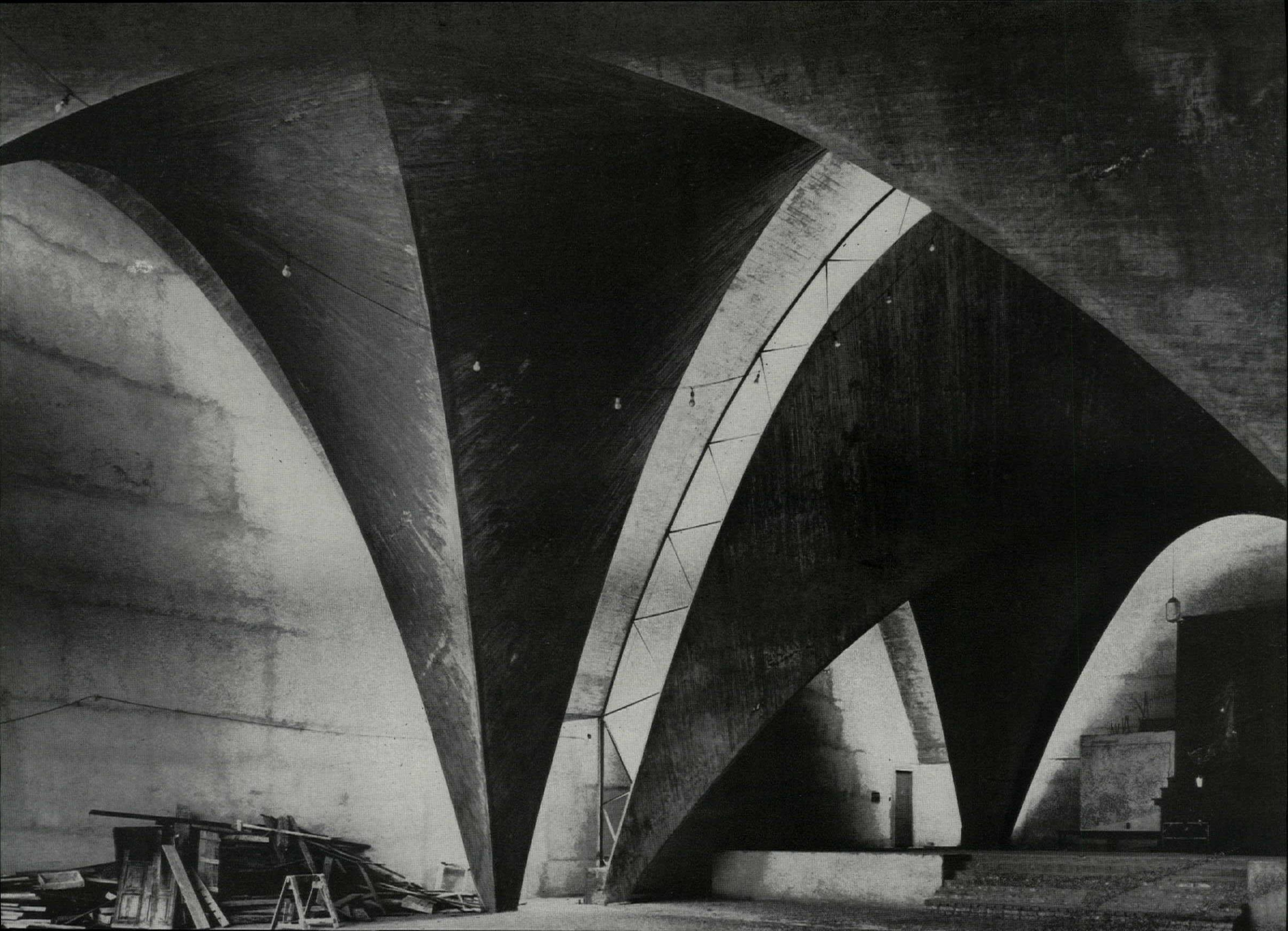
PHOTO: LENI ISELIN; OTHERS: GEORGE CSERNA

Wizard of the shells

The small, round man in the sports jacket below, standing under the sweeping vaults of his church of San Antonio de las Huertas in Mexico City, has probably exerted more direct, imaginative influence on recent thin-shell concrete architecture than any other individual. Spanish-born Félix Candela, architect-engineer-builder, ex-ski champion and Loyalist army fighter, has spent the last ten of his 49 years progressing from one surprising hat trick to another in 250-odd Mexican and U.S. structures—which often look most exciting unfinished. The three churches shown under construction here are the latest, and most graceful, of his spirited, free-soaring shapes.



ARCHITECTS: ENRIQUE DE LA MORA AND FERNANDO LOPEZ CARMONA. PHOTOS: DOGGETT-JACKSON-BECK

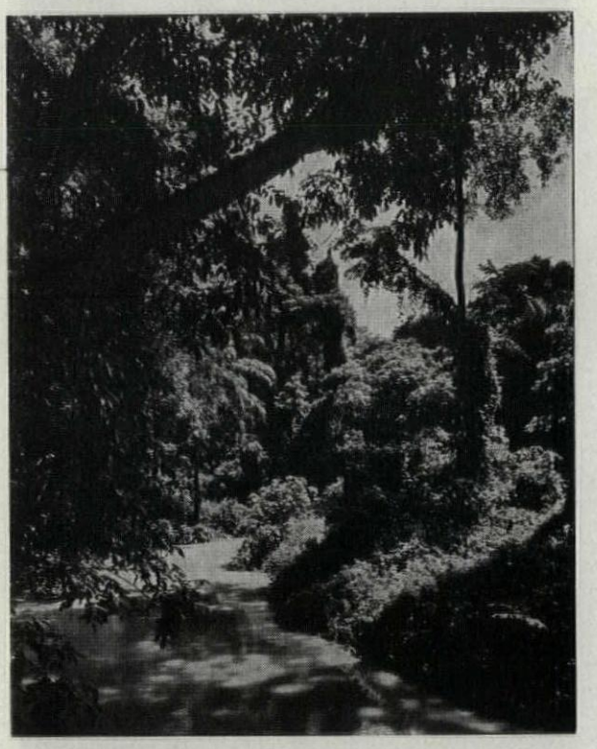


13

sprays; and the sound of these drops of water falling through their runnels also makes pleasant music. Finally, the visual effect can be hypnotic —sunlight sparkling on suspended droplets can concentrate and hold attention for hours **(13)**. The possibilities of water are endless: simple jets **(14)**, bigger streams, gushing through orifices **(15)**, flat shimmering sheets, sometimes grooved as they fall, many jets in counterpoint rising together **(16)**, or even a mist spraying like fog over a pool. And each has its own distinctive sound.

Plants belong in these spaces very selectively. Walled gardens are unnatural in the extreme—confined, small, usually urban—and they are the very antitheses of nature, of the jungle, for instance **(17)**. But plants are needed for their unplanned forms and shape—the cool, restful green, the smell of leaves as well as flowers. This is where the designer's poise must be maintained; the planting must be simple, serene.

17



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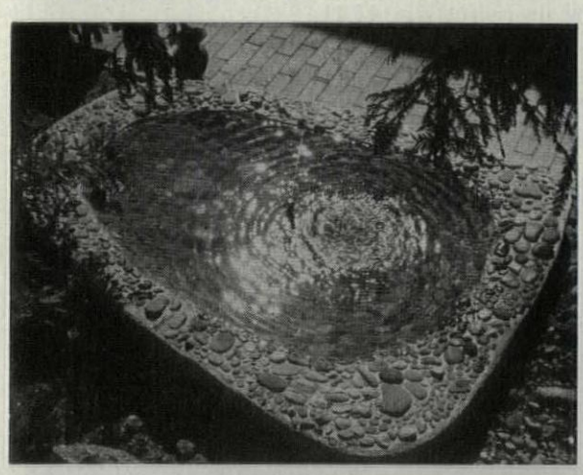

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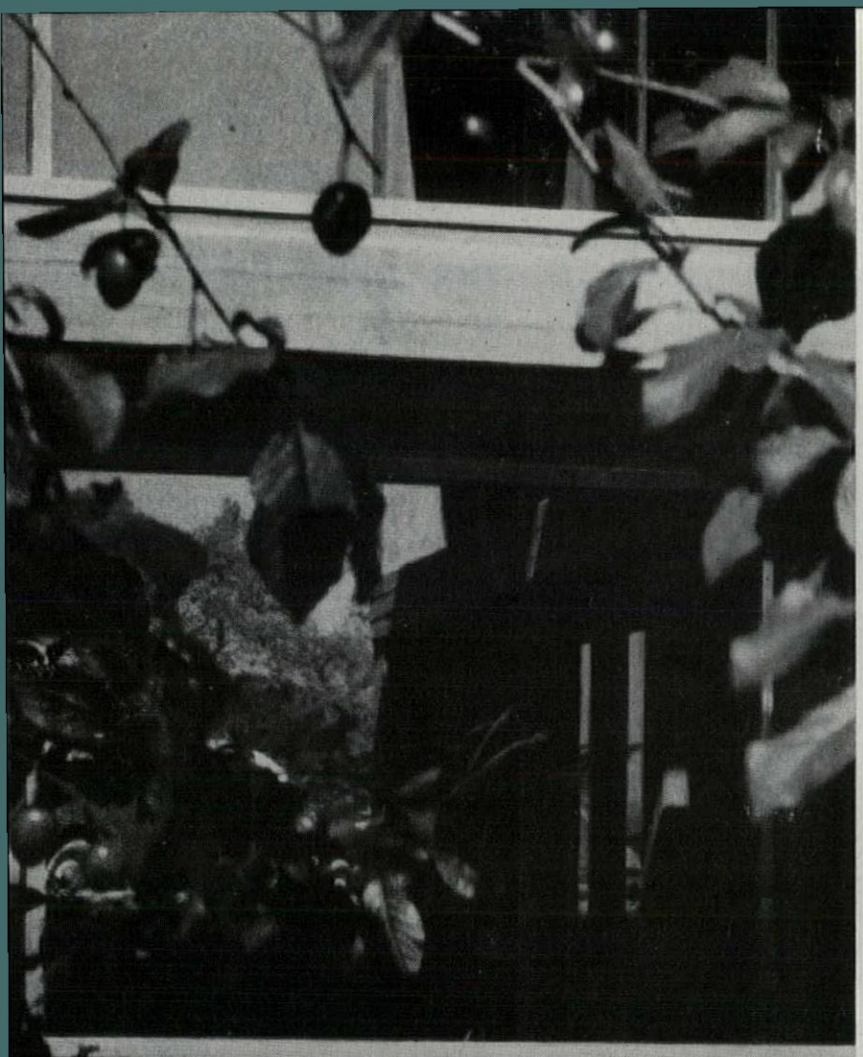
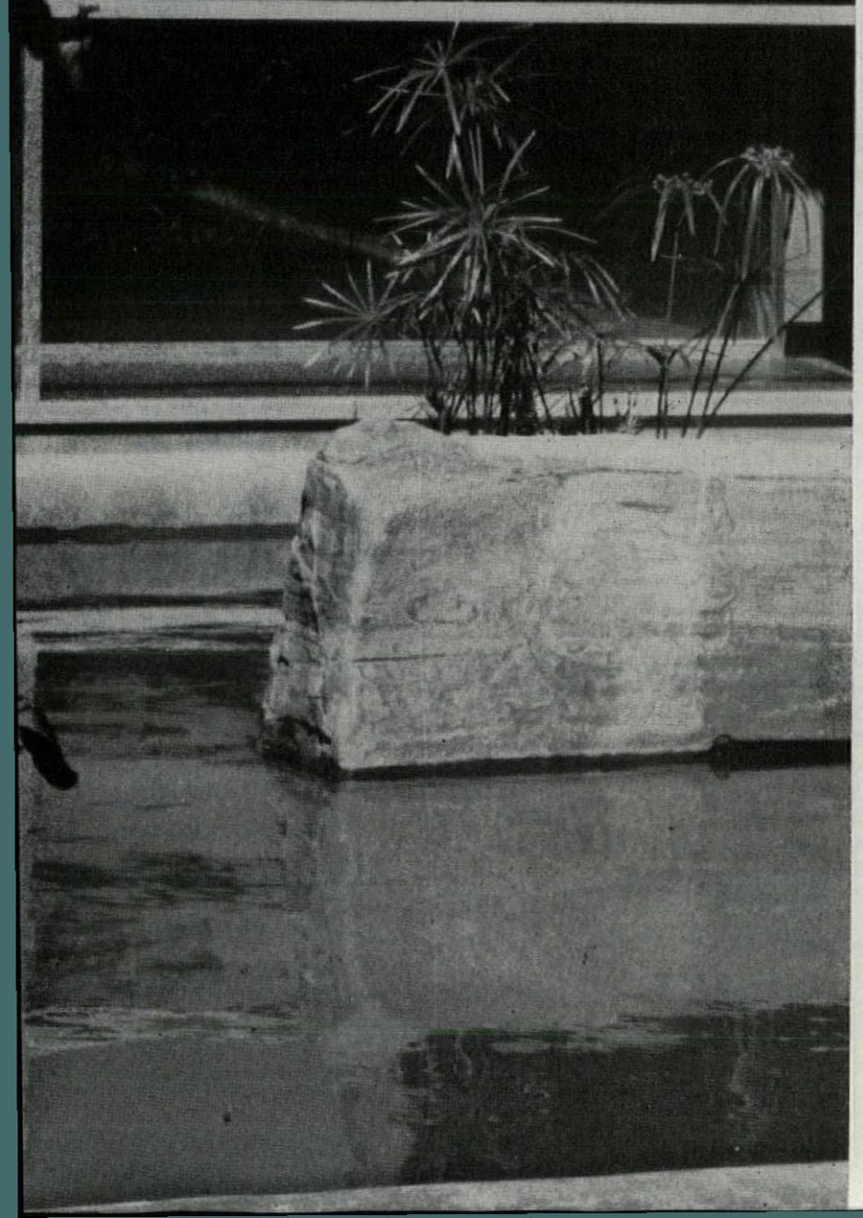
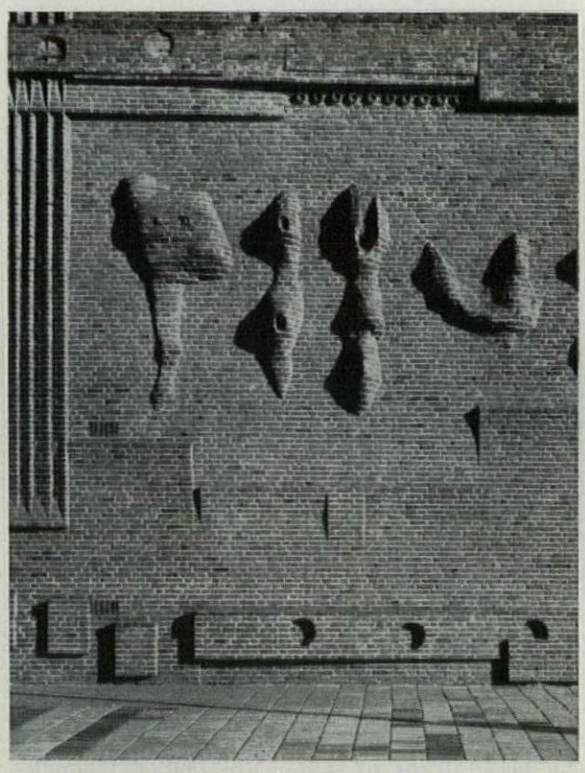
Like the spaces, the plants usually should be small. And they should have a clarity of form and texture, of branching structure and leaf color beyond that needed in the usual garden. A tree against a wall can destroy the wall if it is simply a great green blob; but the two can mutually enhance each other if the tree, through its character and judicious pruning, achieves a linear sculptural shape. If it is overwhelmed, it might better not be there. Landscapes between walls must at once create a sense of contact with nature and with the best of city streets.

Identification and credits: 1. The Alcazar, Segovia, Spain. Photograph by Morley Baer. 2. A small neighborhood plaza in Granada, Spain. Photograph by Morley Baer. 3. Students studying in the Parque Maria Luisa in Seville, Spain. Photography by Morley Baer. 4. Military school courtyard in Seville, Spain. Photograph by Morley Baer. 5. Roofdeck in San Francisco. Lawrence Halprin, landscape architect. Photograph by Ernest Braun. 6. Street in Avila, Spain, just outside the walls of the ancient city. Photograph by Morley Baer. 7. Courtyard in residence. Lawrence Halprin, landscape architect. Photograph by Darrow M. Watt. 8, 9. Design and photograph by Halprin. 10. Sculpture by Henry Moore on wall of the Bouwcentrum, Rotterdam, Holland. Photograph by Netherlands Information Service. 11, 12, 13. Design and photograph by Halprin. 14. Design by Halprin. Photograph by Ernest Braun. 15. Design and photograph by Halprin. 16. Design by Halprin. Photograph by Dandelet. 17. Magumbe Forest in the Belgian Congo. LIFE *photograph by Dmitri Kessel.*







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sculptural **(10)** and the space can flow over them. (If the buildings are offset, in plan, the open spaces can extend between them in a fluid way, almost as apparent as the movement of water. From rooftops this flow of space can be charted by observing the eddying movements of pedestrians below.) But even when the wall is glass it is opaque in daytime, shutting out space by its reflectivity **(11)**.

11

Next in importance is the floor. The confined eye seeks detail, and the floor of a garden underfoot can provide color and texture to be felt as well as seen **(12)**. The floor can move the

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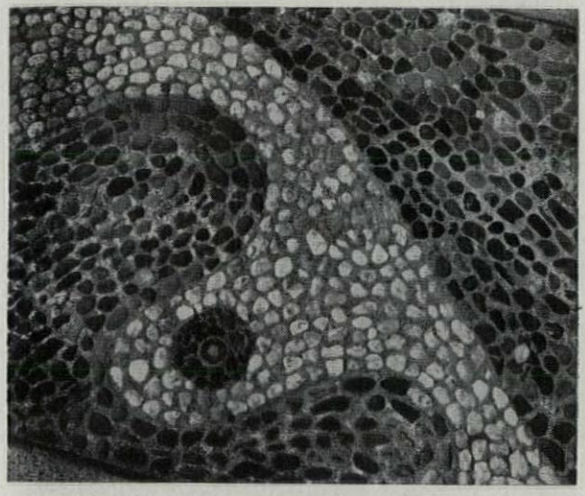
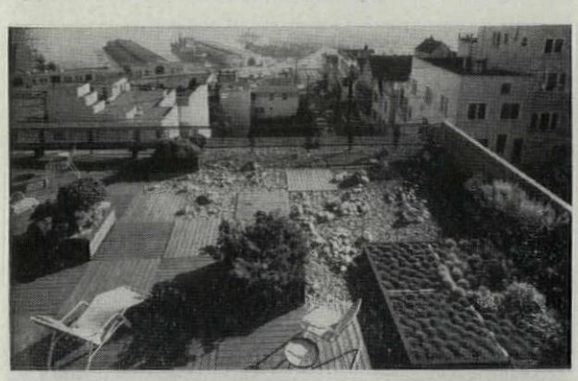


eye and break up the space, too; the scale of its component parts can increase or decrease the apparent size of the garden. Color can aid, by being rich in some places, neutral in others, and the texture can deliberately be varied from rough to smooth to slick.

Water serves a triple function. In the heat of the day fountains first cool the air with their

planes are blank shadow. The eye reacts differently than in a free landscape, retreating. People have a tendency to look away from tall buildings close up, rather than up at them; their eyes also are more restless, flicking over surfaces. Hence, the close-up scale of things becomes important, though the spaces also are seen from different levels, and the aerial view or the view from an upper window **(5)** is valuable, too. The design



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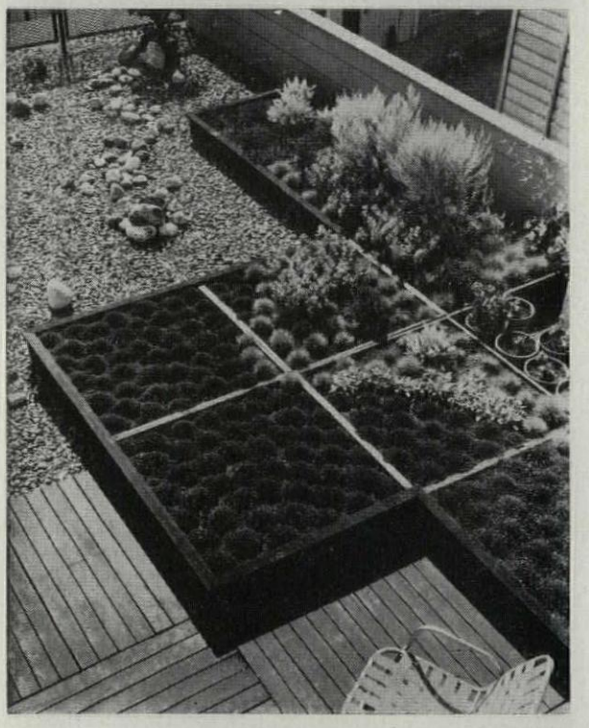

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scale must be multipurpose, and the over-all pattern is significant. But the determining factor is use. In the piazza, where enormous crowds gather and cross daily, the floor will undoubtedly be completely paved **(6)**. But in the private

6

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court **(7)**, or even within small walled gardens which are not too heavily used, plants and grass can grow **(8)**. These confined spaces between buildings owe much of their character simply to the scale and design of surrounding walls **(9)**. Often these are so high as to give a strong sense of confinement; there is a proportion of height of wall to horizontal open space beyond which the garden becomes merely a light well. At times the walls are low, gardenesque, and

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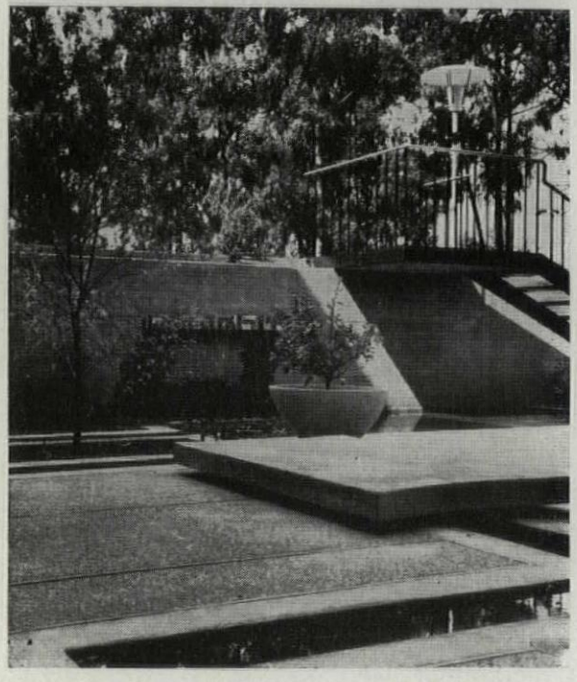

Landscapes between walls

BY LAWRENCE HALPRIN*

The problem of renewing nature in the interstices of spreading urban barrenness is a delicate one to be approached with care

The last 15 years of building in this country have increased environmental tensions immensely by removing man from nature. In the places where most men live and work, the primeval or rural landscape has given way to confined and limited outdoor areas. Forest and plain are gone, and the citizens are surrounded by walls, not only in cities but even in the jam-packed sardine can of suburbs. Boyhood meadows are today parking lots for supermarkets.

In towns large and small, buildings and streets now clearly dominate nature. The spaces between structures are simply echoes of its absence. Not so long ago even groups of buildings were small objects in the bigness of nature. An entire town on a hill was simply a cluster of walls on a mound of earth, a toy in an enormous garden **(1)**. But now the reverse is too frequently

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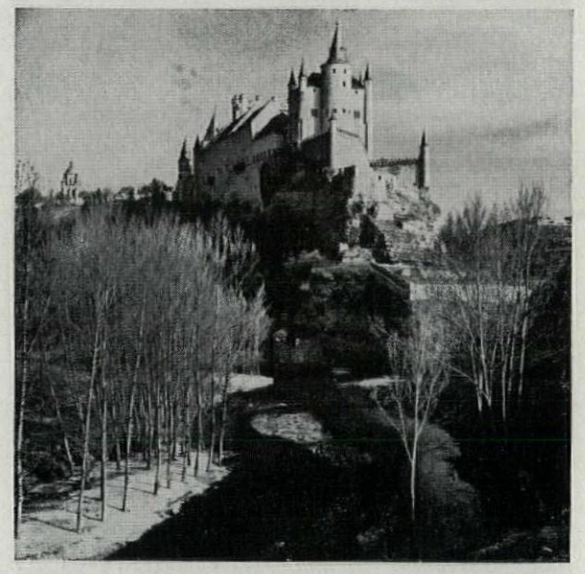

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true. Nature comes in small parcels—parks, plazas, courtyards, and other small spaces—enwrapped in architecture.

Because humans need the daily contact with nature that only these specks of open space can provide (color television cannot bring a whiff of it, for TV as yet has no biology, no sunlight, no fresh air), such specks as still exist in cities and suburbs should be hung onto and care should be taken to design new ones. Placed within buildings as patios, woven into the fabric of groups of buildings as plazas **(2)**, or stretched out as miniature greenbelts to be viewed from pent-

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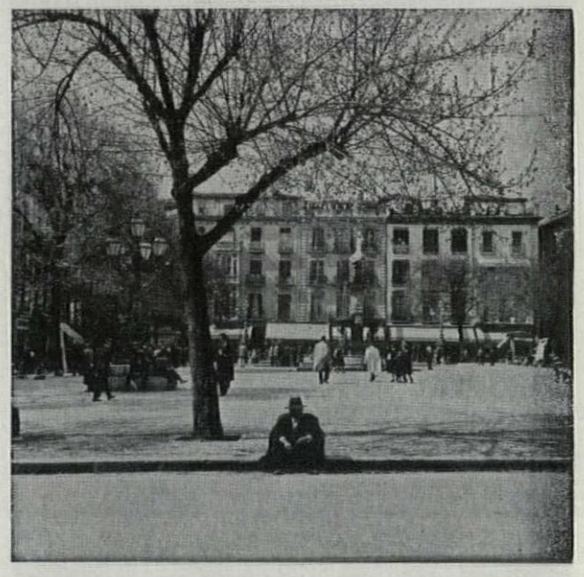

houses or rooftops, these walled-in rescue compartments can reinforce the human factor of our industrialized environment, as indicated in the photograph **(3)** of Spanish students relaxing between classes in Seville.

But a fragment of the landscape cannot be bought just to be compressed and fitted into an enclosed space. The space exists within the jealous embrace of architecture, and the designer can mold it only with poise, not power. One thing an enclosed garden should not be is a miniature of nature, dwarfed like a bonsai tree in the Japanese manner. It also misses its point if it apes the High Sierra in a courtyard.

The first essential of the walled landscape is proper scale. This is because its space is hemmed in by hard, unyielding materials **(4)** whose colors glare, reflecting light, or whose

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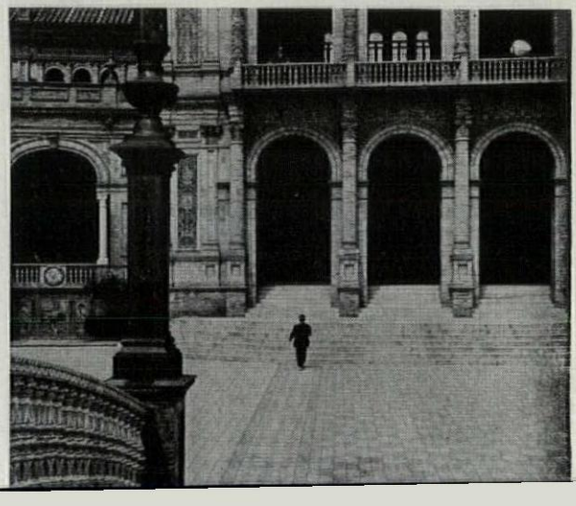


*Lawrence Halprin, born in New York City 43 years ago, is a landscape architect with headquarters in San Francisco and a nationwide practice.

er's working hours pleasant. It's just as important to do this to the environment in which he lives."

Put another way by Otto L. Nelson Jr., vice president of New York Life Insurance Co. in charge of its redevelopment projects, serving as housing advisor to New York's Governor Nelson A. Rockefeller and construction director of the Title I Lincoln Center for the Performing Arts: "The American suburb and its sprawling exurbia have form and meaning only in terms of their relation to the central city which supports them. Healthy metropolitan development and growth cannot occur without a healthy core, which is the heart and nerve center of the region." If the cities go, can capitalism be far behind?

The city as working capital

More than a sentimental relationship exists between cities and capitalism in the Western World, based on the historical fact that modern capitalism was born in and grew up to giant size with cities. And it is in this bone-and-sinew relationship that all the presently intangible but very real challenges and rewards of the midtwentieth-century situation lie, to impel private enterprise to join with government in every means to preserve the values of cities and solve the unprecedented problems of the times. In a real sense, cities, aside from being markets, are a basic part of business' and industry's working capital, vital at all levels for their efficient functioning.

The key to efficient functioning in the city as in the corporation, learned long ago, is concentration. Here at the hub are tap lines on the largest labor pools, brain centers, transportation webs, supply, distribution, and service ganglia. Many enterprises and industries such as communications, finance, advertising, and light industries of mercurial movement, could not function without close person-to-person contact in concentration. For instance, one reason a large company rebuilt in the central city was to preserve something called "executive growth," enabling executives to lunch with a wide variety of people in the city, instead of lunching only with themselves in a headquarters set up far out in the suburbs. And even more are such concentrations needed for cultural pursuits, imagination, and the arts, upon which all life as well as industry now more clearly than ever depend.

In the entirely new mass pattern of human settlement developing, the central city may have to be rethought in its entirety—what economically goes there, what does not, with an entirely new disposition of space—but to allow it to disperse in chaos goes beyond waste to mass suicide. Not many businessmen as yet, with some notable exceptions, have begun to think in this way of the total city as capital, much as the American farmer has been taught to think of his soil as capital. It took many years and some long, heartbreaking disasters for U. S. farmers to learn that the soil could not be endlessly mined and ravaged without replenishment. For the businessman and cities, there is much less time.

Some planners bemoan the lack of hard figures to prove how much is being lost by business through urban waste and inefficiency, how much could be gained in actual dollars and economic growth by correcting deficiencies —and some data would be helpful. Widely quoted is New York City Traffic Commissioner T. T. Wiley's estimate that traffic congestion costs New York business some $2 million a day. No one would dispute that intolerable congestion in New York's garment center, for instance, adds substantially to production costs, and to the cost of the garment sold in Keokuk. But Atlanta's Philip Hammer, consultant on urban renewal and planning, says bluntly that urban problems are so glaring and obvious that no extensive studies are needed. "You're wasting your time filling file drawers with surveys when you could be putting the time and money on doing something to solve the problem."

If private industry does not take a leading role in solving these new urban problems, they will be solved eventually by other means, with some unpleasant overtones and great delaying waste, for the population pressures coming up will brook no nonsolutions.

The real stake

One indication, beneficial enough to begin with, is the labor unions' growing inclination to seize the business or entrepreneurial role in urban development. The latest is the Building Service Employees' International Union, which announces its intent to build a $25 million apartment and office building project in Chicago, for which a $3 million site already has been purchased. Union President William McFetridge says the development (two 40-story apartments, a ten-story office building, and a four-story commercial building) is part of a long-range project of the 250,000-member union to insure the future of downtown areas in major cities. If this one is successful, others will be undertaken in other cities.

But the union president speaks in terms no harder than those of Republic Steel Corp. President Thomas F. Patton of Cleveland, one of a rising number of business leaders urging businessmen to accept their responsibilities in the future of cities. Says Patton: "Our cities are worth saving. It makes no sense to condemn billions of dollars of commercial, residential, and industrial real estate to a lingering death simply because a portion of our population chooses to live in the suburbs, or because we have tormenting street problems that need solving, or because we have not yet worked out ways of providing all our citizens with a chance to enjoy decent housing. In Philadelphia, St. Louis, Chicago, Detroit, and other cities, businessmen have recognized the challenge and are participating in ambitious programs to redevelop their cities. This is a demonstration of faith, and it could be that it will have a more encouraging effect on others in the community than the drawing up of plans and programs or even the provision of money. For I ask you, who has more to lose than business should urban blight win out?"

The businessman's stake in

In a business sense, cities are not only markets but are working capital—and the rebuilding they need is replenishment

A few tangible dollar-and-cent evidences of the rewards to be won, by cities and businesses alike, from clearing slums and redeveloping of blighted central city areas, have begun to show through the long frustrations, delays, and failures in this program.

▸ In Chicago, the city is collecting $470,000 a year more in taxes from the Lake Meadows project than when that area was a slum. Its redeveloped West Central Industrial District already is yielding $265,000 more in yearly taxes. On 22 projects completed or in progress, the city stands to gain in revenue an estimated $4,431,000 a year.

▸ In Detroit, an extensive expressway and urban renewal program has finally begun to reverse an 11.1 per cent drop in downtown retail trade sustained between 1948 and 1954, according to Frank A. Colombo, vice president of the J. L. Hudson Co. A key to this was last year's completion of a 1,000-car underground garage beneath Grand Circus Park, capable of serving 750,000 cars a year, which has brought increasing numbers of people downtown for shopping and business.

▸ In New Orleans, a great new state and civic center has risen on slum land which the city acquired ten years ago at an average cost of $1 per sq. ft. Today adjacent land in private sales brings $39 per sq. ft.

No great acumen is needed to see that these are three types of net gain to a city's economy. And it takes little more to see how such broadening or improvement of the tax base can ease pressures on business in such cities as Cleveland, for instance, where 74 per cent of city taxes fall on business and industry, or St. Louis, where 17.3 per cent of all real estate taxes come from one central business area. But many businessmen are still unable to see the less tangible though even more direct and substantial rewards that can accrue in their tills from a broad-scale attack on slums and city deterioration. This was alarmingly apparent when two top corporation executives soberly asked at an ACTION conference on "The American City" last spring: "Why am I here? What is my company's stake in renewing downtown? What can I say when directors ask how our company can justify any further outlays to support urban renewal?"

Hell with the lid lifted

The first thing these executives might show the board of directors is "hell with the lid lifted"—as Pittsburgh was once known until a modern group of businessmen and civic officials determined to change it—which means showing the directors what will happen to their cities and businesses if present downtrends are allowed to continue for another decade.

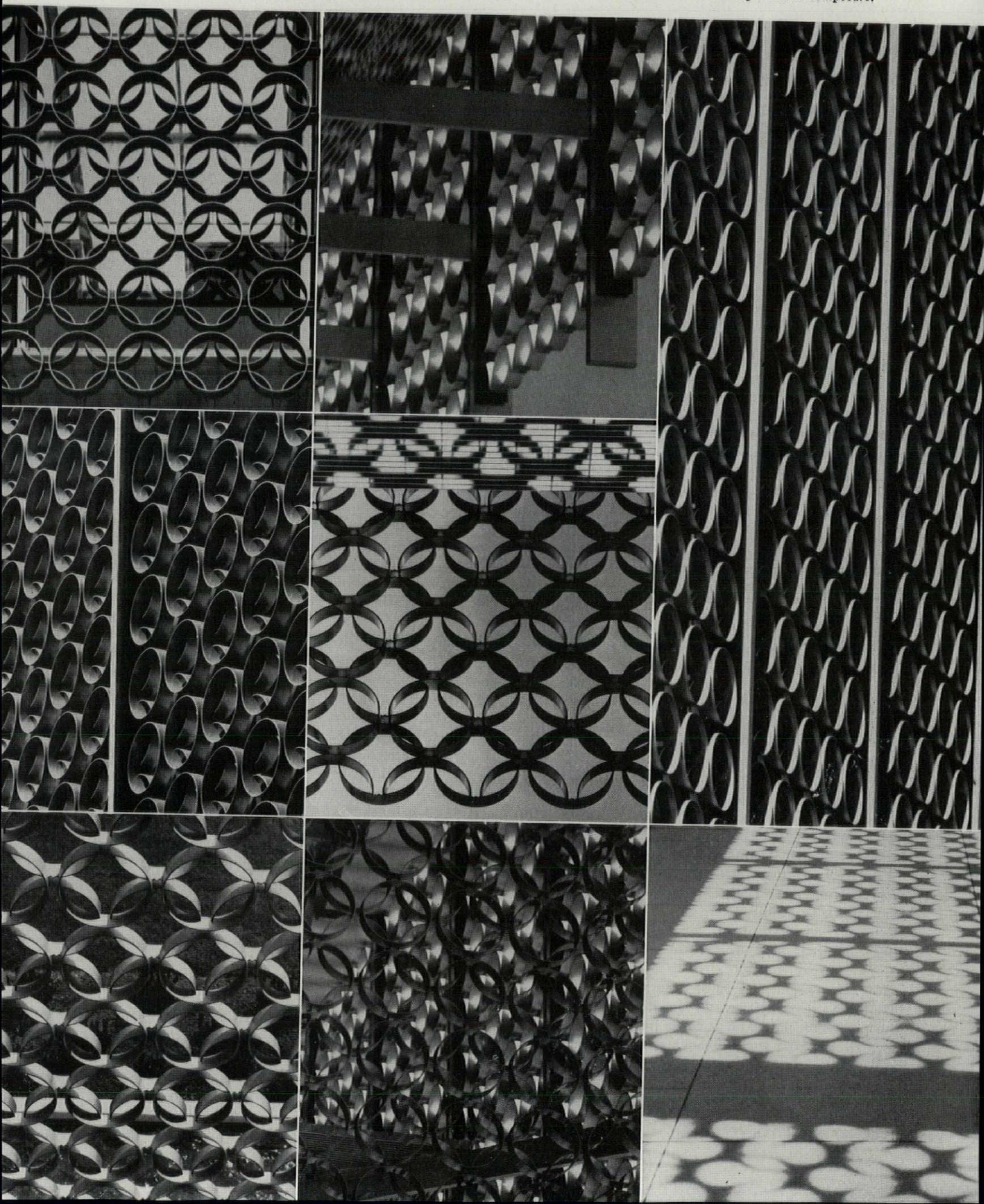
For all the national central-core urban trends are still pointing downward, and any reversals thus far are minute, local, and almost insignificant against the total pattern. To be sure, due to laggard statistical data, the latest official figures are brought up only to 1954 or 1956. But nothing indicates that the general trend, persistent now for nearly two decades, has suddenly turned. Which means that suburbs continue to grow much faster than cities, and nonrural fringe areas are growing at the fastest rate of all, with steady hammer blows to central city values and services. From 1948 to 1954 alone retail sales in 45 U.S. metropolitan areas, including suburbs and fringe areas, rose 32.3 per cent, while sales in their central districts inched up only 1.6 per cent—actually a net decline in physical volume at current dollars. Along with this, and still continuing, were some gross declines in central city retail trade and manufacturing employment, sliding property values, and reduced revenues.

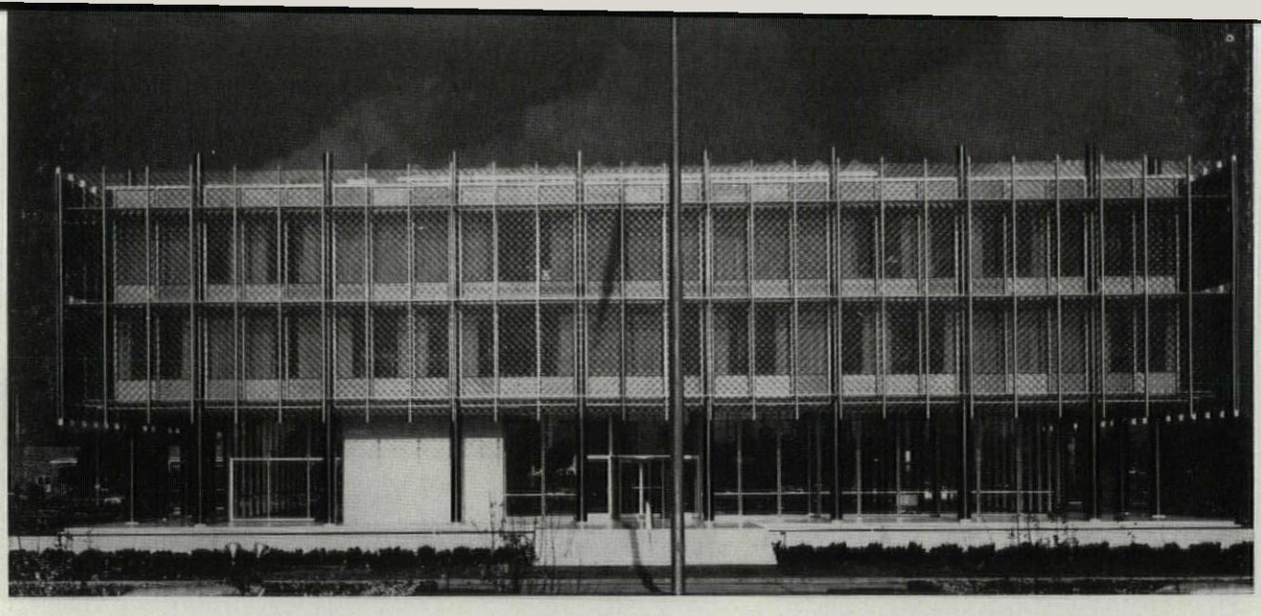
The first to feel the pinch, obviously, were the big retailers, nearly all of whom to a man are now enlightened forwarders of redevelopment schemes. But the next big pinch will come upon the giant industrial corporations and medium to large firms, many of whom so far have been somewhat above the battle, busy building new office headquarters and branch offices downtown, which have to a degree countered the downtrend there while adding to the problems of the next explosive phase. For ahead is a sharp continuation of the population explosion that by 1975 will add more urban dwellers than are now in 15 of the present largest metropolitan areas—a prospect never to be lost sight of—which will not only gloriously swell those markets of the sixties that forecasters cheer about but also deepen tenfold the already harrowing problems of central cities.

In the squeeze of giant forces clearly ahead, the corporations can be badly hurt. For if, around the great feet of the new office towers, slums continue to multiply faster than they are cleared, as now, and an already creaking transportation system is allowed to clog even more, while the middle classes continue to drain out to farther suburbs leaving behind an ever greater contrast of lush luxury and urban jungle, with an ugly new violence already appearing in every major city of the world, the corporations will not only be hit to make up the growing deficits in education, health, transit, police protection, and other city services, but will also find the very bases of their businesses eroding away. Slums are poor customers for everything but ills, and the cancer spreads.

Ernest Bohn, chairman of Cleveland's City Planning Commission, adds another practical consideration: "It's been demonstrated that the environment in which the industrial worker lives has a direct relationship to his production. Most industries are putting in all types of things such as air conditioning and Muzak to make a work-

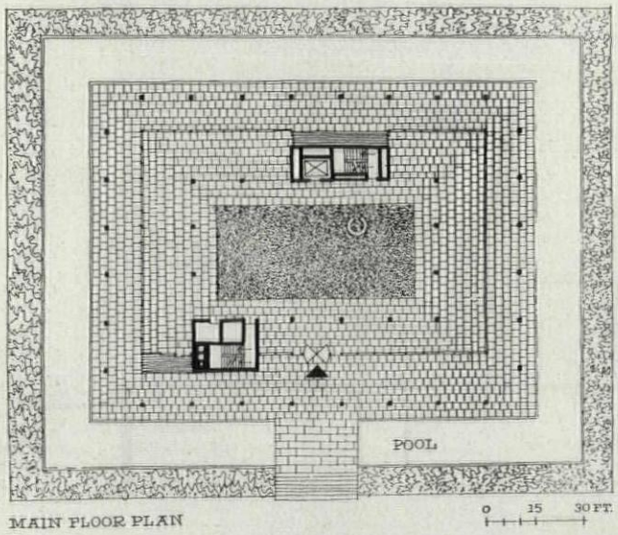
Changing faces of the sun screen depend on the observer's point of view. Crisp shadows and paneled framing further combine to add delight to the building's serene composure.



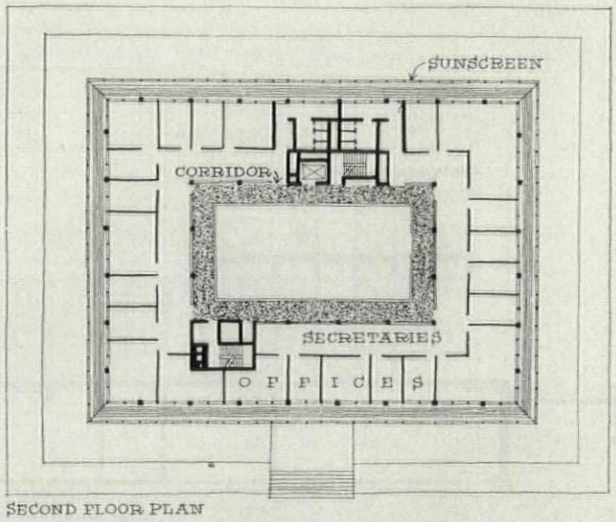


Head-on, the light metal screen tends to disappear, revealing the building's basic structure and its crowning skylight. The side faces of the screen, on the other hand, appear almost solid.

ARCHITECTS: *Minoru Yamasaki & Assoc.* STRUCTURAL ENGINEERS: *Ammann & Whitney.* INTERIOR FURNISHINGS: *W. B. Ford Design Assoc.* LANDSCAPE ARCHITECTS: *Eichstedt-Johnson Assoc.* GENERAL CONTRACTORS: *Darin & Armstrong, Inc.*



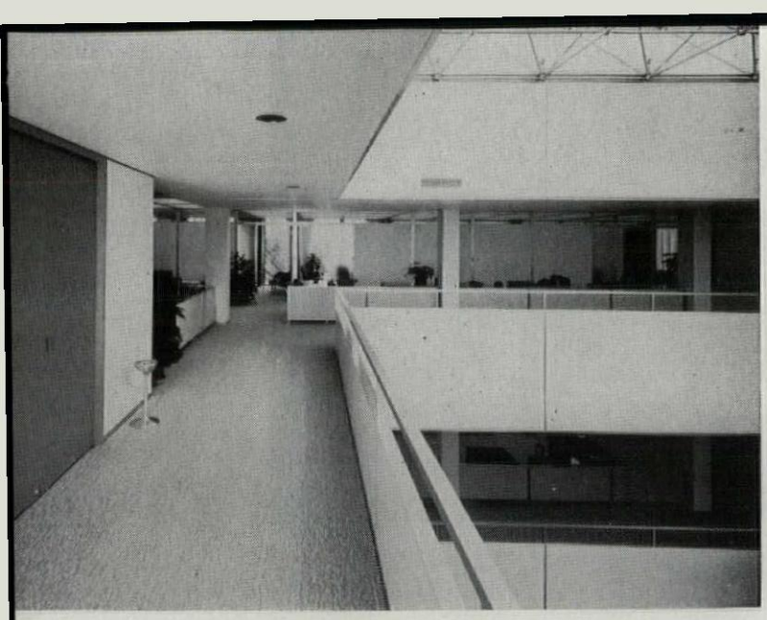
MAIN FLOOR PLAN



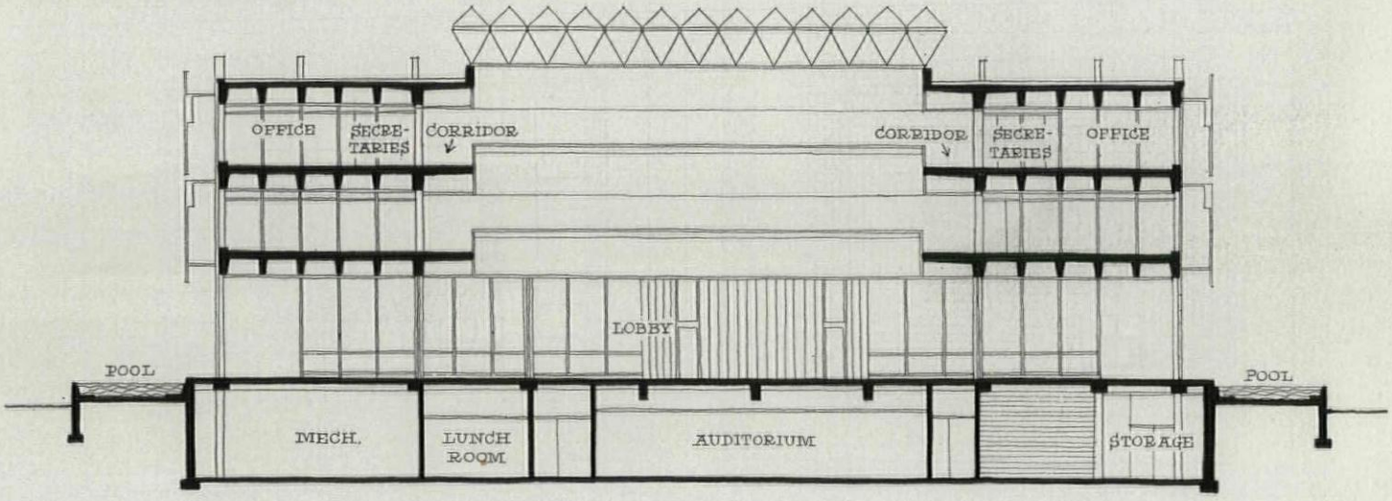
SECOND FLOOR PLAN

Unlike the more common concrete sun screen, massive in appearance and passive in concealing structure and function behind it, the Reynolds screen is clearly hung from the structure and is open enough to reveal in a lively way the goings-on within. Yamasaki has observed that his light metal screen tends to disappear visually at great distances, but he feels that the transparency of this kind of screen from the inside is compensatory. An even more important feature of the metal screen is its changing appearance as the viewer moves around the building (photos, right). This changing composition is a particularly fascinating feature from the highway.

All through the day under various conditions of sun and light, the screen changes alternately from an almost solid-looking plane to a thin and glittering veil. As the observer moves around the building, the vertical runners on the screen's surface seem to flicker past the heavier pattern of the structural frame behind them. Close up, the tracery shadows dance on polished terrazzo floors or bounce back from the reflecting water in the pool. The risk is that over the long run the filigree may be regarded as too pretty; but, it arrestingly soft-sells aluminum.



Second- and third-floor office and conference rooms range around the interior court. The luminous ceiling panels cover the coffers of the waffle slab floor system. Recessed in the coffers are fluorescent tubes. The sun screen, which is hung 5 ft. beyond the windows (right), is 8½ in. thick below the 7 ft. level and 14½ in. thick above.



Two vertical shafts housing stairways and elevator are encased in walls of white terrazzo poured and polished in place. Positioned eccentrically in the otherwise symmetrical building, the shafts also contain vertical ducts for warm and cold air. At each floor, the ducts branch out and follow the perimeter of the court to feed air into a network of floor ducts for radiant heating or cooling. Below this "air floor" the waffled structure of the slab forms coffers 5 ft. square serving as lighting troughs for the luminous ceiling. This compact system cut floor-to-floor heights to a minimal 11 ft., 3 in. without reducing finish ceiling heights to less than the optimum 8 ft., 3 in.

The dominating feature of the exterior is an aluminum sun screen wrapped around the two upper stories of the entire building. Framed 5 ft. out from the glass line, the screen is composed of interlocking gold-anodized aluminum rings 10 in. in diameter. In order to keep the screen on an understandable scale, Yamasaki divided the height in two by leaving a gap in the screen between the second and third floor sections. The screen is also divided into panels by vertical runners of natural-colored aluminum set at the module points.

Interior court is crowned by jewel-like skylight pyramids constructed on a tetrahedral truss. In the court below, the cylindrical reception desk is placed opposite the entrance in front of the elevator which leads to the two office floors above. Set at the edge of the 30 ft. by 60 ft. carpet are three platforms of black marble for plant tubs.

Podium of white polished terrazzo is raised 3 ft., 3 in. above grade. In the shallow reflecting pool are water lilies set in black tubs. The columns, which are set back 10 ft. from the corners and spaced 15 ft. apart, are finished in black anodized aluminum. Coffered aluminum ceiling pans in the public areas mark out the building's 5 ft. module.